Sullivan Road/Trent Avenue Intersection Control Evaluation

Prepared for:
City of Spokane Valley

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FEHR & PEERS

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Introduction

This report presents an Intersection Control Evaluation (ICE) for the State Route 290/Trent Avenue and Sullivan Road interchange located in the City of Spokane Valley. The analysis also includes the intersection of Trent Avenue/Progress Road immediately west of the interchange, as shown in **Figure 1**. WSDOT requires an ICE whenever a change to the traffic control of an intersection along a state highway is proposed, as outlined in Design Manual (DM) Chapter 1300.05(1). This evaluation considers several signalized and roundabout alternatives for the interchange and provides a recommendation for the preferred alternative.

Figure 1. Study Facilities

Study Area Context

The BNSF railroad line parallels Trent Avenue to the south, limiting connectivity. The Evergreen Road crossing one mile west of Sullivan Road serves only Kaiser Aluminum and Centennial Properties Inc., meaning the nearest public access across the railroad in the westerly direction is at Pines Road. The Flora Road crossing one mile east of Sullivan Road will be closed following completion of the Barker Road/ BNSF Grade Separation Project which will also include a roundabout at Trent Avenue. Therefore, the nearest crossings on either side of Sullivan Road will be roughly two miles away in each direction. Sullivan Road also crosses the Spokane River and I-90 to the south, making it a key crossing opportunity for both vehicles and active transportation users. There are residential areas and schools immediately north of the interchange and a large industrial area immediately south of the interchange. Beyond the industrial area, the Centennial Trail runs along the Spokane River with large residential and commercial areas south of I-90.

Spokane County is currently constructing the Bigelow Gulch/Forker Road Urban Connector project which is included in the Spokane Regional Transportation Council's (SRTC) Horizon 2040 long-range transportation plan as a key new north-east connector for the County. The Bigelow Gulch/Forker Road Urban Connector Project will replace and widen Bigelow Gulch Road from the North Spokane Corridor to the northeast corner of Spokane Valley, tying into Sullivan Road at its current northern terminus. The completion of the Bigelow Gulch Forker Road Urban Connector Project will provide an alternative connection that links I-90 to US 395 and US 2. The connection of Sullivan Road with Bigelow Gulch Road will also provide long-term resiliency and route redundancy to US 395 after the North Spokane Corridor is completed.

Because Bigelow Gulch Road will provide an alternate connection and bypass to I-90, the City of Spokane Valley completed the Sullivan Road Corridor Advanced Study Addendum in June 2020. The purpose of the Study Addendum was to evaluate how the completion of the Bigelow Gulch/Forker Road Urban Connector project would affect the Sullivan Road corridor from Wellesley Avenue to Indiana Avenue. The Study Addendum included forecasts developed using the SRTC regional travel demand model to understand the change in regional travel patterns generated by the new connection and evaluated needs for locations throughout the corridor. The Study Addendum concluded that projected 2040 traffic volumes would exceed the capacity of the existing Sullivan Road/Trent Avenue interchange resulting in LOS F operations if the current configuration is maintained. Therefore, to maintain acceptable operations, the interchange would require the replacement or upgrade of the Sullivan Road bridges over Trent Avenue and over the BNSF Railway immediately to the south. Additional background information is provided in *Appendix A: Methods & Assumptions for Trent Ave/Sullivan Rd Interchange ICE* which includes the Sullivan Road Corridor Advanced Study Addendum as an attachment.

While the Study Addendum identified a variety of recommended improvements along the Sullivan Rd corridor, this ICE focuses specifically on the Sullivan Road/Trent Avenue interchange. The purpose of the ICE is to evaluate and select an interchange configuration that can accommodate modal priorities and the projected increase in traffic volumes related to the completion of the Bigelow Gulch/Forker Road Urban Connector.

Existing Conditions

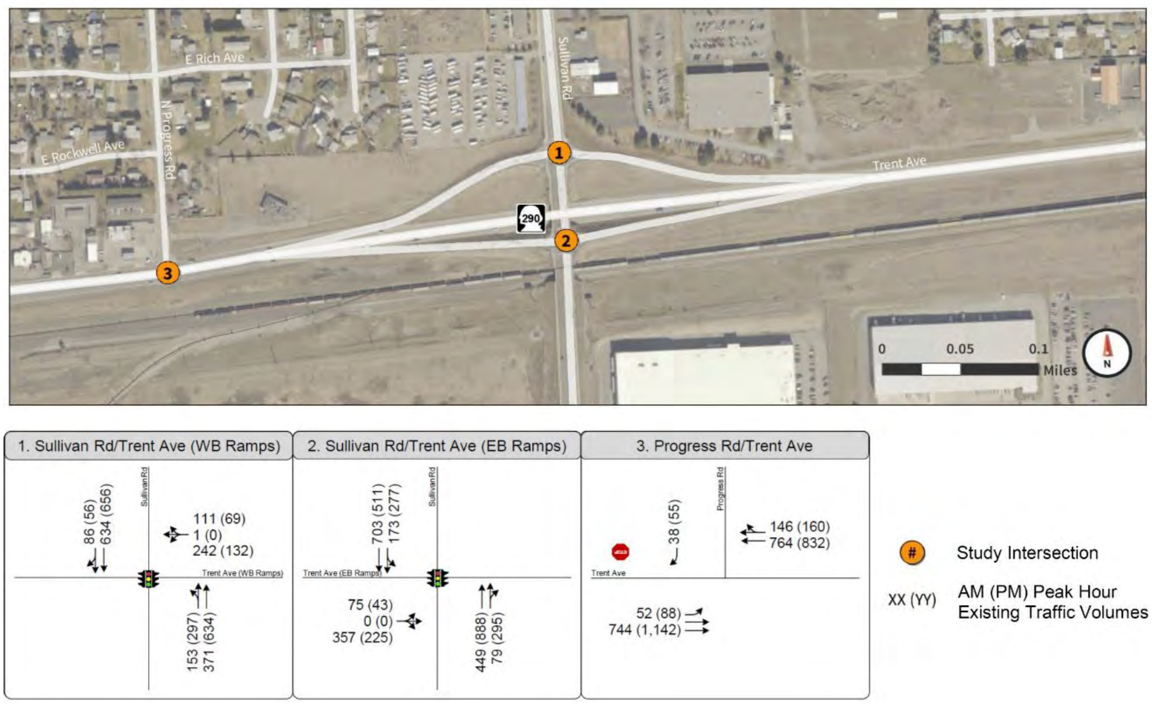
The Sullivan Road/Trent Avenue interchange consists of two signalized intersections: one for westbound ramp access and one for eastbound ramp access. The Sullivan Road bridge structure is four lanes wide with each direction having one shared through/left turn lane and one through lane. The signals operate with permitted-protected left turns and lane utilization tends to be unbalanced as through traffic favors the outside lanes to avoid being delayed behind left-turning vehicles. Sullivan Road has a second bridge structure over the BNSF railway immediately south of the eastbound Trent Avenue ramps.

The Trent Avenue/Progress Road intersection is stop-controlled on the southbound approach (Progress Road) and allows only right turns. Turns onto Progress Road are allowed from both eastbound and westbound Trent Avenue.

Figure 2 shows the study area and existing AM and PM peak hour volumes (collected in 2018 for the interchange and 2020 for Trent Avenue/Progress Road). According to WSDOT's Traffic GeoPortal, 2018

AADT along SR 290/Trent Avenue was approximately 19,000-20,000 and the posted speed limit is 50mph.[1] The posted speed limit on Sullivan Rd is 35mph.

Figure 2. Study Area



Note: The turning movements counts shown in Figure 2 reflect data collected by Welch Comer in October 2018 which were balanced along the Sullivan Rd corridor from Wellesley Ave to Indiana Ave.

Traffic Operations

The intersection Levels of Service (LOS) at the study intersections were calculated using the latest version of the Highway Capacity Manual (HCM) methodology and Synchro 10 analysis software with settings consistent with WSDOT Synchro and SimTraffic Protocol. The average control delay per vehicle and associated LOS grade are shown in **Table 1**. The City of Spokane Valley has an intersection delay standard of LOS D for these intersections, consistent with WSDOT's LOS D standard for SR 290/Trent Avenue. The eastbound ramp intersection currently exceeds this standard during the AM peak hour. Detailed LOS worksheets are included in *Appendix B: Traffic Operations Analysis Results*.

[1] WSDOT Traffic GeoPortal, https://www.wsdot.wa.gov/data/tools/geoportal/?config=traffic, accessed December 18, 2020.

Table 1: Existing Intersection Levels of Service

Intersection	Control Type	AM Peak Hour LOS / Delay (s)	PM Peak Hour LOS / Delay (s)
1. Sullivan Road / Trent Avenue WB Ramp[2]	Signalized	C / 29	C / 18
2. Sullivan Road / Trent Avenue EB Ramp[2]	Signalized	E / 63	D / 43
3. Trent Avenue / Progress Road[1]	Stop-Controlled (SB)	B / 13 (SB)	B / 14 (SB)

Notes: 1. Level of service for stop-controlled intersections is based on delay for the worst movement.
2. HCM 6th Edition does not support a permitted/protected left-turn type from a shared lane. LOS reported using HCM 2000 methodology.
Source: Fehr & Peers, 2021.

Multimodal Facilities

The interchange of Sullivan Road and Trent Avenue features pedestrian crossings at each ramp intersection as well as sidewalks on both sides of Sullivan Road that extend north to Wellesley Avenue and south to Kiernan Avenue. Spokane Transit operates bus route 96 along Sullivan Road across the Trent Avenue interchange, with an in-lane southbound stop immediately north of the westbound Trent Avenue ramps.

Safety

Five years of collision data covering the period from January 2015 to December 2019 was obtained from WSDOT. **Table 2** provides a summary of the collision history by severity. There were 22 collisions reported at the westbound ramp terminal, with seven resulting in an injury, none of which were categorized as serious. There were 19 collisions reported at the eastbound ramp terminal, with three resulting in an injury, none of which were categorized as serious. At the Trent Avenue/Progress Road intersection, there were 14 collisions, two of which resulted in an injury, one of them categorized as serious. All other collisions were categorized as property damage only.

Table 2: 2015-2019 Collision Summary by Severity

Intersection	All Collisions	Fatal Collisions	Injury Collisions
1. Sullivan Road / Trent Avenue WB Ramp	22	0	7
2. Sullivan Road / Trent Avenue EB Ramp	19	0	3
3. Trent Avenue / Progress Road	14	0	2
Average per year			
1. Sullivan Road / Trent Avenue WB Ramp	4.4	0	1.4
2. Sullivan Road / Trent Avenue EB Ramp	3.8	0	0.6
3. Trent Avenue / Progress Road	2.8	0	0.4

Source: 2015-2019 WSDOT data evaluated by Fehr & Peers, 2021.

Table 3 provides a summary of crashes by crash type. At both ramp terminals, the largest proportion of collisions (both in total and for those that resulted in injuries) were related to left-turning vehicles. Rear-end collisions comprised the majority of the remaining collisions.

At Progress Road, the largest proportion of collisions (both in total and for those that resulted in injuries) were related to vehicles entering from Progress Road onto Trent Avenue (entering at an angle). It should be noted that an additional 11 collisions related to accesses to the gas station located at the northwest corner of Trent Avenue/Progress Road occurred between 2015-2019. Because these weren't specifically related to the intersection, they were not included in **Table 3**. The majority of collisions related to the gas station were rear-end or left-turn collisions caused by those entering the station.

Table 3: 2015-2019 Collision Summary by Type

Intersection	Left-Turn	Rear-End	Entering at Angle	Total
All Collisions				
1. Sullivan Road / Trent Avenue WB Ramp	11	7	4	22
2. Sullivan Road / Trent Avenue EB Ramp	11	5	3	19
3. Trent Avenue / Progress Road	1	1	12	14
Injury Collisions				
1. Sullivan Road / Trent Avenue WB Ramp	4	3	0	7
2. Sullivan Road / Trent Avenue EB Ramp	3	0	0	3
3. Trent Avenue / Progress Road	1	0	1	2

Source: 2015-2019 WSDOT data evaluated by Fehr & Peers, 2021.

Evaluation Metrics

Table 4 summarizes the baseline needs for the project along with associated metrics and targets that will be used to evaluate the alternatives.

Table 4: Project Needs and Performance Metrics

Project Need	Metric	Target
Baseline Needs		
BN1. Provide appropriate facilities to address the travel demand needs of all modal priorities	Intersection traffic operations	LOS D during AM and PM peak hours in 2050. 95th percentile queues can be accommodated on off-ramps without spilling back onto Trent Ave
BN2. Provide active transportation facilities suitable to a principal arterial in a suburban context	Predicted number of fatal and serious injury crashes per year	Fewer comparative predicted crashes in the 2050 design year.
	Level of comfort and design for multimodal users	Pedestrian and bicycle facilities consistent with the Spokane Valley Comprehensive Plan and Bike and Pedestrian Master Program Pedestrian delay

Source: Fehr & Peers, 2021.

Conceptual Alternatives

Multiple project alternatives were identified for evaluation, including both signal and roundabout options. These alternatives were sketched at a conceptual level for discussion amongst City of Spokane Valley, WSDOT, and consultant team staff. The subsequent section, *Step 2 Feasibility*, summarizes the outcome of the screening and includes refined drawings for the alternatives that were carried forward.

No Build Alternative

Under the No Build Alternative, the Sullivan Road/Trent Avenue interchange would remain in its current configuration with a four-lane bridge and two signalized intersections at the ramp termini.

Standard Signalized Diamond Interchange

A Standard Signalized Diamond Interchange would widen the Sullivan Road bridge allowing two through lanes in each direction and dedicated left turn lanes. Both interchange intersections would remain signalized. This alternative includes a widened bridge over the BNSF railway to allow a dedicated right turn lane from northbound Sullivan Road to the Trent Avenue eastbound on-ramp, additional storage for vehicles waiting to make the northbound left turn onto Trent Avenue, and a median opposite the southbound left turn lanes.

Single Point Urban Interchange

This alternative includes a Single Point Urban Interchange, commonly known as a SPUI. This interchange design would bring together all ramp movements to a single signalized intersection in the center of a new Sullivan Road bridge.

Diverging Diamond Interchange

A Diverging Diamond Interchange (DDI) is a design in which each direction of Sullivan Road traffic would temporarily transition to the left side of the road, allowing for two simplified two-phase signals which only require through movements because turn movements to and from the ramps occur outside the intersection footprints. The DDI reduces the number of conflict points and increases traffic flow.

Diamond Interchange with Roundabouts

Two types of diamond interchanges with peanut roundabouts were considered. The difference between the two configurations relates to the alignment. The first option would have constructed the peanut roundabout slightly offset to the east from the existing Sullivan Road bridge such that traffic on Sullivan Road could be maintained for a longer period during construction. The second option would construct the peanut roundabout in alignment with the existing bridge which would create more disruption during construction.

Center Turn Overpass

This alternative includes a center turn overpass which would be constructed in the median of Trent Avenue. Vehicles from Trent Avenue would take the left-side exit onto the center overpass up to Sullivan Road and vehicles from Sullivan Road would turn onto the center overpass and merge onto Trent Avenue via a left-side entrance. This design would require a single signalized intersection in the center of the Sullivan Road bridge.

Jughandle Interchange

A "jughandle" interchange would connect the two roadways with a single ramp with intersections at either end, i.e., on Sullivan Road and on Trent Avenue. Both intersections and roundabouts were considered for the intersections at either end of the jughandle ramp.

Step 2. Feasibility

The conceptual alternatives were discussed at a March 22, 2021 meeting with WSDOT, City of Spokane Valley, and consultant team staff. Discussion focused primarily on feasibility from an operational perspective as well as consideration of footprint, physical constraints, and cost. A brief summary of findings for each alternative is summarized below.

- **Standard Signalized Diamond Interchange** – WSDOT staff confirmed this alternative should be carried forward for further study.
- **Single Point Urban Interchange** – Based on prior experience, WSDOT staff have found that SPUIs tend to have inefficient signal phasing and progression. Therefore, this alternative was removed from further consideration.
- **Diverging Diamond Interchange** – WSDOT staff supported studying this alternative further though there is concern about cost. WSDOT requested that the team pay particular attention to the distance between the diamonds and angles of interface as well as pedestrian access including consideration of locating pedestrian facilities through the center of the interchange.
- **Diamond Interchange with Roundabouts** – WSDOT staff indicated that roundabouts are often found to be the preferred option and should be studied. The aligned peanut roundabout was selected as the preferred alignment for further study rather than the offset peanut roundabout.
- **Center Turn Overpass** – WSDOT staff felt this alternative was unlikely to be selected for the following reasons: entering and exiting on the left (median) side of Trent Avenue would be unusual and truck movements could be a concern; the median ramps may affect access to Progress Road; Trent Avenue would require substantial widening. For these reasons, this alternative was not carried forward for further study.
- **Jughandle Interchange** – WSDOT staff supported carrying this alternative forward for further study. Eliminating one of the intersections on Sullivan Road was seen as a benefit for cost reasons. With respect to the type of intersection control, WSDOT preferred studying the alternative with roundabouts at both Trent Avenue and Sullivan Road. Introducing signal delay on Trent Avenue is undesirable particularly given the prior corridor investments to eliminate other signals.

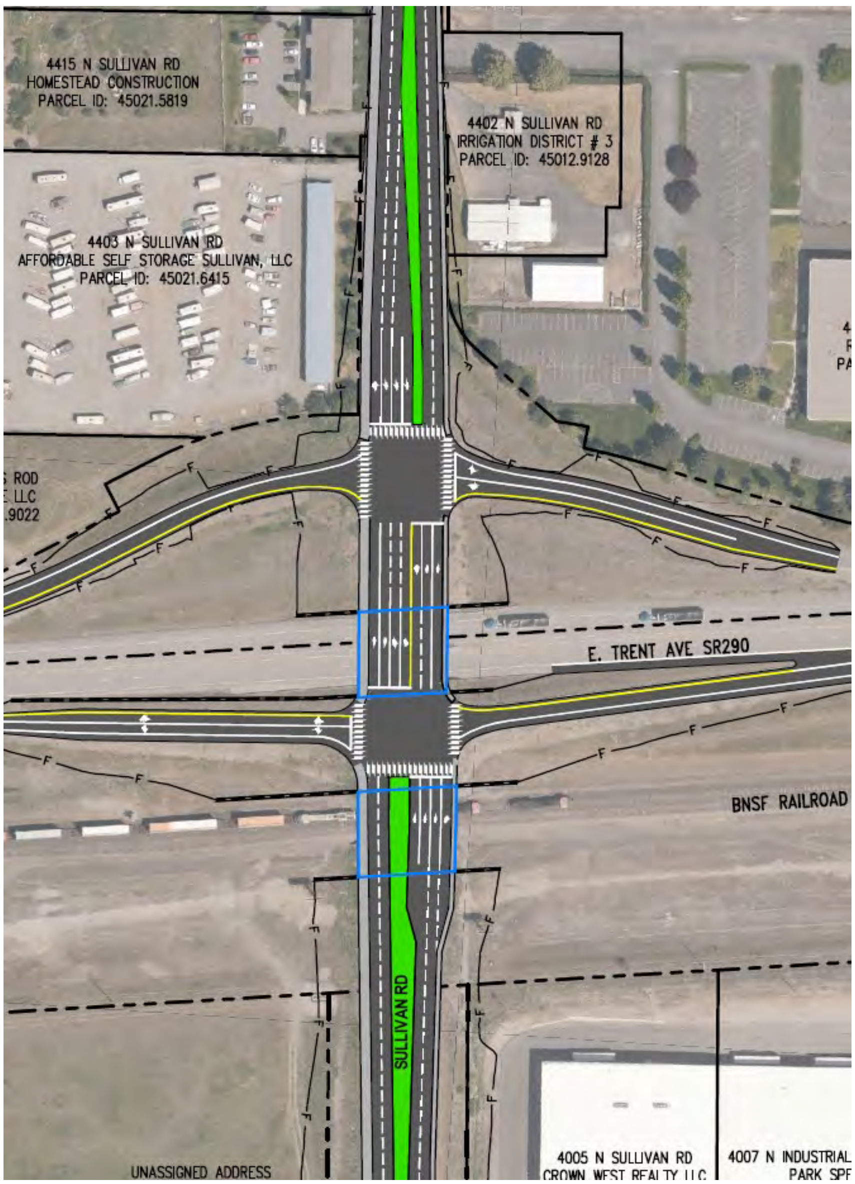
Based on the feasibility evaluation and discussions with WSDOT, four conceptual alternatives (in addition to the No Build Alternative) were carried forward: the Standard Signalized Diamond Interchange, Diamond Interchange with Peanut Roundabout, Diverging Diamond Interchange, and Jughandle with Roundabouts. Refined alternative drawings were developed for each alternative and are shown in **Figure 3 through Figure 6**.

Alternatives Carried Forward

Alternative 1: Standard Signalized Diamond Interchange

As shown in **Figure 3**, the Standard Signalized Diamond Interchange was refined to widen the Sullivan Road bridge to seven lanes allowing two through lanes in each direction, two southbound dedicated left turn lanes, and one northbound dedicated left turn lane. The BNSF bridge would be widened to a similar width allowing four northbound travel lanes, two southbound travel lanes, and a median.

Figure 3. Alternative 1: Standard Signalized Diamond Interchange



Alternative 2: Diamond Interchange with Peanut Roundabout

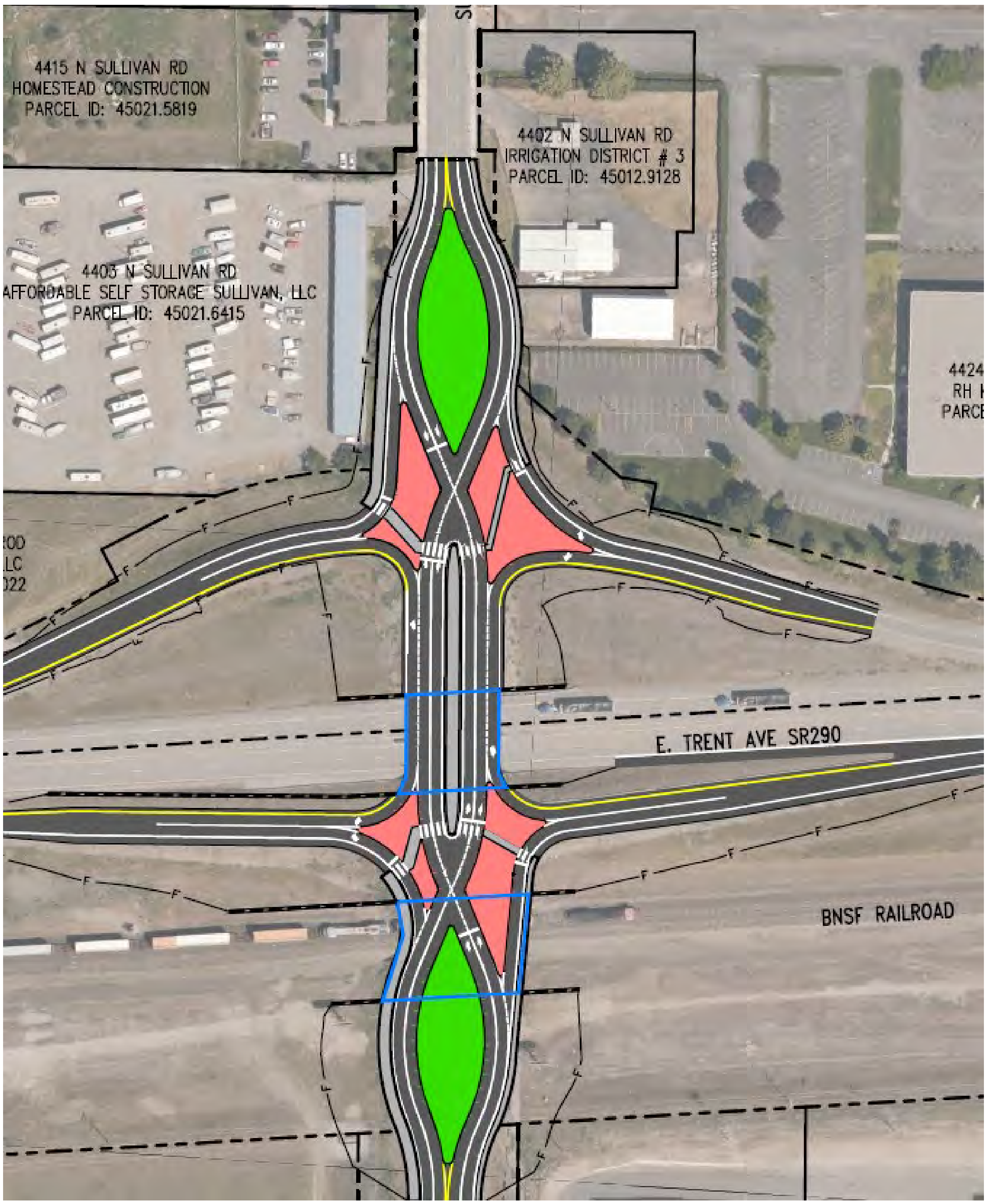
Figure 4 shows the refined diamond interchange with an aligned peanut roundabout. The roundabout design was refined based on projected traffic volumes to include a bypass lane from northbound Sullivan Road onto eastbound Trent Avenue, a bypass lane from westbound Trent Avenue to northbound Sullivan Road, and a third southbound lane through the interchange. The design would require the BNSF bridge to be replaced to allow the northbound lane widening approaching the interchange.

Figure 4. Alternative 2: Diamond Interchange with Peanut Roundabout

Alternative 3: Diverging Diamond Interchange

Figure 5 shows the DDI design for the Sullivan Road/Trent Avenue interchange. Both the Trent Avenue and BNSF bridges would be replaced. The northern bridge would include a six-lane cross-section plus median over Trent Avenue. As discussed during the feasibility evaluation, pedestrian facilities would be provided along the bridge median.

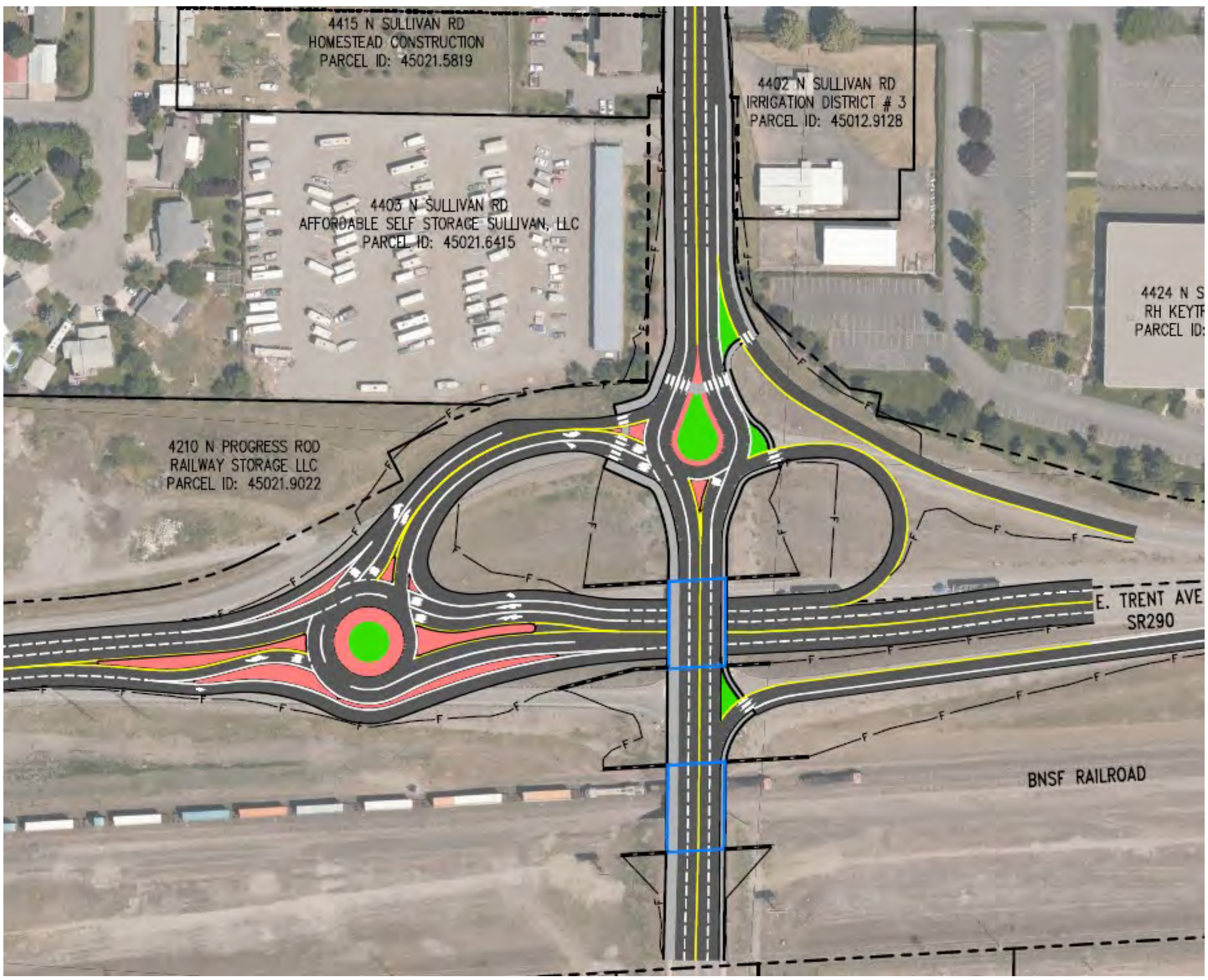
Figure 5. Alternative 3: Diverging Diamond Interchange



Alternative 4: Jughandle with Roundabouts

Figure 6 shows the jughandle design that was developed based on the discussions during the feasibility evaluation. The jughandle ramp would be located in the northwest quadrant of the interchange. The Trent Avenue roundabout would include a bypass lane for eastbound through traffic as well as bypass lanes to and from westbound Trent Avenue. To reduce the amount of traffic that would need to travel through the roundabouts, the design would include separate connections along northbound Sullivan Road for the eastbound on-ramp, westbound on-ramp, and westbound off-ramp. Accommodating some of those movements on separate ramps would allow the Sullivan Road roundabout to be a teardrop roundabout.

Figure 6. Alternative 4: Jughandle with Roundabouts



Step 3. Operational and Safety Performance

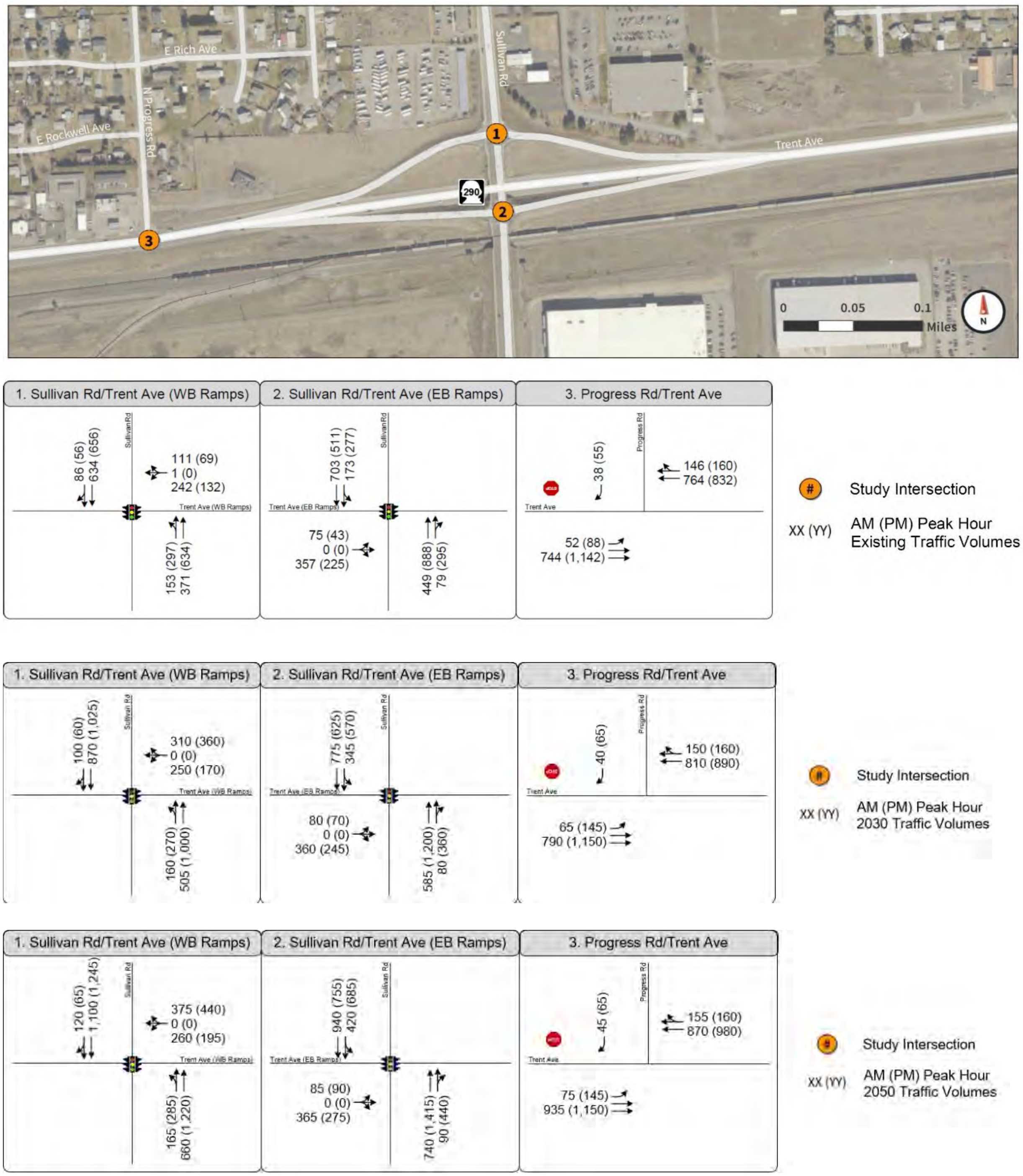
As required by the WSDOT Design Manual, analysis was completed for the project's opening year and a design year. The estimated year of opening for the project is 2030; the opening year analysis will provide information related to the near-term functionality of the Trent Ave/Sullivan Rd interchange to accommodate changing travel patterns resulting from the Bigelow Gulch/Forker Road Urban Connector. A design year of 2050 has been selected to evaluate long-term performance as regional travel demand continues to grow and is consistent with the City's needs for engineering design. The 20-year period between year of opening and design year is typical for evaluation of capacity expansion projects and is also in line with regional travel demand forecasting practices as forecasts over longer periods become more speculative.

Forecasting Approach

Because the main driver for the Sullivan Road Corridor Advanced Study Addendum was the completion of a new regional connection, the SRTC regional travel demand model was used to understand future year volumes along the Sullivan Road corridor. However, this ICE focuses specifically on the forecasts and operations of the Sullivan Road/Trent Avenue interchange. The Sullivan Road Corridor Advanced Study Addendum, completed in June 2020, included development of 2040 forecasts. At that time, SRTC staff provided 2018 and 2040 travel demand model traffic volumes for the study area which were used to determine growth rates that were applied to existing turning movement counts. Additional background on the details of the forecasting approach are included in *Appendix A, Methods & Assumptions for Trent Ave/Sullivan Rd Interchange ICE*. The Sullivan Road/Trent Avenue ICE project team developed forecasts based on the 2040 conditions and adjusted them to 2030 and 2050 using annual growth rates based on historic annual traffic growth rates in Spokane Valley.

The resulting forecasts are summarized in **Figure 7**.

Figure 7. Turning Movement Forecasts



Traffic Operations

Table 5 summarizes the average intersection control delay and LOS grades for each of the alternatives in 2030 and 2050. The signalized alternatives were evaluated in Synchro and the roundabouts were evaluated in Sidra, consistent with the WSDOT Synchro & SimTraffic Protocol and WSDOT Sidra Policy Settings. Detailed LOS worksheets are attached in *Appendix B*.

No Build Alternative

By 2030, both ramp intersections are expected to operate at a deficient level of service under the No Build Alternative during both the AM and PM peak hours. This is due mainly to the substantial increase in traffic volumes along Sullivan Road, coupled with the lack of left-turn storage lanes on the bridge over the interchange. This in turn causes left-turning vehicles accessing the Trent Avenue on-ramps to block the northbound and southbound through movements. These conditions would be exacerbated by 2050 at which time both ramp termini intersections are expected to operate at LOS F during both peak hours with substantial queuing spilling back from the intersections.

Operations results for the intersection of Progress Road and Trent Avenue indicate that the intersection would operate acceptably at LOS B in both 2030 and 2050.

Alternative 1: Signals

Under Alternative 1, traffic operations are expected to operate at LOS B and C during the AM and PM peak hours in 2030. With increased volumes by 2050, delay would increase marginally during the AM peak hour but remain at LOS C, while PM peak hour operations are expected to degrade more substantially including falling to LOS D at the westbound ramp intersection. The analysis did not indicate any queuing concerns with respect to the Trent Avenue off-ramps. Therefore, Alternative 1 is expected to operate acceptably with LOS meeting both the City and WSDOT standards of LOS D and no queue spillback onto Trent Avenue.

The westbound on-ramp is designed to allow vehicles to accelerate to 50mph before merging onto Trent Avenue. Based on the conceptual drawings, this on-ramp would conflict with the Progress Road intersection and potentially the gas station driveways immediately to the west. Therefore, as currently designed, Alternative 1 would likely result in the need to close access to Progress Road.

Alternative 2: Roundabout

Alternative 2 is expected to operate at LOS A during both peak hours for both the 2030 and 2050 analysis years. No substantial queuing is expected and v/c ratios are expected to be well within WSDOT guidelines (the highest v/c ratio expected in 2050 would be 0.68 for the eastbound off-ramp). Therefore, Alternative 2 is expected to meet the City and WSDOT standard of LOS D and have no queue spillback onto Trent Avenue.

Given the finding that the peanut roundabout would operate with low delay, analysts also tested whether there were efficiencies in the design that could potentially reduce the footprint of the roundabout while maintaining acceptable operations. In particular, the Sidra analysis indicates that it is operationally possible to remove the third southbound lane/second circulating lane for southbound lefts. If this alternative moves forward, this modification could be explored further to determine if it is geometrically feasible and could also be tested using microsimulation to confirm its operational conditions.

The westbound on-ramp is designed to allow vehicles to accelerate to 50mph before merging onto Trent Avenue. Based on the conceptual drawings, this on-ramp would conflict with the Progress Road intersection and potentially the gas station driveways immediately to the west. Therefore, as currently designed, Alternative 2 would likely result in the need to close access to Progress Road.

Alternative 3: DDI

Alternative 3 is also expected to operate acceptably during both peak hours for both the 2030 and 2050 analysis years. LOS is expected to be LOS B or better with no substantial queuing. For this screening analysis, the DDI was replicated as two separate signalized intersections in Synchro. This approach is slightly conservative in estimating delay as it accounts for vehicles stopping for pedestrians to cross. In practice, if this alternative moves forward, the design could be refined using microsimulation to evaluate whether some movements could be yield-controlled instead. In addition to the Synchro analysis, SimTraffic was used to observe weaving conditions which indicated that the design would operate adequately.

The westbound on-ramp is designed to allow vehicles to accelerate to 50mph before merging onto Trent Avenue. Based on the conceptual drawings, this on-ramp would conflict with the Progress Road intersection and potentially the gas station driveways immediately to the west. Therefore, as currently designed, Alternative 3 would likely result in the need to close access to Progress Road.

Alternative 4: Jughandle with Roundabouts

Both roundabouts under Alternative 4 are expected to operate at LOS A for both peak hours and during both analysis years. No substantial queuing is expected and v/c ratios are expected to be within WSDOT guidelines (the highest v/c ratio expected in 2050 would be 0.66 for the ramp approaching the roundabout on Trent Avenue). Therefore, Alternative 4 is expected to meet the City and WSDOT standard of LOS D and have no spillback onto Trent Avenue. However, it should also be noted that the roundabout on Trent Avenue would introduce delay to a roadway segment that is currently free flow.

It is assumed that access at Progress Road/Trent Avenue would remain the same under this alternative. Operations results for that intersection indicate that it would operate acceptably at LOS B in both 2030 and 2050.

Given the finding that the jughandle interchange would operate well within the capacity of the design, analysts tested whether there were components of the design that could be modified to reduce the footprint. The analysis indicated that one or more of the following modifications could be considered: reducing the lanes from Trent Avenue to Sullivan Avenue from two to one lane, reducing westbound Trent Avenue approaching the roundabout from three to two lanes, and removing the westbound on-ramp bypass lane on the Trent Avenue roundabout. As with the peanut roundabout findings, if this alternative moves forward, these options could be explored further to determine if it is geometrically feasible and could also be tested using microsimulation to confirm operational conditions.

Table 5: Opening Year and Horizon Year Intersection Levels of Service

Alternative	Intersection	Control Type	Opening Year – 2030				Horizon Year – 2050			
			LOS / Delay (s)		Off-Ramp 95th Percentile Queue (ft)		LOS / Delay (s)		Off-Ramp 95th Percentile Queue (ft)	
			AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Opening Year - 2030										
No Build Alternative[1]	Sullivan Rd / Trent Ave WB	Signal	D/46	F/111	#504	#720	F/85	F/>120	#669	#1037
	Sullivan Rd / Trent Ave EB	Signal	F/90	F/102	#347	#417	F/>120	F/>120	#441	#590
	Progress Rd / Trent Ave	Side-street Stop	B/12	B/13	-	-	B/13	B/14	-	-
Alternative 1: Signals	Sullivan Rd / Trent Ave WB	Signal	C/25	C/25	158	231	C/28	D/44	161	395
	Sullivan Rd / Trent Ave EB	Signal	B/20	C/22	155	74	C/24	C/35	186	121
Alternative 2: Roundabout	Sullivan Rd / Trent Ave WB	Roundabout	A/6	A/5	31	44	A/6	A/6	41	70
	Sullivan Rd / Trent Ave EB	Roundabout	A/6	A/5	75	46	A/6	A/6	92	67
Alternative 3: DDI[1]	Sullivan Rd / Trent Ave WB	Signal	B/11	B/12	79	155	B/12	B/16	121	227
	Sullivan Rd / Trent Ave EB	Signal	A/10	B/15	124	61	B/11	B/18	144	89
Alternative 4: Jughandle	Sullivan Rd / Ramp	Roundabout	A/4	A/4	-	-	A/4	A/4	-	-
	Trent Ave / Ramp	Roundabout	A/7	A/7	-	-	A/7	A/8	-	-
	Progress Rd / Trent Ave	Side-street Stop	B/12	B/13	-	-	B/13	B/14	-	-

Notes:

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

1. HCM 6th Edition does not support a permitted/protected left-turn type from a shared lane. LOS reported using HCM 2000 methodology.

Source: Fehr & Peers, 2022.

Safety

A safety analysis[2] was conducted to predict average intersection collision frequency in 2030 and 2050 under each alternative. In accordance with the WSDOT Safety Analysis Guide, the analysis used WSDOT's Enhanced Interchange Safety Analysis Tool (ISATe) for freeways and ramp terminals based on the HSM predictive method. Because the tool does not include roundabout nor DDI control options, crash reduction factors were applied to the No Build results based on research provided by WSDOT[3] and the CMF Clearinghouse[4]:

- **Roundabouts:** Based on WSDOT research, a 75% crash reduction factor was applied for injury collisions and a 37% crash reduction factor was applied for total collisions to estimate collisions for Alternatives 2 and 4[5]. The reductions can be attributed to lower travel speeds through the intersection (typically 15-20 mph), eliminating the temptation to "beat the light", and the one-way travel pattern which reduces the likelihood of T-bone and head-on collisions.
- **DDI:** Based on the CMF Clearinghouse, a 44% crash reduction factor was applied for injury collisions and a 14% crash reduction factor was applied for total collisions to estimate collisions for Alternative 3. The reductions can be attributed to the removal of left-turning vehicle conflicts from the intersection.

Alternatives 1, 2, and 3 are expected to result in lower numbers of collisions than the ramp terminals under the No Build Alternative. Alternative 2 (the peanut roundabout) would perform best in terms of total collisions as well as fatal and injury collisions.

Predicting collisions for Alternative 4 (the jughandle) is more complex. The proposed Trent Avenue roundabout does not currently exist and therefore has no associated collision history. Instead, the existing collision history in that location relates to the ramp connections to Trent Avenue, which had a total collision rate of 0.8 per year and an injury collision rate of 0.4 per year for the period of 2015-2019. The proposed new roundabout on Trent Avenue would combine movements from several of the existing ramps into one intersection. Because this is a new traffic dynamic with no comparable point of reference under existing conditions, the ISATe tool cannot accurately predict the increase in collisions based on collision history. As such, the Highway Safety Manual (HSM) *Predictive Method for Urban and Suburban Arterials Analysis Spreadsheet* tool was used to analyze the two jughandle intersections rather than ramp

[2] Under 23 U.S. Code § 148 and 23 U.S. Code § 409, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

[3] WSDOT Roundabout Benefits, https://wsdot.wa.gov/Safety/roundabouts/benefits.htm, accessed December 23, 2020.

[4] CMF Clearinghouse: Abdelrahman et al., Systemic Safety Evaluation of Diverging Diamond Interchanges Based on Nationwide Implementation Data (Jan 2021). http://www.cmfclearinghouse.org/study_detail.cfm?stid=623

[5] For Alternative 4, ISATe was used to estimate a collision rate with the No Build configuration but volumes that reflect the movements that would be present under Alternative 4. The crash reduction factor for roundabouts was then applied to that crash rate.

terminals. Because the HSM tool uses different assumptions from the ISATe tool, the No Build scenario was also built in both tools to understand how the tools differ. Based on a comparison of No Build results between the HSM and ISATe tools, it was determined that the HSM tool predicts all collision types approximately 15% lower than all collision types predicted by ISATe. No consistent difference between the two tools for injury collisions was found. As such, the estimates for all collision types from the HSM tool for Alternative 4 were factored up to be more consistent with ISATe assumptions.

While this analysis gives an indication of potential collisions relative to the other alternatives, it should be noted that there are limitations to using HSM to predict collisions for the jughandle configuration in Alternative 4. Neither the HSM nor ISATe tools are built to analyze a jughandle interchange, with much of the underlying research of the tools focusing on 3- or 4-leg intersections or simple ramp terminals, and no adjustments or factors related to jughandle configurations. Based on the data and tools available, the roundabout on Sullivan Road is expected to improve safety compared to the existing ramp termini signals. The Trent Avenue roundabout is expected to result in more collisions than would occur on Trent Avenue under the No Build Alternative. However, the roundabout would also provide broader safety benefits by slowing traffic along the corridor and locating the ramp movements further east than the other alternatives which limits the safety issues associated with the westbound on-ramp's proximity to driveways.

Detailed worksheets are attached in *Appendix C* and a summary of results is shown in **Table 6**.

Table 6: Opening Year and Horizon Year Predicted Annual Collisions

Alternative	Intersection	Control Type	Opening Year – 2030		Horizon Year – 2050	
			Fatal & Injury Collisions	Fatal, Injury & PDO Collisions	Fatal & Injury Collisions	Fatal, Injury & PDO Collisions
No Build Alternative	Sullivan Rd / Trent Ave WB Ramp	Signal	2.1	5.8	2.7	7.2
	Sullivan Rd / Trent Ave EB Ramp	Signal	1.6	6.5	1.9	7.9
Alternative 1: Signals	Sullivan Rd / Trent Ave WB Ramps	Signal	1.4	4.3	1.9	5.5
	Sullivan Rd / Trent Ave EB Ramps	Signal	1.1	5.2	1.4	6.6
Alternative 2: Roundabout	Sullivan Rd / Trent Ave WB Ramps	Roundabout	0.5	3.7	0.7	4.5
	Sullivan Rd / Trent Ave EB Ramps	Roundabout	0.4	4.1	0.5	5.0
Alternative 3: DDI	Sullivan Rd / Trent Ave WB Ramps	Signal	1.2	5.0	1.5	6.2
	Sullivan Rd / Trent Ave EB Ramps	Signal	0.9	5.6	1.1	6.8
Alternative 4: Jughandle	Sullivan Rd / Ramp	Roundabout	0.5	4.0	0.6	5.0
	Trent Ave / Ramp*	Roundabout	0.4	3.4	0.5	4.9

Source: Fehr & Peers, 2022.
*See additional information in safety section.

Multimodal Effects and Potential Treatments

This section describes the conditions for pedestrians and bicycles under each potential future year alternative. In particular, the evaluation considers whether the alternative provides pedestrian and bicycle facilities consistent with the Spokane Valley Comprehensive Plan (adopted 2016) and Bike and Pedestrian Master Program (BPMP, which is integrated within the Comprehensive Plan) and its effects on pedestrian delay.

To complement the existing sidewalks along Sullivan Road, the Spokane Valley Comprehensive Plan and BPMP call for a pedestrian and bicycle shared use path along the north side of Trent Avenue, providing a new east-west pathway across the city. While this interchange project only relates to a small section of that corridor and the shared use facility is not currently funded, the alternatives were reviewed with respect to their compatibility with a future shared use facility through the area. No dedicated bicycle facilities are planned along this section of Sullivan Road.

No Build Alternative

Under the No Build Alternative, pedestrians and bicycles would continue to travel through the interchange area as they do today, using the sidewalks along Sullivan Road and marked crosswalks on three legs of each ramp termini intersection. With the current configuration, the crosswalk across Sullivan Road is roughly 60 ft while the crosswalks across each ramp are generally longer (three of the four are roughly a 90 ft crossing distance). If and when a future shared use path is funded, it could be accommodated along the north side of Trent Avenue and the westbound ramps, connecting to the pedestrian facilities along and across Sullivan Road.

Alternative 1: Signals

Under Alternative 1, pedestrian and bicycle travel patterns would remain essentially the same as under the No Build Alternative because the layout of sidewalks and crosswalks would remain the same. However, with the widened bridge, the geometry would change making the crossing distance across Sullivan Road substantially longer as the bridge would increase from a four-lane cross-section to a six-lane plus median cross-section. The marked crosswalks across the ramps would likely remain similar in length to the No Build Alternative. If and when a future shared use path is funded, it could be accommodated along the north side of Trent Avenue and the westbound ramps.

Alternative 2: Roundabout

Alternative 2 would also accommodate pedestrian and bicycle travel but would require more circuitous travel paths as pedestrians and bicycles navigate around the peanut roundabout. Crossings would generally be shorter than the No Build Alternative or Alternative 1 but would require using multiple crosswalks and pedestrian refuge islands in some locations. Delay for pedestrian and bicycles is generally expected to be lower as they would not have to wait for the signal to allow them to cross. If and when a future shared use path is funded, it could be accommodated along the north side of the westbound ramps.

Alternative 3: DDI

The DDI would provide a more complex system of facilities for pedestrians and bicycles than the other alternatives. While all paths through the interchange would still be possible, people would be required to navigate multiple crosswalks (some unsignalized, some signalized) and pedestrian refuge islands to travel through the interchange. For example, crossing Sullivan Road would require crossing four separate crosswalks and three medians/refuge islands. Travel along Sullivan Road would require pedestrians and bicycles to travel the length of the bridge in the center median with three lanes of traffic on either side. Given the complexity of conditions for pedestrians and bicycles with this interchange design, delay would likely be higher than the other alternatives.

A future shared use path could still be accommodated with this design similar to the other alternatives. However, using the DDI's crossing of Sullivan Road would be more challenging than the other alternatives for users who are continuing along the path rather than accessing Sullivan Road. Another potential shared use path option could be to accommodate the path underneath the Sullivan Road bridge and implement crossings of the westbound ramps instead.

Alternative 4: Jughandle with Roundabouts

Under the jughandle design, pedestrian and bicycle travel along the west side of Sullivan Road would be fairly convenient, with people only needing to cross the ramp at one location, though it would be broken into two separate crosswalks. Because the crosswalks are unsignalized, pedestrians and bicycles would not be delayed waiting for the signal to allow them to cross. Travel along the east side would be more challenging as it would require crossing three separate ramps though the crossing distances would be short (a single lane width). There would only be one opportunity to cross Sullivan Road to the north of the interchange which would require three crossings separated by refuge islands/sidewalks. Assuming vehicles yield to pedestrians and bicycles in a timely fashion, there would be relatively little delay as there are no signals and paths are relatively direct.

A future shared use path along Trent Avenue could be accommodated though the crossings of Sullivan Road would be more complex for path users than the signalized alternatives.

Step 4. Alternatives Evaluation

Table 7 summarizes the findings for each alternative based on the project's performance metrics. The intersection traffic operations evaluation found that all four proposed alternatives would meet City and WSDOT traffic operations criteria with the peanut roundabout and jughandle alternatives performing the best. However, it should be noted that although Alternative 4's Trent Avenue roundabout is expected to operate well, it would add an intersection—and therefore introduce delay—to a corridor that is currently free flow. Because the westbound on-ramp would be reconstructed at a greater length than the existing ramp, Alternatives 1, 2, and 3 are expected to require closure of the access to Progress Road at Trent Avenue.

All proposed alternatives are expected to perform better than the No Build Alternative with respect to safety. Alternative 2 (the peanut roundabout) would perform best in terms of minimizing both total collisions and fatal/injury collisions.

All alternatives would accommodate multimodal users through the interchange with varying benefits and challenges related to crossing distances, signal delay, and complexity of travel paths. Among the proposed alternatives, the DDI would provide the least comfortable and convenient design for pedestrians and bicycles.

Table 7: Project Needs and Performance Metrics

Alternative	Intersection Traffic Operations	Safety	Multimodal Comfort and Design
No Build Alternative	○	○	◑
Alternative 1: Signals	◑	◑	◑
Alternative 2: Roundabout	●	●	◑
Alternative 3: DDI	◑	◑	○
Alternative 4: Jughandle	●	◑	◑

Source: Fehr & Peers, 2022.

Step 5. Alternative Selection

[To be completed following discussions between City of Spokane Valley and WSDOT]

Appendix A:
Methods & Assumptions for Trent Ave/Sullivan Rd Interchange ICE

Memorandum

Date: August 31, 2021

To: WSDOT Eastern Region

From: Michael Adamson and Ariel Davis, Fehr & Peers

Subject: Methods & Assumptions for Trent Ave/Sullivan Rd Interchange ICE

SE20-0739

The City of Spokane Valley is completing an Intersection Control Evaluation (ICE) per the Washington Department of Transportation (WSDOT) Design Manual (DM) Chapter 1300.05(1) for the Sullivan Road/Trent Avenue interchange. Spokane County is currently constructing the Bigelow Gulch/Forker Road Urban Connector project which is included in the Spokane Regional Transportation Council's (SRTC) Horizon 2040 long-range transportation plan as a key new north-east connector for the County. The City of Spokane Valley completed the Sullivan Road Corridor Advanced Study Addendum in June 2020 (included here as Appendix A). The purpose of the Study Addendum was to evaluate how the completion of the Bigelow Gulch/Forker Road Urban Connector project would affect the Sullivan Road corridor from Wellesley Avenue to Indiana Avenue. The Study Addendum included forecasts developed using the SRTC regional travel demand model to understand the change in regional travel patterns generated by the new connection and evaluated needs for locations throughout the corridor. The Study Addendum concluded that projected 2040 traffic volumes would exceed the capacity of the existing Sullivan Road/Trent Avenue interchange and that such an improvement would require the replacement or upgrade of the Sullivan Road bridges over Trent Avenue and over the BNSF Railway immediately to the south. The details of these findings including intersection LOS and safety performance will be documented in the ICE.

While the Study Addendum identified a variety of recommended improvements along the Sullivan Rd corridor, the ICE currently underway focuses specifically on the Sullivan Road/Trent Avenue interchange. The purpose of the ICE will be to evaluate and select an interchange configuration that can accommodate modal priorities and the projected increase in traffic volumes related to the completion of the Bigelow Gulch/Forker Road Urban Connector. This memo documents the proposed methodology and assumptions for WSDOT's review and concurrence.

Methodology and Assumptions

Study Facilities

The study facilities are shown in Figure 1. The ICE will analyze the two signalized intersections that form the Trent Ave/Sullivan Rd interchange, Sullivan Rd at the Trent Ave westbound ramps and Sullivan Rd at the Trent Ave eastbound ramps, as well as the side street stop-controlled intersection at Trent Ave/Progress Rd.

Figure 1. Study Facilities

Analysis Years and Time Periods

Existing Conditions

Turning movement data collected in 2019 at the Trent Ave/Sullivan Rd interchange and in 2020 at the Trent Ave/Progress Rd intersection will be used to document existing traffic operations. Five years of crash data will be used to document safety conditions. Operations and safety at the three study intersections will be evaluated quantitatively, while other elements will be evaluated qualitatively.

Opening and Design Years

As required by the WSDOT Design Manual, analysis will be completed for the project's opening year and a design year. The estimated year of opening for the project is 2030; the opening year analysis will provide information related to the near-term functionality of the Trent Ave/Sullivan Rd interchange to accommodate changing travel patterns resulting from the Bigelow Gulch/Forker Road Urban Connector. A design year of 2050 has been selected to evaluate long-term performance as regional travel demand continues to grow and is consistent with the City's needs for engineering design. The 20-year period between year of opening and design year is typical for evaluation of capacity expansion projects and is also in line with regional travel demand forecasting practices as forecasts over longer periods become more speculative.

Two analysis periods will be used: AM and PM peak hours. The ICE will evaluate the No Build condition and the alternatives that pass the feasibility screening. The 2020 Sullivan Road Corridor Advanced Study Addendum concluded that projected traffic levels would exceed the capacity of the interchange's existing geometry by 2040. While the City has implemented some lower cost improvements to the corridor to support continued mobility, the Sullivan Road Corridor Advanced Study Addendum (Appendix A) completed by the City has determined that the bridge and interchange will need to be replaced to adequately address mobility needs.

Project Needs and Performance Metrics

The BNSF railroad line parallels Trent Ave to the south, limiting connectivity. The Evergreen Rd crossing one mile west of Sullivan Rd serves only Kaiser Aluminum and Centennial Properties Inc, meaning the nearest public access across the railroad in the westerly direction is at Pines Rd. The Flora Rd crossing one mile east of Sullivan Rd will be closed in 2022 following completion of the Barker Rd/BNSF Grade Separation Project which will also include a roundabout at Trent Ave. Therefore, by 2022, the nearest crossings on either side of Sullivan Rd will be roughly two miles in each direction, adding to the need for improvements at Sullivan Rd and Trent Ave. Sullivan Road also crosses the Spokane River and I-90 to the south, making it a key crossing opportunity for both vehicles and active transportation users. Sullivan Road will be the primary recipient of the Bigelow Gulch/Forker Road Urban Connector. There are residential areas and schools immediately north of the interchange and a large industrial area immediately south of the interchange. Beyond the industrial area, the Centennial Trail runs along the Spokane River with large residential and commercial areas south of I-90. The following table summarizes the baseline needs for the project and proposed metrics and targets to be used in evaluating each alternative.

Table 1: Project Needs and Performance Metrics

Project Need	Metric	Target
Baseline Needs		
BN1. Provide appropriate facilities to address the travel demand needs of all modal priorities	Intersection traffic operations	LOS D during AM and PM peak hours in 2050. 95th percentile queues can be accommodated on off-ramps without spilling back onto Trent Ave
BN2. Provide active transportation facilities suitable to a principal arterial in a suburban context	Predicted number of fatal and serious injury crashes per year	Fewer comparative predicted crashes in the 2050 design year.
	Level of comfort and design for multimodal users	Pedestrian and bicycle facilities consistent with the Spokane Valley Comprehensive Plan and Bike and Pedestrian Master Program Pedestrian delay

Forecasting Approach

Because the main driver for the Sullivan Road Corridor Advanced Study Addendum was the completion of a new regional connection, the SRTC regional travel demand model was used to understand future year volumes along the Sullivan Road corridor. However, this ICE focuses specifically on the forecasts and operations of the Sullivan Rd/Trent Ave interchange. The Sullivan Road Corridor Advanced Study Addendum, completed in June 2020, included development of 2040 forecasts. At that time, SRTC staff provided 2018 and 2040 travel demand model traffic volumes for the study area which were used to determine growth rates that were applied to existing turning movement counts. A Traffic Analysis Zone (TAZ) map and land use table are included as Appendix B of this memo. The underlying land use assumptions were reviewed for consistency with the City's most recent planning efforts and adjustments were made to more accurately reflect the expected growth in industrial areas on either side of the Sullivan Rd corridor. This included adding roughly 400 new PM peak hour trips that would turn onto, off of, or cross Sullivan Rd.

The Sullivan Rd/Trent Ave ICE project team developed forecasts based on the 2040 conditions and adjusted them to 2030 and 2050 using annual growth rates based on historic annual traffic growth rates in Spokane Valley.

The SRTC model assumes network changes consistent with the adopted Metropolitan Transportation Plan, Horizon 2040. The forecasts reflect the following network changes between the base year and future year models in the area around the Sullivan Road and Trent Avenue interchange:

- The US 395 freeway (North Spokane Corridor) extended and connected to I-90;
- Widening of I-90 to three lanes in each direction from Sullivan Road interchange to Barker Road interchange and construction of the Kramer Parkway undercrossing[1]—the SRTC base year model includes two lanes in each direction between Sullivan Road and Barker Road although the widening to three lanes was completed in 2013. To account for this discrepancy, a sensitivity test will be conducted to adjust volumes as needed to reflect appropriate base year model volumes;
- The Barker Road/I-90 interchange reconfigured to a standard diamond interchange with two-lane roundabouts plus slip ramps for right-turn movements at both ramps;
- The Barker Road/Trent Avenue intersection reconfigured and including lane widening to two lanes in each direction on Barker Road south to the realigned Wellesley Avenue;
- Widening of Sullivan Road bridge over Spokane River to three lanes in the southbound direction (already completed);
- Bigelow Gulch Road widened to four lanes and connected to Sullivan Road with a traffic signal at Wellesley Avenue; and
- New northbound and southbound left turn lanes on Sullivan Road at the Trent Avenue/SR 290 ramps.

While the configuration of an improved Sullivan Road/Trent Avenue interchange has not yet been determined, this modeling approach recognizes that capacity would be improved in some way such that the forecasts are not constrained by the current configuration. Lastly, the model was not updated to reflect the planned roundabout at Pines Road/Trent Avenue. However, this would not affect the travel demand forecasts at Sullivan Road/Trent Avenue because the model's procedure sequence uses the same capacity calculation for both signals and roundabouts.

The resulting forecasts are summarized in Figure 2.

[1] Note the SRTC model originally used for forecasting also included widening of I-90 to three lanes in each direction between Barker Road and Liberty Lake Road as well as the Appleway Road/E Country Vista Drive/I-90 interchange reconfigured to a diamond interchange. Based on feedback from WSDOT and discussions with SRTC that the 2045 version of the model will not include these changes, Fehr & Peers revised the network in that area to remove those projects and include the Kramer Parkway undercrossing instead. The resulting volume adjustments have been incorporated into the study intersection forecasts shown in Figure 2.

Traffic Operations Methodology

The project team will use Synchro and SIDRA to analyze the alternatives, and apply the settings outlined in the WSDOT Sidra Policy Settings and WSDOT Synchro Protocol.[2] Per WSDOT and local standards, the following adjustments will be made as part of the analysis:

- A saturation flow rate of 1,700 vehicles per hour per lane.
- A peak hour factor of 1.0.

Safety Analysis Methodology

A safety evaluation consistent with WSDOT's Safety Analysis Guide will be completed. This will include using WSDOT's spreadsheet tool for urban and suburban arterials based on the HSM predictive method. Because the tool does not include a roundabout control option, crash reduction factors will be applied to the signalized results based on research provided by WSDOT[3] -- a 75% crash reduction factor for injury collisions and a 37% crash reduction factor for total collisions.

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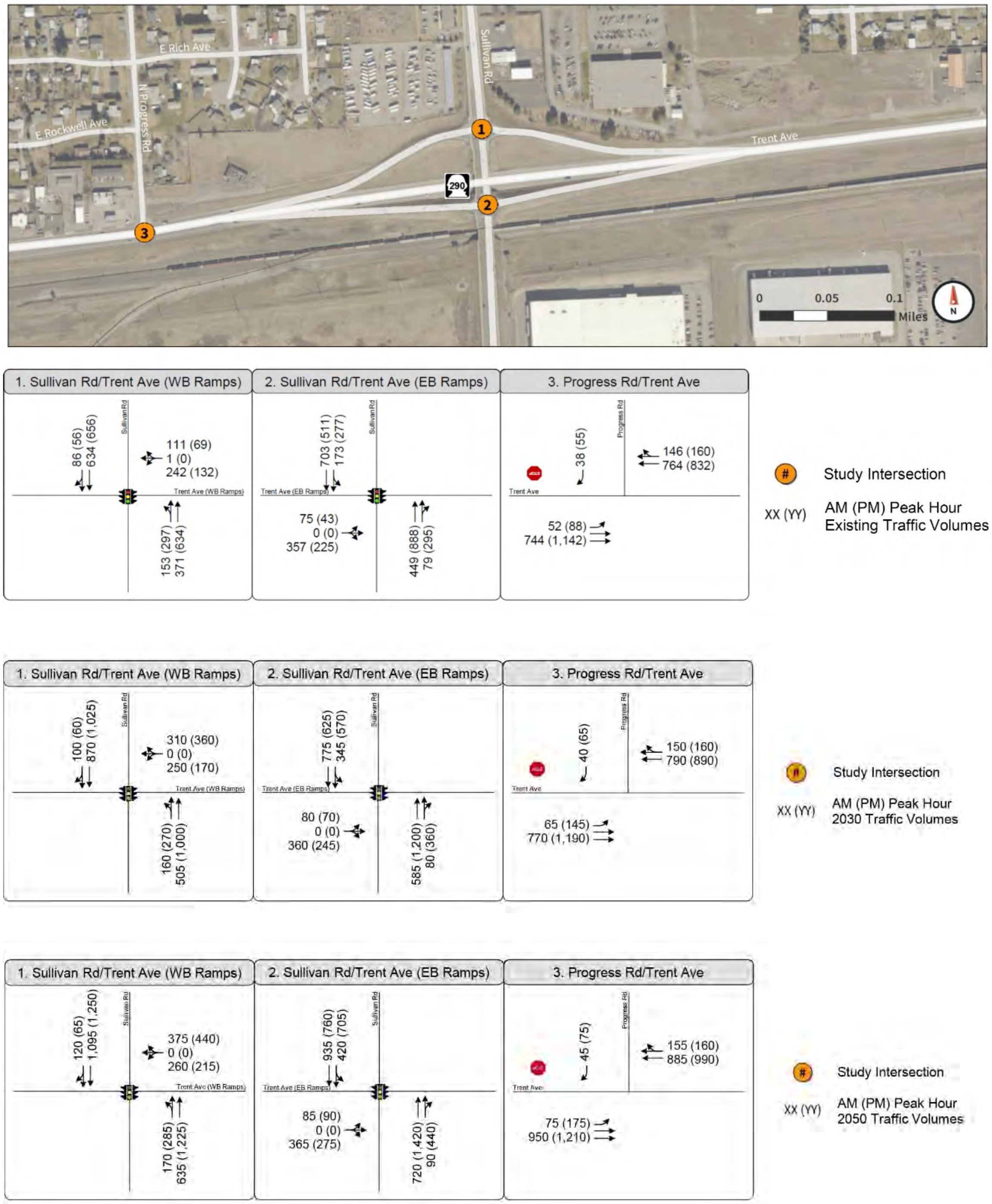
[2] WSDOT Traffic Analysis, https://wsdot.wa.gov/Design/Traffic/Analysis/default.htm, accessed January 6, 2021.

[3] WSDOT Roundabout Benefits, https://wsdot.wa.gov/Safety/roundabouts/benefits.htm, accessed December 23, 2020.

Figure 2. Turning Movement Forecasts



Appendix A:
Sullivan Road Corridor Advanced Study Addendum

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Sullivan Road Corridor Advanced Study Addendum

Submitted to the

City of Spokane Valley

June 2020

WELCH-COMER
ENGINEERS | SURVEYORS

SULLIVAN ROAD CORRIDOR ADVANCED STUDY ADDENDUM

PROJECT NO. 51068

SUBMITTED TO THE:

CITY OF SPOKANE VALLEY

City of Spokane Valley

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6/24/20

JUNE 2020

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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

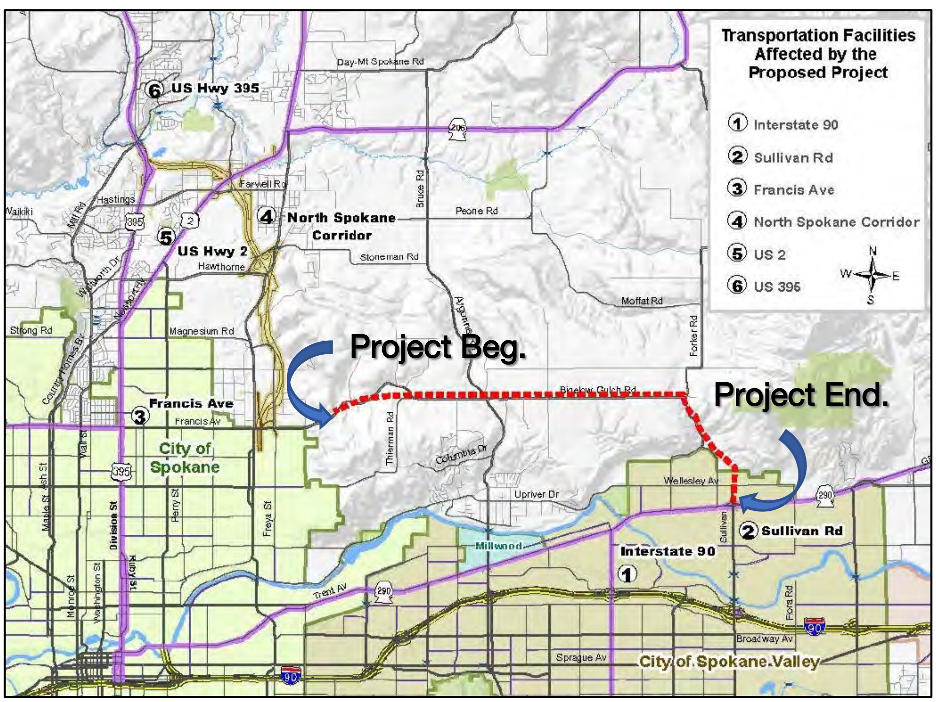
1.1 History

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)	
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

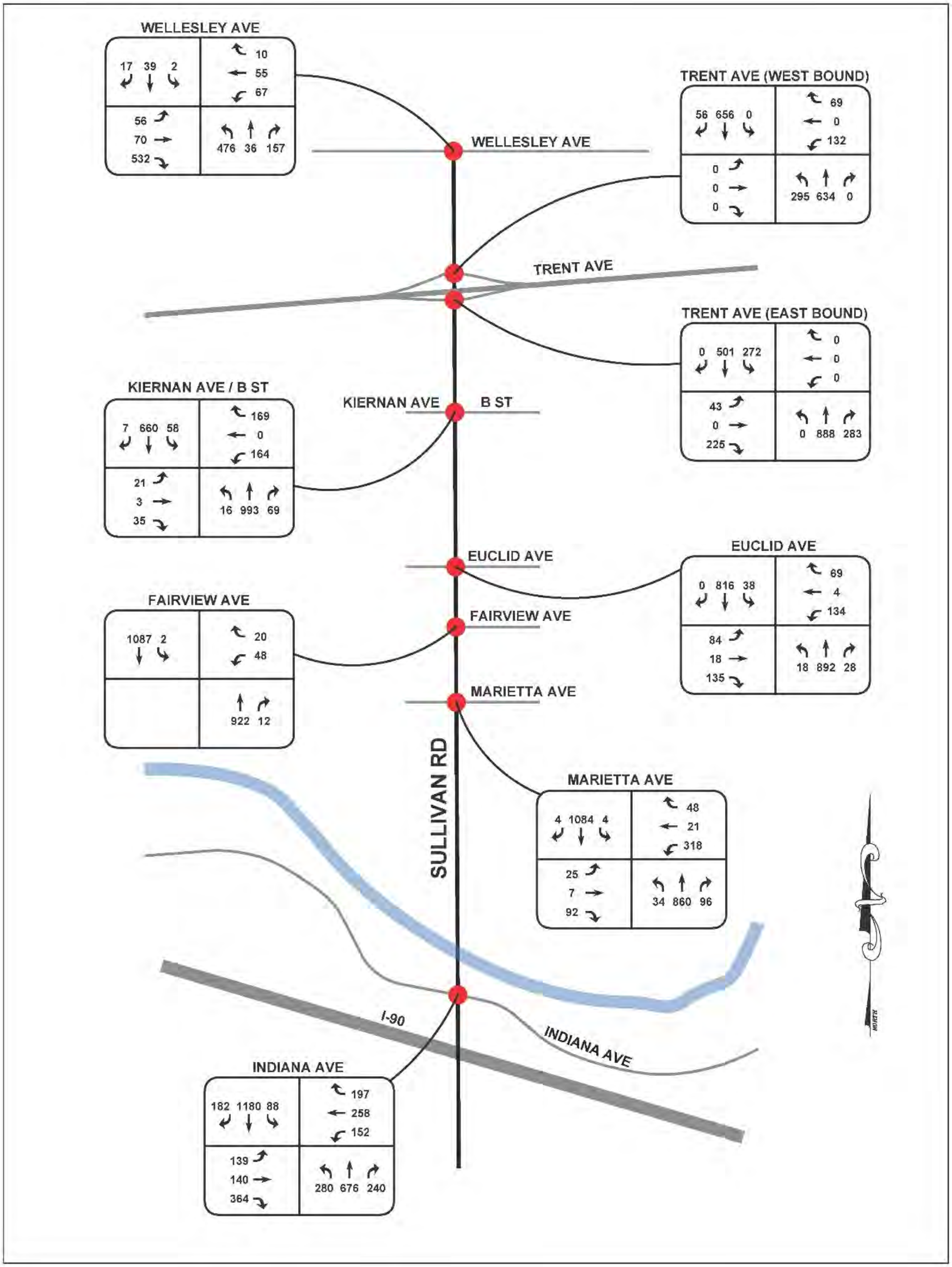
Existing Average Daily Traffic (ADT) volumes were estimated based on PM peak hour volumes and the proportions to daily traffic counts at selected locations along Sullivan Road. This study did not collect 24-hour counts, so volume ratios were taken from the previous study. Table 2-2 summarizes the ADT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

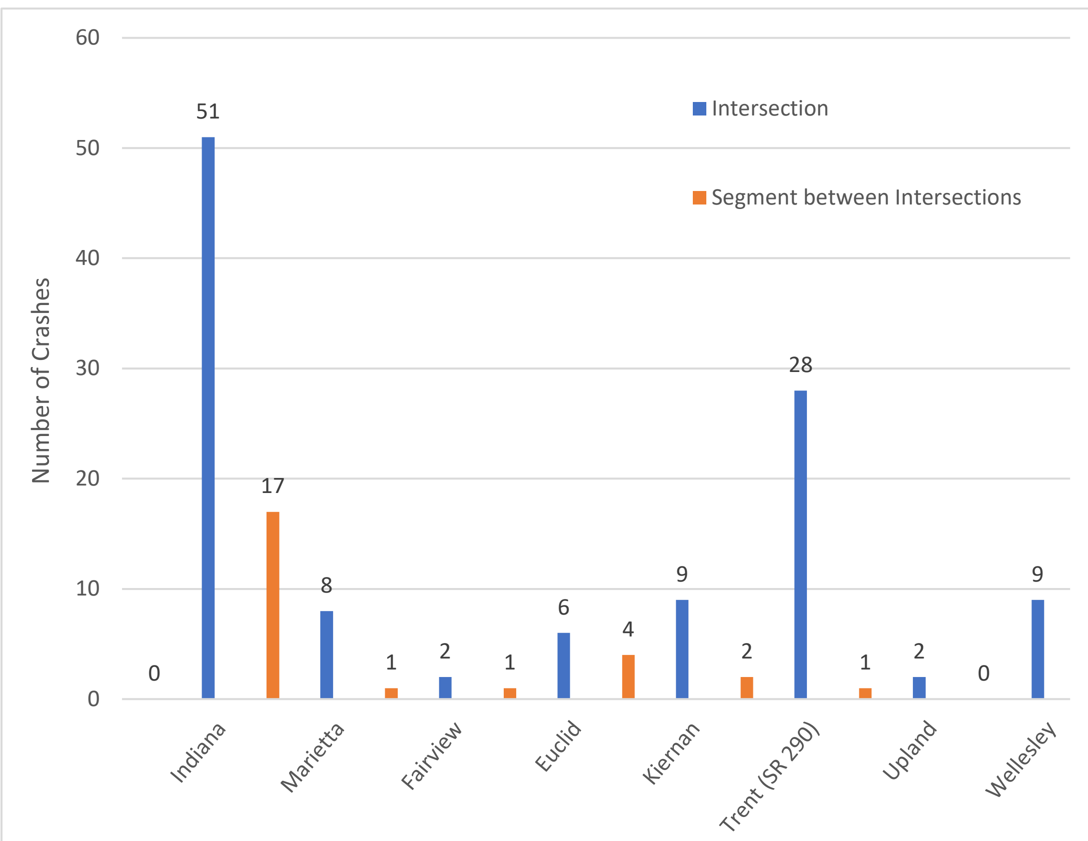
Table 2-7: Crash Data Summary by Severity – 2013-2017

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.

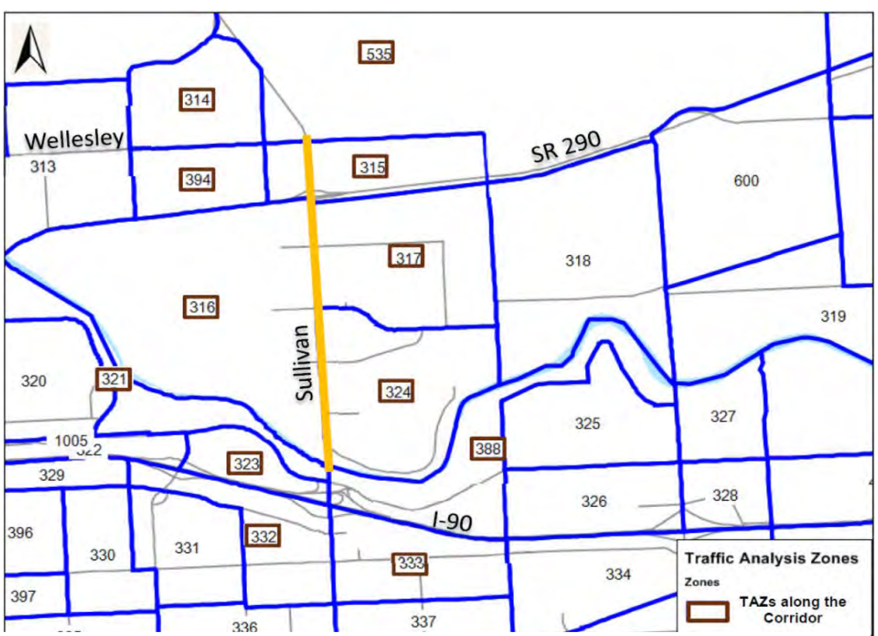
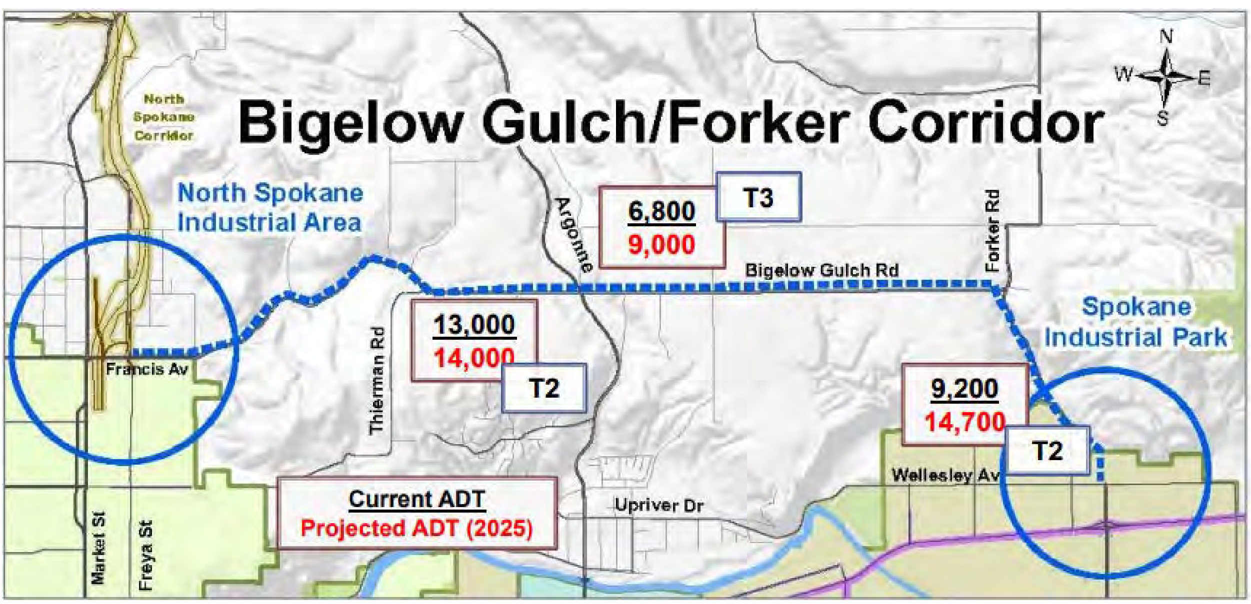


Figure from Original Sullivan Road Corridor Study

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

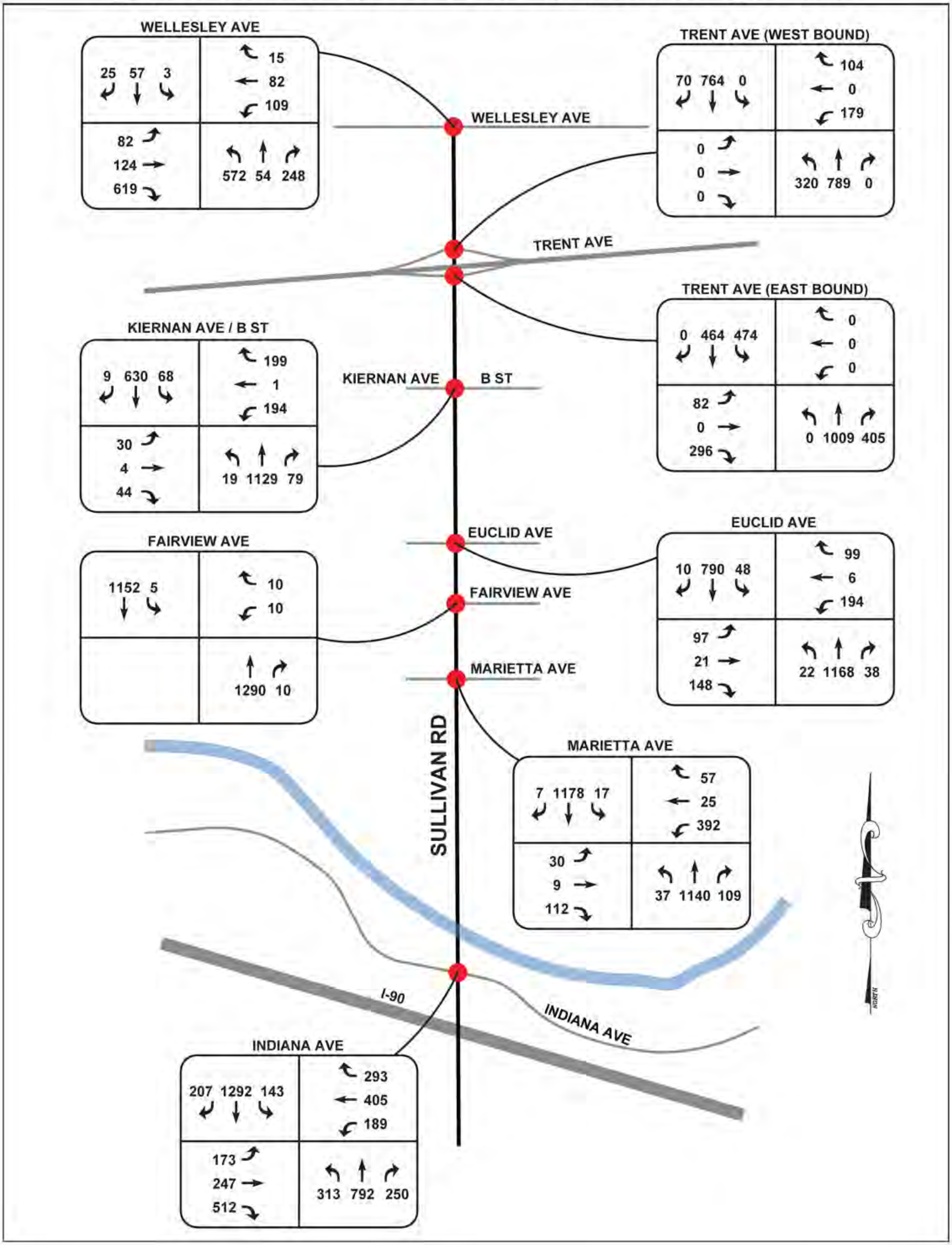
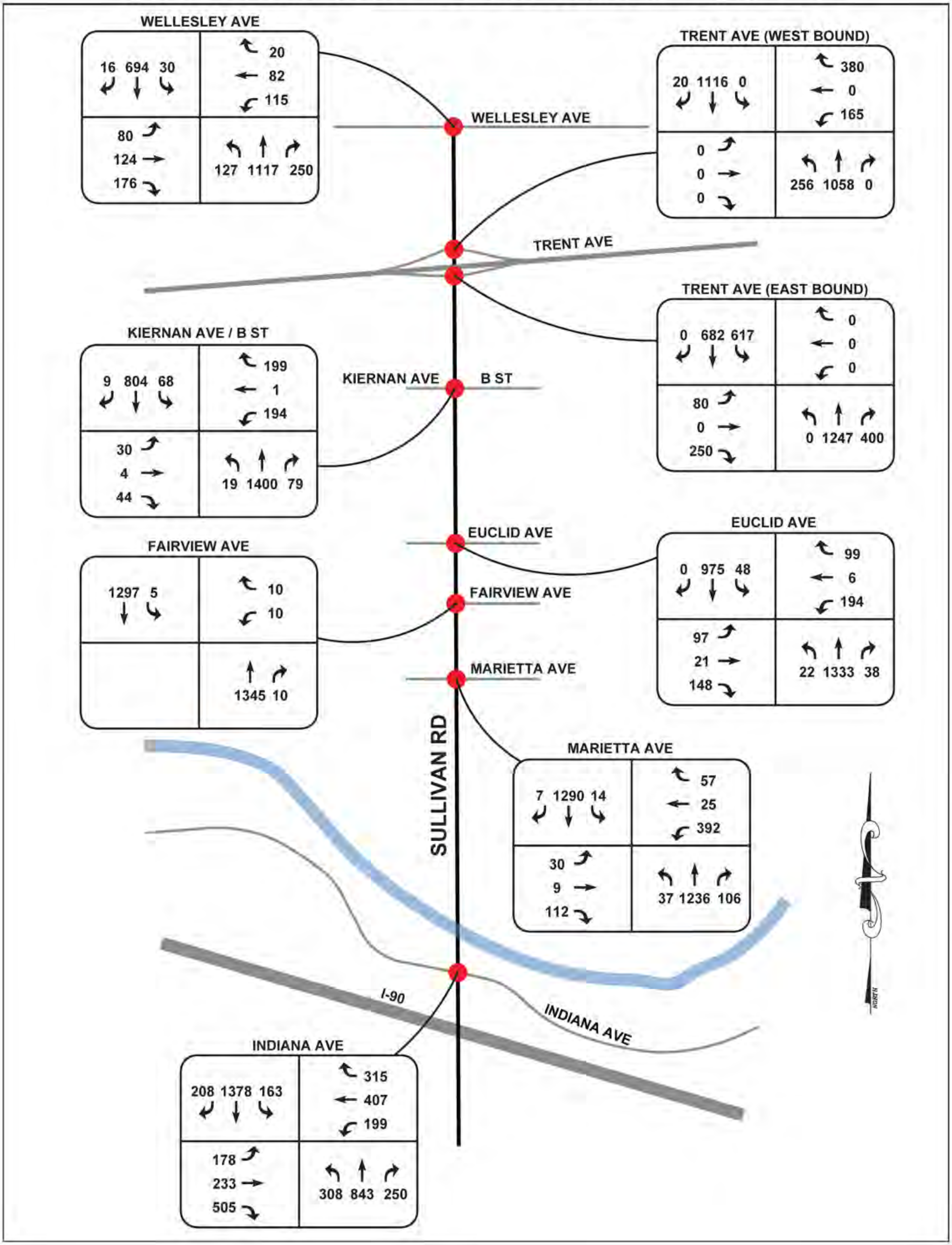


Figure 3-4: 2040 Intersection PM Peak Hour Volumes with Bigelow Gulch



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.

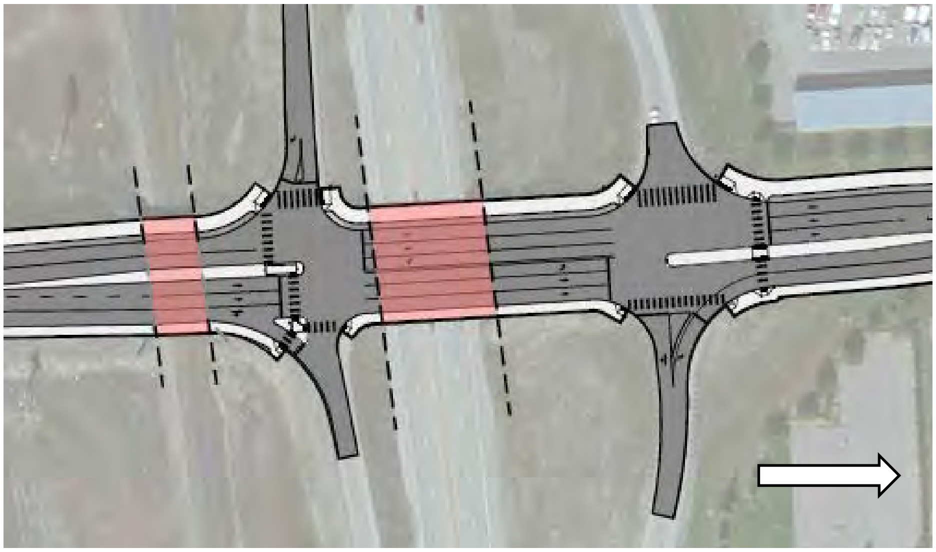
The Washington State Department of Transportation (WSDOT) owns the Trent Avenue right-of-way, as it is part of State Route 290. WSDOT will review and provide input on which design solutions for this intersection would be the most appropriate.

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.

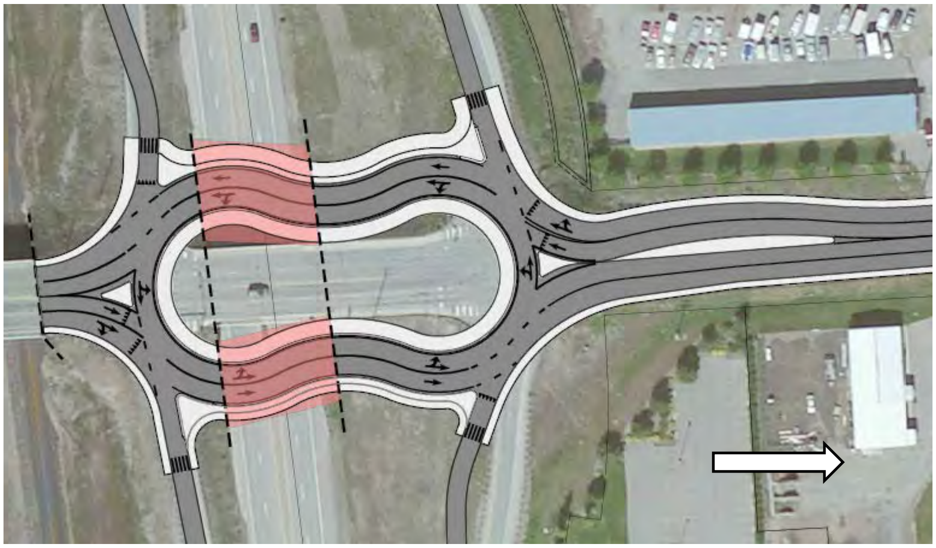
All three designs share general characteristics:

- 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



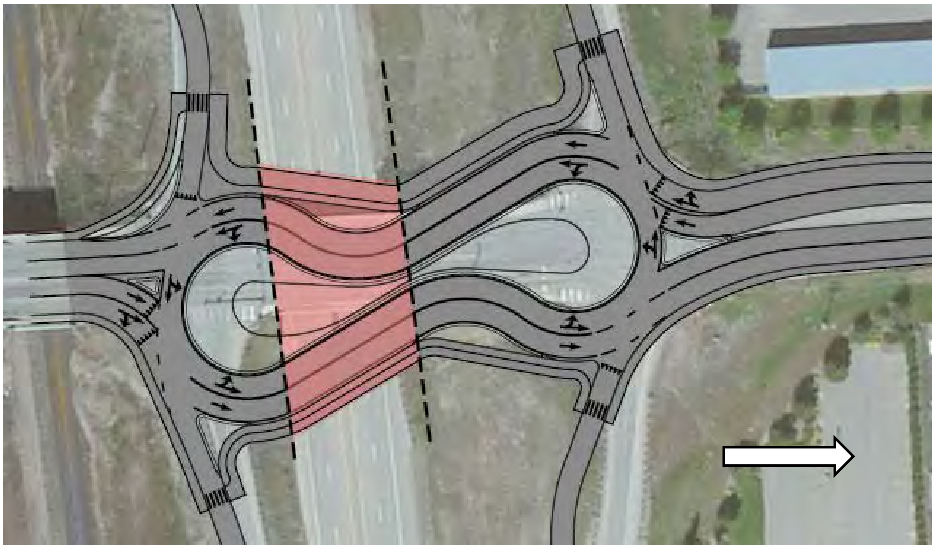
Additionally, this option allows for the existing bridge over Trent Avenue to be used during construction of the two proposed bridges. This will allow for less traffic delays during construction.

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



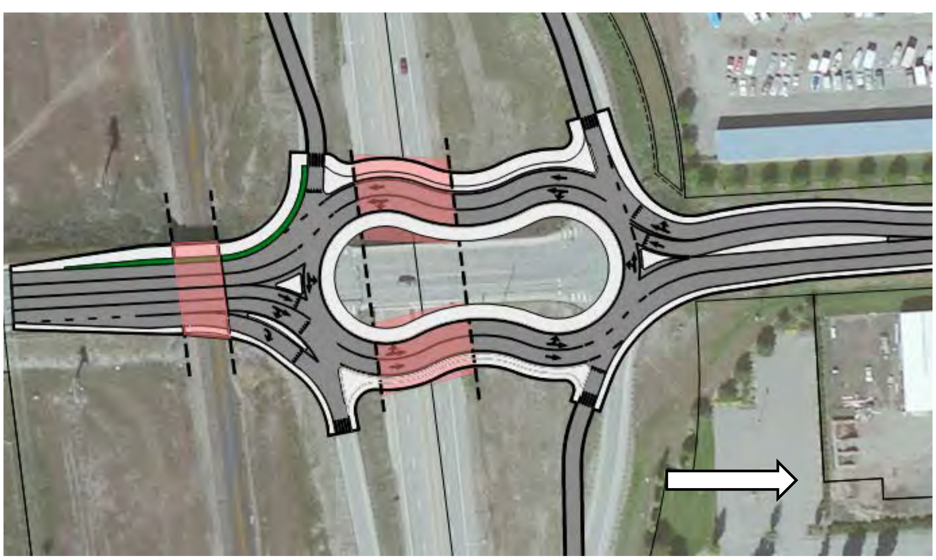
However, this option requires a lane reduction during construction as it was built to maintain traffic on Sullivan Road. This would likely lead to longer delays during construction. An itemized cost estimate for this option was not developed as the geometry was not preferred by the City. However, for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

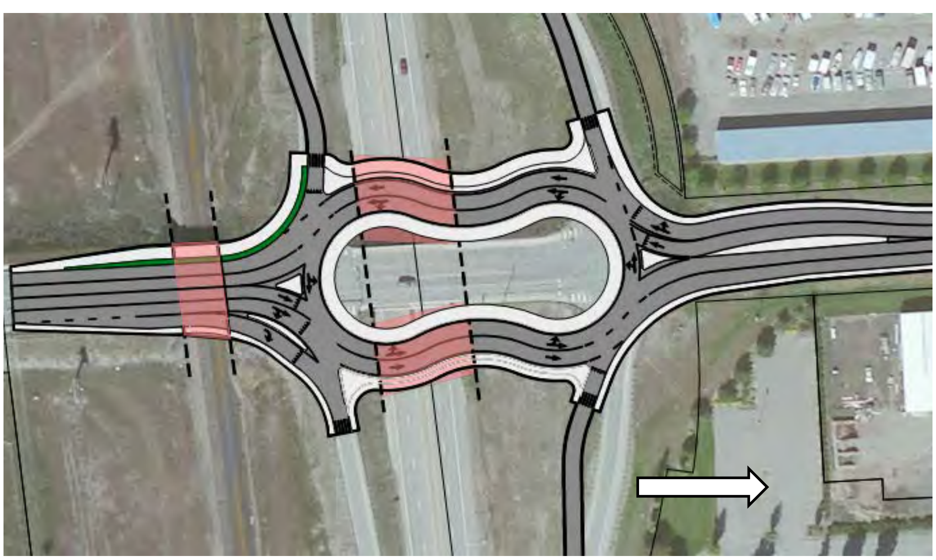
The TWLTL is recommended. As shown in Figure 4-1, the limits of this project would extend from the northern limits of the proposed Trent Avenue project discussed below to the southern limits of the Sullivan and Wellesley Intersection Improvements discussed above, which are just north of Upland Drive. 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

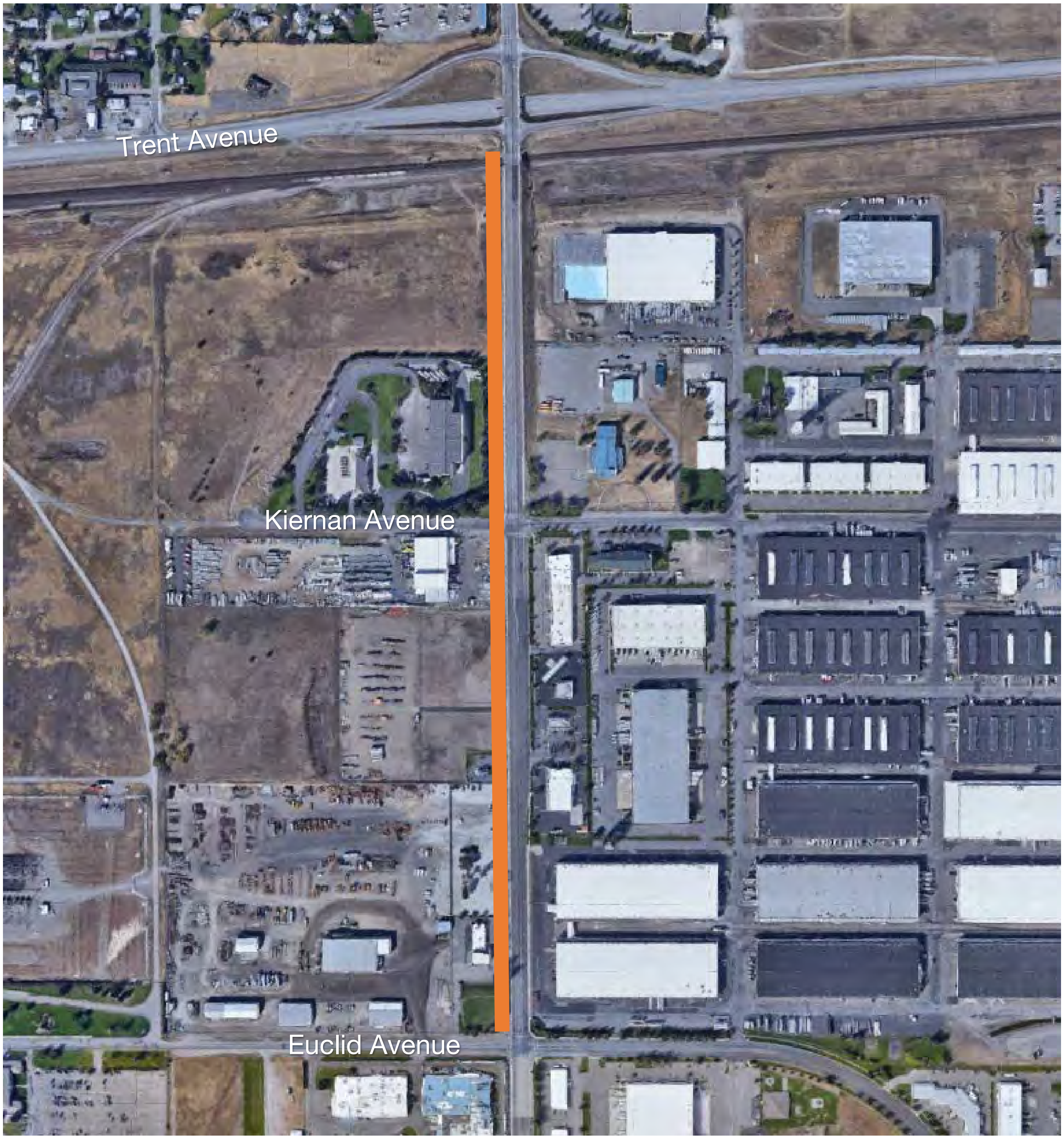
The City shows Sullivan Road as a proposed shared-use path location. Some of this path has been completed; however, there are still multiple gaps. The section from Trent to Wellesley will be completed as part of the Sullivan/Wellesley Improvements, Trent to Upland Widening, and Sullivan/Trent Improvements.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

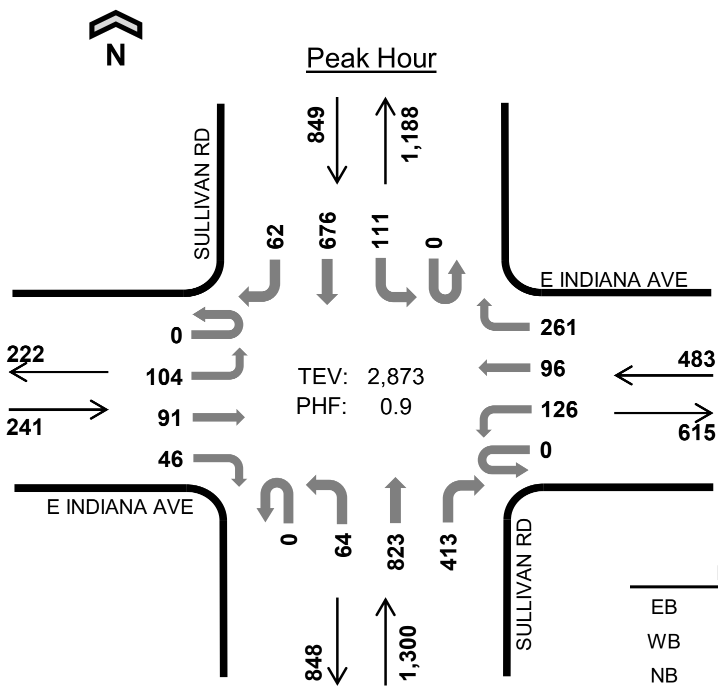
Appendix A

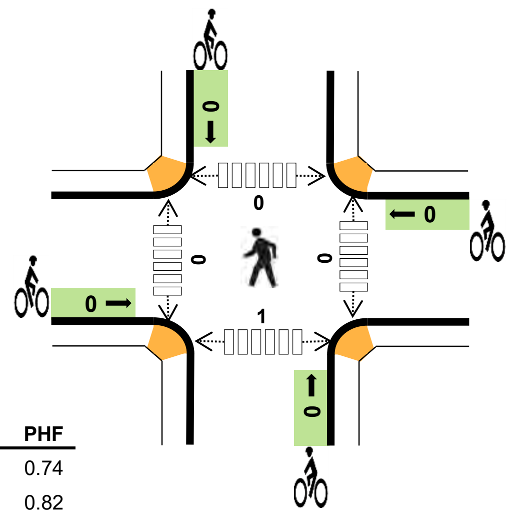
Raw Traffic Count Data

SULLIVAN RD
E INDIANA AVE

idax

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*

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Three-Hour Count Summaries

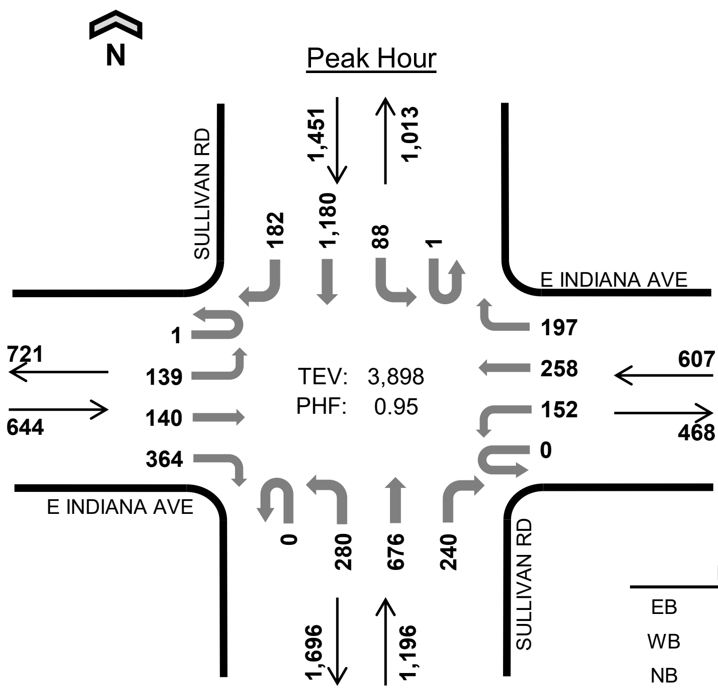
Interval Start	E INDIANA AVE				E INDIANA AVE				SULLIVAN RD				SULLIVAN RD				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
6:00 AM	0	6	5	4	0	4	2	34	0	8	128	15	0	2	73	8	289	0
6:15 AM	0	17	5	7	0	10	13	69	0	12	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**

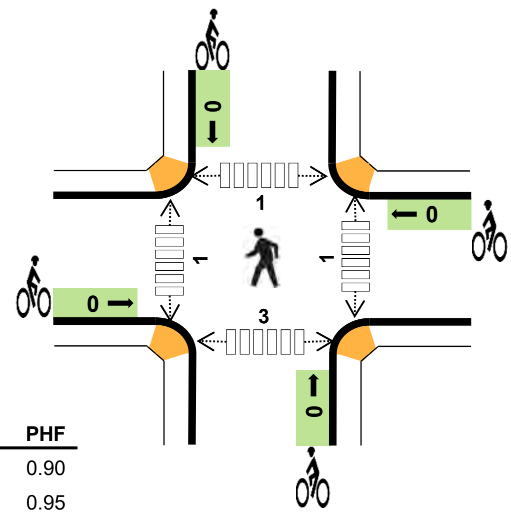
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
6:00 AM	1	1	4	20	*26*	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*
6:30 AM	1	1	11	26	*39*	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*
7:00 AM	3	8	13	41	*65*	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**	**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***
8:15 AM	3	2	18	35	*58*	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*
8:45 AM	1	4	27	36	*68*	0	0	0	0	*0*	0	0	1	1	*2*
Count Total	32	43	175	390	*640*	0	0	0	0	*0*	0	0	4	2	*6*
Peak Hour	**12**	**17**	**66**	**154**	***249***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**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

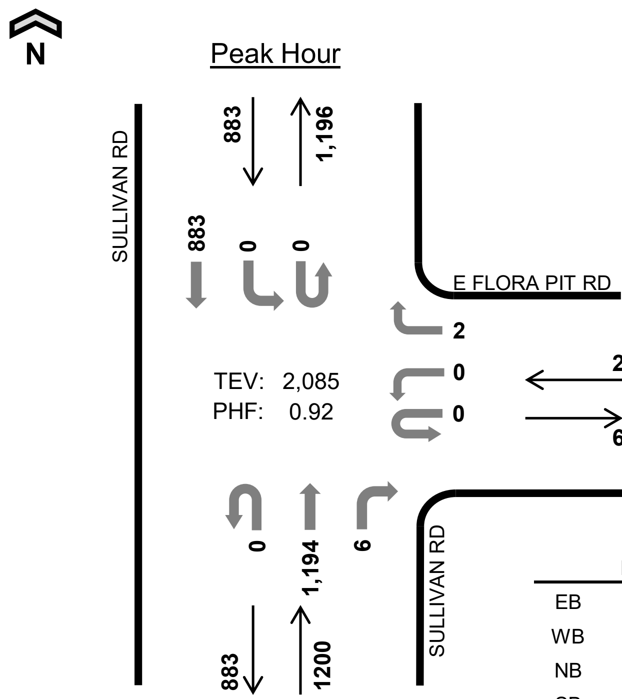
Interval Start	E INDIANA AVE Eastbound UT	LT	TH	RT	E INDIANA AVE Westbound UT	LT	TH	RT	SULLIVAN RD Northbound UT	LT	TH	RT	SULLIVAN RD Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
3:00 PM	0	30	39	88	0	36	47	39	0	58	155	66	1	17	225	33	834	0
3:15 PM	0	44	26	74	0	39	53	67	0	54	120	42	0	10	205	35	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**

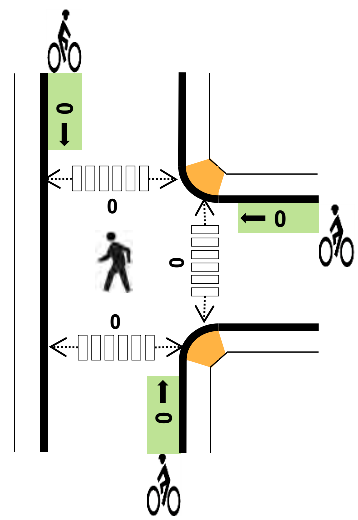
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) 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 Eastbound UT	LT	TH	RT	E FLORA PIT RD Westbound UT	LT	TH	RT	SULLIVAN RD Northbound UT	LT	TH	RT	SULLIVAN RD Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
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 EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) 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*

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Three-Hour Count Summaries

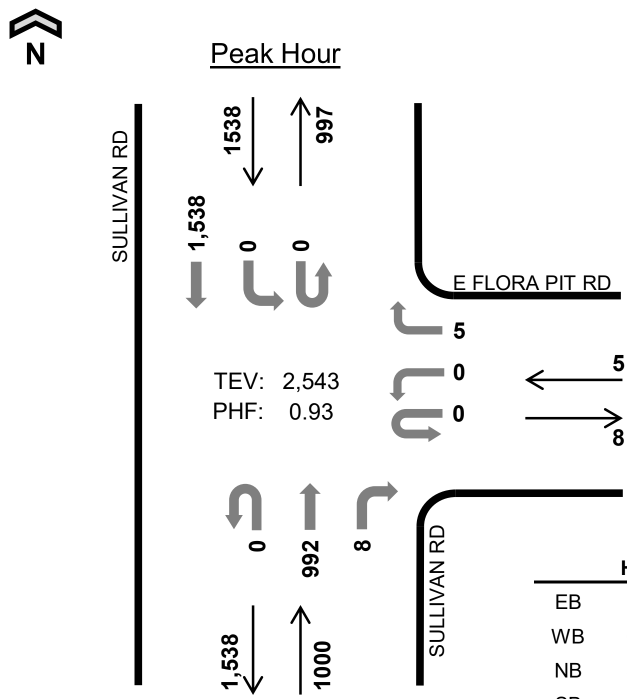
Interval Start	0 Eastbound UT	LT	TH	RT	E FLORA PIT RD Westbound UT	LT	TH	RT	SULLIVAN RD Northbound UT	LT	TH	RT	SULLIVAN RD Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
6:00 AM	0	0	0	0	0	0	0	0	0	0	178	0	0	0	84	0	262	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	210	0	0	0	100	0	310	0
6:30 AM	0	0	0	0	0	0	0	0	0	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.

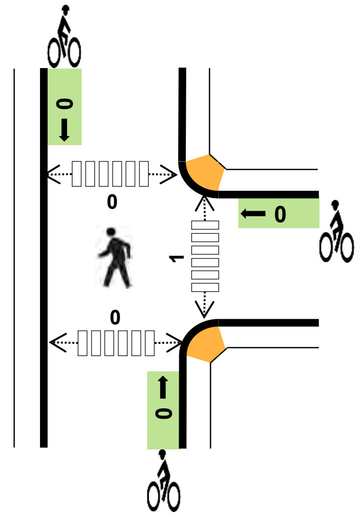
Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
6:00 AM	0	0	3	20	*23*	0	0	0	0	*0*	0	0	0	0	*0*
6:15 AM	0	0	4	15	*19*	0	0	0	0	*0*	1	0	0	0	*1*
6:30 AM	0	0	8	26	*34*	0	0	0	0	*0*	1	0	0	0	*1*
6:45 AM	0	0	14	30	*44*	0	0	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



	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

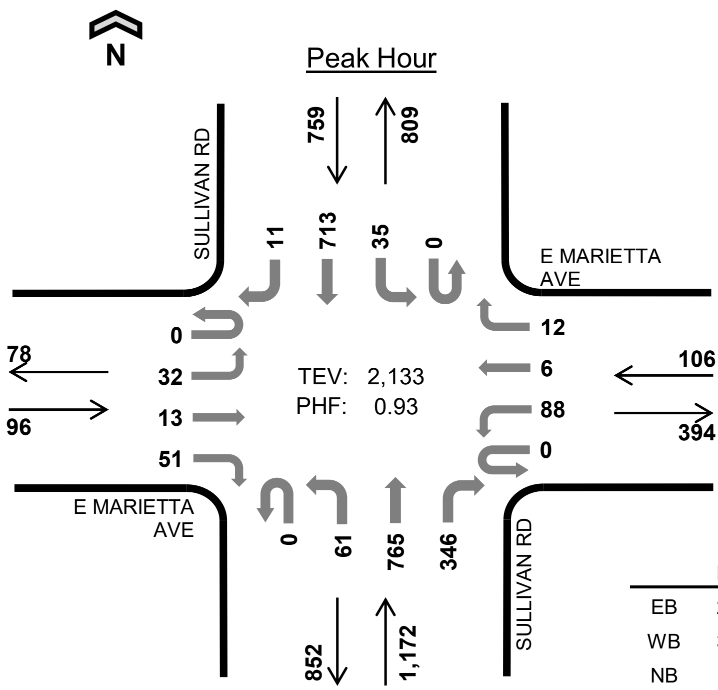
Interval Start	0				E FLORA PIT RD				SULLIVAN RD				SULLIVAN RD				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	0	0	0	0	0	0	1	0	0	213	4	0	0	286	0	504	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	235	1	0	0	268	0	504	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**

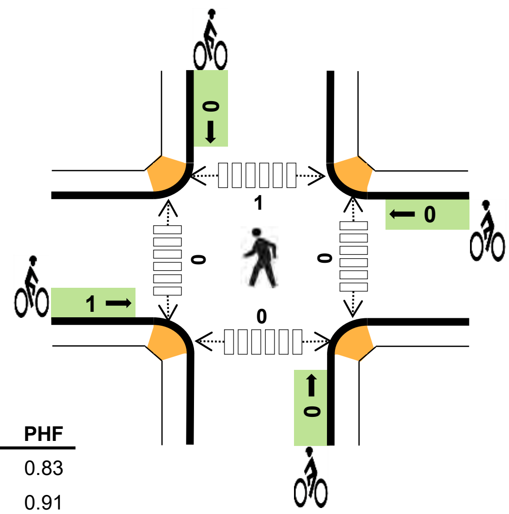
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

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 Eastbound				E MARIETTA AVE Westbound				SULLIVAN RD Northbound				SULLIVAN RD Southbound				15-min Total	Rolling One Hour
	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

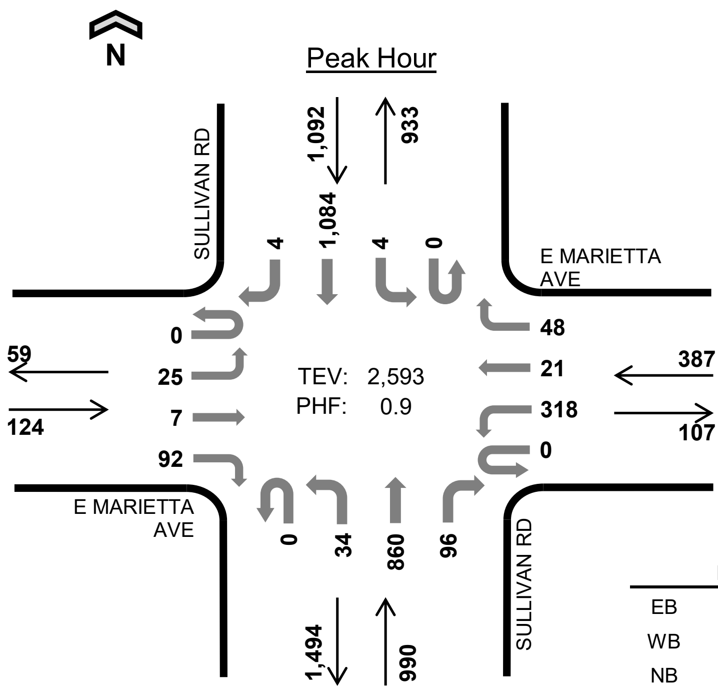
Interval Start	E MARIETTA AVE Eastbound UT	LT	TH	RT	E MARIETTA AVE Westbound UT	LT	TH	RT	SULLIVAN RD Northbound UT	LT	TH	RT	SULLIVAN RD Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
6:00 AM	0	2	3	10	0	8	2	0	0	10	96	52	0	6	77	1	267	0
6:15 AM	0	3	7	8	0	7	1	0	0	12	131	57	0	7	85	3	321	0
6:30 AM	0	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**

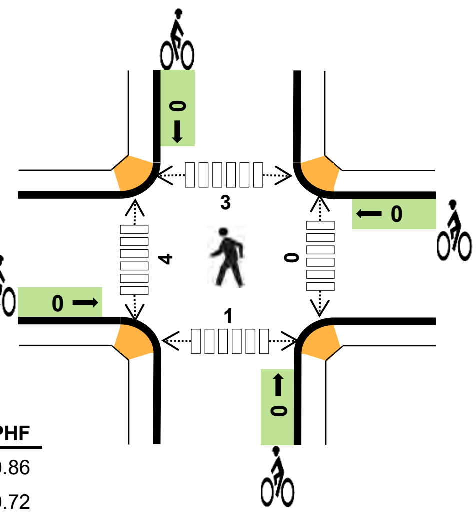
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) 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 Eastbound				E MARIETTA AVE Westbound				SULLIVAN RD Northbound				SULLIVAN RD Southbound				15-min Total	Rolling One Hour
	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

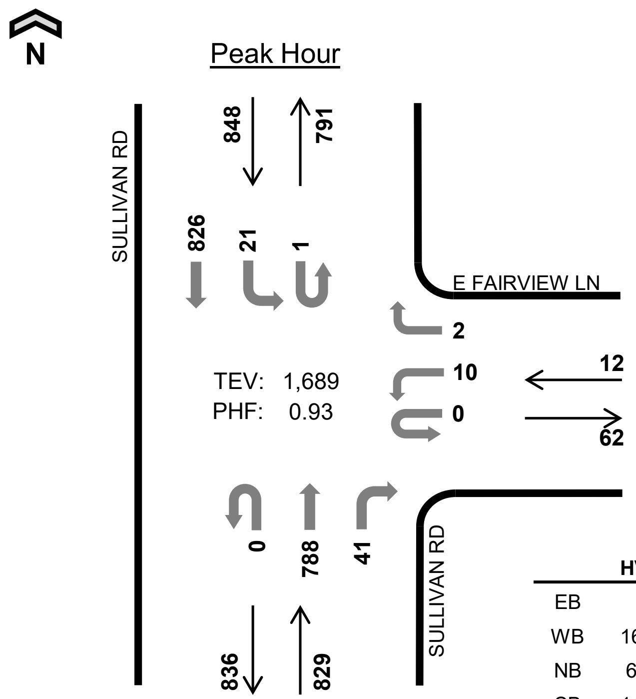
Interval Start	E MARIETTA AVE				E MARIETTA AVE				SULLIVAN RD				SULLIVAN RD				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	8	0	15	0	56	7	9	0	11	172	30	0	4	228	3	543	0
3:15 PM	0	2	5	19	0	45	5	0	0	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.

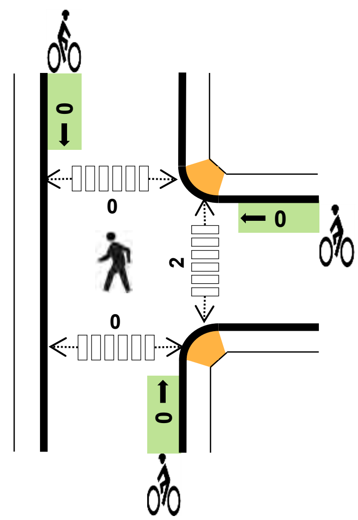
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	2	2	21	17	*42*	0	0	0	0	*0*	0	0	2	0	*2*
3:15 PM	2	2	29	15	*48*	0	0	0	0	*0*	0	0	0	0	*0*
3:30 PM	2	3	24	19	*48*	0	0	0	0	*0*	0	0	0	0	*0*
3:45 PM	3	3	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



	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

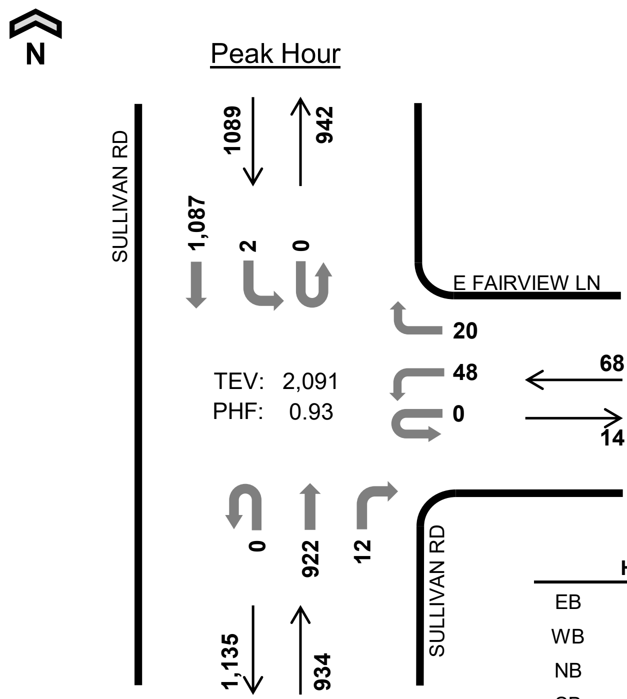
Interval Start	0 Eastbound UT	LT	TH	RT	E FAIRVIEW LN Westbound UT	LT	TH	RT	SULLIVAN RD Northbound UT	LT	TH	RT	SULLIVAN RD Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
6:00 AM	0	0	0	0	0	4	0	1	0	0	95	3	0	5	92	0	200	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	134	3	0	0	104	0	241	0
6:30 AM	0	0	0	0	0	2	0	0	0	0	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.

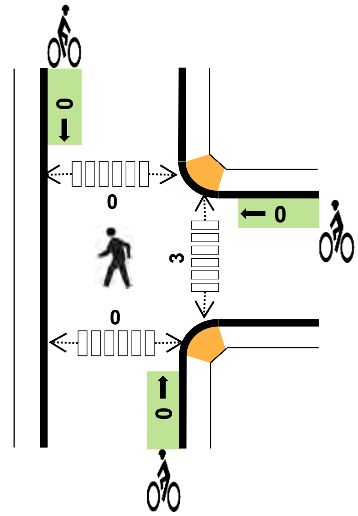
Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
6:00 AM	0	3	2	12	*17*	0	0	0	0	*0*	1	0	0	0	*1*
6:15 AM	0	0	3	14	*17*	0	0	0	0	*0*	0	0	0	0	*0*
6:30 AM	0	2	9	15	*26*	0	0	0	0	*0*	0	0	0	0	*0*
6:45 AM	0	1	8	12	*21*	0	0	0	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



	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 Eastbound UT	LT	TH	RT	E FAIRVIEW LN Westbound UT	LT	TH	RT	SULLIVAN RD Northbound UT	LT	TH	RT	SULLIVAN RD Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
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 EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) 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**

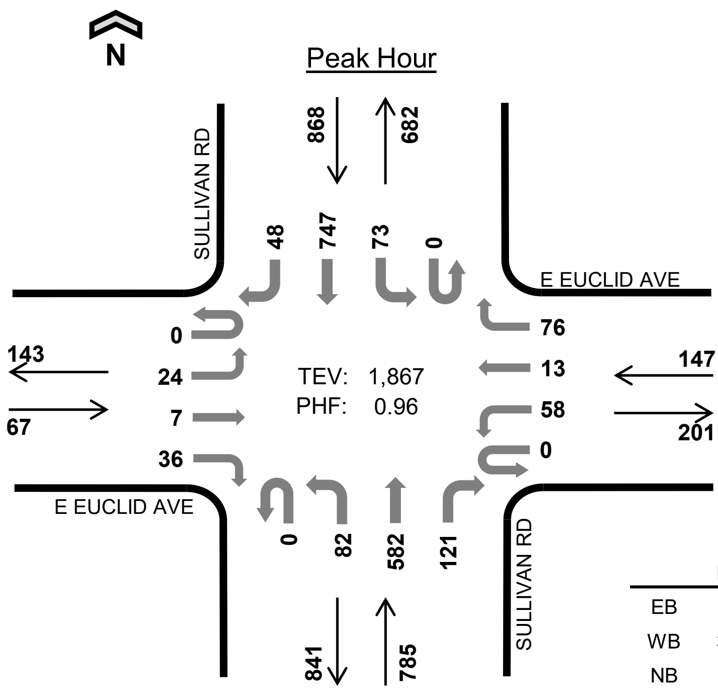
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

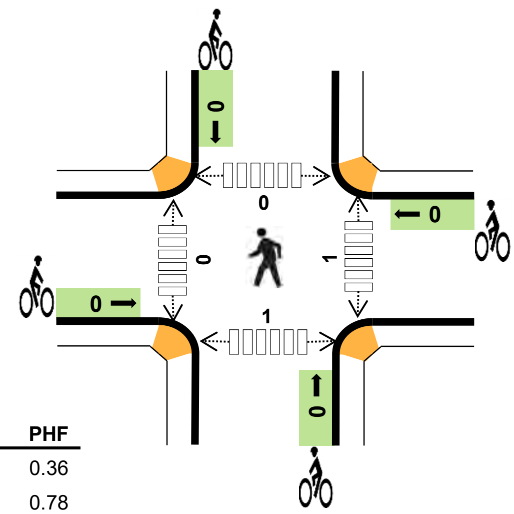
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	0	0	18	17	*35*	0	0	0	0	*0*	0	0	0	0	*0*
3:15 PM	0	0	22	17	*39*	0	0	0	0	*0*	0	0	0	0	*0*
3:30 PM	0	0	17	17	*34*	0	0	0	0	*0*	0	0	0	0	*0*
3:45 PM	0	0	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

Peak Hour





	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	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*
Peak Hour	5	48	50	71	*174*	0	0	0	0	*0*	1	0	0	1	*2*

Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

Three-Hour Count Summaries

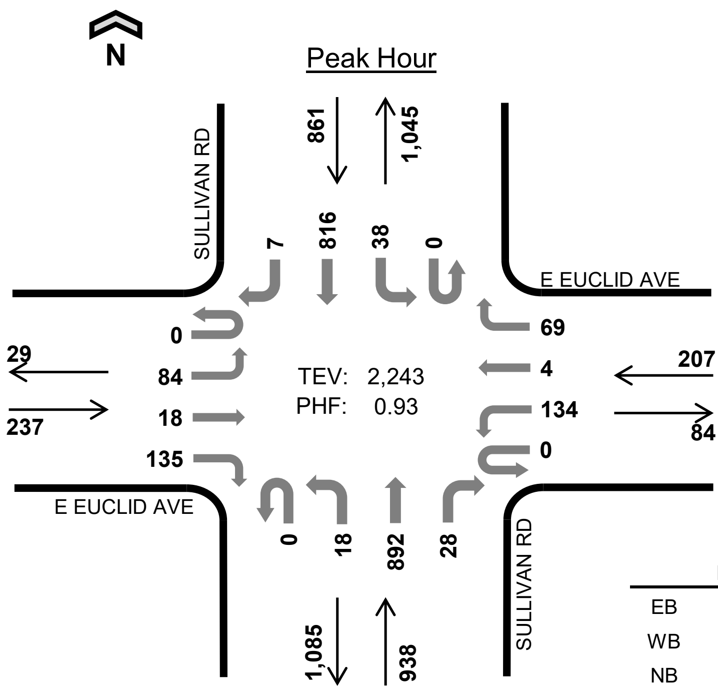
Interval Start	E EUCLID AVE				E EUCLID AVE				SULLIVAN RD				SULLIVAN RD				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
6:00 AM	0	2	1	3	0	10	1	4	0	29	47	22	0	11	81	14	225	0
6:15 AM	0	2	1	5	0	7	5	3	0	34	84	11	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**

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

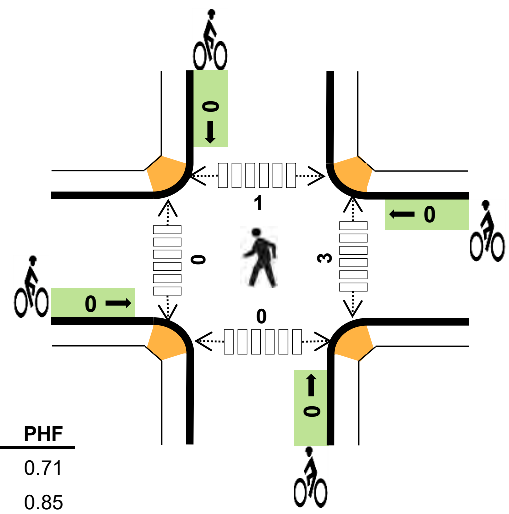
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
6:00 AM	2	4	2	9	*17*	0	0	0	0	*0*	1	0	0	0	*1*
6:15 AM	4	5	2	10	*21*	0	0	0	0	*0*	0	0	0	0	*0*
6:30 AM	5	7	10	6	*28*	0	0	0	0	*0*	0	0	0	0	*0*
6:45 AM	3	7	9	9	*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

Peak Hour



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 Eastbound				E EUCLID AVE Westbound				SULLIVAN RD Northbound				SULLIVAN RD Southbound				15-min Total	Rolling One Hour
	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*

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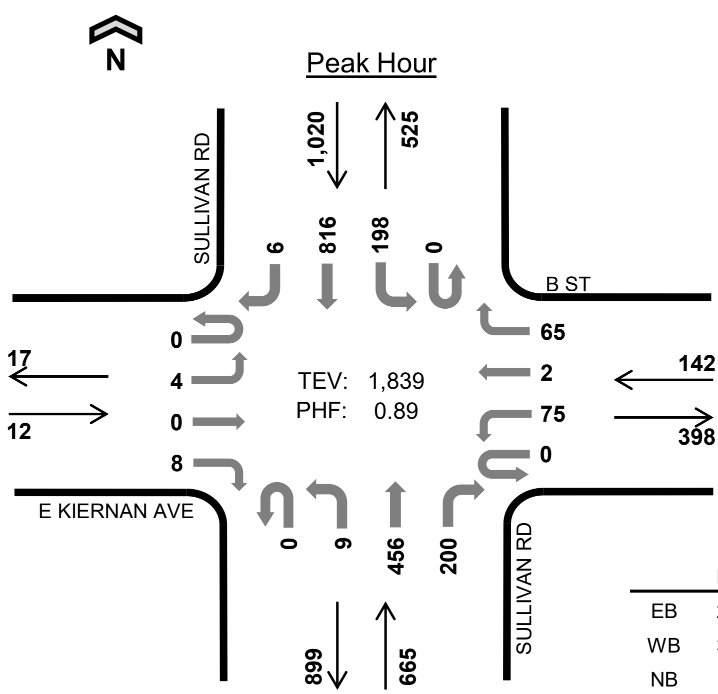
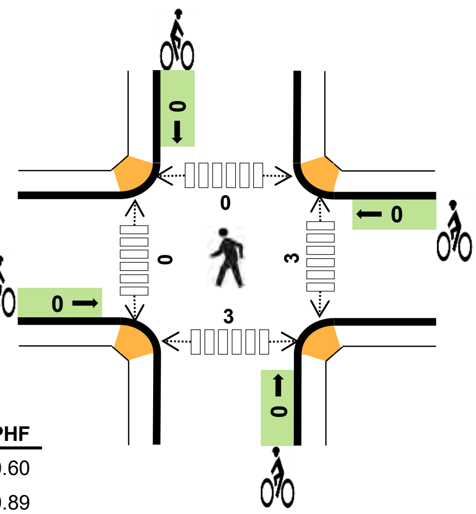
SULLIVAN RD
E KIERNAN AVE

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 Eastbound UT	LT	TH	RT	B ST Westbound UT	LT	TH	RT	SULLIVAN RD Northbound UT	LT	TH	RT	SULLIVAN RD Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
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 EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) 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*

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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**

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

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
6:00 AM	1	8	5	7	*21*	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*
6:30 AM	1	8	9	3	*21*	0	0	0	0	*0*	0	0	0	0	*0*
6:45 AM	1	11	12	7	*31*	0	0	0	0	*0*	0	1	1	0	*2*
7:00 AM	0	6	16	12	*34*	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*
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***
8:15 AM	1	13	10	29	*53*	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*
8:45 AM	1	11	7	9	*28*	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*
Peak Hour	**3**	**49**	**51**	**74**	***177***	**0**	**0**	**0**	**0**	***0***	**3**	**0**	**0**	**3**	***6***

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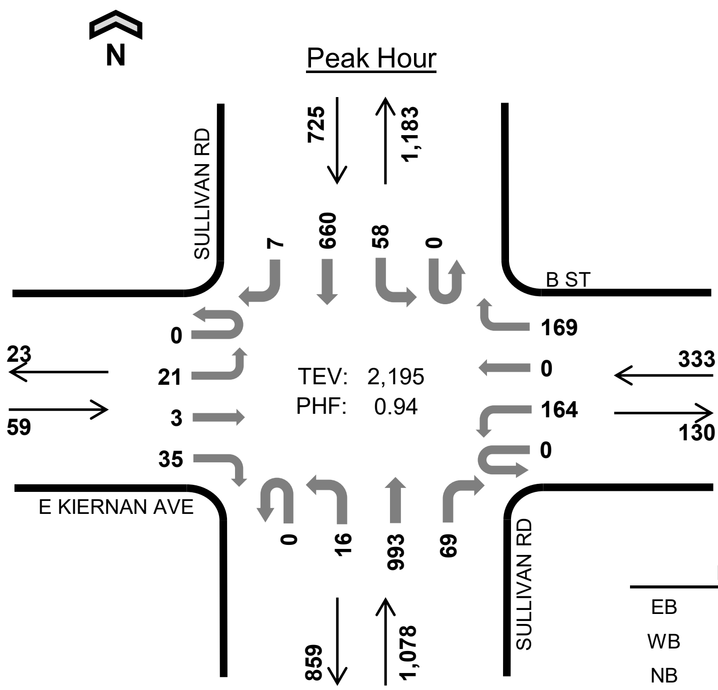
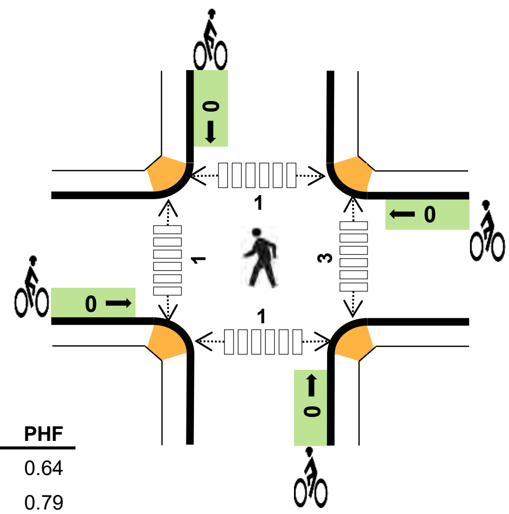
SULLIVAN RD
E KIERNAN AVE

idax

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

Peak Hour





	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	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

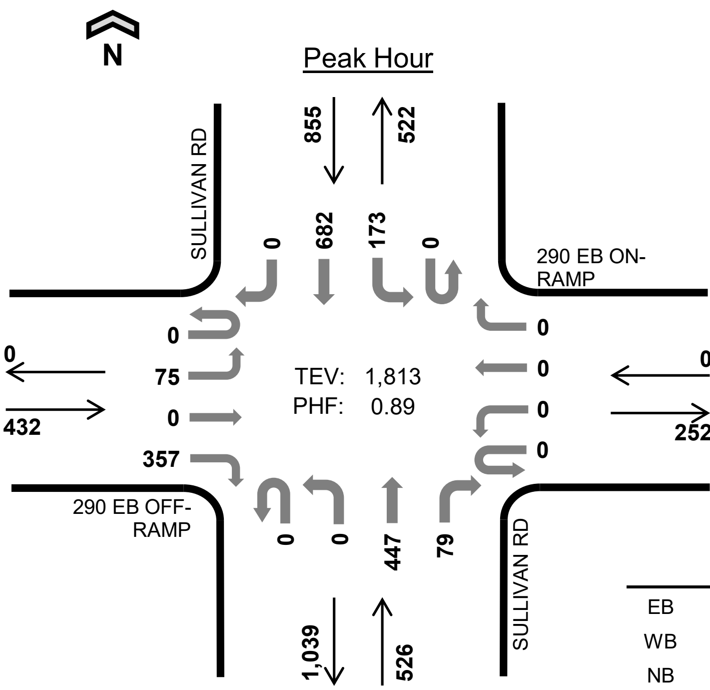
Interval Start	E KIERNAN AVE Eastbound				B ST Westbound				SULLIVAN RD Northbound				SULLIVAN RD Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	9	1	16	0	39	0	33	0	19	179	14	0	16	119	6	451	0
3:15 PM	0	6	0	18	0	26	0	35	0	16	172	17	0	18	129	8	445	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**

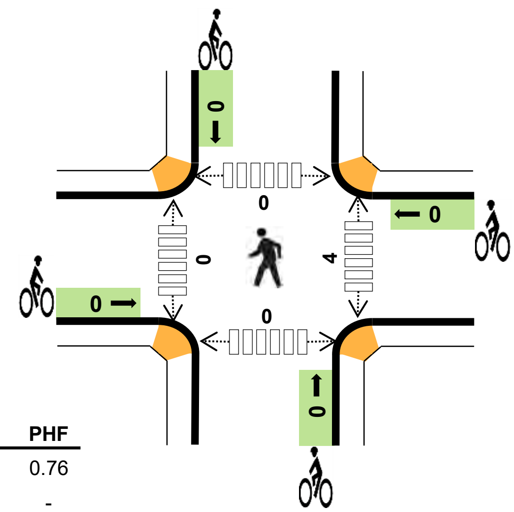
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

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 Eastbound				290 EB ON-RAMP Westbound				SULLIVAN RD Northbound				SULLIVAN RD Southbound				15-min Total	Rolling One Hour
	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**

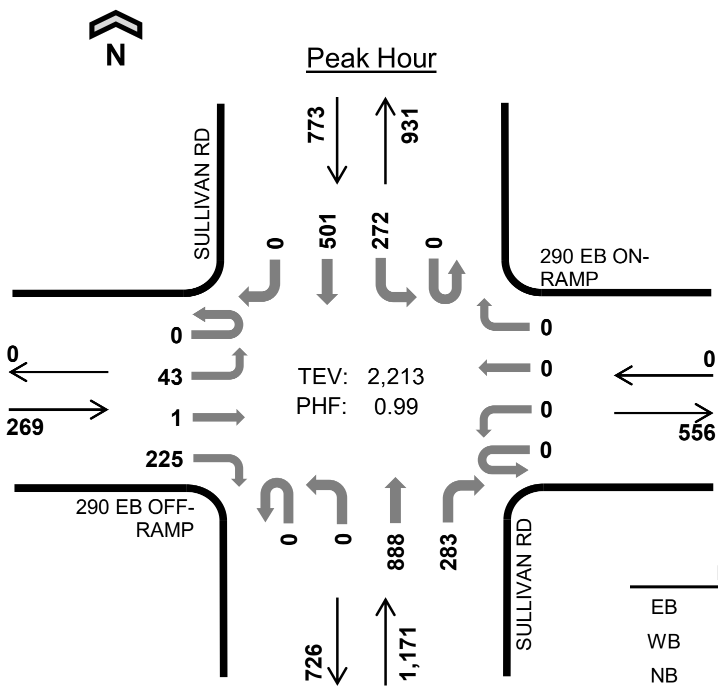
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

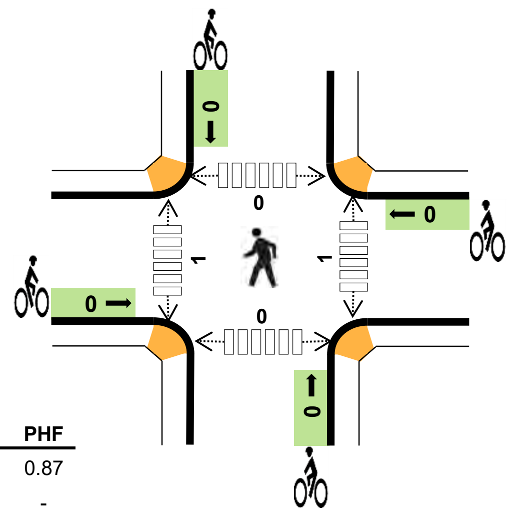
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
6:00 AM	4	0	9	4	*17*	0	0	0	0	*0*	0	0	0	0	*0*
6:15 AM	2	0	9	2	*13*	0	0	0	0	*0*	0	0	0	0	*0*
6:30 AM	1	0	11	3	*15*	0	0	0	0	*0*	0	0	0	0	*0*
6:45 AM	2	0	12	6	*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***

Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

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

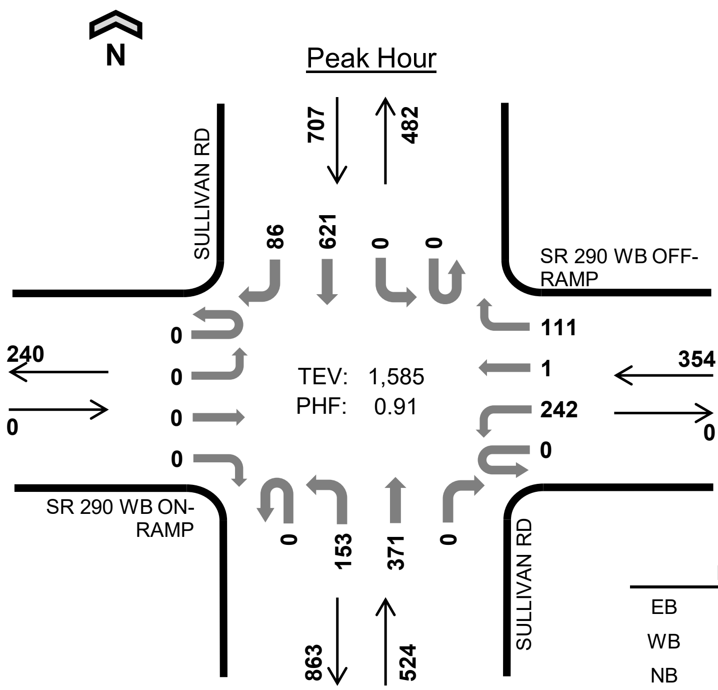
Interval Start	290 EB OFF-RAMP Eastbound				290 EB ON-RAMP Westbound				SULLIVAN RD Northbound				SULLIVAN RD Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	7	0	48	0	0	0	0	0	0	179	48	0	29	97	0	408	0
3:15 PM	0	4	1	67	0	0	0	0	0	0	180	40	0	40	87	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**

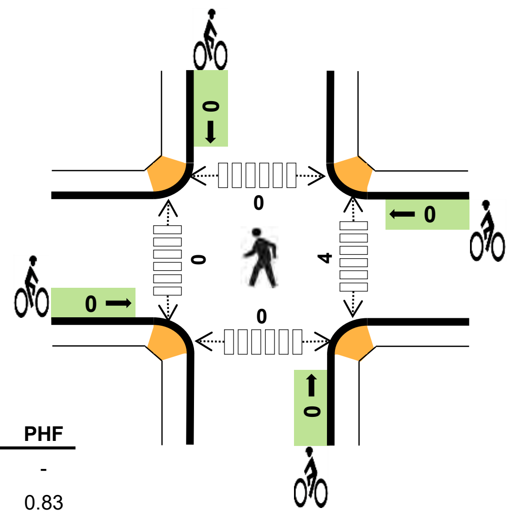
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

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	UT	LT	TH	RT	UT	LT	TH	RT	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**

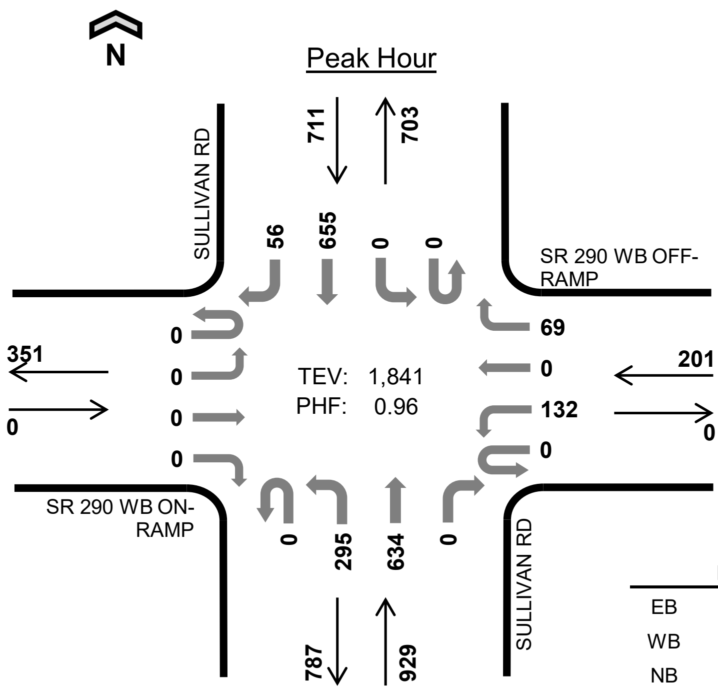
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

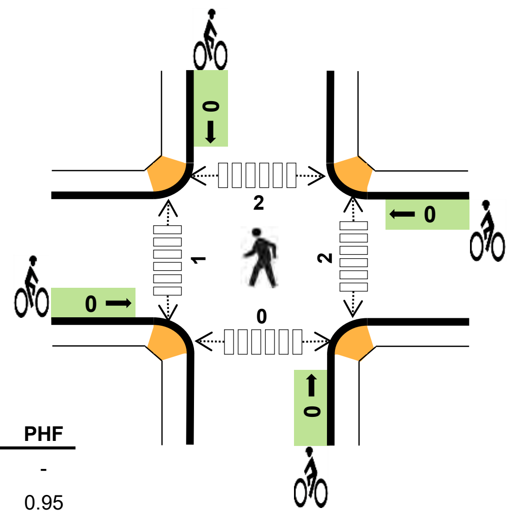
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
6:00 AM	0	4	7	0	*11*	0	0	0	0	*0*	0	0	0	0	*0*
6:15 AM	0	1	7	3	*11*	0	0	0	0	*0*	0	0	0	0	*0*
6:30 AM	0	1	9	3	*13*	0	0	0	0	*0*	0	0	0	0	*0*
6:45 AM	0	3	8	2	*13*	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

Peak Hour





	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	UT	LT	TH	RT	UT	LT	TH	RT	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.

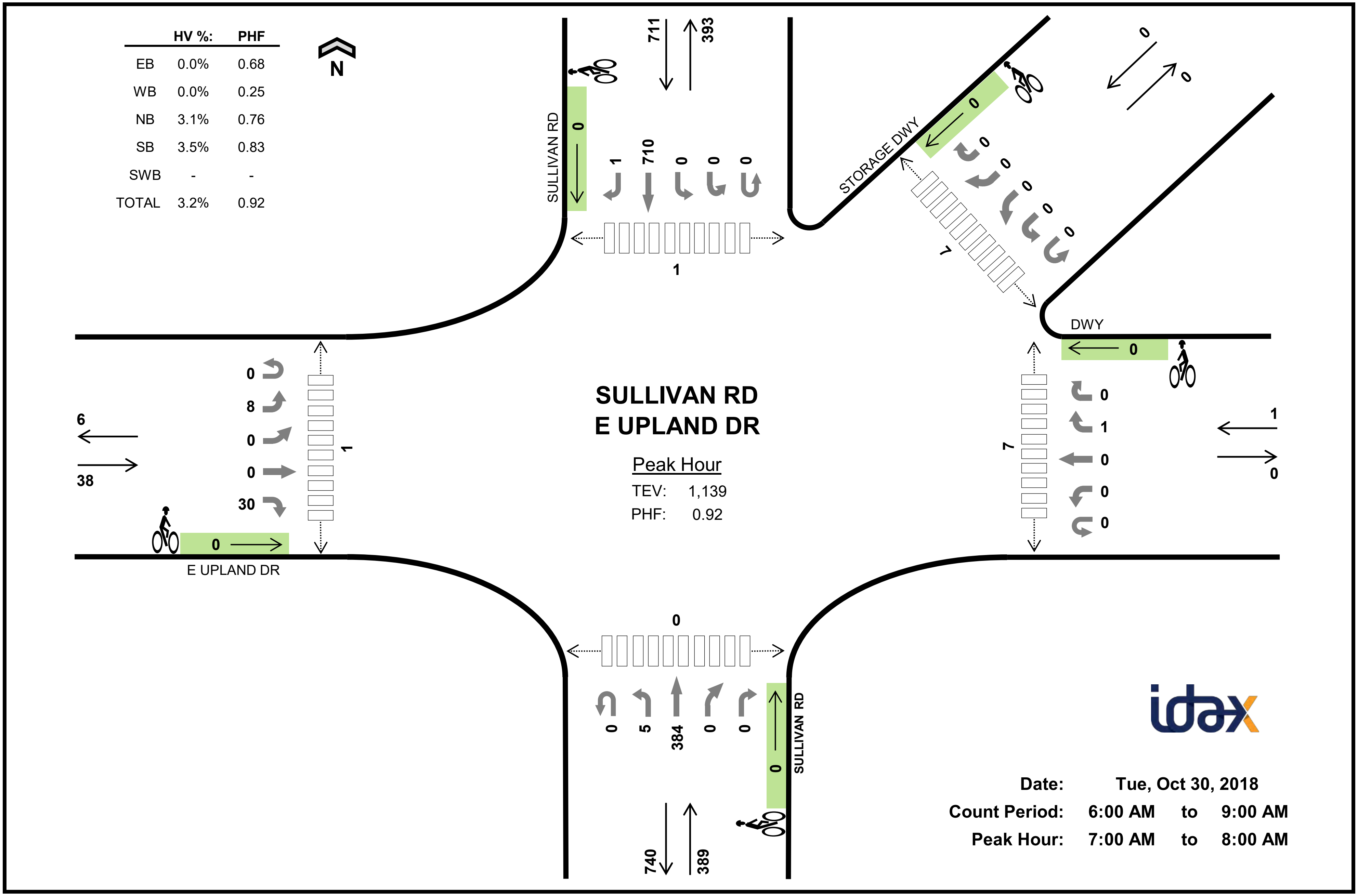
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:30 PM	0	6	5	5	*16*	0	0	0	0	*0*	0	0	1	0	*1*
4:45 PM	0	3	2	6	*11*	0	0	0	0	*0*	1	0	1	0	*2*
5:00 PM	0	1	3	6	*10*	0	0	0	0	*0*	1	1	0	0	*2*
5:15 PM	0	4	5	2	*11*	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
N
SULLIVAN RD
E UPLAND DR
Peak Hour
TEV: 1,139
PHF: 0.92
SULLIVAN RD
STORAGE DWY
DWY
E UPLAND DR
711
393
740
389
1 710 0 0 0
0 5 384 0 0
0 8 0 0 30
0 1 0 0 0
0 0 0 0 0 0
6
38
1
0
7
7
1
0
Date: Tue, Oct 30, 2018
Count Period: 6:00 AM to 9:00 AM
Peak Hour: 7:00 AM to 8:00 AM

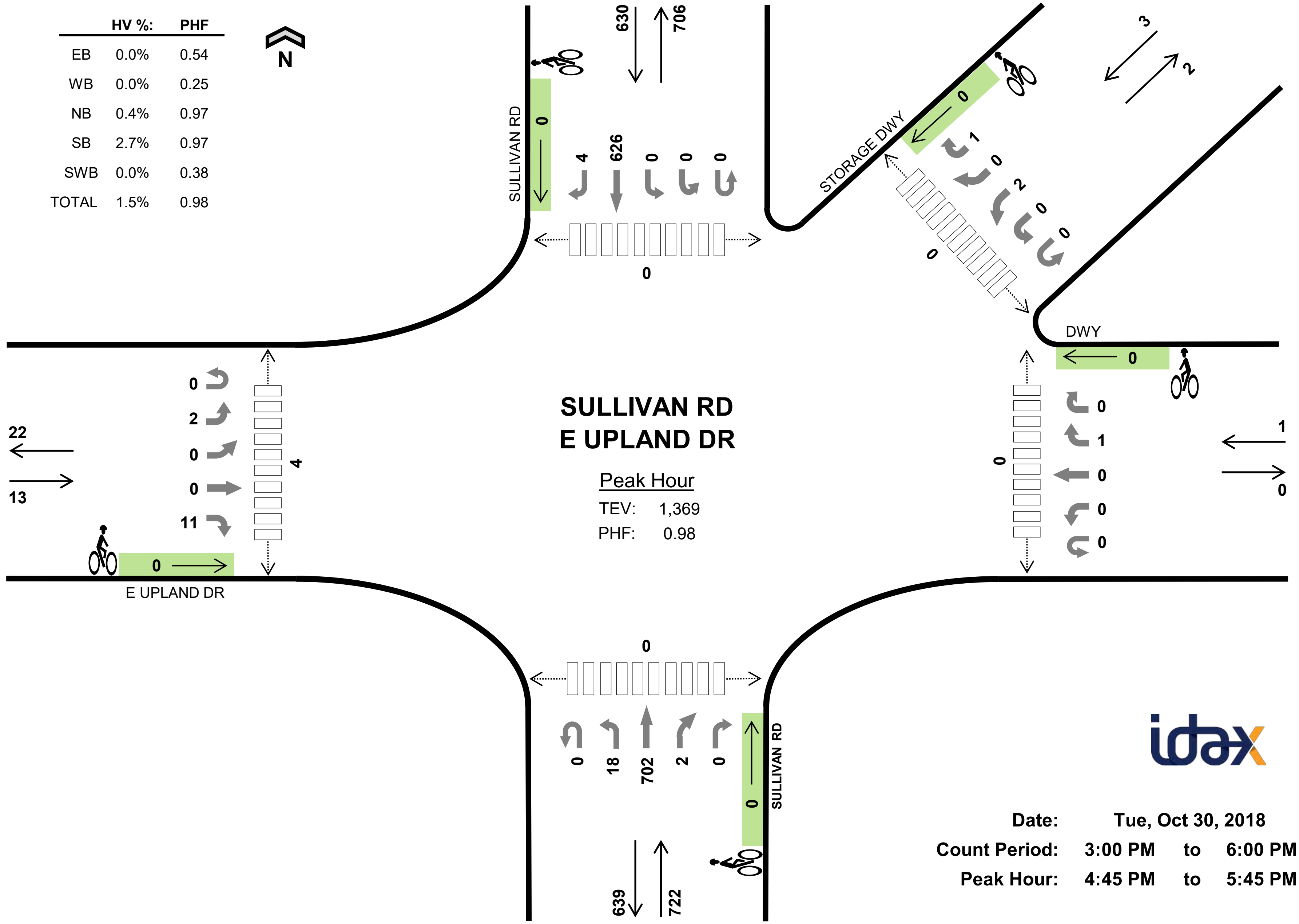
Three-Hour Count Summaries

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	0	143	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*
6:15 AM	0	0	3	2	0	*5*	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*
6:45 AM	0	0	0	2	0	*2*	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***
7:15 AM	**0**	**0**	**1**	**5**	**0**	***6***	**0**	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	**0**	***1***
7:30 AM	**0**	**0**	**3**	**13**	**0**	***16***	**0**	**0**	**0**	**0**	**0**	***0***	**7**	**0**	**0**	**0**	**7**	***14***
7:45 AM	**0**	**0**	**3**	**5**	**0**	***8***	**0**	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**1**	**0**	**0**	***1***
8:00 AM	0	0	1	6	0	*7*	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*
8:30 AM	1	0	3	4	0	*8*	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*
Count Total	1	0	29	47	0	*77*	0	0	0	1	0	*1*	7	1	1	0	7	*16*
Peak Hr	**0**	**0**	**12**	**25**	**0**	***37***	**0**	**0**	**0**	**0**	**0**	***0***	**7**	**1**	**1**	**0**	**7**	*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	0	228	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	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	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	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	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	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	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**	**1**	**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**	**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**	**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**	**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	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**

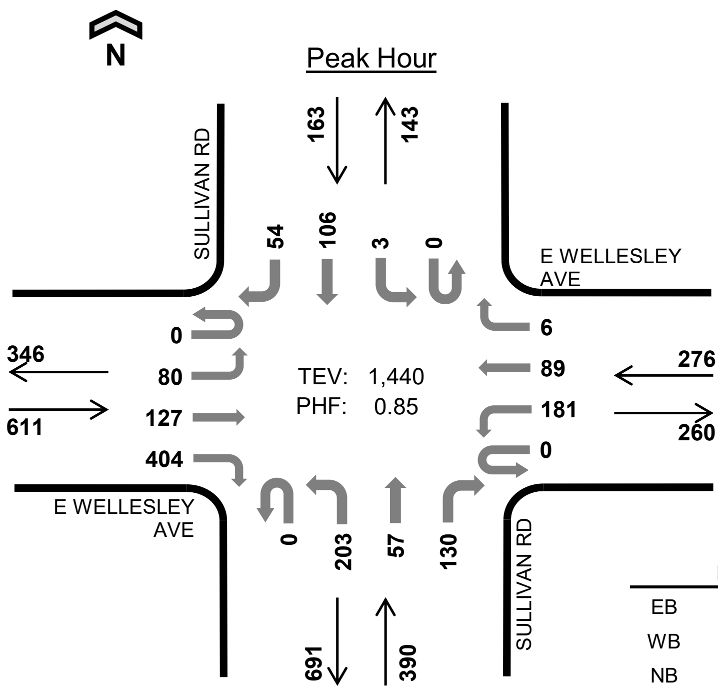
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

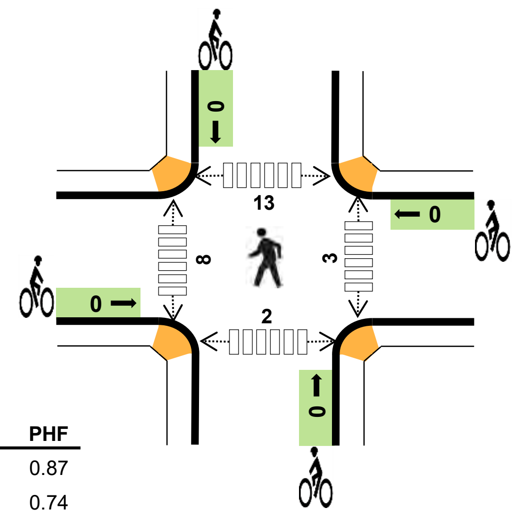
Interval Start	Heavy Vehicle Totals						Bicycles						Pedestrians (Crossing Leg)					
	EB	WB	NB	SB	SWB	Total	EB	WB	NB	SB	SWB	Total	East	West	North	South	Northeast	Total
3:00 PM	0	0	3	5	0	*8*	0	0	0	0	0	*0*	0	0	0	0	0	*0*
3:15 PM	0	0	2	5	0	*7*	0	0	0	0	0	*0*	0	0	0	0	0	*0*
3:30 PM	1	0	3	4	0	*8*	0	0	0	0	0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

SULLIVAN RD
E WELLESLEY AVE

idax

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	3.8%	0.87
WB	3.3%	0.74
NB	3.1%	0.77
SB	16.0%	0.68
TOTAL	4.9%	0.85

Three-Hour Count Summaries

Interval Start	E WELLESLEY AVE Eastbound				E WELLESLEY AVE Westbound				SULLIVAN RD Northbound				SULLIVAN RD Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	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*

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Three-Hour Count Summaries

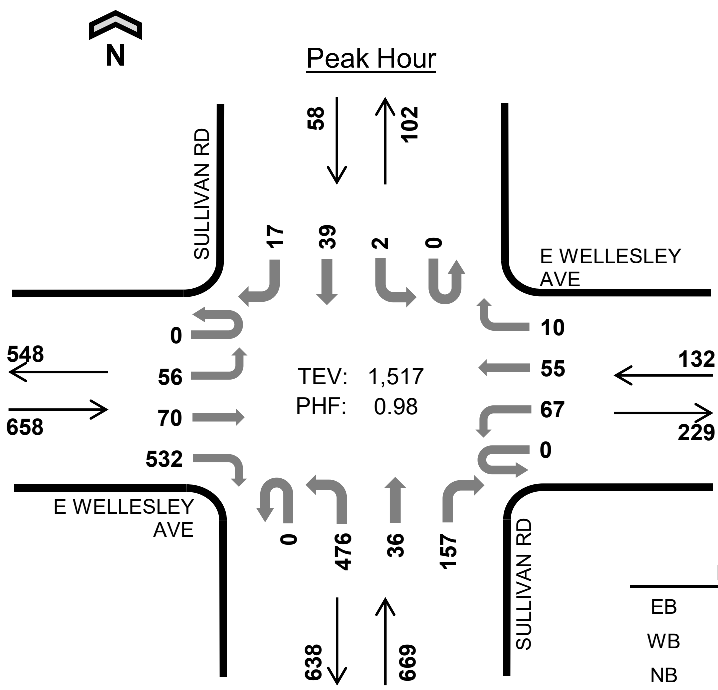
Interval Start	E WELLESLEY AVE				E WELLESLEY AVE				SULLIVAN RD				SULLIVAN RD				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
6:00 AM	0	1	3	79	0	13	4	0	0	33	0	6	0	0	3	0	142	0
6:15 AM	0	0	7	121	0	20	3	0	0	35	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**

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

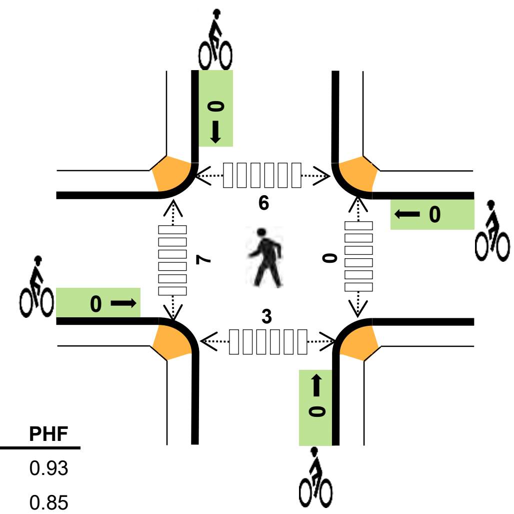
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
6:00 AM	0	0	3	0	*3*	1	0	0	0	*1*	0	1	0	0	*1*
6:15 AM	1	1	4	0	*6*	0	0	0	0	*0*	0	0	0	0	*0*
6:30 AM	1	0	0	0	*1*	0	0	0	0	*0*	0	0	1	0	*1*
6:45 AM	2	1	0	0	*3*	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



	HV %:	PHF
EB	2.7%	0.93
WB	1.5%	0.85
NB	0.3%	0.92
SB	0.0%	0.85
TOTAL	1.5%	0.98



Three-Hour Count Summaries

Interval Start	E WELLESLEY AVE Eastbound				E WELLESLEY AVE Westbound				SULLIVAN RD Northbound				SULLIVAN RD Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
5:00 PM	0	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 Eastbound				E WELLESLEY AVE Westbound				SULLIVAN RD Northbound				SULLIVAN RD Southbound				15-min Total	Rolling One Hour
	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***

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Appendix B

Level of Service Reports

HCM 6th AWSC
230: Sullivan & Wellesley

03/31/2020

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

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.

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.

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.

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

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						
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	NBR	WBLn1	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	-

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	0
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	NBR	WBLn1	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

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.

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.

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

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.

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

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

Intersection						
Int Delay, s/veh	0.3					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
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	NBR	WBLn1	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	-

Intersection						
Int Delay, s/veh	2					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
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	0
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	NBR	WBLn1	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	-

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.

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.

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

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

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.

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

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

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
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	NBR	WBLn1	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	-

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	0
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	NBR	WBLn1	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	-

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.

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.

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

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									

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.

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

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						
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	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	NBR	WBLn1	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	-

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	0
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	NBR	WBLn1	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	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.

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.

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

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.

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	
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.

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.

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		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

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						
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	NBR	WBLn1	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	-

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	0
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	NBR	WBLn1	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

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
Movement Performance - Vehicles													
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)

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	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of 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)

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	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of 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 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)

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	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of 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)

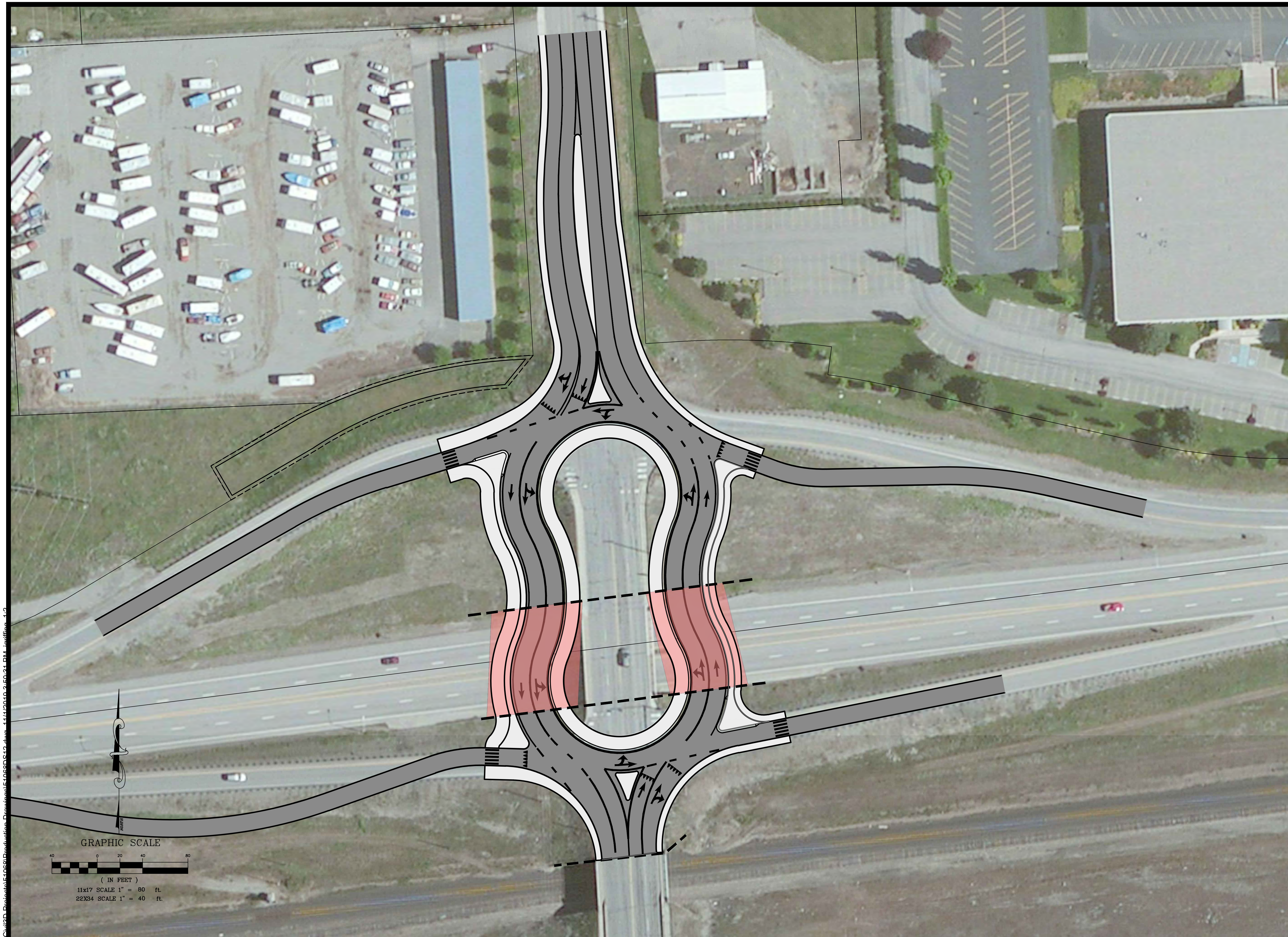
Appendix C

Crash Data

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
1	E EUCLID AVE		N SULLIVAN RD	0	E703290	2017-08-14	08:08	No Apparent Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - all others	Making U-Turn	Going Straight Ahead	Improper U-Turn			None
2	E EUCLID AVE	N SULLIVAN RD		0	3471440	2014-08-27	08:51	Suspected Minor Injury	1	0	1	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Vehicle overturned	Making Left Turn		Exceeding Reas. Safe Speed			
3	E KIERNAN AVE	N SULLIVAN RD		0	2903218	2014-07-08	12:41	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Making Left Turn	Stopped at Signal or Stop Sign	Improper Turn			None
4	E KIERNAN AVE	N SULLIVAN RD		0	E754491	2017-12-29	11:22	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Snowing	Snow/Slush	Daylight	Same direction -- both turning right -- both moving -- sideswi	Making Right Turn	Making Right Turn	Did Not Grant RW to Vehicle			None
5	E MARIETTA AVE	N SULLIVAN RD		0	E418093	2015-04-21	14:26	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	Did Not Grant RW to Vehicle			None
6	E WELLESLEY AVE		N SULLIVAN RD	0	E633605	2017-01-18	08:05	No Apparent Injury	0	0	3	0	0	Intersection Related but Not at Intersection	Raining	Ice	Daylight	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped for Traffic	Other			None
7	E WELLESLEY AVE	N SULLIVAN RD		0	3772233	2016-01-02	16:45	Possible Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Ice	Dark-Street Lights On	Entering at angle	Going Straight Ahead	Stopped at Signal or Stop Sign	Follow Too Closely	Inattention		None
8	E WELLESLEY AVE	N SULLIVAN RD		0	2901590	2014-06-26	11:44	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - one left turn - one straight	Going Straight Ahead	Making Left Turn	Disregard Stop Sign - Flashing Red	Inattention		None
9	E WELLESLEY AVE	N SULLIVAN RD		0	E389936	2015-01-06	14:30	Suspected Minor Injury	1	0	1	1	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Vehicle turning left hits pedestrian	Making Left Turn		Fail to Yield Row to Pedestrian	Inattention		
10	FAIRVIEW LN	N SULLIVAN RD		0	E588419	2016-09-23	16:14	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Making Left Turn	Going Straight Ahead	Other			None
11	N SULLIVAN RD			0	E248268	2013-06-03	14:41	No Apparent Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped in Roadway	Inattention	Follow Too Closely		None
12	N SULLIVAN RD			0	E414515	2015-04-07	14:05	No Apparent Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sid	Changing Lanes	Going Straight Ahead	Did Not Grant RW to Vehicle			None
13	N SULLIVAN RD			0	E423498	2015-05-05	20:00	No Apparent Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sid	Changing Lanes	Going Straight Ahead	Inattention			None
14	N SULLIVAN RD		E EUCLID AVE	0	2901734	2013-05-14	06:53	No Apparent Injury	0	0	2	0	0	Intersection Related but Not at Intersection	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rea	Going Straight Ahead	Going Straight Ahead	Follow Too Closely	Inattention		None
15	N SULLIVAN RD		E EUCLID AVE	0	E372959	2014-11-05	19:44	Unknown	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	Curb, Raised Traffic Island or Raised Median Curb	Going Straight Ahead		Exceeding Stated Speed Limit			
16	N SULLIVAN RD		E EUCLID AVE	0	2908811	2013-05-08	17:06	Possible Injury	1	0	2	0	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Making Left Turn	Going Straight Ahead	Unknown Driver Distraction			Driver Not Distracted
17	N SULLIVAN RD		E FLORA PIT RD	0	E728595	2017-10-26	14:30	No Apparent Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rea	Going Straight Ahead	Going Straight Ahead	Other			None
18	N SULLIVAN RD		E FLORA PIT RD	0	2785291	2015-01-09	15:49	Possible Injury	1	0	3	0	0	At Driveway	Raining	Wet	Dark-Street Lights On	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	Did Not Grant RW to Vehicle	Inattention		None
19	N SULLIVAN RD		E FLORA PIT RD	0	E305989	2014-02-06	13:14	No Apparent Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Sand/Mud/Dirt	Daylight	Snow Bank	Going Straight Ahead	Going Straight Ahead	Exceeding Reas. Safe Speed			None
20	N SULLIVAN RD		E FLORA PIT RD	0	E375850	2014-11-19	13:35	No Apparent Injury	0	0	3	0	0	Intersection Related but Not at Intersection	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rea	Going Straight Ahead	Slowing	Inattention	Follow Too Closely		None
21	N SULLIVAN RD		E FLORA PIT RD	0	E304756	2014-02-04	14:53	No Apparent Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Daylight	From same direction - all others	Going Straight Ahead	Going Straight Ahead	Exceeding Reas. Safe Speed			None
22	N SULLIVAN RD		E FLORA PIT RD	0	E397048	2015-01-30	11:41	No Apparent Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	From same direction - both going straight - both moving - sid	Changing Lanes	Going Straight Ahead	Did Not Grant RW to Vehicle	Over Center Line		None
23	N SULLIVAN RD		E FLORA PIT RD	0	E680218	2017-06-09	12:28	Suspected Minor Injury	3	0	3	0	0	Intersection Related but Not at Intersection	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rea	Going Straight Ahead	Going Straight Ahead	Inattention			None
24	N SULLIVAN RD		E FLORA PIT RD	0	2901731	2013-04-25	12:08	No Apparent Injury	0	0	2	0	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Making Right Turn	Going Straight Ahead	Did Not Grant RW to Vehicle	Inattention		None
25	N SULLIVAN RD		E FLORA PIT RD	0	3471445	2014-11-05	15:51	No Apparent Injury	0	0	2	0	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Making Left Turn	Going Straight Ahead	Did Not Grant RW to Vehicle			None
26	N SULLIVAN RD		E FLORA PIT RD	0	E409033	2015-03-17	06:48	No Apparent Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sid	Going Straight Ahead	Going Straight Ahead	Did Not Grant RW to Vehicle			None
27	N SULLIVAN RD		E INDIANA AVE	0	E372962	2014-11-06	07:33	Possible Injury	1	0	3	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rea	Going Straight Ahead	Slowing	Follow Too Closely			None
28	N SULLIVAN RD		E INDIANA AVE	0	E528874	2016-03-27	18:55	No Apparent Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Wet	Daylight	From same direction - both going straight - both moving - sid	Changing Lanes	Going Straight Ahead	Other			None
29	N SULLIVAN RD		E INDIANA AVE	0	2908885	2014-07-20	06:22	No Apparent Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Concrete Barrier/Jersey Barrier - Face	Going Straight Ahead		Inattention			
30	N SULLIVAN RD		E INDIANA AVE	0	E734339	2017-11-10	15:57	No Apparent Injury	0	0	3	0	0	Not at Intersection and Not Related	Raining	Wet	Dusk	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped for Traffic	Operating Defective Equipment	Follow Too Closely		Driver Not Distracted
31	N SULLIVAN RD		E KIERNAN AVE	0	E285889	2013-11-14	11:23	No Apparent Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped in Roadway	Inattention			None
32	N SULLIVAN RD		E KIERNAN AVE	0	E731843	2017-11-03	12:43	No Apparent Injury	0	0	2	0	0	Intersection Related but Not at Intersection	Snowing	Snow/Slush	Daylight	From same direction - both going straight - both moving - rea	Going Straight Ahead	Slowing	Inattention			None
33	N SULLIVAN RD		E KIERNEN RD	0	E675937	2017-05-24	14:49	Possible Injury	1	0	2	0	0	At Driveway	Overcast	Dry	Daylight	From opposite direction - one left turn - one straight	Going Straight Ahead	Making Left Turn	Exceeding Stated Speed Limit			None
34	N SULLIVAN RD		E MARIETTA AVE	0	E412869	2015-04-01	17:15	No Apparent Injury	0	0	2	0	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	Improper Turn			None
35	N SULLIVAN RD		E MARIETTA AVE	0	E496212	2015-12-16	11:44	No Apparent Injury	0	0	3	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped for Traffic	Follow Too Closely			None
36	N SULLIVAN RD		E PROVIDENCE AVE	0	E579325	2016-08-30	18:45	Possible Injury	1	0	2	0	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Making Right Turn	Going Straight Ahead	Inattention			Driver Not Distracted
37	N SULLIVAN RD		E TRENT AVE	0	E558876	2016-06-29	15:47	No Apparent Injury	0	0	3	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rea	Going Straight Ahead	Going Straight Ahead	Inattention	Follow Too Closely		None
38	N SULLIVAN RD		E UPLAND DR	0	E322201	2014-04-16	17:23	Possible Injury	1	0	3	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped for Traffic	Under Influence of Alcohol			Driver Not Distracted
39	N SULLIVAN RD		E UPLAND DR	0	E513424	2016-02-07	10:53	No Apparent Injury	0	0	2	0	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	Improper Turn			None
40	N SULLIVAN RD		N SULLIVAN RD	0	E689722	2017-07-07	18:46	No Apparent Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Linear Curb	Going Straight Ahead		Driver Distractions Outside Vehicle			
41	N SULLIVAN RD		N SULLIVAN RD	0	E461485	2015-09-14	14:48	No Apparent Injury	0	0	2	0	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	Improper Turn			None
42	N SULLIVAN RD	E EUCLID AVE		0	E594390	2016-10-10	09:15	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped at Signal or Stop Sign	Follow Too Closely			None
43	N SULLIVAN RD	E EUCLID AVE		0	E556200	2016-06-21	12:27	Possible Injury	1	0	2	0	0	At Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rea	Going Straight Ahead	Slowing	Unknown Driver Distraction			Driver Not Distracted
44	N SULLIVAN RD	E KIERNAN AVE		0	E550367	2016-06-03	13:53	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Same direction -- both turning right -- both moving -- sideswi	Making Right Turn	Making Right Turn	Did Not Grant RW to Vehicle			Driver Not Distracted
45	N SULLIVAN RD	E KIERNAN AVE		0	E473541	2015-10-21	17:37	Suspected Serious Injury	5	0	4	0	0	At Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - all others	Going Wrong Way on Divided Hwy	Stopped at Signal or Stop Sign	Other	On Wrong Side Of Road		None
46	N SULLIVAN RD	E KIERNAN AVE		0	3090475	2013-06-24	23:42	Possible Injury	1	0	1	1	0	At Intersection and Related	Raining	Wet	Dark-Street Lights On	Vehicle going straight hits pedestrian	Going Straight Ahead		Fail to Yield Row to Pedestrian			
47	N SULLIVAN RD	E KIERNAN AVE		0	E332416	2014-06-04	20:15	Suspected Minor Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dusk	From opposite direction - one left turn - one straight	Going Straight Ahead	Making Left Turn	Under Influence of Alcohol	Disregard Stop and Go Light		None
48	N SULLIVAN RD	E KIERNAN AVE		0	E615703	2016-11-29	14:49	Possible Injury	1	0	2	0	0	At Intersection and Related	Raining	Wet	Daylight	From same direction - both going straight - one stopped - rea	Stopped at Signal or Stop Sign	Going Straight Ahead	None			Inattention
49	N SULLIVAN RD	E KIERNAN AVE		0	E241450	2013-04-30	14:34	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - one right turn - one straight	Making Right Turn	Going Straight Ahead	None			Inattention
50	N SULLIVAN RD	E MARIETTA AVE		0	2779834	2013-08-24	01:02	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	Entering at angle	Going Straight Ahead	Making Left Turn	Unknown Driver Distraction			Driver Not Distracted
51	N SULLIVAN RD	E MARIETTA AVE		0	E668988	2017-05-08	07:25	Possible Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped at Signal or Stop Sign	Follow Too Closely			None
52	N SULLIVAN RD	E MARIETTA AVE		0	E632714	2017-01-16	13:56	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Snow/Slush	Daylight	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped at Signal or Stop Sign	Follow Too Closely			Driver Not Distracted
53	N SULLIVAN RD	E MARIETTA AVE		0	E263259	2013-08-14	14:12	No Apparent Injury	0	0	2	0	0	At Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sid	Merging (Entering Traffic)	Going Straight Ahead	Unknown Driver Distraction			None
54	N SULLIVAN RD	E MARIETTA AVE		0	E579837	2016-08-30	15:59	Possible Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped at Signal or Stop Sign	Follow Too Closely			Driver Not Distracted
55	N SULLIVAN RD	E MARIETTA AVE		0	E588401	2016-09-25	02:06	Possible Injury	1	0	1	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	Tree or Stump (stationary)	Making Right Turn		Under Influence of Alcohol	Under Influence of Drugs	Exceeding Reas. Safe Speed	
56	N SULLIVAN RD	E MARIETTA AVE		0	E427418	2015-05-22	18:55	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rea	Slowing	Stopped at Signal or Stop Sign	Follow Too Closely			None
57	N SULLIVAN RD	E UPLAND DR		0	E648469	2017-03-01	20:57	No Apparent Injury	0	0	1	0	0	At Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	Utility Pole	Going Straight Ahead		None			
58	N SULLIVAN RD	E WELLESLEY AVE		0	E327054	2014-05-09	10:32	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Making Left Turn	Making Left Turn	Did Not Grant RW to Vehicle			None
59	N SULLIVAN RD	E WELLESLEY AVE		0	E344580	2014-07-24	16:10	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped at Signal or Stop Sign	Follow Too Closely			None
60	N SULLIVAN RD	E WELLESLEY AVE		0	E697469	2017-08-02	00:59	No Apparent Injury	0	0	1	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	Utility Box	Making Left Turn		Apparently Asleep			
61	N SULLIVAN RD	E WELLESLEY AVE		0	E697464	2017-07-28	23:03	No Apparent Injury	0	0	1	0	0	At Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	Breakage of any part of the vehicle resulting in injury or in fu	Going Straight Ahead		Operating Defective Equipment			
62	N SULLIVAN RD	E WELLESLEY AVE		0	E656136	2017-03-27	07:43	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet	Daylight	From opposite direction - one left turn - one right turn	Making Left Turn	Making Right Turn	None			Inattention
63	N SULLIVAN RD	FAIRVIEW LN		0	E703289	2017-08-01	13:56	Possible Injury	2	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped for Traffic	Inattention	Follow Too Closely		None
64	090LX29192			0.11	E689710	2017-06-26	18:14	Possible Injury	1	0	2	0	0	Intersection Related but Not at Intersection	Overcast	Dry	Daylight	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped at Signal or Stop Sign	Follow Too Closely			None
65	090LX29192			0.13	E681450	2017-06-14	16:29	Possible Injury	2	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	Inattention	Did Not Grant RW to Vehicle		None
66	090LX29192			0.13	E690336	2017-07-11	17:50	Possible Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rea	Other*	Stopped at Signal or Stop Sign	Inattention			None
67	090LX29192			0.13	E666580	2017-04-29	15:22	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	Inattention			None
68	090LX29192			0.14	E234057	2013-03-23	14:40	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rea	Changing Lanes	Stopped for Traffic	Follow Too Closely	Operating Defective Equipment		None
69	090LX29192			0.14	E746922	2017-12-13	16:42	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Wet	Dark-Street Lights On	From same direction - one right turn - one straight	Making Right Turn	Going Straight Ahead	Other	Inattention	Unknown Driver Distraction	None
70	090LX29192			0.14	E621685	2016-12-15	17:06	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Ice	Dark-Street Lights On	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped for Traffic	Exceeding Reas. Safe Speed			None
71	090LX29192			0.14	3772802	2017-09-20	14:29	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	Entering at angle	Going Straight Ahead	Going Straight Ahead	None			Other
72	090LX29192			0.14	2901210	2013-06-04	18:44	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	Did Not Grant RW to Vehicle			None
73	090LX29192			0.14	E252859	2013-06-24	14:58	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Overcast	Wet	Daylight	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped for Traffic	Inattention			None
74	090LX29192			0.14	E529675	2016-03-29	14:10	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	Disregard Stop and Go Light	Inattention	Did Not Grant RW to Vehicle	None
75	090LX29192			0.14	E259888	2013-07-25	19:43	Suspected Minor Injury	2	0	3	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	Disregard Stop and Go Light			None
76	090LX29192			0.14	E511709	2016-01-29	09:21	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet	Daylight	From same direction - one right turn - one straight	Making Right Turn	Going Straight Ahead	Improper Turn			Driver Not Distracted
77	090LX29192			0.14	E745604	2017-12-08	06:50	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dawn	Entering at angle	Making Right Turn	Going Straight Ahead	Did Not Grant RW to Vehicle			None
78	090LX29192			0.14	E313070	2014-03-08	18:49	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet	Dark-Street Lights On	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	Improper Turn	Inattention		None
79	090LX29192			0.14	E618859	2016-12-08	17:10	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	From opposite direction - one left turn - one right turn	Making Right Turn	Making Left Turn	Improper Turn			Driver Not Distracted
80	090LX29192			0.14	E669305	2017-05-08	21:40	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dark-Street Lights Off	Entering at angle	Going Straight Ahead	Going Straight Ahead	Disregard Stop and Go Light	Inattention		None
81	090LX29192			0.14	E389377	2015-01-04	12:59	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Snowing	Snow/Slush	Daylight	From same direction - both going straight - one stopped - rea	Changing Lanes	Stopped at Signal or Stop Sign	Operating Defective Equipment	Exceeding Reas. Safe Speed		None
82	090LX29192			0.14	E285897	2013-11-13	14:59	No Apparent Injury	0	0	2	0	0	At Intersection and Not Related	Overcast	Dry	Daylight	From opposite direction - one left turn - one right turn	Making Right Turn	Making Left Turn	Improper Turn			None
83	090LX29192			0.14	E370522	2014-10-29	07:43	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Wet	Daylight	From same direction - both going straight - both moving - sid	Changing Lanes	Going Straight Ahead	Did Not Grant RW to Vehicle			None
84	090LX29192			0.14	2903163	2013-08-14	11:12	Possible Injury	2	0	1	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Vehicle overturned	Making Left Turn		Other			
85	090LX29192			0.14	E705973	2017-08-28	15:02	Possible Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rea	Slowing	Going Straight Ahead	None			Follow Too Closely
86	090LX29192			0.14	3365382	2013-04-02	11:42	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Going Straight Ahead	Making Left Turn	Disregard Stop and Go Light			None
87	090LX29192			0.14	E325923	2014-05-01	15:39	Possible Injury	2	0	1	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Vehicle overturned	Making Right Turn		Other			
88	090LX29192			0.14	E610880	2016-11-17	11:10	Possible Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped at Signal or Stop Sign	Follow Too Closely			None
89	090LX29192			0.14	E490592	2015-12-03	17:03	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet	Dark-Street Lights On	From same direction - both going straight - both moving - sid	Going Straight Ahead	Going Straight Ahead	Driver Not Distracted			Driver Not Distracted
90	090LX29192			0.14	E293020	2013-12-14	16:54	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Wet	Dark-No Street Lights	From same direction - both going straight - both moving - sid	Changing Lanes	Going Straight Ahead	Inattention			None
91	090LX29192			0.14	E664350	2017-04-23	12:03	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Overcast	Dry	Daylight	Entering at angle	Going Straight Ahead	Making Left Turn	Disregard Stop and Go Light			None
92	090LX29192			0.14	E404437	2015-02-27	12:05	No Apparent Injury	0	0	3	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rea	Going Straight Ahead	Going Straight Ahead	Inattention	Follow Too Closely		None
93	090LX29192			0.14	E544859	2016-05-09	18:50	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped at Signal or Stop Sign	Follow Too Closely			None
94	090LX29192			0.14	E233542	2013-03-21	16:25	No Apparent Injury	0	0	3	0	0	At Intersection and Related	Clear or Partly Cloudy	Wet	Daylight	From same direction - both going straight - both moving - rea	Going Straight Ahead	Going Straight Ahead	Inattention	Follow Too Closely		None
95	090LX29192			0.14	E273594	2013-09-28	02:02	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	Entering at angle	Going Straight Ahead	Going Straight Ahead	Under Influence of Alcohol	Disregard Stop and Go Light		None
96	090LX29192			0.15	E450504	2015-08-06	12:56	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - one left turn - one straight	Going Straight Ahead	Making Left Turn	Other			None
97	090LX29192			0.15	E680220	2017-05-26	08:58	No Apparent Injury	0	0	2	0	0	At Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sid	Changing Lanes	Going Straight Ahead	Inattention	Did Not Grant RW to Vehicle		None
98	090LX29192			0.15	E404430	2015-02-27	15:17	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - one left turn - one straight	Making Right Turn	Going Straight Ahead	Improper Turn	Inattention	Did Not Grant RW to Vehicle	None
99	090LX29192			0.15	E629800	2017-01-03	17:30	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Overcast	Wet	Dusk	From same direction - one right turn - one straight	Making Right Turn	Going Straight Ahead	Other			None
100	090LX29192			0.15	2908934	2013-12-30	13:50	No Apparent Injury	0	0	3	0	0	At Intersection and Related	Clear or Partly Cloudy	Wet	Daylight	From same direction - both going straight - both moving - rea	Going Straight Ahead	Slowing	Exceeding Reas. Safe Speed	Inattention		None
101	090LX29192			0.15	E285902	2013-11-15	15:25	Possible Injury	1	0	2	0	0	At Intersection and Not Related	Raining	Wet	Dark-Street Lights On	From same direction - both going straight - both moving - sid	Changing Lanes	Going Straight Ahead	Other			Driver Not Distracted
102	090LX29192			0.15	E584379	2016-09-13	15:40	Possible Injury	1	0	3	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rea	Going Straight Ahead	Going Straight Ahead	Follow Too Closely			None
103	090LX29192			0.15	E662796	2017-04-18	13:20	Possible Injury	1	0	2	0	0	At Intersection and Related	Overcast	Wet	Daylight	From same direction - one right turn - one straight	Making Right Turn	Going Straight Ahead	Improper Turn	Inattention	Did Not Grant RW to Vehicle	None
104	090LX29192			0.15	E605208	2016-10-27	18:12	No Apparent Injury	0	0	3	0	0	At Intersection and Related	Raining	Wet	Dark-Street Lights On	From opposite direction - one left turn - one right turn	Making Right Turn	Making Left Turn	Improper Turn	Inattention		None
105	090LX29192			0.15	3404180	2013-11-10	15:02	Suspected Minor Injury	1	0	2	0	0	At Intersection and Related	Overcast	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	Under Influence of Alcohol			None
106	090LX29192			0.15	E573836	2016-08-11	13:41	Possible Injury	1	0	3	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - sid	Going Straight Ahead	Stopped at Signal or Stop Sign	Follow Too Closely			None
107	090LX29192			0.15	3471774	2017-08-12	14:20	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Overcast	Dry	Daylight	Entering at angle	Making Right Turn	Going Straight Ahead	Did Not Grant RW to Vehicle			
108	090LX29192			0.15	2912378	2013-12-15	08:52	Possible Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Ice	Daylight	From same direction - both going straight - both moving - rea	Going Straight Ahead	Going Straight Ahead	Follow Too Closely			None
109	090LX29192			0.15	E662436	2017-04-17	14:11	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Wet	Daylight	From same direction - both going straight - one stopped - rea	Slowing	Stopped at Signal or Stop Sign	Other			None
110	090LX29192			0.15	E566518	2016-07-21	12:00	No Apparent Injury	0	0	2	0	0	At Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sid	Going Straight Ahead	Going Straight Ahead	Unknown Driver Distraction			Unknown Driver Distraction
111	090LX29192			0.15	E636645	2017-01-21	11:25	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	Disregard Stop and Go Light			None
112	090LX29192			0.15	E397047	2015-01-30	16:25	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Overcast	Dry	Dusk	From same direction - one right turn - one straight	Going Straight Ahead	Making Right Turn	Other			None
113	090LX29192			0.17	E703295	2017-08-17	12:31	Possible Injury	1	0	4	0	0	Intersection Related but Not at Intersection	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped for Traffic	Driver Not Distracted			Driver Not Distracted
114	090LX29192			0.17	E653517	2017-03-20	17:16	No Apparent Injury	0	0	3	0	0	Intersection Related but Not at Intersection	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - sid	Changing Lanes	Stopped at Signal or Stop Sign	Inattention	Apparently Ill		None
115	290LX01053			0	E682681	2017-06-09	17:01	Possible Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped for Traffic	Operating Defective Equipment	Driver Reading or Writing	Follow Too Closely	None
116	290LX01053			0	E740978	2017-11-28	17:25	Suspected Minor Injury	1	0	2	0	0	At Intersection and Related	Raining	Wet	Dark-Street Lights On	From opposite direction - one left turn - one straight	Going Straight Ahead	Making Left Turn	Disregard Stop and Go Light	Exceeding Reas. Safe Speed		None
117	290LX01053			0	E643942	2017-02-10	07:29	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Ice	Daylight	Entering at angle	Going Straight Ahead	Making Left Turn	Exceeding Reas. Safe Speed			None
118	290LX01053			0	E404939	2015-03-02	15:30	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Overcast	Dry	Daylight	Entering at angle	Starting From Parked Position	Making Left Turn	Inattention	Did Not Grant RW to Vehicle		Inattention
119	290LX01053			0	E646089	2017-02-23	15:33	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	Inattention			Driver Not Distracted
120	290LX01053			0	E385812	2014-12-19	12:31	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Overcast	Wet	Daylight	From same direction - both going straight - both moving - rea	Going Straight Ahead	Going Straight Ahead	Follow Too Closely			None
121	290LX01053			0	E532975	2016-04-01	21:32	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	From same direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	Improper Turn			None
122	290LX01053			0	E725838	2017-10-03	17:15	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	Inattention			None
123	290LX01053			0	2901377	2013-06-15	07:19	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	Did Not Grant RW to Vehicle	Inattention		None
124	290LX01053			0	E694413	2017-07-11	16:59	No Apparent Injury	0	0	3	0	0	At Driveway within Major Intersection	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rea	Going Straight Ahead	Going Straight Ahead	Follow Too Closely			None
125	290LX01053			0	E537263	2016-04-24	15:03	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rea	Going Straight Ahead	Slowing	Follow Too Closely			None
126	290LX01053			0	E607793	2016-11-13	20:42	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet	Dark-Street Lights On	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	Improper Turn			None
127	290LX01053			0	E730024	2017-11-01	21:37	Suspected Minor Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	Did Not Grant RW to Vehicle			None
128	290LX01053			0.06	E725860	2017-10-22	12:49	Possible Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	Did Not Grant RW to Vehicle			None
129	290LX01053			0.06	E309256	2014-02-14	17:58	Possible Injury	2	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	From same direction - both going straight - one stopped - rea	Starting in Traffic Lane	Stopped at Signal or Stop Sign	Inattention			None
130	290LX01053			0.06	E695122	2017-07-25	14:36	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - one left turn - one straight	Making Left Turn	Stopped for Traffic	Did Not Grant RW to Vehicle			None
131	290LX01053			0.06	E703301	2017-08-18	05:10	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dawn	Entering at angle	Going Straight Ahead	Making Left Turn	Inattention			Inattention
132	290LX01053			0.06	E346706	2014-08-01	11:46	Possible Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Making Right Turn	Going Straight Ahead	None			None
133	290LX01053			0.06	E474880	2015-10-25	17:29	Possible Injury	1	0	2	0	0	At Intersection and Related	Overcast	Dry	Daylight	From opposite direction - one left turn - one straight	Going Straight Ahead	Making Left Turn	Disregard Stop and Go Light			None
134	290LX01053			0.06	E417902	2015-04-20	15:16	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Going Straight Ahead	Making Left Turn	Disregard Stop and Go Light	Inattention		None
135	290LX01053			0.06	E586350	2016-09-19	16:26	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Making Left Turn	Stopped at Signal or Stop Sign	Other			None
136	290LX01053			0.06	E616688	2016-12-06	17:04	No Apparent Injury	0	0	3	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	Improper Turn			None
137	290LX01053			0.06	E496159	2015-12-20	17:56	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet	Dark-Street Lights On	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	Inattention			None
138	290LX01053			0.06	E517818	2016-02-18	17:09	Possible Injury	1	0	2	0	0	At Intersection and Related	Raining	Wet	Dark-Street Lights On	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	Inattention			None
139	290LX01053			0.06	E562888	2016-07-11	17:15	No Apparent Injury	0	0	2	0	0	At Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped for Traffic	Inattention	Exceeding Reas. Safe Speed	Unknown Driver Distraction	None
140	290P101035			0.17	E441298	2015-07-02	14:40	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rea	Starting in Traffic Lane	Stopped for Traffic	Follow Too Closely			None
141	290P101035			0.17	E626137	2016-12-28	13:45	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Wet	Daylight	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped at Signal or Stop Sign	Follow Too Closely			None
142	290P101035			0.17	E652558	2017-03-16	20:47	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	From same direction - both going straight - one stopped - rea	Going Straight Ahead	Stopped at Signal or Stop Sign	Follow Too Closely			None

Appendix D

Preliminary Designs



PRELIMINARY NOT FOR CONSTRUCTION

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Coeur d'Alene, ID 83815
208–664–9382
(toll free) 877–815–5672
(fax) 208–664–5946

NO.	DATE	REVISION DESCRIPTION	BY

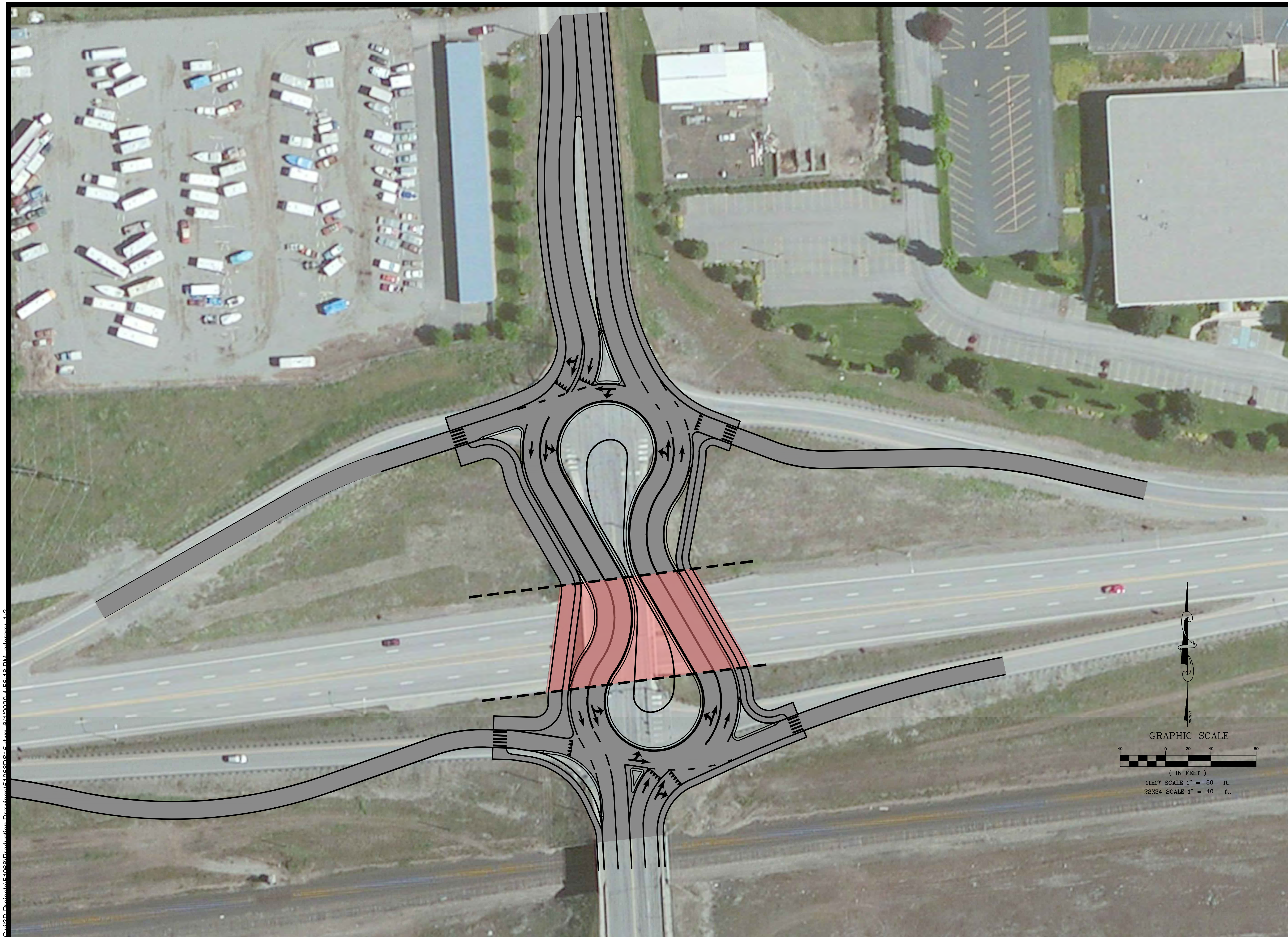
CITY OF SPOKANE VALLEY

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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(toll free) 877-815-5672
(fax) 208-664-5946

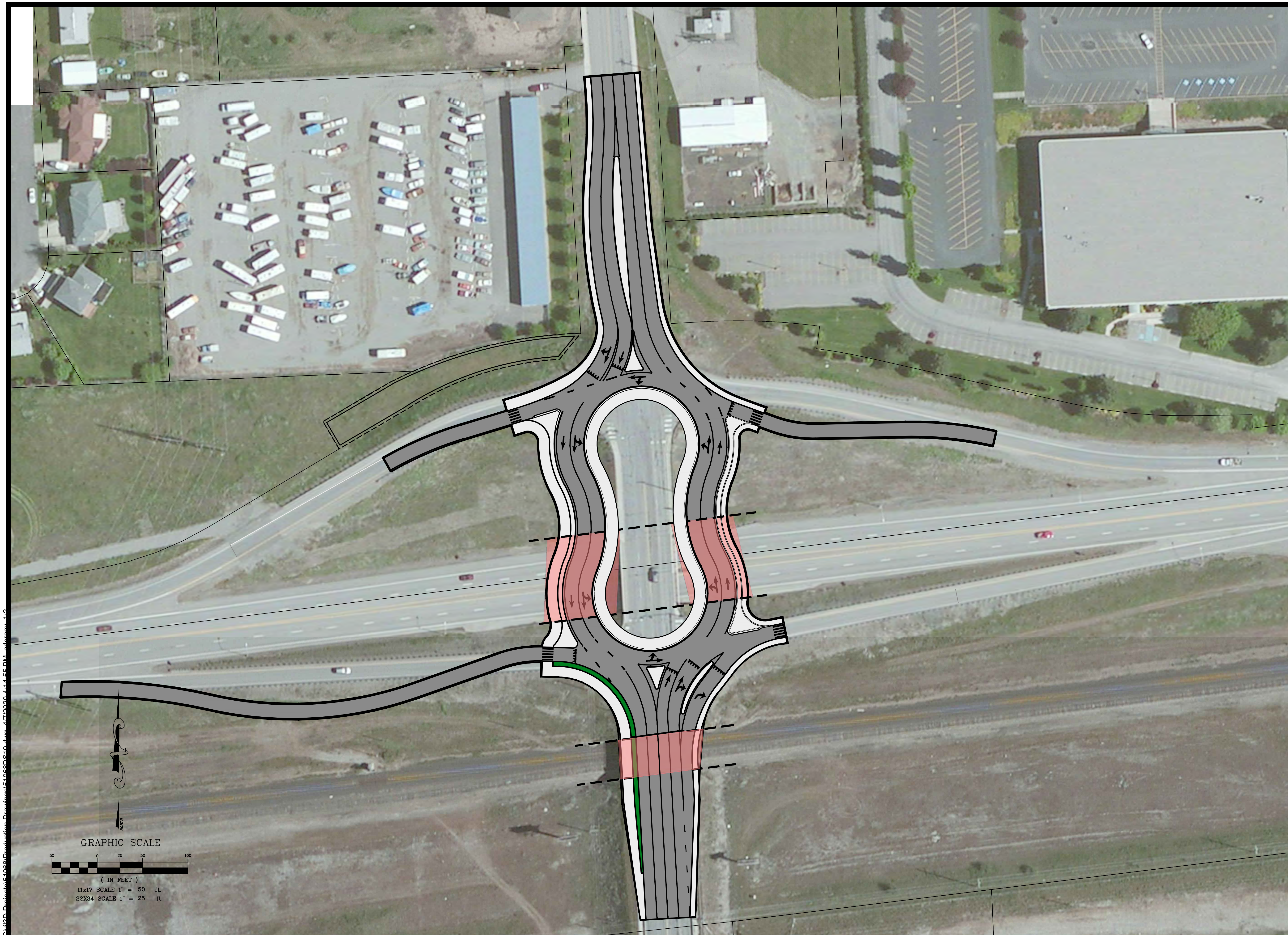
NO.	DATE	REVISION DESCRIPTION	BY

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:	51068DS15.DWG
DATE:	10-21-2019
SHEET NO:	**RAB 2**



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208-664-9382
(toll free) 877-815-5672
(fax) 208-664-5946

NO.	DATE	REVISION DESCRIPTION	BY

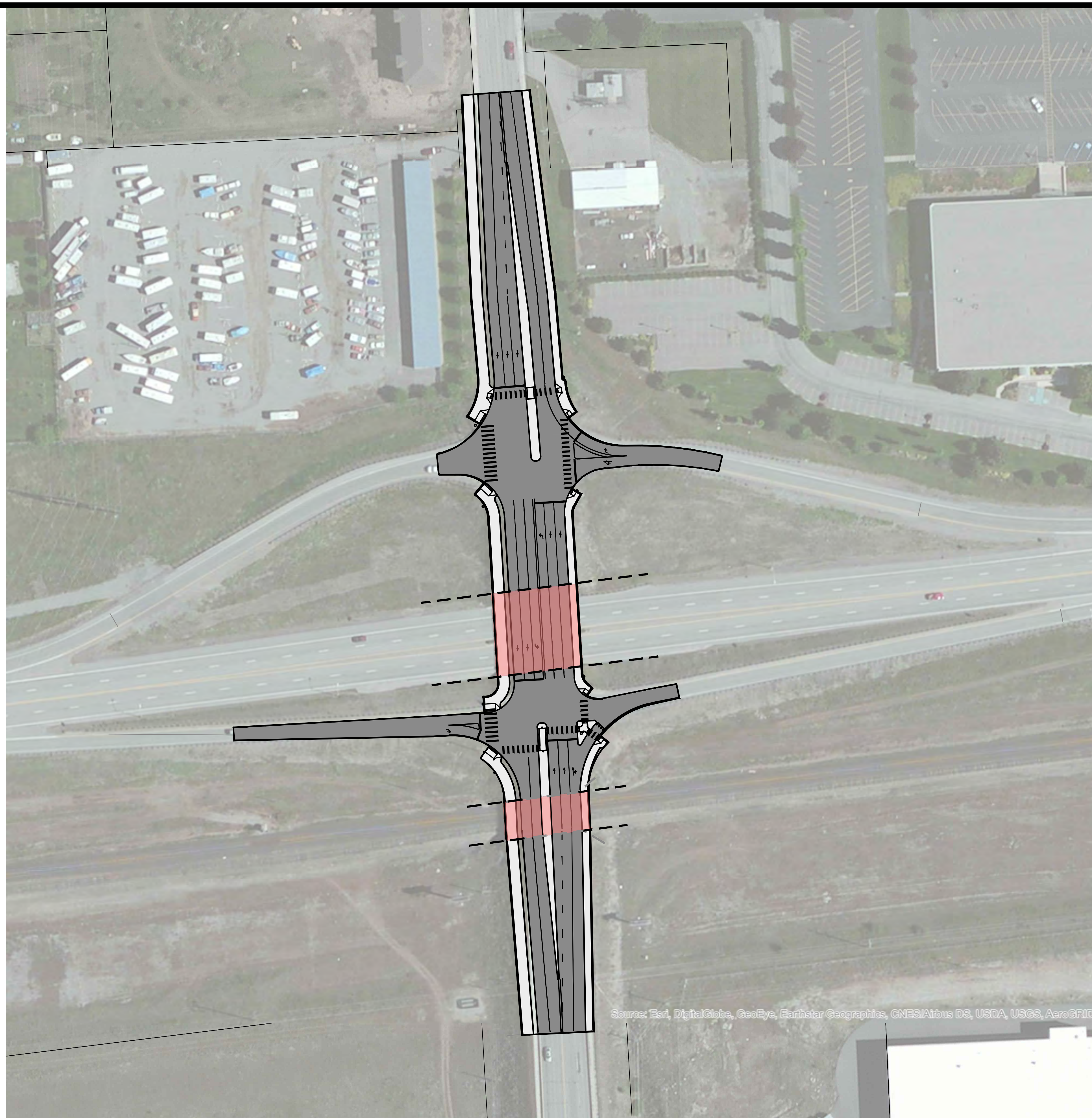
CITY OF SPOKANE VALLEY

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



NORTH

GRAPHIC SCALE

60 0 30 60 120

(IN FEET)

11x17 SCALE 1" = 120 ft.

22X34 SCALE 1" = 60 ft.

PRELIMINARY NOT FOR CONSTRUCTION

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www.welchcomer.com
330 E. Lakeside Ave, Suite 101
Coeur d'Alene, ID 83814
208-664-9382
(toll free) 877-815-5672
(fax) 208-664-5946

NO.	DATE	REVISION DESCRIPTION	BY

CITY OF SPOKANE VALLEY

SULLIVAN ROAD CORRIDOR AT TRENT AVE

PRELIMINARY DESIGN SIGNALIZED INTERSECTIONS OVERVIEW

PROJ NO:	51068
DESIGNED BY:	MRG / JRG
DRAWN BY:	SDS
CHECKED BY:	
DWG NAME:	51068DS16.DWG
DATE:	10-31-2019

SHEET NO:

SGL 1

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**

Welch-Comer Engineers

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**

Welch Comer Engineers

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 PARALLI	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**

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

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 Enginee	$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

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

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

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**

Appendix B:
SRTC Model TAZ Structure and Land Use Assumptions

SRTC 2040 Model

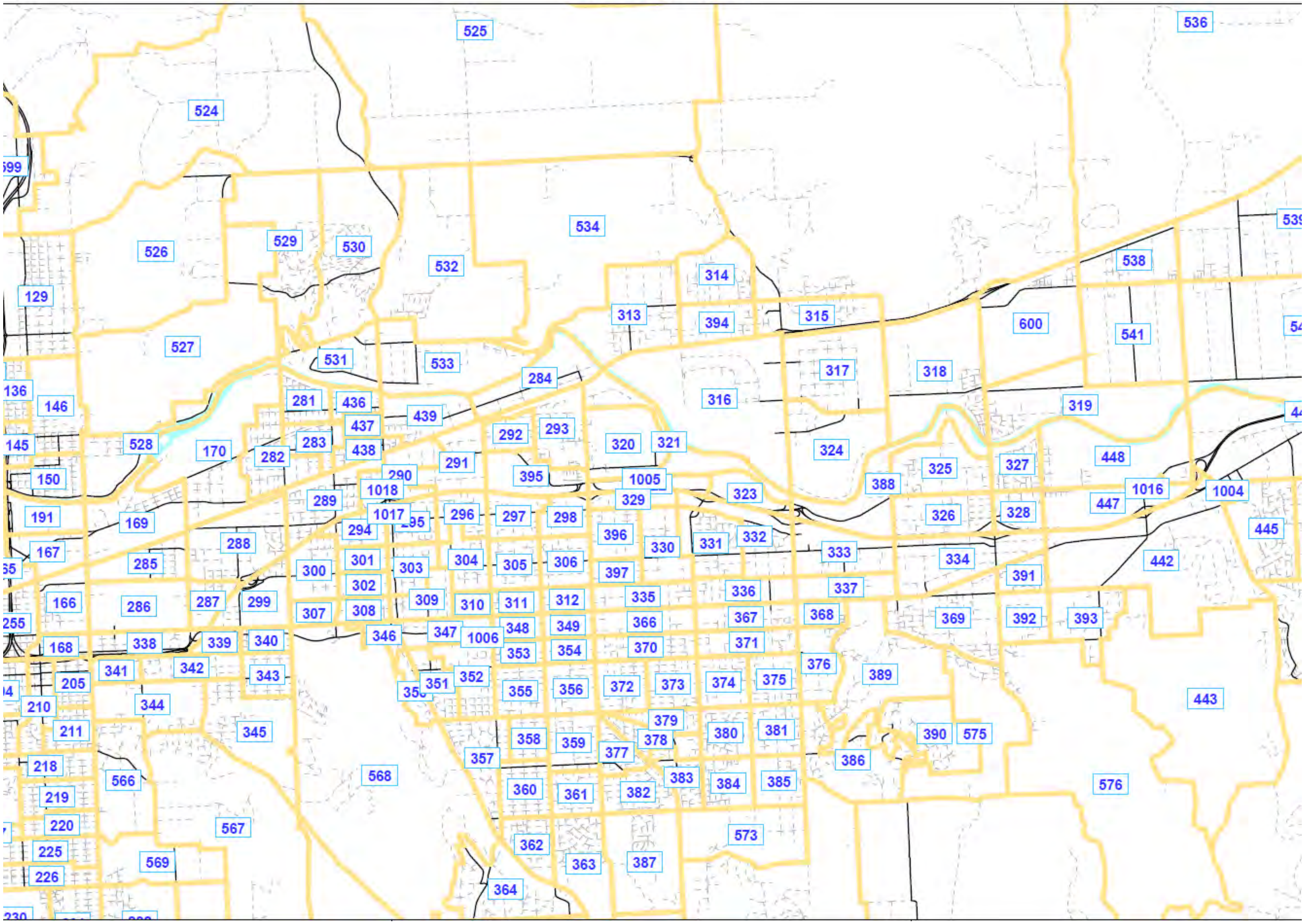

Table B-1 summarizes the complete land use dataset from the SRTC base year and future year models, while the map shown above focuses on the study area and its surrounding land uses.

Table B-1: SRTC Model Land Use

	Existing (2018)		***Future (2040)***	
TAZ	***Households***	***Employment***	***Households***	***Employment***
1	168	788	339	1139
2	0	239	0	252
3	86	5748	172	5892
4	326	657	368	745
5	14	1576	40	1618
6	0	2918	0	2961
7	65	872	65	926
8	373	3391	373	3528
9	284	580	284	690
10	16	1372	16	1397
11	0	1006	0	1031
12	52	951	212	988
13	82	373	82	410
14	0	328	0	375
15	87	854	87	931
16	115	213	115	239
17	61	886	61	923
18	49	235	49	248
19	179	1281	260	1325
20	47	2015	127	2180
21	1	493	7	506
22	20	1025	139	1106
26	644	33	660	33
27	812	100	876	104
28	836	71	1106	108
29	1139	356	1615	424
30	516	41	1431	80
31	320	102	358	107
32	545	30	630	30
33	779	259	906	259
34	861	233	865	233
35	997	759	997	817
36	344	85	344	85
37	629	97	629	101
38	293	10	297	10

Table B-1: SRTC Model Land Use				
	Existing (2018)		***Future (2040)***	
TAZ	***Households***	***Employment***	***Households***	***Employment***
39	487	12	492	12
40	196	69	196	69
41	202	32	203	32
42	302	73	302	73
43	352	6	355	6
44	293	4	294	4
45	320	0	321	0
46	411	248	416	248
47	170	1	172	1
48	186	32	187	32
49	369	600	370	600
50	335	10	335	10
51	349	22	480	23
52	420	61	421	61
53	242	1	243	1
54	322	59	322	59
55	445	64	448	64
56	598	20	599	20
57	0	1000	1	1129
58	237	1	240	1
59	254	4	254	4
60	518	7	518	7
61	355	16	358	16
62	444	35	447	35
63	197	183	200	183
64	241	214	242	214
65	400	105	401	105
66	43	132	44	132
67	452	80	453	80
68	193	24	195	24
69	351	191	365	228
70	308	76	311	76
71	332	138	335	147
72	194	32	197	32
73	349	121	353	142
74	672	338	676	409
75	444	462	446	505
76	341	40	348	40

Table B-1: SRTC Model Land Use				
	Existing (2018)		***Future (2040)***	
TAZ	***Households***	***Employment***	***Households***	***Employment***
77	0	1050	4	1091
78	309	137	310	137
79	313	109	325	139
80	222	58	238	89
81	271	130	276	160
82	321	194	323	194
83	165	131	166	135
84	354	249	354	348
85	307	174	312	225
86	249	185	254	215
87	345	246	348	246
88	249	52	270	52
89	219	23	219	23
90	178	148	191	178
91	81	932	88	962
92	157	854	174	1334
93	320	131	771	132
94	683	114	683	114
95	281	51	287	81
96	244	425	249	455
97	385	542	433	598
98	572	95	576	95
99	435	177	454	199
100	252	3077	264	3118
101	321	312	375	346
102	272	43	712	60
103	125	0	125	0
104	1105	521	1113	521
105	250	43	282	47
106	687	190	727	190
107	211	481	219	566
108	104	80	104	80
109	561	867	710	943
110	344	1684	401	1813
111	217	215	217	356
112	420	588	729	1481
113	311	391	312	391
114	1173	14	1175	14

Table B-1: SRTC Model Land Use				
	Existing (2018)		***Future (2040)***	
TAZ	***Households***	***Employment***	***Households***	***Employment***
115	12	1065	18	1082
116	1	1365	4	1374
117	441	197	442	206
118	465	41	465	41
119	525	55	528	55
120	276	31	280	31
121	294	71	298	101
122	561	133	562	133
123	567	68	568	68
124	499	88	499	92
125	266	5	270	5
126	303	56	308	149
127	323	148	330	247
128	370	65	375	101
129	289	2226	291	3127
130	699	254	705	254
131	636	25	649	25
132	563	90	563	90
133	498	276	502	276
134	545	459	567	502
135	158	585	163	711
136	225	39	228	73
137	456	70	458	70
138	654	241	674	241
139	242	108	261	108
140	419	13	423	13
141	355	10	372	10
142	134	1044	459	1267
143	353	355	369	355
144	382	733	383	750
145	202	88	204	88
146	426	32	462	32
147	243	351	247	351
148	277	104	279	134
149	711	1464	713	1464
150	641	12	657	12
151	348	205	354	231
152	451	222	453	252

Table B-1: SRTC Model Land Use				
	Existing (2018)		***Future (2040)***	
TAZ	***Households***	***Employment***	***Households***	***Employment***
153	644	17	730	17
154	518	124	522	124
155	326	317	341	334
156	57	2647	179	2914
157	450	679	550	778
158	401	111	401	111
159	507	32	529	32
160	151	2361	672	3207
161	140	2308	517	3346
162	90	2288	158	3235
163	152	965	208	1043
164	27	918	27	1002
165	28	409	29	409
166	2	2029	6	2029
167	0	975	0	975
168	144	1057	148	1071
169	192	655	193	655
170	63	632	66	745
171	611	71	634	71
172	629	132	629	132
173	467	2617	469	2686
174	156	939	179	1075
175	273	441	291	441
176	165	736	170	748
177	421	59	423	59
178	763	28	777	28
179	641	252	648	252
181	422	38	437	38
182	398	183	573	183
183	287	180	474	189
184	743	11	1666	11
185	67	9	386	65
186	241	414	270	489
187	467	88	470	88
188	667	31	668	31
189	342	26	342	26
190	171	5656	175	5725
191	1	1302	6	1986

Table B-1: SRTC Model Land Use				
	Existing (2018)		Future (2040)	
TAZ	Households	Employment	Households	Employment
192	434	67	445	84
193	770	46	771	46
194	362	405	364	475
195	307	74	310	74
196	25	30	120	30
197	264	128	323	128
198	1329	126	2035	190
199	291	1635	346	1728
200	455	210	462	210
201	505	134	549	168
202	200	4	210	4
203	312	85	322	89
204	457	265	469	265
205	369	12	372	12
206	346	26	358	26
207	455	195	492	236
208	278	11	291	11
209	718	79	734	92
210	461	250	473	250
211	403	8	412	8
212	393	63	396	63
213	430	87	439	91
214	229	76	241	76
215	413	263	414	263
216	720	334	808	380
217	300	575	331	634
218	447	51	457	51
219	503	110	538	110
220	375	69	393	69
221	529	430	559	469
222	832	94	832	103
223	669	326	818	339
224	367	631	512	860
225	616	198	619	265
226	598	73	598	73
227	295	42	297	42
228	371	11	372	11
229	318	135	321	139

Table B-1: SRTC Model Land Use				
	Existing (2018)		***Future (2040)***	
TAZ	***Households***	***Employment***	***Households***	***Employment***
230	580	516	581	516
231	586	43	652	43
232	472	22	571	25
233	236	87	323	101
234	324	18	328	18
235	805	372	884	505
236	404	69	404	81
237	609	119	629	275
238	0	1954	0	2014
239	357	363	357	363
240	663	101	663	101
241	363	220	363	220
242	1226	1227	1226	1274
243	905	239	905	282
244	997	163	997	163
245	371	869	379	936
246	38	2435	38	2611
247	315	362	355	525
248	92	1079	92	1079
249	220	40	220	40
250	269	19	269	19
251	237	820	245	851
252	186	1186	186	1217
253	307	226	307	243
254	209	993	209	1212
255	54	1098	54	1183
281	355	16	357	16
282	506	291	517	295
283	239	198	242	198
284	197	412	301	426
285	24	1159	24	1227
286	1	2006	1	2509
287	3	953	3	952
288	133	2494	133	2507
289	588	68	595	80
290	448	1654	449	1751
291	34	1168	35	1247
292	232	217	234	217

Table B-1: SRTC Model Land Use				
	Existing (2018)		***Future (2040)***	
TAZ	***Households***	***Employment***	***Households***	***Employment***
293	887	59	947	59
294	215	544	218	572
295	265	1035	268	1104
296	305	87	319	101
297	294	9	307	22
298	366	670	372	678
299	56	423	57	491
300	356	403	361	437
301	160	416	163	416
302	209	422	212	421
303	218	1525	227	1591
304	365	47	372	47
305	345	116	354	116
306	409	518	452	530
307	49	397	49	471
308	120	206	121	299
309	286	315	304	458
310	286	386	312	567
311	231	105	234	137
312	162	899	163	945
313	641	71	831	83
314	396	48	441	48
315	353	337	354	500
316	2	1669	2	2008
317	0	2958	0	3501
318	272	899	281	1578
319	333	20	444	109
320	1294	1987	1678	2158
321	98	806	694	2105
322	0	345	0	387
323	0	1645	0	1723
324	1	924	1	992
325	491	34	660	35
326	368	73	460	108
327	466	15	470	16
328	189	395	267	404
329	332	454	334	523
330	953	158	1002	225

Table B-1: SRTC Model Land Use				
	Existing (2018)		***Future (2040)***	
TAZ	***Households***	***Employment***	***Households***	***Employment***
331	612	346	626	670
332	340	651	360	678
333	480	1499	925	1624
334	385	286	459	405
335	410	561	423	611
336	240	666	241	755
337	377	576	591	641
338	255	944	255	1035
339	126	96	129	101
340	201	128	206	193
341	252	10	294	10
342	573	22	642	22
343	449	51	454	129
344	323	169	553	197
345	405	47	787	51
346	8	355	12	500
347	222	929	254	1764
348	269	233	305	361
349	164	576	231	696
350	122	30	122	37
351	443	47	446	46
352	751	456	823	455
353	224	45	224	53
354	181	38	187	76
355	412	102	419	103
356	280	93	288	92
357	515	363	520	370
358	242	75	242	75
359	323	115	324	115
360	484	100	488	99
361	413	11	413	11
362	402	60	412	60
363	515	54	685	54
364	450	107	483	115
365	593	47	700	116
366	415	806	651	930
367	333	986	392	1079
368	468	264	486	330

Table B-1: SRTC Model Land Use				
	Existing (2018)		***Future (2040)***	
TAZ	***Households***	***Employment***	***Households***	***Employment***
369	854	177	1115	192
370	371	110	373	144
371	378	303	395	321
372	480	146	486	195
373	400	51	408	51
374	319	80	340	79
375	361	14	373	14
376	416	190	587	190
377	241	9	241	8
378	273	32	279	32
379	204	5	208	5
380	374	123	378	123
381	365	9	371	9
382	621	76	621	76
383	341	9	341	9
384	296	27	380	31
385	184	22	308	29
386	509	84	773	158
387	363	302	652	349
388	265	1109	759	2225
389	978	229	1377	327
390	380	49	599	54
391	261	88	299	181
392	238	5	330	5
393	227	17	309	19
394	424	125	451	141
395	211	880	212	948
396	423	1281	424	1478
397	343	64	347	65
436	241	19	244	30
437	119	66	122	77
438	125	430	128	489
439	275	451	325	521
442	493	992	1161	1867
443	85	10	95	15
444	709	51	710	57
445	1140	291	1140	291
446	69	4770	476	5960

Table B-1: SRTC Model Land Use				
	Existing (2018)		***Future (2040)***	
TAZ	***Households***	***Employment***	***Households***	***Employment***
447	68	384	68	1220
448	680	223	1665	409
449	502	22	975	88
450	772	191	772	191
459	1609	452	3850	682
460	32	57	38	275
461	0	1829	0	2222
462	203	1031	203	1720
463	22	261	25	1301
464	438	1445	438	1908
471	838	380	1062	756
472	817	536	996	875
473	250	1997	291	2420
474	757	526	967	690
475	1287	1138	1382	1477
476	329	6	953	31
477	267	131	355	292
483	1189	183	1326	267
484	826	109	958	116
485	194	4	224	8
486	969	356	1414	624
487	330	897	432	1318
488	512	378	664	491
489	980	240	1047	267
490	388	62	468	65
491	1270	98	1428	103
492	453	414	615	460
493	259	241	330	271
494	486	48	488	51
495	886	235	959	268
496	112	382	154	477
497	766	528	842	549
498	652	462	696	480
499	785	170	965	208
500	18	5	18	6
501	92	58	102	62
502	243	111	320	125
503	697	96	737	97

Table B-1: SRTC Model Land Use

	Existing (2018)		*Future (2040)*	
TAZ	***Households***	***Employment***	***Households***	***Employment***
504	632	430	642	485
505	517	40	523	65
506	723	774	966	849
507	78	683	521	1534
508	826	325	992	376
509	380	29	439	31
510	740	159	764	164
511	323	42	345	45
512	978	973	1007	1039
513	158	12	173	14
514	239	572	250	629
515	466	90	499	96
516	350	762	350	813
517	159	542	159	608
518	0	686	0	686
519	659	902	673	958
520	440	206	442	207
521	340	846	742	1321
522	294	27	311	29
523	514	270	532	311
524	248	244	308	269
525	196	9	248	13
526	179	9	349	20
527	142	2	560	4
528	652	17	733	28
529	490	27	559	30
530	810	118	1018	121
531	382	101	447	111
532	262	35	306	50
533	503	137	787	143
534	95	16	98	20
535	931	284	1485	360
536	479	56	496	60
537	557	89	593	96
538	240	64	241	69
539	622	135	625	142
540	686	276	694	281
541	217	66	218	70

Table B-1: SRTC Model Land Use				
	Existing (2018)		***Future (2040)***	
TAZ	***Households***	***Employment***	***Households***	***Employment***
542	536	169	538	185
543	1087	322	1305	398
544	997	124	1123	202
545	216	121	267	132
546	553	91	877	103
547	219	196	337	203
548	184	1023	227	1109
549	676	1994	676	1994
550	370	2183	370	3672
551	16	1701	22	2211
552	78	1953	187	2435
553	739	1451	747	1721
554	165	12	318	14
555	1300	609	1877	699
556	234	122	281	385
557	862	40	1159	85
558	356	212	526	320
559	315	757	359	1075
560	584	317	615	355
561	663	122	674	130
562	345	113	410	124
563	630	615	783	725
564	407	10	479	17
565	177	108	228	119
566	357	39	613	47
567	373	20	394	28
568	606	526	749	604
569	147	104	222	122
570	436	89	460	96
571	128	8	147	12
572	327	57	588	58
573	408	109	700	123
574	534	50	606	58
575	242	45	415	48
576	287	37	670	39
577	433	62	655	67
578	345	57	603	60
579	603	131	800	136

Table B-1: SRTC Model Land Use				
	Existing (2018)		***Future (2040)***	
TAZ	***Households***	***Employment***	***Households***	***Employment***
580	246	23	419	33
581	668	112	817	115
582	546	251	837	319
583	538	71	574	75
584	491	269	675	291
585	824	249	1130	341
586	404	132	478	140
587	405	140	614	144
588	458	38	571	40
589	539	74	601	78
590	516	457	570	468
591	785	52	933	90
592	725	72	842	74
593	1236	318	1438	421
594	275	31	294	40
595	550	823	665	884
596	74	34	99	44
597	566	232	781	265
598	175	793	190	828
599	89	762	102	772
600	148	236	159	883
601	114	111	121	122
602	293	143	337	153
603	38	1561	128	1877
604	520	29	562	34
605	545	401	552	457
606	315	44	450	46
607	604	61	795	66
1001 - Five Mile Park & Ride	0	0	0	0
1002 - K Street Park & Ride	0	0	0	0
1003 - Hastings Park & Ride	0	0	0	0
1004 - Liberty Lake Park & Ride	0	0	0	0
1005 - Mirabeau Point Park & Ride	0	0	0	0
1006 - Pence-Cole Valley Transit Center	0	0	0	0
1007 - South Hill Park & Ride	0	0	0	0
1008 - Airway Heights Park & Ride	0	0	0	0
1009 - Arena Park & Ride	0	0	0	0

Table B-1: SRTC Model Land Use

	Existing (2018)		***Future (2040)***	
TAZ	***Households***	***Employment***	***Households***	***Employment***
1010 - Country Homes Church Park & Ride	0	0	0	0
1011 - Jefferson Lot	0	0	0	0
1012 - St Marks Church Park & Ride	0	0	0	0
1013 - Moran Prairie Park & Ride	-	-	0	0
1014 - West Plains Transit Center	-	-	0	0
1015 - Farwell Park & Ride	-	-	0	0
1016 - Liberty Lake Henry Rd IC Park & Ride	-	-	0	0
1017 - South Argonne Park & Ride	-	-	0	0
1018 - North Argonne Park & Ride	-	-	0	0

Source: SRTC, 2021.

Appendix B:
Traffic Operations Analysis Results

Existing Conditions

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	52	744	764	146	0	38
Future Vol, veh/h	52	744	764	146	0	38
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	120	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	5	5	7	7	2	2
Mvmt Flow	59	845	868	166	0	43

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1034	0	-	0	-	517
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.2	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.25	-	-	-	-	3.32
Pot Cap-1 Maneuver	650	-	-	-	0	503
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	650	-	-	-	-	503
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	12.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	650	-	-	-	503
HCM Lane V/C Ratio	0.091	-	-	-	0.086
HCM Control Delay (s)	11.1	-	-	-	12.8
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.3

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	634	86
Future Volume (vph)	0	0	0	242	1	111	153	371	0	0	634	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			3140	
Flt Permitted					0.97			0.50			1.00	
Satd. Flow (perm)					1487			1134			3140	
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	697	95
RTOR Reduction (vph)	0	0	0	0	19	0	0	0	0	0	11	0
Lane Group Flow (vph)	0	0	0	0	370	0	0	576	0	0	781	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)					25.8			54.2			36.2	
Effective Green, g (s)					25.8			54.2			36.2	
Actuated g/C Ratio					0.29			0.60			0.40	
Clearance Time (s)					5.0			5.0			5.0	
Vehicle Extension (s)					3.0			3.0			3.0	
Lane Grp Cap (vph)					426			814			1262	
v/s Ratio Prot								c0.10			0.25	
v/s Ratio Perm					0.25			c0.32				
v/c Ratio					0.87			0.71			0.62	
Uniform Delay, d1					30.5			12.4			21.4	
Progression Factor					1.00			1.73			1.00	
Incremental Delay, d2					16.8			2.2			2.3	
Delay (s)					47.3			23.7			23.7	
Level of Service					D			C			C	
Approach Delay (s)		0.0			47.3			23.7			23.7	
Approach LOS		A			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	0	357	0	0	0	0	449	79	173	703	0
Future Volume (vph)	75	0	357	0	0	0	0	449	79	173	703	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	504	89	194	790	0
RTOR Reduction (vph)	0	191	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	0	294	0	0	0	0	0	583	0	0	984	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)		17.0						49.0			63.0	
Effective Green, g (s)		17.0						49.0			63.0	
Actuated g/C Ratio		0.19						0.54			0.70	
Clearance Time (s)		5.0						5.0			5.0	
Vehicle Extension (s)		3.0						3.0			3.0	
Lane Grp Cap (vph)		274						1030			901	
v/s Ratio Prot								0.31			c0.11	
v/s Ratio Perm		0.20									c0.66	
v/c Ratio		1.07						0.57			1.09	
Uniform Delay, d1		36.5						13.5			13.5	
Progression Factor		1.00						1.00			0.98	
Incremental Delay, d2		75.5						2.2			54.9	
Delay (s)		112.0						15.7			68.1	
Level of Service		F						B			E	
Approach Delay (s)		112.0			0.0			15.7			68.1	
Approach LOS		F			A			B			E	

Intersection Summary			
HCM 2000 Control Delay	63.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	88	1142	832	160	0	55
Future Vol, veh/h	88	1142	832	160	0	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	120	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	100	1298	945	182	0	63

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1127	0	-	0	-	564
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.14	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.22	-	-	-	-	3.32
Pot Cap-1 Maneuver	616	-	-	-	0	469
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	616	-	-	-	-	469
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	13.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	616	-	-	-	469
HCM Lane V/C Ratio	0.162	-	-	-	0.133
HCM Control Delay (s)	12	-	-	-	13.9
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.6	-	-	-	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	132	0	69	297	634	0	0	656	56
Future Volume (vph)	0	0	0	132	0	69	297	634	0	0	656	56
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)					4.0			4.0			4.0	
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	309	660	0	0	683	58
RTOR Reduction (vph)	0	0	0	0	72	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	0	0	0	138	0	0	969	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)					14.2			67.8			42.8	
Actuated g/C Ratio					0.16			0.75			0.48	
Clearance Time (s)					5.0			5.0			5.0	
Vehicle Extension (s)					3.0			3.0			3.0	
Lane Grp Cap (vph)					238			1128			1517	
v/s Ratio Prot								c0.20			0.23	
v/s Ratio Perm					0.09			c0.45				
v/c Ratio					0.58			0.86			0.49	
Uniform Delay, d1					35.1			7.8			16.1	
Progression Factor					1.00			1.00			1.00	
Incremental Delay, d2					3.6			6.7			1.1	
Delay (s)					38.7			14.4			17.2	
Level of Service					D			B			B	
Approach Delay (s)		0.0			38.7			14.4			17.2	
Approach LOS		A			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	0	225	0	0	0	0	888	295	277	511	0
Future Volume (vph)	43	0	225	0	0	0	0	888	295	277	511	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0						4.0			4.0	
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	298	280	516	0
RTOR Reduction (vph)	0	198	0	0	0	0	0	18	0	0	0	0
Lane Group Flow (vph)	0	72	0	0	0	0	0	1177	0	0	796	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)		10.9						45.1			65.1	
Actuated g/C Ratio		0.13						0.54			0.77	
Clearance Time (s)		5.0						5.0			5.0	
Vehicle Extension (s)		3.0						3.0			3.0	
Lane Grp Cap (vph)		184						1096			1092	
v/s Ratio Prot								c0.58			c0.14	
v/s Ratio Perm		0.05									0.43	
v/c Ratio		0.39						1.07			0.73	
Uniform Delay, d1		33.5						19.4			4.9	
Progression Factor		1.00						1.00			1.00	
Incremental Delay, d2		1.4						49.3			2.5	
Delay (s)		34.9						68.8			7.4	
Level of Service		C						E			A	
Approach Delay (s)		34.9			0.0			68.8			7.4	
Approach LOS		C			A			E			A	

Intersection Summary			
HCM 2000 Control Delay	43.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	84.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

No Action Alternative

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	755	775	150	0	40
Future Volume (Veh/h)	65	755	775	150	0	40
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	65	755	775	150	0	40
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage veh)		2				
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	925				1358	462
vC1, stage 1 conf vol					850	
vC2, stage 2 conf vol					508	
vCu, unblocked vol	925				1358	462
tC, single (s)	4.2				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	91				100	93
cM capacity (veh/h)	716				321	546

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	65	378	378	517	408	40
Volume Left	65	0	0	0	0	0
Volume Right	0	0	0	0	150	40
cSH	716	1700	1700	1700	1700	546
Volume to Capacity	0.09	0.22	0.22	0.30	0.24	0.07
Queue Length 95th (ft)	7	0	0	0	0	6
Control Delay (s)	10.5	0.0	0.0	0.0	0.0	12.1
Lane LOS	B					B
Approach Delay (s)	0.8			0.0		12.1
Approach LOS						B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	250	0	310	160	505	0	0	870	100
Future Volume (vph)	0	0	0	250	0	310	160	505	0	0	870	100
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	
Frpb, ped/bikes					0.99			1.00			1.00	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					0.93			1.00			0.98	
Flt Protected					0.98			0.90			1.00	
Satd. Flow (prot)					1438			2042			3148	
Flt Permitted					0.98			0.50			1.00	
Satd. Flow (perm)					1438			1134			3148	
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	250	0	310	160	505	0	0	870	100
RTOR Reduction (vph)	0	0	0	0	56	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	0	0	0	504	0	0	665	0	0	960	0
Confl. Peds. (#/hr)				4		4						
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)					31.0			49.0			31.0	
Effective Green, g (s)					31.0			49.0			31.0	
Actuated g/C Ratio					0.34			0.54			0.34	
Clearance Time (s)					5.0			5.0			5.0	
Vehicle Extension (s)					3.0			3.0			3.0	
Lane Grp Cap (vph)					495			748			1084	
v/s Ratio Prot								c0.13			0.31	
v/s Ratio Perm					0.35			c0.36				
v/c Ratio					1.02			0.89			0.89	
Uniform Delay, d1					29.5			18.1			27.8	
Progression Factor					1.00			1.34			1.00	
Incremental Delay, d2					45.3			9.6			10.7	
Delay (s)					74.8			33.9			38.5	
Level of Service					E			C			D	
Approach Delay (s)		0.0			74.8			33.9			38.5	
Approach LOS		A			E			C			D	

Intersection Summary			
HCM 2000 Control Delay	46.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	98.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3304: Sullivan & EB Trent

01/06/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	0	360	0	0	0	0	585	80	345	775	0
Future Volume (vph)	80	0	360	0	0	0	0	585	80	345	775	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	
Frpb, ped/bikes		1.00						1.00			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.89						0.85			1.00	
Flt Protected		0.99						1.00			0.90	
Satd. Flow (prot)		1455						1886			2079	
Flt Permitted		0.99						1.00			0.50	
Satd. Flow (perm)		1455						1886			1155	
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	360	0	0	0	0	585	80	345	775	0
RTOR Reduction (vph)	0	180	0	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	260	0	0	0	0	0	657	0	0	1120	0
Confl. Peds. (#/hr)									4	4		
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)		15.0						51.0			65.0	
Effective Green, g (s)		15.0						51.0			65.0	
Actuated g/C Ratio		0.17						0.57			0.72	
Clearance Time (s)		5.0						5.0			5.0	
Vehicle Extension (s)		3.0						3.0			3.0	
Lane Grp Cap (vph)		242						1068			926	
v/s Ratio Prot								0.35			c0.12	
v/s Ratio Perm		0.18									c0.75	
v/c Ratio		1.07						0.61			1.21	
Uniform Delay, d1		37.5						13.0			12.5	
Progression Factor		1.00						1.00			2.08	
Incremental Delay, d2		79.0						2.7			98.4	
Delay (s)		116.5						15.6			124.4	
Level of Service		F						B			F	
Approach Delay (s)		116.5			0.0			15.6			124.4	
Approach LOS		F			A			B			F	

Intersection Summary			
HCM 2000 Control Delay	90.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBT	NBT	SBT
Lane Group Flow (vph)	560	665	970
v/c Ratio	1.01	0.89	0.89
Control Delay	67.5	41.1	38.9
Queue Delay	32.6	0.0	47.4
Total Delay	100.1	41.1	86.3
Queue Length 50th (ft)	~283	196	267
Queue Length 95th (ft)	#504	m#302	#386
Internal Link Dist (ft)	465	235	412
Turn Bay Length (ft)			
Base Capacity (vph)	555	748	1094
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	107	0	221
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.25	0.89	1.11

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	NBT	SBT
Lane Group Flow (vph)	440	665	1120
v/c Ratio	1.04	0.62	1.21
Control Delay	76.3	15.7	127.9
Queue Delay	0.0	0.0	0.8
Total Delay	76.3	15.7	128.7
Queue Length 50th (ft)	~161	162	~493
Queue Length 95th (ft)	#347	240	m#637
Internal Link Dist (ft)	586	670	235
Turn Bay Length (ft)			
Base Capacity (vph)	422	1080	927
Starvation Cap Reductn	0	0	128
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.04	0.62	1.40

Intersection Summary

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

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

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

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	145	1175	870	160	0	65
Future Volume (Veh/h)	145	1175	870	160	0	65
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	145	1175	870	160	0	65
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage veh)		2				
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1030				1828	515
vC1, stage 1 conf vol					950	
vC2, stage 2 conf vol					878	
vCu, unblocked vol	1030				1828	515
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	78				100	87
cM capacity (veh/h)	670				218	505

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	145	588	588	580	450	65
Volume Left	145	0	0	0	0	0
Volume Right	0	0	0	0	160	65
cSH	670	1700	1700	1700	1700	505
Volume to Capacity	0.22	0.35	0.35	0.34	0.26	0.13
Queue Length 95th (ft)	20	0	0	0	0	11
Control Delay (s)	11.8	0.0	0.0	0.0	0.0	13.2
Lane LOS	B					B
Approach Delay (s)	1.3			0.0		13.2
Approach LOS						B

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	170	0	360	270	1000	0	0	1025	60
Future Volume (vph)	0	0	0	170	0	360	270	1000	0	0	1025	60
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					1.00			*0.75			*0.80	
Frpb, ped/bikes					0.99			1.00			1.00	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					0.91			1.00			0.99	
Flt Protected					0.98			0.90			1.00	
Satd. Flow (prot)					1445			2316			2691	
Flt Permitted					0.98			0.50			1.00	
Satd. Flow (perm)					1445			1287			2691	
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	170	0	360	270	1000	0	0	1025	60
RTOR Reduction (vph)	0	0	0	0	58	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	0	0	0	472	0	0	1270	0	0	1082	0
Confl. Peds. (#/hr)				2		4	1		2	4		3
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)					33.0			87.0			69.0	
Effective Green, g (s)					34.0			88.0			70.0	
Actuated g/C Ratio					0.26			0.68			0.54	
Clearance Time (s)					5.0			5.0			5.0	
Vehicle Extension (s)					3.0			3.0			3.0	
Lane Grp Cap (vph)					377			982			1449	
v/s Ratio Prot								c0.14			0.40	
v/s Ratio Perm					0.33			c0.74				
v/c Ratio					1.25			1.29			0.75	
Uniform Delay, d1					48.0			21.0			23.2	
Progression Factor					1.00			0.96			1.00	
Incremental Delay, d2					133.2			132.7			3.6	
Delay (s)					181.2			152.8			26.7	
Level of Service					F			F			C	
Approach Delay (s)		0.0			181.2			152.8			26.7	
Approach LOS		A			F			F			C	

Intersection Summary			
HCM 2000 Control Delay	110.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	115.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	0	245	0	0	0	0	1200	360	570	625	0
Future Volume (vph)	70	0	245	0	0	0	0	1200	360	570	625	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		1.00						*0.65			*0.75	
Frpb, ped/bikes		0.99						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.90						0.85			1.00	
Flt Protected		0.99						1.00			0.90	
Satd. Flow (prot)		1417						1885			2271	
Flt Permitted		0.99						1.00			0.50	
Satd. Flow (perm)		1417						1885			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)	70	0	245	0	0	0	0	1200	360	570	625	0
RTOR Reduction (vph)	0	97	0	0	0	0	0	12	0	0	0	0
Lane Group Flow (vph)	0	218	0	0	0	0	0	1548	0	0	1195	0
Confl. Peds. (#/hr)	1		1				1		1	1		
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)		15.0						91.0			105.0	
Effective Green, g (s)		16.0						92.0			106.0	
Actuated g/C Ratio		0.12						0.71			0.82	
Clearance Time (s)		5.0						5.0			5.0	
Vehicle Extension (s)		3.0						3.0			3.0	
Lane Grp Cap (vph)		174						1334			1106	
v/s Ratio Prot								c0.82			c0.08	
v/s Ratio Perm		0.15									0.80	
v/c Ratio		1.25						1.16			1.08	
Uniform Delay, d1		57.0						19.0			12.0	
Progression Factor		1.00						1.00			2.56	
Incremental Delay, d2		151.4						80.9			45.8	
Delay (s)		208.4						99.9			76.4	
Level of Service		F						F			E	
Approach Delay (s)		208.4			0.0			99.9			76.4	
Approach LOS		F			A			F			E	

Intersection Summary			
HCM 2000 Control Delay	101.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	116.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBT	NBT	SBT
Lane Group Flow (vph)	530	1270	1085
v/c Ratio	1.22	1.29	0.75
Control Delay	151.7	157.7	27.1
Queue Delay	0.3	0.5	49.8
Total Delay	152.1	158.1	76.9
Queue Length 50th (ft)	~496	~748	423
Queue Length 95th (ft)	#720	m#392	530
Internal Link Dist (ft)	465	235	412
Turn Bay Length (ft)			
Base Capacity (vph)	436	982	1452
Starvation Cap Reductn	0	90	0
Spillback Cap Reductn	16	0	565
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.26	1.42	1.22

Intersection Summary

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

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

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

Lane Group	EBT	NBT	SBT
Lane Group Flow (vph)	315	1560	1195
v/c Ratio	1.16	1.16	1.08
Control Delay	137.9	101.4	81.6
Queue Delay	8.6	0.9	10.5
Total Delay	146.5	102.3	92.1
Queue Length 50th (ft)	~227	~1190	~635
Queue Length 95th (ft)	#417	#1398	m#758
Internal Link Dist (ft)	586	670	235
Turn Bay Length (ft)			
Base Capacity (vph)	271	1345	1106
Starvation Cap Reductn	0	0	417
Spillback Cap Reductn	116	260	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	2.03	1.44	1.73

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Unsignalized Intersection Capacity Analysis
101: Trent Avenue & Progress Rd

01/06/2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	75	935	870	155	0	45
Future Volume (Veh/h)	75	935	870	155	0	45
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	75	935	870	155	0	45
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage veh)		2				
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1025				1565	512
vC1, stage 1 conf vol					948	
vC2, stage 2 conf vol					618	
vCu, unblocked vol	1025				1565	512
tC, single (s)	4.2				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	89				100	91
cM capacity (veh/h)	655				275	507

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	75	468	468	580	445	45
Volume Left	75	0	0	0	0	0
Volume Right	0	0	0	0	155	45
cSH	655	1700	1700	1700	1700	507
Volume to Capacity	0.11	0.28	0.28	0.34	0.26	0.09
Queue Length 95th (ft)	10	0	0	0	0	7
Control Delay (s)	11.2	0.0	0.0	0.0	0.0	12.8
Lane LOS	B					B
Approach Delay (s)	0.8			0.0		12.8
Approach LOS						B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	260	0	375	165	660	0	0	1100	120
Future Volume (vph)	0	0	0	260	0	375	165	660	0	0	1100	120
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	
Frpb, ped/bikes					0.99			1.00			1.00	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					0.92			1.00			0.99	
Flt Protected					0.98			0.90			1.00	
Satd. Flow (prot)					1433			2042			3150	
Flt Permitted					0.98			0.50			1.00	
Satd. Flow (perm)					1433			1134			3150	
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	260	0	375	165	660	0	0	1100	120
RTOR Reduction (vph)	0	0	0	0	52	0	0	0	0	0	8	0
Lane Group Flow (vph)	0	0	0	0	583	0	0	825	0	0	1212	0
Confl. Peds. (#/hr)				4		4						
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)					34.0			56.0			38.0	
Effective Green, g (s)					34.0			56.0			38.0	
Actuated g/C Ratio					0.34			0.56			0.38	
Clearance Time (s)					5.0			5.0			5.0	
Vehicle Extension (s)					3.0			3.0			3.0	
Lane Grp Cap (vph)					487			753			1197	
v/s Ratio Prot								c0.14			0.38	
v/s Ratio Perm					0.41			c0.47				
v/c Ratio					1.20			1.10			1.01	
Uniform Delay, d1					33.0			22.0			31.0	
Progression Factor					1.00			1.11			1.00	
Incremental Delay, d2					107.2			56.0			29.1	
Delay (s)					140.2			80.5			60.1	
Level of Service					F			F			E	
Approach Delay (s)		0.0			140.2			80.5			60.1	
Approach LOS		A			F			F			E	

Intersection Summary			
HCM 2000 Control Delay	85.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	115.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	0	365	0	0	0	0	740	90	420	940	0
Future Volume (vph)	85	0	365	0	0	0	0	740	90	420	940	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	
Frpb, ped/bikes		1.00						1.00			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.89						0.85			1.00	
Flt Protected		0.99						1.00			0.90	
Satd. Flow (prot)		1456						1887			2079	
Flt Permitted		0.99						1.00			0.50	
Satd. Flow (perm)		1456						1887			1155	
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)	85	0	365	0	0	0	0	740	90	420	940	0
RTOR Reduction (vph)	0	155	0	0	0	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	295	0	0	0	0	0	823	0	0	1360	0
Confl. Peds. (#/hr)									4	4		
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)		15.0						61.0			75.0	
Effective Green, g (s)		15.0						61.0			75.0	
Actuated g/C Ratio		0.15						0.61			0.75	
Clearance Time (s)		5.0						5.0			5.0	
Vehicle Extension (s)		3.0						3.0			3.0	
Lane Grp Cap (vph)		218						1151			949	
v/s Ratio Prot								0.44			c0.13	
v/s Ratio Perm		0.20									c0.95	
v/c Ratio		1.35						0.72			1.43	
Uniform Delay, d1		42.5						13.5			12.5	
Progression Factor		1.00						1.00			2.16	
Incremental Delay, d2		186.5						3.8			195.5	
Delay (s)		229.0						17.3			222.4	
Level of Service		F						B			F	
Approach Delay (s)		229.0			0.0			17.3			222.4	
Approach LOS		F			A			B			F	

Intersection Summary			
HCM 2000 Control Delay	159.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.48		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	108.9%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBT	NBT	SBT
Lane Group Flow (vph)	635	825	1220
v/c Ratio	1.17	1.10	1.01
Control Delay	122.3	84.7	60.7
Queue Delay	0.4	0.0	34.2
Total Delay	122.7	84.7	94.9
Queue Length 50th (ft)	~450	~285	~412
Queue Length 95th (ft)	#669	m#456	#566
Internal Link Dist (ft)	465	235	412
Turn Bay Length (ft)			
Base Capacity (vph)	544	753	1204
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	27	0	448
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.23	1.10	1.61

Intersection Summary

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

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

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

Lane Group	EBT	NBT	SBT
Lane Group Flow (vph)	450	830	1360
v/c Ratio	1.21	0.71	1.43
Control Delay	139.4	17.6	223.6
Queue Delay	2.3	0.1	1.1
Total Delay	141.7	17.7	224.7
Queue Length 50th (ft)	~246	236	~836
Queue Length 95th (ft)	#441	342	m#787
Internal Link Dist (ft)	586	670	235
Turn Bay Length (ft)			
Base Capacity (vph)	373	1161	950
Starvation Cap Reductn	0	0	173
Spillback Cap Reductn	70	26	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.49	0.73	1.75

Intersection Summary

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

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

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

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	175	1195	980	160	0	75
Future Volume (Veh/h)	175	1195	980	160	0	75
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	175	1195	980	160	0	75
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage veh)		2				
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1140				2008	570
vC1, stage 1 conf vol					1060	
vC2, stage 2 conf vol					948	
vCu, unblocked vol	1140				2008	570
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	71				100	84
cM capacity (veh/h)	609				183	465

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	175	598	598	653	487	75
Volume Left	175	0	0	0	0	0
Volume Right	0	0	0	0	160	75
cSH	609	1700	1700	1700	1700	465
Volume to Capacity	0.29	0.35	0.35	0.38	0.29	0.16
Queue Length 95th (ft)	30	0	0	0	0	14
Control Delay (s)	13.3	0.0	0.0	0.0	0.0	14.2
Lane LOS	B					B
Approach Delay (s)	1.7			0.0		14.2
Approach LOS						B

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	53.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	195	0	440	285	1220	0	0	1245	65
Future Volume (vph)	0	0	0	195	0	440	285	1220	0	0	1245	65
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					1.00			*0.75			*0.80	
Frpb, ped/bikes					0.99			1.00			1.00	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					0.91			1.00			0.99	
Flt Protected					0.98			0.90			1.00	
Satd. Flow (prot)					1443			2316			2694	
Flt Permitted					0.98			0.50			1.00	
Satd. Flow (perm)					1443			1287			2694	
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	195	0	440	285	1220	0	0	1245	65
RTOR Reduction (vph)	0	0	0	0	54	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	0	0	0	581	0	0	1505	0	0	1308	0
Confl. Peds. (#/hr)				2		4	1		2	4		3
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)					39.0			101.0			82.0	
Effective Green, g (s)					40.0			102.0			83.0	
Actuated g/C Ratio					0.27			0.68			0.55	
Clearance Time (s)					5.0			5.0			5.0	
Vehicle Extension (s)					3.0			3.0			3.0	
Lane Grp Cap (vph)					384			978			1490	
v/s Ratio Prot								c0.15			0.49	
v/s Ratio Perm					0.40			c0.89				
v/c Ratio					1.51			1.54			0.88	
Uniform Delay, d1					55.0			24.0			29.1	
Progression Factor					1.00			0.96			1.00	
Incremental Delay, d2					243.6			243.0			7.6	
Delay (s)					298.6			265.9			36.7	
Level of Service					F			F			D	
Approach Delay (s)		0.0			298.6			265.9			36.7	
Approach LOS		A			F			F			D	

Intersection Summary			
HCM 2000 Control Delay	184.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.56		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	136.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	0	275	0	0	0	0	1415	440	685	755	0
Future Volume (vph)	90	0	275	0	0	0	0	1415	440	685	755	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		1.00						*0.65			*0.75	
Frpb, ped/bikes		0.99						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.90						0.85			1.00	
Flt Protected		0.99						1.00			0.90	
Satd. Flow (prot)		1422						1885			2271	
Flt Permitted		0.99						1.00			0.50	
Satd. Flow (perm)		1422						1885			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)	90	0	275	0	0	0	0	1415	440	685	755	0
RTOR Reduction (vph)	0	73	0	0	0	0	0	11	0	0	0	0
Lane Group Flow (vph)	0	292	0	0	0	0	0	1844	0	0	1440	0
Confl. Peds. (#/hr)	1		1				1		1	1		
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)		21.0						105.0			119.0	
Effective Green, g (s)		22.0						106.0			120.0	
Actuated g/C Ratio		0.15						0.71			0.80	
Clearance Time (s)		5.0						5.0			5.0	
Vehicle Extension (s)		3.0						3.0			3.0	
Lane Grp Cap (vph)		208						1332			1076	
v/s Ratio Prot								c0.98			c0.09	
v/s Ratio Perm		0.21									0.98	
v/c Ratio		1.40						1.38			1.34	
Uniform Delay, d1		64.0						22.0			15.0	
Progression Factor		1.00						1.00			2.29	
Incremental Delay, d2		207.2						177.9			154.3	
Delay (s)		271.2						199.9			188.6	
Level of Service		F						F			F	
Approach Delay (s)		271.2			0.0			199.9			188.6	
Approach LOS		F			A			F			F	

Intersection Summary			
HCM 2000 Control Delay	202.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	135.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBT	NBT	SBT
Lane Group Flow (vph)	635	1505	1310
v/c Ratio	1.45	1.54	0.88
Control Delay	249.4	268.2	37.2
Queue Delay	0.3	0.5	48.4
Total Delay	249.8	268.6	85.6
Queue Length 50th (ft)	~792	~1376	672
Queue Length 95th (ft)	#1037	m#452	818
Internal Link Dist (ft)	465	235	412
Turn Bay Length (ft)			
Base Capacity (vph)	438	978	1493
Starvation Cap Reductn	0	85	0
Spillback Cap Reductn	16	0	607
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.50	1.69	1.48

Intersection Summary

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

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

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

Lane Group	EBT	NBT	SBT
Lane Group Flow (vph)	365	1855	1440
v/c Ratio	1.30	1.38	1.34
Control Delay	194.9	199.9	189.1
Queue Delay	6.7	1.7	3.2
Total Delay	201.6	201.6	192.3
Queue Length 50th (ft)	~380	~1849	~1192
Queue Length 95th (ft)	#590	#2050	m#1284
Internal Link Dist (ft)	586	670	235
Turn Bay Length (ft)			
Base Capacity (vph)	281	1342	1076
Starvation Cap Reductn	0	0	465
Spillback Cap Reductn	104	421	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	2.06	2.01	2.36

Intersection Summary

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

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

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

Alternative 1: Signals

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	250	0	310	160	505	0	0	870	100
Future Volume (veh/h)	0	0	0	250	0	310	160	505	0	0	870	100
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				1627	1627	1627	1641	1641	0	0	1695	1695
Adj Flow Rate, veh/h				250	0	310	160	505	0	0	870	100
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				9	9	9	8	8	0	0	4	4
Cap, veh/h				400	0	356	378	1377	0	0	1529	173
Arrive On Green				0.26	0.00	0.26	0.08	0.20	0.00	0.00	0.29	0.29
Sat Flow, veh/h				1550	0	1379	1563	2789	0	0	5590	607
Grp Volume(v), veh/h				250	0	310	160	505	0	0	709	261
Grp Sat Flow(s),veh/h/ln				1550	0	1379	1563	1149	0	0	1458	1586
Q Serve(g_s), s				10.0	0.0	15.1	6.8	13.3	0.0	0.0	9.7	9.9
Cycle Q Clear(g_c), s				10.0	0.0	15.1	6.8	13.3	0.0	0.0	9.7	9.9
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.38
Lane Grp Cap(c), veh/h				400	0	356	378	1377	0	0	1250	453
V/C Ratio(X)				0.63	0.00	0.87	0.42	0.37	0.00	0.00	0.57	0.58
Avail Cap(c_a), veh/h				465	0	414	378	1377	0	0	1250	453
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.86	0.86	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				23.0	0.0	24.9	27.5	16.6	0.0	0.0	21.3	21.4
Incr Delay (d2), s/veh				2.0	0.0	16.3	0.6	0.7	0.0	0.0	1.9	5.3
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				6.5	0.0	10.2	4.8	7.2	0.0	0.0	5.9	7.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				25.0	0.0	41.2	28.2	17.2	0.0	0.0	23.2	26.6
LnGrp LOS				C	A	D	C	B	A	A	C	C
Approach Vol, veh/h					560			665			970	
Approach Delay, s/veh					34.0			19.9			24.1	
Approach LOS					C			B			C	
Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	21.9	25.0				46.9		23.1				
Change Period (Y+Rc), s	5.0	5.0				5.0		5.0				
Max Green Setting (Gmax), s	14.0	20.0				39.0		21.0				
Max Q Clear Time (g_c+I1), s	8.8	11.9				15.3		17.1				
Green Ext Time (p_c), s	0.2	3.8				3.4		1.0				
Intersection Summary												
HCM 6th Ctrl Delay			25.3									
HCM 6th LOS			C									

HCM 6th Signalized Intersection Summary
3304: Sullivan & EB Trent

01/27/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	0	360	0	0	0	0	585	80	345	775	0
Future Volume (veh/h)	80	0	360	0	0	0	0	585	80	345	775	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	1668	1668	1668				0	1614	1614	1668	1668	0
Adj Flow Rate, veh/h	80	0	285				0	585	30	345	775	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, %	6	6	6				0	10	10	6	6	0
Cap, veh/h	368	0	328				0	1113	449	695	1460	0
Arrive On Green	0.23	0.00	0.23				0.00	0.33	0.33	0.23	0.63	0.00
Sat Flow, veh/h	1589	0	1414				0	3872	1367	3082	2836	0
Grp Volume(v), veh/h	80	0	285				0	585	30	345	775	0
Grp Sat Flow(s),veh/h/ln	1589	0	1414				0	1129	1367	1541	1168	0
Q Serve(g_s), s	2.9	0.0	13.6				0.0	9.8	1.1	6.8	13.0	0.0
Cycle Q Clear(g_c), s	2.9	0.0	13.6				0.0	9.8	1.1	6.8	13.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	368	0	328				0	1113	449	695	1460	0
V/C Ratio(X)	0.22	0.00	0.87				0.00	0.53	0.07	0.50	0.53	0.00
Avail Cap(c_a), veh/h	454	0	404				0	1113	449	695	1460	0
HCM Platoon Ratio	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				0.00	1.00	1.00	0.88	0.88	0.00
Uniform Delay (d), s/veh	21.8	0.0	25.9				0.0	19.1	16.1	23.6	7.4	0.0
Incr Delay (d2), s/veh	0.3	0.0	15.6				0.0	1.8	0.3	0.5	1.2	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	1.8	0.0	16.7				0.0	4.5	0.6	4.3	4.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.0	0.0	41.5				0.0	20.8	16.4	24.1	8.6	0.0
LnGrp LOS	C	A	D				A	C	B	C	A	A
Approach Vol, veh/h		365						615			1120	
Approach Delay, s/veh		37.2						20.6			13.4	
Approach LOS		D						C			B	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		48.8		21.2	20.8	28.0						
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0						
Max Green Setting (Gmax), s		40.0		20.0	12.0	23.0						
Max Q Clear Time (g_c+I1), s		15.0		15.6	8.8	11.8						
Green Ext Time (p_c), s		5.6		0.7	0.4	3.0						
Intersection Summary												
HCM 6th Ctrl Delay			19.6									
HCM 6th LOS			B									

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	250	310	160	505	970
v/c Ratio	0.70	0.56	0.52	0.40	0.48
Control Delay	35.1	6.9	44.6	18.2	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	35.1	6.9	44.6	18.2	18.6
Queue Length 50th (ft)	98	0	76	154	88
Queue Length 95th (ft)	158	53	134	213	130
Internal Link Dist (ft)	498			235	1363
Turn Bay Length (ft)		50			
Base Capacity (vph)	457	626	307	1274	2037
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.55	0.50	0.52	0.40	0.48

Intersection Summary

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	80	360	585	80	345	775
v/c Ratio	0.25	0.83	0.50	0.13	0.66	0.57
Control Delay	22.9	29.1	18.7	2.8	26.7	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	22.9	29.1	18.7	2.8	26.7	15.7
Queue Length 50th (ft)	29	70	88	0	34	99
Queue Length 95th (ft)	57	155	146	17	89	247
Internal Link Dist (ft)	478		313			235
Turn Bay Length (ft)		50		200		
Base Capacity (vph)	448	532	1166	619	521	1359
Starvation Cap Reductn	0	0	0	0	0	91
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.68	0.50	0.13	0.66	0.61

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	170	0	360	270	1000	0	0	1025	60
Future Volume (veh/h)	0	0	0	170	0	360	270	1000	0	0	1025	60
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				1654	1654	1654	1723	1723	0	0	1709	1709
Adj Flow Rate, veh/h				170	0	360	270	1000	0	0	1025	60
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				442	0	393	451	1467	0	0	1590	93
Arrive On Green				0.28	0.00	0.28	0.37	0.81	0.00	0.00	0.28	0.28
Sat Flow, veh/h				1576	0	1402	1641	2929	0	0	5964	333
Grp Volume(v), veh/h				170	0	360	270	1000	0	0	788	297
Grp Sat Flow(s),veh/h/ln				1576	0	1402	1641	1206	0	0	1470	1649
Q Serve(g_s), s				7.8	0.0	22.4	12.0	15.9	0.0	0.0	14.1	14.3
Cycle Q Clear(g_c), s				7.8	0.0	22.4	12.0	15.9	0.0	0.0	14.1	14.3
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.20
Lane Grp Cap(c), veh/h				442	0	393	451	1467	0	0	1225	458
V/C Ratio(X)				0.38	0.00	0.92	0.60	0.68	0.00	0.00	0.64	0.65
Avail Cap(c_a), veh/h				490	0	436	451	1467	0	0	1225	458
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	0.53	0.53	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				26.1	0.0	31.3	24.5	4.9	0.0	0.0	28.6	28.6
Incr Delay (d2), s/veh				0.5	0.0	22.5	1.2	1.4	0.0	0.0	2.6	6.9
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				5.2	0.0	14.8	6.8	4.1	0.0	0.0	8.8	10.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				26.7	0.0	53.9	25.7	6.3	0.0	0.0	31.2	35.6
LnGrp LOS				C	A	D	C	A	A	A	C	D
Approach Vol, veh/h					530			1270			1085	
Approach Delay, s/veh					45.1			10.4			32.4	
Approach LOS					D			B			C	

Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	29.8	30.0				59.8		30.2				
Change Period (Y+Rc), s	5.0	5.0				5.0		5.0				
Max Green Setting (Gmax), s	22.0	25.0				52.0		28.0				
Max Q Clear Time (g_c+I1), s	14.0	16.3				17.9		24.4				
Green Ext Time (p_c), s	0.5	4.4				8.4		0.9				

Intersection Summary			
HCM 6th Ctrl Delay			25.0
HCM 6th LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	0	245	0	0	0	0	1200	360	570	625	0
Future Volume (veh/h)	70	0	245	0	0	0	0	1200	360	570	625	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	70	0	170				0	1200	310	570	625	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	224	0	200				0	1608	649	769	1769	0
Arrive On Green	0.14	0.00	0.14				0.00	0.44	0.44	0.33	0.99	0.00
Sat Flow, veh/h	1563	0	1391				0	4134	1460	3132	2882	0
Grp Volume(v), veh/h	70	0	170				0	1200	310	570	625	0
Grp Sat Flow(s),veh/h/ln	1563	0	1391				0	1206	1460	1566	1187	0
Q Serve(g_s), s	3.6	0.0	10.7				0.0	24.8	13.5	14.6	0.3	0.0
Cycle Q Clear(g_c), s	3.6	0.0	10.7				0.0	24.8	13.5	14.6	0.3	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	224	0	200				0	1608	649	769	1769	0
V/C Ratio(X)	0.31	0.00	0.85				0.00	0.75	0.48	0.74	0.35	0.00
Avail Cap(c_a), veh/h	260	0	232				0	1608	649	769	1769	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.83	0.83	0.00
Uniform Delay (d), s/veh	34.6	0.0	37.6				0.0	20.8	17.6	27.8	0.1	0.0
Incr Delay (d2), s/veh	0.8	0.0	22.6				0.0	3.2	2.5	3.2	0.5	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	2.5	0.0	14.1				0.0	11.2	8.2	8.5	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.3	0.0	60.2				0.0	24.0	20.1	31.0	0.6	0.0
LnGrp LOS	D	A	E				A	C	C	C	A	A
Approach Vol, veh/h		240						1510			1195	
Approach Delay, s/veh		52.9						23.2			15.1	
Approach LOS		D						C			B	

Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		72.1		17.9	27.1	45.0						
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0						
Max Green Setting (Gmax), s		65.0		15.0	20.0	40.0						
Max Q Clear Time (g_c+I1), s		2.3		12.7	16.6	26.8						
Green Ext Time (p_c), s		4.8		0.2	0.8	7.7						

Intersection Summary			
HCM 6th Ctrl Delay			22.3
HCM 6th LOS			C

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	170	360	270	1000	1085
v/c Ratio	0.45	0.86	0.68	0.72	0.54
Control Delay	31.4	41.3	52.7	30.2	25.7
Queue Delay	0.0	0.0	0.9	16.1	0.0
Total Delay	31.4	41.3	53.6	46.3	25.7
Queue Length 50th (ft)	81	137	139	352	143
Queue Length 95th (ft)	130	231	m213	523	194
Internal Link Dist (ft)	498			235	1363
Turn Bay Length (ft)		50			
Base Capacity (vph)	483	508	398	1396	2014
Starvation Cap Reductn	0	0	25	402	0
Spillback Cap Reductn	0	0	0	0	36
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.35	0.71	0.72	1.01	0.55

Intersection Summary

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

	→	↘	↑	↗	↘	↓
Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	70	245	1200	360	570	625
v/c Ratio	0.42	0.67	0.78	0.40	0.83	0.38
Control Delay	43.9	14.4	23.8	3.1	28.1	8.5
Queue Delay	0.3	0.0	2.3	0.0	0.0	0.2
Total Delay	44.2	14.4	26.1	3.1	28.1	8.7
Queue Length 50th (ft)	38	0	250	0	46	44
Queue Length 95th (ft)	74	66	#411	48	#117	157
Internal Link Dist (ft)	478		313			235
Turn Bay Length (ft)		50		200		
Base Capacity (vph)	256	433	1538	911	689	1654
Starvation Cap Reductn	0	0	0	0	0	379
Spillback Cap Reductn	28	0	211	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.57	0.90	0.40	0.83	0.49

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	260	0	375	165	660	0	0	1100	120
Future Volume (veh/h)	0	0	0	260	0	375	165	660	0	0	1100	120
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				1627	1627	1627	1641	1641	0	0	1695	1695
Adj Flow Rate, veh/h				260	0	375	165	660	0	0	1100	120
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				9	9	9	8	8	0	0	4	4
Cap, veh/h				462	0	412	315	1283	0	0	1538	167
Arrive On Green				0.30	0.00	0.30	0.07	0.18	0.00	0.00	0.29	0.29
Sat Flow, veh/h				1550	0	1379	1563	2789	0	0	5619	583
Grp Volume(v), veh/h				260	0	375	165	660	0	0	893	327
Grp Sat Flow(s),veh/h/ln				1550	0	1379	1563	1149	0	0	1458	1590
Q Serve(g_s), s				9.9	0.0	18.3	7.1	18.1	0.0	0.0	12.8	13.0
Cycle Q Clear(g_c), s				9.9	0.0	18.3	7.1	18.1	0.0	0.0	12.8	13.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.37
Lane Grp Cap(c), veh/h				462	0	412	315	1283	0	0	1250	454
V/C Ratio(X)				0.56	0.00	0.91	0.52	0.51	0.00	0.00	0.71	0.72
Avail Cap(c_a), veh/h				487	0	433	315	1283	0	0	1250	454
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.65	0.65	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				20.7	0.0	23.7	29.4	20.0	0.0	0.0	22.4	22.5
Incr Delay (d2), s/veh				1.3	0.0	22.6	1.0	1.0	0.0	0.0	3.5	9.5
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				6.2	0.0	12.6	5.0	8.7	0.0	0.0	7.9	9.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				22.0	0.0	46.3	30.5	20.9	0.0	0.0	25.9	32.0
LnGrp LOS				C	A	D	C	C	A	A	C	C
Approach Vol, veh/h					635			825			1220	
Approach Delay, s/veh					36.4			22.8			27.6	
Approach LOS					D			C			C	
Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	19.1	25.0				44.1		25.9				
Change Period (Y+Rc), s	5.0	5.0				5.0		5.0				
Max Green Setting (Gmax), s	13.0	20.0				38.0		22.0				
Max Q Clear Time (g_c+I1), s	9.1	15.0				20.1		20.3				
Green Ext Time (p_c), s	0.1	3.2				4.2		0.5				
Intersection Summary												
HCM 6th Ctrl Delay			28.2									
HCM 6th LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	0	365	0	0	0	0	740	90	420	940	0
Future Volume (veh/h)	85	0	365	0	0	0	0	740	90	420	940	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	1668	1668	1668				0	1614	1614	1668	1668	0
Adj Flow Rate, veh/h	85	0	290				0	740	40	420	940	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, %	6	6	6				0	10	10	6	6	0
Cap, veh/h	379	0	338				0	1017	410	761	1444	0
Arrive On Green	0.24	0.00	0.24				0.00	0.30	0.30	0.17	0.41	0.00
Sat Flow, veh/h	1589	0	1414				0	3872	1367	3082	2836	0
Grp Volume(v), veh/h	85	0	290				0	740	40	420	940	0
Grp Sat Flow(s),veh/h/ln	1589	0	1414				0	1129	1367	1541	1168	0
Q Serve(g_s), s	3.0	0.0	13.8				0.0	13.7	1.5	8.8	22.6	0.0
Cycle Q Clear(g_c), s	3.0	0.0	13.8				0.0	13.7	1.5	8.8	22.6	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	379	0	338				0	1017	410	761	1444	0
V/C Ratio(X)	0.22	0.00	0.86				0.00	0.73	0.10	0.55	0.65	0.00
Avail Cap(c_a), veh/h	522	0	464				0	1017	410	761	1444	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	0.67	0.67	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.78	0.78	0.00
Uniform Delay (d), s/veh	21.4	0.0	25.5				0.0	21.9	17.7	25.7	14.4	0.0
Incr Delay (d2), s/veh	0.3	0.0	11.3				0.0	4.6	0.5	0.7	1.8	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
%ile BackOfQ(95%),veh/ln	1.9	0.0	16.4				0.0	6.7	0.9	5.8	10.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.7	0.0	36.9				0.0	26.5	18.1	26.3	16.2	0.0
LnGrp LOS	C	A	D				A	C	B	C	B	A
Approach Vol, veh/h		375						780			1360	
Approach Delay, s/veh		33.4						26.1			19.3	
Approach LOS		C						C			B	

Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		48.3		21.7	22.3	26.0						
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0						
Max Green Setting (Gmax), s		37.0		23.0	11.0	21.0						
Max Q Clear Time (g_c+I1), s		24.6		15.8	10.8	15.7						
Green Ext Time (p_c), s		5.1		1.0	0.0	2.3						

Intersection Summary			
HCM 6th Ctrl Delay			23.5
HCM 6th LOS			C

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	260	375	165	660	1220
v/c Ratio	0.70	0.75	0.58	0.53	0.59
Control Delay	34.0	19.4	44.9	19.8	20.1
Queue Delay	0.2	0.0	0.0	0.4	0.0
Total Delay	34.2	19.4	44.9	20.2	20.1
Queue Length 50th (ft)	101	55	79	206	120
Queue Length 95th (ft)	161	140	m115	272	170
Internal Link Dist (ft)	498			235	1363
Turn Bay Length (ft)		50			
Base Capacity (vph)	479	581	285	1253	2056
Starvation Cap Reductn	0	0	0	205	0
Spillback Cap Reductn	22	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.57	0.65	0.58	0.63	0.59

Intersection Summary

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

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	85	365	740	90	420	940
v/c Ratio	0.21	0.83	0.70	0.16	0.88	0.75
Control Delay	19.7	32.9	25.3	4.0	45.2	24.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	19.7	32.9	25.3	4.0	45.2	24.3
Queue Length 50th (ft)	28	102	129	0	54	183
Queue Length 95th (ft)	56	186	#230	23	#153	#346
Internal Link Dist (ft)	478		313			235
Turn Bay Length (ft)		50		200		
Base Capacity (vph)	515	534	1057	571	478	1249
Starvation Cap Reductn	0	0	0	0	0	23
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.68	0.70	0.16	0.88	0.77

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	195	0	440	285	1220	0	0	1245	65
Future Volume (veh/h)	0	0	0	195	0	440	285	1220	0	0	1245	65
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				1654	1654	1654	1723	1723	0	0	1709	1709
Adj Flow Rate, veh/h				195	0	440	285	1220	0	0	1245	65
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				529	0	471	488	1401	0	0	1393	73
Arrive On Green				0.34	0.00	0.34	0.30	0.58	0.00	0.00	0.24	0.24
Sat Flow, veh/h				1576	0	1402	1641	2929	0	0	6003	300
Grp Volume(v), veh/h				195	0	440	285	1220	0	0	952	358
Grp Sat Flow(s),veh/h/ln				1576	0	1402	1641	1206	0	0	1470	1655
Q Serve(g_s), s				11.3	0.0	36.4	17.7	51.5	0.0	0.0	25.0	25.2
Cycle Q Clear(g_c), s				11.3	0.0	36.4	17.7	51.5	0.0	0.0	25.0	25.2
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.18
Lane Grp Cap(c), veh/h				529	0	471	488	1401	0	0	1066	400
V/C Ratio(X)				0.37	0.00	0.93	0.58	0.87	0.00	0.00	0.89	0.90
Avail Cap(c_a), veh/h				604	0	537	488	1401	0	0	1066	400
HCM Platoon Ratio				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	0.38	0.38	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				30.2	0.0	38.6	35.8	21.3	0.0	0.0	44.0	44.0
Incr Delay (d2), s/veh				0.4	0.0	22.2	0.7	3.1	0.0	0.0	11.4	25.2
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				7.7	0.0	21.5	9.8	17.8	0.0	0.0	15.3	18.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				30.6	0.0	60.8	36.5	24.5	0.0	0.0	55.4	69.3
LnGrp LOS				C	A	E	D	C	A	A	E	E
Approach Vol, veh/h					635			1505			1310	
Approach Delay, s/veh					51.5			26.7			59.2	
Approach LOS					D			C			E	
Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	40.7	34.0				74.7		45.3				
Change Period (Y+Rc), s	5.0	5.0				5.0		5.0				
Max Green Setting (Gmax), s	30.0	29.0				64.0		46.0				
Max Q Clear Time (g_c+I1), s	19.7	27.2				53.5		38.4				
Green Ext Time (p_c), s	0.6	1.4				6.0		1.9				
Intersection Summary												
HCM 6th Ctrl Delay			43.6									
HCM 6th LOS			D									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	0	275	0	0	0	0	1415	440	685	755	0
Future Volume (veh/h)	90	0	275	0	0	0	0	1415	440	685	755	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	90	0	200				0	1415	390	685	755	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	195	0	174				0	1839	742	757	1879	0
Arrive On Green	0.13	0.00	0.13				0.00	0.51	0.51	0.24	0.79	0.00
Sat Flow, veh/h	1563	0	1391				0	4134	1460	3132	2882	0
Grp Volume(v), veh/h	90	0	200				0	1415	390	685	755	0
Grp Sat Flow(s),veh/h/ln	1563	0	1391				0	1206	1460	1566	1187	0
Q Serve(g_s), s	6.4	0.0	15.0				0.0	37.9	21.5	25.5	11.7	0.0
Cycle Q Clear(g_c), s	6.4	0.0	15.0				0.0	37.9	21.5	25.5	11.7	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	195	0	174				0	1839	742	757	1879	0
V/C Ratio(X)	0.46	0.00	1.15				0.00	0.77	0.53	0.90	0.40	0.00
Avail Cap(c_a), veh/h	195	0	174				0	1839	742	757	1879	0
HCM Platoon Ratio	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				0.00	1.00	1.00	0.59	0.59	0.00
Uniform Delay (d), s/veh	48.7	0.0	52.5				0.0	23.8	19.8	44.2	3.8	0.0
Incr Delay (d2), s/veh	1.7	0.0	114.6				0.0	3.2	2.7	9.3	0.4	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	4.6	0.0	24.5				0.0	16.2	12.1	14.8	4.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.4	0.0	167.1				0.0	27.0	22.4	53.5	4.2	0.0
LnGrp LOS	D	A	F				A	C	C	D	A	A
Approach Vol, veh/h		290						1805			1440	
Approach Delay, s/veh		130.9						26.0			27.6	
Approach LOS		F						C			C	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		100.0		20.0	34.0	66.0						
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0						
Max Green Setting (Gmax), s		95.0		15.0	29.0	61.0						
Max Q Clear Time (g_c+I1), s		13.7		17.0	27.5	39.9						
Green Ext Time (p_c), s		6.1		0.0	0.5	12.5						
Intersection Summary												
HCM 6th Ctrl Delay			35.3									
HCM 6th LOS			D									

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	195	440	285	1220	1310
v/c Ratio	0.39	0.89	0.70	0.95	0.74
Control Delay	32.5	53.8	66.8	53.5	41.8
Queue Delay	0.0	0.0	16.2	45.0	0.2
Total Delay	32.5	53.8	83.0	98.5	42.0
Queue Length 50th (ft)	114	276	210	655	270
Queue Length 95th (ft)	168	395	m260	#910	#358
Internal Link Dist (ft)	498			235	1363
Turn Bay Length (ft)		50			
Base Capacity (vph)	595	572	407	1284	1759
Starvation Cap Reductn	0	0	108	455	0
Spillback Cap Reductn	0	0	0	0	57
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.33	0.77	0.95	1.47	0.77

Intersection Summary

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

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

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	90	275	1415	440	685	755
v/c Ratio	0.60	0.72	0.86	0.47	0.91	0.44
Control Delay	67.3	17.0	31.7	5.3	33.2	10.9
Queue Delay	0.9	0.0	47.9	0.0	3.3	0.5
Total Delay	68.1	17.0	79.6	5.3	36.5	11.4
Queue Length 50th (ft)	67	0	437	30	54	110
Queue Length 95th (ft)	121	86	#589	101	#348	222
Internal Link Dist (ft)	478		313			235
Turn Bay Length (ft)		50		200		
Base Capacity (vph)	192	412	1637	946	749	1734
Starvation Cap Reductn	0	0	0	0	28	542
Spillback Cap Reductn	19	0	549	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.67	1.30	0.47	0.95	0.63

Intersection Summary

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

Alternative 2: Roundabout

MOVEMENT SUMMARY

Site: 101 [Sullivan & EB Trent - 2030 AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Sullivan												
8	T1	585	10.0	0.246	4.5	LOS A	1.3	34.5	0.48	0.48	0.48	29.2
18	R2	80	10.0	0.058	3.9	LOS A	0.2	6.2	0.34	0.47	0.34	31.5
Approach		665	10.0	0.246	4.4	LOS A	1.3	34.5	0.47	0.48	0.47	29.5
North: Sullivan												
7	L2	345	6.0	0.237	7.8	LOS A	0.0	0.0	0.00	0.68	0.00	29.4
4	T1	775	6.0	0.246	2.5	LOS A	0.0	0.0	0.00	0.35	0.00	38.3
Approach		1120	6.0	0.246	4.1	LOS A	0.0	0.0	0.00	0.45	0.00	35.9
West: Trent Off-Ramp												
5	L2	80	6.0	0.613	15.3	LOS B	2.9	75.4	0.67	0.92	0.94	19.0
2	T1	1	6.0	0.613	9.4	LOS A	2.9	75.4	0.67	0.92	0.94	28.9
12	R2	360	6.0	0.613	9.6	LOS A	2.9	75.4	0.67	0.92	0.94	30.6
Approach		441	6.0	0.613	10.6	LOS B	2.9	75.4	0.67	0.92	0.94	29.0
All Vehicles		2226	7.2	0.613	5.5	LOS A	2.9	75.4	0.27	0.55	0.32	32.0

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

MOVEMENT SUMMARY

Site: 102vv [Sullivan & WB Trent - 2030 AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Sullivan												
3	L2	160	8.0	0.244	7.8	LOS A	0.0	0.0	0.00	0.53	0.00	32.2
8	T1	505	8.0	0.244	1.9	LOS A	0.0	0.0	0.00	0.36	0.00	34.5
Approach		665	8.0	0.244	3.3	LOS A	0.0	0.0	0.00	0.40	0.00	34.1
East: Trent Off-Ramp												
1	L2	250	9.0	0.239	11.7	LOS B	0.9	23.5	0.47	0.79	0.47	28.2
6	T1	1	9.0	0.239	5.7	LOS A	0.9	23.5	0.47	0.79	0.47	31.6
16	R2	310	9.0	0.285	5.7	LOS A	1.1	30.8	0.46	0.66	0.46	35.3
Approach		561	9.0	0.285	8.4	LOS A	1.1	30.8	0.47	0.72	0.47	32.6
North: Sullivan												
4	T1	870	4.0	0.289	6.0	LOS A	1.9	48.1	0.59	0.59	0.59	31.4
14	R2	100	4.0	0.289	5.8	LOS A	1.9	48.1	0.57	0.57	0.57	33.0
Approach		970	4.0	0.289	6.0	LOS A	1.9	48.1	0.59	0.59	0.59	31.6
All Vehicles		2196	6.5	0.289	5.8	LOS A	1.9	48.1	0.38	0.56	0.38	32.5

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

MOVEMENT SUMMARY

Site: 101 [Sullivan & EB Trent - 2030 PM]

New Site
Site Category: (None)
Roundabout

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Sullivan												
8	T1	1200	2.0	0.475	5.0	LOS A	2.6	66.1	0.57	0.55	0.61	28.9
18	R2	360	2.0	0.245	4.1	LOS A	1.0	25.4	0.42	0.55	0.42	31.4
Approach		1560	2.0	0.475	4.8	LOS A	2.6	66.1	0.53	0.55	0.56	29.5
North: Sullivan												
7	L2	570	4.0	0.254	7.8	LOS A	0.0	0.0	0.00	0.65	0.00	30.6
4	T1	625	4.0	0.254	2.5	LOS A	0.0	0.0	0.00	0.42	0.00	37.4
Approach		1195	4.0	0.254	5.0	LOS A	0.0	0.0	0.00	0.53	0.00	34.6
West: Trent Off-Ramp												
5	L2	70	8.0	0.459	14.4	LOS B	1.7	46.2	0.61	0.86	0.76	19.5
2	T1	1	8.0	0.459	8.5	LOS A	1.7	46.2	0.61	0.86	0.76	29.3
12	R2	245	8.0	0.459	8.6	LOS A	1.7	46.2	0.61	0.86	0.76	31.0
Approach		316	8.0	0.459	9.9	LOS A	1.7	46.2	0.61	0.86	0.76	29.1
All Vehicles		3071	3.4	0.475	5.4	LOS A	2.6	66.1	0.33	0.57	0.37	31.0

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

MOVEMENT SUMMARY

Site: 102vv [Sullivan & WB Trent - 2030 PM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Sullivan												
3	L2	270	2.0	0.440	7.9	LOS A	0.0	0.0	0.00	0.52	0.00	33.8
8	T1	1000	2.0	0.440	1.9	LOS A	0.0	0.0	0.00	0.36	0.00	34.6
Approach		1270	2.0	0.440	3.2	LOS A	0.0	0.0	0.00	0.40	0.00	34.5
East: Trent Off-Ramp												
1	L2	170	7.0	0.178	12.6	LOS B	0.7	17.5	0.56	0.85	0.56	28.0
6	T1	1	7.0	0.178	6.6	LOS A	0.7	17.5	0.56	0.85	0.56	31.4
16	R2	360	7.0	0.368	7.2	LOS A	1.7	44.1	0.61	0.80	0.64	34.8
Approach		531	7.0	0.368	8.9	LOS A	1.7	44.1	0.59	0.82	0.61	32.9
North: Sullivan												
4	T1	1025	3.0	0.319	6.1	LOS A	2.1	53.3	0.60	0.59	0.60	31.3
14	R2	60	3.0	0.319	5.9	LOS A	2.1	53.3	0.58	0.56	0.58	33.0
Approach		1085	3.0	0.319	6.0	LOS A	2.1	53.3	0.60	0.59	0.60	31.4
All Vehicles		2886	3.3	0.440	5.3	LOS A	2.1	53.3	0.33	0.55	0.34	32.9

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

MOVEMENT SUMMARY

Site: 101 [Sullivan & EB Trent - 2050 AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Sullivan												
8	T1	745	10.0	0.331	5.1	LOS A	1.9	51.2	0.57	0.54	0.57	28.8
18	R2	90	10.0	0.067	4.2	LOS A	0.3	7.6	0.39	0.50	0.39	31.4
Approach		835	10.0	0.331	5.0	LOS A	1.9	51.2	0.55	0.54	0.55	29.2
North: Sullivan												
7	L2	420	6.0	0.290	7.8	LOS A	0.0	0.0	0.00	0.68	0.00	29.4
4	T1	955	6.0	0.304	2.5	LOS A	0.0	0.0	0.00	0.35	0.00	38.3
Approach		1375	6.0	0.304	4.1	LOS A	0.0	0.0	0.00	0.45	0.00	35.9
West: Trent Off-Ramp												
5	L2	85	6.0	0.678	17.2	LOS B	3.5	92.4	0.76	1.00	1.16	18.0
2	T1	1	6.0	0.678	11.3	LOS B	3.5	92.4	0.76	1.00	1.16	27.4
12	R2	365	6.0	0.678	11.5	LOS B	3.5	92.4	0.76	1.00	1.16	29.4
Approach		451	6.0	0.678	12.5	LOS B	3.5	92.4	0.76	1.00	1.16	27.8
All Vehicles		2661	7.3	0.678	5.8	LOS A	3.5	92.4	0.30	0.57	0.37	31.6

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

MOVEMENT SUMMARY

Site: 102vv [Sullivan & WB Trent - 2050 AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Sullivan												
3	L2	165	8.0	0.303	7.8	LOS A	0.0	0.0	0.00	0.50	0.00	32.8
8	T1	660	8.0	0.303	1.9	LOS A	0.0	0.0	0.00	0.36	0.00	34.5
Approach		825	8.0	0.303	3.1	LOS A	0.0	0.0	0.00	0.39	0.00	34.3
East: Trent Off-Ramp												
1	L2	260	9.0	0.258	12.1	LOS B	1.0	25.8	0.51	0.81	0.51	28.1
6	T1	1	9.0	0.258	6.0	LOS A	1.0	25.8	0.51	0.81	0.51	31.5
16	R2	375	9.0	0.361	6.3	LOS A	1.5	40.9	0.53	0.73	0.53	35.1
Approach		636	9.0	0.361	8.6	LOS A	1.5	40.9	0.53	0.76	0.53	32.7
North: Sullivan												
4	T1	1245	4.0	0.397	6.3	LOS A	2.8	72.2	0.65	0.62	0.65	31.0
14	R2	65	4.0	0.397	6.1	LOS A	2.8	72.2	0.63	0.58	0.63	32.7
Approach		1310	4.0	0.397	6.3	LOS A	2.8	72.2	0.65	0.61	0.65	31.1
All Vehicles		2771	6.3	0.397	5.9	LOS A	2.8	72.2	0.43	0.58	0.43	32.4

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

MOVEMENT SUMMARY

Site: 101 [Sullivan & EB Trent - 2050 PM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles													
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Sullivan												
8	T1	1415	2.0	0.587	6.3	LOS A	4.2	106.1	0.67	0.75	0.82	28.4
18	R2	440	2.0	0.307	4.4	LOS A	1.3	33.9	0.48	0.59	0.48	31.2
Approach		1855	2.0	0.587	5.9	LOS A	4.2	106.1	0.62	0.71	0.74	29.1
North: Sullivan												
7	L2	685	4.0	0.307	7.8	LOS A	0.0	0.0	0.00	0.65	0.00	30.6
4	T1	755	4.0	0.307	2.5	LOS A	0.0	0.0	0.00	0.42	0.00	37.4
Approach		1440	4.0	0.307	5.0	LOS A	0.0	0.0	0.00	0.53	0.00	34.6
West: Trent Off-Ramp												
5	L2	90	8.0	0.571	16.3	LOS B	2.5	67.2	0.71	0.95	0.99	18.4
2	T1	1	8.0	0.571	10.4	LOS B	2.5	67.2	0.71	0.95	0.99	27.8
12	R2	275	8.0	0.571	10.5	LOS B	2.5	67.2	0.71	0.95	0.99	29.8
Approach		366	8.0	0.571	11.9	LOS B	2.5	67.2	0.71	0.95	0.99	27.7
All Vehicles		3661	3.4	0.587	6.1	LOS A	4.2	106.1	0.39	0.66	0.47	30.6

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

MOVEMENT SUMMARY

Site: 102vv [Sullivan & WB Trent - 2050 PM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Sullivan												
3	L2	285	2.0	0.521	7.9	LOS A	0.0	0.0	0.00	0.49	0.00	34.1
8	T1	1220	2.0	0.521	1.9	LOS A	0.0	0.0	0.00	0.36	0.00	34.6
Approach		1505	2.0	0.521	3.0	LOS A	0.0	0.0	0.00	0.38	0.00	34.6
East: Trent Off-Ramp												
1	L2	195	7.0	0.215	13.3	LOS B	0.8	22.4	0.61	0.87	0.61	27.6
6	T1	1	7.0	0.215	7.2	LOS A	0.8	22.4	0.61	0.87	0.61	31.0
16	R2	440	7.0	0.477	8.9	LOS A	2.7	70.0	0.69	0.89	0.86	33.9
Approach		636	7.0	0.477	10.2	LOS B	2.7	70.0	0.67	0.89	0.78	32.3
North: Sullivan												
4	T1	1245	3.0	0.400	6.5	LOS A	2.8	72.3	0.66	0.64	0.66	31.0
14	R2	65	3.0	0.400	6.3	LOS A	2.8	72.3	0.65	0.60	0.65	32.7
Approach		1310	3.0	0.400	6.5	LOS A	2.8	72.3	0.66	0.64	0.66	31.1
All Vehicles		3451	3.3	0.521	5.7	LOS A	2.8	72.3	0.37	0.57	0.40	32.6

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

Alternative 3: Diverging Diamond Interchange

Movement	WBL2	WBR	SBT	SBR2	NEL2	NEL
Lane Configurations						
Traffic Volume (vph)	250	310	870	100	160	505
Future Volume (vph)	250	310	870	100	160	505
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.97
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	0.95
Satd. Flow (prot)	1521	1344	3197	1430	1662	3225
Flt Permitted	0.95	1.00	1.00	1.00	0.95	0.95
Satd. Flow (perm)	1521	1344	3197	1430	1662	3225
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	250	310	870	100	160	505
RTOR Reduction (vph)	41	137	0	61	86	0
Lane Group Flow (vph)	209	173	870	39	74	505
Confl. Peds. (#/hr)	4	4				
Heavy Vehicles (%)	9%	9%	4%	4%	0%	0%
Turn Type	Perm	Perm	NA	Perm	Prot	Prot
Protected Phases			6		4	4
Permitted Phases	8	2		6		
Actuated Green, G (s)	25.5	21.5	21.5	21.5	25.5	25.5
Effective Green, g (s)	25.5	21.5	21.5	21.5	25.5	25.5
Actuated g/C Ratio	0.46	0.39	0.39	0.39	0.46	0.46
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	705	525	1249	559	770	1495
v/s Ratio Prot			c0.27		0.04	c0.16
v/s Ratio Perm	0.14	0.13		0.03		
v/c Ratio	0.30	0.33	0.70	0.07	0.10	0.34
Uniform Delay, d1	9.2	11.7	14.0	10.5	8.3	9.4
Progression Factor	1.00	1.00	1.00	1.00	0.07	0.42
Incremental Delay, d2	1.1	0.4	1.7	0.1	0.2	0.6
Delay (s)	10.2	12.1	15.7	10.5	0.8	4.5
Level of Service	B	B	B	B	A	A
Approach Delay (s)			15.2			3.6
Approach LOS			B			A

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL2	EBR	NBL	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	80	360	585	80	345	775
Future Volume (vph)	80	360	585	80	345	775
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.97	1.00	1.00	0.95
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1568	1403	2932	1332	1568	3137
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1568	1403	2932	1332	1568	3137
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	80	360	585	80	345	775
RTOR Reduction (vph)	51	42	0	41	220	0
Lane Group Flow (vph)	29	318	585	39	125	775
Confl. Peds. (#/hr)				4	4	
Heavy Vehicles (%)	6%	6%	10%	10%	6%	6%
Turn Type	Perm	Perm	Prot	Perm	Split	NA
Protected Phases			6		8	8
Permitted Phases	4	2		6		
Actuated Green, G (s)	19.9	27.1	27.1	27.1	19.9	19.9
Effective Green, g (s)	19.9	27.1	27.1	27.1	19.9	19.9
Actuated g/C Ratio	0.36	0.49	0.49	0.49	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	567	691	1444	656	567	1135
v/s Ratio Prot			0.20		0.08	c0.25
v/s Ratio Perm	0.02	c0.23		0.03		
v/c Ratio	0.05	0.46	0.41	0.06	0.22	0.68
Uniform Delay, d1	11.4	9.2	8.8	7.3	12.2	14.9
Progression Factor	1.00	1.00	1.00	1.00	0.35	0.65
Incremental Delay, d2	0.0	2.2	0.8	0.2	0.2	1.5
Delay (s)	11.4	11.4	9.7	7.5	4.4	11.1
Level of Service	B	B	A	A	A	B
Approach Delay (s)						9.0
Approach LOS						A

Intersection Summary			
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL2	WBR	SBT	SBR2	NEL2	NEL
Lane Group Flow (vph)	250	310	870	100	160	505
v/c Ratio	0.34	0.47	0.70	0.16	0.19	0.34
Control Delay	8.7	6.0	17.0	3.3	0.6	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.7	6.0	17.0	3.3	0.6	4.9
Queue Length 50th (ft)	34	16	112	0	0	18
Queue Length 95th (ft)	79	58	161	21	1	26
Internal Link Dist (ft)			1423			270
Turn Bay Length (ft)				100		
Base Capacity (vph)	746	713	1395	680	856	1495
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.43	0.62	0.15	0.19	0.34

Intersection Summary

Lane Group	EBL2	EBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	80	360	585	80	345	775
v/c Ratio	0.11	0.49	0.41	0.11	0.44	0.68
Control Delay	0.3	10.6	10.6	3.1	2.0	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	0.3	10.6	10.6	3.1	2.0	12.4
Queue Length 50th (ft)	0	58	62	0	0	56
Queue Length 95th (ft)	0	124	96	18	25	97
Internal Link Dist (ft)						98
Turn Bay Length (ft)				100		
Base Capacity (vph)	748	733	1444	697	834	1254
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.49	0.41	0.11	0.41	0.62

Intersection Summary

Movement	WBL2	WBR	SBT	SBR2	NEL2	NEL
Lane Configurations						
Traffic Volume (vph)	170	360	1025	60	270	1000
Future Volume (vph)	170	360	1025	60	270	1000
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.97
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	0.95
Satd. Flow (prot)	1550	1370	3228	1444	1630	3162
Flt Permitted	0.95	1.00	1.00	1.00	0.95	0.95
Satd. Flow (perm)	1550	1370	3228	1444	1630	3162
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	170	360	1025	60	270	1000
RTOR Reduction (vph)	25	29	0	35	147	0
Lane Group Flow (vph)	145	331	1025	25	123	1000
Confl. Peds. (#/hr)	4	4				
Heavy Vehicles (%)	7%	7%	3%	3%	2%	2%
Turn Type	Perm	Perm	NA	Perm	Prot	Prot
Protected Phases			6		4	4
Permitted Phases	8	2		6		
Actuated Green, G (s)	27.3	24.7	24.7	24.7	27.3	27.3
Effective Green, g (s)	27.3	24.7	24.7	24.7	27.3	27.3
Actuated g/C Ratio	0.46	0.41	0.41	0.41	0.46	0.46
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	705	563	1328	594	741	1438
v/s Ratio Prot			c0.32		0.08	c0.32
v/s Ratio Perm	0.09	0.24		0.02		
v/c Ratio	0.21	0.59	0.77	0.04	0.17	0.70
Uniform Delay, d1	9.8	13.7	15.2	10.6	9.6	13.0
Progression Factor	1.00	1.00	1.00	1.00	0.27	0.40
Incremental Delay, d2	0.7	1.6	2.8	0.0	0.3	2.1
Delay (s)	10.5	15.3	18.1	10.6	2.9	7.3
Level of Service	B	B	B	B	A	A
Approach Delay (s)			17.7			6.4
Approach LOS			B			A

Intersection Summary			
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL2	EBR	NBL	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	70	245	1200	360	570	625
Future Volume (vph)	70	245	1200	360	570	625
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.97	1.00	1.00	0.95
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1539	1377	3162	1436	1599	3197
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1539	1377	3162	1436	1599	3197
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	70	245	1200	360	570	625
RTOR Reduction (vph)	29	52	0	65	290	0
Lane Group Flow (vph)	41	193	1200	295	280	625
Confl. Peds. (#/hr)				4	4	
Heavy Vehicles (%)	8%	8%	2%	2%	4%	4%
Turn Type	Perm	Perm	Prot	Perm	Split	NA
Protected Phases			6		8	8
Permitted Phases	4	2		6		
Actuated Green, G (s)	19.6	32.4	32.4	32.4	19.6	19.6
Effective Green, g (s)	19.6	32.4	32.4	32.4	19.6	19.6
Actuated g/C Ratio	0.33	0.54	0.54	0.54	0.33	0.33
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	502	743	1707	775	522	1044
v/s Ratio Prot			c0.38		0.18	c0.20
v/s Ratio Perm	0.03	0.14		0.21		
v/c Ratio	0.08	0.26	0.70	0.38	0.54	0.60
Uniform Delay, d1	14.0	7.4	10.2	8.0	16.5	16.9
Progression Factor	1.00	1.00	1.00	1.00	1.44	0.87
Incremental Delay, d2	0.1	0.8	2.5	1.4	0.7	0.7
Delay (s)	14.0	8.2	12.7	9.4	24.4	15.4
Level of Service	B	A	B	A	C	B
Approach Delay (s)						19.7
Approach LOS						B

Intersection Summary			
HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL2	WBR	SBT	SBR2	NEL2	NEL
Lane Group Flow (vph)	170	360	1025	60	270	1000
v/c Ratio	0.23	0.61	0.77	0.10	0.30	0.70
Control Delay	8.8	16.5	19.6	3.8	1.1	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	8.8	16.5	19.6	3.8	1.1	7.8
Queue Length 50th (ft)	26	79	153	0	0	33
Queue Length 95th (ft)	60	155	220	17	m5	69
Internal Link Dist (ft)			800			270
Turn Bay Length (ft)				100		
Base Capacity (vph)	728	621	1398	659	888	1436
Starvation Cap Reductn	0	0	0	0	0	36
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.58	0.73	0.09	0.30	0.71

Intersection Summary

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

Lane Group	EBL2	EBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	70	245	1200	360	570	625
v/c Ratio	0.13	0.31	0.70	0.43	0.70	0.60
Control Delay	7.5	5.9	13.8	7.3	9.8	16.4
Queue Delay	0.0	0.0	0.0	0.0	3.3	0.0
Total Delay	7.5	5.9	13.8	7.3	13.2	16.4
Queue Length 50th (ft)	6	24	162	42	39	54
Queue Length 95th (ft)	28	61	238	98	m124	101
Internal Link Dist (ft)						98
Turn Bay Length (ft)				100		
Base Capacity (vph)	591	796	1708	840	859	1172
Starvation Cap Reductn	0	0	0	0	194	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.31	0.70	0.43	0.86	0.53

Intersection Summary

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

Movement	WBL2	WBR	SBT	SBR2	NEL2	NEL
Lane Configurations						
Traffic Volume (vph)	260	375	1100	120	165	660
Future Volume (vph)	260	375	1100	120	165	660
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.97
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	0.95
Satd. Flow (prot)	1521	1345	3197	1430	1662	3225
Flt Permitted	0.95	1.00	1.00	1.00	0.95	0.95
Satd. Flow (perm)	1521	1345	3197	1430	1662	3225
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	260	375	1100	120	165	660
RTOR Reduction (vph)	25	69	0	67	96	0
Lane Group Flow (vph)	235	306	1100	53	69	660
Confl. Peds. (#/hr)	4	4				
Heavy Vehicles (%)	9%	9%	4%	4%	0%	0%
Turn Type	Perm	Perm	NA	Perm	Prot	Prot
Protected Phases			6		4	4
Permitted Phases	8	2		6		
Actuated Green, G (s)	22.9	24.1	24.1	24.1	22.9	22.9
Effective Green, g (s)	22.9	24.1	24.1	24.1	22.9	22.9
Actuated g/C Ratio	0.42	0.44	0.44	0.44	0.42	0.42
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	633	589	1400	626	691	1342
v/s Ratio Prot			c0.34		0.04	c0.20
v/s Ratio Perm	0.15	0.23		0.04		
v/c Ratio	0.37	0.52	0.79	0.08	0.10	0.49
Uniform Delay, d1	11.1	11.2	13.2	9.0	9.8	11.8
Progression Factor	1.00	1.00	1.00	1.00	0.13	0.40
Incremental Delay, d2	1.7	0.8	3.0	0.1	0.2	1.1
Delay (s)	12.8	12.0	16.2	9.1	1.5	5.9
Level of Service	B	B	B	A	A	A
Approach Delay (s)			15.5			5.0
Approach LOS			B			A

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL2	EBR	NBL	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	85	365	740	90	420	940
Future Volume (vph)	85	365	740	90	420	940
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.97	1.00	1.00	0.95
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1568	1403	2932	1332	1568	3137
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1568	1403	2932	1332	1568	3137
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	85	365	740	90	420	940
RTOR Reduction (vph)	50	34	0	50	248	0
Lane Group Flow (vph)	35	331	740	40	172	940
Confl. Peds. (#/hr)				4	4	
Heavy Vehicles (%)	6%	6%	10%	10%	6%	6%
Turn Type	Perm	Perm	Prot	Perm	Split	NA
Protected Phases			6		8	8
Permitted Phases	4	2		6		
Actuated Green, G (s)	22.5	24.5	24.5	24.5	22.5	22.5
Effective Green, g (s)	22.5	24.5	24.5	24.5	22.5	22.5
Actuated g/C Ratio	0.41	0.45	0.45	0.45	0.41	0.41
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	641	624	1306	593	641	1283
v/s Ratio Prot			c0.25		0.11	c0.30
v/s Ratio Perm	0.02	0.24		0.03		
v/c Ratio	0.05	0.53	0.57	0.07	0.27	0.73
Uniform Delay, d1	9.8	11.1	11.3	8.7	10.8	13.7
Progression Factor	1.00	1.00	1.00	1.00	0.69	0.68
Incremental Delay, d2	0.0	3.2	1.8	0.2	0.1	1.7
Delay (s)	9.9	14.3	13.1	8.9	7.5	11.0
Level of Service	A	B	B	A	A	B
Approach Delay (s)						10.0
Approach LOS						A

Intersection Summary			
HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL2	WBR	SBT	SBR2	NEL2	NEL
Lane Group Flow (vph)	260	375	1100	120	165	660
v/c Ratio	0.40	0.57	0.79	0.17	0.21	0.49
Control Delay	12.0	11.2	17.9	2.9	0.8	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.0	11.2	17.9	2.9	0.8	6.1
Queue Length 50th (ft)	48	52	147	0	0	22
Queue Length 95th (ft)	98	121	214	22	m5	39
Internal Link Dist (ft)			1451			270
Turn Bay Length (ft)				100		
Base Capacity (vph)	657	678	1453	715	788	1343
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.55	0.76	0.17	0.21	0.49

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

Lane Group	EBL2	EBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	85	365	740	90	420	940
v/c Ratio	0.12	0.55	0.57	0.14	0.47	0.73
Control Delay	2.3	13.8	14.0	3.5	2.2	12.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.3	13.8	14.0	3.5	2.2	12.2
Queue Length 50th (ft)	0	71	92	0	0	65
Queue Length 95th (ft)	15	144	139	20	m22	120
Internal Link Dist (ft)						98
Turn Bay Length (ft)				100		
Base Capacity (vph)	743	658	1305	642	920	1368
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.55	0.57	0.14	0.46	0.69

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

Movement	WBL2	WBR	SBT	SBR2	NEL2	NEL
Lane Configurations						
Traffic Volume (vph)	195	440	1245	65	285	1220
Future Volume (vph)	195	440	1245	65	285	1220
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.97
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	0.95
Satd. Flow (prot)	1549	1390	3228	1444	1630	3162
Flt Permitted	0.95	1.00	1.00	1.00	0.95	0.95
Satd. Flow (perm)	1549	1390	3228	1444	1630	3162
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	195	440	1245	65	285	1220
RTOR Reduction (vph)	14	13	0	28	161	0
Lane Group Flow (vph)	181	427	1245	37	124	1220
Confl. Peds. (#/hr)	4	4				
Heavy Vehicles (%)	7%	7%	3%	3%	2%	2%
Turn Type	Perm	Prot	NA	Perm	Prot	Prot
Protected Phases		2	6		4	4
Permitted Phases	8			6		
Actuated Green, G (s)	28.3	28.7	28.7	28.7	28.3	28.3
Effective Green, g (s)	28.3	28.7	28.7	28.7	28.3	28.3
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	674	613	1425	637	709	1376
v/s Ratio Prot		0.31	c0.39		0.08	c0.39
v/s Ratio Perm	0.12			0.03		
v/c Ratio	0.27	0.70	0.87	0.06	0.18	0.89
Uniform Delay, d1	11.7	14.6	16.5	10.4	11.2	16.9
Progression Factor	1.00	1.00	1.00	1.00	0.30	0.45
Incremental Delay, d2	1.0	3.4	6.2	0.0	0.3	5.5
Delay (s)	12.7	18.1	22.7	10.4	3.6	13.2
Level of Service	B	B	C	B	A	B
Approach Delay (s)			22.1			11.4
Approach LOS			C			B

Intersection Summary			
HCM 2000 Control Delay	16.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL2	EBR	NBL	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	90	275	1415	440	685	755
Future Volume (vph)	90	275	1415	440	685	755
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.97	1.00	1.00	0.95
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1539	1377	3162	1436	1593	3197
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1539	1377	3162	1436	1593	3197
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	90	275	1415	440	685	755
RTOR Reduction (vph)	19	29	0	38	244	0
Lane Group Flow (vph)	71	246	1415	402	441	755
Confl. Peds. (#/hr)				4	4	
Heavy Vehicles (%)	8%	8%	2%	2%	4%	4%
Turn Type	Perm	Perm	Prot	Perm	Perm	NA
Protected Phases			6			8
Permitted Phases	4	2		6	8	
Actuated Green, G (s)	21.9	35.1	35.1	35.1	21.9	21.9
Effective Green, g (s)	21.9	35.1	35.1	35.1	21.9	21.9
Actuated g/C Ratio	0.34	0.54	0.54	0.54	0.34	0.34
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	518	743	1707	775	536	1077
v/s Ratio Prot			c0.45			0.24
v/s Ratio Perm	0.05	0.18		0.28	c0.28	
v/c Ratio	0.14	0.33	0.83	0.52	0.82	0.70
Uniform Delay, d1	15.0	8.4	12.4	9.6	19.8	18.7
Progression Factor	1.00	1.00	1.00	1.00	1.13	0.94
Incremental Delay, d2	0.1	1.2	4.8	2.5	5.0	1.4
Delay (s)	15.1	9.6	17.3	12.0	27.3	19.1
Level of Service	B	A	B	B	C	B
Approach Delay (s)						23.0
Approach LOS						C

Intersection Summary			
HCM 2000 Control Delay	18.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL2	WBR	SBT	SBR2	NEL2	NEL
Lane Group Flow (vph)	195	440	1245	65	285	1220
v/c Ratio	0.28	0.70	0.87	0.10	0.33	0.89
Control Delay	11.7	21.2	25.2	5.1	1.1	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	1.2
Total Delay	11.7	21.2	25.2	5.1	1.1	16.1
Queue Length 50th (ft)	41	126	222	3	0	45
Queue Length 95th (ft)	82	227	#352	22	m3	m#330
Internal Link Dist (ft)			1423			270
Turn Bay Length (ft)				100		
Base Capacity (vph)	688	632	1440	671	870	1377
Starvation Cap Reductn	0	0	0	0	0	49
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.70	0.86	0.10	0.33	0.92

Intersection Summary

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

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

Lane Group	EBL2	EBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	90	275	1415	440	685	755
v/c Ratio	0.17	0.36	0.83	0.54	0.88	0.70
Control Delay	11.7	8.4	18.7	11.1	18.6	20.3
Queue Delay	0.0	0.0	0.4	0.0	40.3	0.0
Total Delay	11.7	8.4	19.2	11.1	58.9	20.3
Queue Length 50th (ft)	16	44	229	85	98	91
Queue Length 95th (ft)	44	89	#339	162	m146	m124
Internal Link Dist (ft)						98
Turn Bay Length (ft)				100		
Base Capacity (vph)	562	771	1705	812	801	1131
Starvation Cap Reductn	0	0	0	0	165	0
Spillback Cap Reductn	0	0	57	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.36	0.86	0.54	1.08	0.67

Intersection Summary

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

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

Alternative 4: Jughandle

MOVEMENT SUMMARY

Site: 103 [Sullivan Roundabout 2030 AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: RoadName												
2	T1	616	8.0	0.244	3.9	LOS A	1.7	12.8	0.27	0.38	0.27	57.0
3	R2	168	8.0	0.244	3.6	LOS A	1.7	12.8	0.27	0.40	0.27	55.5
Approach		784	8.0	0.244	3.9	LOS A	1.7	12.8	0.27	0.38	0.27	56.6
East: RoadName												
6	R2	326	9.0	0.180	3.0	LOS A	0.0	0.0	0.00	0.39	0.00	57.2
Approach		326	9.0	0.180	3.0	LOS A	0.0	0.0	0.00	0.39	0.00	57.2
North: RoadName												
8	T1	916	4.0	0.310	3.6	LOS A	0.0	0.0	0.00	0.36	0.00	58.5
9	R2	105	4.0	0.310	3.7	LOS A	0.0	0.0	0.00	0.36	0.00	56.5
Approach		1021	4.0	0.310	3.6	LOS A	0.0	0.0	0.00	0.36	0.00	58.3
West: RoadName												
10	L2	84	9.0	0.134	13.2	LOS B	0.5	3.5	0.56	0.84	0.56	51.2
12	R2	379	9.0	0.369	6.4	LOS A	1.6	12.2	0.58	0.77	0.61	54.0
Approach		463	9.0	0.369	7.6	LOS A	1.6	12.2	0.58	0.78	0.60	53.4
All Vehicles		2595	6.7	0.369	4.3	LOS A	1.7	12.8	0.19	0.44	0.19	56.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 102 [Trent Roundabout 2030 AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles													
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: RoadName												
5	T1	1179	7.0	0.506	6.0	LOS A	3.9	29.0	0.70	0.59	0.71	54.5
6	R2	263	7.0	0.144	3.4	LOS A	0.0	0.0	0.00	0.41	0.00	56.7
Approach		1442	7.0	0.506	5.5	LOS A	3.9	29.0	0.57	0.56	0.58	54.9
North: RoadName												
7	L2	363	7.0	0.299	12.7	LOS B	2.1	15.2	0.76	0.88	0.76	52.0
9	R2	105	7.0	0.299	7.0	LOS A	2.1	15.2	0.76	0.90	0.76	51.3
Approach		468	7.0	0.299	11.5	LOS B	2.1	15.2	0.76	0.88	0.76	51.8
West: RoadName												
10	L2	463	7.0	0.421	10.6	LOS B	2.5	18.3	0.56	0.73	0.56	52.3
11	T1	832	7.0	0.421	3.6	LOS A	2.5	18.3	0.01	0.35	0.01	58.2
Approach		1295	7.0	0.421	6.1	LOS A	2.5	18.3	0.21	0.49	0.21	55.9
All Vehicles		3205	7.0	0.506	6.6	LOS A	3.9	29.0	0.45	0.58	0.46	54.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 103 [Sullivan Roundabout 2030 PM]]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: RoadName												
2	T1	1263	2.0	0.462	3.9	LOS A	4.3	30.6	0.32	0.38	0.32	56.8
3	R2	284	2.0	0.462	3.6	LOS A	4.3	30.6	0.33	0.40	0.33	55.3
Approach		1547	2.0	0.462	3.9	LOS A	4.3	30.6	0.32	0.39	0.32	56.5
East: RoadName												
6	R2	379	7.0	0.207	3.0	LOS A	0.0	0.0	0.00	0.39	0.00	57.2
Approach		379	7.0	0.207	3.0	LOS A	0.0	0.0	0.00	0.39	0.00	57.2
North: RoadName												
8	T1	1079	3.0	0.344	3.5	LOS A	0.0	0.0	0.00	0.35	0.00	58.5
9	R2	63	3.0	0.344	3.7	LOS A	0.0	0.0	0.00	0.36	0.00	56.5
Approach		1142	3.0	0.344	3.6	LOS A	0.0	0.0	0.00	0.35	0.00	58.4
West: RoadName												
10	L2	74	7.0	0.113	13.2	LOS B	0.4	2.9	0.57	0.85	0.57	51.3
12	R2	258	7.0	0.256	6.3	LOS A	1.0	7.6	0.57	0.75	0.57	54.1
Approach		332	7.0	0.256	7.8	LOS A	1.0	7.6	0.57	0.77	0.57	53.4
All Vehicles		3400	3.4	0.462	4.1	LOS A	4.3	30.6	0.20	0.41	0.20	56.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 102 [Trent Roundabout 2030 PM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: RoadName												
5	T1	1368	3.0	0.526	5.1	LOS A	4.2	30.2	0.63	0.50	0.63	55.0
6	R2	168	3.0	0.089	3.3	LOS A	0.0	0.0	0.00	0.41	0.00	56.8
Approach		1537	3.0	0.526	4.9	LOS A	4.2	30.2	0.56	0.49	0.56	55.2
North: RoadName												
7	L2	589	3.0	0.476	14.6	LOS B	3.2	23.1	0.83	0.99	0.98	50.7
9	R2	63	3.0	0.476	9.4	LOS A	3.2	23.1	0.83	0.99	1.00	49.0
Approach		653	3.0	0.476	14.1	LOS B	3.2	23.1	0.83	0.99	0.98	50.6
West: RoadName												
10	L2	332	3.0	0.521	11.7	LOS B	3.5	25.2	0.70	0.79	0.77	53.3
11	T1	1237	3.0	0.521	4.0	LOS A	3.5	25.2	0.12	0.42	0.13	57.4
Approach		1568	3.0	0.521	5.6	LOS A	3.5	25.2	0.24	0.50	0.26	56.5
All Vehicles		3758	3.0	0.526	6.8	LOS A	4.2	30.2	0.47	0.58	0.51	54.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 103 [Sullivan Roundabout 2050 AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: RoadName												
2	T1	779	8.0	0.301	4.0	LOS A	2.3	17.0	0.30	0.39	0.30	56.8
3	R2	174	8.0	0.301	3.6	LOS A	2.3	17.0	0.31	0.40	0.31	55.3
Approach		953	8.0	0.301	3.9	LOS A	2.3	17.0	0.30	0.39	0.30	56.5
East: RoadName												
6	R2	395	9.0	0.218	3.0	LOS A	0.0	0.0	0.00	0.39	0.00	57.2
Approach		395	9.0	0.218	3.0	LOS A	0.0	0.0	0.00	0.39	0.00	57.2
North: RoadName												
8	T1	1158	4.0	0.389	3.6	LOS A	0.0	0.0	0.00	0.36	0.00	58.5
9	R2	126	4.0	0.389	3.7	LOS A	0.0	0.0	0.00	0.36	0.00	56.5
Approach		1284	4.0	0.389	3.6	LOS A	0.0	0.0	0.00	0.36	0.00	58.3
West: RoadName												
10	L2	89	9.0	0.147	13.8	LOS B	0.5	3.9	0.59	0.86	0.59	50.8
12	R2	384	9.0	0.395	7.2	LOS A	1.8	13.9	0.63	0.82	0.71	53.4
Approach		474	9.0	0.395	8.4	LOS A	1.8	13.9	0.62	0.83	0.69	52.9
All Vehicles		3105	6.6	0.395	4.4	LOS A	2.3	17.0	0.19	0.44	0.20	56.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 102 [Trent Roundabout 2050 AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: RoadName												
5	T1	1253	7.0	0.548	6.4	LOS A	4.7	34.9	0.74	0.65	0.79	54.3
6	R2	274	7.0	0.149	3.4	LOS A	0.0	0.0	0.00	0.41	0.00	56.7
Approach		1526	7.0	0.548	5.9	LOS A	4.7	34.9	0.61	0.61	0.65	54.7
North: RoadName												
7	L2	442	7.0	0.386	13.6	LOS B	3.0	22.2	0.81	0.94	0.88	51.6
9	R2	126	7.0	0.386	8.1	LOS A	3.0	22.2	0.81	0.95	0.89	50.5
Approach		568	7.0	0.386	12.4	LOS B	3.0	22.2	0.81	0.94	0.88	51.3
West: RoadName												
10	L2	474	7.0	0.483	11.1	LOS B	3.1	22.6	0.63	0.78	0.65	52.3
11	T1	984	7.0	0.483	3.7	LOS A	3.1	22.6	0.03	0.37	0.03	58.0
Approach		1458	7.0	0.483	6.1	LOS A	3.1	22.6	0.23	0.50	0.23	56.0
All Vehicles		3553	7.0	0.548	7.0	LOS A	4.7	34.9	0.48	0.62	0.51	54.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 103 [Sullivan Roundabout 2050 PM]

New Site
Site Category: (None)
Roundabout

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: RoadName												
2	T1	1489	2.0	0.546	4.2	LOS A	5.8	41.2	0.41	0.41	0.41	56.3
3	R2	300	2.0	0.546	3.8	LOS A	5.8	41.2	0.43	0.43	0.43	54.8
Approach		1789	2.0	0.546	4.1	LOS A	5.8	41.2	0.42	0.41	0.42	56.0
East: RoadName												
6	R2	463	7.0	0.253	3.0	LOS A	0.0	0.0	0.00	0.39	0.00	57.2
Approach		463	7.0	0.253	3.0	LOS A	0.0	0.0	0.00	0.39	0.00	57.2
North: RoadName												
8	T1	1311	3.0	0.416	3.5	LOS A	0.0	0.0	0.00	0.35	0.00	58.5
9	R2	68	3.0	0.416	3.7	LOS A	0.0	0.0	0.00	0.36	0.00	56.5
Approach		1379	3.0	0.416	3.6	LOS A	0.0	0.0	0.00	0.35	0.00	58.4
West: RoadName												
10	L2	95	7.0	0.147	13.7	LOS B	0.5	3.9	0.61	0.86	0.61	50.9
12	R2	289	7.0	0.302	6.9	LOS A	1.3	9.4	0.63	0.79	0.63	53.6
Approach		384	7.0	0.302	8.6	LOS A	1.3	9.4	0.62	0.81	0.62	52.9
All Vehicles		4016	3.4	0.546	4.2	LOS A	5.8	41.2	0.24	0.43	0.24	56.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 102 [Trent Roundabout 2050 PM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: RoadName												
5	T1	1500	3.0	0.604	5.9	LOS A	5.6	40.3	0.73	0.60	0.77	54.5
6	R2	205	3.0	0.109	3.3	LOS A	0.0	0.0	0.00	0.41	0.00	56.8
Approach		1705	3.0	0.604	5.6	LOS A	5.6	40.3	0.64	0.58	0.68	54.7
North: RoadName												
7	L2	721	3.0	0.663	18.0	LOS B	5.3	38.4	0.92	1.09	1.27	48.5
9	R2	68	3.0	0.663	13.3	LOS B	5.3	38.4	0.92	1.09	1.28	46.7
Approach		789	3.0	0.663	17.6	LOS B	5.3	38.4	0.92	1.09	1.27	48.4
West: RoadName												
10	L2	384	3.0	0.562	12.5	LOS B	4.1	29.1	0.78	0.90	0.89	52.5
11	T1	1258	3.0	0.562	4.0	LOS A	4.1	29.1	0.09	0.41	0.10	57.6
Approach		1642	3.0	0.562	6.0	LOS A	4.1	29.1	0.25	0.52	0.29	56.3
All Vehicles		4137	3.0	0.663	8.0	LOS A	5.6	40.3	0.54	0.65	0.64	53.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

Appendix C:

Safety Analysis Results

ISATe Ramp Results - No Build (2030)

Output Worksheet for Crossroad Ramp Terminals		WB Ramp		EB Ramp		Terminal 3		Terminal 4		Terminal 5		Terminal 6	
Signal = signalized intersection model Unsig = unsignalized intersection model	**Applicable Models**	**Crash Period**	**Study Period**	**Crash Period**	**Study Period**	**Crash Period**	**Study Period**	**Crash Period**	**Study Period**	**Crash Period**	**Study Period**	**Crash Period**	**Study Period**
Expected Average Crash Frequency													
Fatal-and-Injury Crash Frequency													
Ramp Terminal Crash Analysis	**Year**												
Overdispersion parameter ($k_{w,x,at,fi}$):		0.087		0.087									
Observed crash count ($N^*_{o,w,x,at,fi}$), crashes:		7		3									
Reference year (r):		2015		2015									
Predicted average crash freq. for reference year ($N_{p,w,x,at,fi,r}$), crashes/yr:		0.959		1.365									
Equivalent years associated with crash count ($C_{b,w,x,at,fi,r}$), yr:		5.000		5.000									
Expected average crash freq. for reference year given N^*_o ($N_{a,w,x,at,fi,r}$), crashes/yr:		1.089		1.080									
Expected average crash frequency ($N_{e,w,x,at,fi}$), crashes/yr:	2015	1.089		1.080									
	2016	1.089		1.080									
	2017	1.089		1.080									
	2018	1.089		1.080									
	2019	1.089		1.080									
	2020												
	2021												
	2022												
	2023												
	2024												
	2025												
	2026												
	2027												
	2028												
	2029												
	2030		2.129		1.634								
	2031												
	2032												
	2033												
	2034												
	2035												
	2036												
	2037												
	2038												
Property-Damage-Only Crash Frequency													
Ramp Terminal Crash Analysis	**Year**												
Overdispersion parameter ($k_{w,x,at,pdo}$):		0.139		0.139									
Observed crash count ($N^*_{o,w,x,at,pdo}$), crashes:		14		16									
Reference year (r):		2015		2015									
Predicted average crash freq. for reference year ($N_{p,w,x,at,pdo,r}$), crashes/yr:		1.281		1.595									
Equivalent years associated with crash count ($C_{b,w,x,at,pdo,r}$), yr:		5.000		5.000									
Expected average crash freq. for reference year given N^*_o ($N_{a,w,x,at,pdo,r}$), crashes/yr:		1.995		2.438									
Expected average crash frequency ($N_{e,w,x,at,pdo}$), crashes/yr:	2015	1.995		2.438									
	2016	1.995		2.438									
	2017	1.995		2.438									
	2018	1.995		2.438									
	2019	1.995		2.438									
	2020												
	2021												
	2022												
	2023												
	2024												
	2025												
	2026												
	2027												
	2028												
	2029												
	2030		3.682		4.900								
	2031												
	2032												
	2033												
	2034												
	2035												
	2036												
	2037												
	2038												
Crash Severity Distribution (during Study Period)													
Fatal crash frequency ($N^*_{e,w,x,at,K}$), crashes:			0.003		0.002								
Incapacitating injury crash freq. ($N^*_{e,w,x,at,A}$), crashes:			0.063		0.048								
Non-incapacitating inj. crash freq. ($N^*_{e,w,x,at,B}$), crashes:			0.373		0.286								
Possible injury crash freq. ($N^*_{e,w,x,at,C}$), crashes:			1.690		1.297								
Total fatal-and-injury crash freq. ($N^*_{e,w,x,at,fi}$), crashes:			2.129		1.634								
Property-damage-only crash freq. ($N^*_{e,w,x,at,pdo}$), crashes:			3.682		4.900								
Total crash frequency ($N^*_{e,w,x,at,as}$), crashes:			5.810		6.534								

ISATe Ramp Results - No Build (2050)**

Output Worksheet for Crossroad Ramp Terminals		WB Ramp		EB Ramp		Terminal 3		Terminal 4		Terminal 5		Terminal 6	
Signal = signalized intersection model Unsig = unsignalized intersection model	**Applicable Models**	**Crash Period**	**Study Period**	**Crash Period**	**Study Period**	**Crash Period**	**Study Period**	**Crash Period**	**Study Period**	**Crash Period**	**Study Period**	**Crash Period**	**Study Period**
Expected Average Crash Frequency													
Fatal-and-Injury Crash Frequency													
Ramp Terminal Crash Analysis	**Year**												
Overdispersion parameter ($k_{w,x,at,fi}$):		0.087		0.087									
Observed crash count ($N^*_{o,w,x,at,fi}$), crashes:		7		3									
Reference year (r):		2015		2015									
Predicted average crash freq. for reference year ($N_{p,w,x,at,fi,r}$), crashes/yr:		0.959		1.365									
Equivalent years associated with crash count ($C_{b,w,x,at,fi,r}$), yr:		5.000		5.000									
Expected average crash freq. for reference year given N^*_o ($N_{a,w,x,at,fi,r}$), crashes/yr:		1.089		1.080									
Expected average crash frequency ($N_{e,w,x,at,fi}$), crashes/yr:	2015	1.089		1.080									
	2016	1.089		1.080									
	2017	1.089		1.080									
	2018	1.089		1.080									
	2019	1.089		1.080									
	2020												
	2021												
	2022												
	2023												
	2024												
	2025												
	2026												
	2027												
	2028												
	2029												
	2030		2.735		1.900								
	2031												
	2032												
	2033												
	2034												
	2035												
	2036												
	2037												
	2038												
Property-Damage-Only Crash Frequency													
Ramp Terminal Crash Analysis	**Year**												
Overdispersion parameter ($k_{w,x,at,pdo}$):		0.139		0.139									
Observed crash count ($N^*_{o,w,x,at,pdo}$), crashes:		14		16									
Reference year (r):		2015		2015									
Predicted average crash freq. for reference year ($N_{p,w,x,at,pdo,r}$), crashes/yr:		1.281		1.595									
Equivalent years associated with crash count ($C_{b,w,x,at,pdo,r}$), yr:		5.000		5.000									
Expected average crash freq. for reference year given N^*_o ($N_{a,w,x,at,pdo,r}$), crashes/yr:		1.995		2.438									
Expected average crash frequency ($N_{e,w,x,at,pdo}$), crashes/yr:	2015	1.995		2.438									
	2016	1.995		2.438									
	2017	1.995		2.438									
	2018	1.995		2.438									
	2019	1.995		2.438									
	2020												
	2021												
	2022												
	2023												
	2024												
	2025												
	2026												
	2027												
	2028												
	2029												
	2030		4.495		6.025								
	2031												
	2032												
	2033												
	2034												
	2035												
	2036												
	2037												
	2038												
Crash Severity Distribution (during Study Period)													
Fatal crash frequency ($N^*_{e,w,x,at,K}$), crashes:			0.003		0.002								
Incapacitating injury crash freq. ($N^*_{e,w,x,at,A}$), crashes:			0.080		0.056								
Non-incapacitating inj. crash freq. ($N^*_{e,w,x,at,B}$), crashes:			0.479		0.333								
Possible injury crash freq. ($N^*_{e,w,x,at,C}$), crashes:			2.172		1.509								
Total fatal-and-injury crash freq. ($N^*_{e,w,x,at,fi}$), crashes:			2.735		1.900								
Property-damage-only crash freq. ($N^*_{e,w,x,at,pdo}$), crashes:			4.495		6.025								
Total crash frequency ($N^*_{e,w,x,at,as}$), crashes:			7.230		7.924								

**Note that the ISATe tool is built for analysis out to 2038. To do the 2050 analysis, 2050 values were input instead for the "2030" time slot.

ISATe Ramp Results - Alternative 1 (2030)

Output Worksheet for Crossroad Ramp Terminals		WB Ramp		EB Ramp		Terminal 3		Terminal 4		Terminal 5		Terminal 6	
Signal = signalized intersection model Unsig = unsignalized intersection model	**Applicable Models**	**Crash Period**	**Study Period**	**Crash Period**	**Study Period**	**Crash Period**	**Study Period**	**Crash Period**	**Study Period**	**Crash Period**	**Study Period**	**Crash Period**	**Study Period**
Expected Average Crash Frequency													
Fatal-and-Injury Crash Frequency													
Ramp Terminal Crash Analysis	**Year**												
Overdispersion parameter ($k_{w,x,at,fi}$):		0.087		0.087									
Observed crash count ($N^*_{o,w,x,at,fi}$), crashes:		7		3									
Reference year (r):		2015		2015									
Predicted average crash freq. for reference year ($N_{p,w,x,at,fi,r}$), crashes/yr:		0.584		0.601									
Equivalent years associated with crash count ($C_{b,w,x,at,fi,r}$), yr:		5.000		5.000									
Expected average crash freq. for reference year given N^*_o ($N_{a,w,x,at,fi,r}$), crashes/yr:		0.749		0.601									
Expected average crash frequency ($N_{e,w,x,at,fi}$), crashes/yr:	2015	0.749		0.601									
	2016	0.749		0.601									
	2017	0.749		0.601									
	2018	0.749		0.601									
	2019	0.749		0.601									
	2020												
	2021												
	2022												
	2023												
	2024												
	2025												
	2026												
	2027												
	2028												
	2029												
	2030		1.378		1.111								
	2031												
	2032												
	2033												
	2034												
	2035												
	2036												
	2037												
	2038												
Property-Damage-Only Crash Frequency													
Ramp Terminal Crash Analysis	**Year**												
Overdispersion parameter ($k_{w,x,at,pdo}$):		0.139		0.139									
Observed crash count ($N^*_{o,w,x,at,pdo}$), crashes:		14		16									
Reference year (r):		2015		2015									
Predicted average crash freq. for reference year ($N_{p,w,x,at,pdo,r}$), crashes/yr:		0.871		0.887									
Equivalent years associated with crash count ($C_{b,w,x,at,pdo,r}$), yr:		5.000		5.000									
Expected average crash freq. for reference year given N^*_o ($N_{a,w,x,at,pdo,r}$), crashes/yr:		1.598		1.767									
Expected average crash frequency ($N_{e,w,x,at,pdo}$), crashes/yr:	2015	1.598		1.767									
	2016	1.598		1.767									
	2017	1.598		1.767									
	2018	1.598		1.767									
	2019	1.598		1.767									
	2020												
	2021												
	2022												
	2023												
	2024												
	2025												
	2026												
	2027												
	2028												
	2029												
	2030		2.966		4.053								
	2031												
	2032												
	2033												
	2034												
	2035												
	2036												
	2037												
	2038												
Crash Severity Distribution (during Study Period)													
Fatal crash frequency ($N^*_{e,w,x,at,K}$), crashes:			0.001		0.001								
Incapacitating injury crash freq. ($N^*_{e,w,x,at,A}$), crashes:			0.032		0.025								
Non-incapacitating inj. crash freq. ($N^*_{e,w,x,at,B}$), crashes:			0.207		0.167								
Possible injury crash freq. ($N^*_{e,w,x,at,C}$), crashes:			1.138		0.917								
Total fatal-and-injury crash freq. ($N^*_{e,w,x,at,fi}$), crashes:			1.378		1.111								
Property-damage-only crash freq. ($N^*_{e,w,x,at,pdo}$), crashes:			2.966		4.053								
Total crash frequency ($N^*_{e,w,x,at,as}$), crashes:			4.344		5.163								

ISATe Ramp Results - Alternative 1 (2050) **

Output Worksheet for Crossroad Ramp Terminals													
Signal = signalized intersection model		WB Ramp		EB Ramp		Terminal 3		Terminal 4		Terminal 5		Terminal 6	
Unsig = unsignalized intersection model	Applicable Models	Crash Period	Study Period	Crash Period	Study Period	Crash Period	Study Period	Crash Period	Study Period	Crash Period	Study Period	Crash Period	Study Period
Expected Average Crash Frequency													
Fatal-and-Injury Crash Frequency													
Ramp Terminal Crash Analysis	**Year**												
Overdispersion parameter ($k_{w,x,at,fi}$):		0.087		0.087									
Observed crash count ($N^*_{o,w,x,at,fi}$), crashes:		7		3									
Reference year (r):		2015		2015									
Predicted average crash freq. for reference year ($N_{p,w,x,at,fi,r}$), crashes/yr:		0.592		0.613									
Equivalent years associated with crash count ($C_{b,w,x,at,fi,r}$), yr:		5.000		5.000									
Expected average crash freq. for reference year given N^*_o ($N_{a,w,x,at,fi,r}$), crashes/yr:		0.758		0.611									
Expected average crash frequency ($N_{e,w,x,at,fi}$), crashes/yr:	2015	0.758		0.611									
	2016	0.758		0.611									
	2017	0.758		0.611									
	2018	0.758		0.611									
	2019	0.758		0.611									
	2020												
	2021												
	2022												
	2023												
	2024												
	2025												
	2026												
	2027												
	2028												
	2029												
	2030		1.904		1.391								
	2031												
	2032												
	2033												
	2034												
	2035												
	2036												
	2037												
	2038												
Property-Damage-Only Crash Frequency													
Ramp Terminal Crash Analysis	**Year**												
Overdispersion parameter ($k_{w,x,at,pdo}$):		0.139		0.139									
Observed crash count ($N^*_{o,w,x,at,pdo}$), crashes:		14		16									
Reference year (r):		2015		2015									
Predicted average crash freq. for reference year ($N_{p,w,x,at,pdo,r}$), crashes/yr:		0.871		0.887									
Equivalent years associated with crash count ($C_{b,w,x,at,pdo,r}$), yr:		5.000		5.000									
Expected average crash freq. for reference year given N^*_o ($N_{a,w,x,at,pdo,r}$), crashes/yr:		1.598		1.767									
Expected average crash frequency ($N_{e,w,x,at,pdo}$), crashes/yr:	2015	1.598		1.767									
	2016	1.598		1.767									
	2017	1.598		1.767									
	2018	1.598		1.767									
	2019	1.598		1.767									
	2020												
	2021												
	2022												
	2023												
	2024												
	2025												
	2026												
	2027												
	2028												
	2029												
	2030		3.592		5.193								
	2031												
	2032												
	2033												
	2034												
	2035												
	2036												
	2037												
	2038												
Crash Severity Distribution (during Study Period)													
Fatal crash frequency ($N^*_{e,w,x,at,K}$), crashes:			0.002		0.001								
Incapacitating injury crash freq. ($N^*_{e,w,x,at,A}$), crashes:			0.044		0.032								
Non-incapacitating inj. crash freq. ($N^*_{e,w,x,at,B}$), crashes:			0.286		0.209								
Possible injury crash freq. ($N^*_{e,w,x,at,C}$), crashes:			1.572		1.149								
Total fatal-and-injury crash freq. ($N^*_{e,w,x,at,fi}$), crashes:			1.904		1.391								
Property-damage-only crash freq. ($N^*_{e,w,x,at,pdo}$), crashes:			3.592		5.193								
Total crash frequency ($N^*_{e,w,x,at,as}$), crashes:			5.496		6.584								

**Note that the ISATe tool is built for analysis out to 2038. To do the 2050 analysis, 2050 values were input instead for the "2030" time slot.

HSM Urban/Suburban Intersection Results - Alternative 4 (2030)
Sullivan Road / Ramps Roundabout

Worksheet 3A -- Predicted Crashes by Severity and Site Type and Observed Crashes Using the Site-Specific EB Method for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Collision type / Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes, $N_{observed}$** (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
INTERSECTIONS							
Multiple-vehicle							
Intersection_1	5.033	1.677	3.357		0.390	0.338	1.699
Intersection_2	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_3	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_4	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_5	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_6	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_7	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_8	0.000	0.000	0.000		0.000	1.000	0.000
Single-vehicle							
Intersection_1	0.315	0.081	0.234		0.360	0.898	0.283
Intersection_2	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_3	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_4	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_5	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_6	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_7	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_8	0.000	0.000	0.000		0.000	1.000	0.000
Intersection Totals:	5.348	1.758	3.591				1.982
COMBINED (sum of column)	12.866	4.018	8.848		--	--	3.587

Worksheet 3B -- Predicted Pedestrian and Bicycle Crashes for Urban and Suburban Arterials

(1)	(2)	(3)
Site Type	**N_{ped}**	**N_{bike}**
INTERSECTIONS		
Intersection_1	0.000	0.080
Intersection_2	0.000	0.000
Intersection_3	0.000	0.000
Intersection_4	0.000	0.000
Intersection_5	0.000	0.000
Intersection_6	0.000	0.000
Intersection_7	0.000	0.000
Intersection_8	0.000	0.000
COMBINED (sum of column)	0.308	0.283

Worksheet 3C -- Site-Specific EB Method Summary Results for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)
Crash severity level	**$N_{predicted}$**	**N_{ped}**	**N_{bike}**	$N_{expected\ (VEHICLE)}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(8)_{COMB}$ Worksheet 3A	(3)+(4)+(5)
	12.866	0.308	0.283	3.587	4.179
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(5)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$	(3)+(4)+(5)
	4.018	0.308	0.283	1.120	1.712
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 3A	--	--	$(5)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$	(3)+(4)+(5)
	8.848	0.000	0.000	2.467	2.467

HSM Urban/Suburban Intersection Results - Alternative 4 (2050)
Sullivan Road / Ramps Roundabout

Worksheet 3A -- Predicted Crashes by Severity and Site Type and Observed Crashes Using the Site-Specific EB Method for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Collision type / Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes, $N_{observed}$** (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
INTERSECTIONS							
Multiple-vehicle							
Intersection_1	6.457	2.190	4.267		0.390	0.284	1.835
Intersection_2	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_3	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_4	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_5	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_6	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_7	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_8	0.000	0.000	0.000		0.000	1.000	0.000
Single-vehicle							
Intersection_1	0.377	0.093	0.285		0.360	0.880	0.332
Intersection_2	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_3	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_4	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_5	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_6	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_7	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_8	0.000	0.000	0.000		0.000	1.000	0.000
Intersection Totals:	6.834	2.283	4.551				2.168
COMBINED (sum of column)	14.352	4.543	9.809		--	--	3.773

Worksheet 3B -- Predicted Pedestrian and Bicycle Crashes for Urban and Suburban Arterials

(1)	(2)	(3)
Site Type	N_{ped}	N_{bike}
INTERSECTIONS		
Intersection_1	0.000	0.103
Intersection_2	0.000	0.000
Intersection_3	0.000	0.000
Intersection_4	0.000	0.000
Intersection_5	0.000	0.000
Intersection_6	0.000	0.000
Intersection_7	0.000	0.000
Intersection_8	0.000	0.000
COMBINED (sum of column)	0.308	0.305

Worksheet 3C -- Site-Specific EB Method Summary Results for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)
Crash severity level	$N_{predicted}$	N_{ped}	N_{bike}	$N_{expected\ (VEHICLE)}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(8)_{COMB}$ Worksheet 3A	(3)+(4)+(5)
	14.352	0.308	0.305	3.773	4.387
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(5)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$	(3)+(4)+(5)
	4.543	0.308	0.305	1.194	1.808
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 3A	--	--	$(5)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$	(3)+(4)+(5)
	9.809	0.000	0.000	2.579	2.579

HSM Urban/Suburban Intersection Results - Alternative 4 (2030)
Trent Avenue / Ramps Roundabout

Worksheet 3A -- Predicted Crashes by Severity and Site Type and Observed Crashes Using the Site-Specific EB Method for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Collision type / Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes,** $N_{observed}$ (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
INTERSECTIONS							
Multiple-vehicle							
Intersection_1	4.336	1.431	2.905		0.330	0.411	1.784
Intersection_2	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_3	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_4	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_5	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_6	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_7	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_8	0.000	0.000	0.000		0.000	1.000	0.000
Single-vehicle							
Intersection_1	0.271	0.075	0.196		0.360	0.911	0.247
Intersection_2	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_3	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_4	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_5	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_6	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_7	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_8	0.000	0.000	0.000		0.000	1.000	0.000
Intersection Totals:	4.607	1.506	3.101				2.031
COMBINED (sum of column)	12.125	3.766	8.358		--	--	3.637

Worksheet 3B -- Predicted Pedestrian and Bicycle Crashes for Urban and Suburban Arterials

(1)	(2)	(3)
Site Type	N_{ped}	N_{bike}
INTERSECTIONS		
Intersection_1	0.000	0.051
Intersection_2	0.000	0.000
Intersection_3	0.000	0.000
Intersection_4	0.000	0.000
Intersection_5	0.000	0.000
Intersection_6	0.000	0.000
Intersection_7	0.000	0.000
Intersection_8	0.000	0.000
COMBINED (sum of column)	0.308	0.254

Worksheet 3C -- Site-Specific EB Method Summary Results for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)
Crash severity level	$N_{predicted}$	N_{ped}	N_{bike}	$N_{expected\ (VEHICLE)}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(8)_{COMB}$ Worksheet 3A	(3)+(4)+(5)
	12.125	0.308	0.254	3.637	4.199
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(5)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$	(3)+(4)+(5)
	3.766	0.308	0.254	1.130	1.692
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 3A	--	--	$(5)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$	(3)+(4)+(5)
	8.358	0.000	0.000	2.507	2.507

HSM Urban/Suburban Intersection Results - Alternative 4 (2050)

Trent Avenue / Ramps Roundabout

Worksheet 3A -- Predicted Crashes by Severity and Site Type and Observed Crashes Using the Site-Specific EB Method for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Collision type / Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes, $N_{observed}$** (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
INTERSECTIONS							
Multiple-vehicle							
Intersection_1	6.298	1.990	4.308		0.330	0.325	2.046
Intersection_2	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_3	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_4	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_5	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_6	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_7	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_8	0.000	0.000	0.000		0.000	1.000	0.000
Single-vehicle							
Intersection_1	0.335	0.093	0.243		0.360	0.892	0.299
Intersection_2	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_3	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_4	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_5	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_6	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_7	0.000	0.000	0.000		0.000	1.000	0.000
Intersection_8	0.000	0.000	0.000		0.000	1.000	0.000
Intersection Totals:	6.633	2.083	4.550				2.345
COMBINED (sum of column)	14.150	4.343	9.808		--	--	3.951

Worksheet 3B -- Predicted Pedestrian and Bicycle Crashes for Urban and Suburban Arterials

(1)	(2)	(3)
Site Type	N_{ped}	N_{bike}
INTERSECTIONS		
Intersection_1	0.000	0.073
Intersection_2	0.000	0.000
Intersection_3	0.000	0.000
Intersection_4	0.000	0.000
Intersection_5	0.000	0.000
Intersection_6	0.000	0.000
Intersection_7	0.000	0.000
Intersection_8	0.000	0.000
COMBINED (sum of column)	0.308	0.276

Worksheet 3C -- Site-Specific EB Method Summary Results for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)
Crash severity level	$N_{predicted}$	N_{ped}	N_{bike}	$N_{expected\ (VEHICLE)}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(8)_{COMB}$ Worksheet 3A	(3)+(4)+(5)
	14.150	0.308	0.276	3.951	4.535
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(5)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$	(3)+(4)+(5)
	4.343	0.308	0.276	1.213	1.797
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 3A	--	--	$(5)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$	(3)+(4)+(5)
	9.808	0.000	0.000	2.738	2.738

Alternatives 2-4 CMF Adjustments

2030 Collisions

Alternative	Ramp	Base Predicted Collisions		ISATe Source	CMF*		Final Predicted Collisions	
		Fatal/Injury	Total		Fatal/Injury	Total	Fatal/Injury	Total
Alternative 2 (Roundabout)	Sullivan Rd / Trent Ave WB Ramp	2.1	5.8	No Build	0.25	0.63	***0.5***	***3.7***
	Sullivan Rd / Trent Ave EB Ramp	1.6	6.5	No Build	0.25	0.63	***0.4***	***4.1***
Alternative 3 (DDI)	Sullivan Rd / Trent Ave WB Ramp	2.1	5.8	No Build	0.56	0.86	***1.2***	***5.0***
	Sullivan Rd / Trent Ave EB Ramp	1.6	6.5	No Build	0.56	0.86	***0.9***	***5.6***
Alternative 4 (Jug Handle)**	Sullivan Road Roundabout	1.8	5.4	Alternative 4	0.25	0.63	***0.5***	***4.0***
	Trent Avenue Roundabout	1.5	4.6	Alternative 4	0.25	0.63	***0.4***	***3.4***

2050 Collisions

Alternative	Ramp	Base Predicted Collisions		ISATe Source	CMF*		Final Predicted Collisions	
		Fatal/Injury	Total		Fatal/Injury	Total	Fatal/Injury	Total
Alternative 2 (Roundabout)	Sullivan Rd / Trent Ave WB Ramp	2.7	7.2	No Build	0.25	0.63	***0.7***	***4.5***
	Sullivan Rd / Trent Ave EB Ramp	1.9	7.9	No Build	0.25	0.63	***0.5***	***5.0***
Alternative 3 (DDI)	Sullivan Rd / Trent Ave WB Ramp	2.7	7.2	No Build	0.56	0.86	***1.5***	***6.2***
	Sullivan Rd / Trent Ave EB Ramp	1.9	7.9	No Build	0.56	0.86	***1.1***	***6.8***
Alternative 4 (Jug Handle)**	Sullivan Road Roundabout	2.3	6.8	Alternative 4	0.25	0.63	***0.6***	***5.0***
	Trent Avenue Roundabout	2.1	6.6	Alternative 4	0.25	0.63	***0.5***	***4.9***

**CMF (Crash Modification Factors) for both roundabouts and DDI were sourced from the CMF Clearinghouse*

**Due to the intersecton configurations under Alternative 4, the HSM tool was used instead of the ISATe tool. Because of this, the No Build alternative was built in HSM to determine the difference in collision estimates between HSM and ISATe. From this assessment, it was determined that HSM was estimating total collisions on average 15% lower than ISATe. Based on this, the HSM total collision results for Alternative 4 were adjusted upward accordingly.