

Traffic Impact Analysis

WILLIAMS INDUSTRIAL

Prepared for:
Williams Investment

September 2023

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Introduction

The purpose of this traffic impact analysis (TIA) is to identify potential transportation-related impacts to the surrounding street network associated with the development of the proposed Industrial project in Arlington, WA.

Project Description

The overall development plan for the Williams Industrial project includes development across parcels in Arlington and Marysville. This study focuses on the approximately 131,566 square feet of business park that would be developed in Arlington. The balance of the project includes approximately 2,055,069 square feet of industrial park in Marysville. A separate report will be submitted summarizing the impact analysis prepared for the Marysville parcels. The site vicinity is shown in Figure 1. Access to the development is proposed along 168th Street NE and 47th Avenue NE. Figure 2 illustrates the preliminary site plan. It is anticipated that the development would be constructed and occupied by 2026.

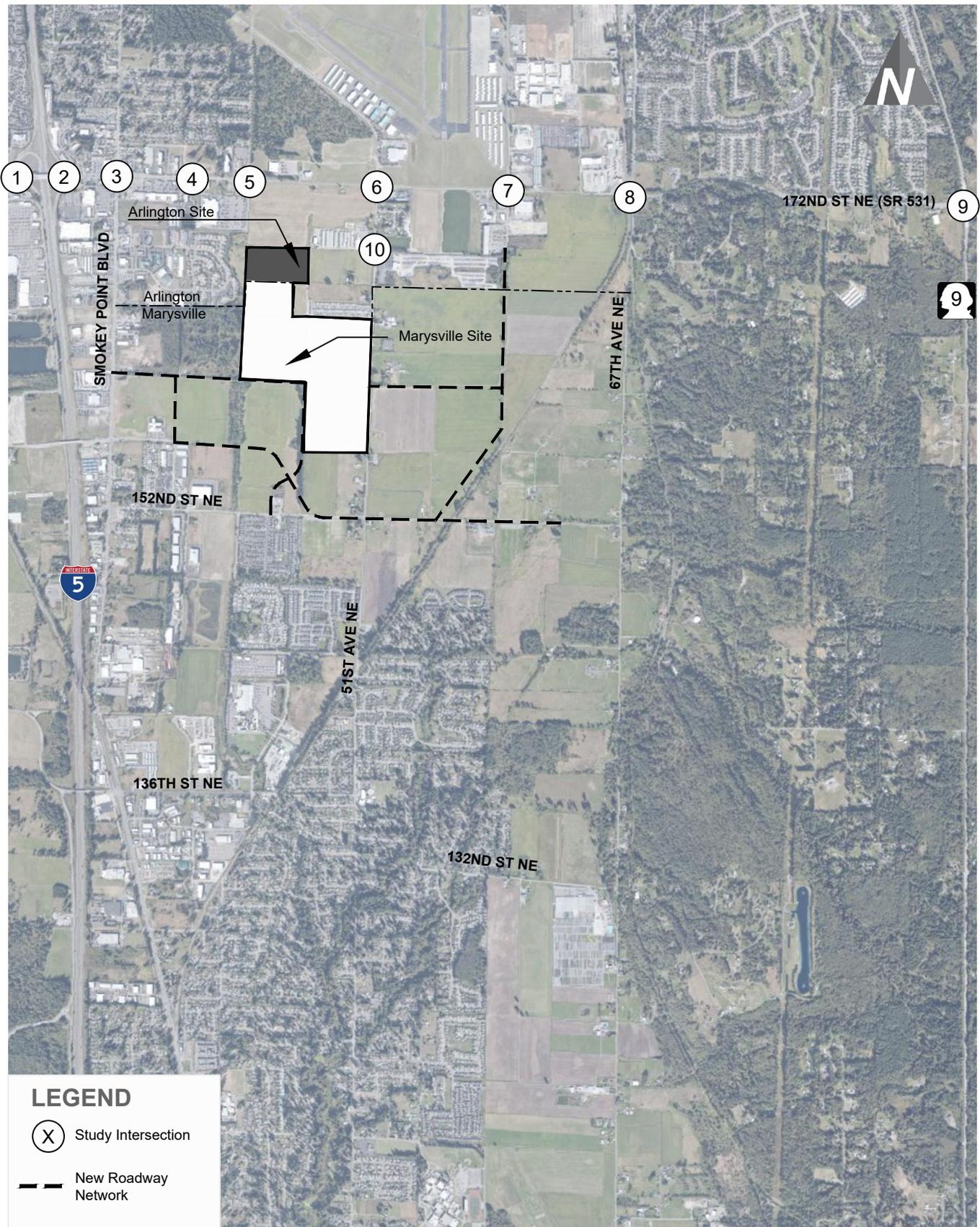
Study Scope

The scope of this analysis is based on anticipated impacts to City of Arlington and WSDOT facilities. Based on anticipated travel patterns for project-generated vehicle traffic, the following intersections were selected for study:

1. I-5 SB Ramps/172nd Street NE
2. I-5 NB Ramps/172nd Street NE
3. Smokey Point Boulevard/172nd Street NE
4. 40th Ave NE/172nd Street NE
5. 43rd Ave NE/172nd Street NE
6. 51st Avenue NE/172nd Street NE
7. 59th Avenue NE/172nd Street NE
8. 67th Avenue NE/172nd Street NE
9. State Route 9/172nd Street NE
10. 51st Avenue NE/168th Street NE

The scope of the analysis included a review of the weekday PM peak hour conditions. The analysis includes a review of existing conditions in the vicinity of the project site, including the street network, non-motorized facilities, transit service, existing and future (2026) without-project peak hour traffic volumes, traffic operations, and traffic safety. Future (2026) with-project conditions are evaluated by adding site-generated traffic to future (2026) without-project volumes and were then compared to future (2026) without-project conditions to identify the relative impacts the proposed project has on the surrounding transportation system.

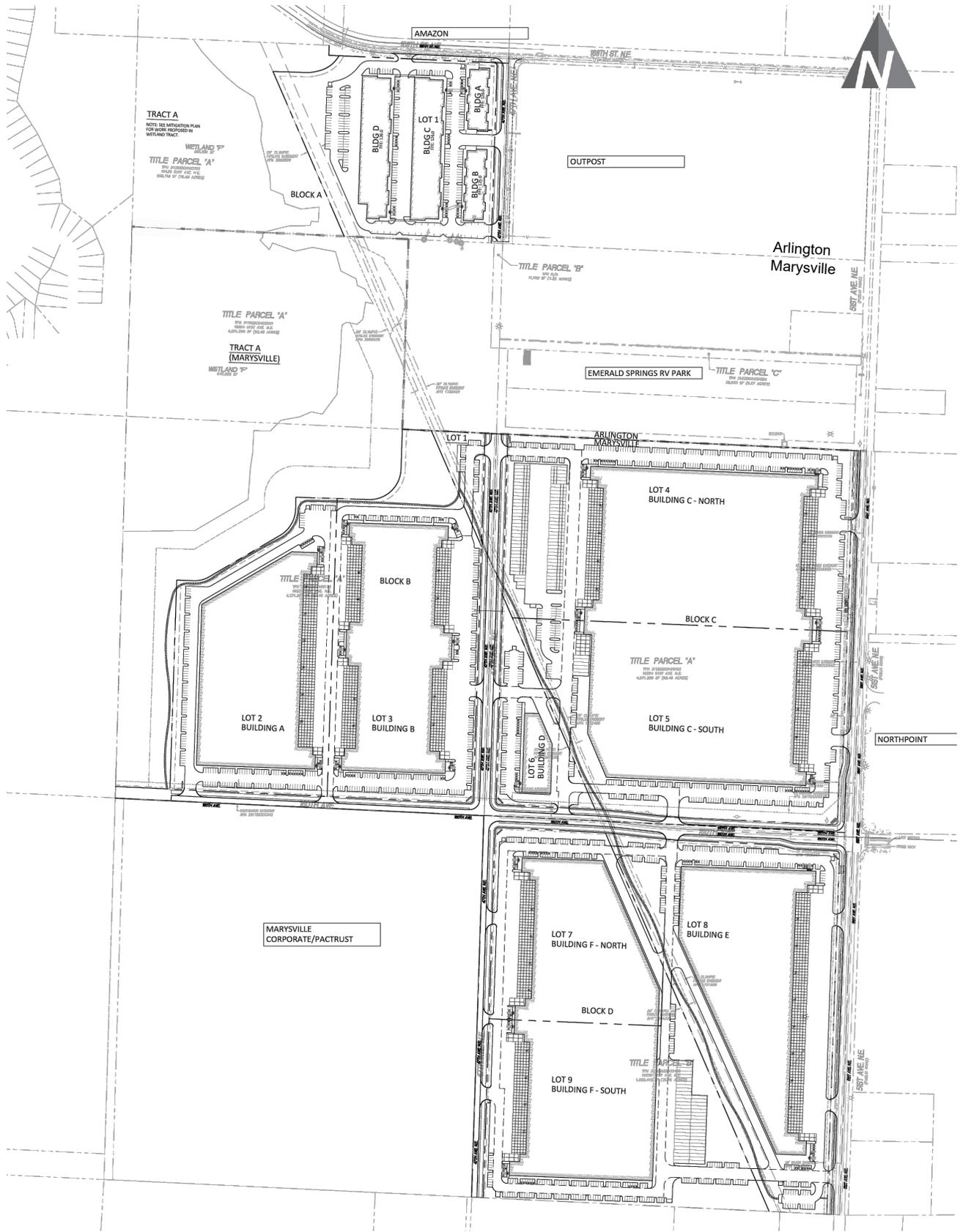
Although not currently approved, the Marysville portion of the Williams Industrial project was included in the without-project analyses as a pipeline project. This results in the with-project conditions being representative of the cumulative impacts of both development projects.



Site Vicinity & Study Intersections

FIGURE

1



Preliminary Site Plan

Williams Industrial

FIGURE

2



Existing & Future Without-Project Conditions

This section describes existing and future (2026) without-project conditions within the study area. Study area characteristics are provided for the existing street network, non-motorized facilities, transit service, existing and future without-project peak hour traffic volumes, traffic operations, and traffic safety.

Street System

The following describes the existing street network within the vicinity of the proposed project and any anticipated changes resulting from planned improvements.

Existing Inventory

Characteristics of the existing street system in the project vicinity are described in Table 1.

Table 1. Study Area Existing Roadway Network Summary

Roadway	Roadway Classification	Posted Speed Limit	Number of Travel Lanes	Parking?	Sidewalks?	Bicycle Facilities?
Interstate 5 (I-5)	Interstate	60 to 70 mph ¹	6	No	No	No
172nd Street NE (SR 531)	Other Principal Arterial/ Minor Arterial ²	35 mph	2 to 5	No	Intermittent	Intermittent
Smokey Point Boulevard	Arterial	35 mph	5	No	Yes	No
40th Ave NE	Local	No Limit Posted	3	No	Yes	No
43rd Avenue NE	Local	35 mph	2 to 3	No	Intermittent	No
51st Avenue NE	Arterial	35 mph	2 to 3	No	Intermittent	No
59th Avenue NE	Minor Arterial	No Limit Posted	2 to 3	No	Intermittent	No
67th Avenue NE	Minor Arterial	35 mph	2 to 3	No	Intermittent	No
SR 9	Other Freeway Expressway	35 mph	2	No	No	No

Note: mph = miles per hour

1. 60 mph south of SR 531 and 70 mph north of SR 531.

2. Other principal arterial between I-5 SB Ramps and Smokey Point Boulevard. Minor arterial between Smokey Point Boulevard and SR 9.

As shown in Table 1, availability of sidewalks in the area are intermittent. The Airport Trail and Centennial Trail are also located in the area, providing recreational and commute possibilities. The Airport Trail is approximately a 6-mile walking trail located in the City of Arlington primarily around the Municipal Airport. The Centennial Trail is a 30-mile paved multiuse trail that connects Snohomish County and Skagit County, running through the Cities of Snohomish, Marysville and Arlington. The improvements described below as well as frontage improvements as part of planned developments in the area include construction of non-motorized facilities.

Planned Improvements

Based on a review of the Washington Department of Transportation (WSDOT) 2023-2026 Statewide Transportation Program (STIP) and the *City of Arlington Comprehensive Plan's Six Year Transportation Improvement Plan*, there are a number of improvements in the area that would impact both capacity at study intersections and travel patterns in the area. The following summarizes the projects planned in the area and include:

- 172nd Street NE (SR 531) Widening, Phase I:** Widening of 172nd Street NE (SR 531) from 43rd Avenue NE to 67th Avenue NE to a four-lane facility with two travel lanes in each direction. The improvement project would include provision of roundabouts at the 43rd Avenue NE, 51st Avenue NE, 59th Avenue NE, 63rd Avenue NE, and 67th Avenue NE intersections with 172nd Street NE (SR 531).

- **172nd Street NE (SR 531) Widening, Phase II:** Widening of 172nd Street NE (SR 531) between 67th Avenue NE and SR-9 to a four-lane facility with two travel lanes in each direction.
- **51st Avenue NE Widening:** Widening of 51st Avenue NE from 152nd Street NE to 160th Street NE into a 3-lane roadway with bicycle lanes and sidewalks.
- **168th Street NE/51st Avenue NE Roundabout:** Installation of a roundabout at the 168th Street NE/51st Avenue NE intersection. The project is fully funded by the developer. The project would include ADA-complaint ramps, pedestrian facilities, and lighting. Construction is scheduled to begin in 2023. The roundabout was assumed in the future (2026) analysis.

Additionally, a longer-term improvement includes the construction of a new I-5 interchange at 156th Street NE in Marysville. This planned improvement is anticipated to result in a shift in traffic from 172nd Street NE (SR 531) to 156th Street NE and could help alleviate some existing and forecast congestion along the corridor. Construction of this project is anticipated to begin in 2025 with completion in 2031 and therefore was not included in the future (2026) analysis.

Transit Service

Transit service in the study area is provided by Community Transit and is primarily provided along 172nd Street NE (SR 531), Smokey Point Boulevard, 51st Avenue NE, and 152nd Street NE. The nearest bus stop is located on 152nd Street NE at 51st Avenue NE and is served by route 202.

Route 202 provides service between the Smokey Point Transit Center in Arlington and the Lynnwood Transit Center. Transit service along route 202 is provided 7 days a week with AM and PM peak hour headways of approximately 40 minutes on weekdays and 1-hour headways on weekends.

No planned transit improvements were identified along these corridors. However, it is anticipated that transit service in the area may be adjusted to account for future growth, and a new bus stop has been proposed next to the site at the intersection of 51st Avenue NE and 160th Street NE.

Traffic Volumes

The following summarizes the traffic volumes for existing and future without-project conditions.

Existing Traffic Volumes

Existing traffic counts were obtained from the City of Arlington or collected at study intersections. All data are from November 2022 or newer. Traffic volumes data collected in 2022 were grown at an average annual growth rate of 3 percent to establish existing 2023 conditions. The annual average growth rate of 3 percent is based on recent coordination with City staff. Detailed traffic counts are provided in Appendix A.

Future Without-Project Traffic Volumes

The following sections describe the methodologies to develop the forecast 2026 without-project traffic volumes.

Consistent with City requirements, future 2026 without-project traffic volumes were forecast by applying an annual growth rate to existing traffic volumes and adding traffic from “pipeline” development projects that would also contribute traffic to the study intersections. Three pipeline projects were identified in the vicinity of the project site. The three pipeline projects identified are Project Roxy, a portion of the Cascade Commerce Center, and the Marysville Industrial

project. In addition to the three pipeline projects, the Marysville portion of the Williams Industrial project was included in the background.

Project Roxy is developing approximately 2.82 million square foot fulfillment center warehouse located between 172nd Street NE (SR 531) and 169th Street NE, and 43rd Avenue NE and 51st Avenue NE in the City of Arlington. Based on the timing of the counts used in this analysis and anticipation of the occupancy this project has been included in the background volume forecasting.

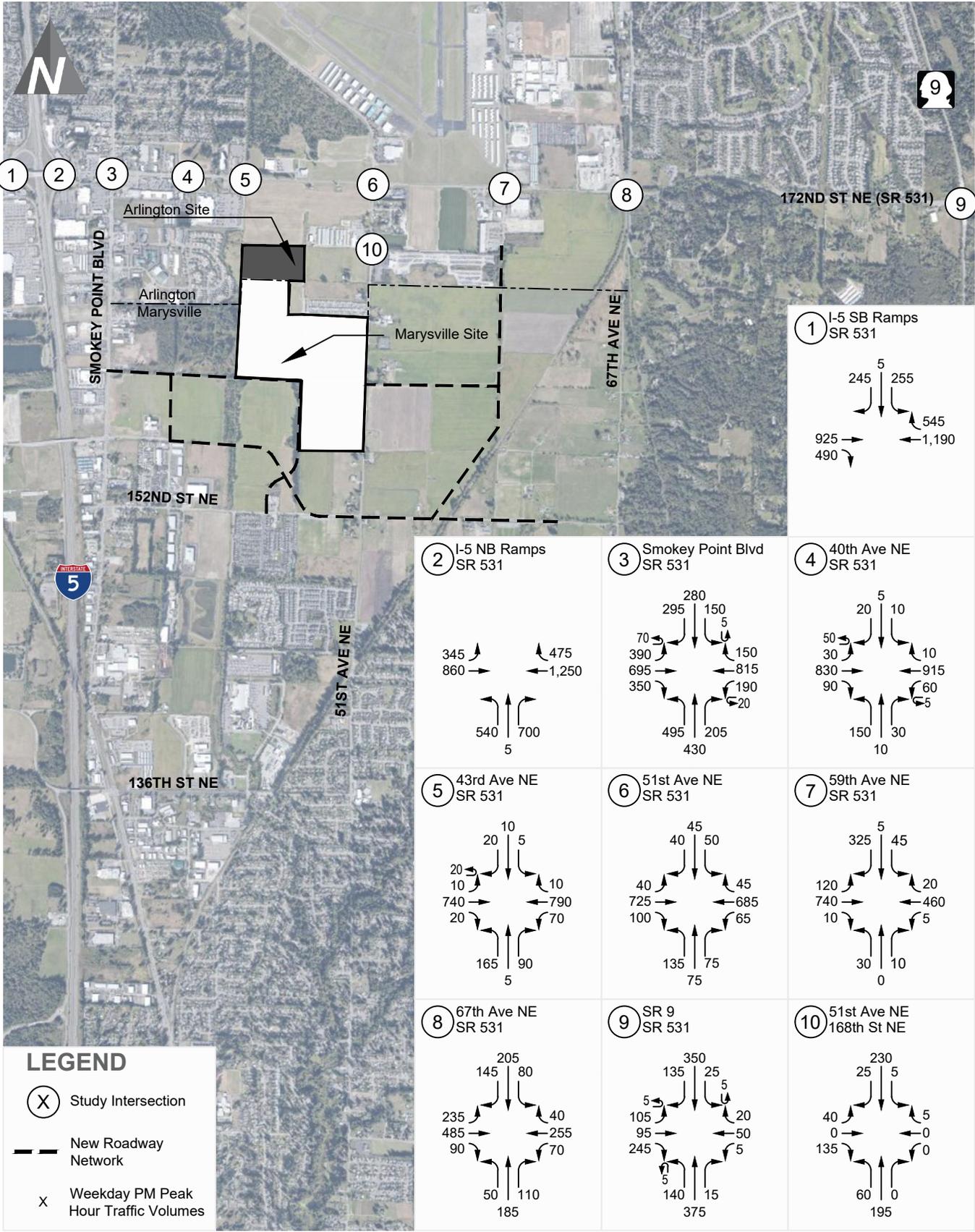
The Cascade Commerce Center (CCC) would develop approximately 4.15 million square feet of a mix of industrial uses anticipated to include a combination of industrial park, high-cube warehouse, and high-cube fulfillment center. The CCC is located in both the City of Arlington and the City of Marysville approximately south of 172nd Street NE (SR 531) and between 51st Avenue NE/59th Avenue NE and the railroad track to the east. The CCC is anticipated to be completed across 9 buildings which would be built and occupied separately. The full site is anticipated to be constructed by 2030; however, full buildout of the project has not been approved. Based on coordination with City staff only 250,000 square feet of warehouse space have been approved. As such, a 250,000 square foot warehouse was assumed under future 2026 without-project conditions.

The PacTrust Project would develop approximately 745,250 square feet of Industrial Park within the City of Marysville. The development includes areas north and south of 156th Street NE. Access to the development is provided by proposed driveways along 47th Avenue NE and 156th Street NE. It is anticipated that the development would be constructed and occupied by 2025.

The Outpost would develop an approximately 500-unit multi-family residential development with 21,982 square feet of office space, 69,058 square feet of retail space and 16 live/work units. The project is located southwest of the 51st Street NE/168th Street NE intersection in Arlington.

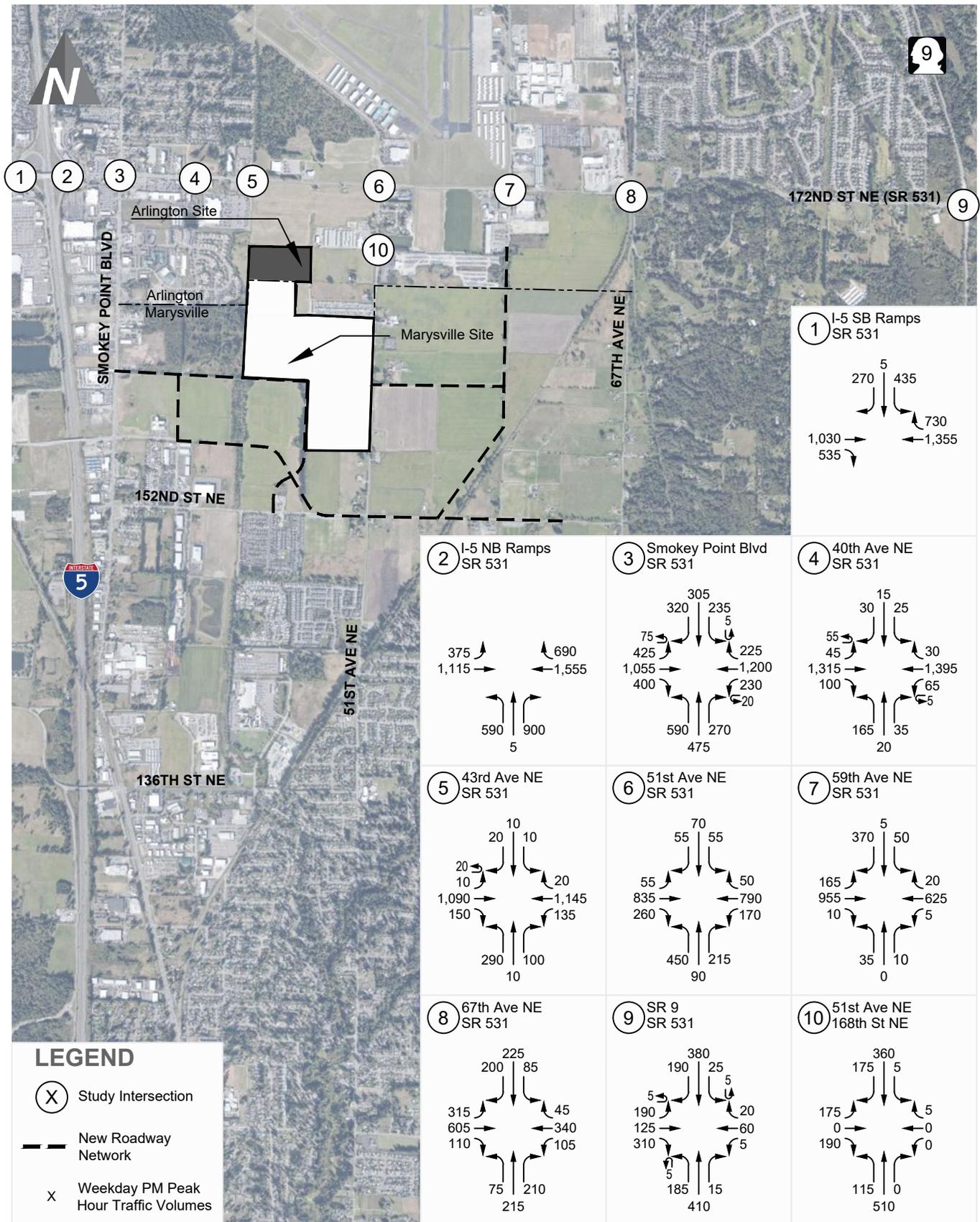
Williams Industrial (Marysville) Development of up to 2,055,069 square feet of industrial park. IT is anticipated that the development would be constructed and occupied by 2026.

In addition to the traffic associated with the pipeline projects identified above an annual growth rate of 3 percent per year was applied to the existing PM peak hour traffic volumes at each study intersection based on recent discussions with City staff. Future (2026) without-project traffic volumes are shown in Figure 4.



Existing Weekday PM Peak Hour Traffic Volumes

FIGURE



Future (2026) Without-Project Weekday PM Peak Hour Traffic Volumes

FIGURE

Traffic Operations

The following sections summarize traffic operations for existing and future conditions within the study area.

The operational characteristics of an intersection are determined by calculating the intersection level of service (LOS). At signalized, all-way stop, and roundabout intersections, LOS is measured in average control delay per vehicle and is typically reported using the intersection delay. At unsignalized side-street, stop-controlled intersections, LOS is measured by the average delay on the worst-movement of the intersection. Traffic operations and average vehicle delay for an intersection can be described qualitatively with a range of levels of service (LOS A through LOS F), with LOS A indicating free-flowing traffic and LOS F indicating extreme congestion and long vehicle delays. Appendix B contains a detailed explanation of LOS criteria and definitions.

For the operations analysis of existing conditions at the signalized study intersections, signal timing and phasing information was obtained from the WSDOT or the City of Arlington. As described previously, there are a number of improvements planned by 2026 that would impact intersection capacity. Those improvements were accounted for in the future 2026 without-project analysis. Signal timing was optimized where intersection improvements at signalized intersections are anticipated.

Weekday PM peak hour traffic operations for existing and future without-project conditions were evaluated at the study intersections based on the procedures identified in the *Highway Capacity Manual* 6th Edition, unless otherwise noted for signal timing constraints, and were evaluated using *Synchro 11*. *Synchro 11* is a software program that uses *HCM* methodology to evaluate intersection LOS and average vehicle delays. Roundabout controlled intersections were evaluated utilizing *Sidra 9* and the WSDOT methodology for analyzing roundabouts. Results for the existing and future without-project operations analyses are summarized in Table 2. Detailed LOS worksheets for each intersection analysis are included in Appendix C.

The City of Arlington and the WSDOT intersections have an LOS Standard of LOS D for the study intersections.

For the roundabouts along 172nd street NE (SR 531), WSDOT does not apply LOS standards, instead utilizes a number of measures of effectiveness (MOEs) to assess the operations. WSDOT uses a combination of v/c ratios, delay, stop rate, queueing, and then LOS. Generally, WSDOT is targeting a v/c ratio of 0.90 or less and LOS D.

Table 2. Existing & Future (2026) Without-Project Weekday PM Peak Hour LOS Summary

Intersection	Traffic Control	Existing			Future 2026 Without-Project		
		LOS ¹	Delay ²	v/c ³	LOS	Delay	v/c
1. I-5 SB Ramps/172nd St NE (SR 531)	Signal	A	8.4	-	B	11.4	-
2. I-5 NB Ramps/172nd St NE (SR 531)	Signal	C	32.5	-	D	40.7	-
3. Smokey Point Blvd/172nd St NE (SR 531) ⁵	Signal	E	72.7	-	F	111.0	-
4. 40th Ave NE/172nd St NE (SR 531) ⁵	Signal	C	31.2	-	C	32.7	-
5. 43rd Ave NE/172nd St NE (SR 531)	Roundabout	A	6.0	0.38	A	7.1	0.59
6. 51st Ave NE/172nd St NE (SR 531)	Signal/ Roundabout ⁴	D	35.2	-	B	12.5	0.87
7. 59th Ave NE/172nd St NE (SR 531)	Signal/ Roundabout ⁴	D	42.8	-	A	5.6	0.44
8. 67th Ave NE/172nd St NE (SR 531)	Signal/ Roundabout ⁴	D	53.6	-	C	25.9	1.14
9. SR 9/172nd St NE (SR 531)	Roundabout	A	6.2	0.39	A	6.9	0.49
10. 51st Ave NE/168th St NE	Side-Street Stop/ Roundabout ⁴	A	12.8	EB	A	7.2	0.64

1. Level of Service (A – F) as defined by the *Highway Capacity Manual* (HCM) 6th Edition (TRB)
2. Average delay per vehicle in seconds.
3. Volume to capacity ratio reported for roundabouts.
4. Roundabout with future SR 531 improvements.
5. Intersections evaluated utilizing HCM 2000 methodology due to signal timing constraints not allowed under HCM 6th Edition and/or the presence of U-Turning movements.

As shown in Table 2, under existing conditions, one intersection currently operates at a LOS that does not meet LOS standards. Under future (2026) without-project conditions, with inclusion of area planned improvements two intersections are forecast to not meet the applicable LOS standards. The intersections forecast to not meet the LOS standard in 2026 include:

- Smokey Point Boulevard/172nd Street NE (SR 531)
- 67th Avenue NE/172nd Street NE (SR 531)

While the 67 Avenue NE/172nd Street NE (SR 531) intersection is forecast to operate at LOS C with approximately 26 seconds of delay the v/c ratio is anticipated to be 1.14, exceeding the target v/c ratio of 0.90.

As described in the planned improvements, there are longer-range funded plans to construct a new I-5 interchange at 156th Street NE. The interchange is anticipated to result in shifts in traffic away from the 172nd Street NE (SR 531) corridor and could help reduce intersection delays along the corridor. However, as this analysis represents a 2026 horizon year, the interchange and associated shifts in traffic were excluded as the project would not be completed at the time of the proposed project opening.

Traffic Safety

Recent collision records were reviewed within the study area to identify existing traffic safety issues at the study intersections. The most recent complete five-year summary of accident data from the WSDOT is for the period between January 1, 2018 and December 31, 2022. This information is summarized in Table 3.

Table 3. Five-Year Collision Summary – 2018 to 2022

Location	Number of Collisions					Total	Annual Average
	2018	2019	2020	2021	2022		
1. I-5 SB Ramps/172nd St NE (SR 531)	10	11	5	9	11	46	9.20
2. I-5 NB Ramps/172nd St NE (SR 531)	11	12	9	12	10	54	10.80
3. Smokey Point Blvd/172nd St NE (SR 531) ⁵	26	28	19	19	13	105	21.00
4. 40th Ave NE/172nd St NE (SR 531)	3	1	5	3	3	14	2.80
5. 43rd Ave NE/172nd St NE (SR 531)	6	3	4	5	7	25	5.00
6. 51st Ave NE/172nd St NE (SR 531)	9	8	2	14	9	42	8.40
7. 59th Ave NE/172nd St NE (SR 531)	3	5	2	1	2	13	2.60
8. 67th Ave NE/172nd St NE (SR 531)	5	7	5	7	2	26	5.20
9. SR 9/172nd St NE (SR 531)	6	2	2	3	2	15	3.00
10. 51st Ave NE/168th St NE ¹	-	-	-	0	0	0	0.00

Source: WSDOT, 2023

Under 23 U.S. Code § 409 and 23 U.S. Code § 148, 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.

1. Construction on the intersection was completed between 2021 and 2022.

As shown in Table 3, the total number of collisions at the study area intersections ranged between 0 and 105 over the five years resulting in an annual average between 0.00 and 21.00 collisions per year. In the study area there were a total of 7 reported collisions that involved either a pedestrian or a cyclist. There were no reported fatalities in the study area over the five-year period.

The highest number of reported collisions occurred at the Smokey Point Boulevard/172nd Street NE (SR 531) intersection which also carries some of the highest traffic volumes in the study area. At the Smokey Point Boulevard/172nd Street (SR 531) the most frequent number of collisions report were rear-end followed by sideswipe. The majority (approximately 78 percent) resulted in property damage only.

As a requirement of the Project Roxy additional improvements were identified along the 172nd Street NE (SR 531) corridor were identified. These potential improvements will be considered as the City of Arlington completes the updates to the transportation element of the Comprehensive Plan. While not adopted, with these improvements complete, congestion is expected to decrease resulting in a decrease of congestion related collisions.

Project Impacts

This section of the report documents the proposed project’s impacts on the surrounding street network and study intersections. First, estimated traffic volumes generated by the proposed project are distributed and assigned to adjacent streets and intersections within the study area for the weekday PM peak hour study period. Next, project trips are added to future without-project traffic volumes and any potential impact to traffic operations. Site specific items are also discussed such as the operation of the site’s access driveway.

Trip Generation

The proposed project is constructing approximately 131,566 square feet of Business Park in Arlington and 2,055,069 square feet of Industrial Park in Marysville. Trip generation estimates have been prepared for the development based on trip rates identified using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition (2021) based on Business Park (LU #770). Based on the anticipated land uses permitted through the current zoning, this land use definition in ITE was identified as the most applicable. This designation was approved by City staff. The site is currently undeveloped so no credit for any existing uses is shown.

Table 4 provides a summary of the trip generation for the proposed land use in Arlington.. A detailed summary of the trip generation calculations for these uses has been provided in Appendix D.

Table 4. Estimated Weekday Vehicle Trip Generation

Land Use	Size	Daily Trips ¹	AM Peak-Hour Trips			PM Peak-Hour Trips		
			In	Out	Total	In	Out	Total
<u>Proposed</u>								
Arlington – Business Park (LU #770)	131,566 sf	1,636	151	27	178	42	119	161

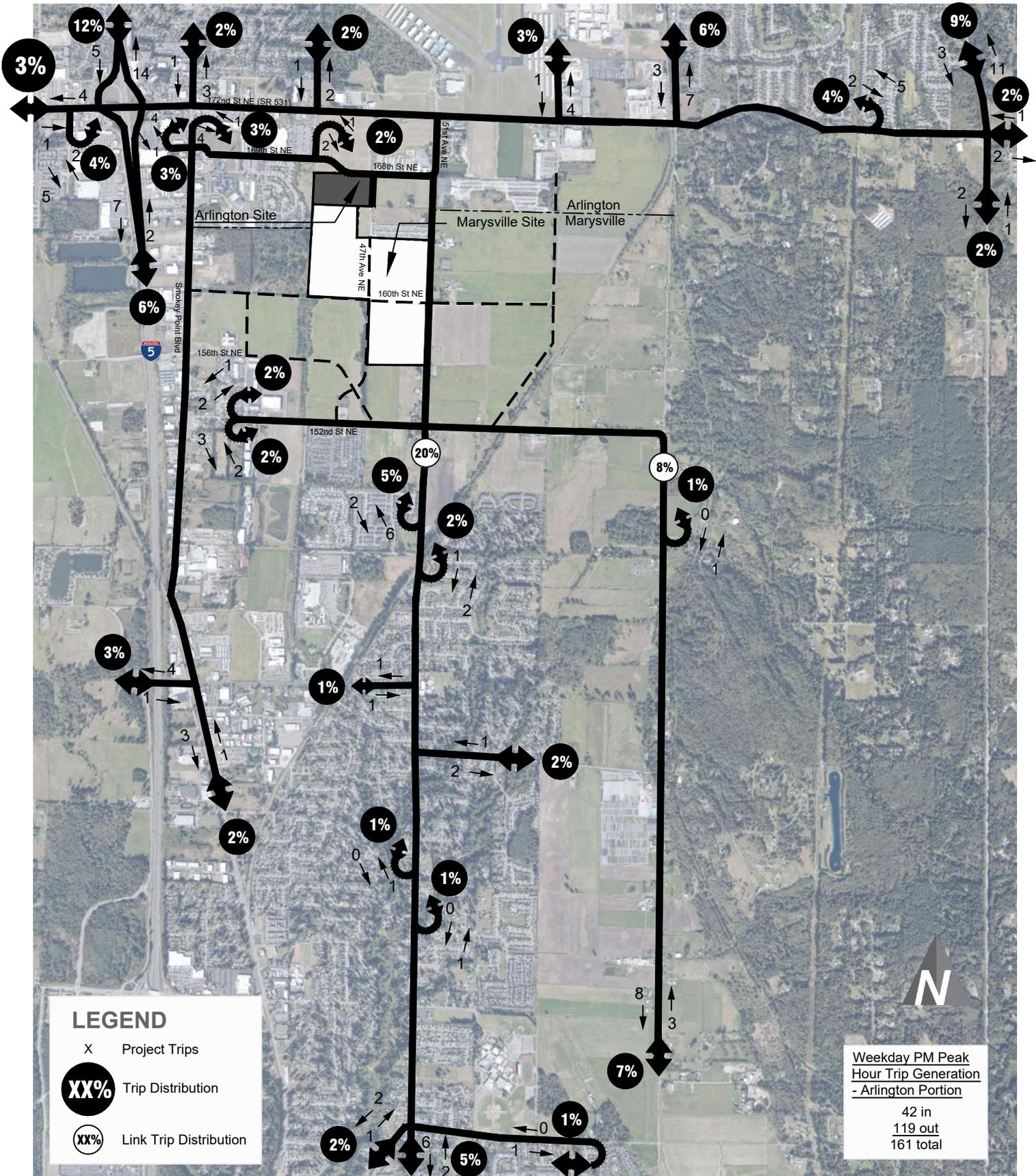
Notes: sf = square-feet

1. Vehicle trips were estimated based on vehicle trip calculations and localized mode split information.

As shown in Table 4, within the Arlington parcels, the project is anticipated to generate 1,636 weekday daily trips with 178 during the AM peak hour and 161 during the PM peak hour.

Trip Distribution & Assignment

Trip distribution patterns developed for the project are consistent with other studies completed within the Cascade Industrial Center. Figure 5 illustrates trip distribution and assignment for the proposed project. The resulting future (2026) with-project weekday PM peak hour traffic volumes are shown on Figure 6.



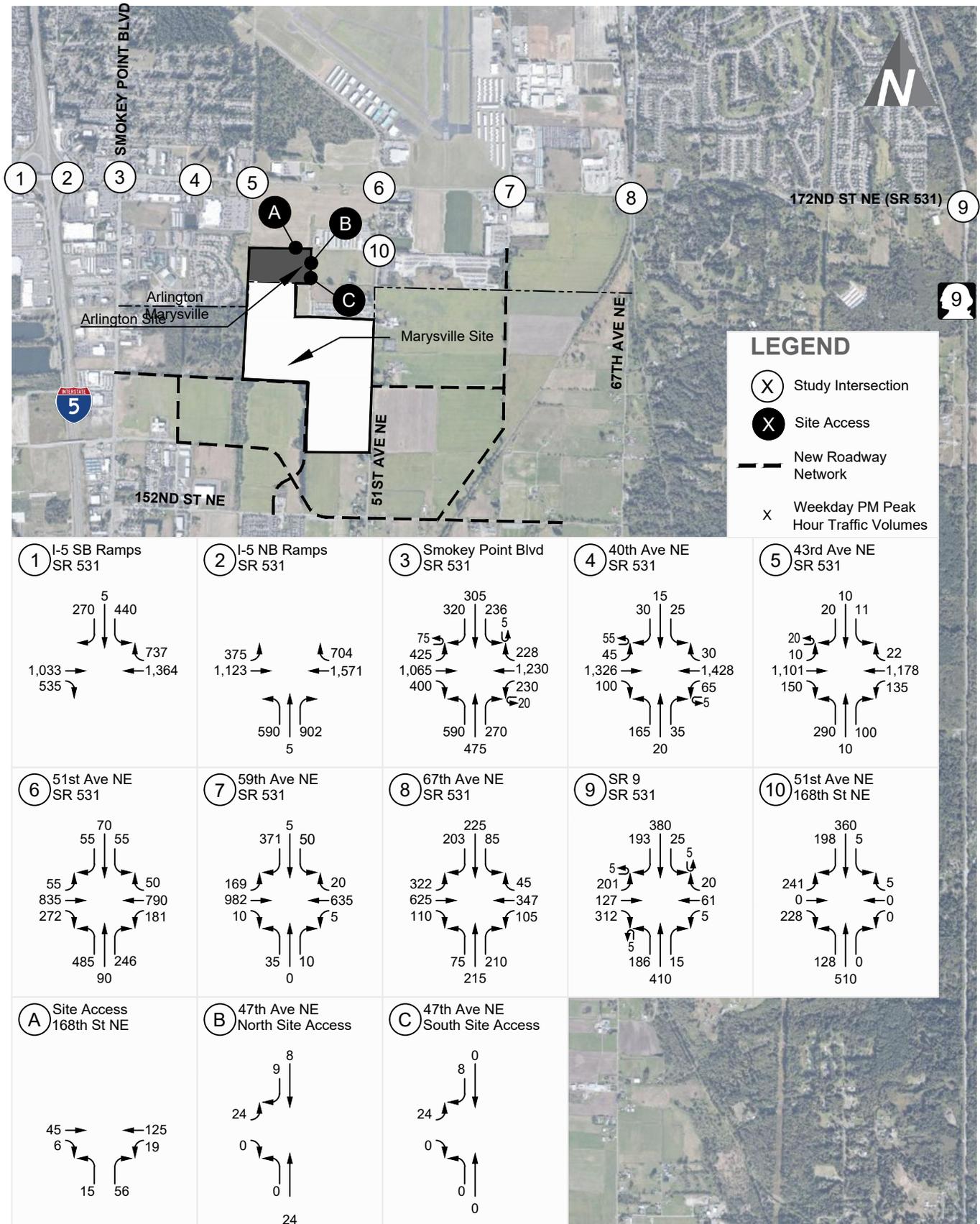
Project Trip Distribution & Assignment

Williams Industrial

transpogroup

FIGURE

5



Future (2026) With-Project Weekday PM Peak Hour Traffic Volumes

FIGURE

Volume Impact Summary

The project generated traffic was added to the future without-project weekday PM peak hour traffic volumes at the study intersections under forecast 2026 conditions. Table 5 summarizes the project share of traffic volumes at the study intersections during the weekday PM peak hour under forecast 2026 year of opening conditions.

Table 5. Future (2026) Weekday PM Peak Hour Traffic Volume Impacts at Study Intersections

Intersection	PM Peak Hour Total Entering Vehicles			Project Share
	2026 Without-Project	Project Trips	2026 With-Project	
1. I-5 SB Ramps/172nd St NE (SR 531)	4,360	24	4,384	0.5%
2. I-5 NB Ramps/172nd St NE (SR 531)	5,230	40	5,270	0.8%
3. Smokey Point Blvd/172nd St NE (SR 531)	5,830	44	5,874	0.7%
4. 40th Ave NE/172nd St NE (SR 531)	3,300	44	3,344	1.3%
5. 43rd Ave NE/172nd St NE (SR 531)	3,010	47	3,057	1.5%
6. 51st Ave NE/172nd St NE (SR 531)	3,095	89	3,184	2.8%
7. 59th Ave NE/172nd St NE (SR 531)	2,250	42	2,292	1.8%
8. 67th Ave NE/172nd St NE (SR 531)	1,620	37	1,657	2.2%
9. SR 9/172nd St NE (SR 531)	2,530	37	2,567	1.4%
10. 51st Ave NE/168th St NE	1,535	140	1,675	8.4%

As shown in Table 5, the proposed project is estimated to account for less than 3 percent of the total weekday PM peak hour traffic at all study intersections with the exception of one intersection. The project is forecast to represent approximately 8.4 percent at the 51st Avenue NE/168th Street NE intersection. Traffic volumes fluctuate day-to-day and the anticipated traffic increase at study intersections are within the range of typical daily traffic fluctuations which can be up to 5 percent.

Traffic Operations

The following section summarizes the future with-project LOS at the study intersections relative to the without-project conditions to identify project-related impacts.

Intersection parameters such as channelization and intersection control applied to the future with-project analyses were consistent with those used in the evaluation of future without-project conditions. A comparison of the future 2026 year of opening without-project and with-project weekday PM peak hour traffic operations are summarized in Table 6. Detailed LOS worksheets are provided in Appendix C.

Table 6. Future (2026) Weekday PM Peak Hour LOS Summary

Intersection	Traffic Control	Future 2026 Without-Project			Future 2026 With-Project		
		LOS ¹	Delay ²	v/c ³	LOS	Delay	v/c
1. I-5 SB Ramps/172nd St NE (SR 531)	Signal	B	11.4	-	B	11.4	-
2. I-5 NB Ramps/172nd St NE (SR 531)	Signal	D	40.7	-	D	41.7	-
3. Smokey Point Blvd/172nd St NE (SR 531) ⁵	Signal	F	111.0	-	F	112.8	-
4. 40th Ave NE/172nd St NE (SR 531) ^{5,6}	Signal	C	32.7	-	C	32.0	-
5. 43rd Ave NE/172nd St NE (SR 531)	Roundabout	A	7.1	0.59	A	7.1	0.61
6. 51st Ave NE/172nd St NE (SR 531)	Roundabout ⁴	B	12.5	0.87	B	14.6	0.93
7. 59th Ave NE/172nd St NE (SR 531)	Roundabout ⁴	A	5.6	0.44	A	5.6	0.44
8. 67th Ave NE/172nd St NE (SR 531)	Roundabout ⁴	C	25.9	1.14	C	28.4	1.17
9. SR 9/172nd St NE (SR 531)	Roundabout	A	6.9	0.49	A	7.0	0.50
10. 51st Ave NE/168th St NE	Roundabout	A	7.2	0.64	A	8.7	0.71

1. Level of Service (A – F) as defined by the *Highway Capacity Manual* (HCM) 6th Edition (TRB)
2. Average delay per vehicle in seconds.
3. Volume to capacity ratio reported for roundabouts.
4. Roundabout control assumed with future SR 531 improvements.
5. Intersections evaluated utilizing HCM 2000 methodology due to signal timing constraints not allowed under HCM 6th Edition and/or the presence of U-Turning movements.
6. The decrease in delay is related to the increase in eastbound through movements where more capacity is available reducing the overall weighted average delay at the intersection.

As shown in Table 6, all study intersections continue to operate at LOS D or better with the exception of the Smokey Point Boulevard/172nd Street NE (SR 531) intersection that is projected to operate at LOS F under without or with-project conditions. The increase in delay is only approximately 2 second between the without and with-project analyses. The 67th Avenue NE/172nd Street NE intersection is forecast to continue to not meet WSDOT v/c ratio. As noted previously, there are funded improvements in the area that are anticipated to shift traffic away from the 172nd Street NE (SR 531) corridor.

Site Access

The project includes five site driveways, three along 168th Street NE and two along 47th Avenue NE. The weekday PM peak hour intersection LOS operations at each are summarized in Table 7.

Table 7. Future 2026 Weekday PM Peak Hour Site Access LOS Summary

Intersection	LOS ¹	Delay ²	WM ³
A. Site Access/168th Street NE	A	9.1	NB
B. 47th Avenue NE/North Site Access	A	8.8	EB
C. 47th Avenue NE/South Site Access	A	9.0	EB

1. Level of Service (A – F) as defined by the *Highway Capacity Manual* (HCM) 6th Edition (TRB)
2. Average delay per vehicle in seconds.
3. Worst movement reported for unsignalized intersections.

As shown in Table 7, the site access locations are forecast to operate at LOS A under future (2026) with-project conditions.

Mitigation and Recommendations

The proposed project would construct the portions of 168th Street NE and 47th Avenue NE along the northern and eastern sides of the site. The project impacts to the surrounding transportation system would be mitigated through the City of Arlington, Snohomish County and WSDOT impact fee programs.

Transportation Mitigation Fees

To mitigate impacts of the proposal on the surrounding transportation system, the developer would be required to pay impact fees to three jurisdictions: the City of Arlington, Snohomish County, and WSDOT based on current interlocal agreements that have been established between these entities. The following provides an estimate only, the final fees will be calculated at time of permit issuance.

City of Arlington

The City of Arlington traffic mitigation fees are currently \$3,355 per PM peak hour trip. Based on the anticipated trip generation of 161 trips the resulting City of Arlington impact fee would be **\$540,155** (\$3,355/trip x 161 trips). The fee rate is subject to annual increases and will be based on the adopted rates at the time of building permit issuance.

Snohomish County

Snohomish County has an interlocal agreement with the City of Arlington. Per the Snohomish County Traffic Mitigation Worksheet for City Developments Impacting County Streets, the percentage of trips impacting County Streets was determined to be 70 percent. Per SCC 30.66B.330 the fee for commercial uses within the urban growth area of TSA is \$157 per average daily trip (ADT). The resulting fee was estimated to be approximately **\$179,796.40** (70% x 1,636 ADT x \$157 per ADT). The fee rate is subject to annual increases and will be based on the adopted rates at the time of building permit issuance.

WSDOT

Per the interlocal agreement with WSDOT, project-related impacts can be mitigated through the payment of a flat fee of \$36 per ADT or a proportional share based on the WSDOT projects currently planned. Based on the project distribution, the project would impact the WSDOT projects on 172nd Street NE (SR 531) and the I-5 Interchange at 156th Street NE; however, those projects have been identified as funded. As such no impact fees would be paid to WSDOT.

Findings and Conclusions

This transportation impact analysis summarizes the transportation impacts associated with the proposed business park in Arlington, WA.

- The proposed project would construct approximately 131,566 square feet of business park.
- The Arlington portion of the development is anticipated to generate 1,636 weekday daily trips, with 178 trips occurring during the weekday AM peak hour and 161 trips during the PM peak hour.
- The proposed project is estimated to account for less than 3 percent of the total 2026 weekday PM peak hour traffic at the study intersections with the exception of one intersection. The project is anticipated to represent approximately 8.4 percent of the traffic volumes at the 51st Avenue NE/168th Street NE intersection.
- Under forecast (2026) with-project conditions all study intersections remain at the same LOS under with-project conditions with increases in delay generally less than 3 seconds with the exception of two intersections. The Smokey Point Boulevard/172nd Street NE (SR 531) intersection is forecast to remain operating at LOS F with approximately a 2 second increase in delay. The 67th Avenue NE/172nd Street NE (SR 531) is forecast to continue to operate at LOS C with approximately 28 seconds of delay and a v/c of 1.17.
- Access to the proposed development would be provided via three driveways along 168th Street NE and 47th Avenue NE. All site driveways are forecast to operate at LOS A under future 2026 conditions.
- The developer would be required to pay transportation mitigation fees. The mitigation fee is estimated to be a total of \$719,951.40 based on the project's calculated pro-rata share. However, the final fees are calculated at the time of building permit issuance. The fee rate is subject to annual increases and will be based on the adopted rates at the time of building permit issuance.

Appendix A: Traffic Counts

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	SR 531				SR 531				I-5 SB Ramps				I-5 SB Ramps				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	2	1	0	0	9	6	0	0	0	0	0	8	0	2	28	0
4:15 PM	0	0	3	2	0	0	4	6	0	0	0	0	0	5	0	1	21	0
4:30 PM	0	0	1	2	0	0	3	4	0	0	0	0	0	3	0	1	14	0
4:45 PM	0	0	1	1	0	0	3	6	0	0	0	0	0	3	0	2	16	79
5:00 PM	0	0	5	2	0	0	1	3	0	0	0	0	0	6	0	1	18	69
5:15 PM	0	0	1	1	0	0	4	3	0	0	0	0	0	1	0	2	12	60
5:30 PM	0	0	1	0	0	0	5	0	0	0	0	0	0	2	0	0	8	54
5:45 PM	0	0	3	1	0	0	0	3	0	0	0	0	0	7	0	0	14	52
Count Total	0	0	17	10	0	0	29	31	0	0	0	0	0	35	0	9	131	0
Peak Hour	0	0	7	6	0	0	19	22	0	0	0	0	0	19	0	6	79	0

Two-Hour Count Summaries - Bikes																
Interval Start	SR 531			SR 531			I-5 SB Ramps			I-5 SB Ramps			15-min Total	Rolling One Hour		
	Eastbound			Westbound			Northbound			Southbound						
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT				
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	1	0		
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
5:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	1		
Count Total	0	1	0	0	0	0	0	0	0	0	0	1	2	0		
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	1	1	0		

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	SR 531				SR 531				I-5 NB Ramps				I-5 NB Ramps				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	1	6	0	0	0	12	4	0	3	0	9	0	0	0	0	35	0
4:15 PM	0	4	10	0	0	0	7	3	0	4	0	7	0	0	0	0	35	0
4:30 PM	0	2	7	0	0	0	7	3	0	2	0	8	0	0	0	0	29	0
4:45 PM	0	3	4	0	0	0	2	3	0	2	0	11	0	0	0	0	25	124
5:00 PM	0	0	5	0	0	0	4	2	0	2	0	12	0	0	0	0	25	114
5:15 PM	0	0	3	0	0	0	5	1	0	0	0	12	0	0	0	0	21	100
5:30 PM	0	0	5	0	0	0	4	1	0	3	0	10	0	0	0	0	23	94
5:45 PM	0	2	9	0	0	0	4	2	0	2	0	15	0	0	0	0	34	103
Count Total	0	12	49	0	0	0	45	19	0	18	0	84	0	0	0	0	227	0
Peak Hour	0	10	27	0	0	0	28	13	0	11	0	35	0	0	0	0	124	0

Two-Hour Count Summaries - Bikes																
Interval Start	SR 531			SR 531			I-5 NB Ramps			I-5 NB Ramps			15-min Total	Rolling One Hour		
	Eastbound			Westbound			Northbound			Southbound						
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT				
4:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	0		
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
5:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	1		
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
Count Total	0	2	0	0	0	0	0	0	0	0	0	0	2	0		
Peak Hour	0	1	0	0	0	0	0	0	0	0	0	0	1	0		

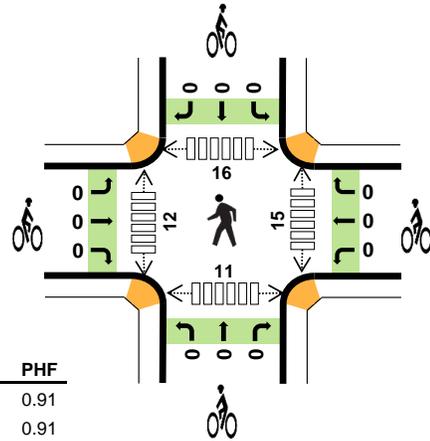
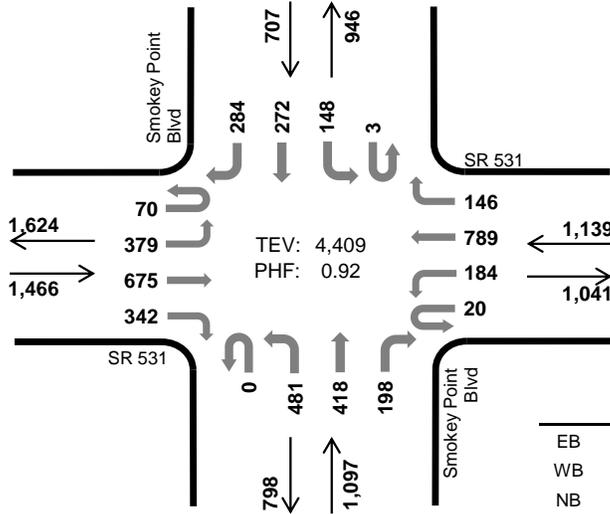
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Smokey Point Blvd SR 531



Peak Hour

Date: 11/01/2022
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:00 PM to 5:00 PM



	HV %:	PHF
EB	4.4%	0.91
WB	1.5%	0.91
NB	2.6%	0.87
SB	2.4%	0.96
TOTAL	2.9%	0.92

Two-Hour Count Summaries

Interval Start	SR 531 Eastbound				SR 531 Westbound				Smokey Point Blvd Northbound				Smokey Point Blvd Southbound				15-min Total	Rolling One Hour	
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
4:00 PM	16	100	194	92	5	39	194	74	0	139	103	58	1	40	77	67	1,199	0	
4:15 PM	18	101	170	77	3	52	191	24	0	103	96	44	1	30	73	67	1,050	0	
4:30 PM	12	87	140	89	2	36	206	26	0	149	117	50	1	41	58	81	1,095	0	
4:45 PM	24	91	171	84	10	57	198	22	0	90	102	46	0	37	64	69	1,065	4,409	
5:00 PM	15	101	183	79	1	37	206	20	0	121	123	41	4	29	52	71	1,083	4,293	
5:15 PM	11	100	167	77	4	47	209	19	0	137	79	41	0	28	72	73	1,064	4,307	
5:30 PM	14	107	184	73	8	33	155	22	0	137	89	42	0	40	56	51	1,011	4,223	
5:45 PM	19	91	173	71	6	49	150	11	0	94	57	43	1	33	36	38	872	4,030	
Count Total	129	778	1,382	642	39	350	1,509	218	0	970	766	365	8	278	488	517	8,439	0	
Peak Hour	All	70	379	675	342	20	184	789	146	0	481	418	198	3	148	272	284	4,409	0
	HV	1	15	33	15	0	4	11	2	0	16	11	1	0	0	7	10	126	0
	HV%	1%	4%	5%	4%	0%	2%	1%	1%	-	3%	3%	1%	0%	0%	3%	4%	3%	0

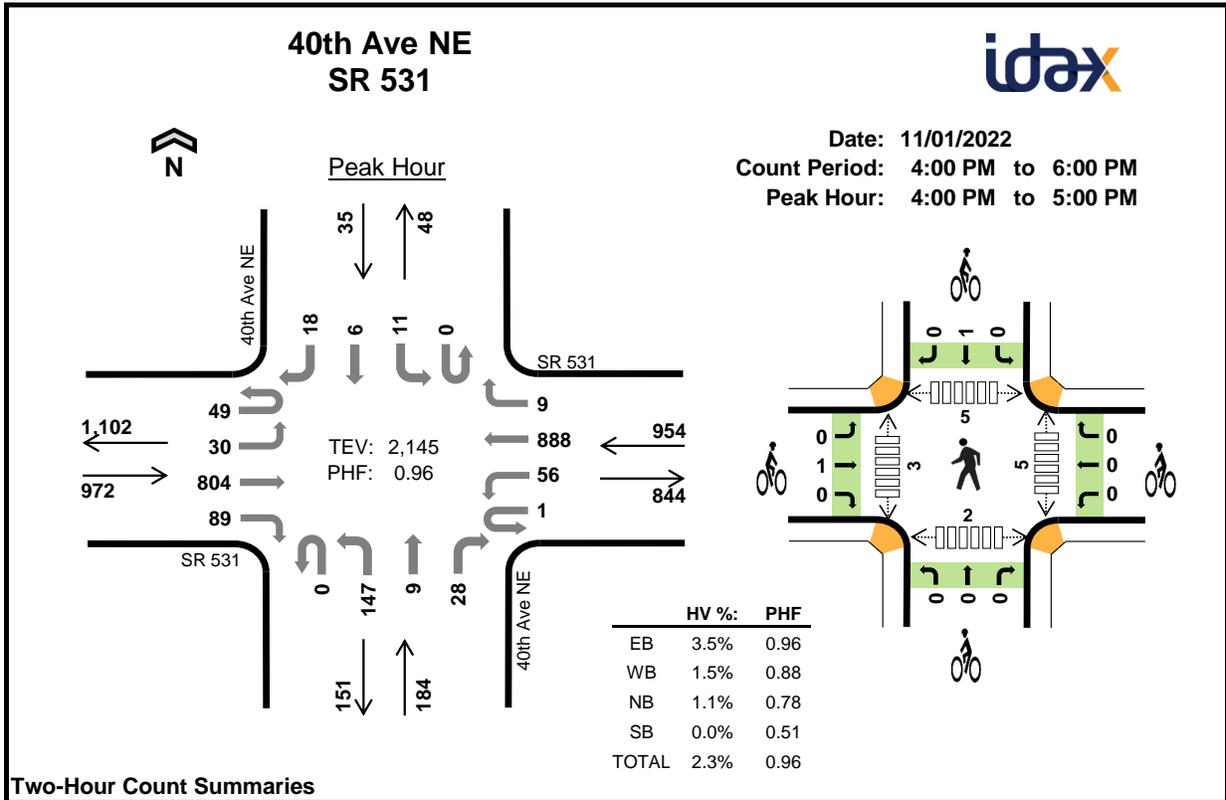
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	19	8	7	6	40	0	0	0	0	0	4	3	2	2	11
4:15 PM	14	3	8	5	30	0	0	0	0	0	5	4	9	3	21
4:30 PM	12	3	5	4	24	0	0	0	0	0	4	3	2	1	10
4:45 PM	19	3	8	2	32	0	0	0	0	0	2	2	3	5	12
5:00 PM	16	1	6	4	27	0	0	0	0	0	1	3	2	2	8
5:15 PM	15	3	4	6	28	0	0	0	0	0	2	1	9	1	13
5:30 PM	15	1	5	3	24	0	0	0	0	0	6	3	4	1	14
5:45 PM	21	2	4	3	30	0	0	0	0	0	3	1	3	1	8
Count Total	131	24	47	33	235	0	0	0	0	0	27	20	34	16	97
Peak Hour	64	17	28	17	126	0	0	0	0	0	15	12	16	11	54

Two-Hour Count Summaries - Heavy Vehicles														15-min Total	Rolling One Hour			
Interval Start	SR 531				SR 531				Smokey Point Blvd				Smokey Point Blvd					
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	5	8	6	0	1	5	2	0	5	2	0	0	0	1	5	40	0
4:15 PM	0	4	6	4	0	1	2	0	0	4	4	0	0	0	2	3	30	0
4:30 PM	1	0	10	1	0	0	3	0	0	3	2	0	0	0	2	2	24	0
4:45 PM	0	6	9	4	0	2	1	0	0	4	3	1	0	0	2	0	32	126
5:00 PM	0	3	10	3	0	0	1	0	0	3	3	0	0	0	2	2	27	113
5:15 PM	0	5	5	5	0	1	2	0	0	2	1	1	0	0	2	4	28	111
5:30 PM	0	2	8	5	0	0	1	0	0	2	2	1	0	0	2	1	24	111
5:45 PM	0	4	11	6	0	0	2	0	0	3	1	0	0	1	1	1	30	109
Count Total	1	29	67	34	0	5	17	2	0	26	18	3	0	1	14	18	235	0
Peak Hour	1	15	33	15	0	4	11	2	0	16	11	1	0	0	7	10	126	0

Two-Hour Count Summaries - Bikes														15-min Total	Rolling One Hour			
Interval Start	SR 531			SR 531			Smokey Point Blvd			Smokey Point Blvd								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Two-Hour Count Summaries

Interval Start	SR 531 Eastbound				SR 531 Westbound				40th Ave NE Northbound				40th Ave NE Southbound				15-min Total	Rolling One Hour	
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
4:00 PM	14	10	195	31	1	13	233	3	0	31	3	5	0	7	4	6	556	0	
4:15 PM	15	4	203	22	0	15	198	3	0	32	2	10	0	3	0	4	511	0	
4:30 PM	9	5	190	20	0	11	258	2	0	47	3	9	0	0	0	2	556	0	
4:45 PM	11	11	216	16	0	17	199	1	0	37	1	4	0	1	2	6	522	2,145	
5:00 PM	13	4	177	22	0	17	186	2	0	56	3	11	0	1	2	5	499	2,088	
5:15 PM	16	8	229	16	0	11	199	4	0	25	4	12	0	3	0	4	531	2,108	
5:30 PM	6	2	216	18	1	15	177	4	0	29	3	12	0	5	1	7	496	2,048	
5:45 PM	9	4	197	24	0	14	158	0	0	31	1	13	0	1	3	1	456	1,982	
Count Total	93	48	1,623	169	2	113	1,608	19	0	288	20	76	0	21	12	35	4,127	0	
Peak Hour	All	49	30	804	89	1	56	888	9	0	147	9	28	0	11	6	18	2,145	0
	HV	0	1	33	0	0	0	14	0	0	1	0	1	0	0	0	0	50	0
	HV%	0%	3%	4%	0%	0%	0%	2%	0%	-	1%	0%	4%	-	0%	0%	0%	2%	0

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

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	8	5	1	0	14	0	0	0	0	0	0	1	1	0	2
4:15 PM	6	4	0	0	10	1	0	0	0	1	3	0	1	2	6
4:30 PM	10	3	0	0	13	0	0	0	1	1	1	1	2	0	4
4:45 PM	10	2	1	0	13	0	0	0	0	0	1	1	1	0	3
5:00 PM	9	2	0	0	11	1	0	0	0	1	1	1	4	0	6
5:15 PM	6	2	0	0	8	0	0	0	0	0	0	0	2	2	4
5:30 PM	8	2	1	1	12	0	0	0	0	0	0	2	1	1	4
5:45 PM	12	2	0	0	14	0	0	0	0	0	0	1	0	0	1
Count Total	69	22	3	1	95	2	0	0	1	3	6	7	12	5	30
Peak Hour	34	14	2	0	50	1	0	0	1	2	5	3	5	2	15

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	SR 531				SR 531				40th Ave NE				40th Ave NE				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	8	0	0	0	5	0	0	1	0	0	0	0	0	0	14	0
4:15 PM	0	0	6	0	0	0	4	0	0	0	0	0	0	0	0	0	10	0
4:30 PM	0	0	10	0	0	0	3	0	0	0	0	0	0	0	0	0	13	0
4:45 PM	0	1	9	0	0	0	2	0	0	0	0	0	1	0	0	0	13	50
5:00 PM	0	0	8	1	0	1	1	0	0	0	0	0	0	0	0	0	11	47
5:15 PM	0	0	6	0	0	0	2	0	0	0	0	0	0	0	0	0	8	45
5:30 PM	0	0	8	0	0	1	1	0	0	0	1	0	0	0	0	1	12	44
5:45 PM	0	0	12	0	0	0	2	0	0	0	0	0	0	0	0	0	14	45
Count Total	0	1	67	1	0	2	20	0	0	1	1	1	0	0	0	1	95	0
Peak Hour	0	1	33	0	0	0	14	0	0	1	0	1	0	0	0	0	50	0

Two-Hour Count Summaries - Bikes																		
Interval Start	SR 531			SR 531			40th Ave NE			40th Ave NE			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Count Total	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	3	3	0
Peak Hour	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	2	2	0

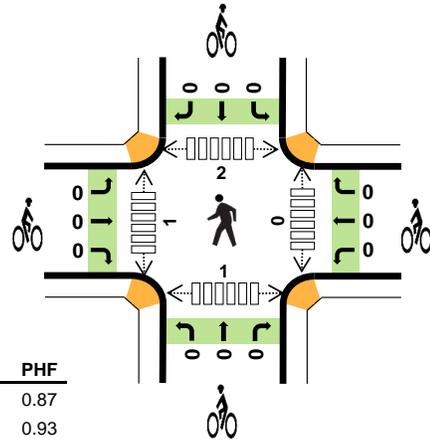
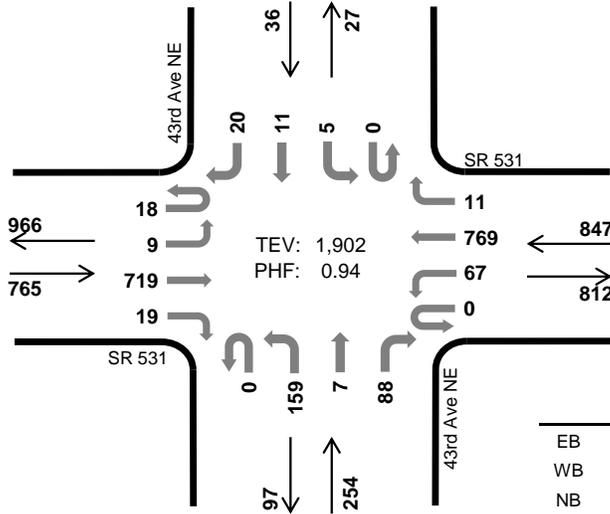
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

43rd Ave NE SR 531



Peak Hour

Date: 11/01/2022
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:00 PM to 5:00 PM



	HV %:	PHF
EB	4.4%	0.87
WB	1.4%	0.93
NB	0.4%	0.67
SB	0.0%	0.75
TOTAL	2.5%	0.94

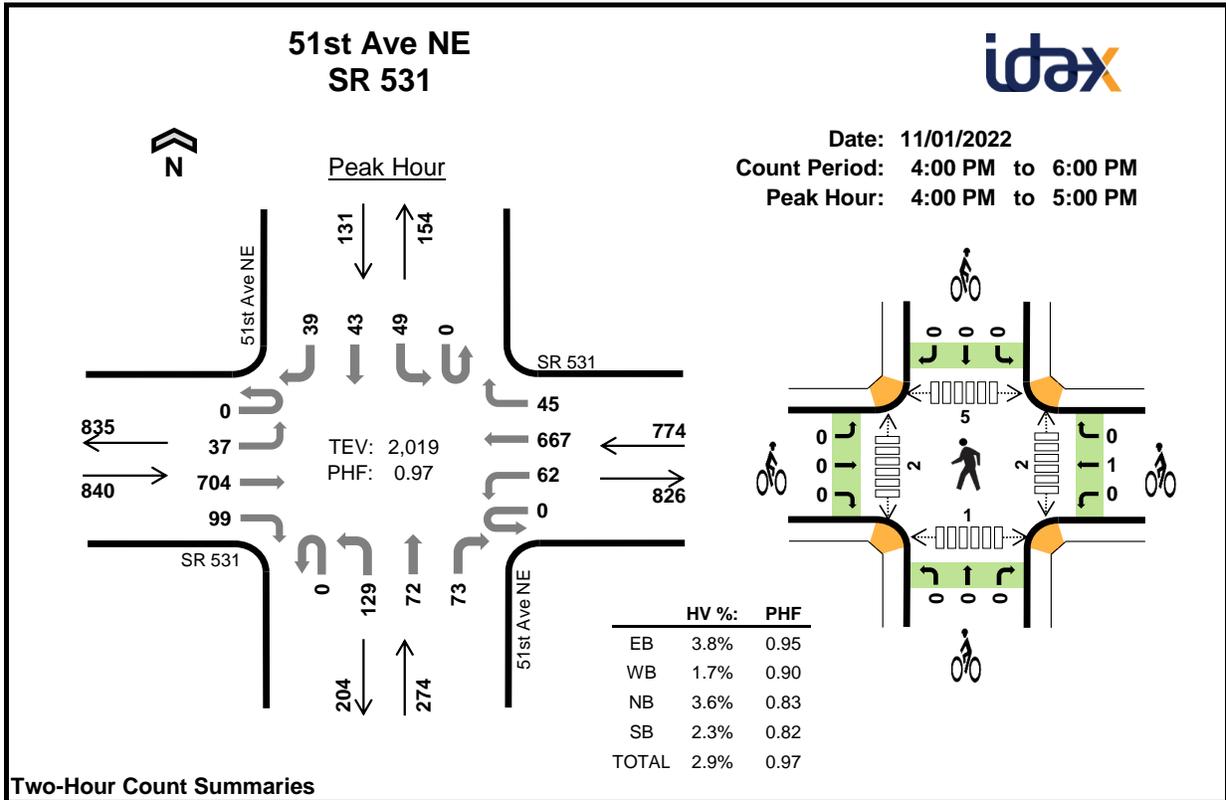
Two-Hour Count Summaries

Interval Start	SR 531 Eastbound				SR 531 Westbound				43rd Ave NE Northbound				43rd Ave NE Southbound				15-min Total	Rolling One Hour	
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
4:00 PM	3	0	168	8	0	16	200	3	0	37	1	29	0	2	4	6	477	0	
4:15 PM	6	3	203	7	0	18	188	3	0	24	1	17	0	1	2	3	476	0	
4:30 PM	4	4	162	2	0	13	211	3	0	68	2	25	0	2	2	6	504	0	
4:45 PM	5	2	186	2	0	20	170	2	0	30	3	17	0	0	3	5	445	1,902	
5:00 PM	2	2	186	6	0	20	190	2	0	18	2	29	0	4	5	3	469	1,894	
5:15 PM	8	4	194	2	0	19	185	0	0	29	4	29	0	1	2	3	480	1,898	
5:30 PM	6	1	188	2	0	17	161	2	0	20	7	14	0	1	3	2	424	1,818	
5:45 PM	7	3	188	8	1	23	129	2	0	31	1	24	0	2	2	2	423	1,796	
Count Total	41	19	1,475	37	1	146	1,434	17	0	257	21	184	0	13	23	30	3,698	0	
Peak Hour	All	18	9	719	19	0	67	769	11	0	159	7	88	0	5	11	20	1,902	0
	HV	1	0	33	0	0	0	12	0	0	1	0	0	0	0	0	0	47	0
	HV%	6%	0%	5%	0%	-	0%	2%	0%	-	1%	0%	0%	-	0%	0%	0%	2%	0

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

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	6	4	0	0	10	0	0	0	0	0	0	1	1	0	2
4:15 PM	9	5	0	0	14	0	0	0	0	0	0	0	1	1	2
4:30 PM	10	3	1	0	14	0	0	0	0	0	0	0	0	0	0
4:45 PM	9	0	0	0	9	0	0	0	0	0	0	0	0	0	0
5:00 PM	9	4	0	1	14	0	0	0	0	0	0	0	0	0	0
5:15 PM	6	4	0	0	10	0	0	0	0	0	0	0	1	1	2
5:30 PM	7	1	0	0	8	0	0	0	0	0	0	1	0	0	1
5:45 PM	13	2	0	0	15	0	0	0	0	0	0	0	0	0	0
Count Total	69	23	1	1	94	0	0	0	0	0	0	2	3	2	7
Peak Hour	34	12	1	0	47	0	0	0	0	0	0	1	2	1	4

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	SR 531				SR 531				43rd Ave NE				43rd Ave NE				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	6	0	0	0	4	0	0	0	0	0	0	0	0	10	0	
4:15 PM	0	0	9	0	0	0	5	0	0	0	0	0	0	0	0	14	0	
4:30 PM	0	0	10	0	0	0	3	0	0	1	0	0	0	0	0	14	0	
4:45 PM	1	0	8	0	0	0	0	0	0	0	0	0	0	0	9	47		
5:00 PM	0	0	9	0	0	0	4	0	0	0	0	0	0	1	14	51		
5:15 PM	0	0	6	0	0	1	3	0	0	0	0	0	0	0	10	47		
5:30 PM	0	0	7	0	0	0	1	0	0	0	0	0	0	0	8	41		
5:45 PM	0	0	11	2	0	0	2	0	0	0	0	0	0	0	15	47		
Count Total	1	0	66	2	0	1	22	0	0	1	0	0	0	1	94	0		
Peak Hour	1	0	33	0	0	0	12	0	0	1	0	0	0	0	47	0		
Two-Hour Count Summaries - Bikes																		
Interval Start	SR 531			SR 531			43rd Ave NE			43rd Ave NE			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Note: U-Turn volumes for bikes are included in Left-Turn, if any.</i>																		



Two-Hour Count Summaries

Interval Start	SR 531 Eastbound				SR 531 Westbound				51st Ave NE Northbound				51st Ave NE Southbound				15-min Total	Rolling One Hour	
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
4:00 PM	0	10	181	29	0	17	162	11	0	36	22	25	0	12	8	8	521	0	
4:15 PM	0	14	180	19	0	17	167	12	0	33	12	10	0	13	10	4	491	0	
4:30 PM	0	5	169	25	0	14	190	11	0	21	17	20	0	10	12	18	512	0	
4:45 PM	0	8	174	26	0	14	148	11	0	39	21	18	0	14	13	9	495	2,019	
5:00 PM	0	4	160	26	0	10	161	12	0	33	19	24	0	16	8	12	485	1,983	
5:15 PM	0	11	184	35	0	13	154	7	0	35	16	21	0	12	9	13	510	2,002	
5:30 PM	0	9	195	23	0	13	137	5	0	39	20	13	1	15	9	10	489	1,979	
5:45 PM	0	6	183	23	0	10	140	4	0	26	9	15	0	11	12	11	450	1,934	
Count Total	0	67	1,426	206	0	108	1,259	73	0	262	136	146	1	103	81	85	3,953	0	
Peak Hour	All	0	37	704	99	0	62	667	45	0	129	72	73	0	49	43	39	2,019	0
	HV	0	1	30	1	0	5	6	2	0	4	3	3	0	1	2	0	58	0
	HV%	-	3%	4%	1%	-	8%	1%	4%	-	3%	4%	4%	-	2%	5%	0%	3%	0

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

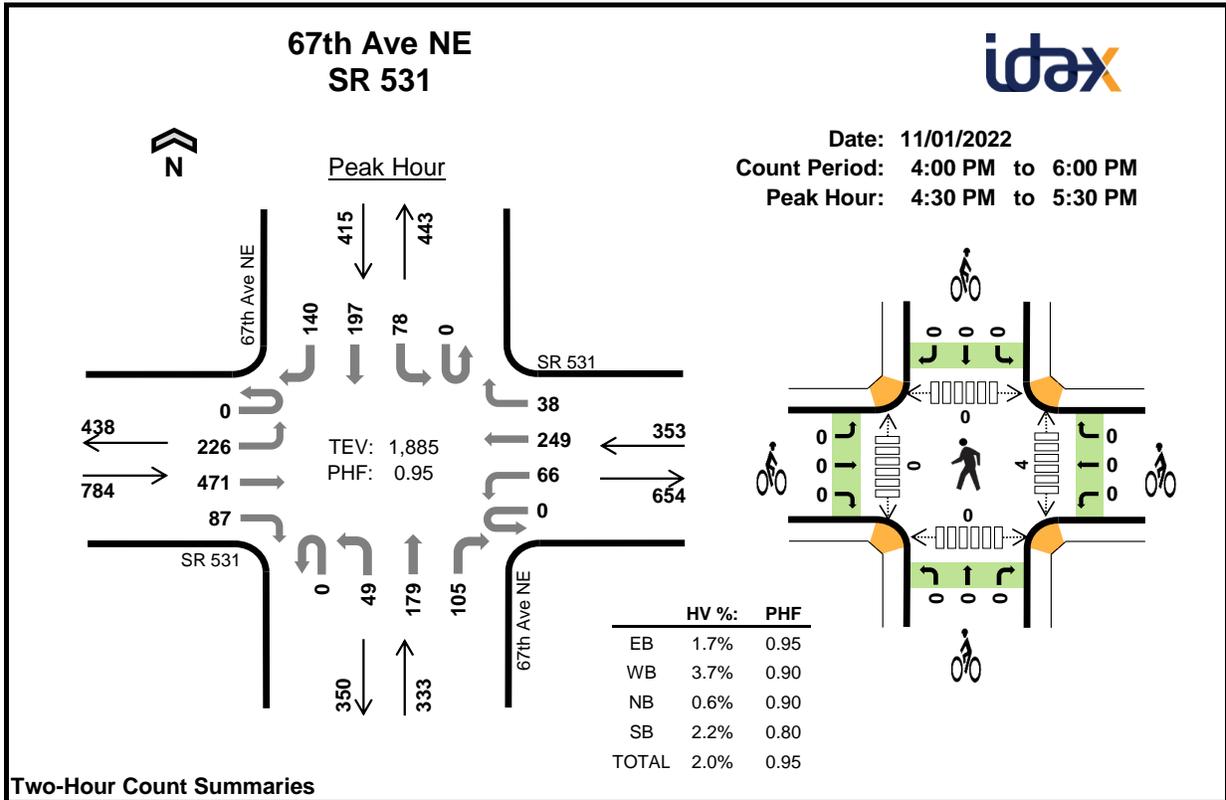
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	8	2	5	2	17	0	0	0	0	0	0	0	2	1	3
4:15 PM	6	5	2	0	13	0	0	0	0	0	0	1	1	0	2
4:30 PM	10	3	1	0	14	0	1	0	0	1	0	0	2	0	2
4:45 PM	8	3	2	1	14	0	0	0	0	0	2	1	0	0	3
5:00 PM	9	4	4	0	17	0	0	0	0	0	0	1	0	2	3
5:15 PM	6	5	0	1	12	0	0	0	0	0	0	0	0	0	0
5:30 PM	6	3	0	0	9	0	0	0	0	0	0	0	0	0	0
5:45 PM	11	3	1	1	16	0	0	0	0	0	0	0	0	1	1
Count Total	64	28	15	5	112	0	1	0	0	1	2	3	5	4	14
Peak Hour	32	13	10	3	58	0	1	0	0	1	2	2	5	1	10

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	SR 531				SR 531				51st Ave NE				51st Ave NE				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	1	7	0	0	0	1	1	0	3	1	1	0	1	1	0	17	0
4:15 PM	0	0	5	1	0	2	3	0	0	1	1	0	0	0	0	0	13	0
4:30 PM	0	0	10	0	0	1	2	0	0	0	0	1	0	0	0	0	14	0
4:45 PM	0	0	8	0	0	2	0	1	0	0	1	1	0	0	1	0	14	58
5:00 PM	0	0	9	0	0	0	3	1	0	1	2	1	0	0	0	0	17	58
5:15 PM	0	0	6	0	0	2	3	0	0	0	0	0	0	0	1	0	12	57
5:30 PM	0	0	6	0	0	1	2	0	0	0	0	0	0	0	0	0	9	52
5:45 PM	0	1	9	1	0	0	2	1	0	0	0	1	0	1	0	0	16	54
Count Total	0	2	60	2	0	8	16	4	0	5	5	5	0	2	3	0	112	0
Peak Hour	0	1	30	1	0	5	6	2	0	4	3	3	0	1	2	0	58	0

Two-Hour Count Summaries - Bikes																		
Interval Start	SR 531			SR 531			51st Ave NE			51st Ave NE			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
Peak Hour	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	SR 531				SR 531				59th Ave NE				59th Ave NE				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	3	3	0	0	0	1	0	0	0	0	0	0	0	0	4	11	0
4:15 PM	0	2	4	0	0	0	3	1	0	0	0	0	0	0	0	1	11	0
4:30 PM	0	6	3	1	0	0	1	1	0	1	0	0	0	0	0	0	13	0
4:45 PM	0	1	4	4	0	0	1	0	0	0	0	0	0	0	0	2	12	47
5:00 PM	0	3	3	1	0	2	1	1	0	0	0	0	0	0	0	1	12	48
5:15 PM	0	1	7	1	0	1	4	0	0	1	0	0	0	0	0	0	15	52
5:30 PM	0	2	4	0	0	0	1	0	0	0	0	0	0	0	0	0	7	46
5:45 PM	0	2	2	6	0	0	4	0	0	0	0	0	0	0	0	0	14	48
Count Total	0	20	30	13	0	3	16	3	0	2	0	0	0	0	0	8	95	0
Peak Hour	0	12	14	5	0	0	6	2	0	1	0	0	0	0	0	7	47	0
Two-Hour Count Summaries - Bikes																		
Interval Start	SR 531			SR 531			59th Ave NE			59th Ave NE			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Note: U-Turn volumes for bikes are included in Left-Turn, if any.</i>																		



Two-Hour Count Summaries

Interval Start	SR 531				SR 531				67th Ave NE				67th Ave NE				15-min Total	Rolling One Hour	
	Eastbound		Westbound		Northbound		Southbound		Northbound		Southbound		Southbound						
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
4:00 PM	0	74	100	23	0	16	55	7	0	11	53	11	0	20	44	44	458	0	
4:15 PM	0	50	132	21	0	7	61	9	0	8	37	13	0	12	43	31	424	0	
4:30 PM	0	53	102	30	0	22	53	13	0	16	53	23	0	27	60	43	495	0	
4:45 PM	0	51	127	18	0	17	63	6	0	14	48	25	0	20	51	29	469	1,846	
5:00 PM	0	60	115	22	0	16	55	10	0	8	36	30	0	18	47	41	458	1,846	
5:15 PM	0	62	127	17	0	11	78	9	0	11	42	27	0	13	39	27	463	1,885	
5:30 PM	0	58	115	18	0	13	71	6	0	9	39	26	0	11	43	32	441	1,831	
5:45 PM	0	44	125	22	0	12	76	4	0	13	49	18	0	10	38	33	444	1,806	
Count Total	0	452	943	171	0	114	512	64	0	90	357	173	0	131	365	280	3,652	0	
Peak Hour	All	0	226	471	87	0	66	249	38	0	49	179	105	0	78	197	140	1,885	0
	HV	0	7	5	1	0	3	7	3	0	1	0	1	0	0	4	5	37	0
	HV%	-	3%	1%	1%	-	5%	3%	8%	-	2%	0%	1%	-	0%	2%	4%	2%	0

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

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	4	4	1	1	10	0	0	0	0	0	2	0	0	0	2
4:15 PM	5	0	0	3	8	0	0	0	0	0	0	0	0	0	0
4:30 PM	2	3	0	3	8	0	0	0	0	0	1	0	0	0	1
4:45 PM	3	2	0	3	8	0	0	0	0	0	2	0	0	0	2
5:00 PM	3	5	0	1	9	0	0	0	0	0	0	0	0	0	0
5:15 PM	5	3	2	2	12	0	0	0	0	0	1	0	0	0	1
5:30 PM	1	1	1	2	5	0	0	0	0	0	1	0	0	0	1
5:45 PM	1	2	0	3	6	0	0	0	0	0	0	0	0	0	0
Count Total	24	20	4	18	66	0	0	0	0	0	7	0	0	0	7
Peak Hour	13	13	2	9	37	0	0	0	0	0	4	0	0	0	4

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	SR 531				SR 531				67th Ave NE				67th Ave NE				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	3	1	0	0	2	2	0	0	1	0	0	0	0	1	10	0
4:15 PM	0	2	1	2	0	0	0	0	0	0	0	0	0	0	0	3	8	0
4:30 PM	0	1	1	0	0	0	2	1	0	0	0	0	0	0	3	0	8	0
4:45 PM	0	0	3	0	0	1	1	0	0	0	0	0	0	0	0	3	8	34
5:00 PM	0	2	1	0	0	1	2	2	0	0	0	0	0	0	1	0	9	33
5:15 PM	0	4	0	1	0	1	2	0	0	1	0	1	0	0	0	2	12	37
5:30 PM	0	1	0	0	0	0	1	0	0	0	0	1	0	0	1	1	5	34
5:45 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	1	2	6	32
Count Total	0	10	10	4	0	3	12	5	0	1	1	2	0	0	6	12	66	0
Peak Hour	0	7	5	1	0	3	7	3	0	1	0	1	0	0	4	5	37	0

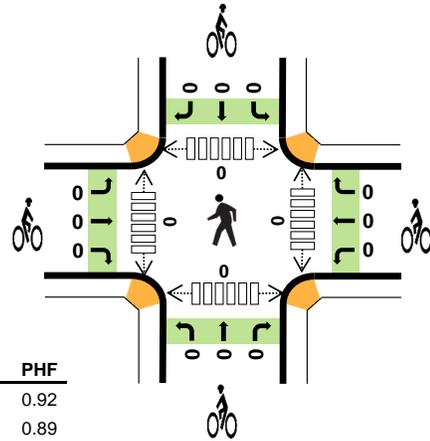
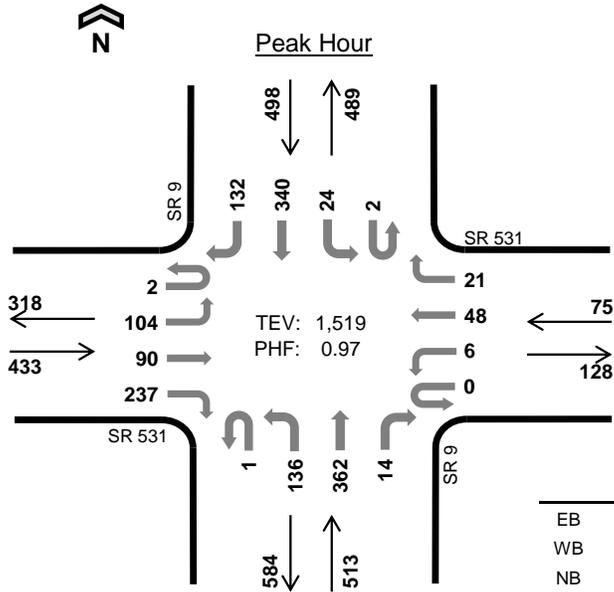
Two-Hour Count Summaries - Bikes																	
Interval Start	SR 531			SR 531			67th Ave NE			67th Ave NE			15-min Total	Rolling One Hour			
	Eastbound			Westbound			Northbound			Southbound							
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT					
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

SR 9 SR 531



Date: 11/01/2022
 Count Period: 4:00 PM to 6:00 PM
 Peak Hour: 4:30 PM to 5:30 PM



	HV %:	PHF
EB	1.2%	0.92
WB	2.7%	0.89
NB	5.3%	0.94
SB	2.0%	0.86
TOTAL	2.9%	0.97

Two-Hour Count Summaries

Interval Start	SR 531 Eastbound				SR 531 Westbound				SR 9 Northbound				SR 9 Southbound				15-min Total	Rolling One Hour	
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
4:00 PM	0	23	25	50	0	1	8	5	0	30	58	1	1	4	74	30	310	0	
4:15 PM	0	29	25	44	0	0	12	3	0	34	78	4	0	11	91	17	348	0	
4:30 PM	0	23	23	72	0	1	15	4	0	33	96	2	0	5	87	31	392	0	
4:45 PM	1	26	21	50	0	2	8	5	0	38	96	2	0	5	113	26	393	1,443	
5:00 PM	0	25	26	65	0	2	12	5	0	25	82	7	2	6	70	36	363	1,496	
5:15 PM	1	30	20	50	0	1	13	7	1	40	88	3	0	8	70	39	371	1,519	
5:30 PM	2	23	29	45	0	3	9	8	0	30	80	3	0	6	88	46	372	1,499	
5:45 PM	0	27	22	54	0	1	18	5	0	24	62	2	1	8	56	46	326	1,432	
Count Total	4	206	191	430	0	11	95	42	1	254	640	24	4	53	649	271	2,875	0	
Peak Hour	All	2	104	90	237	0	6	48	21	1	136	362	14	2	24	340	132	1,519	0
	HV	0	1	1	3	0	0	1	1	0	10	17	0	0	0	9	1	44	0
	HV%	0%	1%	1%	1%	-	0%	2%	5%	0%	7%	5%	0%	0%	0%	3%	1%	3%	0

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

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	4	0	4	7	15	0	0	0	0	0	0	0	0	0	0
4:15 PM	1	0	4	3	8	0	0	0	0	0	0	0	0	0	0
4:30 PM	1	0	5	1	7	0	0	0	0	0	0	0	0	0	0
4:45 PM	1	0	6	2	9	0	0	0	0	0	0	0	0	0	0
5:00 PM	2	0	8	4	14	0	0	0	0	0	0	0	0	0	0
5:15 PM	1	2	8	3	14	0	0	0	0	0	0	0	0	0	0
5:30 PM	2	0	1	4	7	0	0	0	0	0	0	0	0	0	0
5:45 PM	3	0	1	2	6	0	0	0	0	0	0	0	0	0	0
Count Total	15	2	37	26	80	0	0	0	0	0	0	0	0	0	0
Peak Hour	5	2	27	10	44	0	0	0	0	0	0	0	0	0	0

Two-Hour Count Summaries - Heavy Vehicles																			
Interval Start	SR 531				SR 531				SR 9				SR 9				15-min Total	Rolling One Hour	
	Eastbound				Westbound				Northbound				Southbound						
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
4:00 PM	0	1	1	2	0	0	0	0	0	1	3	0	0	0	5	2	15	0	
4:15 PM	0	0	0	1	0	0	0	0	0	0	1	3	0	0	1	2	0	8	0
4:30 PM	0	0	0	1	0	0	0	0	0	0	2	3	0	0	0	1	0	7	0
4:45 PM	0	0	0	1	0	0	0	0	0	0	2	4	0	0	0	2	0	9	39
5:00 PM	0	0	1	1	0	0	0	0	0	0	4	4	0	0	0	4	0	14	38
5:15 PM	0	1	0	0	0	0	1	1	0	0	2	6	0	0	0	2	1	14	44
5:30 PM	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	3	1	7	44
5:45 PM	0	1	1	1	0	0	0	0	0	0	1	0	0	0	1	1	0	6	41
Count Total	0	3	5	7	0	0	1	1	0	13	24	0	0	2	20	4	80	0	
Peak Hour	0	1	1	3	0	0	1	1	0	10	17	0	0	0	9	1	44	0	

Two-Hour Count Summaries - Bikes																		
Interval Start	SR 531			SR 531			SR 9			SR 9			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Highway Capacity Manual, 2000

Signalized intersection level of service (LOS) is defined in terms of the average total vehicle delay of all movements through an intersection. Vehicle delay is a method of quantifying several intangible factors, including driver discomfort, frustration, and lost travel time. Specifically, LOS criteria are stated in terms of average delay per vehicle during a specified time period (for example, the PM peak hour). Vehicle delay is a complex measure based on many variables, including signal phasing (i.e., progression of movements through the intersection), signal cycle length, and traffic volumes with respect to intersection capacity. Table 1 shows LOS criteria for signalized intersections, as described in the *Highway Capacity Manual* (Transportation Research Board, Special Report 209, 2000).

Table 1. Level of Service Criteria for Signalized Intersections

Level of Service	Average Control Delay (sec/veh)	General Description (Signalized Intersections)
A	≤10	Free Flow
B	>10 - 20	Stable Flow (slight delays)
C	>20 - 35	Stable flow (acceptable delays)
D	>35 - 55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55 - 80	Unstable flow (intolerable delay)
F	>80	Forced flow (jammed)

Source: *Highway Capacity Manual*, Transportation Research Board, Special Report 209, 2000.

Unsignalized intersection LOS criteria can be further reduced into two intersection types: all-way stop-controlled and two-way stop-controlled. All-way, stop-controlled intersection LOS is expressed in terms of the average vehicle delay of all of the movements, much like that of a signalized intersection. Two-way, stop-controlled intersection LOS is defined in terms of the average vehicle delay of an individual movement(s). This is because the performance of a two-way, stop-controlled intersection is more closely reflected in terms of its individual movements, rather than its performance overall. For this reason, LOS for a two-way, stop-controlled intersection is defined in terms of its individual movements. With this in mind, total average vehicle delay (i.e., average delay of all movements) for a two-way, stop-controlled intersection should be viewed with discretion. Table 2 shows LOS criteria for unsignalized intersections (both all-way and two-way, stop-controlled).

Table 2. Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (sec/veh)
A	0 - 10
B	>10 - 15
C	>15 - 25
D	>25 - 35
E	>35 - 50
F	>50

Source: *Highway Capacity Manual*, Transportation Research Board, Special Report 209, 2000.

Highway Capacity Manual 2010/6th Edition

Signalized intersection level of service (LOS) is defined in terms of a weighted average control delay for the entire intersection. Control delay quantifies the increase in travel time that a vehicle experiences due to the traffic signal control as well as provides a surrogate measure for driver discomfort and fuel consumption. Signalized intersection LOS is stated in terms of average control delay per vehicle (in seconds) during a specified time period (e.g., weekday PM peak hour). Control delay is a complex measure based on many variables, including signal phasing and coordination (i.e., progression of movements through the intersection and along the corridor), signal cycle length, and traffic volumes with respect to intersection capacity and resulting queues. Table 1 summarizes the LOS criteria for signalized intersections, as described in the *Highway Capacity Manual 2010* and 6th Edition (Transportation Research Board, 2010 and 2016, respectively).

Table 1. Level of Service Criteria for Signalized Intersections

Level of Service	Average Control Delay (seconds/vehicle)	General Description
A	≤10	Free Flow
B	>10 – 20	Stable Flow (slight delays)
C	>20 – 35	Stable flow (acceptable delays)
D	>35 – 55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55 – 80	Unstable flow (intolerable delay)
F ¹	>80	Forced flow (congested and queues fail to clear)

Source: *Highway Capacity Manual 2010 and 6th Edition*, Transportation Research Board, 2010 and 2016, respectively.

1. If the volume-to-capacity (v/c) ratio for a lane group exceeds 1.0 LOS F is assigned to the individual lane group. LOS for overall approach or intersection is determined solely by the control delay.

Unsignalized intersection LOS criteria can be further reduced into two intersection types: all-way stop and two-way stop control. All-way stop control intersection LOS is expressed in terms of the weighted average control delay of the overall intersection or by approach. Two-way stop-controlled intersection LOS is defined in terms of the average control delay for each minor-street movement (or shared movement) as well as major-street left-turns. This approach is because major-street through vehicles are assumed to experience zero delay, a weighted average of all movements results in very low overall average delay, and this calculated low delay could mask deficiencies of minor movements. Table 2 shows LOS criteria for unsignalized intersections.

Table 2. Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (seconds/vehicle)
A	0 – 10
B	>10 – 15
C	>15 – 25
D	>25 – 35
E	>35 – 50
F ¹	>50

Source: *Highway Capacity Manual 2010 and 6th Edition*, Transportation Research Board, 2010 and 2016, respectively.

1. If the volume-to-capacity (v/c) ratio exceeds 1.0, LOS F is assigned an individual lane group for all unsignalized intersections, or minor street approach at two-way stop-controlled intersections. Overall intersection LOS is determined solely by control delay.

HCM 6th Signalized Intersection Summary
 1: I-5 SB On Ramp & SR 531 (172nd St) & I-5 SB Ramps

Williams Industrial
 Existing PM Peak Hour - Arlington



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR
Lane Configurations		↑↑	↗		↑↑	↗	↘	↘	↗		
Traffic Volume (veh/h)	0	925	490	0	1190	545	255	5	245	0	0
Future Volume (veh/h)	0	925	490	0	1190	545	255	5	245	0	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	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	0	1687	1687	0	1575	1575	1826	1826	1826		
Adj Flow Rate, veh/h	0	934	0	0	1202	0	262	262	0		
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99		
Percent Heavy Veh, %	0	1	1	0	2	2	5	5	5		
Cap, veh/h	0	2581		0	2364		358	358			
Arrive On Green	0.00	0.81	0.00	0.00	1.00	0.00	0.10	0.10	0.00		
Sat Flow, veh/h	0	3289	1429	0	3071	1335	3478	3478	1547		
Grp Volume(v), veh/h	0	934	0	0	1202	0	262	262	0		
Grp Sat Flow(s),veh/h/ln	0	1602	1429	0	1496	1335	1739	1739	1547		
Q Serve(g_s), s	0.0	10.4	0.0	0.0	0.0	0.0	9.5	9.5	0.0		
Cycle Q Clear(g_c), s	0.0	10.4	0.0	0.0	0.0	0.0	9.5	9.5	0.0		
Prop In Lane	0.00		1.00	0.00		1.00	1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	0	2581		0	2364		358	358			
V/C Ratio(X)	0.00	0.36		0.00	0.51		0.73	0.73			
Avail Cap(c_a), veh/h	0	2581		0	2364		915	915			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00		
Upstream Filter(I)	0.00	1.00	0.00	0.00	0.51	0.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	0.0	3.5	0.0	0.0	0.0	0.0	56.6	56.6	0.0		
Incr Delay (d2), s/veh	0.0	0.4	0.0	0.0	0.4	0.0	4.9	4.9	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(50%),veh/ln	0.0	2.7	0.0	0.0	0.1	0.0	4.3	4.3	0.0		
Unsig. Movement Delay, s/veh											
LnGrp Delay(d),s/veh	0.0	3.9	0.0	0.0	0.4	0.0	61.4	61.4	0.0		
LnGrp LOS	A	A		A	A		E	E			
Approach Vol, veh/h		934			1202		262	262			
Approach Delay, s/veh		3.9			0.4		61.4	61.4			
Approach LOS		A			A		E	E			
Timer - Assigned Phs		2		4		6					
Phs Duration (G+Y+Rc), s		110.8		19.2		110.8					
Change Period (Y+Rc), s		* 6.1		* 5.8		6.1					
Max Green Setting (Gmax), s		* 84		* 34		83.9					
Max Q Clear Time (g_c+I1), s		12.4		11.5		2.0					
Green Ext Time (p_c), s		12.5		1.6		19.5					

Intersection Summary

HCM 6th Ctrl Delay	8.4
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
 2: I-5 NB Off Ramp/I-5 NB On Ramp & SR 531 (172nd St)

Williams Industrial
 Existing PM Peak Hour - Arlington



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑			↑↑↑	↗	↘	↗	↗			
Traffic Volume (veh/h)	345	860	0	0	1250	475	540	5	700	0	0	0
Future Volume (veh/h)	345	860	0	0	1250	475	540	5	700	0	0	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	1660	1660	0	0	1575	1575	1841	1841	1841			
Adj Flow Rate, veh/h	356	887	0	0	1289	0	561	0	0			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97			
Percent Heavy Veh, %	3	3	0	0	2	2	4	4	4			
Cap, veh/h	366	2215	0	0	1774		696	0				
Arrive On Green	0.46	1.00	0.00	0.00	0.41	0.00	0.20	0.00	0.00			
Sat Flow, veh/h	1581	3237	0	0	4442	1335	3506	0	1560			
Grp Volume(v), veh/h	356	887	0	0	1289	0	561	0	0			
Grp Sat Flow(s),veh/h/ln	1581	1577	0	0	1433	1335	1753	0	1560			
Q Serve(g_s), s	28.6	0.0	0.0	0.0	32.7	0.0	19.8	0.0	0.0			
Cycle Q Clear(g_c), s	28.6	0.0	0.0	0.0	32.7	0.0	19.8	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	366	2215	0	0	1774		696	0				
V/C Ratio(X)	0.97	0.40	0.00	0.00	0.73		0.81	0.00				
Avail Cap(c_a), veh/h	406	2215	0	0	1774		949	0				
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.92	0.92	0.00	0.00	1.00	0.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	34.6	0.0	0.0	0.0	32.0	0.0	49.7	0.0	0.0			
Incr Delay (d2), s/veh	34.6	0.5	0.0	0.0	2.6	0.0	4.9	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	12.0	0.2	0.0	0.0	11.5	0.0	8.9	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.1	0.5	0.0	0.0	34.7	0.0	54.6	0.0	0.0			
LnGrp LOS	E	A	A	A	C		D	A				
Approach Vol, veh/h		1243			1289			561				
Approach Delay, s/veh		20.2			34.7			54.6				
Approach LOS		C			C			D				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		98.4			36.7	61.7		31.6				
Change Period (Y+Rc), s		6.1			5.6	* 6.1		5.8				
Max Green Setting (Gmax), s		82.9			34.4	* 43		35.2				
Max Q Clear Time (g_c+I1), s		2.0			30.6	34.7		21.8				
Green Ext Time (p_c), s		11.7			0.4	6.1		3.1				

Intersection Summary

HCM 6th Ctrl Delay	32.5
HCM 6th LOS	C

Notes

- User approved volume balancing among the lanes for turning movement.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
- Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

HCM Signalized Intersection Capacity Analysis

3: Smokey Pt Blvd & SR 531 (172nd St)

Williams Industrial
Existing PM Peak Hour - Arlington



Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations		↖	↗	↘		↖	↗	↘	↖	↗	↘	
Traffic Volume (vph)	70	390	695	350	20	190	815	150	495	430	205	5
Future Volume (vph)	70	390	695	350	20	190	815	150	495	430	205	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	6.5	6.5		8.5	9.5	9.5	5.5	5.9	5.9	
Lane Util. Factor		1.00	0.95	1.00		1.00	0.91	1.00	0.97	0.95	1.00	
Frbp, ped/bikes		1.00	1.00	0.97		1.00	1.00	0.97	1.00	1.00	0.97	
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)		1736	3471	1514		1770	5085	1537	3400	3505	1524	
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)		1736	3471	1514		1770	5085	1537	3400	3505	1524	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	76	424	755	380	22	207	886	163	538	467	223	5
RTOR Reduction (vph)	0	0	0	212	0	0	0	127	0	0	157	0
Lane Group Flow (vph)	0	500	755	168	0	229	886	36	538	467	66	0
Confl. Peds. (#/hr)		16		11		11		16	12		15	
Heavy Vehicles (%)	4%	4%	4%	4%	2%	2%	2%	2%	3%	3%	3%	2%
Turn Type	Prot	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot
Protected Phases	5 15	5 15	2		1	1	6		3	8		7
Permitted Phases				2				6			8	
Actuated Green, G (s)		37.0	53.7	53.7		23.3	35.5	35.5	19.8	29.2	29.2	
Effective Green, g (s)		37.0	53.7	53.7		20.3	32.5	32.5	19.8	29.2	29.2	
Actuated g/C Ratio		0.25	0.37	0.37		0.14	0.22	0.22	0.14	0.20	0.20	
Clearance Time (s)			6.5	6.5		5.5	6.5	6.5	5.5	5.9	5.9	
Vehicle Extension (s)			3.0	3.0		2.5	3.0	3.0	2.5	3.0	3.0	
Lane Grp Cap (vph)		439	1274	556		245	1130	341	460	700	304	
v/s Ratio Prot		c0.29	0.22			0.13	c0.17		c0.16	c0.13		
v/s Ratio Perm				0.11				0.02			0.04	
v/c Ratio		1.14	0.59	0.30		0.93	0.78	0.11	1.17	0.67	0.22	
Uniform Delay, d1		54.6	37.4	32.9		62.3	53.5	45.3	63.2	54.0	48.9	
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		86.8	0.7	0.3		39.7	3.6	0.1	97.4	2.4	0.4	
Delay (s)		141.4	38.1	33.2		102.0	57.2	45.4	160.6	56.4	49.3	
Level of Service		F	D	C		F	E	D	F	E	D	
Approach Delay (s)			68.6				63.7			100.8		
Approach LOS			E				E			F		
Intersection Summary												
HCM 2000 Control Delay			72.7		HCM 2000 Level of Service					E		
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			146.2		Sum of lost time (s)					30.9		
Intersection Capacity Utilization			108.4%		ICU Level of Service					G		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 3: Smokey Pt Blvd & SR 531 (172nd St)

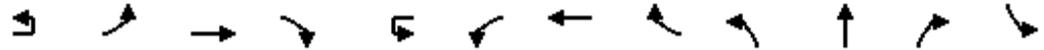
Williams Industrial
 Existing PM Peak Hour - Arlington



Movement	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↘
Traffic Volume (vph)	150	280	295
Future Volume (vph)	150	280	295
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.5	5.9	5.9
Lane Util. Factor	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1543
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1543
Peak-hour factor, PHF	0.92	0.92	0.92
Adj. Flow (vph)	163	304	321
RTOR Reduction (vph)	0	0	0
Lane Group Flow (vph)	168	304	321
Confl. Peds. (#/hr)	15		12
Heavy Vehicles (%)	2%	2%	2%
Turn Type	Prot	NA	custom
Protected Phases	7	4	
Permitted Phases			4 6
Actuated Green, G (s)	16.6	26.0	61.5
Effective Green, g (s)	16.6	26.0	61.5
Actuated g/C Ratio	0.11	0.18	0.42
Clearance Time (s)	5.5	5.9	
Vehicle Extension (s)	2.5	3.0	
Lane Grp Cap (vph)	200	629	649
v/s Ratio Prot	0.09	0.09	
v/s Ratio Perm			0.21
v/c Ratio	0.84	0.48	0.49
Uniform Delay, d1	63.5	54.1	31.0
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	25.0	0.6	0.6
Delay (s)	88.5	54.6	31.6
Level of Service	F	D	C
Approach Delay (s)		52.5	
Approach LOS		D	
Intersection Summary			

HCM Signalized Intersection Capacity Analysis
4: 40th Ave NE & SR 531 (172nd St)

Williams Industrial
Existing PM Peak Hour - Arlington



Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations		↔	↕			↔	↕		↔	↕	↔	↕
Traffic Volume (vph)	50	30	830	90	5	60	915	10	150	10	30	10
Future Volume (vph)	50	30	830	90	5	60	915	10	150	10	30	10
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		4.5	4.0			4.5	4.0		4.5	4.0	4.0	4.5
Lane Util. Factor		1.00	0.95			1.00	0.95		1.00	1.00	1.00	1.00
Frbp, ped/bikes		1.00	1.00			1.00	1.00		1.00	1.00	0.97	1.00
Flpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	1.00	1.00	0.99
Frt		1.00	0.99			1.00	1.00		1.00	1.00	0.85	1.00
Flt Protected		0.95	1.00			0.95	1.00		0.95	1.00	1.00	0.95
Satd. Flow (prot)		1553	3049			1583	3160		1593	1683	1395	1592
Flt Permitted		0.13	1.00			0.15	1.00		0.48	1.00	1.00	0.75
Satd. Flow (perm)		214	3049			242	3160		802	1683	1395	1259
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)	52	31	865	94	5	62	953	10	156	10	31	10
RTOR Reduction (vph)	0	0	7	0	0	0	1	0	0	0	19	0
Lane Group Flow (vph)	0	83	952	0	0	68	962	0	156	10	12	10
Confl. Peds. (#/hr)		8		5		7		10	5		7	10
Confl. Bikes (#/hr)				1								
Heavy Vehicles (%)	4%	4%	4%	4%	2%	2%	2%	2%	1%	1%	1%	0%
Turn Type	custom	pm+pt	NA		custom	pm+pt	NA		pm+pt	NA	Perm	pm+pt
Protected Phases		7	4			3	8		5	2		1
Permitted Phases	7	4			3	8		2			2	6
Actuated Green, G (s)		46.6	39.6			44.8	38.7		44.9	39.4	39.4	9.2
Effective Green, g (s)		46.6	39.6			44.8	38.7		44.9	39.4	39.4	9.2
Actuated g/C Ratio		0.45	0.38			0.43	0.38		0.44	0.38	0.38	0.09
Clearance Time (s)		4.5	4.0			4.5	4.0		4.5	4.0	4.0	4.5
Vehicle Extension (s)		3.0	3.0			3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		187	1171			184	1186		596	643	533	115
v/s Ratio Prot		c0.03	c0.31			0.02	0.30		c0.08	0.01		0.00
v/s Ratio Perm		0.17				0.14			c0.03		0.01	0.01
v/c Ratio		0.44	0.81			0.37	0.81		0.26	0.02	0.02	0.09
Uniform Delay, d1		19.2	28.4			19.4	28.9		18.3	19.8	19.8	43.0
Progression Factor		1.00	1.00			1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		1.7	4.4			1.3	4.3		0.2	0.0	0.1	0.3
Delay (s)		20.9	32.9			20.7	33.2		18.6	19.8	19.9	43.4
Level of Service		C	C			C	C		B	B	B	D
Approach Delay (s)			31.9				32.4			18.8		
Approach LOS			C				C			B		
Intersection Summary												
HCM 2000 Control Delay			31.2			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			103.1			Sum of lost time (s)			17.0			
Intersection Capacity Utilization			64.7%			ICU Level of Service			C			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
 4: 40th Ave NE & SR 531 (172nd St)

Williams Industrial
 Existing PM Peak Hour - Arlington



Movement	SBT	SBR
Lane Configurations	P	
Traffic Volume (vph)	5	20
Future Volume (vph)	5	20
Ideal Flow (vphpl)	1700	1700
Total Lost time (s)	4.0	
Lane Util. Factor	1.00	
Frpb, ped/bikes	0.98	
Flpb, ped/bikes	1.00	
Frt	0.88	
Flt Protected	1.00	
Satd. Flow (prot)	1458	
Flt Permitted	1.00	
Satd. Flow (perm)	1458	
Peak-hour factor, PHF	0.96	0.96
Adj. Flow (vph)	5	21
RTOR Reduction (vph)	19	0
Lane Group Flow (vph)	7	0
Confl. Peds. (#/hr)	8	
Confl. Bikes (#/hr)	1	
Heavy Vehicles (%)	0%	0%
Turn Type	NA	
Protected Phases	6	
Permitted Phases		
Actuated Green, G (s)	8.2	
Effective Green, g (s)	8.2	
Actuated g/C Ratio	0.08	
Clearance Time (s)	4.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	115	
v/s Ratio Prot	0.00	
v/s Ratio Perm		
v/c Ratio	0.06	
Uniform Delay, d1	43.9	
Progression Factor	1.00	
Incremental Delay, d2	0.2	
Delay (s)	44.1	
Level of Service	D	
Approach Delay (s)	43.9	
Approach LOS	D	
Intersection Summary		

MOVEMENT SUMMARY

Site: 5 [5. 172nd Street NE/43rd Avenue NE (Site Folder: Existing 2023)]

Existing PM Peak Hour
 Site Category: (None)
 Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: 43rd Ave NE														
3	L2	165	0.0	176	0.0	0.191	11.9	LOS B	0.8	19.5	0.55	0.81	0.55	33.9
8	T1	5	0.0	5	0.0	0.191	6.0	LOS A	0.8	19.5	0.55	0.81	0.55	33.7
18	R2	90	0.0	96	0.0	0.131	6.8	LOS A	0.5	12.3	0.56	0.74	0.56	35.3
Approach		260	0.0	277	0.0	0.191	10.0	LOS B	0.8	19.5	0.56	0.79	0.56	34.4
East: 172nd St NE														
1	L2	70	1.0	74	1.0	0.381	11.2	LOS B	2.7	68.6	0.52	0.55	0.52	35.9
6	T1	790	1.0	840	1.0	0.381	5.3	LOS A	2.8	70.2	0.51	0.52	0.51	36.1
16	R2	10	1.0	11	1.0	0.381	5.2	LOS A	2.8	70.2	0.50	0.50	0.50	35.0
Approach		870	1.0	926	1.0	0.381	5.8	LOS A	2.8	70.2	0.51	0.52	0.51	36.1
North: 43rd Ave NE														
7	L2	5	0.0	5	0.0	0.052	12.2	LOS B	0.2	4.6	0.56	0.70	0.56	36.2
4	T1	10	0.0	11	0.0	0.052	6.3	LOS A	0.2	4.6	0.56	0.70	0.56	36.0
14	R2	20	0.0	21	0.0	0.052	6.3	LOS A	0.2	4.6	0.56	0.70	0.56	35.0
Approach		35	0.0	37	0.0	0.052	7.2	LOS A	0.2	4.6	0.56	0.70	0.56	35.4
West: 172nd St NE														
5u	U	20	4.0	21	4.0	0.320	12.9	LOS B	2.2	57.2	0.33	0.44	0.33	37.6
5	L2	10	4.0	11	4.0	0.320	10.4	LOS B	2.2	57.2	0.33	0.44	0.33	36.6
2	T1	740	4.0	787	4.0	0.320	4.5	LOS A	2.2	57.8	0.32	0.43	0.32	36.8
12	R2	20	4.0	21	4.0	0.320	4.6	LOS A	2.2	57.8	0.32	0.41	0.32	35.6
Approach		790	4.0	840	4.0	0.320	4.8	LOS A	2.2	57.8	0.32	0.43	0.32	36.8
All Vehicles		1955	2.1	2080	2.1	0.381	6.0	LOS A	2.8	70.2	0.44	0.52	0.44	36.1

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

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

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

HCM 6th Signalized Intersection Summary
6: 51st Ave NE & SR 531

Williams Industrial
Existing PM Peak Hour - Arlington

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	725	100	65	685	45	135	75	75	50	45	40
Future Volume (veh/h)	40	725	100	65	685	45	135	75	75	50	45	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1453	1453	1453	1575	1575	1575	1647	1647	1647	1673	1673	1673
Adj Flow Rate, veh/h	41	747	103	67	706	46	139	77	77	52	46	41
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	4	4	4	2	2	2	4	4	4	2	2	2
Cap, veh/h	282	838	116	172	978	64	203	284	240	207	140	125
Arrive On Green	0.01	0.67	0.67	0.01	0.67	0.69	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	1384	1249	172	1500	1460	95	1284	1647	1391	1230	813	725
Grp Volume(v), veh/h	41	0	850	67	0	752	139	77	77	52	0	87
Grp Sat Flow(s),veh/h/ln	1384	0	1421	1500	0	1555	1284	1647	1391	1230	0	1538
Q Serve(g_s), s	1.2	0.0	78.3	1.7	0.0	49.4	17.0	6.5	7.8	6.1	0.0	7.9
Cycle Q Clear(g_c), s	1.2	0.0	78.3	1.7	0.0	49.4	25.0	6.5	7.8	12.6	0.0	7.9
Prop In Lane	1.00		0.12	1.00		0.06	1.00		1.00	1.00		0.47
Lane Grp Cap(c), veh/h	282	0	954	172	0	1041	203	284	240	207	0	265
V/C Ratio(X)	0.15	0.00	0.89	0.39	0.00	0.72	0.69	0.27	0.32	0.25	0.00	0.33
Avail Cap(c_a), veh/h	416	0	954	320	0	1041	254	350	296	250	0	318
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	0.87	0.00	0.87	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.6	0.0	21.5	37.5	0.0	16.8	69.0	57.5	58.0	63.0	0.0	58.1
Incr Delay (d2), s/veh	0.2	0.0	12.3	0.9	0.0	3.8	5.4	0.5	0.8	0.6	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	28.1	1.7	0.0	18.2	5.9	2.7	2.8	2.0	0.0	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.7	0.0	33.9	38.4	0.0	20.6	74.4	58.0	58.8	63.6	0.0	58.8
LnGrp LOS	C	A	C	D	A	C	E	E	E	E	A	E
Approach Vol, veh/h		891			819			293				139
Approach Delay, s/veh		33.3			22.1			66.0				60.6
Approach LOS		C			C			E				E
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.2	116.3		33.5	10.5	116.0		33.5				
Change Period (Y+Rc), s	5.5	5.9		* 5.9	6.3	* 5.9		5.9				
Max Green Setting (Gmax), s	20.5	89.1		* 34	19.7	* 90		33.1				
Max Q Clear Time (g_c+I1), s	4.7	81.3		27.0	4.2	51.4		14.6				
Green Ext Time (p_c), s	0.1	4.6		0.6	0.0	9.7		0.5				

Intersection Summary

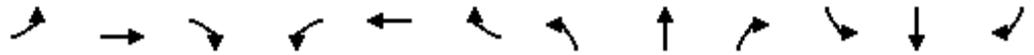
HCM 6th Ctrl Delay	35.2
HCM 6th LOS	D

Notes

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

HCM 6th Signalized Intersection Summary
 7: 59th Ave NE & SR 531/SR 531 (172nd St)

Williams Industrial
 Existing PM Peak Hour - Arlington



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	740	10	5	460	20	30	0	10	45	5	325
Future Volume (veh/h)	120	740	10	5	460	20	30	0	10	45	5	325
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	1550	1550	1550	1624	1624	1624	1673	1673	1673	1673	1673	1673
Adj Flow Rate, veh/h	122	755	10	5	469	20	31	0	10	46	5	332
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	4	4	4	2	2	2	2	2	2	2	2	2
Cap, veh/h	131	903	12	6	783	33	38	0	312	57	5	325
Arrive On Green	0.18	1.00	1.00	0.00	0.51	0.51	0.02	0.00	0.22	0.04	0.23	0.23
Sat Flow, veh/h	1476	1526	20	1547	1546	66	1594	0	1418	1594	21	1400
Grp Volume(v), veh/h	122	0	765	5	0	489	31	0	10	46	0	337
Grp Sat Flow(s),veh/h/ln	1476	0	1546	1547	0	1612	1594	0	1418	1594	0	1421
Q Serve(g_s), s	13.0	0.0	0.0	0.5	0.0	34.4	3.1	0.0	0.9	4.6	0.0	37.1
Cycle Q Clear(g_c), s	13.0	0.0	0.0	0.5	0.0	34.4	3.1	0.0	0.9	4.6	0.0	37.1
Prop In Lane	1.00		0.01	1.00		0.04	1.00		1.00	1.00		0.99
Lane Grp Cap(c), veh/h	131	0	915	6	0	817	38	0	312	57	0	330
V/C Ratio(X)	0.93	0.00	0.84	0.87	0.00	0.60	0.81	0.00	0.03	0.80	0.00	1.02
Avail Cap(c_a), veh/h	309	0	915	140	0	817	95	0	329	95	0	330
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.49	0.00	0.49	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	65.3	0.0	0.0	79.7	0.0	28.0	77.7	0.0	49.0	76.6	0.0	61.5
Incr Delay (d2), s/veh	13.4	0.0	4.6	134.3	0.0	3.2	32.3	0.0	0.1	22.2	0.0	55.4
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	4.9	0.0	1.2	0.4	0.0	13.9	1.6	0.0	0.3	2.2	0.0	18.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	78.7	0.0	4.6	214.0	0.0	31.2	110.1	0.0	49.1	98.8	0.0	116.9
LnGrp LOS	E	A	A	F	A	C	F	A	D	F	A	F
Approach Vol, veh/h		887			494			41				383
Approach Delay, s/veh		14.8			33.0			95.2				114.7
Approach LOS		B			C			F				F
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.1	101.6	9.3	43.0	20.7	86.9	11.2	41.1				
Change Period (Y+Rc), s	5.5	5.9	5.5	5.9	5.5	5.9	5.5	5.9				
Max Green Setting (Gmax), s	14.5	76.1	9.5	37.1	34.5	56.1	9.5	37.1				
Max Q Clear Time (g_c+I1), s	2.5	2.0	5.1	39.1	15.0	36.4	6.6	2.9				
Green Ext Time (p_c), s	0.0	10.4	0.0	0.0	0.3	4.1	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			42.8									
HCM 6th LOS			D									

HCM 6th Signalized Intersection Summary
8: 67th Ave NE & SR 531 (172nd St)

Williams Industrial
Existing PM Peak Hour - Arlington



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	235	485	90	70	255	40	50	185	110	80	205	145
Future Volume (veh/h)	235	485	90	70	255	40	50	185	110	80	205	145
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1673	1673	1647	1647	1647	1687	1687	1687	1673	1673	1673
Adj Flow Rate, veh/h	247	511	95	74	268	42	53	195	116	84	216	153
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, %	2	2	2	4	4	4	1	1	1	2	2	2
Cap, veh/h	611	950	805	402	716	112	101	206	123	144	206	146
Arrive On Green	0.09	0.57	0.57	0.03	0.51	0.51	0.04	0.21	0.21	0.05	0.23	0.23
Sat Flow, veh/h	1594	1673	1418	1569	1390	218	1606	987	587	1594	908	643
Grp Volume(v), veh/h	247	511	95	74	0	310	53	0	311	84	0	369
Grp Sat Flow(s),veh/h/ln	1594	1673	1418	1569	0	1608	1606	0	1574	1594	0	1551
Q Serve(g_s), s	11.3	30.4	5.0	3.6	0.0	18.5	4.1	0.0	31.2	6.6	0.0	36.3
Cycle Q Clear(g_c), s	11.3	30.4	5.0	3.6	0.0	18.5	4.1	0.0	31.2	6.6	0.0	36.3
Prop In Lane	1.00		1.00	1.00		0.14	1.00		0.37	1.00		0.41
Lane Grp Cap(c), veh/h	611	950	805	402	0	828	101	0	329	144	0	352
V/C Ratio(X)	0.40	0.54	0.12	0.18	0.00	0.37	0.52	0.00	0.95	0.58	0.00	1.05
Avail Cap(c_a), veh/h	771	950	805	642	0	828	246	0	336	259	0	352
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.8	21.5	16.0	18.7	0.0	23.3	50.8	0.0	62.4	49.3	0.0	61.9
Incr Delay (d2), s/veh	0.4	2.2	0.3	0.2	0.0	1.3	4.1	0.0	35.3	3.7	0.0	61.6
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	4.2	12.4	1.7	1.3	0.0	7.4	1.8	0.0	15.7	2.8	0.0	20.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.2	23.7	16.3	18.9	0.0	24.6	54.9	0.0	97.8	53.0	0.0	123.5
LnGrp LOS	B	C	B	B	A	C	D	A	F	D	A	F
Approach Vol, veh/h		853			384			364			453	
Approach Delay, s/veh		20.7			23.5			91.5			110.4	
Approach LOS		C			C			F			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.5	96.7	10.6	42.2	18.9	88.3	13.5	39.3				
Change Period (Y+Rc), s	5.0	5.9	5.0	5.9	5.0	5.9	5.0	5.9				
Max Green Setting (Gmax), s	30.0	54.1	20.0	34.1	30.0	54.1	20.0	34.1				
Max Q Clear Time (g_c+I1), s	5.6	32.4	6.1	38.3	13.3	20.5	8.6	33.2				
Green Ext Time (p_c), s	0.2	5.1	0.1	0.0	0.6	2.8	0.1	0.2				

Intersection Summary

HCM 6th Ctrl Delay	53.6
HCM 6th LOS	D

MOVEMENT SUMMARY

 Site: 9 [9. SR 9/SR 531 (Site Folder: Existing 2023)]

Existing PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: SR 9														
3u	U	5	5.0	5	5.0	0.393	13.3	LOS B	2.7	71.5	0.50	0.55	0.50	36.6
3	L2	140	5.0	144	5.0	0.393	10.9	LOS B	2.7	71.5	0.50	0.55	0.50	35.7
8	T1	375	5.0	387	5.0	0.393	4.7	LOS A	2.7	71.5	0.50	0.55	0.50	35.7
18	R2	15	5.0	15	5.0	0.017	5.4	LOS A	0.1	2.1	0.41	0.51	0.41	35.5
Approach		535	5.0	552	5.0	0.393	6.4	LOS A	2.7	71.5	0.49	0.55	0.49	35.7
East: SR 531														
1	L2	5	3.0	5	3.0	0.095	13.2	LOS B	0.6	14.2	0.68	0.67	0.68	35.7
6	T1	50	3.0	52	3.0	0.095	7.1	LOS A	0.6	14.2	0.68	0.67	0.68	35.6
16	R2	20	3.0	21	3.0	0.095	7.3	LOS A	0.6	14.2	0.68	0.67	0.68	34.6
Approach		75	3.0	77	3.0	0.095	7.6	LOS A	0.6	14.2	0.68	0.67	0.68	35.4
North: SR 9														
7u	U	5	2.0	5	2.0	0.272	12.9	LOS B	1.7	41.9	0.41	0.48	0.41	37.5
7	L2	25	2.0	26	2.0	0.272	10.5	LOS B	1.7	41.9	0.41	0.48	0.41	36.6
4	T1	350	2.0	361	2.0	0.272	4.4	LOS A	1.7	41.9	0.41	0.48	0.41	36.6
14	R2	135	2.0	139	2.0	0.130	5.2	LOS A	0.7	16.8	0.40	0.54	0.40	35.6
Approach		515	2.0	531	2.0	0.272	5.0	LOS A	1.7	41.9	0.40	0.50	0.40	36.3
West: SR 531														
5u	U	5	1.0	5	1.0	0.200	14.0	LOS B	1.1	29.0	0.55	0.67	0.55	35.8
5	L2	105	1.0	108	1.0	0.200	11.6	LOS B	1.1	29.0	0.55	0.67	0.55	35.0
2	T1	95	1.0	98	1.0	0.200	5.5	LOS A	1.1	29.0	0.55	0.67	0.55	34.9
12	R2	245	1.0	253	1.0	0.195	5.5	LOS A	1.2	29.9	0.53	0.60	0.53	35.3
Approach		450	1.0	464	1.0	0.200	7.0	LOS A	1.2	29.9	0.54	0.63	0.54	35.2
All Vehicles		1575	2.8	1624	2.8	0.393	6.2	LOS A	2.7	71.5	0.49	0.56	0.49	35.7

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

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

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

Intersection												
Int Delay, s/veh	4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Traffic Vol, veh/h	40	0	135	0	0	5	60	195	0	5	230	25
Future Vol, veh/h	40	0	135	0	0	5	60	195	0	5	230	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	220
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	0	0	0	2	2	2	3	3	3
Mvmt Flow	43	0	144	0	0	5	64	207	0	5	245	27

Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	593	590	245	676	617	207	272	0	0	207	0	0
Stage 1	255	255	-	335	335	-	-	-	-	-	-	-
Stage 2	338	335	-	341	282	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.1	6.5	6.2	4.12	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.5	4	3.3	2.218	-	-	2.227	-	-
Pot Cap-1 Maneuver	417	420	794	370	408	839	1291	-	-	1358	-	-
Stage 1	749	696	-	683	646	-	-	-	-	-	-	-
Stage 2	676	643	-	678	681	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	395	395	794	289	384	839	1291	-	-	1358	-	-
Mov Cap-2 Maneuver	395	395	-	289	384	-	-	-	-	-	-	-
Stage 1	707	693	-	645	610	-	-	-	-	-	-	-
Stage 2	634	607	-	553	678	-	-	-	-	-	-	-

Approach	EB		WB			NB			SB		
HCM Control Delay, s	12.8		9.3			1.9			0.1		
HCM LOS	B		A								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1291	-	-	645	839	1358	-	-
HCM Lane V/C Ratio	0.049	-	-	0.289	0.006	0.004	-	-
HCM Control Delay (s)	7.9	0	-	12.8	9.3	7.7	0	-
HCM Lane LOS	A	A	-	B	A	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	1.2	0	0	-	-

HCM 6th Signalized Intersection Summary
 1: I-5 SB On Ramp & SR 531 (172nd St) & I-5 SB Ramps

Williams Industrial
 Future (2026) Without-Project PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR
Lane Configurations		↑↑	↗		↑↑	↗	↗	↘	↗		
Traffic Volume (veh/h)	0	1030	535	0	1355	730	435	5	270	0	0
Future Volume (veh/h)	0	1030	535	0	1355	730	435	5	270	0	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	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	0	1687	1687	0	1575	1575	1826	1826	1826		
Adj Flow Rate, veh/h	0	1040	0	0	1369	0	443	443	0		
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99		
Percent Heavy Veh, %	0	1	1	0	2	2	5	5	5		
Cap, veh/h	0	2401		0	2196		554	554			
Arrive On Green	0.00	0.75	0.00	0.00	1.00	0.00	0.16	0.16	0.00		
Sat Flow, veh/h	0	3289	1429	0	3071	1335	3478	3478	1547		
Grp Volume(v), veh/h	0	1040	0	0	1369	0	443	443	0		
Grp Sat Flow(s),veh/h/ln	0	1602	1429	0	1496	1335	1739	1739	1547		
Q Serve(g_s), s	0.0	15.7	0.0	0.0	0.0	0.0	16.0	16.0	0.0		
Cycle Q Clear(g_c), s	0.0	15.7	0.0	0.0	0.0	0.0	16.0	16.0	0.0		
Prop In Lane	0.00		1.00	0.00		1.00	1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	0	2401		0	2196		554	554			
V/C Ratio(X)	0.00	0.43		0.00	0.62		0.80	0.80			
Avail Cap(c_a), veh/h	0	2401		0	2196		915	915			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00		
Upstream Filter(I)	0.00	1.00	0.00	0.00	0.09	0.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	0.0	6.1	0.0	0.0	0.0	0.0	52.7	52.7	0.0		
Incr Delay (d2), s/veh	0.0	0.6	0.0	0.0	0.1	0.0	4.6	4.6	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(50%),veh/ln	0.0	4.8	0.0	0.0	0.0	0.0	7.1	7.1	0.0		
Unsig. Movement Delay, s/veh											
LnGrp Delay(d),s/veh	0.0	6.6	0.0	0.0	0.1	0.0	57.2	57.2	0.0		
LnGrp LOS	A	A		A	A		E	E			
Approach Vol, veh/h		1040			1369		443	443			
Approach Delay, s/veh		6.6			0.1		57.2	57.2			
Approach LOS		A			A		E	E			
Timer - Assigned Phs		2		4		6					
Phs Duration (G+Y+Rc), s		103.5		26.5		103.5					
Change Period (Y+Rc), s		* 6.1		* 5.8		6.1					
Max Green Setting (Gmax), s		* 84		* 34		83.9					
Max Q Clear Time (g_c+I1), s		17.7		18.0		2.0					
Green Ext Time (p_c), s		14.8		2.6		24.9					

Intersection Summary

HCM 6th Ctrl Delay	11.4
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

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

Unsignalized Delay for [EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
 2: I-5 NB Off Ramp/I-5 NB On Ramp & SR 531 (172nd St)

Williams Industrial
 Future (2026) Without-Project PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑			↑↑↑	↗	↘	↗	↗			
Traffic Volume (veh/h)	375	1115	0	0	1555	690	590	5	900	0	0	0
Future Volume (veh/h)	375	1115	0	0	1555	690	590	5	900	0	0	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	1660	1660	0	0	1575	1575	1841	1841	1841			
Adj Flow Rate, veh/h	387	1149	0	0	1603	0	612	0	0			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97			
Percent Heavy Veh, %	3	3	0	0	2	2	4	4	4			
Cap, veh/h	394	2173	0	0	1639		743	0				
Arrive On Green	0.50	1.00	0.00	0.00	0.38	0.00	0.21	0.00	0.00			
Sat Flow, veh/h	1581	3237	0	0	4442	1335	3506	0	1560			
Grp Volume(v), veh/h	387	1149	0	0	1603	0	612	0	0			
Grp Sat Flow(s),veh/h/ln	1581	1577	0	0	1433	1335	1753	0	1560			
Q Serve(g_s), s	31.2	0.0	0.0	0.0	47.8	0.0	21.7	0.0	0.0			
Cycle Q Clear(g_c), s	31.2	0.0	0.0	0.0	47.8	0.0	21.7	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	394	2173	0	0	1639		743	0				
V/C Ratio(X)	0.98	0.53	0.00	0.00	0.98		0.82	0.00				
Avail Cap(c_a), veh/h	406	2173	0	0	1639		949	0				
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.86	0.86	0.00	0.00	1.00	0.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	32.3	0.0	0.0	0.0	39.7	0.0	48.9	0.0	0.0			
Incr Delay (d2), s/veh	36.1	0.8	0.0	0.0	17.6	0.0	5.8	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	13.0	0.2	0.0	0.0	19.1	0.0	9.7	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.4	0.8	0.0	0.0	57.3	0.0	54.8	0.0	0.0			
LnGrp LOS	E	A	A	A	E		D	A				
Approach Vol, veh/h		1536			1603			612				
Approach Delay, s/veh		17.8			57.3			54.8				
Approach LOS		B			E			D				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		96.7			39.0	57.7		33.3				
Change Period (Y+Rc), s		6.1			5.6	* 6.1		5.8				
Max Green Setting (Gmax), s		82.9			34.4	* 43		35.2				
Max Q Clear Time (g_c+I1), s		2.0			33.2	49.8		23.7				
Green Ext Time (p_c), s		17.9			0.2	0.0		3.1				

Intersection Summary

HCM 6th Ctrl Delay	40.7
HCM 6th LOS	D

Notes

- User approved volume balancing among the lanes for turning movement.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
- Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

HCM Signalized Intersection Capacity Analysis

3: Smokey Pt Blvd & SR 531 (172nd St)

Williams Industrial
Future (2026) Without-Project PM Peak Hour



Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations												
Traffic Volume (vph)	75	425	1055	400	20	230	1200	225	590	475	270	5
Future Volume (vph)	75	425	1055	400	20	230	1200	225	590	475	270	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	6.5	6.5			8.5	9.5	9.5	5.5	5.9	5.9
Lane Util. Factor		1.00	0.95	1.00			1.00	0.91	1.00	0.97	0.95	1.00
Frbp, ped/bikes		1.00	1.00	0.97			1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85			1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00			0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1736	3471	1513			1770	5085	1535	3400	3505	1522
Flt Permitted		0.95	1.00	1.00			0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1736	3471	1513			1770	5085	1535	3400	3505	1522
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	462	1147	435	22	250	1304	245	641	516	293	5
RTOR Reduction (vph)	0	0	0	162	0	0	0	128	0	0	185	0
Lane Group Flow (vph)	0	544	1147	273	0	272	1304	117	641	516	108	0
Confl. Peds. (#/hr)		16		11			11		16	12		15
Heavy Vehicles (%)	4%	4%	4%	4%	2%	2%	2%	2%	3%	3%	3%	2%
Turn Type	Prot	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot
Protected Phases	5 15	5 15	2		1	1	6		3	8		7
Permitted Phases				2				6				8
Actuated Green, G (s)		36.6	55.3	55.3			28.0	42.2	42.2	19.6	31.9	31.9
Effective Green, g (s)		36.6	55.3	55.3			25.0	39.2	39.2	19.6	31.9	31.9
Actuated g/C Ratio		0.24	0.36	0.36			0.16	0.25	0.25	0.13	0.21	0.21
Clearance Time (s)			6.5	6.5			5.5	6.5	6.5	5.5	5.9	5.9
Vehicle Extension (s)			3.0	3.0			2.5	3.0	3.0	2.5	3.0	3.0
Lane Grp Cap (vph)		408	1234	538			284	1281	386	428	719	312
v/s Ratio Prot		c0.31	c0.33				0.15	0.26		c0.19	c0.15	
v/s Ratio Perm				0.18					0.08			0.07
v/c Ratio		1.33	0.93	0.51			0.96	1.02	0.30	1.50	0.72	0.35
Uniform Delay, d1		59.5	48.2	39.4			64.7	58.1	47.1	68.0	57.6	52.9
Progression Factor		1.00	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		166.0	12.1	0.8			41.5	29.7	0.4	236.0	3.4	0.7
Delay (s)		225.4	60.4	40.1			106.2	87.9	47.5	303.9	61.0	53.5
Level of Service		F	E	D			F	F	D	F	E	D
Approach Delay (s)			98.4					85.2		166.9		
Approach LOS			F					F		F		
Intersection Summary												
HCM 2000 Control Delay			111.0				HCM 2000 Level of Service				F	
HCM 2000 Volume to Capacity ratio			1.18									
Actuated Cycle Length (s)			155.5				Sum of lost time (s)				30.9	
Intersection Capacity Utilization			118.7%				ICU Level of Service				H	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 3: Smokey Pt Blvd & SR 531 (172nd St)

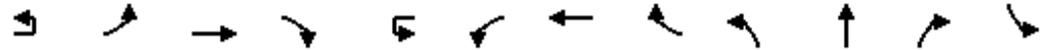
Williams Industrial
 Future (2026) Without-Project PM Peak Hour



Movement	SBL	SBT	SBR
Lane Configurations	↵	↑↑	↵
Traffic Volume (vph)	235	305	320
Future Volume (vph)	235	305	320
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.5	5.9	5.9
Lane Util. Factor	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1542
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1542
Peak-hour factor, PHF	0.92	0.92	0.92
Adj. Flow (vph)	255	332	348
RTOR Reduction (vph)	0	0	0
Lane Group Flow (vph)	260	332	348
Confl. Peds. (#/hr)	15		12
Heavy Vehicles (%)	2%	2%	2%
Turn Type	Prot	NA	custom
Protected Phases	7	4	
Permitted Phases			4 6
Actuated Green, G (s)	16.9	29.2	71.4
Effective Green, g (s)	16.9	29.2	71.4
Actuated g/C Ratio	0.11	0.19	0.46
Clearance Time (s)	5.5	5.9	
Vehicle Extension (s)	2.5	3.0	
Lane Grp Cap (vph)	192	664	708
v/s Ratio Prot	0.15	0.09	
v/s Ratio Perm			0.23
v/c Ratio	1.35	0.50	0.49
Uniform Delay, d1	69.3	56.6	29.4
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	189.5	0.6	0.5
Delay (s)	258.8	57.2	29.9
Level of Service	F	E	C
Approach Delay (s)		102.9	
Approach LOS		F	
Intersection Summary			

HCM Signalized Intersection Capacity Analysis
4: 40th Ave NE & SR 531 (172nd St)

Williams Industrial
Future (2026) Without-Project PM Peak Hour



Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations		↔	↕			↔	↕		↔	↕	↔	↕
Traffic Volume (vph)	55	45	1315	100	5	65	1395	30	165	20	35	25
Future Volume (vph)	55	45	1315	100	5	65	1395	30	165	20	35	25
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		4.5	4.0			4.5	4.0		4.5	4.0	4.0	4.5
Lane Util. Factor		1.00	0.95			1.00	0.95		1.00	1.00	1.00	1.00
Frt		1.00	0.99			1.00	1.00		1.00	1.00	0.85	1.00
Flt Protected		0.95	1.00			0.95	1.00		0.95	1.00	1.00	0.95
Satd. Flow (prot)		1568	3103			1568	3126		1568	1650	1403	1568
Flt Permitted		0.06	1.00			0.08	1.00		0.55	1.00	1.00	0.74
Satd. Flow (perm)		103	3103			140	3126		913	1650	1403	1227
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)	57	47	1370	104	5	68	1453	31	172	21	36	26
RTOR Reduction (vph)	0	0	4	0	0	0	1	0	0	0	27	0
Lane Group Flow (vph)	0	104	1470	0	0	73	1483	0	172	21	9	26
Turn Type	custom	pm+pt	NA		custom	pm+pt	NA		pm+pt	NA	Perm	pm+pt
Protected Phases		7	4			3	8		5	2		1
Permitted Phases	7	4			3	8		2			2	6
Actuated Green, G (s)		84.5	74.4			76.9	70.6		40.4	33.1	33.1	17.2
Effective Green, g (s)		84.5	74.4			76.9	70.6		40.4	33.1	33.1	17.2
Actuated g/C Ratio		0.63	0.56			0.58	0.53		0.30	0.25	0.25	0.13
Clearance Time (s)		4.5	4.0			4.5	4.0		4.5	4.0	4.0	4.5
Vehicle Extension (s)		3.0	3.0			3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		175	1728			147	1651		381	408	347	165
v/s Ratio Prot		c0.04	0.47			0.02	c0.47		c0.07	0.01		0.00
v/s Ratio Perm		0.33				0.26			c0.06		0.01	0.02
v/c Ratio		0.59	0.85			0.50	0.90		0.45	0.05	0.03	0.16
Uniform Delay, d1		23.5	24.9			19.5	28.3		36.6	38.3	38.0	51.6
Progression Factor		1.00	1.00			1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		5.3	4.2			2.6	6.9		0.9	0.2	0.1	0.4
Delay (s)		28.8	29.2			22.1	35.2		37.5	38.5	38.2	52.0
Level of Service		C	C			C	D		D	D	D	D
Approach Delay (s)			29.1				34.6			37.7		
Approach LOS			C				C			D		

Intersection Summary		
HCM 2000 Control Delay	32.7	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.75	C
Actuated Cycle Length (s)	133.6	Sum of lost time (s)
Intersection Capacity Utilization	77.7%	17.0
Analysis Period (min)	15	ICU Level of Service
		D

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 4: 40th Ave NE & SR 531 (172nd St)

Williams Industrial
 Future (2026) Without-Project PM Peak Hour



Movement	SBT	SBR
Lane Configurations	↓	↘
Traffic Volume (vph)	15	30
Future Volume (vph)	15	30
Ideal Flow (vphpl)	1700	1700
Total Lost time (s)	4.0	
Lane Util. Factor	1.00	
Frt	0.90	
Flt Protected	1.00	
Satd. Flow (prot)	1487	
Flt Permitted	1.00	
Satd. Flow (perm)	1487	
Peak-hour factor, PHF	0.96	0.96
Adj. Flow (vph)	16	31
RTOR Reduction (vph)	28	0
Lane Group Flow (vph)	19	0
Turn Type	NA	
Protected Phases	6	
Permitted Phases		
Actuated Green, G (s)	14.4	
Effective Green, g (s)	14.4	
Actuated g/C Ratio	0.11	
Clearance Time (s)	4.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	160	
v/s Ratio Prot	0.01	
v/s Ratio Perm		
v/c Ratio	0.12	
Uniform Delay, d1	53.9	
Progression Factor	1.00	
Incremental Delay, d2	0.3	
Delay (s)	54.2	
Level of Service	D	
Approach Delay (s)	53.4	
Approach LOS	D	
Intersection Summary		

MOVEMENT SUMMARY

Site: 5 [5. 172nd Street NE/43rd Avenue NE (Site Folder: Baseline 2026)]

Future (2026) Without-Project PM Peak Hour
 Site Category: (None)
 Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: 43rd Ave NE														
3	L2	290	0.0	309	0.0	0.359	12.6	LOS B	1.9	47.7	0.73	0.87	0.76	33.5
8	T1	10	0.0	11	0.0	0.359	6.8	LOS A	1.9	47.7	0.73	0.87	0.76	33.3
18	R2	100	0.0	106	0.0	0.173	7.6	LOS A	0.7	18.5	0.68	0.83	0.68	34.9
Approach		400	0.0	426	0.0	0.359	11.2	LOS B	1.9	47.7	0.72	0.86	0.74	33.8
East: 172nd St NE														
1	L2	135	1.0	144	1.0	0.594	13.2	LOS B	5.7	144.8	0.78	0.75	0.84	34.8
6	T1	1145	1.0	1218	1.0	0.594	6.7	LOS A	5.8	145.0	0.76	0.67	0.80	35.1
16	R2	20	1.0	21	1.0	0.594	6.4	LOS A	5.8	145.0	0.75	0.61	0.77	34.1
Approach		1300	1.0	1383	1.0	0.594	7.4	LOS A	5.8	145.0	0.77	0.68	0.80	35.1
North: 43rd Ave NE														
7	L2	10	0.0	11	0.0	0.076	13.7	LOS B	0.3	8.7	0.74	0.84	0.74	35.2
4	T1	10	0.0	11	0.0	0.076	7.8	LOS A	0.3	8.7	0.74	0.84	0.74	35.0
14	R2	20	0.0	21	0.0	0.076	7.8	LOS A	0.3	8.7	0.74	0.84	0.74	34.0
Approach		40	0.0	43	0.0	0.076	9.3	LOS A	0.3	8.7	0.74	0.84	0.74	34.5
West: 172nd St NE														
5u	U	20	4.0	21	4.0	0.513	13.6	LOS B	4.5	116.9	0.56	0.52	0.56	36.9
5	L2	10	4.0	11	4.0	0.513	11.1	LOS B	4.5	116.9	0.56	0.52	0.56	35.9
2	T1	1090	4.0	1160	4.0	0.513	5.2	LOS A	4.7	120.8	0.55	0.50	0.55	36.0
12	R2	150	4.0	160	4.0	0.513	5.1	LOS A	4.7	120.8	0.53	0.49	0.53	34.9
Approach		1270	4.0	1351	4.0	0.513	5.3	LOS A	4.7	120.8	0.54	0.50	0.54	35.9
All Vehicles		3010	2.1	3202	2.1	0.594	7.1	LOS A	5.8	145.0	0.67	0.63	0.68	35.2

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

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

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

MOVEMENT SUMMARY

Site: 6 [6. 172nd Street NE/51st Avenue NE (Site Folder: Baseline 2026)]

Future (2026) Without-Project PM Peak Hour
 Site Category: (None)
 Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: 51st Ave NE														
3	L2	450	4.0	464	4.0	0.867	22.7	LOS D	9.1	236.0	0.94	1.24	1.73	29.1
8	T1	90	4.0	93	4.0	0.867	17.6	LOS D	9.1	236.0	0.94	1.24	1.73	29.1
18	R2	215	4.0	222	4.0	0.498	11.9	LOS B	2.5	65.6	0.76	0.94	0.94	32.1
Approach		755	4.0	778	4.0	0.867	19.0	LOS B	9.1	236.0	0.89	1.16	1.51	29.8
East: 172nd St NE														
1	L2	170	2.0	175	2.0	0.685	18.8	LOS B	7.6	192.7	0.97	1.09	1.29	31.6
6	T1	790	2.0	814	2.0	0.685	12.7	LOS B	8.1	205.9	0.97	1.06	1.28	32.6
16	R2	50	2.0	52	2.0	0.685	12.6	LOS B	8.1	205.9	0.98	1.05	1.27	32.2
Approach		1010	2.0	1041	2.0	0.685	13.7	LOS B	8.1	205.9	0.97	1.07	1.28	32.4
North: 51st Ave NE														
7	L2	55	2.0	57	2.0	0.467	18.6	LOS B	2.5	63.1	0.84	0.98	1.02	31.8
4	T1	60	2.0	62	2.0	0.467	13.3	LOS B	2.5	63.1	0.84	0.98	1.02	31.9
14	R2	55	2.0	57	2.0	0.467	13.1	LOS B	2.5	63.1	0.84	0.98	1.02	31.2
Approach		170	2.0	175	2.0	0.467	14.9	LOS B	2.5	63.1	0.84	0.98	1.02	31.6
West: 172nd St NE														
5	L2	55	4.0	57	4.0	0.550	11.8	LOS B	4.4	112.8	0.68	0.68	0.69	34.8
2	T1	835	4.0	861	4.0	0.550	6.5	LOS A	4.4	113.7	0.67	0.67	0.68	35.0
12	R2	260	4.0	268	4.0	0.550	6.5	LOS A	4.4	113.7	0.66	0.65	0.66	34.3
Approach		1150	4.0	1186	4.0	0.550	6.8	LOS A	4.4	113.7	0.67	0.66	0.67	34.8
All Vehicles		3085	3.2	3180	3.2	0.867	12.5	LOS B	9.1	236.0	0.83	0.93	1.10	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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

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

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

MOVEMENT SUMMARY

Site: 7 [7. 172nd Street NE/59th Avenue NE (Site Folder: Baseline 2026)]

Future (2026) Without-Project PM Peak Hour
 Site Category: (None)
 Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: 59th Ave NE														
3	L2	35	2.0	36	2.0	0.083	13.6	LOS B	0.3	7.4	0.60	0.86	0.60	33.3
8	T1	1	2.0	1	2.0	0.083	7.9	LOS A	0.3	7.4	0.60	0.86	0.60	33.4
18	R2	10	2.0	10	2.0	0.083	8.1	LOS A	0.3	7.4	0.60	0.86	0.60	32.4
Approach		46	2.0	47	2.0	0.083	12.3	LOS B	0.3	7.4	0.60	0.86	0.60	33.1
East: 172nd St NE														
1	L2	5	2.0	5	2.0	0.260	10.9	LOS B	1.5	37.1	0.41	0.50	0.41	36.8
6	T1	625	2.0	638	2.0	0.260	4.9	LOS A	1.5	37.8	0.40	0.49	0.40	36.5
16	R2	20	2.0	20	2.0	0.260	4.9	LOS A	1.5	37.8	0.39	0.48	0.39	35.6
Approach		650	2.0	663	2.0	0.260	4.9	LOS A	1.5	37.8	0.40	0.49	0.40	36.5
North: 59th Ave NE														
7	L2	50	2.0	51	2.0	0.122	14.2	LOS B	0.4	10.5	0.56	0.85	0.56	32.9
4	T1	5	2.0	5	2.0	0.122	8.1	LOS A	0.4	10.5	0.56	0.85	0.56	33.0
14	R2	370	2.0	378	2.0	0.439	7.2	LOS A	2.2	55.2	0.61	0.83	0.68	34.6
Approach		425	2.0	434	2.0	0.439	8.0	LOS A	2.2	55.2	0.61	0.84	0.66	34.4
West: 172nd St NE														
5	L2	165	4.0	168	4.0	0.400	10.2	LOS B	2.9	75.7	0.28	0.48	0.28	36.5
2	T1	955	4.0	974	4.0	0.400	4.0	LOS A	3.0	76.8	0.27	0.42	0.27	37.0
12	R2	10	4.0	10	4.0	0.400	4.0	LOS A	3.0	76.8	0.26	0.38	0.26	36.4
Approach		1130	4.0	1153	4.0	0.400	4.9	LOS A	3.0	76.8	0.27	0.42	0.27	36.9
All Vehicles		2251	3.0	2297	3.0	0.439	5.6	LOS A	3.0	76.8	0.38	0.53	0.39	36.2

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

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

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

MOVEMENT SUMMARY

Site: 8 [8. 172nd Street NE/67th Avenue NE (Site Folder: Baseline 2026)]

Future (2026) Without-Project PM Peak Hour
 Site Category: (None)
 Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: 67th Ave NE														
3	L2	75	1.0	79	1.0	1.135	92.3	LOS F	32.0	805.5	1.00	2.26	4.97	15.5
8	T1	215	1.0	226	1.0	1.135	87.3	LOS F	32.0	805.5	1.00	2.26	4.97	15.5
18	R2	210	1.0	221	1.0	1.135	88.7	LOS F	32.0	805.5	1.00	2.26	4.97	15.3
Approach		500	1.0	526	1.0	1.135	88.6	LOS F	32.0	805.5	1.00	2.26	4.97	15.4
East: 172nd St NE														
1	L2	105	4.0	111	4.0	0.288	13.3	LOS B	1.8	46.1	0.71	0.79	0.71	33.9
6	T1	340	4.0	358	4.0	0.288	7.7	LOS A	1.9	49.9	0.71	0.73	0.71	34.6
16	R2	45	4.0	47	4.0	0.288	7.2	LOS A	1.9	49.9	0.71	0.71	0.71	34.3
Approach		490	4.0	516	4.0	0.288	8.8	LOS A	1.9	49.9	0.71	0.74	0.71	34.4
North: 67th Ave NE														
7	L2	85	2.0	89	2.0	0.769	16.9	LOS B	6.8	171.8	0.84	1.05	1.19	32.7
4	T1	225	2.0	237	2.0	0.769	12.0	LOS B	6.8	171.8	0.84	1.05	1.19	32.9
14	R2	200	2.0	211	2.0	0.769	12.0	LOS B	6.8	171.8	0.84	1.05	1.19	31.8
Approach		510	2.0	537	2.0	0.769	12.8	LOS B	6.8	171.8	0.84	1.05	1.19	32.4
West: 172nd St NE														
5	L2	315	2.0	332	2.0	0.654	13.8	LOS B	7.1	181.5	0.83	0.85	0.96	33.8
2	T1	605	2.0	637	2.0	0.654	8.6	LOS A	7.1	181.5	0.78	0.80	0.86	34.2
12	R2	110	2.0	116	2.0	0.398	7.2	LOS A	2.6	67.2	0.69	0.71	0.69	34.5
Approach		1030	2.0	1084	2.0	0.654	10.1	LOS B	7.1	181.5	0.79	0.80	0.87	34.1
All Vehicles		2530	2.2	2663	2.2	1.135	25.9	LOS C	32.0	805.5	0.82	1.13	1.71	27.4

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

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

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

MOVEMENT SUMMARY

 Site: 9 [9. SR 9/SR 531 (Site Folder: Baseline 2026)]

Future (2026) Without-Project PM Peak Hour

Site Category: (None)

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed	
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft					
South: SR 9															
3u	U	5	5.0	5	5.0	0.494	14.0	LOS B	3.8	99.8	0.65	0.63	0.65	36.0	
3	L2	185	5.0	191	5.0	0.494	11.6	LOS B	3.8	99.8	0.65	0.63	0.65	35.2	
8	T1	410	5.0	423	5.0	0.494	5.5	LOS A	3.8	99.8	0.65	0.63	0.65	35.2	
18	R2	15	5.0	15	5.0	0.018	6.0	LOS A	0.1	2.3	0.50	0.55	0.50	35.3	
Approach		615	5.0	634	5.0	0.494	7.4	LOS A	3.8	99.8	0.65	0.63	0.65	35.2	
East: SR 531															
1	L2	5	3.0	5	3.0	0.132	14.9	LOS B	0.9	21.9	0.80	0.77	0.80	35.0	
6	T1	60	3.0	62	3.0	0.132	8.8	LOS A	0.9	21.9	0.80	0.77	0.80	35.0	
16	R2	20	3.0	21	3.0	0.132	9.1	LOS A	0.9	21.9	0.80	0.77	0.80	33.9	
Approach		85	3.0	88	3.0	0.132	9.2	LOS A	0.9	21.9	0.80	0.77	0.80	34.7	
North: SR 9															
7u	U	5	2.0	5	2.0	0.307	13.2	LOS B	2.0	50.8	0.49	0.51	0.49	37.2	
7	L2	25	2.0	26	2.0	0.307	10.8	LOS B	2.0	50.8	0.49	0.51	0.49	36.3	
4	T1	380	2.0	392	2.0	0.307	4.7	LOS A	2.0	50.8	0.49	0.51	0.49	36.3	
14	R2	190	2.0	196	2.0	0.184	5.5	LOS A	1.0	25.8	0.47	0.58	0.47	35.5	
Approach		600	2.0	619	2.0	0.307	5.3	LOS A	2.0	50.8	0.48	0.53	0.48	36.1	
West: SR 531															
5u	U	5	1.0	5	1.0	0.263	13.8	LOS B	1.7	43.4	0.59	0.67	0.59	35.6	
5	L2	190	1.0	196	1.0	0.263	11.4	LOS B	1.7	43.4	0.59	0.67	0.59	34.8	
2	T1	125	1.0	129	1.0	0.263	5.3	LOS A	1.7	43.4	0.59	0.67	0.59	34.7	
12	R2	310	1.0	320	1.0	0.311	6.3	LOS A	2.0	49.8	0.62	0.68	0.62	35.1	
Approach		630	1.0	649	1.0	0.311	7.7	LOS A	2.0	49.8	0.60	0.67	0.60	34.9	
All Vehicles		1930	2.7	1990	2.7	0.494	6.9	LOS A	3.8	99.8	0.59	0.62	0.59	35.3	

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

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

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

MOVEMENT SUMMARY

Site: 10 [10. 51st Avenue NE/168th Street NE (Site Folder: Baseline 2026)]

Future (2026) Without-Project PM Peak Hour
 Site Category: (None)
 Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: 51st Ave NE														
3	L2	115	2.0	122	2.0	0.643	11.6	LOS B	6.1	155.0	0.68	0.65	0.69	34.8
8	T1	510	2.0	543	2.0	0.643	6.3	LOS A	6.1	155.0	0.68	0.65	0.69	34.9
18	R2	1	2.0	1	2.0	0.643	6.3	LOS A	6.1	155.0	0.68	0.65	0.69	34.0
Approach		626	2.0	666	2.0	0.643	7.3	LOS A	6.1	155.0	0.68	0.65	0.69	34.9
East: 168th St NE														
1	L2	1	0.0	1	0.0	0.013	14.9	LOS B	0.1	2.0	0.77	0.66	0.77	34.0
6	T1	1	0.0	1	0.0	0.013	9.6	LOS A	0.1	2.0	0.77	0.66	0.77	34.0
16	R2	5	0.0	5	0.0	0.013	9.6	LOS A	0.1	2.0	0.77	0.66	0.77	33.2
Approach		7	0.0	7	0.0	0.013	10.3	LOS B	0.1	2.0	0.77	0.66	0.77	33.4
North: 51st Ave NE														
7	L2	5	3.0	5	3.0	0.525	10.6	LOS B	4.4	112.5	0.50	0.53	0.50	35.9
4	T1	360	3.0	383	3.0	0.525	5.3	LOS A	4.4	112.5	0.50	0.53	0.50	35.9
14	R2	175	3.0	186	3.0	0.525	5.3	LOS A	4.4	112.5	0.50	0.53	0.50	35.0
Approach		540	3.0	574	3.0	0.525	5.4	LOS A	4.4	112.5	0.50	0.53	0.50	35.6
West: 168th St NE														
5	L2	175	2.0	186	2.0	0.445	12.4	LOS B	3.0	75.3	0.68	0.77	0.68	34.4
2	T1	1	2.0	1	2.0	0.445	7.1	LOS A	3.0	75.3	0.68	0.77	0.68	34.4
12	R2	190	2.0	202	2.0	0.445	7.1	LOS A	3.0	75.3	0.68	0.77	0.68	33.6
Approach		366	2.0	389	2.0	0.445	9.6	LOS A	3.0	75.3	0.68	0.77	0.68	34.0
All Vehicles		1539	2.3	1637	2.3	0.643	7.2	LOS A	6.1	155.0	0.62	0.63	0.62	34.9

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

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

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

HCM 6th Signalized Intersection Summary
 1: I-5 SB On Ramp & SR 531 (172nd St) & I-5 SB Ramps

Williams Industrial
 Future (2026) With-Project PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR
Lane Configurations		↑↑	↗		↑↑	↗	↗	↘	↗		
Traffic Volume (veh/h)	0	1033	535	0	1364	737	440	5	270	0	0
Future Volume (veh/h)	0	1033	535	0	1364	737	440	5	270	0	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	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	0	1687	1687	0	1575	1575	1826	1826	1826		
Adj Flow Rate, veh/h	0	1043	0	0	1378	0	448	448	0		
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99		
Percent Heavy Veh, %	0	1	1	0	2	2	5	5	5		
Cap, veh/h	0	2396		0	2192		559	559			
Arrive On Green	0.00	0.75	0.00	0.00	1.00	0.00	0.16	0.16	0.00		
Sat Flow, veh/h	0	3289	1429	0	3071	1335	3478	3478	1547		
Grp Volume(v), veh/h	0	1043	0	0	1378	0	448	448	0		
Grp Sat Flow(s),veh/h/ln	0	1602	1429	0	1496	1335	1739	1739	1547		
Q Serve(g_s), s	0.0	15.8	0.0	0.0	0.0	0.0	16.1	16.1	0.0		
Cycle Q Clear(g_c), s	0.0	15.8	0.0	0.0	0.0	0.0	16.1	16.1	0.0		
Prop In Lane	0.00		1.00	0.00		1.00	1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	0	2396		0	2192		559	559			
V/C Ratio(X)	0.00	0.44		0.00	0.63		0.80	0.80			
Avail Cap(c_a), veh/h	0	2396		0	2192		915	915			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00		
Upstream Filter(I)	0.00	1.00	0.00	0.00	0.09	0.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	0.0	6.1	0.0	0.0	0.0	0.0	52.6	52.6	0.0		
Incr Delay (d2), s/veh	0.0	0.6	0.0	0.0	0.1	0.0	4.6	4.6	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(50%),veh/ln	0.0	4.8	0.0	0.0	0.0	0.0	7.2	7.2	0.0		
Unsig. Movement Delay, s/veh											
LnGrp Delay(d),s/veh	0.0	6.7	0.0	0.0	0.1	0.0	57.1	57.1	0.0		
LnGrp LOS	A	A		A	A		E	E			
Approach Vol, veh/h		1043			1378		448	448			
Approach Delay, s/veh		6.7			0.1		57.1	57.1			
Approach LOS		A			A		E	E			
Timer - Assigned Phs		2		4		6					
Phs Duration (G+Y+Rc), s		103.3		26.7		103.3					
Change Period (Y+Rc), s		* 6.1		* 5.8		6.1					
Max Green Setting (Gmax), s		* 84		* 34		83.9					
Max Q Clear Time (g_c+I1), s		17.8		18.1		2.0					
Green Ext Time (p_c), s		14.8		2.6		25.3					

Intersection Summary

HCM 6th Ctrl Delay	11.4
HCM 6th LOS	B

Notes

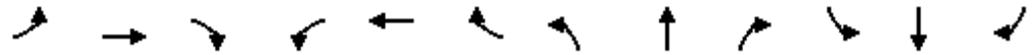
User approved volume balancing among the lanes for turning movement.

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

Unsignalized Delay for [EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
 2: I-5 NB Off Ramp/I-5 NB On Ramp & SR 531 (172nd St)

Williams Industrial
 Future (2026) With-Project PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑			↑↑↑	↗	↘	↗	↗			
Traffic Volume (veh/h)	375	1123	0	0	1571	704	590	5	902	0	0	0
Future Volume (veh/h)	375	1123	0	0	1571	704	590	5	902	0	0	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	1660	1660	0	0	1575	1575	1841	1841	1841			
Adj Flow Rate, veh/h	387	1158	0	0	1620	0	612	0	0			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97			
Percent Heavy Veh, %	3	3	0	0	2	2	4	4	4			
Cap, veh/h	394	2173	0	0	1639		743	0				
Arrive On Green	0.50	1.00	0.00	0.00	0.38	0.00	0.21	0.00	0.00			
Sat Flow, veh/h	1581	3237	0	0	4442	1335	3506	0	1560			
Grp Volume(v), veh/h	387	1158	0	0	1620	0	612	0	0			
Grp Sat Flow(s),veh/h/ln	1581	1577	0	0	1433	1335	1753	0	1560			
Q Serve(g_s), s	31.2	0.0	0.0	0.0	48.6	0.0	21.7	0.0	0.0			
Cycle Q Clear(g_c), s	31.2	0.0	0.0	0.0	48.6	0.0	21.7	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	394	2173	0	0	1639		743	0				
V/C Ratio(X)	0.98	0.53	0.00	0.00	0.99		0.82	0.00				
Avail Cap(c_a), veh/h	406	2173	0	0	1639		949	0				
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.86	0.86	0.00	0.00	1.00	0.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	32.3	0.0	0.0	0.0	39.9	0.0	48.9	0.0	0.0			
Incr Delay (d2), s/veh	36.1	0.8	0.0	0.0	19.7	0.0	5.8	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	13.0	0.2	0.0	0.0	19.6	0.0	9.7	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.4	0.8	0.0	0.0	59.6	0.0	54.8	0.0	0.0			
LnGrp LOS	E	A	A	A	E		D	A				
Approach Vol, veh/h		1545			1620			612				
Approach Delay, s/veh		17.7			59.6			54.8				
Approach LOS		B			E			D				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		96.7			39.0	57.7		33.3				
Change Period (Y+Rc), s		6.1			5.6	* 6.1		5.8				
Max Green Setting (Gmax), s		82.9			34.4	* 43		35.2				
Max Q Clear Time (g_c+I1), s		2.0			33.2	50.6		23.7				
Green Ext Time (p_c), s		18.2			0.2	0.0		3.1				

Intersection Summary

HCM 6th Ctrl Delay	41.7
HCM 6th LOS	D

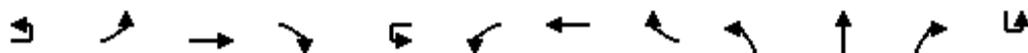
Notes

- User approved volume balancing among the lanes for turning movement.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
- Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

HCM Signalized Intersection Capacity Analysis

3: Smokey Pt Blvd & SR 531 (172nd St)

Williams Industrial
Future (2026) With-Project PM Peak Hour



Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations		↖	↗	↘		↖	↗	↘	↖	↗	↘	
Traffic Volume (vph)	75	425	1065	400	20	230	1230	228	590	475	270	5
Future Volume (vph)	75	425	1065	400	20	230	1230	228	590	475	270	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	6.5	6.5		8.5	9.5	9.5	5.5	5.9	5.9	
Lane Util. Factor		1.00	0.95	1.00		1.00	0.91	1.00	0.97	0.95	1.00	
Frbp, ped/bikes		1.00	1.00	0.97		1.00	1.00	0.97	1.00	1.00	0.97	
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)		1736	3471	1513		1770	5085	1535	3400	3505	1522	
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)		1736	3471	1513		1770	5085	1535	3400	3505	1522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	462	1158	435	22	250	1337	248	641	516	293	5
RTOR Reduction (vph)	0	0	0	161	0	0	0	126	0	0	185	0
Lane Group Flow (vph)	0	544	1158	274	0	272	1337	122	641	516	108	0
Confl. Peds. (#/hr)		16		11		11		16	12		15	
Heavy Vehicles (%)	4%	4%	4%	4%	2%	2%	2%	2%	3%	3%	3%	2%
Turn Type	Prot	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot
Protected Phases	5 15	5 15	2		1	1	6		3	8		7
Permitted Phases				2				6			8	
Actuated Green, G (s)		36.6	55.3	55.3		28.0	42.2	42.2	19.6	31.9	31.9	
Effective Green, g (s)		36.6	55.3	55.3		25.0	39.2	39.2	19.6	31.9	31.9	
Actuated g/C Ratio		0.24	0.36	0.36		0.16	0.25	0.25	0.13	0.21	0.21	
Clearance Time (s)			6.5	6.5		5.5	6.5	6.5	5.5	5.9	5.9	
Vehicle Extension (s)			3.0	3.0		2.5	3.0	3.0	2.5	3.0	3.0	
Lane Grp Cap (vph)		408	1234	538		284	1281	386	428	719	312	
v/s Ratio Prot		c0.31	c0.33			0.15	0.26		c0.19	c0.15		
v/s Ratio Perm				0.18				0.08			0.07	
v/c Ratio		1.33	0.94	0.51		0.96	1.04	0.32	1.50	0.72	0.35	
Uniform Delay, d1		59.5	48.5	39.4		64.7	58.1	47.3	68.0	57.6	52.9	
Progression Factor		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		166.0	13.3	0.8		41.5	37.3	0.5	236.0	3.4	0.7	
Delay (s)		225.4	61.8	40.2		106.2	95.5	47.7	303.9	61.0	53.5	
Level of Service		F	E	D		F	F	D	F	E	D	
Approach Delay (s)			99.0				90.7		166.9			
Approach LOS			F				F		F			
Intersection Summary												
HCM 2000 Control Delay			112.8			HCM 2000 Level of Service				F		
HCM 2000 Volume to Capacity ratio			1.18									
Actuated Cycle Length (s)			155.5			Sum of lost time (s)				30.9		
Intersection Capacity Utilization			119.1%			ICU Level of Service				H		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 3: Smokey Pt Blvd & SR 531 (172nd St)

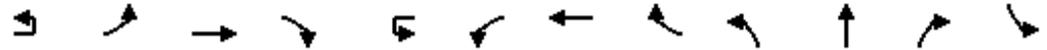
Williams Industrial
 Future (2026) With-Project PM Peak Hour



Movement	SBL	SBT	SBR
Lane Configurations	↵	↑↑	↵
Traffic Volume (vph)	236	305	320
Future Volume (vph)	236	305	320
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.5	5.9	5.9
Lane Util. Factor	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1542
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1542
Peak-hour factor, PHF	0.92	0.92	0.92
Adj. Flow (vph)	257	332	348
RTOR Reduction (vph)	0	0	0
Lane Group Flow (vph)	262	332	348
Confl. Peds. (#/hr)	15		12
Heavy Vehicles (%)	2%	2%	2%
Turn Type	Prot	NA	custom
Protected Phases	7	4	
Permitted Phases			4 6
Actuated Green, G (s)	16.9	29.2	71.4
Effective Green, g (s)	16.9	29.2	71.4
Actuated g/C Ratio	0.11	0.19	0.46
Clearance Time (s)	5.5	5.9	
Vehicle Extension (s)	2.5	3.0	
Lane Grp Cap (vph)	192	664	708
v/s Ratio Prot	0.15	0.09	
v/s Ratio Perm			0.23
v/c Ratio	1.36	0.50	0.49
Uniform Delay, d1	69.3	56.6	29.4
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	193.8	0.6	0.5
Delay (s)	263.1	57.2	29.9
Level of Service	F	E	C
Approach Delay (s)		104.4	
Approach LOS		F	
Intersection Summary			

HCM Signalized Intersection Capacity Analysis
 4: 40th Ave NE & SR 531 (172nd St)

Williams Industrial
 Future (2026) With-Project PM Peak Hour



Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	55	45	1326	100	5	65	1428	30	165	20	35	25
Future Volume (vph)	55	45	1326	100	5	65	1428	30	165	20	35	25
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		4.5	4.0			4.5	4.0		4.5	4.0	4.0	4.5
Lane Util. Factor		1.00	0.95			1.00	0.95		1.00	1.00	1.00	1.00
Frt		1.00	0.99			1.00	1.00		1.00	1.00	0.85	1.00
Flt Protected		0.95	1.00			0.95	1.00		0.95	1.00	1.00	0.95
Satd. Flow (prot)		1568	3103			1568	3126		1568	1650	1403	1568
Flt Permitted		0.06	1.00			0.09	1.00		0.54	1.00	1.00	0.74
Satd. Flow (perm)		101	3103			142	3126		899	1650	1403	1227
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)	57	47	1381	104	5	68	1488	31	172	21	36	26
RTOR Reduction (vph)	0	0	4	0	0	0	1	0	0	0	27	0
Lane Group Flow (vph)	0	104	1481	0	0	73	1518	0	172	21	9	26
Turn Type	custom	pm+pt	NA		custom	pm+pt	NA		pm+pt	NA	Perm	pm+pt
Protected Phases		7	4			3	8		5	2		1
Permitted Phases	7	4			3	8			2		2	6
Actuated Green, G (s)		85.7	75.9			78.7	72.4		39.3	32.0	32.0	16.3
Effective Green, g (s)		85.7	75.9			78.7	72.4		39.3	32.0	32.0	16.3
Actuated g/C Ratio		0.64	0.57			0.59	0.54		0.29	0.24	0.24	0.12
Clearance Time (s)		4.5	4.0			4.5	4.0		4.5	4.0	4.0	4.5
Vehicle Extension (s)		3.0	3.0			3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		171	1757			150	1688		370	394	335	156
v/s Ratio Prot		c0.04	0.48			0.02	c0.49		c0.07	0.01		0.00
v/s Ratio Perm		0.34				0.26			c0.06		0.01	0.02
v/c Ratio		0.61	0.84			0.49	0.90		0.46	0.05	0.03	0.17
Uniform Delay, d1		24.4	24.1			18.8	27.5		37.7	39.3	39.1	52.6
Progression Factor		1.00	1.00			1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		6.0	3.9			2.5	6.8		0.9	0.3	0.1	0.5
Delay (s)		30.4	28.0			21.3	34.4		38.6	39.6	39.2	53.1
Level of Service		C	C			C	C		D	D	D	D
Approach Delay (s)			28.1				33.8			38.8		
Approach LOS			C				C			D		

Intersection Summary		
HCM 2000 Control Delay	32.0	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.76	C
Actuated Cycle Length (s)	134.0	Sum of lost time (s)
Intersection Capacity Utilization	78.7%	17.0
Analysis Period (min)	15	ICU Level of Service
		D

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 4: 40th Ave NE & SR 531 (172nd St)

Williams Industrial
 Future (2026) With-Project PM Peak Hour



Movement	SBT	SBR
Lane Configurations	↓	↘
Traffic Volume (vph)	15	30
Future Volume (vph)	15	30
Ideal Flow (vphpl)	1700	1700
Total Lost time (s)	4.0	
Lane Util. Factor	1.00	
Frt	0.90	
Flt Protected	1.00	
Satd. Flow (prot)	1487	
Flt Permitted	1.00	
Satd. Flow (perm)	1487	
Peak-hour factor, PHF	0.96	0.96
Adj. Flow (vph)	16	31
RTOR Reduction (vph)	28	0
Lane Group Flow (vph)	19	0
Turn Type	NA	
Protected Phases	6	
Permitted Phases		
Actuated Green, G (s)	13.5	
Effective Green, g (s)	13.5	
Actuated g/C Ratio	0.10	
Clearance Time (s)	4.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	149	
v/s Ratio Prot	0.01	
v/s Ratio Perm		
v/c Ratio	0.13	
Uniform Delay, d1	54.9	
Progression Factor	1.00	
Incremental Delay, d2	0.4	
Delay (s)	55.3	
Level of Service	E	
Approach Delay (s)	54.5	
Approach LOS	D	
Intersection Summary		

MOVEMENT SUMMARY

Site: 5 [5. 172nd Street NE/43rd Avenue NE (Site Folder: With-Project 2026)]

Future (2026) With-Project PM Peak Hour
 Site Category: (None)
 Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist ft]				
South: 43rd Ave NE														
3	L2	290	0.0	309	0.0	0.361	12.7	LOS B	1.9	48.3	0.74	0.87	0.77	33.5
8	T1	10	0.0	11	0.0	0.361	6.8	LOS A	1.9	48.3	0.74	0.87	0.77	33.3
18	R2	100	0.0	106	0.0	0.174	7.7	LOS A	0.7	18.6	0.69	0.83	0.69	34.9
Approach		400	0.0	426	0.0	0.361	11.3	LOS B	1.9	48.3	0.73	0.86	0.75	33.8
East: 172nd St NE														
1	L2	135	1.0	144	1.0	0.610	13.4	LOS B	6.1	154.4	0.79	0.77	0.86	34.8
6	T1	1178	1.0	1253	1.0	0.610	6.9	LOS A	6.2	155.0	0.78	0.69	0.82	35.1
16	R2	22	1.0	23	1.0	0.610	6.5	LOS A	6.2	155.0	0.77	0.64	0.80	34.1
Approach		1335	1.0	1420	1.0	0.610	7.6	LOS A	6.2	155.0	0.78	0.70	0.82	35.0
North: 43rd Ave NE														
7	L2	11	0.0	12	0.0	0.080	13.8	LOS B	0.4	9.2	0.75	0.85	0.75	35.1
4	T1	10	0.0	11	0.0	0.080	8.0	LOS A	0.4	9.2	0.75	0.85	0.75	34.9
14	R2	20	0.0	21	0.0	0.080	7.9	LOS A	0.4	9.2	0.75	0.85	0.75	33.9
Approach		41	0.0	44	0.0	0.080	9.5	LOS A	0.4	9.2	0.75	0.85	0.75	34.4
West: 172nd St NE														
5u	U	20	4.0	21	4.0	0.518	13.6	LOS B	4.6	118.9	0.56	0.52	0.56	36.8
5	L2	10	4.0	11	4.0	0.518	11.1	LOS B	4.6	118.9	0.56	0.52	0.56	35.8
2	T1	1101	4.0	1171	4.0	0.518	5.2	LOS A	4.8	122.9	0.55	0.50	0.55	36.0
12	R2	150	4.0	160	4.0	0.518	5.1	LOS A	4.8	122.9	0.54	0.49	0.54	34.9
Approach		1281	4.0	1363	4.0	0.518	5.3	LOS A	4.8	122.9	0.55	0.50	0.55	35.9
All Vehicles		3057	2.1	3252	2.1	0.610	7.1	LOS A	6.2	155.0	0.68	0.64	0.70	35.2

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

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

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

MOVEMENT SUMMARY

Site: 6 [6. 172nd Street NE/51st Avenue NE (Site Folder: With-Project 2026)]

Future (2026) With-Project PM Peak Hour
 Site Category: (None)
 Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: 51st Ave NE														
3	L2	485	4.0	500	4.0	0.932	28.4	LOS D	12.5	322.9	0.98	1.40	2.20	27.1
8	T1	90	4.0	93	4.0	0.932	23.3	LOS D	12.5	322.9	0.98	1.40	2.20	27.1
18	R2	246	4.0	254	4.0	0.556	12.4	LOS B	3.1	78.9	0.79	0.97	1.01	31.9
Approach		821	4.0	846	4.0	0.932	23.1	LOS C	12.5	322.9	0.92	1.27	1.84	28.3
East: 172nd St NE														
1	L2	181	2.0	187	2.0	0.733	21.1	LOS C	8.8	224.4	1.00	1.16	1.43	30.6
6	T1	790	2.0	814	2.0	0.733	14.9	LOS B	9.5	242.3	1.00	1.13	1.41	31.6
16	R2	50	2.0	52	2.0	0.733	14.7	LOS B	9.5	242.3	1.00	1.12	1.40	31.2
Approach		1021	2.0	1053	2.0	0.733	16.0	LOS B	9.5	242.3	1.00	1.14	1.41	31.4
North: 51st Ave NE														
7	L2	55	2.0	57	2.0	0.516	20.0	LOS B	2.9	72.7	0.86	1.00	1.09	31.2
4	T1	70	2.0	72	2.0	0.516	14.7	LOS B	2.9	72.7	0.86	1.00	1.09	31.3
14	R2	55	2.0	57	2.0	0.516	14.6	LOS B	2.9	72.7	0.86	1.00	1.09	30.6
Approach		180	2.0	186	2.0	0.516	16.3	LOS B	2.9	72.7	0.86	1.00	1.09	31.0
West: 172nd St NE														
5	L2	55	4.0	57	4.0	0.566	12.2	LOS B	4.7	122.5	0.71	0.72	0.74	34.6
2	T1	835	4.0	861	4.0	0.566	7.0	LOS A	4.8	122.6	0.70	0.70	0.73	34.9
12	R2	272	4.0	280	4.0	0.566	6.8	LOS A	4.8	122.6	0.69	0.68	0.71	34.2
Approach		1162	4.0	1198	4.0	0.566	7.2	LOS A	4.8	122.6	0.70	0.70	0.72	34.7
All Vehicles		3184	3.2	3282	3.2	0.932	14.6	LOS B	12.5	322.9	0.86	1.00	1.25	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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

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

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

MOVEMENT SUMMARY

Site: 7 [7. 172nd Street NE/59th Avenue NE (Site Folder: With-Project 2026)]

Future (2026) With-Project PM Peak Hour
 Site Category: (None)
 Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist ft]				
South: 59th Ave NE														
3	L2	35	2.0	36	2.0	0.085	13.7	LOS B	0.3	7.6	0.61	0.86	0.61	33.3
8	T1	1	2.0	1	2.0	0.085	8.0	LOS A	0.3	7.6	0.61	0.86	0.61	33.3
18	R2	10	2.0	10	2.0	0.085	8.2	LOS A	0.3	7.6	0.61	0.86	0.61	32.3
Approach		46	2.0	47	2.0	0.085	12.4	LOS B	0.3	7.6	0.61	0.86	0.61	33.1
East: 172nd St NE														
1	L2	5	2.0	5	2.0	0.265	10.9	LOS B	1.5	38.0	0.41	0.50	0.41	36.8
6	T1	635	2.0	648	2.0	0.265	4.9	LOS A	1.5	38.8	0.40	0.49	0.40	36.5
16	R2	20	2.0	20	2.0	0.265	4.9	LOS A	1.5	38.8	0.40	0.48	0.40	35.6
Approach		660	2.0	673	2.0	0.265	4.9	LOS A	1.5	38.8	0.40	0.49	0.40	36.5
North: 59th Ave NE														
7	L2	50	2.0	51	2.0	0.122	14.2	LOS B	0.4	10.6	0.56	0.85	0.56	32.9
4	T1	5	2.0	5	2.0	0.122	8.2	LOS A	0.4	10.6	0.56	0.85	0.56	33.0
14	R2	371	2.0	379	2.0	0.443	7.3	LOS A	2.2	56.0	0.62	0.84	0.68	34.6
Approach		426	2.0	435	2.0	0.443	8.1	LOS A	2.2	56.0	0.61	0.84	0.67	34.4
West: 172nd St NE														
5	L2	169	4.0	172	4.0	0.411	10.2	LOS B	3.1	79.0	0.28	0.48	0.28	36.5
2	T1	982	4.0	1002	4.0	0.411	4.0	LOS A	3.1	80.1	0.27	0.42	0.27	37.0
12	R2	10	4.0	10	4.0	0.411	4.0	LOS A	3.1	80.1	0.26	0.38	0.26	36.4
Approach		1161	4.0	1185	4.0	0.411	4.9	LOS A	3.1	80.1	0.27	0.42	0.27	36.9
All Vehicles		2293	3.0	2340	3.0	0.443	5.6	LOS A	3.1	80.1	0.38	0.53	0.39	36.2

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

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

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

MOVEMENT SUMMARY

Site: 8 [8. 172nd Street NE/67th Avenue NE (Site Folder: With-Project 2026)]

Future (2026) With-Project PM Peak Hour
 Site Category: (None)
 Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: 67th Ave NE														
3	L2	75	1.0	79	1.0	1.168	105.3	LOS F	35.5	893.9	1.00	2.40	5.41	14.2
8	T1	215	1.0	226	1.0	1.168	100.3	LOS F	35.5	893.9	1.00	2.40	5.41	14.2
18	R2	210	1.0	221	1.0	1.168	101.9	LOS F	35.5	893.9	1.00	2.40	5.41	14.0
Approach		500	1.0	526	1.0	1.168	101.7	LOS F	35.5	893.9	1.00	2.40	5.41	14.2
East: 172nd St NE														
1	L2	105	4.0	111	4.0	0.294	13.3	LOS B	1.8	47.3	0.72	0.79	0.72	33.9
6	T1	347	4.0	365	4.0	0.294	7.7	LOS A	2.0	51.2	0.72	0.74	0.72	34.6
16	R2	45	4.0	47	4.0	0.294	7.2	LOS A	2.0	51.2	0.71	0.71	0.71	34.2
Approach		497	4.0	523	4.0	0.294	8.8	LOS A	2.0	51.2	0.72	0.75	0.72	34.4
North: 67th Ave NE														
7	L2	85	2.0	89	2.0	0.777	17.1	LOS B	6.9	176.2	0.84	1.06	1.21	32.6
4	T1	225	2.0	237	2.0	0.777	12.2	LOS B	6.9	176.2	0.84	1.06	1.21	32.7
14	R2	203	2.0	214	2.0	0.777	12.2	LOS B	6.9	176.2	0.84	1.06	1.21	31.7
Approach		513	2.0	540	2.0	0.777	13.0	LOS B	6.9	176.2	0.84	1.06	1.21	32.3
West: 172nd St NE														
5	L2	322	2.0	339	2.0	0.671	14.1	LOS B	7.6	193.9	0.84	0.86	0.99	33.7
2	T1	625	2.0	658	2.0	0.671	8.8	LOS A	7.6	193.9	0.79	0.81	0.88	34.2
12	R2	110	2.0	116	2.0	0.409	7.2	LOS A	2.7	69.6	0.70	0.72	0.70	34.5
Approach		1057	2.0	1113	2.0	0.671	10.3	LOS B	7.6	193.9	0.80	0.82	0.90	34.1
All Vehicles		2567	2.2	2702	2.2	1.168	28.4	LOS C	35.5	893.9	0.83	1.16	1.80	26.6

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

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

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

MOVEMENT SUMMARY

Site: 9 [9. SR 9/SR 531 (Site Folder: With-Project 2026)]

Future (2026) With-Project PM Peak Hour

Site Category: (None)

Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: SR 9														
3u	U	5	5.0	5	5.0	0.500	14.1	LOS B	3.9	101.6	0.67	0.64	0.67	35.9
3	L2	186	5.0	192	5.0	0.500	11.7	LOS B	3.9	101.6	0.67	0.64	0.67	35.1
8	T1	410	5.0	423	5.0	0.500	5.6	LOS A	3.9	101.6	0.67	0.64	0.67	35.1
18	R2	15	5.0	15	5.0	0.019	6.1	LOS A	0.1	2.4	0.51	0.55	0.51	35.3
Approach		616	5.0	635	5.0	0.500	7.5	LOS A	3.9	101.6	0.66	0.64	0.66	35.1
East: SR 531														
1	L2	5	3.0	5	3.0	0.136	15.1	LOS B	0.9	22.7	0.81	0.77	0.81	34.9
6	T1	61	3.0	63	3.0	0.136	9.0	LOS A	0.9	22.7	0.81	0.77	0.81	34.9
16	R2	20	3.0	21	3.0	0.136	9.2	LOS A	0.9	22.7	0.81	0.77	0.81	33.8
Approach		86	3.0	89	3.0	0.136	9.4	LOS A	0.9	22.7	0.81	0.77	0.81	34.6
North: SR 9														
7u	U	5	2.0	5	2.0	0.307	13.2	LOS B	2.0	51.0	0.49	0.51	0.49	37.2
7	L2	25	2.0	26	2.0	0.307	10.8	LOS B	2.0	51.0	0.49	0.51	0.49	36.3
4	T1	380	2.0	392	2.0	0.307	4.7	LOS A	2.0	51.0	0.49	0.51	0.49	36.3
14	R2	193	2.0	199	2.0	0.187	5.5	LOS A	1.0	26.4	0.47	0.58	0.47	35.5
Approach		603	2.0	622	2.0	0.307	5.3	LOS A	2.0	51.0	0.48	0.53	0.48	36.0
West: SR 531														
5u	U	5	1.0	5	1.0	0.274	13.8	LOS B	1.8	45.6	0.59	0.67	0.59	35.5
5	L2	201	1.0	207	1.0	0.274	11.4	LOS B	1.8	45.6	0.59	0.67	0.59	34.7
2	T1	127	1.0	131	1.0	0.274	5.3	LOS A	1.8	45.6	0.59	0.67	0.59	34.7
12	R2	312	1.0	322	1.0	0.313	6.3	LOS A	2.0	50.3	0.62	0.68	0.62	35.1
Approach		645	1.0	665	1.0	0.313	7.8	LOS A	2.0	50.3	0.61	0.68	0.61	34.9
All Vehicles		1950	2.7	2010	2.7	0.500	7.0	LOS A	3.9	101.6	0.60	0.62	0.60	35.3

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

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

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

MOVEMENT SUMMARY

Site: 10 [10. 51st Avenue NE/168th Street NE - Copy (Site Folder: With-Project 2026)]

Future (2026) With-Project PM Peak Hour
 Site Category: (None)
 Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: 51st Ave NE														
3	L2	128	2.0	136	2.0	0.705	13.8	LOS B	8.2	208.4	0.82	0.79	0.92	34.2
8	T1	510	2.0	543	2.0	0.705	8.5	LOS A	8.2	208.4	0.82	0.79	0.92	34.3
18	R2	1	2.0	1	2.0	0.705	8.5	LOS A	8.2	208.4	0.82	0.79	0.92	33.4
Approach		639	2.0	680	2.0	0.705	9.6	LOS A	8.2	208.4	0.82	0.79	0.92	34.3
East: 168th St NE														
1	L2	1	0.0	1	0.0	0.015	16.0	LOS B	0.1	2.4	0.82	0.69	0.82	33.4
6	T1	1	0.0	1	0.0	0.015	10.7	LOS B	0.1	2.4	0.82	0.69	0.82	33.5
16	R2	5	0.0	5	0.0	0.015	10.7	LOS B	0.1	2.4	0.82	0.69	0.82	32.6
Approach		7	0.0	7	0.0	0.015	11.5	LOS B	0.1	2.4	0.82	0.69	0.82	32.9
North: 51st Ave NE														
7	L2	5	3.0	5	3.0	0.558	10.8	LOS B	4.9	126.6	0.56	0.55	0.56	35.7
4	T1	360	3.0	383	3.0	0.558	5.5	LOS A	4.9	126.6	0.56	0.55	0.56	35.8
14	R2	198	3.0	211	3.0	0.558	5.5	LOS A	4.9	126.6	0.56	0.55	0.56	34.8
Approach		563	3.0	599	3.0	0.558	5.5	LOS A	4.9	126.6	0.56	0.55	0.56	35.4
West: 168th St NE														
5	L2	241	2.0	256	2.0	0.575	13.8	LOS B	5.0	125.8	0.76	0.85	0.86	33.6
2	T1	1	2.0	1	2.0	0.575	8.5	LOS A	5.0	125.8	0.76	0.85	0.86	33.6
12	R2	228	2.0	243	2.0	0.575	8.5	LOS A	5.0	125.8	0.76	0.85	0.86	32.8
Approach		470	2.0	500	2.0	0.575	11.2	LOS B	5.0	125.8	0.76	0.85	0.86	33.2
All Vehicles		1679	2.3	1786	2.3	0.705	8.7	LOS A	8.2	208.4	0.72	0.73	0.78	34.3

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

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

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

Intersection						
Int Delay, s/veh	3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	45	6	19	125	15	56
Future Vol, veh/h	45	6	19	125	15	56
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	47	6	20	130	16	58

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	0	0	53	0
Stage 1	-	-	-	50
Stage 2	-	-	-	170
Critical Hdwy	-	-	4.13	-
Critical Hdwy Stg 1	-	-	-	5.43
Critical Hdwy Stg 2	-	-	-	5.43
Follow-up Hdwy	-	-	2.227	-
Pot Cap-1 Maneuver	-	-	1546	-
Stage 1	-	-	-	970
Stage 2	-	-	-	857
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	-	1546	-
Mov Cap-2 Maneuver	-	-	-	747
Stage 1	-	-	-	970
Stage 2	-	-	-	845

Approach	EB	WB	NB
HCM Control Delay, s	0	1	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	943	-	-	1546	-
HCM Lane V/C Ratio	0.078	-	-	0.013	-
HCM Control Delay (s)	9.1	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection						
Int Delay, s/veh	3.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T		T		T	
Traffic Vol, veh/h	24	0	0	24	8	9
Future Vol, veh/h	24	0	0	24	8	9
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	96	96	96	96	96	96
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	25	0	0	25	8	9

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	38	13	17	0	0
Stage 1	13	-	-	-	-
Stage 2	25	-	-	-	-
Critical Hdwy	6.43	6.23	4.13	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-
Follow-up Hdwy	3.527	3.327	2.227	-	-
Pot Cap-1 Maneuver	972	1064	1594	-	-
Stage 1	1007	-	-	-	-
Stage 2	995	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	972	1064	1594	-	-
Mov Cap-2 Maneuver	972	-	-	-	-
Stage 1	1007	-	-	-	-
Stage 2	995	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.8	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1594	-	972	-	-
HCM Lane V/C Ratio	-	-	0.026	-	-
HCM Control Delay (s)	0	-	8.8	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection						
Int Delay, s/veh	6.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	0	0	0	0	8
Future Vol, veh/h	24	0	0	0	0	8
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	96	96	96	96	96	96
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	25	0	0	0	0	8

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	4	4	8	0	-	0
Stage 1	4	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Critical Hdwy	6.43	6.23	4.13	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	2.227	-	-	-
Pot Cap-1 Maneuver	1015	1077	1606	-	-	-
Stage 1	1017	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	1015	1077	1606	-	-	-
Mov Cap-2 Maneuver	928	-	-	-	-	-
Stage 1	1017	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1606	-	928	-	-
HCM Lane V/C Ratio	-	-	0.027	-	-
HCM Control Delay (s)	0	-	9	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

1.21144.00 - Williams Industrial

<i>Proposed Use</i>										
								Total Trips		
Land Use	Setting	Size	Units	Model	Rate¹	Units	Inbound %	Inbound	Outbound	Total
Business Park (LU 770) - Arlington		131,566 sf								
Daily	General Urban/Suburban			Rate	12.44	per ksf	50%	818	818	1,636
AM Peak Hour	General Urban/Suburban			Rate	1.35	per ksf	85%	151	27	178
PM Peak Hour	General Urban/Suburban			Rate	1.22	per ksf	26%	42	119	161

Notes:

1. Trip rates based on Institute of Transportation Engineers' (ITE) *Trip Generation* 11th Edition equation and average trip rate as shown above.