

# Traffic Impact Analysis

## FIRCREST PROSE

Prepared for:  
Alliance Residential

July 2022

Prepared by:



12131 113<sup>th</sup> Avenue NE, Suite 203  
Kirkland, WA 98034-7120  
Phone: 425-821-3665  
[www.transpogroup.com](http://www.transpogroup.com)

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# Introduction

This traffic impact analysis (TIA) identifies potential transportation-related impacts associated with the construction of a 395-unit multifamily residential development with 8,650 square feet of retail located in the City of Fircrest.

## Project Description

The project is located east of Mildred Street W with 23rd St W to the south and S 19th Street approximately 0.1 miles to the north (see Figure 1). The project would develop 395 multifamily units with 8,650 square feet of retail space. The existing unoccupied warehouse would be demolished. Three vehicular access points would be provided to the site with one on the northwestern corner, one on the southwestern corner, and one aligned with 22nd St W along the western frontage. A preliminary site plan is illustrated on Figure 2. The project is anticipated to be constructed and occupied by 2026.

## Study Scope

While the project is located in the City of Fircrest, access and off-site impacts are primarily within the University Place jurisdiction. As such City of University Place staff was consulted as part of the preparation of this Traffic Impact Analysis. Based on this coordination, the following intersections were identified for analysis:

1. Mildred Street W/S 19th Street
2. Mildred Street W/22nd Street W
3. 67th Avenue W/Regents Boulevard W/24th Street W
4. Bridgeport Way W/27th Street W
5. 35th Street W/67th Avenue W
6. 40th Street W/67th Avenue W

In addition to the off-site intersections, the three proposed access points were evaluated under future (2026) with-project conditions.

The scope of the analysis includes analysis of existing and future conditions in the vicinity of the project site under weekday PM peak hour conditions. A review of the surrounding street system, transit service, non-motorized facilities, existing and future (2026) without-project weekday peak hour traffic volumes, traffic operations, and traffic safety are provided. Future (2026) with-project conditions were estimated by adding site-generated traffic to future without-project volumes. The project's impacts on the surrounding transportation system were identified by comparing the future with-project conditions to the future without-project conditions.

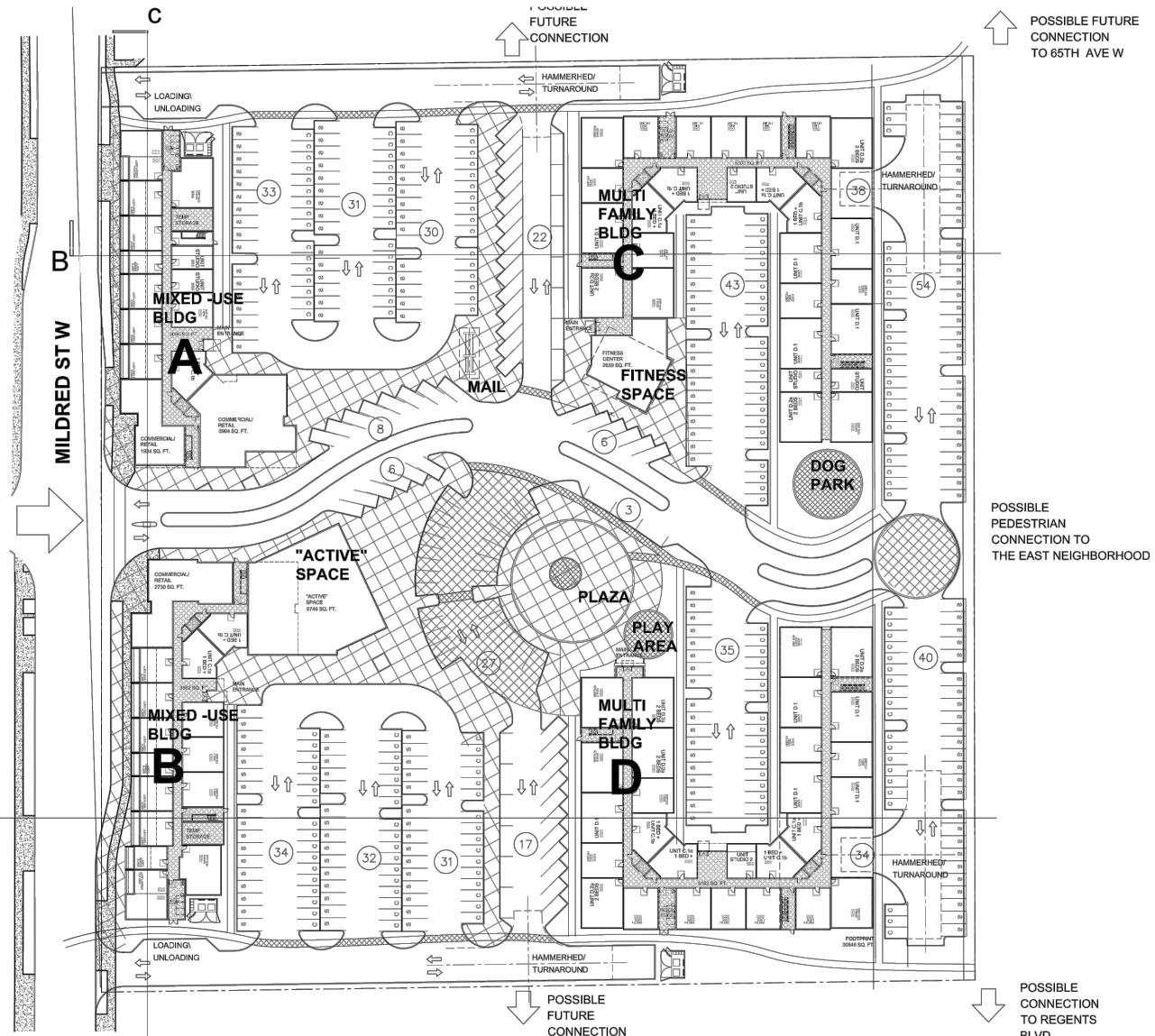


## Site Vicinity & Study Intersections

Fircrest Prose

FIGURE

1



## Preliminary Site Plan

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## FIGURE

2

# Existing and Future Without-Project Conditions

This section describes existing condition within the identified study area. Characteristics are provided for the roadway network, non-motorized facilities, transit service, existing traffic volumes, traffic operations, and traffic safety.

## Roadway Network

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

### Existing

The project site is in the City of Fircrest, with site accesses along Mildred Street W. The site lies south of S 19th Street, with the southernmost boundary approximately parallel to 23rd Street W. A description of the existing roadway network is shown on Table 1.

**Table 1. Study Area Existing Roadway Network Summary**

Roadway	Arterial Classification <sup>1</sup>	Posted Speed Limit (mph)	Number of Travel Lanes	Parking?	Sidewalks?	Bicycle Facilities?
S 19th Street	Principal Arterial	35	5	No	Yes	No
Mildred Street W	Minor Arterial	35	3-5 <sup>2</sup>	No	Yes	Yes
24th Street W	Major Collector	25	2	No	No	No
27th Street W/Regents Boulevard	Minor Arterial	35	3	No	Yes	No
Bridgeport Way W	Principal Arterial	35	5	No	Yes	Yes
35th Street W	Major Collector	25	2	No	Yes	No
40th Street W	Principal Arterial	35	3	No	Yes	Yes

1. Arterial Classification comes from WSDOT

2. S Mildred St is a 3 lane road that widens to 5 lanes at some intersections to include designated turn lanes

### Planned Improvements

Based on a review of the *City of University Place 2022-2027 Transportation Improvement Program* (TIP), seven planned improvements were identified within the vicinity of the study area that would impact the street network. Only two of the seven planned projects have secured some degree of funding at the time of this analysis. The following planned improvements were identified:

- **Mildred St/Regents Intersection Improvements (Project #1)** - Construction of intersection improvements at the intersection of 67th Avenue and Regents Boulevard. Project is projected to start in 2023 and last until 2026-2027.
- **27th St W Undergrounding (Project #2)** – Installation of underground utilities below 27th Street West between Grandview Drive and Bridgeport Way. Project is expected to start between 2026 and 2027.
- **67th Ave Phases 1-3 (Projects #11-13)** – Construct concrete curbs, gutters, and sidewalks on both sides of 67th Avenue between Regents Boulevard and 40th Street in phase 1, between Bridgeport Way and Cirque Drive in phase 2, and between Cirque Drive and 40th Street in phase 3. Phase 1 is projected for completion in 2022, phase 2 is expected to last between 2022 and 2024, and phase 3 is expected to begin in 2026. Some funding has been secured for phases 1 and 2.

- **40th Street Phase 3 (Project #14)** - Construct concrete curbs, gutters, sidewalks, and bike lanes on the north side of 40th Street between 7200 block and 67th Avenue. Project is expected to begin between 2026 and 2027.
- **35th Street Improvements Phases 1-2 (Projects # 19-20)** – Construction of concrete curbs, gutters, sidewalks, and bike lanes on both sides of 35th Street between Bridgeport way and 67th Street during phase 1, and between Grandview Drive and Bridgeport Way during phase 2. Both phases have secured funding and are expected to be completed in 2023.
- **27th Street (Project #26)** – Construction of curb, gutter, sidewalks and bike lane on one side of 27th Street between Grandview Drive and city limits (67th Avenue/ S Mildred Street). Enclosed storm drainage will also be installed throughout the street. The project is expected to start between 2026 and 2027.
- **40th Street/67th Avenue Intersection (Project #43)** - Construction of intersection improvements at the intersection of 40th Street and 67th Avenue. Project is expected to start between 2026 and 2027.

While worth noting these improvements, no intersection improvements were identified by the City of Fircrest that would impact the operational characteristics of study area intersections.

## Non-Motorized Facilities

Sidewalks are provided along Mildred Street W in the vicinity of the project site. Marked crosswalks with curb ramps are present at all 6 intersections in the study area. Bike lanes exist in both the north and south directions of the segment of Mildred Street W that borders the project site. The nearest signalized pedestrian and bicycle crossings occur to the north at S Mildred Street/S 19th Street, and to the south at Mildred Street W/Regents Boulevard/67th Avenue W.

In the future, as identified in the planned improvement section above, there are planned project to install sidewalks at the intersections of Mildred Street/Regents Boulevard, Bridgeport Way/27th Street, 67th Avenue/35th Street, and 67th Avenue/40th Street.

## Transit Service

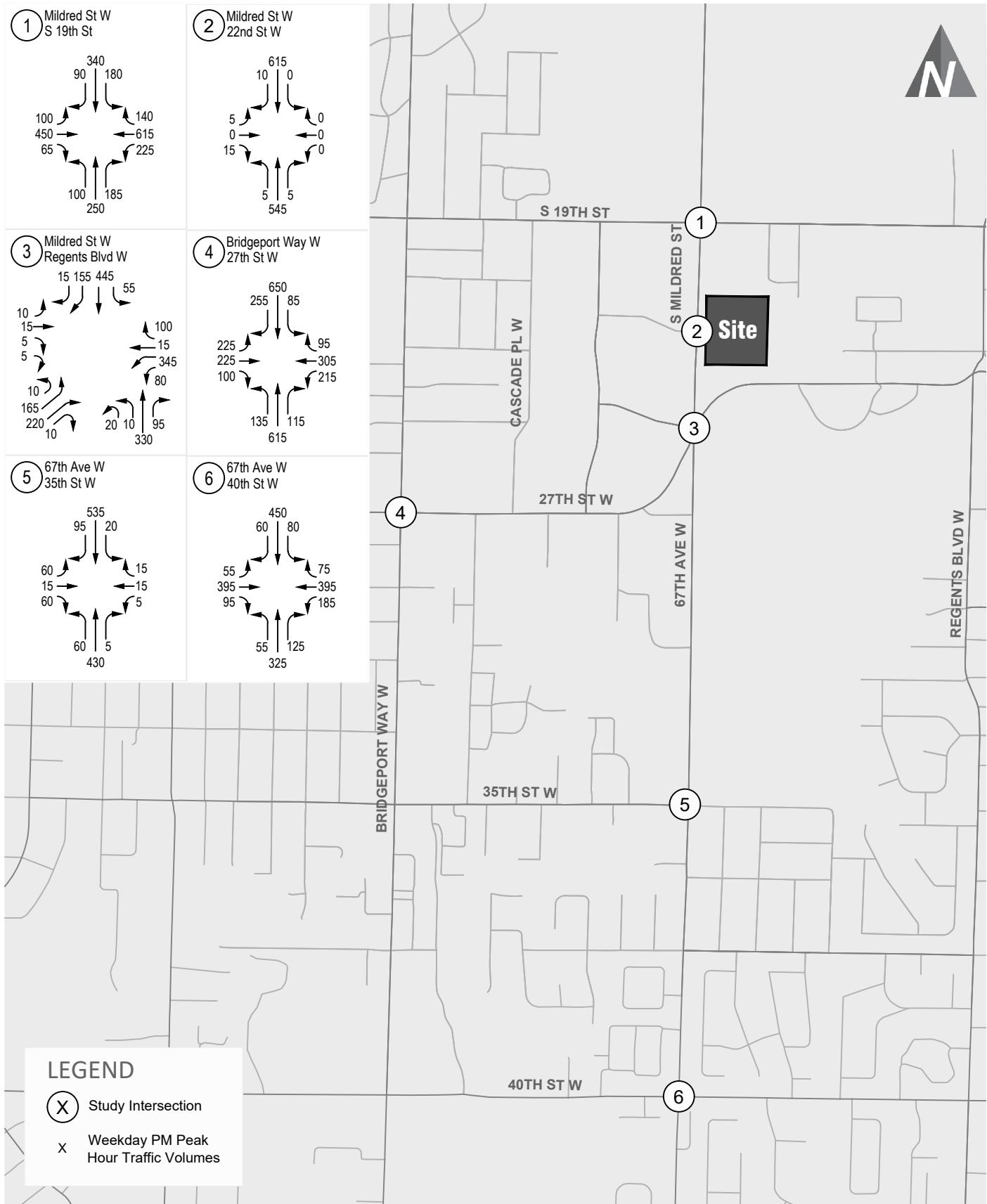
The closest transit stop to the site is located along S Mildred Street at the 22nd Street W intersection, immediately south of the existing site access. The stop is served by Pierce Transit's Route 53, providing service from Tacoma Community College to South Tacoma. This route has a designate transit-only lane on the south side of the intersection of S Mildred Street and S 19th Street. Pierce Transit's Routes 2 and 52 also run along streets designated in the study area.

## Traffic Volumes

The following sections summarize existing and future (2026) without-project traffic volumes within the study area.

### *Existing*

Existing weekday PM peak period (4-6 p.m.) traffic volumes were collected in June 2022 at the study intersections. The estimated existing weekday PM peak hour traffic volumes are shown on Figure 3. The traffic volumes were rounded to the nearest five vehicles to account for daily fluctuations. The detailed weekday PM peak hour traffic counts are included in Appendix A.



## Existing Weekday Peak Hour Traffic Volumes

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FIGURE

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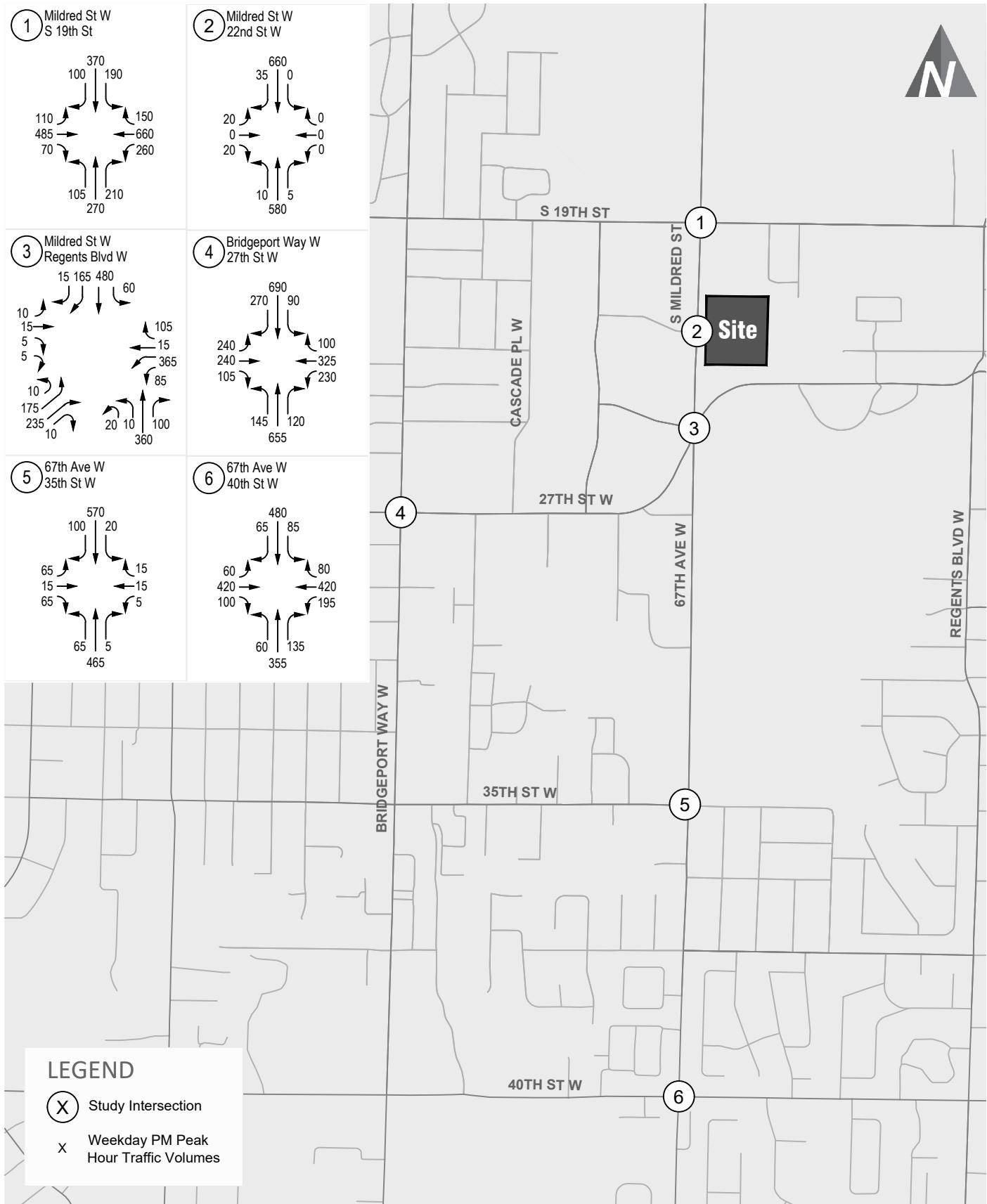
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## ***Future Without-Project Traffic Volumes***

Future (2026) without-project traffic volumes were forecasted by applying an annual growth rate to existing traffic volumes and adding traffic from “pipeline” development projects that would also contribute traffic to study intersections. Consistent with the Traffic Impact Analysis completed for the project on the west side of Mildred Street W, an annual growth rate of 1.5 percent was applied to existing study intersection traffic volumes to estimate 2026 horizon year background traffic growth. In addition to the background growth rate, one pipeline project was identified to be completed by 2026 and is included in the analysis, based on coordination with City staff. The pipeline project is described below.

- **Narrow Urban Village:** *Up to 272 Multi-family dwelling units single family development located between 70th Avenue W and Mildred Street W. The development is bisected by 22nd Street W; providing a new intersection with Mildred Street W.*

The forecast future (2026) without-project weekday peak hour traffic volumes are shown on Figure 4.



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

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FIGURE

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## Traffic Operations

The operational characteristics of an intersection are determined by calculating the intersection level of service (LOS). 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 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.

Existing analysis parameters such as channelization were maintained for future (2026) without-project conditions. Weekday AM and PM peak hour traffic operations for existing and future (2026) without-project conditions were evaluated based on the procedures identified in the *Highway Capacity Manual* (HCM 6) using *Synchro 11*. *Synchro 11* is a software program that uses HCM methodology to evaluate intersection LOS and average vehicle delay. The intersections of S 19th Street/Mildred Street W and Mildred Street W/Regents Boulevard/67th Avenue W were evaluated based on HCM 2000 methodology due to the northbound transit queue jump and five-lane approach respectively. These two parameters are restricted by HCM 6th edition methodology, so HCM 2000 was used. 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.

**Table 2. Existing and Future (2026) Without-Project Weekday PM Peak Hour Level of Service**

Intersections	Traffic Control <sup>4</sup>	Existing			2026 Without-Project		
		LOS <sup>1</sup>	Delay <sup>2</sup>	WM <sup>3</sup>	LOS	Delay	WM
<b>PM Peak Hour</b>							
1. Mildred St W/S 19th St	Signal	D	35	-	D	37	-
2. Mildred St W/22nd St W	TWSC	C	17	EB	D	27	EB
3. Mildred St W/Regents Blvd	Signal	D	49	-	D	52	-
4. Bridgeport Way W/27th St W	Signal	B	18	-	B	19	-
5. 67th Ave W/35th St W	Signal	A	6	-	A	6	-
6. 67th Ave W/40th St W	Signal	C	28	-	C	33	-

Note: TWSC = two-way stop-controlled.

1. Level of service (LOS), based on *Highway Capacity Manual* 6th Edition methodology.
2. Average delay in seconds per vehicle.
3. Worst movement reported for unsignalized intersections where EB = eastbound
4. Existing traffic control

As shown in Table 2, all intersections operate at LOS D or better under existing and future (2026) without-project PM peak hour conditions, meeting the City's LOS D standard.

## Traffic Safety

Collision data was obtained from the Washington State Department of Transportation (WSDOT) for the most recent three-year period for the study area intersections. Data was summarized between January 1, 2019 and December 31, 2021. A summary of the collision history at the study intersections is provided in Table 3.

**Table 3. Three-Year Collision Summary – 2019 to 2021**

Location	Number of Collisions			Total	Annual Average	Collisions per MEV <sup>1</sup>
	2019	2020	2021			
1. Mildred St W/S 19th St	5	4	9	18	6.00	0.60
2. Mildred St W/22nd St W	1	1	0	2	0.67	0.15
3. Mildred St W/Regents Blvd	6	0	4	10	3.33	0.47
4. Bridgeport Way W/27th St W	5	8	8	21	7.00	0.53
5. 67th Ave W/35th St W	2	1	2	5	1.67	0.35
6. 67th Ave W/40th St W	7	3	2	12	4.00	0.38

Source: WSDOT June 2022

1. MEV = Million Entering Vehicles

As shown in Table 3, annual averages ranged from 0.67 to 7 collisions per year at the study intersections. The majority of collisions resulted in property damage only and were the result of rear-end collisions or entering at an angle. There were no reported fatalities. There was one reported pedestrian related collision at the intersection of Bridgeport Way W/27th Street W in which a vehicle driving straight hit a pedestrian at night, resulting in an injury.

The number of collisions per million entering vehicles (MEV) was also reviewed for the study intersections. The collision rate is representative of the number of collisions per one million entering vehicles at each intersection. Intersections with a rate greater than 1.0 collisions per MEV are typically noted for further investigation to determine whether an adverse condition exists. As shown in Table 3, the highest collisions per MEV occurred at the intersection of Mildred Street W/S 19th Street with a value of 0.60. The collision summary indicates that there are no present safety concerns at the study intersections.

## Project Impacts

The following sections summarize the proposed project's impacts on the surrounding street system. First, traffic volumes generated by the proposed project are estimated and then distributed and assigned to adjacent roadways within the study area. Next, project trips are added to future without-project traffic volumes and the potential impact to traffic operations are identified. Site-specific items are also discussed.

### Trip Generation

Trip generation for the existing and proposed project was based on established trip rates published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual* (11th Edition, 2021). As previously noted, the project includes construction of 395 multifamily (low-rise) homes and 8,650 sf of retail space. For the proposed land uses, ITE's Multifamily (LU #221) and Strip Plaza Retail (< 40k) (LU #822) were used. ITE land use definitions for 821 & 822 note that specific uses in this category could include retail merchandising facilities, office space, restaurants, banks, and recreational facilities amongst others. Pass-by trips were evaluated for the retail use consistent with the *Trip Generation Manual*, which is calculated as 40% of the gross trips.

Table 4 shows the estimated weekday trips generated by the proposed project. The detailed trip generation calculations are included in Appendix E.

**Table 4. Estimated Weekday Vehicle Trip Generation**

Land Use <sup>1</sup>	Size	Daily Trips	AM Peak Hour Trips			PM Peak Hour Trips		
			In	Out	Total	In	Out	Total
<b>Proposed</b>								
Multifamily (LU #221)	395 du	1,838	37	125	162	94	60	154
Retail (LU #822 <sup>2</sup> )	8,650 sf	68	12	8	20	29	28	57
Less Pass-By		<u>28</u>	<u>4</u>	<u>4</u>	<u>8</u>	<u>11</u>	<u>11</u>	<u>22</u>
Subtotal		<b>40</b>	<b>8</b>	<b>4</b>	<b>12</b>	<b>18</b>	<b>17</b>	<b>35</b>
<b>Net New Trips</b>		<b>1,878</b>	<b>45</b>	<b>129</b>	<b>174</b>	<b>112</b>	<b>77</b>	<b>189</b>

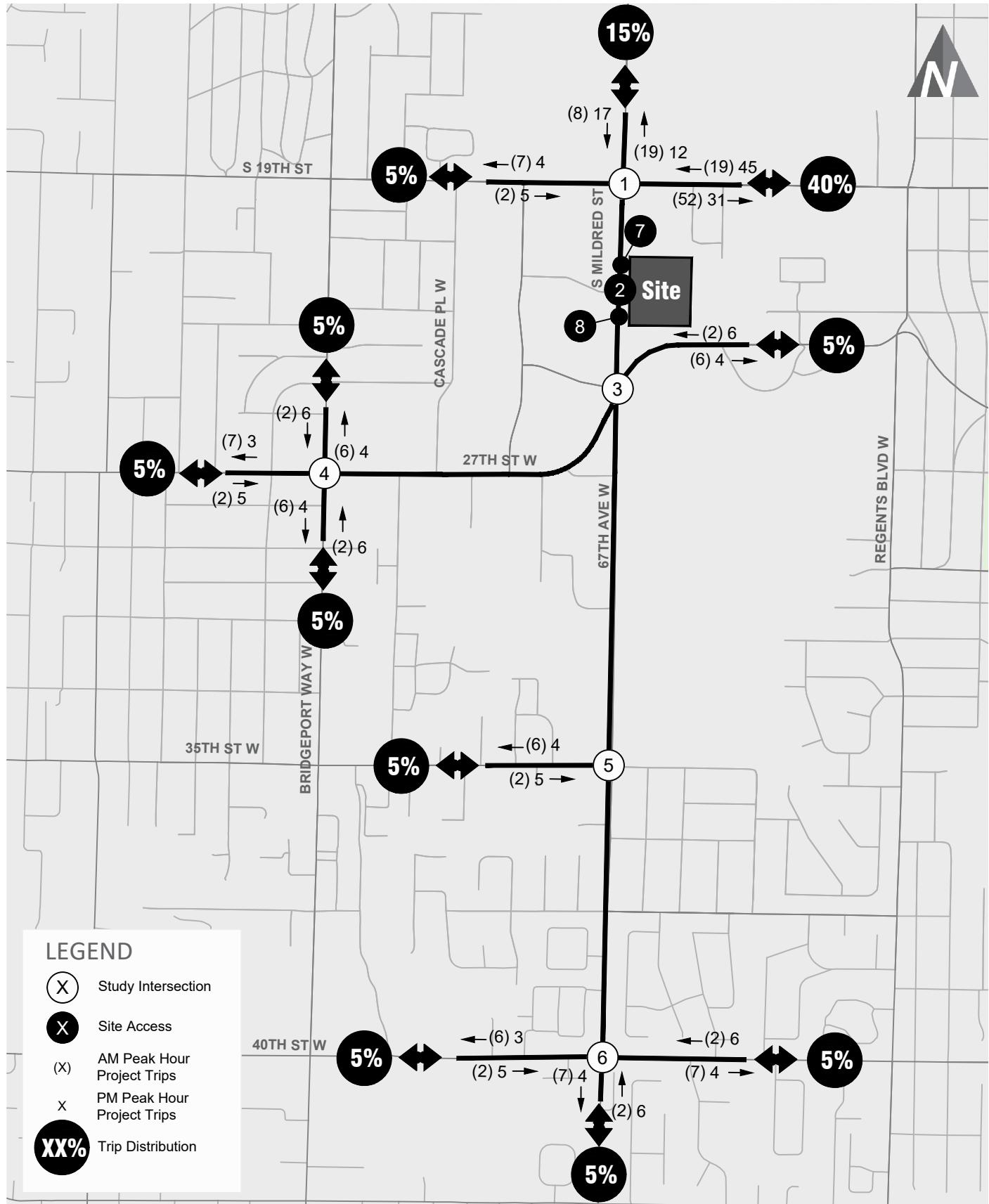
Note: du = dwelling units, sf = square feet  
1. Average trip rates from ITE *Trip Generation Manual*, 11th Edition (2021).  
2. ITE Land use #822 – Strip Plaza Retail < 40k

As shown in Table 4, the proposed project is estimated to generate 1,878 weekday net new daily trips with 174 occurring in the weekday AM peak hour and 189 occurring in the PM peak hour.

### Trip Distribution & Assignment

Trip distribution patterns for the proposed uses to and from the site were based on previous studies in the project vicinity, U.S. Census Bureau's *OnTheMap* tool, and were coordinated with City of University Place staff. *OnTheMap* is a web-based mapping and reporting application, which shows where workers are employed and where they live based on census data. The *OnTheMap* census data was translated to the number of people that live within a quarter-mile radius of the proposed project and where they work. The zip codes were evaluated to determine if a person would be more likely to travel to the zip code via vehicle or by other means. Trips to zip codes closer to the proposed project site or in more transit-oriented locations are more likely to use transit, walk, bike, or other non-SOV modes. The trip distribution for the proposed project is shown in Figure 5.

The net new peak hour project trips were assigned within the study area based on distribution for the proposed project and are shown in Figure 5.



## Project Trip Distribution and Weekday Peak Hour Assignment

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FIGURE

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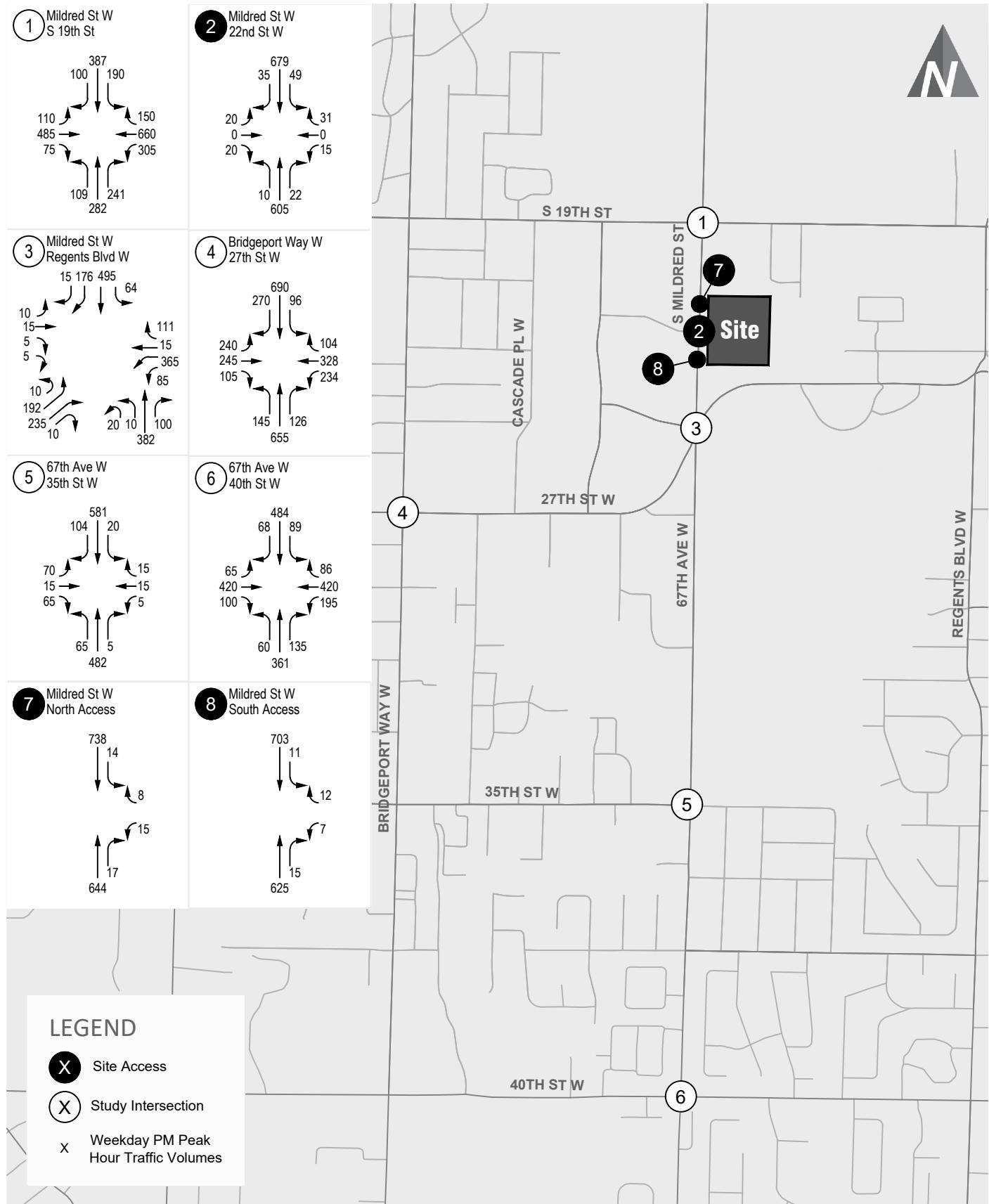
## Traffic Volume Impact

Site-generated weekday peak hour traffic volumes were added to future without-project volumes at study intersections. The resulting future (2026) with-project peak hour traffic volumes are illustrated on Figure 6. 5 summarizes the anticipated increase in total entering traffic at the study intersections as well as the percent of future with-project traffic volumes attributable to the proposed project.

**Table 5. Traffic Volume Impacts at Study Intersections**

Intersection	Total Entering Vehicles			
	2026 Without-Project	New Project Trips	2026 With-Project	Percent Project Share
<b><u>Weekday PM Peak Hour</u></b>				
1. Mildred St W/S 19th St	2,980	114	3,094	3.7%
2. Mildred St W/22nd St W	1,330	156	1,486	10.5%
3. Mildred St W/Regents Blvd	2,245	75	2,320	3.2%
4. Bridgeport Way W/27th St W	3,210	28	3,238	0.9%
5. 67th Ave W/35th St W	1,405	37	1,442	2.6%
6. 67th Ave W/40th St W	2,455	28	2,483	1.1%

As shown in Table 5, the project generated traffic volumes are anticipated to be minimal (less than 4 percent) at the study intersections under future conditions with the exception of Mildred Street W/22nd Street W, which will function as the primary site access with 10.5 percent project share.



Future (2026) With-Project Weekday Peak Hour Traffic Volumes FIGURE  
Fircrest Prose

## Traffic Operations Impact

A future (2026) with-project level of service analysis was conducted for the weekday peak hour to analyze traffic impacts of the proposed project. The same methodologies were applied as described for existing and future without-project conditions. All intersection parameters such as channelization and intersection control were consistent with those used in the evaluation of future without-project conditions. A comparison of future (2026) without-project and with-project weekday peak hour traffic operations is summarized in Table 6. Detailed LOS worksheets are provided in Appendix C.

**Table 6. Future (2026) Without- and With-Project Weekday Peak Hour LOS Summary**

Intersections	Traffic Control	2026 Without-Project			2026 With-Project		
		LOS <sup>1</sup>	Delay <sup>2</sup>	WM	LOS	Delay	WM
<b>PM Peak Hour</b>							
1. Mildred St W/ S 19th St	Signal	D	37	-	D	39	-
3. Mildred St W/ Regents Blvd	Signal	D	52	-	D	54	-
4. Bridgeport Way W/ 27th St W	Signal	B	19	-	B	19	-
5. 67th Ave W/ 35th St W	Signal	A	6	-	A	6	-
6. 67th Ave W/ 40th St W	Signal	C	33	-	C	34	-

1. Level of service (LOS), based on *Highway Capacity Manual* 6th Edition methodology.

2. Average delay in seconds per vehicle.

As shown in Table 6, under future with-project conditions, all intersections are forecast to operate at LOS D or better, meeting the City of University Place requirements.

## Site Access Evaluation

As described above and shown on Figure 2, three vehicular accesses would be provided to the site via Mildred Street W located at the northern corner, central, and southern corner along the western frontage. The operations at the site access along Mildred Street W are reviewed below.

### Traffic Operations

Weekday PM peak hour traffic operations were evaluated at the site accesses along Mildred Street W under future (2026) with-project conditions based on the same methodology as noted above for the off-site study intersections. The traffic operations are summarized in Table 7. Detailed LOS worksheets are provided in Appendix C.

Since Mildred Street W is a five (5) lane roadway with a center two-way left-turn lane, no turn restrictions were assumed at the northern or southern site access points.

**Table 7. Existing and Future (2026) Without-Project Weekday PM Peak Hour Level of Service**

Intersections	Traffic Control	2026 With-Project		
		LOS <sup>1</sup>	Delay <sup>2</sup>	WM <sup>3</sup>
2. Mildred St W/22nd St W/Central Access	TWSC	E	38	EB
7. Mildred St W/Northern Access	TWSC	C	17	WB
8. Mildred St W/Southern Access	TWSC	B	15	WB

Note: TWSC = two-way stop-controlled. Note shading indicates intersection is operating below LOS D standard.

1. Level of service (LOS), based on *Highway Capacity Manual* 6th Edition methodology.

2. Average delay in seconds per vehicle.

3. Worst movement reported for unsignalized intersections where EB = eastbound, WB = westbound.

As shown in Table 7, the northern and southern site accesses are forecast to operate at LOS C or better. The eastbound approach at the 22nd St W/central access point degrades to LOS

E with the proposed project. The City of University Place LOS standard is D. The operations at the central access are discussed below.

- **Mildred Street W/22nd Street W/Central Access**
  - Queuing was reviewed at the intersection, and a 95th percentile queue of less than 1 vehicle (EB approach) is anticipated during without-project conditions. With the addition of project-generated traffic, the 95th percentile queue is not expected to increase substantially.
  - A signal warrant analysis was conducted at the intersection utilizing *HCS 7* to determine whether the intersection would meet signal warrants. The signal warrant analysis suggests that signalizing the intersection is not warranted. The signal warrant analysis is located in Appendix D.
  - Converting the intersection into an all-way stop-controlled intersection would yield LOS F operations under future (2026) with-project PM peak hour conditions.
  - The proposed project has accommodated a future grid system consistent with Fircrest requirements. This internal grid network will provide additional connections to properties north, south, and east of the site as those properties redevelop. Ultimately these connections will provide an alternative to utilizing Mildred Street W as the only means to access the site.
  - The Narrow Urban Village development on the west side of Mildred Street W will maintain the east-west connection between 70th Avenue W and Mildred Street W via 22nd Street W, which would allow drivers to utilize 70th Avenue W as an alternative north-south route.

## Mitigation

The operational analysis summarized above showed that the off-site study intersections and site accesses are forecast to operate at LOS D or better with the project during the weekday PM peak hour. One site access is forecast to operate poorly. The Mildred Street W/22nd Street W/Central Site Access intersection is anticipated to operate at LOS E under future (2026) with-project PM peak hour conditions with 11 seconds of added delay forecast for the eastbound approach. As noted above, the queuing increase at the intersection is minimal, and a signal is not warranted at the intersection. The future grid system would provide additional alternative routes in the vicinity of the site.

## Findings and Recommendations

This traffic impact study summarizes the project traffic impacts of the proposed Fircrest Prose mixed-use development. General findings and recommendations include:

- The proposed project, constructing 395 multifamily homes and 8,650 square feet of retail, is estimated to generate approximately 1,878 weekday net new daily trips with 174 occurring in the AM peak hour and 189 occurring in the PM peak hour.
- Project traffic would represent less than 4 percent of the future (2026) weekday peak hour traffic volumes at the study intersections during the weekday PM peak hour with the exception of the main central site access, where it would represent 10.5 percent.
- Traffic operations at each intersection include:
  - All off-site intersections as well as the northern and southern site accesses are forecast to operate at LOS D or better under future (2026) with-project PM peak hour conditions, meeting the City of University Place standards.
  - The central site access along Mildred Street W is forecast to operate at LOS E with the project during the weekday PM peak hour. This is accompanied by an increase in delay of 11 seconds. Queuing at the intersection is anticipated to increase from 0.7 vehicles to 1.1 vehicles when comparing without-project and with-project conditions. A signal is not warranted at the intersection.

## Appendix A: Traffic Counts

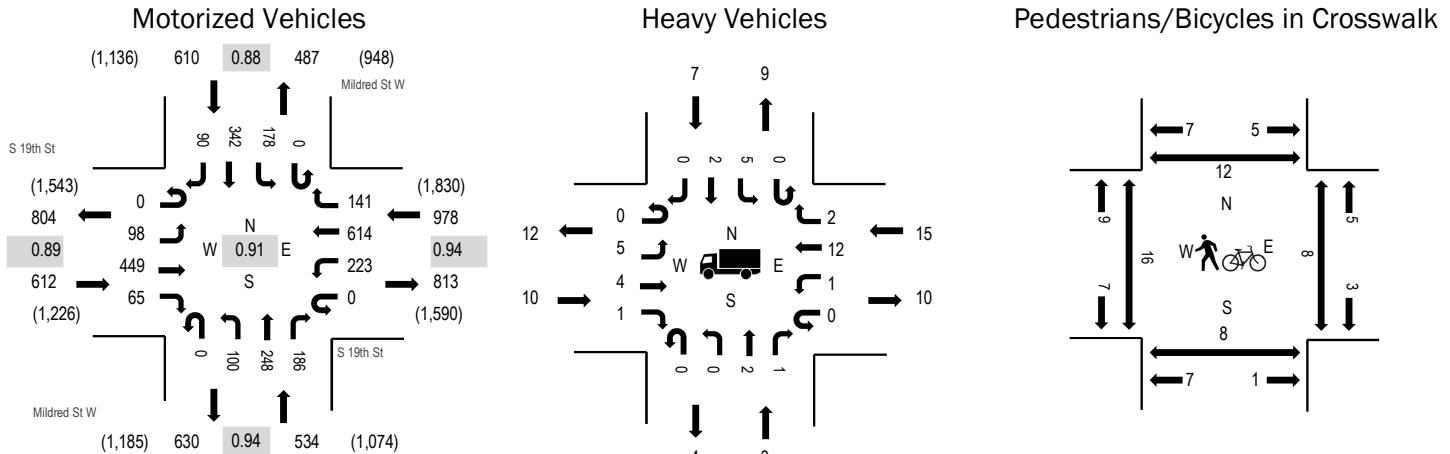
**Location:** 1 Mildred St W & S 19th St PM

**Date:** Tuesday, June 14, 2022

**Peak Hour:** 04:30 PM - 05:30 PM

**Peak 15-Minutes:** 05:00 PM - 05:15 PM

### Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	1.6%	0.89
WB	1.5%	0.94
NB	0.6%	0.94
SB	1.1%	0.88
All	1.3%	0.91

### Traffic Counts - Motorized Vehicles

Interval Start Time	S 19th St Eastbound				S 19th St Westbound				Mildred St W Northbound				Mildred St W Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	24	113	18	0	46	143	32	0	26	63	44	0	39	79	25	652	2,622
4:15 PM	0	36	102	20	0	55	152	32	0	23	47	58	0	24	80	14	643	2,723
4:30 PM	0	23	112	9	0	62	148	30	0	27	64	56	0	36	71	22	660	2,734
4:45 PM	0	28	95	21	0	42	154	39	0	26	63	46	0	40	87	26	667	2,730
5:00 PM	0	30	132	15	0	61	159	39	0	24	70	47	0	58	102	16	753	2,644
5:15 PM	0	17	110	20	0	58	153	33	0	23	51	37	0	44	82	26	654	
5:30 PM	0	31	122	11	0	50	137	30	0	21	67	45	0	37	71	34	656	
5:45 PM	0	15	106	16	0	35	116	24	0	28	60	58	0	29	74	20	581	
Count Total	0	204	892	130	0	409	1,162	259	0	198	485	391	0	307	646	183	5,266	
Peak Hour	0	98	449	65	0	223	614	141	0	100	248	186	0	178	342	90	2,734	

### Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway				Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB		EB	NB	WB	SB	Total
4:00 PM	4	0	3	3	10	4:00 PM	0	0	0	0	4:00 PM	6	2	5	7	20
4:15 PM	3	1	5	1	10	4:15 PM	0	0	0	0	4:15 PM	2	0	0	2	4
4:30 PM	2	0	4	1	7	4:30 PM	0	1	0	1	4:30 PM	5	1	2	4	12
4:45 PM	4	2	4	2	12	4:45 PM	0	0	0	0	4:45 PM	7	2	4	5	18
5:00 PM	2	0	2	2	6	5:00 PM	0	0	0	0	5:00 PM	6	3	2	4	15
5:15 PM	2	1	5	2	10	5:15 PM	0	2	0	0	5:15 PM	0	6	0	0	6
5:30 PM	1	0	4	3	8	5:30 PM	0	0	0	0	5:30 PM	7	1	3	7	18
5:45 PM	2	2	1	2	7	5:45 PM	0	0	0	0	5:45 PM	2	2	0	4	8
Count Total	20	6	28	16	70	Count Total	0	3	0	1	Count Total	35	17	16	33	101
Peak Hour	10	3	15	7	35	Peak Hour	0	3	0	1	Peak Hour	18	12	8	13	51

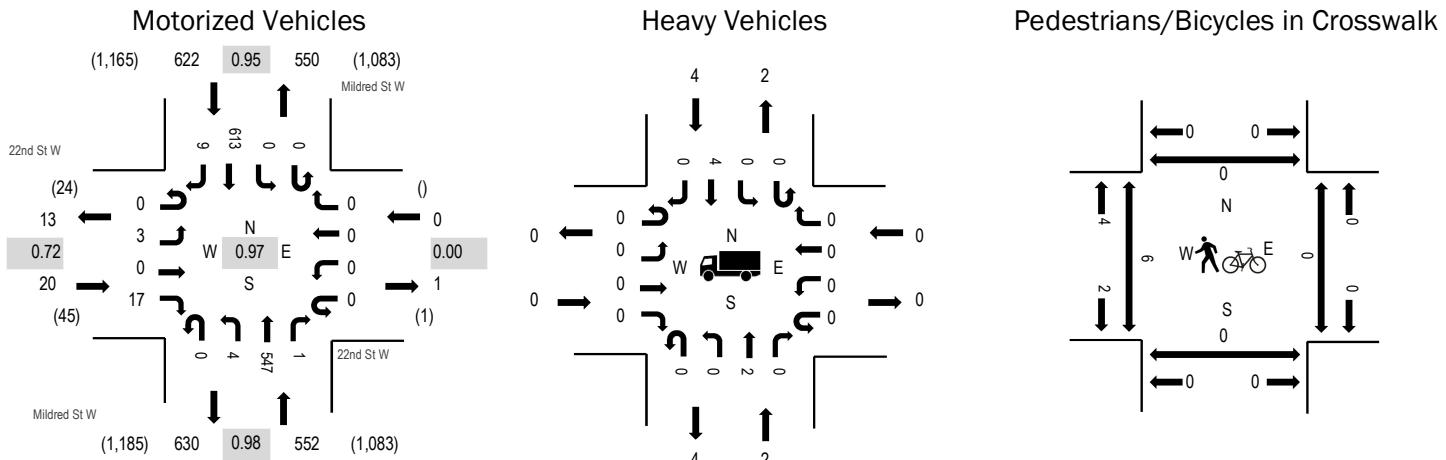
**Location:** 2 Mildred St W & 22nd St W PM

**Date:** Tuesday, June 14, 2022

**Peak Hour:** 04:15 PM - 05:15 PM

**Peak 15-Minutes:** 05:00 PM - 05:15 PM

### Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.0%	0.72
WB	0.0%	0.00
NB	0.4%	0.98
SB	0.6%	0.95
All	0.5%	0.97

### Traffic Counts - Motorized Vehicles

Interval Start Time	22nd St W Eastbound				22nd St W Westbound				Mildred St W Northbound				Mildred St W Southbound				Total	Rolling Hour	
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			
4:00 PM	0	1	0	6	0	0	0	0	0	1	137	0	0	0	0	126	2	273	1,160
4:15 PM	0	0	0	4	0	0	0	0	0	2	139	0	0	0	0	148	0	293	1,194
4:30 PM	0	2	0	6	0	0	0	0	0	1	135	1	0	0	0	144	4	293	1,177
4:45 PM	0	0	0	3	0	0	0	0	0	0	139	0	0	0	0	158	1	301	1,151
5:00 PM	0	1	0	4	0	0	0	0	0	1	134	0	0	0	0	163	4	307	1,133
5:15 PM	0	2	0	5	0	0	0	0	0	1	109	0	0	0	0	157	2	276	
5:30 PM	0	3	0	5	0	0	0	0	0	0	132	0	0	0	0	125	2	267	
5:45 PM	0	0	0	3	0	0	0	0	0	2	149	0	0	0	0	128	1	283	
Count Total	0	9	0	36	0	0	0	0	8	1,074	1	0	0	0	1,149	16	2,293		
Peak Hour	0	3	0	17	0	0	0	0	4	547	1	0	0	0	613	9	1,194		

### Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway				Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB		EB	NB	WB	SB	Total
4:00 PM	0	0	0	2	2	4:00 PM	0	0	0	0	4:00 PM	2	0	0	0	2
4:15 PM	0	1	0	1	2	4:15 PM	0	0	0	0	4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	1	1	4:30 PM	0	0	0	0	4:30 PM	2	0	0	0	2
4:45 PM	0	1	0	1	2	4:45 PM	0	0	0	0	4:45 PM	4	0	0	0	4
5:00 PM	0	0	0	1	1	5:00 PM	0	0	0	0	5:00 PM	2	0	0	0	2
5:15 PM	0	1	0	1	2	5:15 PM	0	2	0	0	5:15 PM	1	0	0	0	1
5:30 PM	0	2	0	3	5	5:30 PM	0	0	0	0	5:30 PM	6	0	0	0	6
5:45 PM	0	2	0	0	2	5:45 PM	0	0	0	0	5:45 PM	0	0	0	0	0
Count Total	0	7	0	10	17	Count Total	0	2	0	0	Count Total	17	0	0	0	17
Peak Hour	0	2	0	4	6	Peak Hour	0	0	0	0	Peak Hour	8	0	0	0	8

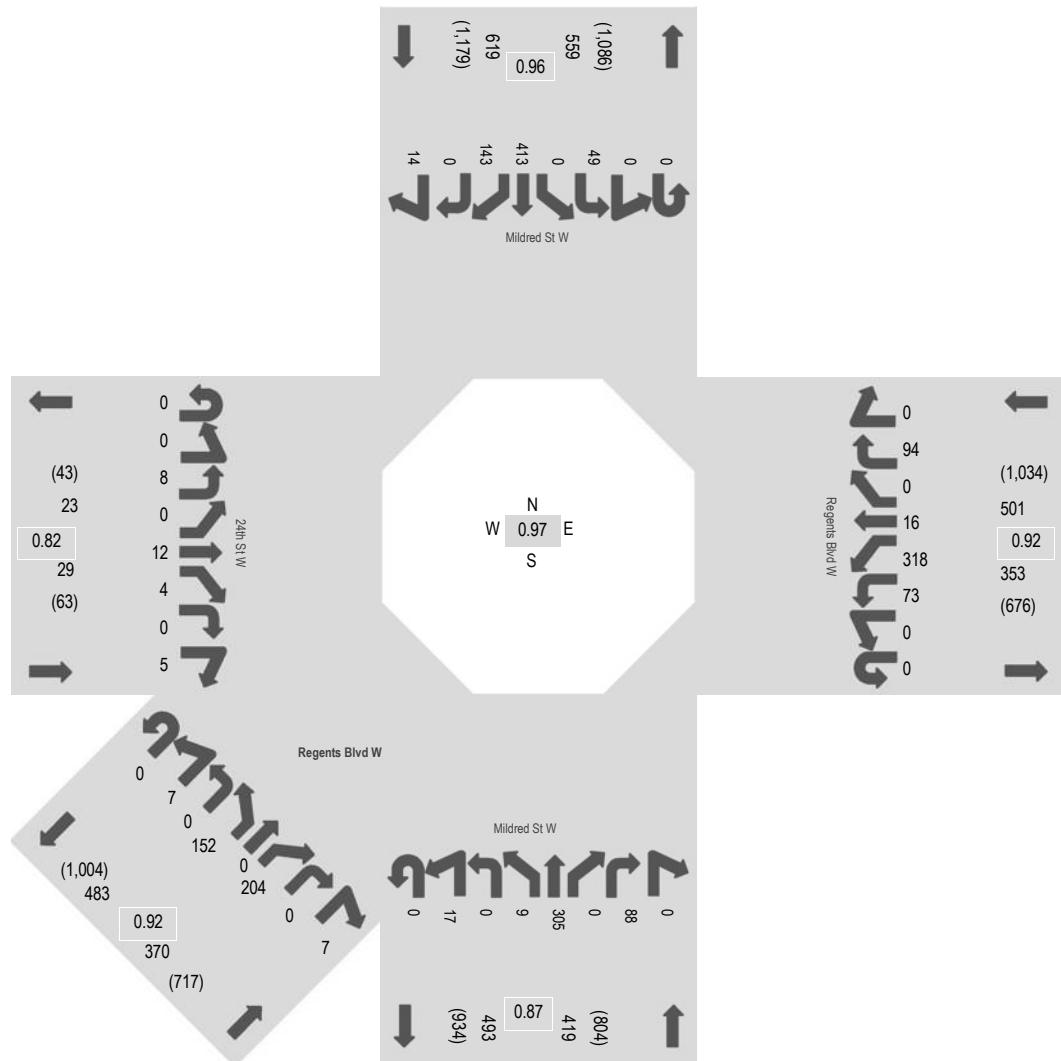
**Location:** 3 Mildred St W & Regents Blvd W PM

**Date:** Tuesday, June 14, 2022

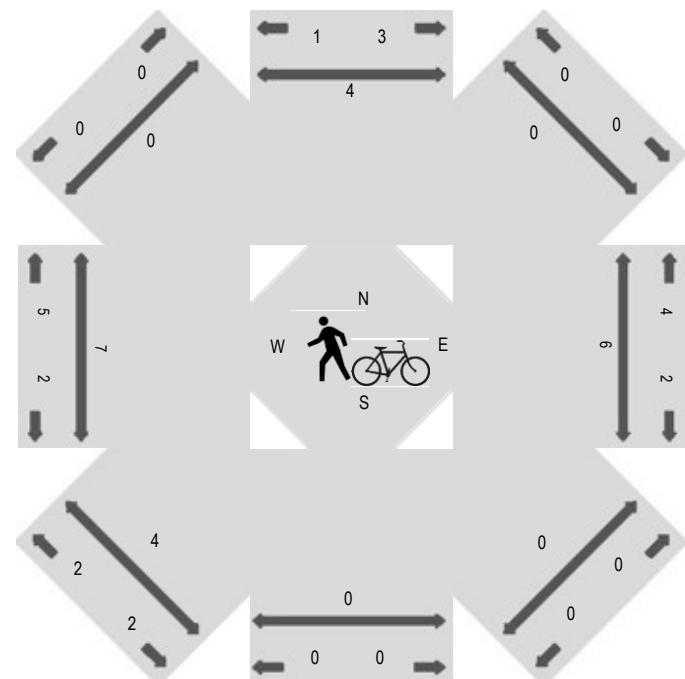
**Peak Hour:** 04:15 PM - 05:15 PM

**Peak 15-Minutes:** 04:30 PM - 04:45 PM

### Peak Hour - Motorized Vehicles

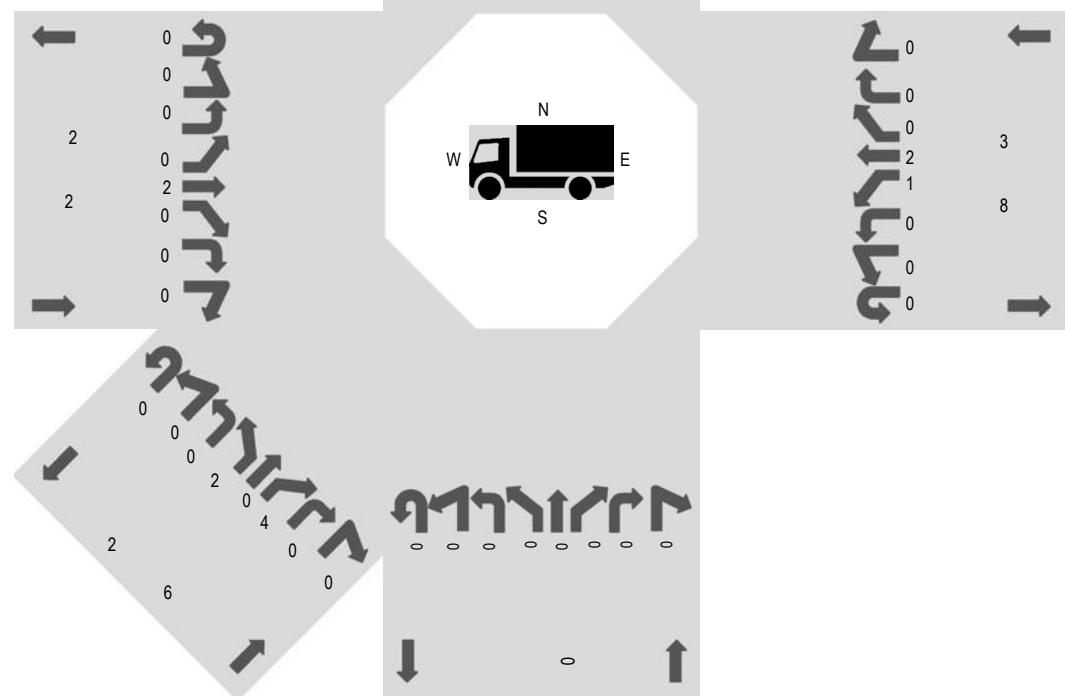


### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

## Peak Hour - Heavy Vehicles



	HV%	PHF
WB	0.6%	0.92
NWB	0.0%	0.00
NB	0.0%	0.87
NEB	1.6%	0.92
EB	6.9%	0.82
SEB	0.0%	0.00
SB	0.5%	0.96
SWB	0.0%	0.00
All	0.7%	0.97

## Traffic Counts - Motorized Vehicles

Interval Start Time	Westbound								Northwestbound								Northbound								Northeastbound									
	U	HL	L	BL	T	BR	R	HR	U	HL	L	BL	T	BR	R	HR	U	HL	L	BL	T	BR	R	HR	U	HL	L	BL	T	BR	R	HR		
4:00 PM	0	0	19	82	4	0	23	0									0	3	0	0	70	0	19	0	0	0	1	0	44	0	52	0	0	0
4:15 PM	0	0	17	83	5	0	27	0									0	4	0	5	71	0	25	0	0	0	3	0	45	0	52	0	3	0
4:30 PM	0	0	16	86	5	0	21	0									0	4	0	3	80	0	34	0	0	0	3	0	36	0	52	0	3	0
4:45 PM	0	0	23	79	3	0	20	0									0	6	0	1	78	0	13	0	0	0	1	0	35	0	51	0	0	0
5:00 PM	0	0	17	70	3	0	26	0									0	3	0	0	76	0	16	0	0	0	0	36	0	49	0	1	0	
5:15 PM	0	0	27	93	1	0	20	0									0	2	0	1	61	0	13	0	0	0	3	0	30	0	52	0	0	0
5:30 PM	0	0	25	87	4	0	21	0									0	6	0	0	75	0	16	0	0	0	1	0	30	0	45	0	0	0
5:45 PM	0	0	18	81	6	0	22	0									0	9	0	3	87	0	20	0	0	0	0	40	0	48	0	1	0	
Count Total	0	0	162	661	31	0	180	0									0	37	0	13	598	0	156	0	0	0	12	0	296	0	401	0	8	0
Peak Hour	0	0	73	318	16	0	94	0									0	17	0	9	305	0	88	0	0	0	7	0	152	0	204	0	7	0

### Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles								Interval Start Time	Bicycles on Roadway								Interval Start Time	Pedestrians/Bicycles on Crosswalk									
	WB	NWB	NB	NEB	EB	SEB	SB	SWB		WB	NWB	NB	NEB	EB	SEB	SB	SWB		WB	NWB	NB	NEB	EB	SEB	SB	SWB	Total	
4:00 PM	4	0	0	0	1	0	1	0	6	4:00 PM	0	0	0	0	0	0	0	0	4:00 PM	2	0	0	0	0	0	0	0	2
4:15 PM	2	0	0	2	1	0	1	0	6	4:15 PM	0	0	0	0	0	0	0	0	4:15 PM	0	0	0	0	0	0	1	0	1
4:30 PM	0	0	0	2	0	0	0	0	2	4:30 PM	0	0	0	0	0	0	0	0	4:30 PM	0	0	0	0	0	0	2	0	2
4:45 PM	0	0	0	1	1	0	1	0	3	4:45 PM	0	0	0	0	0	0	0	0	4:45 PM	4	0	0	3	4	0	1	0	12
5:00 PM	1	0	0	1	0	0	1	0	3	5:00 PM	0	0	0	0	0	0	0	0	5:00 PM	2	0	0	1	3	0	0	0	6
5:15 PM	2	0	0	1	1	0	1	0	5	5:15 PM	0	0	2	0	0	0	0	0	5:15 PM	0	0	0	2	4	0	0	0	6
5:30 PM	3	0	1	1	0	0	3	0	8	5:30 PM	0	0	0	0	0	0	0	0	5:30 PM	0	0	0	1	2	0	0	0	3
5:45 PM	2	0	0	1	1	0	0	0	4	5:45 PM	0	0	0	0	0	0	0	0	5:45 PM	0	0	0	0	1	0	0	0	1
Count Total	14	0	1	9	5	0	8	0	37	Count Total	0	0	2	0	0	0	0	0	Count Total	8	0	0	7	14	0	4	0	33
Peak Hour	3	0	0	6	2	0	3	0	14	Peak Hour	0	0	0	0	0	0	0	0	Peak Hour	6	0	0	4	7	0	4	0	21

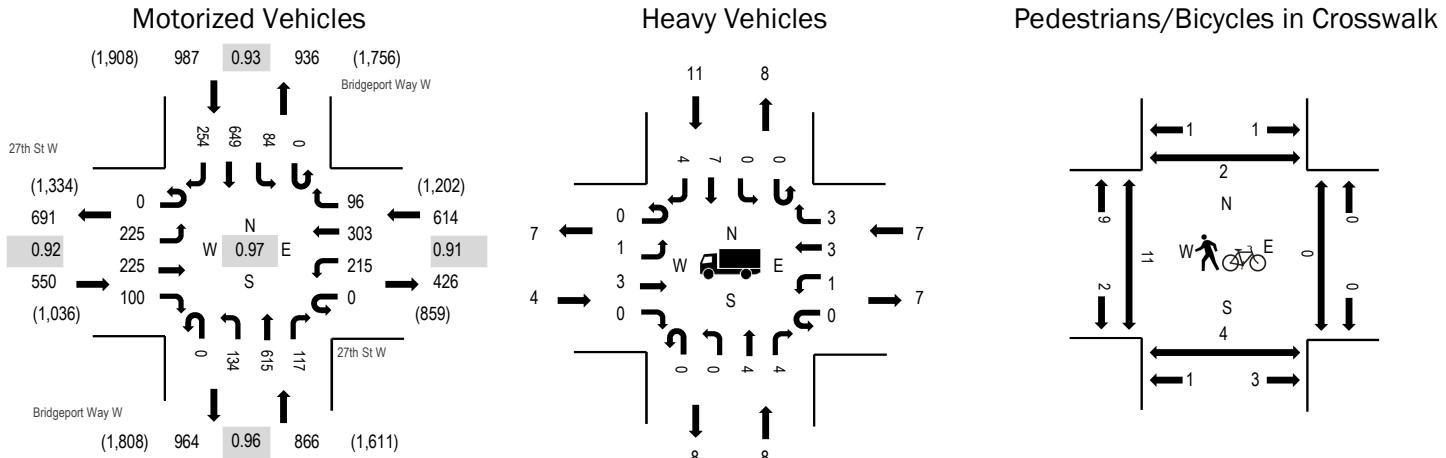
**Location:** 4 Bridgeport Way W & 27th St W PM

**Date:** Tuesday, June 14, 2022

**Peak Hour:** 04:30 PM - 05:30 PM

**Peak 15-Minutes:** 05:15 PM - 05:30 PM

### Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.7%	0.92
WB	1.1%	0.91
NB	0.9%	0.96
SB	1.1%	0.93
All	1.0%	0.97

### Traffic Counts - Motorized Vehicles

Interval Start Time	27th St W Eastbound				27th St W Westbound				Bridgeport Way W Northbound				Bridgeport Way W Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	42	51	19	0	34	86	34	2	31	125	23	0	23	155	56	681	2,906
4:15 PM	0	54	69	15	0	39	78	29	0	39	139	35	0	20	157	51	725	2,968
4:30 PM	0	63	56	31	0	44	74	29	0	40	142	32	0	22	154	54	741	3,017
4:45 PM	0	62	59	17	0	58	79	22	0	25	172	25	0	23	154	63	759	2,952
5:00 PM	0	51	46	27	0	56	62	21	0	31	172	26	0	23	167	61	743	2,851
5:15 PM	0	49	64	25	0	57	88	24	0	38	129	34	0	16	174	76	774	
5:30 PM	0	56	51	13	0	49	81	18	2	29	121	23	0	32	153	48	676	
5:45 PM	0	49	53	14	0	48	66	26	0	21	127	28	0	25	144	57	658	
Count Total	0	426	449	161	0	385	614	203	4	254	1,127	226	0	184	1,258	466	5,757	
Peak Hour	0	225	225	100	0	215	303	96	0	134	615	117	0	84	649	254	3,017	

### Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway				Interval Start Time	Pedestrians/Bicycles on Crosswalk					
	EB	NB	WB	SB	Total		EB	NB	WB	SB		EB	NB	WB	SB	Total	
4:00 PM	1	2	2	0	5	4:00 PM	1	0	0	0	1	4:00 PM	0	3	1	1	5
4:15 PM	3	1	0	3	7	4:15 PM	0	0	0	0	0	4:15 PM	5	1	1	5	12
4:30 PM	1	3	2	2	8	4:30 PM	0	0	0	0	0	4:30 PM	3	0	0	0	3
4:45 PM	2	2	2	2	8	4:45 PM	0	0	0	1	1	4:45 PM	1	2	0	0	3
5:00 PM	0	2	2	5	9	5:00 PM	1	0	0	1	2	5:00 PM	3	1	1	2	7
5:15 PM	1	1	1	2	5	5:15 PM	0	0	0	0	0	5:15 PM	4	1	0	2	7
5:30 PM	1	0	2	1	4	5:30 PM	0	0	0	0	0	5:30 PM	1	1	0	2	4
5:45 PM	2	1	0	1	4	5:45 PM	0	0	0	0	0	5:45 PM	0	3	0	5	8
Count Total	11	12	11	16	50	Count Total	2	0	0	2	4	Count Total	17	12	3	17	49
Peak Hour	4	8	7	11	30	Peak Hour	1	0	0	2	3	Peak Hour	11	4	1	4	20

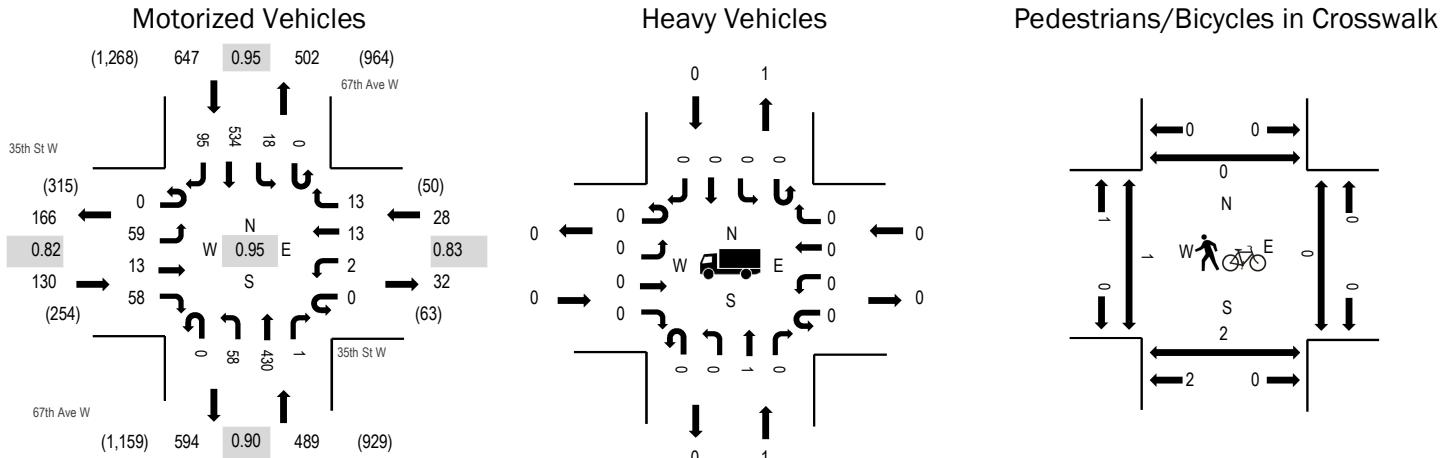
**Location:** 5 67th Ave W & 35th St W PM

**Date:** Tuesday, June 14, 2022

**Peak Hour:** 04:15 PM - 05:15 PM

**Peak 15-Minutes:** 04:15 PM - 04:30 PM

### Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.0%	0.82
WB	0.0%	0.83
NB	0.2%	0.90
SB	0.0%	0.95
All	0.1%	0.95

### Traffic Counts - Motorized Vehicles

Interval Start Time	35th St W Eastbound				35th St W Westbound				67th Ave W Northbound				67th Ave W Southbound				Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
4:00 PM	0	14	1	11	0	0	1	3	0	15	78	1	0	4	132	18	278 1,252
4:15 PM	0	16	3	17	0	1	1	5	0	20	115	1	0	4	129	27	339 1,294
4:30 PM	0	17	5	15	0	0	3	4	0	13	106	0	0	3	133	25	324 1,276
4:45 PM	0	15	3	16	0	0	4	2	0	12	105	0	0	8	131	15	311 1,264
5:00 PM	0	11	2	10	0	1	5	2	0	13	104	0	0	3	141	28	320 1,249
5:15 PM	0	19	4	18	0	0	1	8	0	8	89	0	0	3	147	24	321
5:30 PM	0	14	2	11	0	0	2	2	0	12	115	0	1	4	129	20	312
5:45 PM	0	9	8	13	0	0	2	3	0	15	107	0	0	4	104	31	296
Count Total	0	115	28	111	0	2	19	29	0	108	819	2	1	33	1,046	188	2,501
Peak Hour	0	59	13	58	0	2	13	13	0	58	430	1	0	18	534	95	1,294

### Traffic Counts - Heavy Vehicles, Bicycles on Roadway, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway				Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB		EB	NB	WB	SB	Total
4:00 PM	0	0	0	2	2	4:00 PM	0	0	0	0	4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	4:15 PM	0	1	0	0	1
4:30 PM	0	1	0	0	1	4:30 PM	0	0	0	0	4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	5:00 PM	1	1	0	0	2
5:15 PM	0	0	0	0	0	5:15 PM	0	2	0	0	5:15 PM	2	0	0	1	3
5:30 PM	0	0	0	1	1	5:30 PM	0	0	0	0	5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	5:45 PM	1	0	0	0	1
Count Total	0	1	0	3	4	Count Total	0	2	0	0	Count Total	4	2	0	1	7
Peak Hour	0	1	0	0	1	Peak Hour	0	0	0	0	Peak Hour	1	2	0	0	3

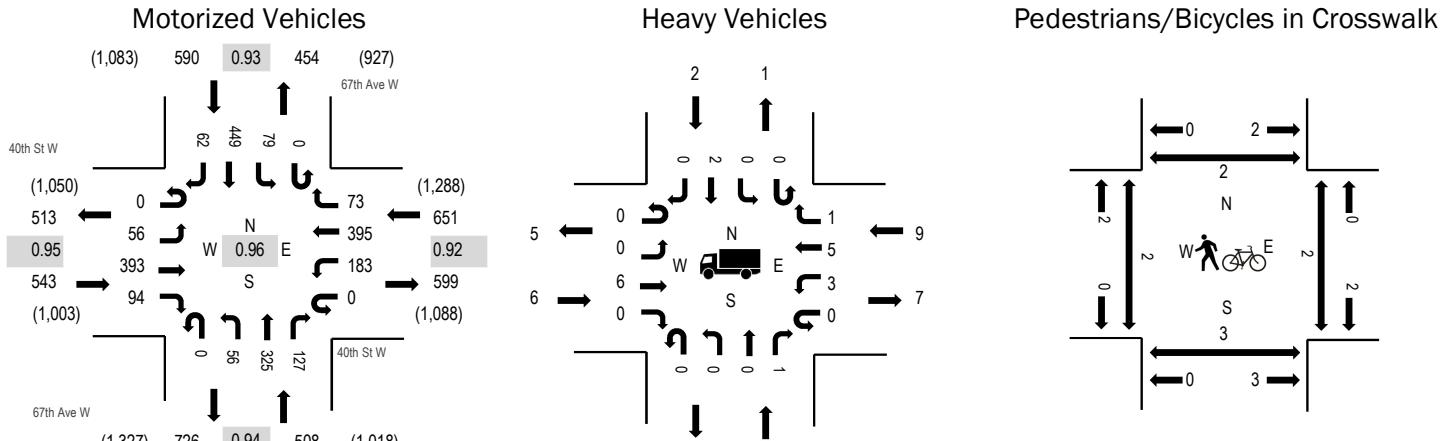
**Location:** 6 67th Ave W & 40th St W PM

**Date:** Tuesday, June 14, 2022

**Peak Hour:** 04:30 PM - 05:30 PM

**Peak 15-Minutes:** 05:00 PM - 05:15 PM

### Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	1.1%	0.95
WB	1.4%	0.92
NB	0.2%	0.94
SB	0.3%	0.93
All	0.8%	0.96

### Traffic Counts - Motorized Vehicles

Interval Start Time	40th St W Eastbound				40th St W Westbound				67th Ave W Northbound				67th Ave W Southbound				Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
4:00 PM	0	18	72	19	0	33	100	13	0	15	87	20	0	20	99	13	509
4:15 PM	0	18	100	19	0	42	111	17	0	16	84	28	0	16	99	12	562
4:30 PM	0	9	97	20	0	53	89	20	0	12	91	35	0	22	110	6	564
4:45 PM	0	13	106	23	0	37	93	19	0	17	84	32	0	23	102	15	564
5:00 PM	0	21	102	22	0	50	114	17	0	11	77	29	0	18	120	16	597
5:15 PM	0	13	88	29	0	43	99	17	0	16	73	31	0	16	117	25	567
5:30 PM	0	11	66	20	0	47	108	19	0	16	93	24	0	18	103	8	533
5:45 PM	0	11	89	17	0	28	102	17	0	17	85	25	0	11	75	19	496
Count Total	0	114	720	169	0	333	816	139	0	120	674	224	0	144	825	114	4,392
Peak Hour	0	56	393	94	0	183	395	73	0	56	325	127	0	79	449	62	2,292

### Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway				Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB		EB	NB	WB	SB	Total
4:00 PM	0	0	1	1	2	4:00 PM	0	0	0	0	4:00 PM	0	0	0	0	0
4:15 PM	6	1	1	0	8	4:15 PM	0	0	0	0	4:15 PM	0	0	0	1	1
4:30 PM	3	0	4	1	8	4:30 PM	0	0	0	0	4:30 PM	0	0	1	0	1
4:45 PM	1	0	2	0	3	4:45 PM	0	0	0	0	4:45 PM	1	2	0	1	4
5:00 PM	0	1	1	0	2	5:00 PM	0	2	0	0	5:00 PM	1	1	0	1	3
5:15 PM	2	0	2	1	5	5:15 PM	0	0	0	0	5:15 PM	0	0	1	0	1
5:30 PM	1	0	2	1	4	5:30 PM	0	0	0	0	5:30 PM	2	0	1	2	5
5:45 PM	2	0	0	0	2	5:45 PM	0	0	0	0	5:45 PM	1	0	0	0	1
Count Total	15	2	13	4	34	Count Total	0	2	0	0	Count Total	5	3	5	16	
Peak Hour	6	1	9	2	18	Peak Hour	0	2	0	0	Peak Hour	2	3	2	2	9

## Appendix B: LOS Definitions

## 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 <sup>1</sup>	>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 <sup>1</sup>	>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.

## 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.

## Appendix C: LOS Worksheets

# HCM Signalized Intersection Capacity Analysis

1: Mildred St SW & 19th St W

Fircrest Prose

Existing PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↓		↑	↑↑	↑	↑	↑	↑	↑	↑↑↓	
Traffic Volume (vph)	100	450	65	225	615	140	100	250	185	180	340	90
Future Volume (vph)	100	450	65	225	615	140	100	250	185	180	340	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fr <sub>t</sub>	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3458		1770	3539	1517	1787	1881	1566	1787	3441	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3458		1770	3539	1517	1787	1881	1566	1787	3441	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	110	495	71	247	676	154	110	275	203	198	374	99
RTOR Reduction (vph)	0	13	0	0	0	102	0	0	153	0	28	0
Lane Group Flow (vph)	110	553	0	247	676	52	110	275	50	198	445	0
Confl. Peds. (#/hr)	12		8	8		12	16		8	8		16
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases						8			6			
Actuated Green, G (s)	9.8	20.9		21.9	33.0	33.0	8.9	19.1	19.1	15.1	25.3	
Effective Green, g (s)	9.8	20.9		21.9	33.0	33.0	8.9	19.1	19.1	15.1	25.3	
Actuated g/C Ratio	0.10	0.22		0.23	0.34	0.34	0.09	0.20	0.20	0.16	0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	178	745		399	1203	516	163	370	308	278	897	
v/s Ratio Prot	0.06	c0.16		c0.14	0.19		0.06	c0.15		c0.11	0.13	
v/s Ratio Perm						0.03			0.03			
v/c Ratio	0.62	0.74		0.62	0.56	0.10	0.67	0.74	0.16	0.71	0.50	
Uniform Delay, d1	41.8	35.5		33.8	26.1	21.9	42.6	36.6	32.3	38.9	30.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.4	3.5		2.0	1.9	0.4	8.4	6.9	0.1	7.0	0.2	
Delay (s)	46.2	39.1		35.8	28.0	22.3	51.0	43.6	32.4	45.9	30.6	
Level of Service	D	D		D	C	C	D	D	C	D	C	
Approach Delay (s)		40.2			29.0			41.1			35.1	
Approach LOS		D			C			D			D	
Intersection Summary												
HCM 2000 Control Delay		35.2			HCM 2000 Level of Service				D			
HCM 2000 Volume to Capacity ratio		0.73										
Actuated Cycle Length (s)		97.0			Sum of lost time (s)				23.0			
Intersection Capacity Utilization		70.5%			ICU Level of Service				C			
Analysis Period (min)		15										
c Critical Lane Group												

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↑	↑	↑	↑	↑	↑
Traffic Vol, veh/h	5	0	15	0	0	0	5	545	5	0	615	10
Future Vol, veh/h	5	0	15	0	0	0	5	545	5	0	615	10
Conflicting Peds, #/hr	6	0	6	0	0	0	6	0	0	0	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	100	100	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	1	1	1
Mvmt Flow	5	0	15	0	0	0	5	562	5	0	634	10
Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	1221	1217	646	1225	1222	568	650	0	0	567	0	0
Stage 1	640	640	-	572	572	-	-	-	-	-	-	-
Stage 2	581	577	-	653	650	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.11	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.209	-	-
Pot Cap-1 Maneuver	158	182	475	157	181	526	946	-	-	1010	-	-
Stage 1	467	473	-	509	508	-	-	-	-	-	-	-
Stage 2	503	505	-	460	468	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	156	180	470	150	179	523	941	-	-	1010	-	-
Mov Cap-2 Maneuver	156	180	-	150	179	-	-	-	-	-	-	-
Stage 1	462	470	-	506	505	-	-	-	-	-	-	-
Stage 2	497	502	-	442	465	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	17.3			0			0.1			0		
HCM LOS	C			A								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1		SBL	SBT	SBR			
Capacity (veh/h)	941	-	-	313	-	1010	-	-	-			
HCM Lane V/C Ratio	0.005	-	-	0.066	-	-	-	-	-			
HCM Control Delay (s)	8.8	-	-	17.3	0	0	-	-	-			
HCM Lane LOS	A	-	-	C	A	A	-	-	-			
HCM 95th %tile Q(veh)	0	-	-	0.2	-	0	-	-	-			

# HCM Signalized Intersection Capacity Analysis

3: Regents Blvd W & 67th Ave W/Mildred St SW & 24th St W/Regents Blvd

Fircrest Prose

Existing PM Peak Hour

Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations												
Traffic Volume (vph)	10	15	5	5	80	345	15	100	20	10	330	95
Future Volume (vph)	10	15	5	5	80	345	15	100	20	10	330	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5			8.0	8.0	8.0	8.0		7.0	8.0	8.0
Lane Util. Factor	1.00	1.00			1.00	0.95	0.95	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97			1.00	1.00	1.00	0.97		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	1.00
Fr <sub>t</sub>	1.00	0.85			1.00	1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected	0.98	1.00			0.95	0.95	0.96	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1736	1466			1787	1698	1709	1548		1805	1900	1556
Flt Permitted	0.36	1.00			0.74	0.95	0.96	1.00		0.95	1.00	1.00
Satd. Flow (perm)	644	1466			1394	1698	1709	1548		1805	1900	1556
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	15	5	5	82	356	15	103	21	10	340	98
RTOR Reduction (vph)	0	0	9	0	0	0	0	88	0	0	0	71
Lane Group Flow (vph)	0	25	1	0	82	185	186	15	0	31	340	27
Confl. Peds. (#/hr)	4			4		4		4	4	7		6
Heavy Vehicles (%)	7%	7%	7%	7%	1%	1%	1%	1%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm		Perm	Split	NA	Perm	Prot	Prot	NA	Perm
Protected Phases		7				8	8		1	1	6	
Permitted Phases	7		7		8			8				6
Actuated Green, G (s)	7.7	7.7			18.4	18.4	18.4	18.4		2.9	33.4	33.4
Effective Green, g (s)	7.7	7.7			18.4	18.4	18.4	18.4		2.9	33.4	33.4
Actuated g/C Ratio	0.06	0.06			0.15	0.15	0.15	0.15		0.02	0.27	0.27
Clearance Time (s)	6.5	6.5			8.0	8.0	8.0	8.0		7.0	8.0	8.0
Vehicle Extension (s)	1.0	1.0			3.0	3.0	3.0	3.0		1.0	3.0	3.0
Lane Grp Cap (vph)	40	92			209	255	257	232		42	518	424
v/s Ratio Prot					c0.11	0.11				0.02	c0.18	
v/s Ratio Perm	c0.04	0.00			0.06			0.01				0.02
v/c Ratio	0.62	0.01			0.39	0.73	0.72	0.07		0.74	0.66	0.06
Uniform Delay, d1	55.9	53.7			46.9	49.5	49.5	44.6		59.3	39.4	32.9
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	19.9	0.0			1.2	9.8	9.7	0.1		44.0	3.0	0.1
Delay (s)	75.8	53.7			48.1	59.4	59.2	44.7		103.3	42.4	32.9
Level of Service	E	D			D	E	E	D		F	D	C
Approach Delay (s)	69.5						54.9				44.4	
Approach LOS	E						D				D	
Intersection Summary												
HCM 2000 Control Delay	49.4											D
HCM 2000 Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	122.3											39.0
Intersection Capacity Utilization	91.5%											F
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
3: Regents Blvd W & 67th Ave W/Mildred St SW & 24th St W/Regents Blvd

Fircrest Prose  
Existing PM Peak Hour

Movement	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations	↑ ↗	↑ ↘	↗ ↖	↗ ↙	↗ ↖	↗ ↙	↗ ↖	↗ ↙
Traffic Volume (vph)	55	445	155	15	10	165	220	10
Future Volume (vph)	55	445	155	15	10	165	220	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	8.0	8.0			9.5	9.5	
Lane Util. Factor	1.00	1.00	1.00			1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95			1.00	0.96	
Flpb, ped/bikes	1.00	1.00	1.00			0.98	1.00	
Fr <sub>t</sub>	1.00	1.00	0.85			1.00	0.85	
Flt Protected	0.95	1.00	1.00			0.95	1.00	
Satd. Flow (prot)	1787	1881	1521			1729	1527	
Flt Permitted	0.95	1.00	1.00			0.97	1.00	
Satd. Flow (perm)	1787	1881	1521			1763	1527	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	57	459	160	15	10	170	227	10
RTOR Reduction (vph)	0	0	123	0	0	0	203	0
Lane Group Flow (vph)	57	459	52	0	0	180	34	0
Confl. Peds. (#/hr)	6		4	7	7	4	6	
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm		Perm	Perm	Perm	
Protected Phases	5	2						
Permitted Phases			2		4	4	4	
Actuated Green, G (s)	6.0	36.5	36.5			17.8	17.8	
Effective Green, g (s)	6.0	36.5	36.5			17.8	17.8	
Actuated g/C Ratio	0.05	0.30	0.30			0.15	0.15	
Clearance Time (s)	7.0	8.0	8.0			9.5	9.5	
Vehicle Extension (s)	1.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	87	561	453			256	222	
v/s Ratio Prot	0.03	c0.24						
v/s Ratio Perm			0.03			c0.10	0.02	
v/c Ratio	0.66	0.82	0.12			0.70	0.16	
Uniform Delay, d1	57.1	39.8	31.2			49.7	45.7	
Progression Factor	1.00	1.00	1.00			1.00	1.00	
Incremental Delay, d2	12.7	9.0	0.1			8.5	0.3	
Delay (s)	69.9	48.9	31.3			58.2	46.0	
Level of Service	E	D	C			E	D	
Approach Delay (s)		46.1				51.3		
Approach LOS		D				D		
Intersection Summary								

HCM 6th Signalized Intersection Summary  
4: Bridgeport Way W & 27th St W

Fircrest Prose  
Existing PM Peak Hour

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑↑	↑	↑	↑↑	↑
Traffic Volume (veh/h)	225	225	100	215	305	95	135	615	115	85	650	255
Future Volume (veh/h)	225	225	100	215	305	95	135	615	115	85	650	255
Initial Q (Q <sub>b</sub> ), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00		0.99	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No		No		No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	232	232	103	222	314	98	139	634	119	88	670	263
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, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	419	422	483	469	412	430	335	918	172	302	996	643
Arrive On Green	0.13	0.22	0.22	0.12	0.22	0.22	0.08	0.31	0.31	0.05	0.28	0.28
Sat Flow, veh/h	1795	1885	1589	1795	1885	1589	1795	3001	562	1795	3582	1566
Grp Volume(v), veh/h	232	232	103	222	314	98	139	378	375	88	670	263
Grp Sat Flow(s), veh/h/ln	1795	1885	1589	1795	1885	1589	1795	1791	1772	1795	1791	1566
Q Serve(g_s), s	5.6	6.3	2.8	5.3	9.0	2.8	3.1	10.7	10.8	1.9	9.6	6.9
Cycle Q Clear(g_c), s	5.6	6.3	2.8	5.3	9.0	2.8	3.1	10.7	10.8	1.9	9.6	6.9
Prop In Lane	1.00			1.00		1.00	1.00		0.32	1.00		1.00
Lane Grp Cap(c), veh/h	419	422	483	469	412	430	335	548	542	302	996	643
V/C Ratio(X)	0.55	0.55	0.21	0.47	0.76	0.23	0.41	0.69	0.69	0.29	0.67	0.41
Avail Cap(c_a), veh/h	1304	897	883	1363	897	838	689	1100	1088	831	2199	1169
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.0	19.9	15.0	14.4	21.2	16.4	14.0	17.6	17.7	13.7	18.5	12.2
Incr Delay (d2), s/veh	0.4	0.4	0.1	0.3	1.1	0.1	0.3	0.6	0.6	0.2	0.3	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	2.1	2.6	0.9	1.9	3.8	0.9	1.1	4.0	4.0	0.7	3.6	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	15.5	20.3	15.1	14.7	22.3	16.5	14.3	18.2	18.3	13.9	18.8	12.3
LnGrp LOS	B	C	B	B	C	B	B	B	B	B	B	B
Approach Vol, veh/h		567			634			892			1021	
Approach Delay, s/veh		17.4			18.7			17.6			16.7	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+R <sub>c</sub> ), s	8.6	20.6	11.2	17.4	7.0	22.2	11.5	17.1				
Change Period (Y+R <sub>c</sub> ), s	4.0	4.5	4.0	4.5	4.0	4.5	4.0	4.5				
Max Green Setting (Gmax), s	16.0	35.5	36.0	27.5	20.0	35.5	36.0	27.5				
Max Q Clear Time (g <sub>c+l1</sub> ), s	5.1	11.6	7.3	8.3	3.9	12.8	7.6	11.0				
Green Ext Time (p <sub>c</sub> ), s	0.0	3.7	0.1	1.0	0.0	3.2	0.1	1.2				
Intersection Summary												
HCM 6th Ctrl Delay			17.5									
HCM 6th LOS			B									

HCM 6th Signalized Intersection Summary  
5: 67th Ave W & 35th St SW

Fircrest Prose  
Existing PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	15	60	5	15	15	60	430	5	20	535	95
Future Volume (veh/h)	60	15	60	5	15	15	60	430	5	20	535	95
Initial Q (Q <sub>b</sub> ), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00			1.00	1.00		1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	63	16	63	5	16	16	63	453	5	21	563	100
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	320	52	125	192	153	134	489	886	750	583	886	750
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.47	0.47	0.47	0.47	0.47	0.47
Sat Flow, veh/h	579	291	693	126	846	740	784	1900	1608	948	1900	1608
Grp Volume(v), veh/h	142	0	0	37	0	0	63	453	5	21	563	100
Grp Sat Flow(s), veh/h/ln	1562	0	0	1712	0	0	784	1900	1608	948	1900	1608
Q Serve(g_s), s	1.3	0.0	0.0	0.0	0.0	0.0	1.6	4.0	0.0	0.4	5.4	0.9
Cycle Q Clear(g_c), s	1.9	0.0	0.0	0.4	0.0	0.0	7.0	4.0	0.0	4.4	5.4	0.9
Prop In Lane	0.44		0.44	0.14			0.43	1.00		1.00	1.00	1.00
Lane Grp Cap(c), veh/h	498	0	0	479	0	0	489	886	750	583	886	750
V/C Ratio(X)	0.29	0.00	0.00	0.08	0.00	0.00	0.13	0.51	0.01	0.04	0.64	0.13
Avail Cap(c_a), veh/h	1238	0	0	1288	0	0	1279	2801	2371	1538	2801	2371
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.8	0.0	0.0	8.3	0.0	0.0	7.5	4.5	3.4	6.0	4.9	3.7
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.3	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	0.4	0.0	0.0	0.1	0.0	0.0	0.2	0.4	0.0	0.0	0.6	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	9.0	0.0	0.0	8.3	0.0	0.0	7.6	4.7	3.4	6.1	5.2	3.7
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h	142			37			521			684		
Approach Delay, s/veh	9.0			8.3			5.0			5.0		
Approach LOS	A			A			A			A		
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+R <sub>c</sub> ), s	15.7		8.3		15.7		8.3					
Change Period (Y+R <sub>c</sub> ), s	4.5		4.0		4.5		4.0					
Max Green Setting (Gmax), s	35.5		16.0		35.5		16.0					
Max Q Clear Time (g_c+l1), s	7.4		2.4		9.0		3.9					
Green Ext Time (p_c), s	2.7		0.1		2.2		0.4					
Intersection Summary												
HCM 6th Ctrl Delay			5.5									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary  
6: 67th Ave W & 40th St W/Emerson St

Fircrest Prose  
Existing PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	55	395	95	185	395	75	55	325	125	80	450	60
Future Volume (veh/h)	55	395	95	185	395	75	55	325	125	80	450	60
Initial Q (Q <sub>b</sub> ), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	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		No		No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	57	411	99	193	411	78	57	339	130	83	469	62
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	0	0	0
Cap, veh/h	74	509	429	184	509	97	72	529	447	107	566	478
Arrive On Green	0.04	0.27	0.27	0.10	0.33	0.33	0.04	0.28	0.28	0.06	0.30	0.30
Sat Flow, veh/h	1795	1885	1589	1795	1539	292	1810	1900	1604	1810	1900	1605
Grp Volume(v), veh/h	57	411	99	193	0	489	57	339	130	83	469	62
Grp Sat Flow(s), veh/h/ln	1795	1885	1589	1795	0	1831	1810	1900	1604	1810	1900	1605
Q Serve(g_s), s	1.8	11.9	2.8	6.0	0.0	14.3	1.8	9.2	3.7	2.7	13.5	1.7
Cycle Q Clear(g_c), s	1.8	11.9	2.8	6.0	0.0	14.3	1.8	9.2	3.7	2.7	13.5	1.7
Prop In Lane	1.00		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	74	509	429	184	0	606	72	529	447	107	566	478
V/C Ratio(X)	0.77	0.81	0.23	1.05	0.00	0.81	0.79	0.64	0.29	0.78	0.83	0.13
Avail Cap(c_a), veh/h	184	1303	1098	184	0	1265	648	1151	972	648	1151	972
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.8	20.0	16.7	26.3	0.0	17.9	27.9	18.6	16.6	27.2	19.2	15.0
Incr Delay (d2), s/veh	6.1	1.2	0.1	80.2	0.0	1.0	7.2	0.5	0.1	4.5	1.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	0.9	4.9	1.0	6.5	0.0	5.5	0.9	3.7	1.3	1.2	5.5	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	33.9	21.2	16.8	106.5	0.0	18.9	35.1	19.0	16.7	31.6	20.4	15.1
LnGrp LOS	C	C	B	F	A	B	D	B	B	C	C	B
Approach Vol, veh/h	567				682			526			614	
Approach Delay, s/veh	21.7				43.7			20.2			21.4	
Approach LOS	C				D			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+R <sub>c</sub> ), s	7.5	20.8	6.4	23.9	6.3	22.0	10.0	20.3				
Change Period (Y+R <sub>c</sub> ), s	4.0	4.5	4.0	4.5	4.0	4.5	4.0	4.5				
Max Green Setting (Gmax), s	21.0	35.5	6.0	40.5	21.0	35.5	6.0	40.5				
Max Q Clear Time (g_c+l1), s	4.7	11.2	3.8	16.3	3.8	15.5	8.0	13.9				
Green Ext Time (p_c), s	0.0	1.5	0.0	2.1	0.0	2.0	0.0	1.8				
Intersection Summary												
HCM 6th Ctrl Delay				27.6								
HCM 6th LOS				C								

# HCM Signalized Intersection Capacity Analysis

1: Mildred St W & 19th St W

Fircrest Prose

Future (2026) Without-Project PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↓		↑	↑↑	↑	↑	↑	↑	↑	↑↑↓	
Traffic Volume (vph)	110	485	70	260	660	150	105	270	210	190	370	100
Future Volume (vph)	110	485	70	260	660	150	105	270	210	190	370	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fr <sub>t</sub>	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3457		1770	3539	1517	1787	1881	1566	1787	3438	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3457		1770	3539	1517	1787	1881	1566	1787	3438	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	121	533	77	286	725	165	115	297	231	209	407	110
RTOR Reduction (vph)	0	13	0	0	0	111	0	0	159	0	29	0
Lane Group Flow (vph)	121	597	0	286	725	54	115	297	72	209	488	0
Confl. Peds. (#/hr)	12		8	8		12	16		8	8		16
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases						8			6			
Actuated Green, G (s)	10.5	21.2		21.2	31.9	31.9	9.5	19.8	19.8	14.8	25.1	
Effective Green, g (s)	10.5	21.2		21.2	31.9	31.9	9.5	19.8	19.8	14.8	25.1	
Actuated g/C Ratio	0.11	0.22		0.22	0.33	0.33	0.10	0.20	0.20	0.15	0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	191	755		386	1163	498	175	383	319	272	889	
v/s Ratio Prot	0.07	c0.17		c0.16	0.20		0.06	c0.16		c0.12	0.14	
v/s Ratio Perm						0.04			0.05			
v/c Ratio	0.63	0.79		0.74	0.62	0.11	0.66	0.78	0.23	0.77	0.55	
Uniform Delay, d1	41.4	35.8		35.3	27.5	22.7	42.2	36.5	32.2	39.5	31.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.0	5.3		6.6	2.5	0.4	6.6	8.7	0.1	11.1	0.4	
Delay (s)	46.4	41.1		41.9	30.0	23.1	48.8	45.2	32.3	50.6	31.4	
Level of Service	D	D		D	C	C	D	D	C	D	C	
Approach Delay (s)		42.0			31.9			41.2			36.9	
Approach LOS		D			C			D			D	
Intersection Summary												
HCM 2000 Control Delay		37.1										
HCM 2000 Volume to Capacity ratio		0.80										
Actuated Cycle Length (s)		97.0										
Intersection Capacity Utilization		74.7%										
Analysis Period (min)		15										
c Critical Lane Group												

Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↖	↑	↖	↖	↑	↖
Traffic Vol, veh/h	20	0	20	0	0	0	10	580	5	0	660	35
Future Vol, veh/h	20	0	20	0	0	0	10	580	5	0	660	35
Conflicting Peds, #/hr	6	0	6	0	0	0	6	0	0	0	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	100	-	100	100	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	1	1	1
Mvmt Flow	21	0	21	0	0	0	10	598	5	0	680	36

Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	1313	1309	692	1333	1340	604	722	0	0	603	0	0
Stage 1	686	686	-	618	618	-	-	-	-	-	-	-
Stage 2	627	623	-	715	722	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.11	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.209	-	-
Pot Cap-1 Maneuver	137	161	447	132	154	502	889	-	-	979	-	-
Stage 1	441	451	-	480	484	-	-	-	-	-	-	-
Stage 2	475	481	-	425	434	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	134	158	442	124	151	499	884	-	-	979	-	-
Mov Cap-2 Maneuver	134	158	-	124	151	-	-	-	-	-	-	-
Stage 1	434	448	-	475	479	-	-	-	-	-	-	-
Stage 2	467	476	-	403	431	-	-	-	-	-	-	-
Approach	EB	WB			NB			SB				
HCM Control Delay, s	26.8	0			0.2			0				
HCM LOS	D	A										
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	884	-	-	206	-	979	-	-				
HCM Lane V/C Ratio	0.012	-	-	0.2	-	-	-	-				
HCM Control Delay (s)	9.1	-	-	26.8	0	0	-	-				
HCM Lane LOS	A	-	-	D	A	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.7	-	0	-	-				

# HCM Signalized Intersection Capacity Analysis

Fircrest Prose

3: Regents Blvd W & 67th Ave W/Mildred St W & 24th St W/Regents Blvd W Without-Project PM Peak Hour

Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations												
Traffic Volume (vph)	10	15	5	5	85	365	15	105	20	10	360	100
Future Volume (vph)	10	15	5	5	85	365	15	105	20	10	360	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5			8.0	8.0	8.0	8.0		7.0	8.0	8.0
Lane Util. Factor	1.00	1.00			1.00	0.95	0.95	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97			1.00	1.00	1.00	0.97		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	1.00
Fr <sub>t</sub>	1.00	0.85			1.00	1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected	0.98	1.00			0.95	0.95	0.96	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1735	1465			1787	1698	1708	1547		1805	1900	1555
Flt Permitted	0.35	1.00			0.74	0.95	0.96	1.00		0.95	1.00	1.00
Satd. Flow (perm)	612	1465			1394	1698	1708	1547		1805	1900	1555
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	15	5	5	88	376	15	108	21	10	371	103
RTOR Reduction (vph)	0	0	9	0	0	0	0	92	0	0	0	72
Lane Group Flow (vph)	0	25	1	0	88	196	195	16	0	31	371	31
Confl. Peds. (#/hr)	4			4		4		4	4	7		6
Heavy Vehicles (%)	7%	7%	7%	7%	1%	1%	1%	1%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm		Perm	Split	NA	Perm	Prot	Prot	NA	Perm
Protected Phases		7				8	8		1	1	6	
Permitted Phases	7		7		8			8				6
Actuated Green, G (s)	8.1	8.1			19.0	19.0	19.0	19.0		3.1	38.5	38.5
Effective Green, g (s)	8.1	8.1			19.0	19.0	19.0	19.0		3.1	38.5	38.5
Actuated g/C Ratio	0.06	0.06			0.15	0.15	0.15	0.15		0.02	0.30	0.30
Clearance Time (s)	6.5	6.5			8.0	8.0	8.0	8.0		7.0	8.0	8.0
Vehicle Extension (s)	1.0	1.0			3.0	3.0	3.0	3.0		1.0	3.0	3.0
Lane Grp Cap (vph)	38	91			204	249	250	227		43	565	463
v/s Ratio Prot					c0.12	0.11				0.02	c0.20	
v/s Ratio Perm	c0.04	0.00			0.06			0.01				0.02
v/c Ratio	0.66	0.01			0.43	0.79	0.78	0.07		0.72	0.66	0.07
Uniform Delay, d1	59.2	56.8			50.2	53.2	53.1	47.5		62.7	39.6	32.5
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	27.1	0.0			1.5	15.1	14.5	0.1		39.5	2.8	0.1
Delay (s)	86.4	56.8			51.7	68.3	67.7	47.7		102.2	42.4	32.6
Level of Service	F	E			D	E	E	D		F	D	C
Approach Delay (s)	77.9						61.8				44.1	
Approach LOS	E						E				D	
Intersection Summary												
HCM 2000 Control Delay	52.4											D
HCM 2000 Volume to Capacity ratio	0.79											
Actuated Cycle Length (s)	129.3											39.0
Intersection Capacity Utilization	94.6%											F
Analysis Period (min)	15											
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

Fircrest Prose

3: Regents Blvd W & 67th Ave W/Mildred St W & 24th St W/Regents Blvd W Without-Project PM Peak Hour

Movement	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations								
Traffic Volume (vph)	60	480	165	15	10	175	235	10
Future Volume (vph)	60	480	165	15	10	175	235	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	8.0	8.0			9.5	9.5	
Lane Util. Factor	1.00	1.00	1.00			1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95			1.00	0.96	
Flpb, ped/bikes	1.00	1.00	1.00			0.98	1.00	
Fr <sub>t</sub>	1.00	1.00	0.85			1.00	0.85	
Flt Protected	0.95	1.00	1.00			0.95	1.00	
Satd. Flow (prot)	1787	1881	1519			1727	1525	
Flt Permitted	0.95	1.00	1.00			0.97	1.00	
Satd. Flow (perm)	1787	1881	1519			1764	1525	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	62	495	170	15	10	180	242	10
RTOR Reduction (vph)	0	0	125	0	0	0	206	0
Lane Group Flow (vph)	62	495	60	0	0	190	46	0
Confl. Peds. (#/hr)	6		4	7	7	4	6	
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm		Perm	Perm	Perm	
Protected Phases	5	2						
Permitted Phases			2		4	4	4	
Actuated Green, G (s)	6.3	41.7	41.7			18.4	18.4	
Effective Green, g (s)	6.3	41.7	41.7			18.4	18.4	
Actuated g/C Ratio	0.05	0.32	0.32			0.14	0.14	
Clearance Time (s)	7.0	8.0	8.0			9.5	9.5	
Vehicle Extension (s)	1.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	87	606	489			251	217	
v/s Ratio Prot	0.03	c0.26						
v/s Ratio Perm			0.04			c0.11	0.03	
v/c Ratio	0.71	0.82	0.12			0.76	0.21	
Uniform Delay, d1	60.6	40.3	30.9			53.3	49.0	
Progression Factor	1.00	1.00	1.00			1.00	1.00	
Incremental Delay, d2	20.4	8.4	0.1			12.3	0.5	
Delay (s)	81.0	48.7	31.0			65.6	49.5	
Level of Service	F	D	C			E	D	
Approach Delay (s)		47.0				56.4		
Approach LOS		D				E		
Intersection Summary								

HCM 6th Signalized Intersection Summary  
4: Bridgeport Way W & 27th St W

Fircrest Prose  
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)	240	240	105	230	325	100	145	655	120	90	690	270
Future Volume (veh/h)	240	240	105	230	325	100	145	655	120	90	690	270
Initial Q (Q <sub>b</sub> ), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No											
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	247	247	108	237	335	103	149	675	124	93	711	278
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, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	413	435	500	466	425	444	326	939	172	290	1011	656
Arrive On Green	0.13	0.23	0.23	0.13	0.23	0.23	0.08	0.31	0.31	0.05	0.28	0.28
Sat Flow, veh/h	1795	1885	1589	1795	1885	1589	1795	3012	553	1795	3582	1566
Grp Volume(v), veh/h	247	247	108	237	335	103	149	401	398	93	711	278
Grp Sat Flow(s), veh/h/ln	1795	1885	1589	1795	1885	1589	1795	1791	1774	1795	1791	1566
Q Serve(g_s), s	6.3	7.2	3.1	6.0	10.4	3.1	3.6	12.3	12.3	2.1	11.0	7.8
Cycle Q Clear(g_c), s	6.3	7.2	3.1	6.0	10.4	3.1	3.6	12.3	12.3	2.1	11.0	7.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.31	1.00		1.00
Lane Grp Cap(c), veh/h	413	435	500	466	425	444	326	559	553	290	1011	656
V/C Ratio(X)	0.60	0.57	0.22	0.51	0.79	0.23	0.46	0.72	0.72	0.32	0.70	0.42
Avail Cap(c_a), veh/h	1216	838	839	1279	838	792	640	1027	1017	774	2054	1113
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.9	21.1	15.6	15.2	22.6	17.2	14.9	18.9	18.9	14.6	19.9	12.8
Incr Delay (d2), s/veh	0.5	0.4	0.1	0.3	1.2	0.1	0.4	0.7	0.7	0.2	0.3	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	2.4	3.0	1.0	2.3	4.4	1.1	1.3	4.7	4.7	0.8	4.2	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	16.4	21.5	15.7	15.5	23.8	17.3	15.3	19.5	19.6	14.8	20.2	13.0
LnGrp LOS	B	C	B	B	C	B	B	B	B	B	C	B
Approach Vol, veh/h		602			675			948			1082	
Approach Delay, s/veh		18.4			19.9			18.9			17.9	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+R <sub>c</sub> ), s	9.2	22.0	12.0	18.8	7.3	23.8	12.3	18.5				
Change Period (Y+R <sub>c</sub> ), s	4.0	4.5	4.0	4.5	4.0	4.5	4.0	4.5				
Max Green Setting (Gmax), s	16.0	35.5	36.0	27.5	20.0	35.5	36.0	27.5				
Max Q Clear Time (g_c+l1), s	5.6	13.0	8.0	9.2	4.1	14.3	8.3	12.4				
Green Ext Time (p_c), s	0.0	3.9	0.1	1.0	0.0	3.4	0.1	1.3				
Intersection Summary												
HCM 6th Ctrl Delay			18.7									
HCM 6th LOS			B									

HCM 6th Signalized Intersection Summary  
5: 67th Ave W & 35th St SW

Fircrest Prose  
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)	65	15	65	5	15	15	65	465	5	20	570	100
Future Volume (veh/h)	65	15	65	5	15	15	65	465	5	20	570	100
Initial Q (Q <sub>b</sub> ), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	68	16	68	5	16	16	68	489	5	21	600	105
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	310	50	126	182	154	134	470	924	782	565	924	782
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.49	0.49	0.49	0.49	0.49	0.49
Sat Flow, veh/h	584	278	698	121	852	742	754	1900	1609	917	1900	1609
Grp Volume(v), veh/h	152	0	0	37	0	0	68	489	5	21	600	105
Grp Sat Flow(s), veh/h/ln	1560	0	0	1716	0	0	754	1900	1609	917	1900	1609
Q Serve(g_s), s	1.5	0.0	0.0	0.0	0.0	0.0	1.9	4.5	0.0	0.4	6.0	0.9
Cycle Q Clear(g_c), s	2.2	0.0	0.0	0.4	0.0	0.0	7.9	4.5	0.0	5.0	6.0	0.9
Prop In Lane	0.45		0.45	0.14		0.43	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	486	0	0	470	0	0	470	924	782	565	924	782
V/C Ratio(X)	0.31	0.00	0.00	0.08	0.00	0.00	0.14	0.53	0.01	0.04	0.65	0.13
Avail Cap(c_a), veh/h	1169	0	0	1218	0	0	1155	2647	2241	1397	2647	2241
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.4	0.0	0.0	8.7	0.0	0.0	7.9	4.5	3.4	6.2	4.9	3.6
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.3	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	0.5	0.0	0.0	0.1	0.0	0.0	0.2	0.5	0.0	0.0	0.7	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	9.6	0.0	0.0	8.8	0.0	0.0	7.9	4.7	3.4	6.3	5.2	3.6
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h	152			37			562			726		
Approach Delay, s/veh	9.6			8.8			5.1			5.0		
Approach LOS	A			A			A			A		
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+R <sub>c</sub> ), s	16.9		8.6		16.9		8.6					
Change Period (Y+R <sub>c</sub> ), s	4.5		4.0		4.5		4.0					
Max Green Setting (Gmax), s	35.5		16.0		35.5		16.0					
Max Q Clear Time (g_c+l1), s	8.0		2.4		9.9		4.2					
Green Ext Time (p_c), s	3.0		0.1		2.4		0.4					
Intersection Summary												
HCM 6th Ctrl Delay			5.6									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary  
6: 67th Ave W & 40th St W/Emerson St

Fircrest Prose  
Future (2026) Without-Project PM Peak Hour

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	60	420	100	195	420	80	60	355	135	85	480	65
Future Volume (veh/h)	60	420	100	195	420	80	60	355	135	85	480	65
Initial Q (Q <sub>b</sub> ), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	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		No		No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	62	438	104	203	438	83	62	370	141	89	500	68
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	0	0	0
Cap, veh/h	78	530	447	171	512	97	79	552	467	115	590	499
Arrive On Green	0.04	0.28	0.28	0.10	0.33	0.33	0.04	0.29	0.29	0.06	0.31	0.31
Sat Flow, veh/h	1795	1885	1589	1795	1539	292	1810	1900	1605	1810	1900	1605
Grp Volume(v), veh/h	62	438	104	203	0	521	62	370	141	89	500	68
Grp Sat Flow(s), veh/h/ln	1795	1885	1589	1795	0	1831	1810	1900	1605	1810	1900	1605
Q Serve(g_s), s	2.2	13.7	3.2	6.0	0.0	16.8	2.1	10.8	4.3	3.1	15.5	1.9
Cycle Q Clear(g_c), s	2.2	13.7	3.2	6.0	0.0	16.8	2.1	10.8	4.3	3.1	15.5	1.9
Prop In Lane	1.00		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	78	530	447	171	0	609	79	552	467	115	590	499
V/C Ratio(X)	0.79	0.83	0.23	1.19	0.00	0.86	0.78	0.67	0.30	0.77	0.85	0.14
Avail Cap(c_a), veh/h	171	1210	1020	171	0	1175	602	1069	903	602	1069	903
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.9	21.2	17.4	28.6	0.0	19.6	29.9	19.7	17.4	29.1	20.3	15.7
Incr Delay (d2), s/veh	6.5	1.3	0.1	128.9	0.0	1.4	6.2	0.5	0.1	4.1	1.3	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	1.0	5.7	1.1	8.6	0.0	6.7	1.0	4.5	1.5	1.4	6.5	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	36.4	22.5	17.5	157.5	0.0	21.0	36.1	20.2	17.5	33.2	21.7	15.7
LnGrp LOS	D	C	B	F	A	C	D	C	B	C	C	B
Approach Vol, veh/h	604				724			573			657	
Approach Delay, s/veh	23.1				59.3			21.3			22.6	
Approach LOS	C				E			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+R <sub>c</sub> ), s	8.0	22.8	6.8	25.5	6.8	24.1	10.0	22.2				
Change Period (Y+R <sub>c</sub> ), s	4.0	4.5	4.0	4.5	4.0	4.5	4.0	4.5				
Max Green Setting (Gmax), s	21.0	35.5	6.0	40.5	21.0	35.5	6.0	40.5				
Max Q Clear Time (g_c+l1), s	5.1	12.8	4.2	18.8	4.1	17.5	8.0	15.7				
Green Ext Time (p_c), s	0.0	1.7	0.0	2.2	0.0	2.1	0.0	2.0				
Intersection Summary												
HCM 6th Ctrl Delay				32.8								
HCM 6th LOS				C								

# HCM Signalized Intersection Capacity Analysis

1: Mildred St W & 19th St W

Fircrest Prose  
Future (2026) With-Project PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↓		↑	↑↑	↑	↑	↑	↑	↑	↑↑↓	
Traffic Volume (vph)	110	485	75	305	660	150	109	282	241	190	387	100
Future Volume (vph)	110	485	75	305	660	150	109	282	241	190	387	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fr <sub>t</sub>	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3452		1770	3539	1517	1787	1881	1566	1787	3443	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3452		1770	3539	1517	1787	1881	1566	1787	3443	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	121	533	82	335	725	165	120	310	265	209	425	110
RTOR Reduction (vph)	0	13	0	0	0	111	0	0	174	0	27	0
Lane Group Flow (vph)	121	602	0	335	725	54	120	310	91	209	508	0
Confl. Peds. (#/hr)	12		8	8		12	16		8	8		16
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases						8			6			
Actuated Green, G (s)	10.4	21.3		20.6	31.5	31.5	9.9	20.4	20.4	14.7	25.2	
Effective Green, g (s)	10.4	21.3		20.6	31.5	31.5	9.9	20.4	20.4	14.7	25.2	
Actuated g/C Ratio	0.11	0.22		0.21	0.32	0.32	0.10	0.21	0.21	0.15	0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	189	758		375	1149	492	182	395	329	270	894	
v/s Ratio Prot	0.07	c0.17		c0.19	0.20		0.07	c0.16		c0.12	c0.15	
v/s Ratio Perm						0.04			0.06			
v/c Ratio	0.64	0.79		0.89	0.63	0.11	0.66	0.78	0.28	0.77	0.57	
Uniform Delay, d1	41.5	35.8		37.1	27.8	22.9	41.9	36.2	32.1	39.6	31.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.4	5.4		22.1	2.6	0.4	6.4	9.1	0.2	11.9	0.5	
Delay (s)	46.9	41.1		59.2	30.5	23.4	48.4	45.3	32.3	51.4	31.7	
Level of Service	D	D		E	C	C	D	D	C	D	C	
Approach Delay (s)		42.1			37.4			40.9			37.2	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM 2000 Control Delay		39.1										
HCM 2000 Volume to Capacity ratio		0.84										
Actuated Cycle Length (s)		97.0										
Intersection Capacity Utilization		77.8%										
Analysis Period (min)		15										
c Critical Lane Group												

Intersection													
Int Delay, s/veh	2.2												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔			↔			↖	↑	↖	↖	↑	↖	
Traffic Vol, veh/h	20	0	20	15	0	31	10	605	22	49	679	35	
Future Vol, veh/h	20	0	20	15	0	31	10	605	22	49	679	35	
Conflicting Peds, #/hr	6	0	6	0	0	0	6	0	0	0	0	6	
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None	
Storage Length	-	-	-	-	-	-	100	-	100	100	-	100	
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97	
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	1	1	1	
Mvmt Flow	21	0	21	15	0	32	10	624	23	51	700	36	
Major/Minor													
Minor2		Minor1			Major1			Major2					
Conflicting Flow All	1486	1475	712	1481	1488	630	742	0	0	647	0	0	
Stage 1	808	808	-	644	644	-	-	-	-	-	-	-	
Stage 2	678	667	-	837	844	-	-	-	-	-	-	-	
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.11	-	-	
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-	
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.209	-	-	
Pot Cap-1 Maneuver	104	128	436	105	125	485	874	-	-	943	-	-	
Stage 1	378	397	-	465	471	-	-	-	-	-	-	-	
Stage 2	445	460	-	364	382	-	-	-	-	-	-	-	
Platoon blocked, %								-	-	-	-	-	
Mov Cap-1 Maneuver	91	119	431	95	116	482	869	-	-	943	-	-	
Mov Cap-2 Maneuver	91	119	-	95	116	-	-	-	-	-	-	-	
Stage 1	372	373	-	459	465	-	-	-	-	-	-	-	
Stage 2	408	454	-	326	359	-	-	-	-	-	-	-	
Approach													
EB			WB			NB			SB				
HCM Control Delay, s	37.9		27.5			0.1			0.6				
HCM LOS	E		D										
Minor Lane/Major Mvmt		NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	869		-	-	150	207	943	-	-				
HCM Lane V/C Ratio	0.012		-	-	0.275	0.229	0.054	-	-				
HCM Control Delay (s)	9.2		-	-	37.9	27.5	9	-	-				
HCM Lane LOS	A		-	-	E	D	A	-	-				
HCM 95th %tile Q(veh)	0		-	-	1.1	0.9	0.2	-	-				

# HCM Signalized Intersection Capacity Analysis

Fircrest Prose

3: Regents Blvd W & 67th Ave W/Mildred St W & 24th St W/Regents Blvd W

Future (2026) With-Project PM Peak Hour

Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations												
Traffic Volume (vph)	10	15	5	5	85	365	15	111	20	10	382	100
Future Volume (vph)	10	15	5	5	85	365	15	111	20	10	382	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5			8.0	8.0	8.0	8.0		7.0	8.0	8.0
Lane Util. Factor	1.00	1.00			1.00	0.95	0.95	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97			1.00	1.00	1.00	0.97		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	1.00
Fr <sub>t</sub>	1.00	0.85			1.00	1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected	0.98	1.00			0.95	0.95	0.96	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1735	1465			1787	1698	1708	1547		1805	1900	1555
Flt Permitted	0.35	1.00			0.74	0.95	0.96	1.00		0.95	1.00	1.00
Satd. Flow (perm)	612	1465			1394	1698	1708	1547		1805	1900	1555
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	15	5	5	88	376	15	114	21	10	394	103
RTOR Reduction (vph)	0	0	9	0	0	0	0	97	0	0	0	73
Lane Group Flow (vph)	0	25	1	0	88	196	195	17	0	31	394	30
Confl. Peds. (#/hr)	4			4		4		4	4	7		6
Heavy Vehicles (%)	7%	7%	7%	7%	1%	1%	1%	1%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm		Perm	Split	NA	Perm	Prot	Prot	NA	Perm
Protected Phases		7				8	8		1	1	6	
Permitted Phases	7		7		8			8				6
Actuated Green, G (s)	8.1	8.1			19.0	19.0	19.0	19.0		3.1	38.2	38.2
Effective Green, g (s)	8.1	8.1			19.0	19.0	19.0	19.0		3.1	38.2	38.2
Actuated g/C Ratio	0.06	0.06			0.15	0.15	0.15	0.15		0.02	0.29	0.29
Clearance Time (s)	6.5	6.5			8.0	8.0	8.0	8.0		7.0	8.0	8.0
Vehicle Extension (s)	1.0	1.0			3.0	3.0	3.0	3.0		1.0	3.0	3.0
Lane Grp Cap (vph)	38	91			203	247	248	225		42	556	455
v/s Ratio Prot					c0.12	0.11				0.02	c0.21	
v/s Ratio Perm	c0.04	0.00			0.06			0.01				0.02
v/c Ratio	0.66	0.01			0.43	0.79	0.79	0.07		0.74	0.71	0.07
Uniform Delay, d1	59.8	57.4			50.8	53.8	53.7	48.1		63.2	41.1	33.2
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	27.1	0.0			1.5	15.9	15.1	0.1		44.0	4.1	0.1
Delay (s)	86.9	57.4			52.3	69.7	68.8	48.2		107.2	45.3	33.3
Level of Service	F	E			D	E	E	D		F	D	C
Approach Delay (s)	78.5						62.7				46.6	
Approach LOS	E						E				D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay	54.2											D
HCM 2000 Volume to Capacity ratio	0.81											
Actuated Cycle Length (s)	130.4											39.0
Intersection Capacity Utilization	95.4%											F
Analysis Period (min)	15											
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

Fircrest Prose

3: Regents Blvd W & 67th Ave W/Mildred St W & 24th St W/Regents Blvd (2026) With-Project PM Peak Hour

Movement	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	64	495	176	15	10	192	235	10
Future Volume (vph)	64	495	176	15	10	192	235	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	8.0	8.0			9.5	9.5	
Lane Util. Factor	1.00	1.00	1.00			1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95			1.00	0.96	
Flpb, ped/bikes	1.00	1.00	1.00			0.98	1.00	
Fr <sub>t</sub>	1.00	1.00	0.85			1.00	0.85	
Flt Protected	0.95	1.00	1.00			0.95	1.00	
Satd. Flow (prot)	1787	1881	1518			1728	1525	
Flt Permitted	0.95	1.00	1.00			0.97	1.00	
Satd. Flow (perm)	1787	1881	1518			1769	1525	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	66	510	181	15	10	198	242	10
RTOR Reduction (vph)	0	0	133	0	0	0	204	0
Lane Group Flow (vph)	66	510	63	0	0	208	48	0
Confl. Peds. (#/hr)	6		4	7	7	4	6	
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm		Perm	Perm	Perm	
Protected Phases	5	2						
Permitted Phases			2		4	4	4	
Actuated Green, G (s)	6.6	41.7	41.7			19.5	19.5	
Effective Green, g (s)	6.6	41.7	41.7			19.5	19.5	
Actuated g/C Ratio	0.05	0.32	0.32			0.15	0.15	
Clearance Time (s)	7.0	8.0	8.0			9.5	9.5	
Vehicle Extension (s)	1.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	90	601	485			264	228	
v/s Ratio Prot	0.04	c0.27						
v/s Ratio Perm			0.04			c0.12	0.03	
v/c Ratio	0.73	0.85	0.13			0.79	0.21	
Uniform Delay, d1	61.0	41.4	31.5			53.5	48.7	
Progression Factor	1.00	1.00	1.00			1.00	1.00	
Incremental Delay, d2	23.1	10.8	0.1			14.4	0.5	
Delay (s)	84.1	52.2	31.6			67.8	49.1	
Level of Service	F	D	C			E	D	
Approach Delay (s)			49.7			57.6		
Approach LOS			D			E		
Intersection Summary								

HCM 6th Signalized Intersection Summary  
4: Bridgeport Way W & 27th St W

Fircrest Prose  
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)	240	245	105	234	328	104	145	655	126	96	690	270
Future Volume (veh/h)	240	245	105	234	328	104	145	655	126	96	690	270
Initial Q (Q <sub>b</sub> ), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00		0.99	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No		No		No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	247	253	108	241	338	107	149	675	130	99	711	278
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, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	412	434	499	464	428	452	325	920	177	290	1010	655
Arrive On Green	0.13	0.23	0.23	0.13	0.23	0.23	0.08	0.31	0.31	0.06	0.28	0.28
Sat Flow, veh/h	1795	1885	1589	1795	1885	1589	1795	2986	574	1795	3582	1566
Grp Volume(v), veh/h	247	253	108	241	338	107	149	405	400	99	711	278
Grp Sat Flow(s), veh/h/ln	1795	1885	1589	1795	1885	1589	1795	1791	1769	1795	1791	1566
Q Serve(g_s), s	6.3	7.4	3.1	6.2	10.5	3.2	3.6	12.5	12.6	2.3	11.0	7.8
Cycle Q Clear(g_c), s	6.3	7.4	3.1	6.2	10.5	3.2	3.6	12.5	12.6	2.3	11.0	7.8
Prop In Lane	1.00			1.00		1.00	1.00		0.32	1.00		1.00
Lane Grp Cap(c), veh/h	412	434	499	464	428	452	325	552	545	290	1010	655
V/C Ratio(X)	0.60	0.58	0.22	0.52	0.79	0.24	0.46	0.73	0.73	0.34	0.70	0.42
Avail Cap(c_a), veh/h	1212	835	837	1271	835	795	638	1024	1012	766	2048	1110
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.9	21.3	15.7	15.2	22.6	17.1	15.0	19.2	19.2	14.7	20.0	12.9
Incr Delay (d2), s/veh	0.5	0.5	0.1	0.3	1.3	0.1	0.4	0.7	0.7	0.3	0.3	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	2.4	3.1	1.0	2.3	4.4	1.1	1.3	4.8	4.8	0.9	4.3	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	16.4	21.7	15.8	15.6	23.9	17.2	15.3	19.9	19.9	15.0	20.3	13.0
LnGrp LOS	B	C	B	B	C	B	B	B	B	C	B	
Approach Vol, veh/h						686			954			1088
Approach Delay, s/veh						19.9			19.2			18.0
Approach LOS			B			B			B			B
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+R <sub>c</sub> ), s	9.2	22.0	12.1	18.8	7.5	23.6	12.3	18.6				
Change Period (Y+R <sub>c</sub> ), s	4.0	4.5	4.0	4.5	4.0	4.5	4.0	4.5				
Max Green Setting (Gmax), s	16.0	35.5	36.0	27.5	20.0	35.5	36.0	27.5				
Max Q Clear Time (g_c+l1), s	5.6	13.0	8.2	9.4	4.3	14.6	8.3	12.5				
Green Ext Time (p_c), s	0.0	3.9	0.1	1.0	0.0	3.4	0.1	1.3				
Intersection Summary												
HCM 6th Ctrl Delay				18.8								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary  
5: 67th Ave W & 35th St SW

Fircrest Prose  
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)	70	15	65	5	15	15	65	482	5	20	581	104
Future Volume (veh/h)	70	15	65	5	15	15	65	482	5	20	581	104
Initial Q (Q <sub>b</sub> ), 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
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	74	16	68	5	16	16	68	507	5	21	612	109
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	315	48	121	179	155	134	463	935	791	554	935	791
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.49	0.49	0.49	0.49	0.49	0.49
Sat Flow, veh/h	616	268	668	120	856	744	743	1900	1609	902	1900	1609
Grp Volume(v), veh/h	158	0	0	37	0	0	68	507	5	21	612	109
Grp Sat Flow(s), veh/h/ln	1553	0	0	1719	0	0	743	1900	1609	902	1900	1609
Q Serve(g_s), s	1.7	0.0	0.0	0.0	0.0	0.0	2.0	4.8	0.0	0.4	6.3	1.0
Cycle Q Clear(g_c), s	2.4	0.0	0.0	0.5	0.0	0.0	8.2	4.8	0.0	5.2	6.3	1.0
Prop In Lane	0.47			0.43	0.14		0.43	1.00		1.00	1.00	1.00
Lane Grp Cap(c), veh/h	484	0	0	468	0	0	463	935	791	554	935	791
V/C Ratio(X)	0.33	0.00	0.00	0.08	0.00	0.00	0.15	0.54	0.01	0.04	0.65	0.14
Avail Cap(c_a), veh/h	1146	0	0	1195	0	0	1113	2596	2198	1343	2596	2198
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.7	0.0	0.0	8.9	0.0	0.0	8.0	4.6	3.4	6.4	4.9	3.6
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.3	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	0.5	0.0	0.0	0.1	0.0	0.0	0.2	0.6	0.0	0.0	0.8	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	9.8	0.0	0.0	8.9	0.0	0.0	8.1	4.8	3.4	6.4	5.2	3.6
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h	158			37			580			742		
Approach Delay, s/veh	9.8			8.9			5.1			5.0		
Approach LOS	A			A			A			A		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+R <sub>c</sub> ), s	17.3			8.7			17.3			8.7		
Change Period (Y+R <sub>c</sub> ), s	4.5			4.0			4.5			4.0		
Max Green Setting (Gmax), s	35.5			16.0			35.5			16.0		
Max Q Clear Time (g_c+l1), s	8.3			2.5			10.2			4.4		
Green Ext Time (p_c), s	3.0			0.1			2.5			0.4		
Intersection Summary												
HCM 6th Ctrl Delay				5.7								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary  
6: 67th Ave W & 40th St W/Emerson St

Fircrest Prose  
Future (2026) With-Project PM Peak Hour

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	65	420	100	195	420	86	60	361	135	89	484	68
Future Volume (veh/h)	65	420	100	195	420	86	60	361	135	89	484	68
Initial Q (Q <sub>b</sub> ), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	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		No		No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	68	438	104	203	438	90	62	376	141	93	504	71
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	0	0	0
Cap, veh/h	87	550	463	166	509	104	79	548	463	120	591	500
Arrive On Green	0.05	0.29	0.29	0.09	0.34	0.34	0.04	0.29	0.29	0.07	0.31	0.31
Sat Flow, veh/h	1795	1885	1589	1795	1516	311	1810	1900	1605	1810	1900	1605
Grp Volume(v), veh/h	68	438	104	203	0	528	62	376	141	93	504	71
Grp Sat Flow(s), veh/h/ln	1795	1885	1589	1795	0	1827	1810	1900	1605	1810	1900	1605
Q Serve(g_s), s	2.4	14.0	3.2	6.0	0.0	17.6	2.2	11.4	4.5	3.3	16.2	2.1
Cycle Q Clear(g_c), s	2.4	14.0	3.2	6.0	0.0	17.6	2.2	11.4	4.5	3.3	16.2	2.1
Prop In Lane	1.00		1.00	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	87	550	463	166	0	613	79	548	463	120	591	500
V/C Ratio(X)	0.78	0.80	0.22	1.23	0.00	0.86	0.78	0.69	0.30	0.77	0.85	0.14
Avail Cap(c_a), veh/h	166	1173	989	166	0	1137	584	1036	875	584	1036	875
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.6	21.3	17.5	29.5	0.0	20.2	30.8	20.5	18.1	29.9	21.0	16.1
Incr Delay (d2), s/veh	5.7	1.0	0.1	143.7	0.0	1.4	6.2	0.6	0.1	3.9	1.4	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	1.1	5.8	1.1	9.1	0.0	7.0	1.1	4.8	1.6	1.5	6.8	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	36.3	22.3	17.6	173.2	0.0	21.6	37.0	21.1	18.2	33.8	22.4	16.2
LnGrp LOS	D	C	B	F	A	C	D	C	B	C	C	B
Approach Vol, veh/h	610				731			579			668	
Approach Delay, s/veh	23.1				63.7			22.1			23.3	
Approach LOS	C				E			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+R <sub>c</sub> ), s	8.3	23.3	7.1	26.3	6.8	24.8	10.0	23.5				
Change Period (Y+R <sub>c</sub> ), s	4.0	4.5	4.0	4.5	4.0	4.5	4.0	4.5				
Max Green Setting (Gmax), s	21.0	35.5	6.0	40.5	21.0	35.5	6.0	40.5				
Max Q Clear Time (g_c+l1), s	5.3	13.4	4.4	19.6	4.2	18.2	8.0	16.0				
Green Ext Time (p_c), s	0.0	1.7	0.0	2.3	0.0	2.1	0.0	2.0				
Intersection Summary												
HCM 6th Ctrl Delay				34.4								
HCM 6th LOS				C								

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	B	T	R	T	U
Traffic Vol, veh/h	15	8	644	17	14	738
Future Vol, veh/h	15	8	644	17	14	738
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	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	15	8	664	18	14	761
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1462	673	0	0	682	0
Stage 1	673	-	-	-	-	-
Stage 2	789	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.11	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.209	-
Pot Cap-1 Maneuver	143	459	-	-	916	-
Stage 1	511	-	-	-	-	-
Stage 2	451	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	141	459	-	-	916	-
Mov Cap-2 Maneuver	281	-	-	-	-	-
Stage 1	511	-	-	-	-	-
Stage 2	444	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	16.9	0		0.2		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	325	916	-	
HCM Lane V/C Ratio	-	-	0.073	0.016	-	
HCM Control Delay (s)	-	-	16.9	9	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	0.2	0	-	

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	B	T	R	U	↑
Traffic Vol, veh/h	7	12	625	15	11	703
Future Vol, veh/h	7	12	625	15	11	703
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	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	7	12	644	15	11	725
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1399	652	0	0	659	0
Stage 1	652	-	-	-	-	-
Stage 2	747	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.11	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.209	-
Pot Cap-1 Maneuver	156	471	-	-	934	-
Stage 1	522	-	-	-	-	-
Stage 2	472	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	154	471	-	-	934	-
Mov Cap-2 Maneuver	295	-	-	-	-	-
Stage 1	522	-	-	-	-	-
Stage 2	466	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	14.8	0	0.1			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	386	934	-	
HCM Lane V/C Ratio	-	-	0.051	0.012	-	
HCM Control Delay (s)	-	-	14.8	8.9	-	
HCM Lane LOS	-	-	B	A	-	
HCM 95th %tile Q(veh)	-	-	0.2	0	-	

## Appendix D: Signal Warrant Analysis

<b>Warrants Summary</b>												
<b>Information</b>												
Analyst	Transpo Group			Intersection	Mildred/Central Site Access							
Agency/Co				Jurisdiction	Fircrest							
Date Performed	7/6/2022			Units	U.S. Customary							
Project ID				Time Period Analyzed	PM Peak Hour							
East/West Street	Central Site Access			North/South Street	Mildred St W							
File Name	Central Updated.xhy			Major Street	North-South							
<b>Project Description</b>												
<b>General</b>			<b>Roadway Network</b>									
Major Street Speed (mph)	35	<input type="checkbox"/>	Population < 10,000			Two Major Routes			<input type="checkbox"/>			
Nearest Signal (ft)	0	<input type="checkbox"/>	Coordinated Signal System			Weekend Count			<input type="checkbox"/>			
Crashes (per year)	0	<input type="checkbox"/>	Adequate Trials of Alternatives			5-yr Growth Factor			0			
<b>Geometry and Traffic</b>	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N	0	1	0	0	1	0	1	1	1	1	1	1
Lane usage		LTR			LTR		L	T	R	L	T	R
Vehicle Volume Averages (vph)	14	0	14	11	0	22	7	446	16	36	500	25
Peds (ped/h) / Gaps (gaps/h)	--	0 / 0	--	--	0 / 0	--	--	0 / 0	--	--	0 / 0	--
Delay (s/veh) / (veh-hr)	--	0 / 0	--	--	0 / 0	--	--	0 / 0	--	--	0 / 0	--
<b>Warrant 1: Eight-Hour Vehicular Volume</b>												
1 A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--											<input type="checkbox"/>	
1 B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--											<input type="checkbox"/>	
1 (80%) Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)											<input type="checkbox"/>	
<b>Warrant 2: Four-Hour Vehicular Volume</b>												
2 A. Four-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)											<input type="checkbox"/>	
<b>Warrant 3: Peak Hour</b>												
3 A. Peak-Hour Conditions (Minor delay --and-- minor volume --and-- total volume ) --or--											<input type="checkbox"/>	
3 B. Peak- Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)											<input type="checkbox"/>	
<b>Warrant 4: Pedestrian Volume</b>												
4 A. Four Hour Volumes --or--											<input type="checkbox"/>	
4 B. One-Hour Volumes											<input type="checkbox"/>	
<b>Warrant 5: School Crossing</b>												
5. Student Volumes --and--											<input type="checkbox"/>	
5. Gaps Same Period											<input type="checkbox"/>	
<b>Warrant 6: Coordinated Signal System</b>												
6. Degree of Platooning (Predominant direction or both directions)											<input type="checkbox"/>	
<b>Warrant 7: Crash Experience</b>												
7 A. Adequate trials of alternatives, observance and enforcement failed --and--											<input type="checkbox"/>	
7 B. Reported crashes susceptible to correction by signal (12-month period) --and--											<input type="checkbox"/>	
7 C. (80%) Volumes for Warrants 1A, 1B --or-- 4 are satisfied											<input type="checkbox"/>	

<b><i>Warrant 8: Roadway Network</i></b>	
8 A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2 or 3) --or--	<input type="checkbox"/>
8 B. Weekend Volume (Five hours total)	<input type="checkbox"/>
<b><i>Warrant 9: Grade Crossing</i></b>	
9 A. Grade Crossing within 140 ft --and--	<input type="checkbox"/>
9 B. Peak-Hour Vehicular Volumes	<input type="checkbox"/>

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HCS7™ Warrants Version 7.2.1

Generated: 7/6/2022 10:30 AM

## Appendix E: Trip Generation

## Appendix E: Trip Generation

### Fircrest Prose

<b><i>Proposed Use</i></b>																		
Land Use	Setting	Size	Units	Model	Equation	Rate	Units	Inbound %	Gross Trips			Pass-By <sup>2</sup>			Total Net New			
									Inbound	Outbound	Subtotal	%	In	Out	Total	Inbound	Outbound	Total
Multifamily (Low-Rise) (LU 221)		395 du																
Daily	General Urban/Suburban			Equation (lin)	T= 4.77x-46.46	-	-	50%	919	919	1,838		-	-	-	919	919	1,838
AM Peak Hour	General Urban/Suburban			Equation (lin)	T= 0.44x-11.61	-	-	23%	37	125	162		-	-	-	37	125	162
PM Peak Hour	General Urban/Suburban			Equation (lin)	T= 0.39x+0.34	-	-	61%	94	60	154		-	-	-	94	60	154
Retail (LU 822)		8,650 sf																
Daily	General Urban/Suburban			Rate	-	7.81	per ksf	50%	34	34	68	40%	14	14	28	20	20	40
AM Peak Hour	General Urban/Suburban			Rate	-	2.36	per ksf	60%	12	8	20	40%	4	4	8	8	4	12
PM Peak Hour	General Urban/Suburban			Rate	-	6.59	per ksf	50%	29	28	57	40%	11	11	22	18	17	35
<b><u>Subtotal</u></b>									953	953	1,906		14	14	28	939	939	1,878
Daily									49	133	182		4	4	8	45	129	174
AM Peak Hour									123	88	211		11	11	22	112	77	189

### ***Net New Trips***

Daily															939	939	1878
AM Peak Hour															45	129	174
PM Peak Hour															112	77	189

### Notes:

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

2. Passby rates per ITE Trip Generation Manual (11th Edition, 2021).