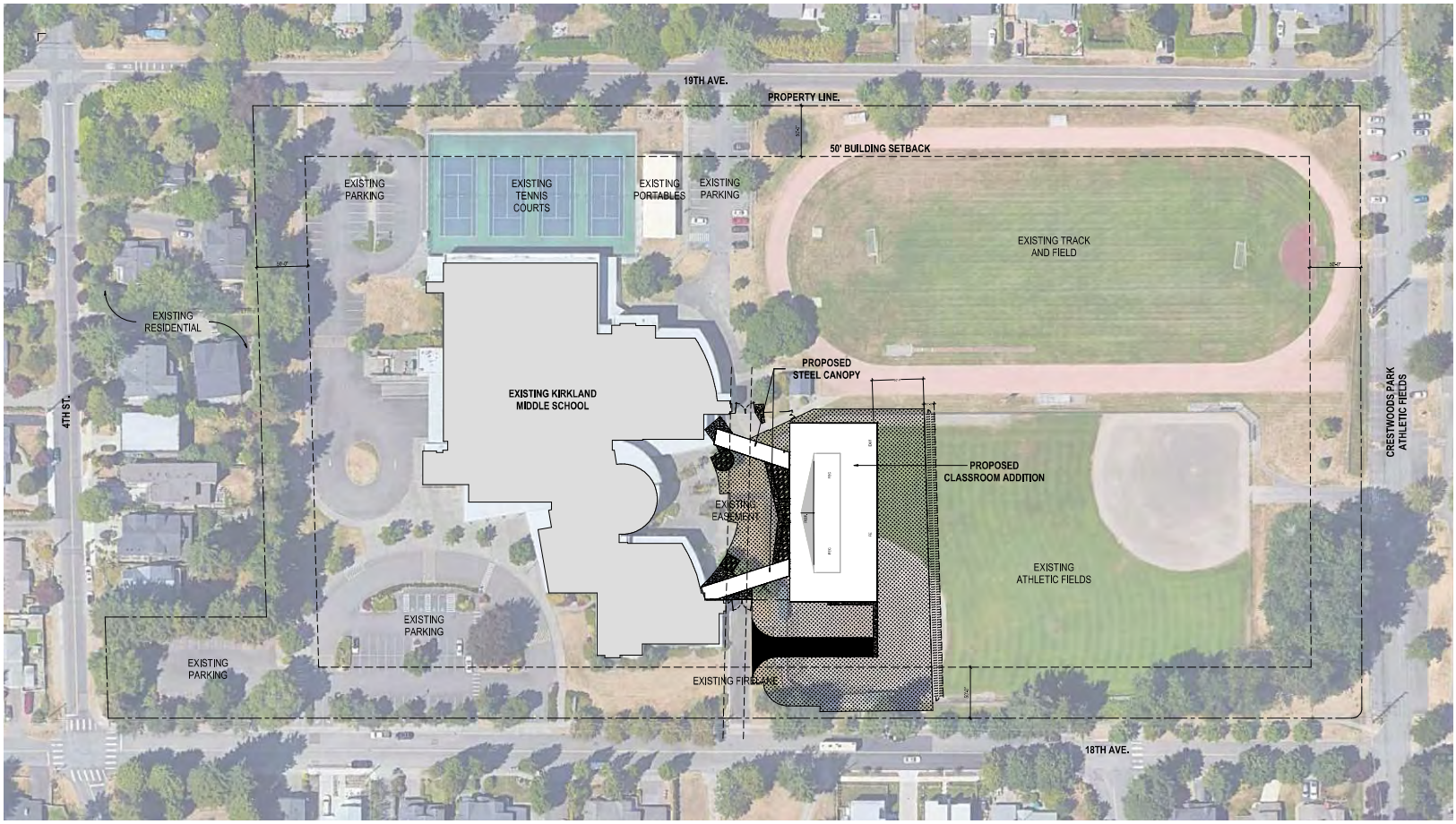
Attachment A: Project Site Vicinity

N
NOT TO SCALE

ATTACHMENT B

Preliminary Site Plan



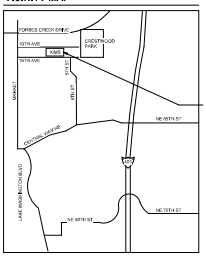
1 SITE PLAN - OVERALL

SCALE: 1" = 30'-0"

0 30 60 90

SCALE: 1" = 30'-0"

VICINITY MAP



ATTACHMENT C

Existing Parking Demand Data

Kirkland Middle School Addition
Parking Data Summary
TENW Project No. 2022-175

WEEKDAY PARKING DEMAND

		Number of Occupied Stalls Observed											
		Tuesday 5/10/22				Tuesday 5/17/22				Thursday 5/19/22			
		9:00 AM		2:00 PM		9:45 AM		2:35 PM		9:30 AM		2:30 PM	
Type of Parking Stall	**Number of Available Stalls**	**Number**	**Percent Occupied**	**Number**	**Percent Occupied**	**Number**	**Percent Occupied**	**Number**	**Percent Occupied**	**Number**	**Percent Occupied**	**Number**	**Percent Occupied**
Area #1 (Northeast Lot)													
ADA	2	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
General	26	12	46%	12	46%	10	38%	10	38%	10	38%	11	42%
Area #2 (Northwest Lot)													
Staff	34	5	15%	3	9%	6	18%	3	9%	6	18%	4	12%
Area #3 (Main Lot)													
ADA	4	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Resource Officer	1	0	0%	0	0%	1	100%	0	0%	1	100%	1	100%
General	42	33	79%	33	79%	31	74%	32	76%	34	81%	30	71%
Area #4 (Southwest Lot)													
General	27	0	0%	0	0%	0	0%	0	0%	1	4%	2	7%
ON-SITE TOTAL	**136**	**50**		**48**		**48**		**45**		**52**		**48**	
ON-SITE PERCENT OCCUPIED		**37%**		**35%**		**35%**		**33%**		**38%**		**35%**	

ATTACHMENT D

ITE Parking Parking Generation Manual, 5th edition
Land Use Code 522

Middle School/Junior High School (522)

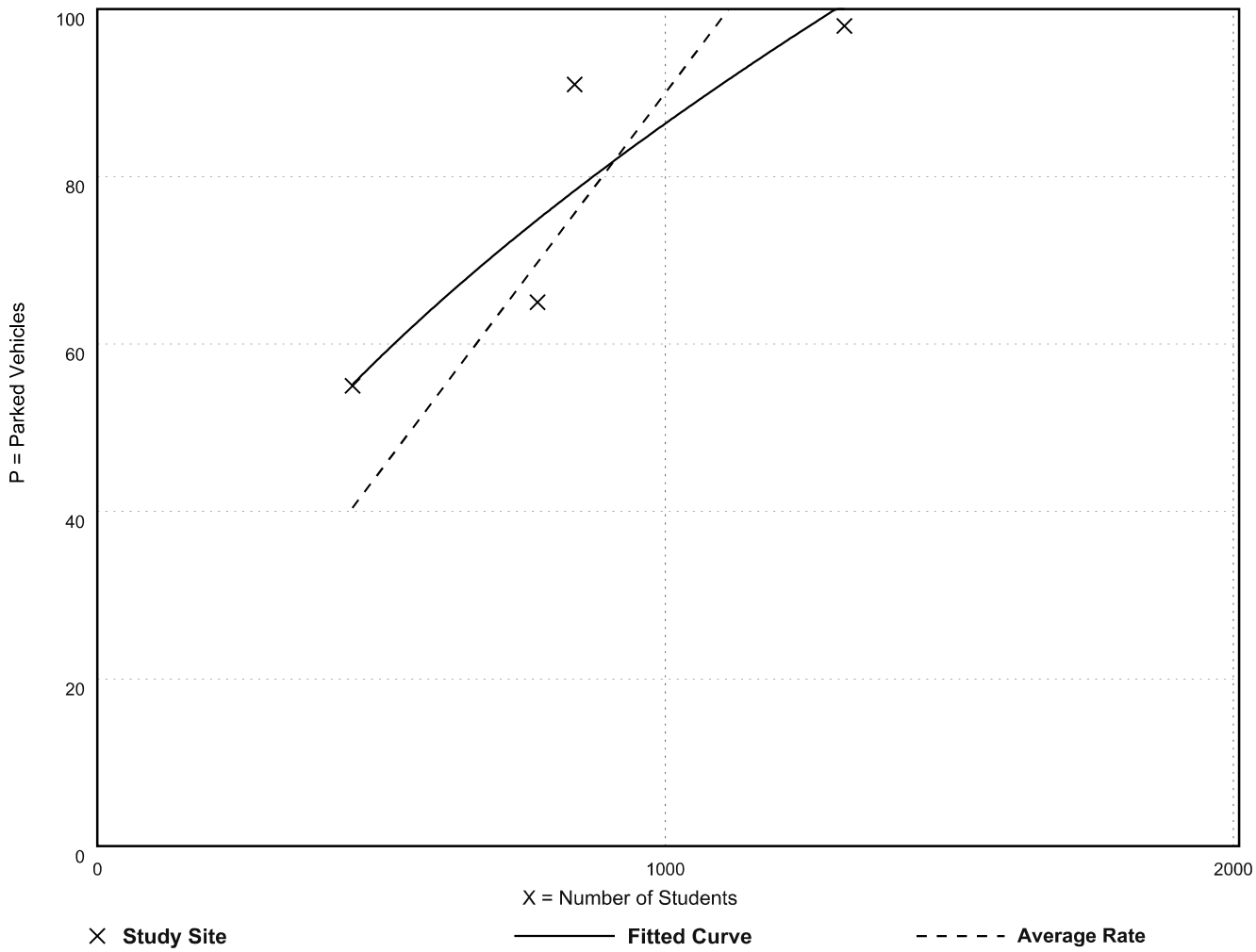
Peak Period Parking Demand vs: Students
On a: Weekday (Monday - Friday)
Setting/Location: General Urban/Suburban
Peak Period of Parking Demand: 10:00 a.m. - 2:00 p.m.
Number of Studies: 4
Avg. Num. of Students: 845

Peak Period Parking Demand per Student

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
0.09	0.07 - 0.12	0.08 / 0.12	***	0.02 (22%)

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Ln(P) = 0.56 Ln(X) + 0.59

R^2= 0.81

ATTACHMENT E

Future Parking Demand Calculations

Kirkland Middle School Addition
Parking Data Summary
TENW Project No. 2022-175

WEEKDAY PARKING DEMAND SUMMARY

Existing Weekday Parking Demand

	Parking Demand Observed (vehicles)	
Day	**~9:30 AM**	**~2:30 PM**
Tuesday 5/10/22	50	48
Tuesday 5/17/22	48	45
Thursday 5/19/22	52	48
3-day average	49	

Existing Weekday Parking Demand Rates per Student

	Maximum Peak Observed (occupied stalls)	Number of Students[1]	Peak Parking Demand Rate (stalls/student)
Max Parking Demand	52	543	0.10

Future (with Addition Project) Weekday Parking Demand Estimates per Student

	Peak Parking Demand Rate (stalls/student)	Future Student Enrollment[2]	Projected Future Peak Parking Demand (stalls)	Total Parking Supply	Parking Surplus or Deficit (stalls)
Max Parking Demand	0.10	885	89	136	+47

Notes:

1) Number of students as of 5/13/22 as provided by LWSD.

2) Total future capacity with Addition per LWSD (685 existing capacity +200 students = 885 future capacity).

CITY OF KIRKLAND
Department of Public Works
123 Fifth Avenue, Kirkland, WA 98033
425.587.3800 - www.kirklandwa.gov

MEMORANDUM

Date: April 25, 2023

To: Tony Leavitt, Senior Planner

From: Rochelle Starrett, Transportation Engineer
Joel Pfundt, Transportation Manager

File No.: ZON22-00800

Subject: **Kirkland Middle School Addition Parking Study and On-Site Circulation Review**

INTRODUCTION

This memo summarizes my review of the parking study prepared for the Kirkland Middle School Addition project pursuant to Kirkland Zoning Code (KZC) 105.25 and my review of the transportation impact analysis which evaluated the impacts of the project to the existing on-site vehicle circulation and loading area pursuant to KZC 15.40.130. I have received and reviewed the following documents:

- Parking Analysis for Kirkland Middle School Addition prepared by TENW dated February 15, 2023
- Updated Parking Analysis for Kirkland Middle School Addition prepared by TENW dated April 19, 2023
- Updated Transportation Impact Analysis for Kirkland Middle School Addition prepared by TENW dated February 16, 2023

This review is required because the KZC requires the applicant to provide a parking demand study to determine the appropriate amount of parking for this land use rather than providing a general rate. The purpose of my review is to analyze the applicant's peak parking demand study and provide recommendations based on the criteria found in KZC 105.25. This review is also required to ensure that the existing on-site circulation and loading area is adequate with the addition project to minimize the impacts to nearby residential uses pursuant to KZC 15.40.130.

PROJECT DESCRIPTION

The subject property is located at 430 18th Avenue (Parcel #1245000676). The applicant is proposing to construct an 8-classroom addition at the existing Kirkland Middle School site which would increase the capacity of the school by up to 200 students. With the addition project, Kirkland Middle School would have a maximum capacity of 885 students and is expected to

employ 70 to 72 staff. The existing vehicle access to the site will remain the same with the addition project.

PREPARED STUDIES

Parking Analysis

KZC Section 105.25 allows an applicant to propose the number of parking spaces required in cases where the KZC does not specify a parking space requirement for a particular use based on a parking study prepared by a licensed Transportation Engineer. The scope of the study shall be proposed by the Transportation Engineer and approved by the City's Transportation Engineer. The study shall provide at least two days of data for morning, afternoon and evening hours, or as otherwise approved or required by the City's Transportation Engineer.

The applicant's parking study evaluated parking demand at the existing Kirkland Middle School site to capture the unique characteristics of this site which may influence parking demand. Parking demand was evaluated at the site for three weekdays in May 2022 around 9:00 AM (after peak morning drop-off) and around 2:30 PM (before peak afternoon pick-up). The evaluated parking demand periods represent the parking demand during typical school operations, and as noted in the transportation impact analysis prepared for this project, Kirkland Middle School was operating fully in-person at the time of this study.

Transportation Impact Analysis

The applicant's transportation impact analysis was prepared in accordance with City of Kirkland Policy R-38: Transportation Impact Analysis Review. Traffic counts were collected at the site access driveways for two days in May 2022 during the AM (8-9 AM, consistent with an 8:35 AM school start time), afternoon (2:30-3:30 PM, consistent with a 3:05 PM school dismissal time), and PM peak (4-6 PM). The collected traffic counts were used to develop site trip generation and traffic volumes for existing, future baseline, and future with project conditions which were used to prepare the level of service and vehicle queueing analysis for the site access driveways. The selected evaluation periods represent typical peak pick-up and drop-off periods at Kirkland Middle School since the school was operating fully in-person at the time of the study.

ANALYSIS

Parking Analysis

The parking demand measured at the site represents typical operating characteristics for Kirkland Middle School. Middle school parking demand includes both employee and visitor parking demand. Employees are typically parked on site for the duration of the school day while visitor traffic may be more variable throughout the day. School events, sports practices, or meetings may all contribute to evening parking demand, however, these events are typically infrequent or are expected to have lower overall parking demand since they may only affect a portion of the students attending Kirkland Middle School. Therefore, it is reasonable that the typical peak parking demand for the Kirkland Middle School site occurs during the day. Furthermore, the applicant evaluated parking demand once in the morning after the peak drop-off period and once in the afternoon prior to the peak pick-up period for three days. The time periods selected by the applicant correspond to periods when Kirkland Middle School was in session with fully in-person classes, and therefore, the parking demand represents typical peak parking demand for the site.

The applicant recorded a peak parking demand of 52 vehicles and a three-day average weekday peak parking demand of 49 vehicles. Based on the enrollment of 543 students at the time of the study, the peak parking demand corresponds to a parking rate of 0.10 spaces per student. As noted in the applicant's parking study, the peak parking demand rate for Kirkland Middle School is consistent with the range of 0.07 to 0.12 spaces per student identified in the Institute of Transportation Engineer's Parking Generation Manual.

The future maximum student capacity of Kirkland Middle School is 885 students which would correspond to a future peak parking demand of 89 parking spaces (0.10 spaces per student x 885 students). The projected parking demand would also accommodate the 70 to 72 staff expected at the site once the addition project is completed. Currently, the Kirkland Middle School site has a total of 136 on-site parking stalls across 4 lots. The existing parking supply includes 6 ADA stalls, 1 resource officer stall, 34 staff stalls, and 95 general purpose stalls. The existing parking supply is sufficient to accommodate the future projected parking demand with the addition project.

On-Site Circulation Analysis

The volumes used in the transportation impact analysis represent typical existing and projected future volumes for Kirkland Middle School. The projected future traffic volumes at Kirkland Middle School with the addition project were used to evaluate level of service and vehicle queues at the existing site access driveways during the AM, afternoon, and PM peak periods. Based on this analysis, all site access driveways are expected to operate at LOS C or better and the 95th percentile vehicle queues are expected to be 75 feet (3 vehicles) or less in 2024 with the proposed Kirkland Middle School addition project. Therefore, the increased pick-up and drop-off traffic generated by the addition project is expected to be accommodated on site and not significantly impact existing residential driveways near the existing site accesses on either 18th Avenue or 19th Avenue.

FINDINGS

The measured peak parking demand rate for Kirkland Middle School is 0.10 spaces per student. The future capacity of 885 students is expected to generate demand for a total of 89 parking spaces during typical school operations. The Kirkland Middle School site has sufficient parking to accommodate the increased parking demand that will be generated by the addition project.

All existing site access driveways are expected to operate at LOS C or better and 95th percentile vehicle queues at the site access driveways are expected to be 75 feet (3 vehicles) or less in 2024 with the proposed addition project. The existing main site access off 18th Avenue has sufficient storage to accommodate pick-up and drop-off activity on site

RECOMMENDATIONS

I recommend establishing a parking rate of 0.10 spaces per student for the Kirkland Middle School site. Based on the projected future student capacity, 89 parking spaces will be required to serve this use which will be accommodate within the current parking supply of 136 parking spaces.

I also recommend approving the addition project with no changes to the existing on-site circulation or loading area. The existing on-site circulation and loading area can accommodate the projected future demand on site and is not expected to significantly impact surrounding residences.

Kirkland Middle School (KiMS) Addition

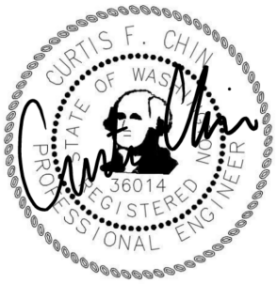
Kirkland, WA

Updated Transportation Impact Analysis

February 16, 2023

Prepared for:

Lake Washington School District No. 414
Support Services Center
15212 NE 95th Street
Redmond, WA 98052



2/16/2023

Prepared by:

TENW

Transportation Engineering NorthWest

11400 SE 8th Street, Suite 200
Bellevue, WA 98004
(425) 889-6747

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Appendices

List of Figures and Tables

EXECUTIVE SUMMARY

This updated transportation impact analysis (TIA) has been prepared for the proposed 8-classroom addition to Kirkland Middle School (KiMS) located at 430 18th Avenue (King County Parcel #1245000676) in Kirkland, Washington.

Project Proposal. The existing Kirkland Middle School serves grades 6 through 8 with an enrollment of 543 students (as of May 2022), however the school is currently entitled for up to 685 students. Based on information from the Lake Washington School District, the proposed project would include an addition consisting of 8 new classrooms. The existing 2 portables are expected to remain on site with the proposed addition project. The proposed 8-classroom addition would increase the capacity of the school by 200 students resulting in a total future maximum capacity of 885 students.

Vehicular access to the site would continue to be provided via the two existing driveways on 18th Avenue (one enter-only and one exit-only), and via the two existing driveways on 19th Avenue (one bus/staff parking only and one that provides access to a small parking lot). The project is planned to be completed prior to the start of school in Fall 2024.

Trip Generation. The proposed *KiMS Addition* (+200 students) is estimated to generate 564 new weekday daily trips with 180 new weekday AM peak hour trips (92 entering, 88 exiting), 92 new weekday afternoon peak hour trips (40 entering, 52 exiting), and 40 new weekday PM peak hour trips (25 entering, 15 exiting).

Transportation Concurrency. The City has determined the proposed project meets the City's transportation concurrency requirements. A Concurrency Test Notice was issued on November 4, 2022.

Intersection Operations. An analysis was conducted at 5 off-site study intersections and 4 site access intersections:

1) Market Street / 18th Avenue
2) 4th Street / 18th Avenue
3) 5th Place / 18th Avenue
4) Lake Street / Central Ave
5) 6th Street / Central Ave

A) 19th Avenue / KiMS West Access Driveway
B) 19th Avenue / 5th Street / KiMS East Access Driveway
C) 18th Avenue / KiMS West Access Driveway
D) 18th Avenue / KiMS East Access Driveway

The results of the analysis show that all study intersections are anticipated to operate at LOS D or better in 2024 with the proposed project during the AM peak hour, afternoon peak hour, and PM peak hour without or with the proposed *KiMS Addition* project.

Queuing Analysis. A future year weekday peak hour queuing analysis was conducted at two study intersections and the site access driveways for future year 2024 No Action (without project) and with-project conditions. The 95th percentile queues during the AM, afternoon, and PM peak hours at the

study intersections closest to Kirkland Middle School are anticipated to be accommodated within the existing storage.

Additionally, the 95th percentile queues during the AM, afternoon, and PM peak hours at the KiMS site access driveways are anticipated to be 75 feet (3 vehicles or less) with the project in 2024 and would be accommodated within the existing storage.

Vehicular Access and Circulation. The increase in AM and Afternoon peak period traffic volumes and associated drop-off and pick-up queueing as a result of the *KiMS Addition* project is anticipated to be accommodated on-site and therefore not result in additional significant adverse impacts to existing driveways located within 150 feet of the KiMS site access driveways on 18th Avenue and 19th Avenue.

Non-Motorized and Transit Impacts. The proposed project is anticipated to generate some additional pedestrian and bicycle trips. It is anticipated that the existing pedestrian and bicycle facilities in the project vicinity would be adequate to accommodate any additional pedestrian and bicycle trips generated by the proposed project. Additionally, impacts to the existing public transit services in the vicinity as a result of the proposed project are not expected.

Parking Analysis. The parking analysis for the *KiMS Addition* project is documented under a separate memorandum.

Mitigation

Concurrency. The project was evaluated for transportation concurrency by the City of Kirkland in November 2022. Based on the results, the City has determined the project meets the City's transportation concurrency requirements. Therefore, no short-term transportation mitigation was required to obtain concurrency in the City of Kirkland.

SEPA Improvements. Based on the results of the LOS analysis and the proportional share calculations at the study intersections, the installation of improvements under SEPA is not required.

Transportation Impact Fees. Transportation mitigation required by the City of Kirkland is payment of an impact fee based on the project's proposed land use. The currently adopted transportation impact fee is $479.04 per middle school student as of January 1, 2023. The cost per trip is subject to change and final impact fee calculations will be conducted at the time of building permit issuance.

INTRODUCTION

This updated transportation impact analysis (TIA) has been prepared for the proposed addition to Kirkland Middle School (KiMS) located at 430 18th Avenue (King County Parcel #1245000676) in Kirkland, Washington. A vicinity map showing the location of the site and the surrounding area is included in Figure 1.

Project Description

The existing Kirkland Middle School serves grades 6 through 8 with an enrollment of 543 students (as of May 2022), however the school is currently entitled for up to 685 students. Based on information from the Lake Washington School District, the proposed project would include an addition consisting of 8 new classrooms. The existing 2 portables are expected to remain on site with the proposed addition project. The proposed 8-classroom addition would increase the capacity of the school by 200 students resulting in a total future maximum capacity of 885 students.

Vehicular access to the site would continue to be provided via the two existing driveways on 18th Avenue (one enter-only and one exit-only), and via the two existing driveways on 19th Avenue (one bus/staff parking only and one that provides access to a small parking lot). The project is planned to be completed prior to the start of school in Fall 2024. A preliminary site plan is included in Appendix A.

Project Approach

The report is structured in accordance with the City of Kirkland's *Policy R-38 Transportation Impact Analysis Review* (July 2022), in documenting the evaluation of traffic impacts and recommended mitigation measures. Specific scope items to be included were also discussed and confirmed by City staff. To analyze the traffic impacts from the proposed *KiMS Addition*, the following tasks were undertaken:

- Assessment of existing conditions through field reconnaissance and review of existing planning documents.
- Described and assessed existing transportation conditions in the area, including existing traffic volumes, level of service, crash history, public transportation, and non-motorized facilities;
- Documented the City's planned transportation improvements in the site vicinity;
- Estimated trip generation and documented trip distribution and assignment of AM, afternoon, and PM peak hour project traffic;
- Evaluated intersection proportional shares based on City guidelines;
- Forecasted future 2024 no action and with-project traffic volumes.
- Analyzed year 2024 AM, afternoon, and PM peak hour LOS at the study intersections and site driveways.
- Analyzed year 2024 peak hour queuing at the site driveways and study intersections nearest to the site.
- Discussed future vehicular access and circulation.

- Discussed non-motorized and transit impacts.
- Identified mitigation to the City of Kirkland.

Primary Data and Information Sources

- City of Kirkland *Policy R-38 Transportation Impact Analysis Review*, July 2022.
- AM, afternoon, and PM peak period traffic counts, ATD, May and October 2022.
- Average Daily Traffic Volumes; source: City of Kirkland.
- *Highway Capacity Manual (HCM),* TRB, 6th Edition, 2016.
- Washington State Department of Transportation 2019-2021 crash data.
- City of Kirkland 2019-2021 crash data.
- Metro/King County Website, September 2022.
- City of Kirkland Preliminary *2023-2028 Capital Improvement Program (CIP).*
- City of Kirkland *Transportation Impact Fees,* effective January 1, 2023.

Figure 1: Project Site Vicinity

N
NOT TO SCALE

EXISTING CONDITIONS

This section describes existing transportation system conditions in the study area, including an inventory of existing roadways, existing traffic volumes, intersection levels of service (LOS), crash history, public transportation services, and non-motorized transportation facilities.

Roadway Network

Table 1 describes the existing characteristics of the streets that would be used as primary routes to and from the site. Roadway characteristics are described in terms of orientation, arterial classification, number of lanes, posted speed limits, parking, pedestrian facilities, and bicycle facilities. The relationship of these roadways to the project site is shown in Figure 1.

Table 1
Existing Study Area Roadway Network

Roadway	Orientation	Arterial Classification	# of Lanes	Lane Width	Posted Speed Limit (mph)	Parking / Shoulder Treatment	Sidewalks	Bicycle Facilities
18th Avenue	East/west	Collector Street	2	Typ[1]	25 [2]	Parking on both Sides	5' on north side, intermittent 5' on south side	No
19th Avenue	East/west	Local Street	2	Typ[1]	25	South Side	5' on south side	No
Market Street	North/south	Principal Arterial	2 - 3	Typ[1]	35	Parking on both sides	5' on both sides	Yes on both sides
4th Street	North/south	Local Street	2	Typ[1]	25	Parking on both Sides	Intermittent 5' on east side	No
5th Place	North/south	Collector Street	2	Typ[1]	25	Parking on both sides	5' on both sides	No

1) Typ = Typical Lane Widths (10-12').
2) In the immediate vicinity of the school, 18th Avenue has school-zone signs with a speed limit of 20 mph when children are present.

Existing Traffic Volumes

Year 2022 existing AM, afternoon, and PM peak hour traffic volumes were based on counts conducted by All Traffic Data in May and October 2022 at the study intersections and site access driveways as follows:

Study Intersection / Site Access Driveway	Date of Turning Movement Count		
	AM Peak	Afternoon Peak	PM Peak
1. Market Street / 18th Ave	October 6, 2022	*not studied*	May 12, 2022
2. 4th Street / 18th Ave	October 6, 2022	October 6, 2022	May 12, 2022
3. 5th Place / 18th Ave	October 6, 2022	October 6, 2022	May 12, 2022
4. Lake Street / Central Ave	October 6, 2022	*not studied*	October 6, 2022
5. 6th Street / Central Ave	October 6, 2022	*not studied*	October 6, 2022
A. 19th Ave / KiMS West Driveway	May 12, 2022	May 12, 2022	May 10, 2022
B. 19th Ave / KiMS East Driveway	May 12, 2022	May 12, 2022	May 10, 2022
C. 18th Ave / KiMS West Driveway	May 12, 2022	May 12, 2022	May 10, 2022
D. 18th Ave / KiMS East Driveway	May 12, 2022	May 12, 2022	May 10, 2022

At the off-site study intersections, existing weekday AM peak hour traffic volumes represent the highest one-hour between 7:00 and 9:00 AM, existing weekday afternoon peak hour traffic volumes represent the highest hour between 2:00 and 4:00 PM, and existing weekday PM peak hour traffic volumes represent the highest hour between 4:00 and 6:00 PM. The turning movement counts at the off-site study intersections and site access driveways are included in Appendix B.

At the site access driveways, the existing weekday AM and Afternoon peak hour traffic counts were conducted on both Tuesday, May 10, 2022 and Thursday, May 12, 2022 from 8:00 to 9:00 AM (to reflect 8:35 AM school start time) and 2:30 to 3:30 PM (to reflect a 3:05 PM school dismissal time). Additionally, the weekday PM peak hour traffic counts were conducted from 4:00 to 6:00 PM.

As discussed in further detail in the *Trip Generation* section of this TIA, the weekday AM peak and Afternoon peak existing traffic volumes at the KiMS site access driveways were then adjusted to be consistent with the school's peak hour trip generation from 7:45 to 8:45 AM (AM peak hour) and from 2:45 to 3:45 PM (Afternoon peak hour). The AM peak hour, Afternoon peak hour, and PM peak hour traffic volumes at the site access driveways used in the detailed LOS analysis in this TIA were based on the day that reflected the highest peak hour trip generation for the school (Thursday May 12 for the AM and the Afternoon peaks and Tuesday May 10 for the PM peak). The turning movement counts at the site access driveways and detailed adjustment calculations are included in Appendix B.

The adjusted site access driveway AM peak hour (7:45 to 8:45 AM) and Afternoon peak hour (2:45 to 3:45 PM) traffic volumes were then compared to the traffic volumes at the adjacent off-site study intersections, and it was determined that no further volume adjustments were necessary since the traffic volumes were balanced between the driveways and the intersections.

It should be noted that at the time of the counts in May 2022, KiMS was fully in-person and remote or hybrid (part remote/part in-person) school was not offered. Additionally, it should be noted that no adjustments were applied to the existing 2022 traffic volumes at the off-site study intersections and site access driveways as a result of the COVID-19 pandemic.

Figures 2 - 4 show the existing 2022 weekday AM, afternoon, and PM peak hour traffic volumes at the study intersections.

Historical average daily traffic volumes on streets in the vicinity were provided by the City of Kirkland. Table 2 summarizes the historical traffic counts on Central Way, Lake Street, Market Street, 6th Street, and 18th Avenue in the project site vicinity.

Table 2
Existing Daily Traffic Volumes

Count Location	2019	2017	2015	2013	2011
Central Way					
East of Lake Street	11,548	12,661	13,236	13,305	13,559
West of Lake Street	16,746	17,726	19,700	18,877	19,361
E of 6th Street	24,702	24,503	23,531	25,786	26,032
Lake Street					
South of Central Way	12,157	12,317	13,295	12,855	17,457
Market Street					
South of Forbes Creek Dr	19,749	20,396	20,598	19,251	19,127
6th Street					
North of Central Way	8,326	8,208	8,444	7,737	8,347
South of Central Way	10,301	11,051	11,152	10,291	12,002
North of 7th Ave	5,605	5,434	4,963	4,288	4,428
18th Avenue					
East of Market Street	1,903	--	--	--	--

Source: City of Kirkland Public Works Department

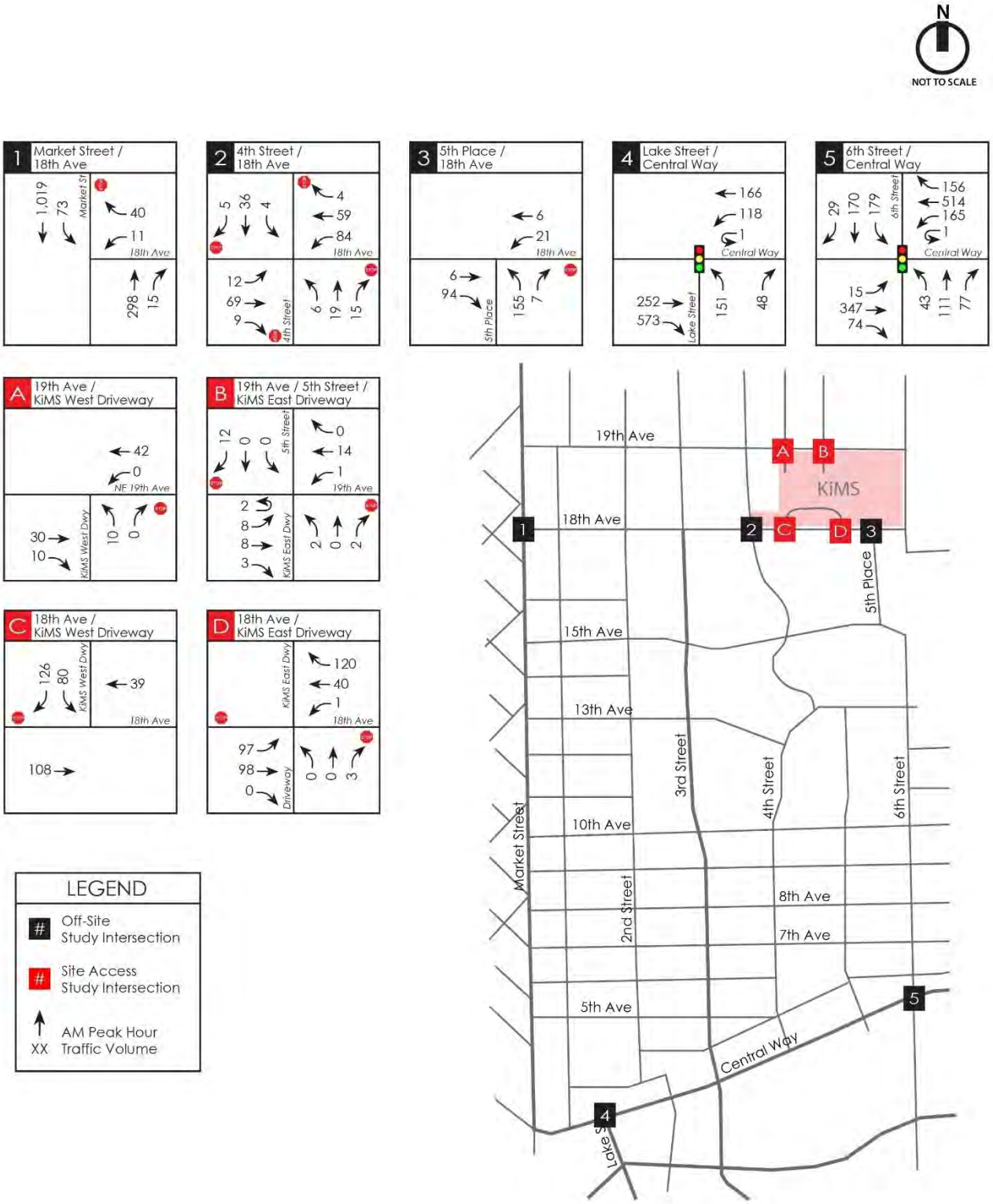

Figure 2: 2022 Existing AM Peak Hour Traffic Volumes

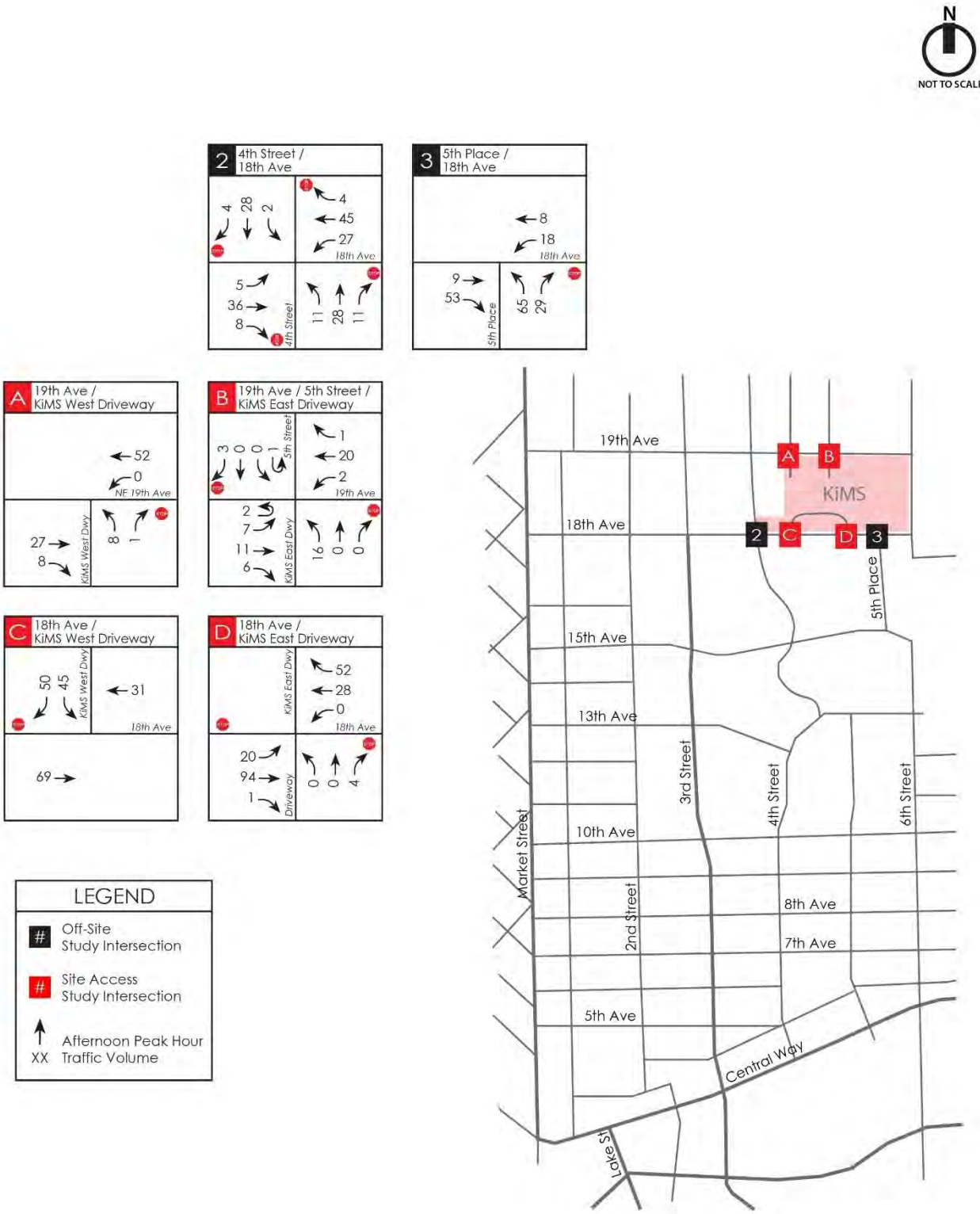

Figure 3: 2022 Existing Afternoon Peak Hour Traffic Volumes

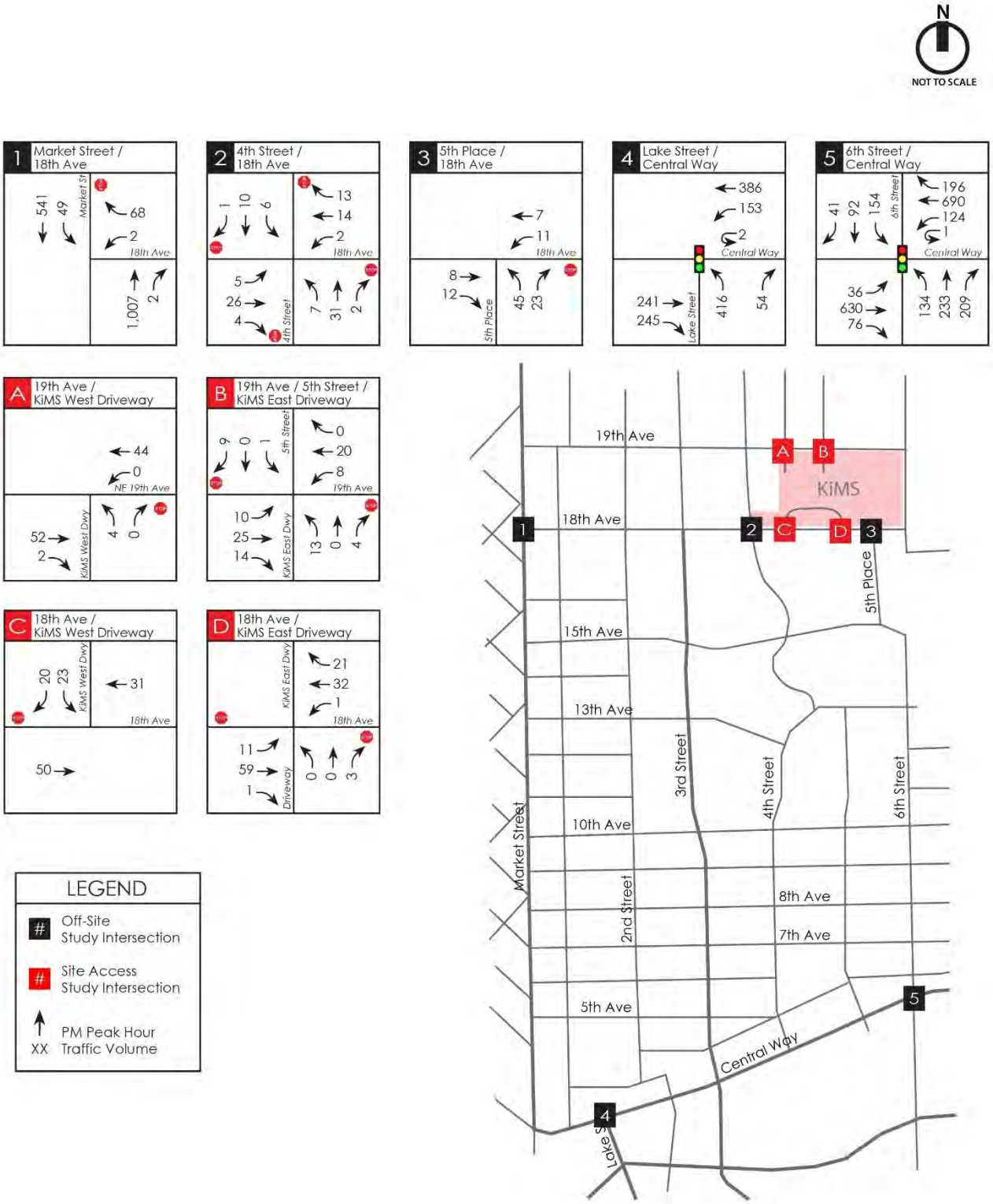

Figure 4: 2022 Existing PM Peak Hour Traffic Volumes

Crash History

Crash records at the study intersections were reviewed for the most recent three-year period from January 1, 2019 to December 31, 2021. Crash data was provided by the Washington State Department of Transportation (WSDOT). The detailed crash data is included in Appendix C. Summaries of the total and yearly average crashes are provided in Table 3 and summaries of crashes by type are provided in Table 4.

Table 3
Crash Data Summary, January 1, 2019 to December 31, 2021

	Number of Crashes				
	2019	2020	2021	Average Annual Crashes	Average Crashes / MEV[1]
Intersections:					
1. Market Street / 18th Avenue	0	0	0	0.00	0.00
2. 4th Street / 18th Avenue	0	0	0	0.00	0.00
3. 5th Place / 18th Avenue	0	0	0	0.00	0.00
4. Lake Street / Central Way	0	1	1	0.67	0.12
5. 6th Street / Central Way	2	2	1	1.67	0.17
Roadway Segments:					
18th Ave between 4th Street and 5th Place	0	0	0	0.00	--
19th Ave between 4th Street and 6th Street	0	0	1	0.33	--

1. MEV = Million Entering Vehicles.
Crash data was provided by WSDOT.

Table 4
Crash Data Summary by Type, January 21, 2019 to December 31, 2021

	Crash Type							
	Angle (Left/Right)	Angle (T)	Sideswipe	Rear-end	Parked Veh / Fixed Object	Ped/ Bike	Other	Three-Year Total Crashes
Intersections:								
1. Market Street / 18th Avenue	0	0	0	0	0	0	0	0
2. 4th Street / 18th Avenue	0	0	0	0	0	0	0	0
3. 5th Place / 18th Avenue	0	0	0	0	0	0	0	0
4. Lake Street / Central Way	1	1	0	0	0	0	0	2
5. 6th Street / Central Way	1	1	0	1	0	0	2	5
Roadway Segments:								
18th Ave between 4th Street and 5th Place	0	0	0	0	0	0	0	0
19th Ave between 4th Street and 6th Street	0	0	0	0	0	0	1	1

Source: WSDOT Crash Data.

Intersection crash rates over 1.0 crash per MEV generally warrant further review to determine if any patterns exist. Based on the most recent 3 years of crash history provided by WSDOT, there are no study intersections with a crash per MEV rate greater than 1.0.

Also, based on a review of the crash history, there were no crashes over the 3-year period along the segment of 18th Avenue between 4th Street and 6th Street (including at the existing site access driveways), and only one crash along the segment of 19th Avenue between 4th Street and 6th Street which occurred at the intersection of 19th Avenue/6th Street. There were no crashes involving pedestrians or bicyclists at the study intersections or along the site frontages on 18th Avenue and 19th Avenue during the 3-year period from 2019 to 2021.

Comparison to City of Kirkland Crash Data

Crash records at the study intersections and site frontages on 18th Avenue and 19th Avenue were also reviewed for the most recent three-year period from January 1, 2019 to December 31, 2021 based on crash data obtained from the City of Kirkland (see Appendix C). The crash data from the City of Kirkland generally matched the crash data from WSDOT summarized above except at the intersections of Market Street/18th Avenue, Central Way/Lake Street, and Central Way/6th Street:

- At Market Street/18th Avenue, the City of Kirkland crash data included 1 crash that occurred in 2020 approximately 50' north of the intersection and involved a pedestrian/bicycle; however, the WSDOT data classified this collision as "at driveway" instead of "at intersection" so it was excluded from Tables 3 and 4 above.At Central Way/Lake Street, the City of Kirkland crash data included a total of 6 crashes compared to 2 crashes reported by WSDOT. The City data included 1 crash that occurred in March 2019 that was not included in the WSDOT crash data. Additionally, the City of Kirkland crash data included 3 collisions at the intersection (in May 2019, July 2019, and June 2021) that were classified as WSDOT by either "not at intersection and not related" or "intersection related but not at intersection" and therefore were not included in the summary of WSDOT crash history in Tables 3 and 4 above.
- At Central Way/6th Street, the City of Kirkland crash data reported a total of 5 crashes (same as WSDOT); however, the City data appears to have 1 duplicate crash entry for a crash that occurred in October 2020 and does not include one crash that occurred at the intersection in July 2020 according to the WSDOT crash data.

Public Transportation Services

King County-Metro Transit provides public transportation services in the project vicinity. Transit stops for routes 230, 231, 239, 250, 255, and 893 are located on 18th Avenue, Market St and/or Central Way.

Route 230 offers weekday and weekend service in both directions between Bothell and the downtown Kirkland Transit Center. Weekday service runs from approximately 6:45 a.m. to 11:00 p.m. with approximate 30 to 60-minute headways. Weekend service runs from approximately 7:30 a.m. and 9:00 p.m. with approximately 60-minute headways,

Route 231 offers weekday and weekend service in both directions between Woodinville and the downtown Kirkland Transit Center. Weekday service runs from approximately 5:30 a.m. to 9:45 p.m. with approximate 30 to 60-minute headways. Weekend service runs from approximately 7:00 a.m. and 8:30 p.m. with approximately 60-minute headways,

Route 239 offers weekday and weekend service in both directions between Bothell, the Totem Lake Transit Center, and the Kirkland Transit Center. Weekday and weekend service runs from approximately 5:00 a.m. to 12:00 a.m. with approximate 30 to 60-minute headways.

Route 250 offers weekday and weekend service in both directions between Avondale, Kirkland Transit Center, and Bellevue Transit Center. Weekday and weekend service runs from approximately 6:00 a.m. to 12:00 a.m. with approximate 15 to 30-minute headways.

Route 255 offers weekday and weekend service in both directions between the Totem Lake Transit Center, the Kirkland Transit Center, and the University District. Weekday and weekend service runs from approximately 5:00 a.m. to 12:00 a.m. with approximate 10 to 30-minute headways.

Route 893 offers weekday service between the Totem Lake Transit Center and Lake Washington High School, with a stop located near Kirkland Middle School (KiMS) . There is one bus providing service in the morning between the Transit Center and KiMS and one bus providing service in the afternoon between KiMS and the Transit Center.

Non-Motorized Transportation Facilities

Pedestrian facilities in the study area include sidewalks on the north side of 18th Avenue, intermittent sidewalks on the south side of 18th Avenue, sidewalks on the south side of 19th Avenue along the school frontage, and intermitted sidewalks on the the east side of 4th Street. Marked crosswalks are also located on all legs at the all-way stop-controlled intersection of 4th Street/18th Avenue and on the east leg of the 5th Place/18th Avenue two-way stop-controlled intersection that provide access toward the KiMS site.

Designated bicycle lanes in the immediate vicinity of the project exist on both sides of Market Street.

Kirkland Middle School also has a total of 3 bike racks with a capacity for 24 bikes.

Intersection Levels of Service

An existing level of service (LOS) analysis was conducted at the study intersections and existing site access driveways. LOS generally refers to the degree of congestion on a roadway or intersection. It is a measure of vehicle operating speed, travel time, travel delays, and driving comfort. A letter scale from A to F generally describes intersection LOS. At signalized intersections, LOS A represents free-flow conditions (motorists experience little or no delays), and LOS F represents forced-flow conditions where motorists experience an average delay in excess of 80 seconds per vehicle.

The LOS reported for signalized intersections, roundabouts, and all-way stop controlled intersections represents the average control delay (sec/veh) and can be reported for the overall intersection, for each approach, and for each lane group or movement (additional v/c ratio criteria apply to lane group or movement LOS only).

The LOS reported at two-way stop-controlled intersections is based on the average control delay and can be reported for each controlled minor approach, controlled minor lane group, and controlled major-street movement (additional v/c ratio criteria apply to lane group or movement LOS only).

Table 5 outlines the current HCM LOS criteria for signalized and unsignalized intersections based on these methodologies.

Table 5
LOS Criteria for Signalized and Unsignalized Intersections[1]

SIGNALIZED INTERSECTIONS			UNSIGNALIZED INTERSECTIONS		
	LOS by Volume-to Capacity (V/C) Ratio[2]			LOS by Volume-to Capacity (V/C) Ratio[3]	
Control Delay (sec/veh)	≤ 1.0	> 1.0	Control Delay (sec/veh)	≤ 1.0	> 1.0
≤ 10	A	F	≤ 10	A	F
> 10 to ≤ 20	B	F	> 10 to ≤ 15	B	F
> 20 to ≤ 35	C	F	> 15 to ≤ 25	C	F
> 35 to ≤ 55	D	F	> 25 to ≤ 35	D	F
> 55 to ≤ 80	E	F	> 35 to ≤ 50	E	F
> 80	F	F	> 50	F	F

[1] Source: Highway Capacity Manual (HCM), Transportation Research Board, 6th Edition, 2016.

[2] For approach-based and intersection-wide assessments at signals, LOS is defined solely by control delay.

[3] For two-way stop-controlled intersections, the LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole at two-way stop-controlled intersections. For approach-based and intersection-wide assessments at all-way stop controlled intersections and roundabouts, LOS is solely defined by control delay.

Level of service calculations for intersections were based on methodology and procedures outlined in the 6th Edition of the *Highway Capacity Manual* using *Synchro 11* traffic analysis software. Existing signal timing used in the analysis was provided by the City of Kirkland.

The 2022 existing AM, afternoon, and PM peak hour LOS analysis results for the study intersections are summarized in Table 6. The LOS worksheets are included in Appendix D.

Table 6
2022 Existing Peak Hour Level of Service Summary

Study Intersection / Site Access Driveway	2022 Existing AM Peak Hour LOS	2022 Existing AM Peak Hour Delay (sec)	2022 Existing Afternoon Peak Hour LOS	2022 Existing Afternoon Peak Hour Delay (sec)	2022 Existing PM Peak Hour LOS	2022 Existing PM Peak Hour Delay (sec)
Signalized Intersections						
4. Lake Street / Central Way [1]	B	17.7	--	--	C	33.1
5. 6th Street / Central Way	C	33.6	--	--	D	43.7
All-Way Stop-Controlled Intersection[2]						
2. 4th Street / 18th Avenue (all-way stop)	A	9.2	A	8.0	A	7.7
Eastbound Approach	*A*	*8.8*	*A*	*7.8*	*A*	*7.4*
Westbound Approach	*A*	*9.9*	*A*	*8.3*	*A*	*8.0*
Northbound Approach	*A*	*8.4*	*A*	*7.9*	*A*	*7.7*
Southbound Approach	*A*	*8.6*	*A*	*7.8*	*A*	*7.6*
Side-Street Stop-Controlled Intersections						
1. Market Street / 18th Avenue						
Westbound Approach	B	12.1	--	--	C	17.0
Southbound Left-Turn	A	8.2	--	--	B	11.2
3. 5th Place / 18th Avenue						
Westbound Left-Turn	A	7.7	A	7.5	A	7.3
Northbound Approach	B	14.0	B	10.9	A	9.3
A. 19th Avenue / KiMS West Driveway						
Westbound Left-Turn	A	0.0	A	0.0	A	0.0
Northbound Approach	B	10.0	B	10.4	A	9.5
B. 19th Ave / 5th Street / KiMS East Driveway						
Eastbound Left-Turn	A	7.4	A	7.3	A	7.3
Westbound Left-Turn	A	7.3	A	7.3	A	7.3
Northbound Approach	A	8.8	A	9.4	A	9.3
Southbound Approach	A	8.4	A	8.7	A	8.5
C. 18th Avenue / KiMS West Driveway						
Southbound Left-Turn	B	11.7	B	10.1	A	9.7
Southbound Right-Turn	A	9.8	A	8.9	A	8.7
D. 18th Avenue / KiMS East Driveway						
Eastbound Left-Turn	A	8.2	A	7.5	A	7.5
Westbound Left-Turn	A	7.5	A	0.0	A	7.4
Northbound Approach	A	9.1	A	8.9	A	8.8

--Not studied during afternoon peak hour

[1] Synchro LOS methodology results reported due to custom phasing not supported by HCM 6th methodology.

[2] LOS and delay for all-way stop-controlled intersections are reported as a weighted average of all approaches based on HCM methodology. The LOS and delay for the individual approaches are presented for disclosure. BOLD = Worst approach.

As shown in **Table 6,** the signalized study intersections and individual movements at the stop-controlled intersections and site access driveways all currently operate at LOS D or better under existing conditions during the weekday AM, afternoon, and PM peak hours.

Site Access

Vehicular access to the site is currently provided via two access driveways on 19th Avenue (one for buses/staff only) and two access driveway on 18th Avenue (one enter-only and one exit-only).

At the time of the existing counts in May 2022, all on-site AM peak drop-off and Afternoon peak pick-up at Kirkland Middle School occurred via the main site access driveways on 18th Avenue which provides access to the drop-off/pick-up loop and the main on-site parking lot. Vehicular drop-off and pick-up of students was also observed to occur in legal on-street parking on 18th Avenue and 19th Avenue.

Students walking and biking to utilize the existing sidewalks on the north side of 18th Avenue and the south side of 19th Avenue along the site frontages. The main student access to the school is located just north of the main drop-off/pick-up loop and parking lot.

As shown in **Tables 3 and 4**, a review of the 3-year crash history from 2019 through 2021 showed no crashes at any of the existing KiMS site access driveways.

Additionally, intersection and stopping sight distance at the existing site access locations on 19th Avenue and 18th Avenue meets the applicable standards based on *City of Kirkland Department of Public Works Pre-Approved Plans Policy R-13 (Intersection Sight Distance)* and *AASHTO Geometric Design of Highways and Streets*.

FUTURE CONDITIONS

Planned Transportation Improvements

A review of the City of Kirkland's Preliminary *2023-2028 Capital Improvement Program (CIP)* showed that there are no fully funded planned transportation improvement projects in the study area.

Improvements at the Central Way/6th Street intersection are currently being constructed by a private developer and include an eastbound right-turn lane with overlap phase, dual westbound left-turn lanes, and two receiving lanes on the south leg on 6th Street to reflect the improvements currently under construction. These improvements are anticipated to be completed in 2023.

Project Trip Generation

The trip generation estimates for the proposed *Kirkland Middle School Addition* project were based on trip rates derived from existing counts at the school. Consistent with historical school addition projects in the City of Kirkland (Mark Twain Elementary addition, Rose Hill Elementary addition, Ben Franklin Elementary addition, and Lake Washington High School addition), conducting counts at the existing school allows for a more accurate and reliable trip generation estimate of new trips generated by the proposed addition. Additionally, vehicular trip rates documented in the Institute of Transportation Engineers (ITE) *Trip Generation Manual* for public schools are typically lower than vehicular trip rates observed at schools in the Puget Sound vicinity so use of school-specific trip generation rates is preferred over ITE trip generation rates.

Traffic Counts

Existing traffic counts were collected at Kirkland Middle School over an "average" two-day study period (Tuesday, May 10, 2022 and Thursday, May 12, 2022) during the AM peak period (8:00 – 9:00 AM), afternoon peak period (2:30 – 3:30 PM), and PM peak period (4:00 – 6:00 PM). It should be noted that at the time of the counts in May 2022, KiMS was fully in-person and remote or hybrid (part remote/part in-person) school was not offered.

The traffic counts included all vehicles entering and exiting the school driveways on 18th Avenue and 19th Avenue as well as vehicles dropping off and picking up students on 18th Avenue, and 19th Avenue adjacent to the school (see map included in Appendix E).

Existing Trip Generation Rates

Based on historical data from four historical trip generation studies conducted at LWSD middle schools, the two-day average of existing traffic counts at KiMS during the AM and Afternoon peak periods was increased by 9 percent and 3 percent respectively to estimate the school trip generation from 7:45 to 8:45 AM (AM peak hour) and from 2:45 to 3:45 PM (Afternoon peak hour). The detailed calculations are included in Appendix F.

The adjusted existing trip generation estimates and the school enrollment of 543 students at the time of the counts, were then used to derive weekday AM peak hour, Afternoon peak hour, and PM peak hour trip rates for the existing Kirkland Middle School site. The resulting trip generation rates and directional splits from the trip generation study are shown in Table 7 below. The vehicular count summaries, adjustments based on historical count data, and the trip rate calculations are included in Appendix E and Appendix F.

Table 7
KiMS Existing Trip Generation Study Results [1]

Time Period	Average Trip Rate (trips/student)	Directional Split In	Directional Split Out
Daily	2.82	50%	50%
AM Peak Hour (7:45 – 8:45 AM)	0.90	51%	49%
Afternoon Peak Hour (2:45 – 3:45 PM)	0.46	44%	56%
PM Peak Hour (varies)	0.20	63%	37%

[1] Based on a trip generation study completed at KiMS in May 2022 and historical LWSD middle school trip generation studies.

As shown in Table 7, the average trip rate at Kirkland Middle School is 0.90 trips per student during the AM peak hour, 0.46 trips per student during the Afternoon peak hour, and 0.20 trips per student during the PM peak hour. An estimated weekday daily trip rate was derived using the Institute of Transportation Engineers (ITE) *Trip Generation Manual* (11th Edition) for Land Use Code 522 (Middle School) by applying the ratio of peak hour Kirkland Middle School trip rates to ITE trip rates.

An estimated weekday daily trip rate for KiMS was derived using the Institute of Transportation Engineers (ITE) *Trip Generation Manual* (11th Edition) for Land Use Code 522 (Middle School) by applying the ratio of the ITE daily trip rate (2.10) to the ITE AM peak hour trip rate (0.67) to the 0.90 AM peak hour Kirkland Middle School trip rate (2.10 / 0.67 = 3.13 X 0.90 = 2.82. This approach to estimating a weekday daily trip rate for KiMS was chosen because it can be considered conservative for the following reasons:

- The estimated weekday daily trip rate of 2.82 is 34% higher than the 2.10 average weekday daily trip rate for a middle school as documented in ITE.
- The estimated weekday trip rate of 2.82 is 5% higher than 2.16 the estimated weekday daily trip rate based on the ratio of ITE daily to AM rates applied to the KiMS Afternoon peak hour trip rate (2.10 / 0.36 = 5.83 X 0.46 = 2.68)

It is less appropriate to estimate daily trip generation of a middle school based on the PM peak hour trip generation, since the PM peak hour trip generation at a middle school also includes trips associated wth extra-curricular activites and/or intramural sports during some months of the year and the trip generation associated with these activities may not increase in proportionally as a result of the proposed 200-student Addition project like the AM peak drop-off and Afternoon peak pick-up periods are expected to. As a sensitivity test, if the estimated weekday daily trip rate was calculated based on applying the ratio of ITE daily to PM rates to the KiMS PM peak hour trip rate (2.10 / 0.15 = 14 X 0.20 = 2.80), the total estimated weekday daily trip generation associated with the *KiMS Addition* project would be 560 trips (less than what is currently estimated as shown in Table 8 below).

Future Trip Generation Estimate

To estimate the new trips generated by the proposed *KiMS Addition* project, the derived trip generation rates shown in Table 7 were applied to the net increase in student capacity associated with the proposed addition (200 students). Table 8 summarizes the new weekday AM peak hour, afternoon peak hour, and PM peak hour trip generation estimates associated with the proposed project. The detailed trip generation calculations are included in Appendix G.

Table 8
KiMS Addition Trip Generation Summary

Weekday Time Period	Trip Rate (trips/student)	# of additional Students	New Trips Generated		
			In	Out	Total
Daily	2.82	200	282	282	564
AM Peak Hour	0.90	200	92	88	180
Afternoon Peak Hour	0.46	200	40	52	92
PM Peak Hour	0.20	200	25	15	40

As shown in Table 8, the proposed *KiMS Addition* is estimated to generate 564 new weekday daily trips with 180 new weekday AM peak hour trips (92 entering, 88 exiting), 92 new weekday afternoon peak hour trips (40 entering, 52 exiting), and 40 new weekday PM peak hour trips (25 entering, 15 exiting).

Transportation Concurrency

The project was evaluated for transportation concurrency by the City of Kirkland in November 2022. Based on the results, the City has determined the project meets the City's transportation concurrency requirements. A Concurrency Test Notice was issued for the project on November 4, 2022 and is included in Appendix H.

Project Trip Distribution and Assignment

School traffic traditionally has a slightly different distribution for inbound versus outbound trips. This is intuitive since inbound trips mainly originate at home, while outbound trips are likely more varied with regard to destination. For example, some parents might leave home to drop off their students at school and then exit the site and go to work instead of returning home.

The estimated weekday distribution of new trips associated with the proposed *KiMS Addition* project within the immediate vicinity of the school was based on existing AM peak hour, afternoon peak hour, and PM peak hour turning movement count volumes at the school driveways and adjacent study intersections (see Appendix B). Beyond the immediate vicinity of the school, the estimated weekday distribution of new trips associated with the project was based on existing school boundary information and general residential density within the boundary, anticipated origins/destinations, , and additional bus trip estimates provided by LWSD.

The estimated distribution of new weekday AM peak hour, afternoon peak hour, and PM peak hour school trips are illustrated graphically in Figures 5 - 7. Figures 5 - 7 also illustrate the assignment of the new trips associated with the proposed addition project through the site access driveways and off-site study intersections during the weekday AM, afternoon, and PM peak hours.

The weekday distribution of new daily project trips was estimated by averaging the AM peak hour, afternoon peak hour, and PM peak hour distributions. Since the majority of the traffic generated by the school occurs during these 3 peak hours, it is logical and appropriate to average them to estimate the daily distribution. The weekday distribution of new daily project trips is illustrated in Appendix I.

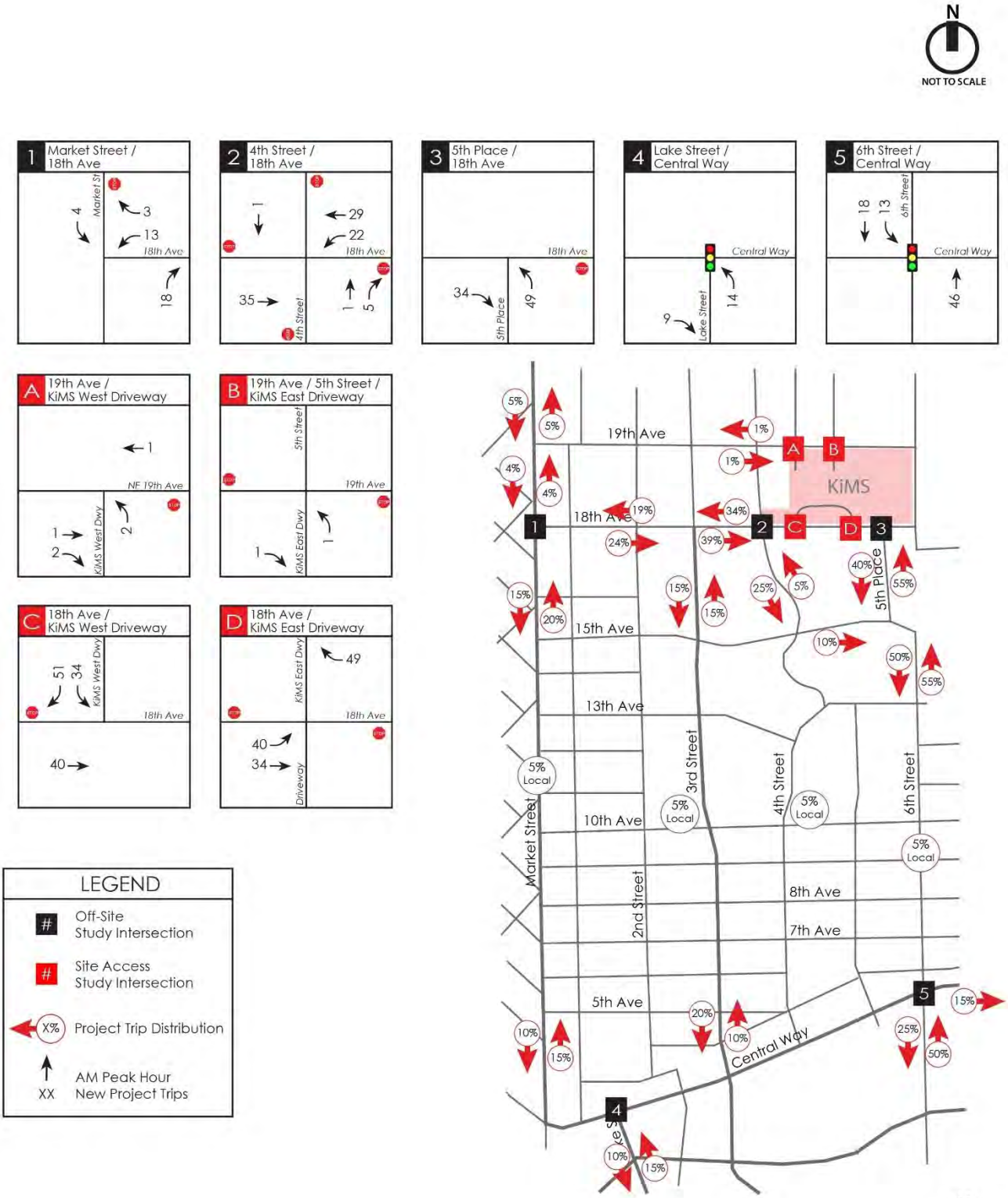

Figure 5: AM Peak Hour Project Trip Distribution and Assignment

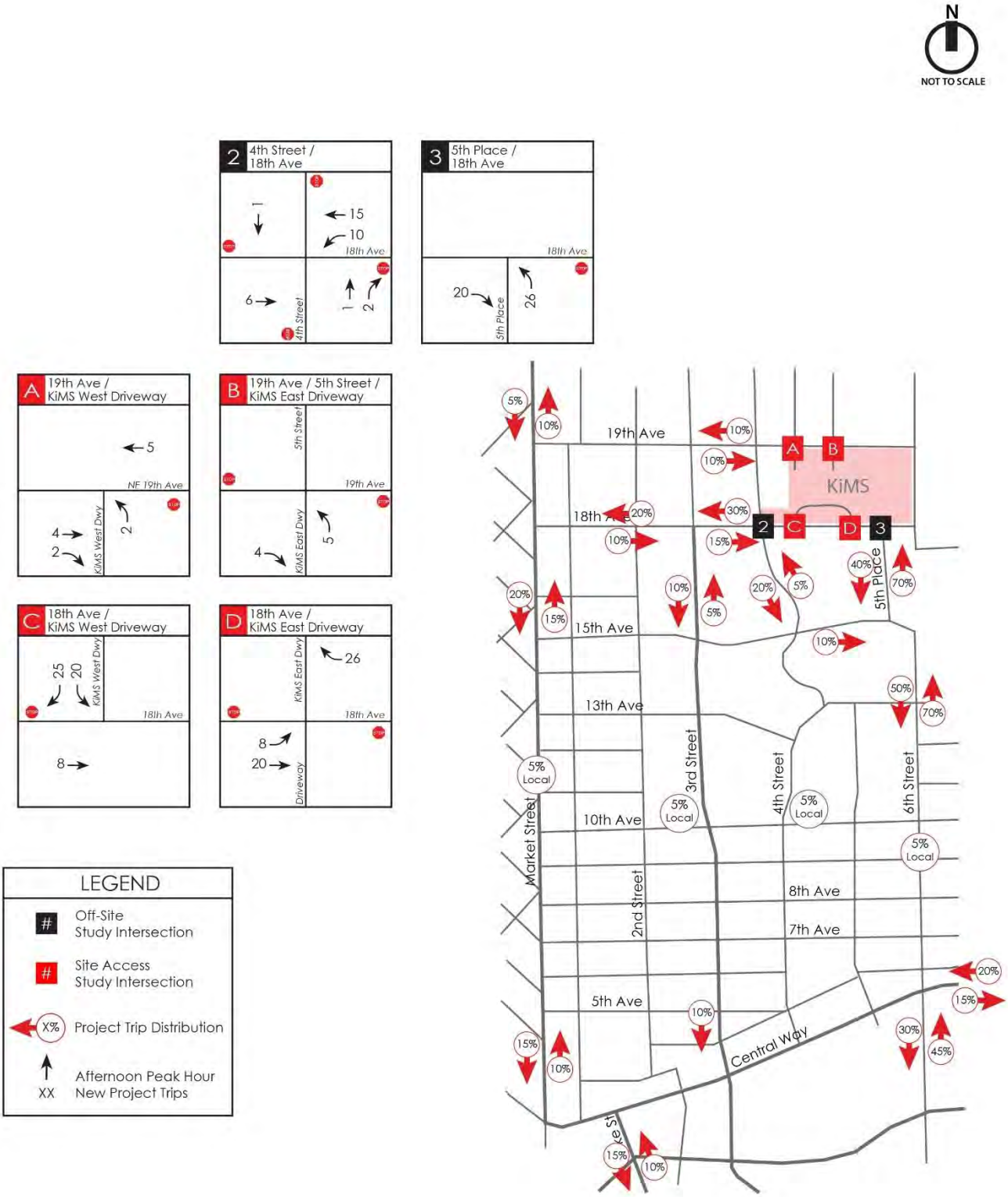

Figure 6: Afternoon Peak Hour Project Trip Distribution and Assignment

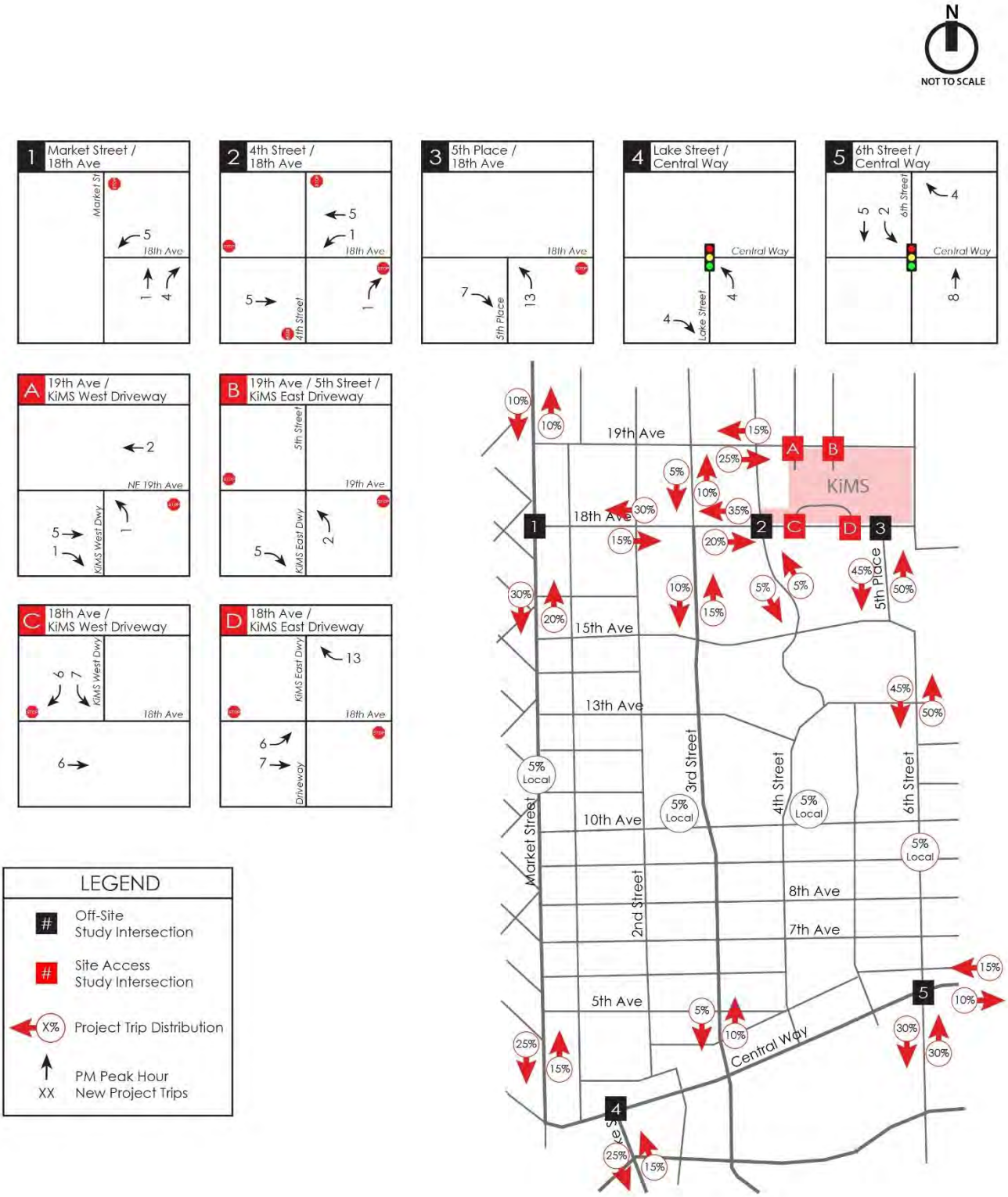

Figure 7: PM Peak Hour Project Trip Distribution and Assignment

Proportional Share Evaluation

Based upon the City of Kirkland's *Policy R-38 Transportation Impact Analysis Review* (July 2022), a detailed traffic analysis is required at intersections that have a proportional share of project traffic of at least 1 percent. The proportional share calculations are based on use of the City's proportional share spreadsheet and the project's daily trip assignment, as shown in Appendix I. Table 9 summarizes the intersection proportional share calculations.

Table 9
Intersection Proportional Shares

Intersection #	Intersection	Proportional Share (%)	Detailed Analysis Required?
205	Market Street / Forbes Creek Dr	0.17%	No
211	Market Street / 15th Ave	0.43%	No
105	6th Street / Central Way	2.31%	YES
106	3rd Street / Central Way	0.56%	No
107	Lake Street / Central Way	1.23%	YES
209	Market Street / 7th Ave	0.34%	No
109	NE 85th Street / 114th Ave NE	0.14%	No
110	4th Ave / 6th Street	0.59%	No
112	Kirkland Way / 6th Street	0.59%	No

As shown in Table 9, two intersections have a project proportional share of at least one percent with the proposed *KiMS Addition* project. Detailed traffic analysis was conducted at these two study intersections and also at the four existing KiMS driveways on 19th Avenue and 18th Avenue. Additionally, per the request of the City, detailed traffic analysis was conducted at the intersections of Market Street/18th Avenue, 4th Street/18th Avenue and 5th Place/18th Avenue during the AM and PM peak hours and also 4th Street/18th Avenue and 5th Place/18th Avenue during the afternoon peak hour. Appendix J contains the proportional share evaluation worksheets for each intersection.

Future Traffic Volumes

Future year 2024 No Action (without project) AM, afternoon, and PM peak hour traffic volumes at the study intersections and site driveways were estimated by applying a 2.0 percent growth rate compounded annually to the existing (2022) volumes with exception to the study intersections of Lake Street/Central Way and 6th Street/Central Way where future year 2024 No Action (without project) traffic volumes were provided by the City of Kirkland. *It should be noted that the annual growth rate was not applied to entering and exiting turning movements at the 4 existing KiMS site access driveways on 18th Avenue and 19th Avenue.*

The future year 2024 No Action traffic volumes also include trips associated with an additional 142 students that represent the current entitled KiMS student capacity of 685 students (685 entitled students less 543 existing enrollment = 142 additional students). The trips associated with the additional 142 students were estimated based on the trip rates included in Table 6 and were distributed to the study intersections and site access driveways consistent with the trip distribution illustrated in Figures 5 - 7.

The resulting 2024 No Action AM peak hour, afternoon peak hour, and PM peak hour traffic volumes at the study intersections and site access driveways are illustrated in Figures 8 - 10.

Future year 2024 With Project peak hour traffic volumes were estimated by adding the new project trips associated with the *KiMS Addition* (Figures 5 - 7) to the 2024 No Action traffic volumes (Figures 8 - 10). The resulting future year 2024 With Project peak hour traffic volumes at the study intersections and site access driveways are shown in Figures 11 - 13 for the weekday AM, afternoon, and PM peak hours.

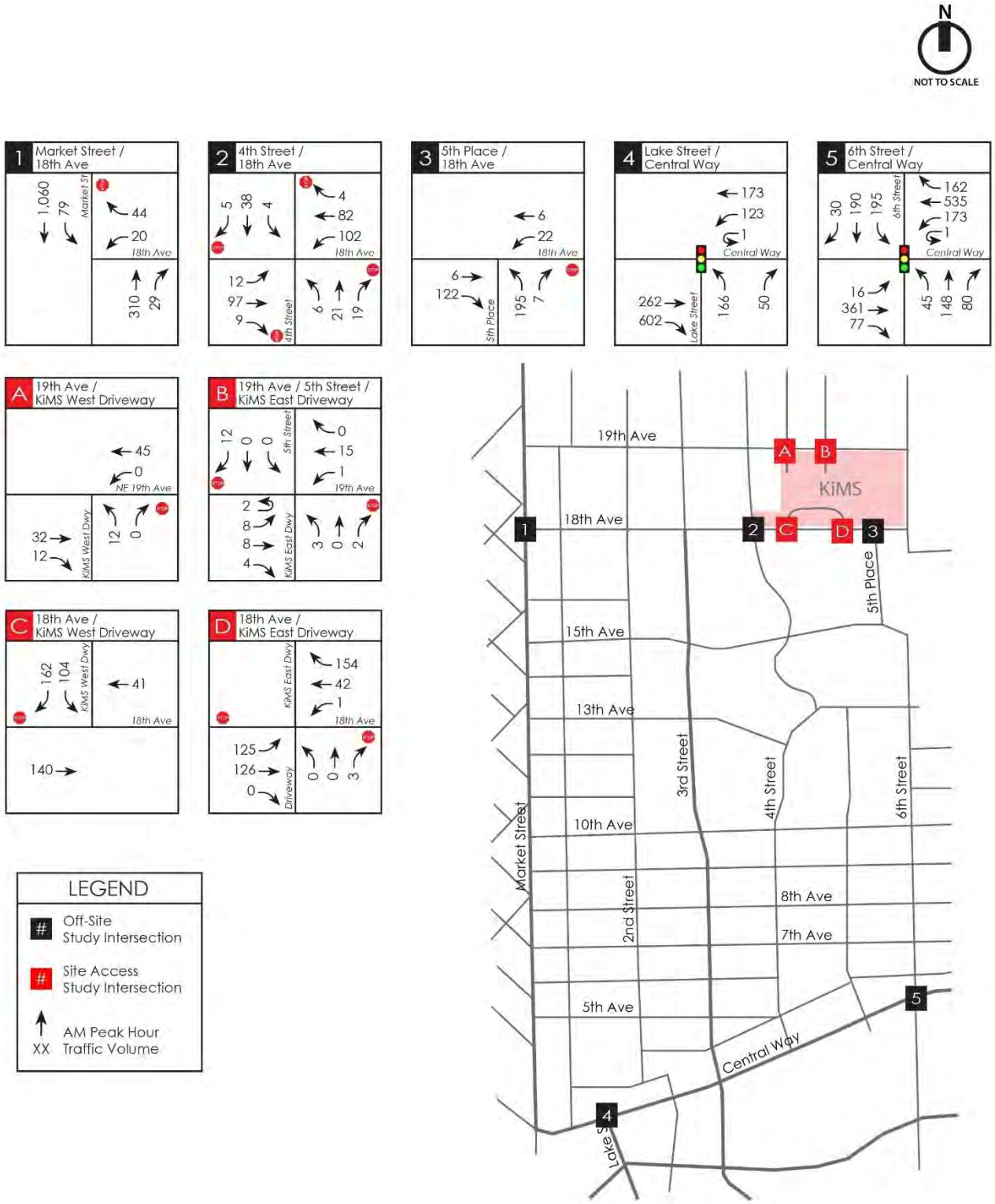

Figure 8: 2024 No Action AM Peak Hour Traffic Volumes

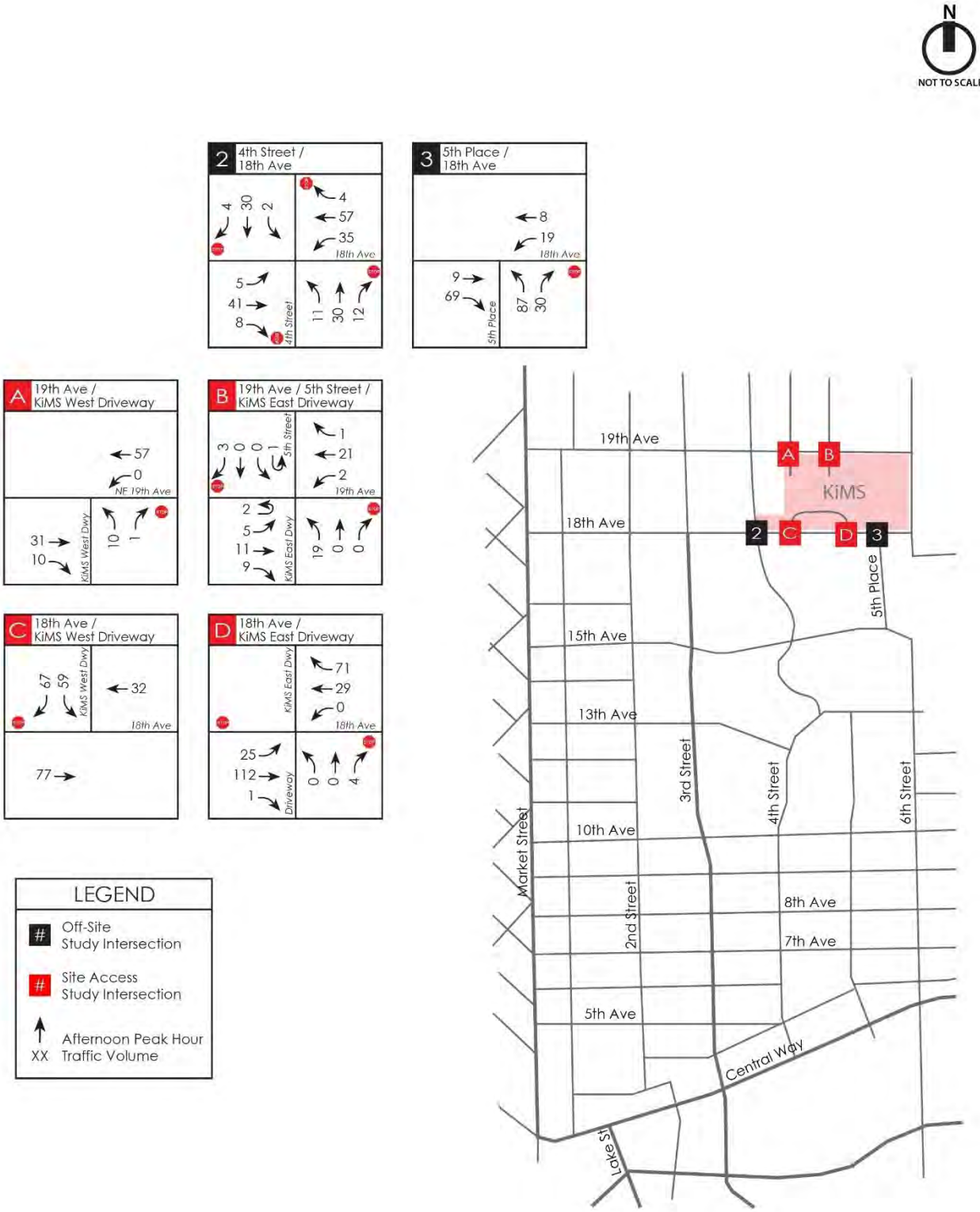

Figure 9: 2024 No Action Afternoon Peak Hour Traffic Volumes

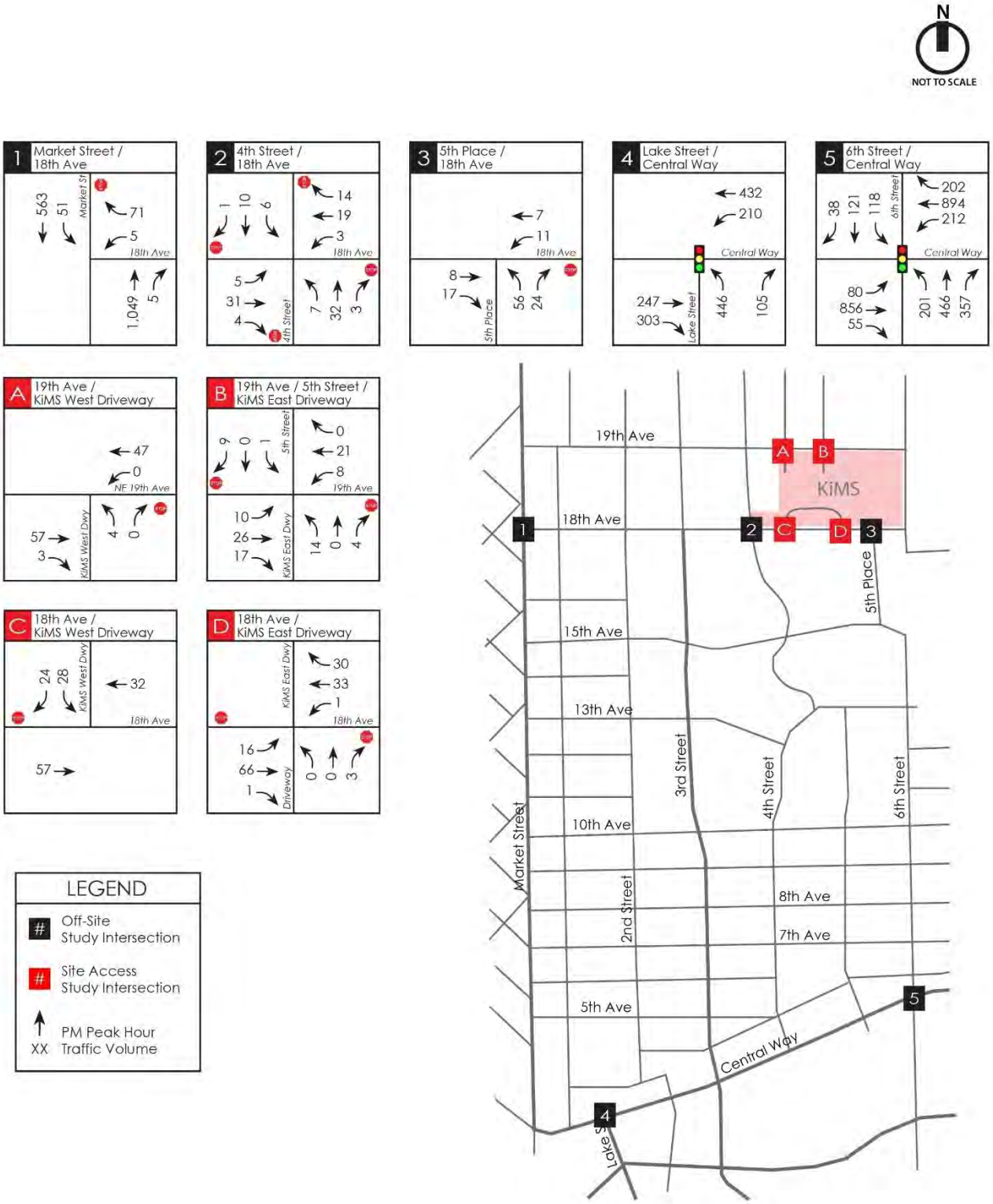

Figure 10: 2024 No Action PM Peak Hour Traffic Volumes

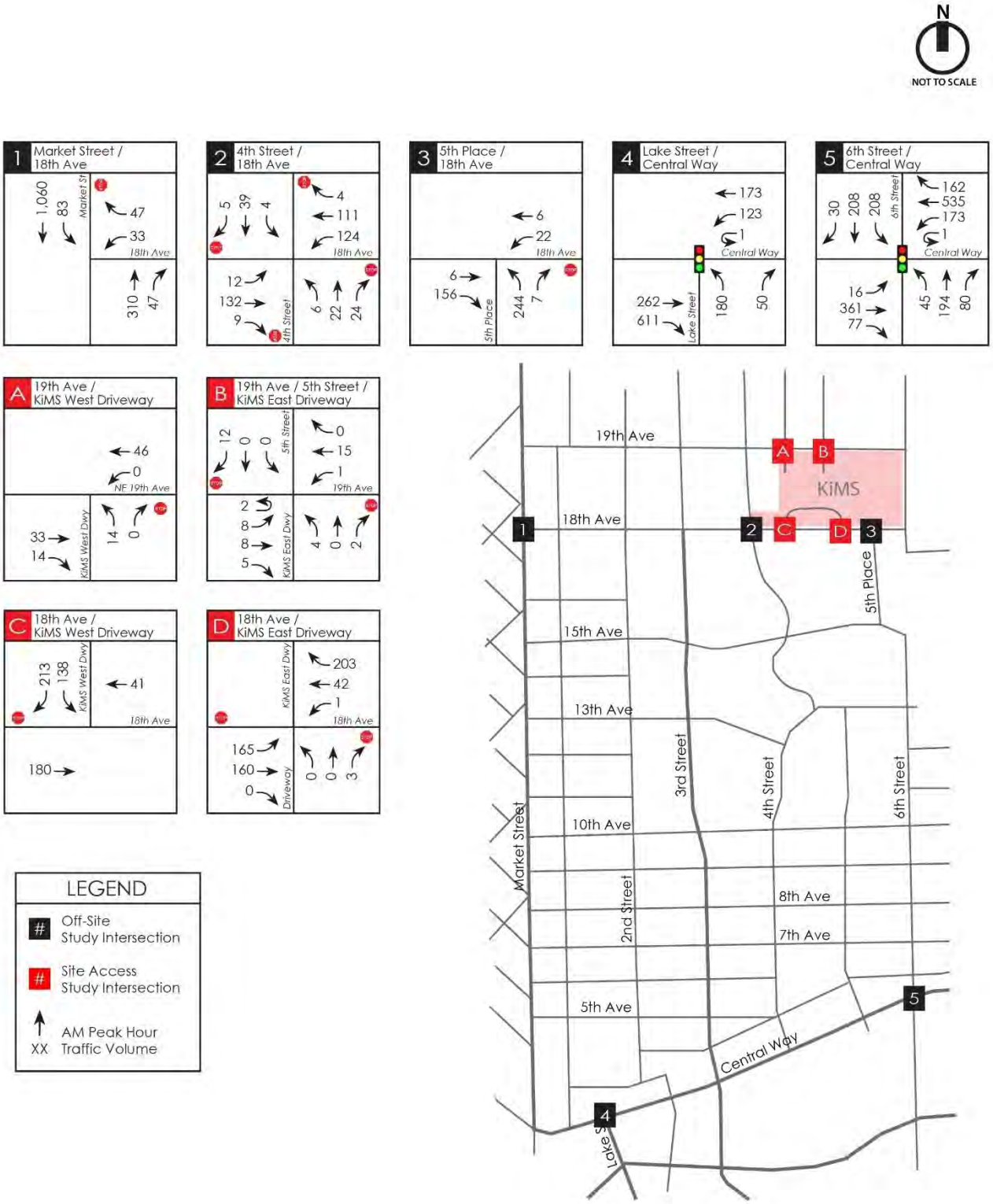

Figure 11: 2024 With Project AM Peak Hour Traffic Volumes

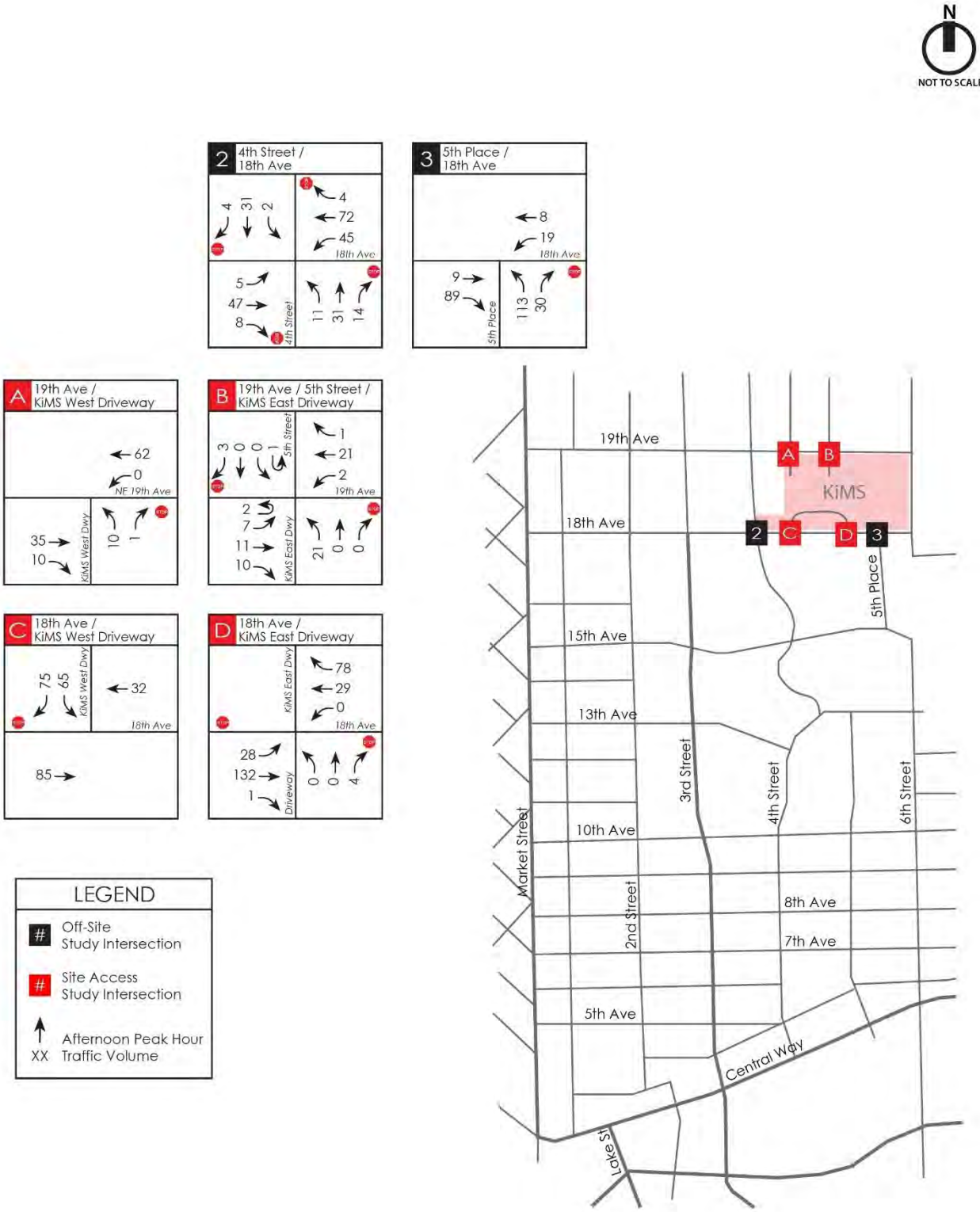

Figure 12: 2024 With Project Afternoon Peak Hour Traffic Volumes

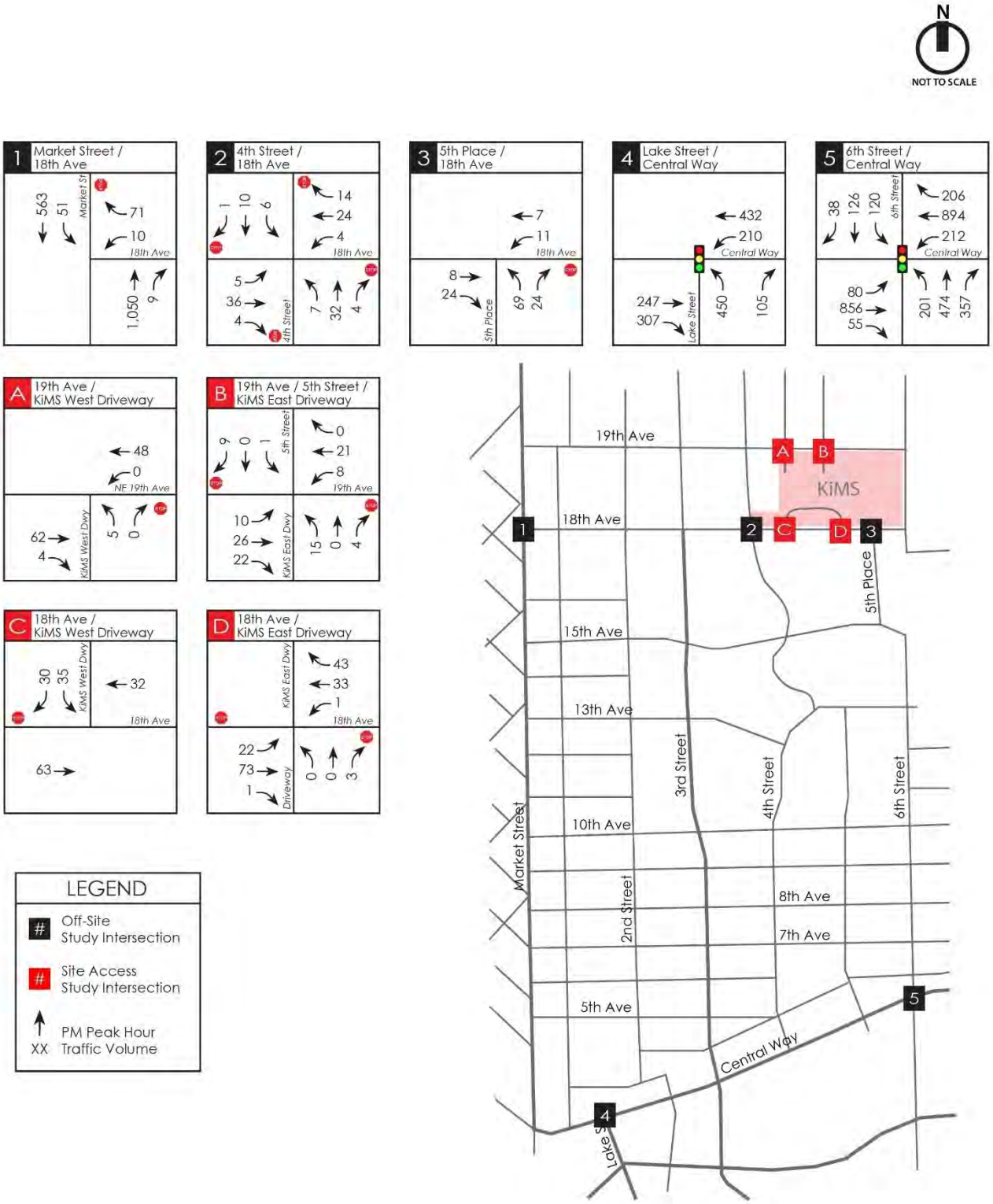

Figure 13: 2024 With Project PM Peak Hour Traffic Volumes

Intersection Operations

A future year weekday peak hour Level of Service (LOS) analysis was conducted at the study intersections for future year 2024 No Action (without project) conditions and future year 2024 conditions with the proposed *KiMS Addition* project.

The roadway network and signal timing assumed in the future year 2024 LOS analysis was based on existing conditions. One planned improvement was identified for construction by 2024 at the study intersection of Central Way/6th Street. The planned improvement includes an eastbound right-turn lane with overlap phase, dual westbound left-turn lanes, and two receiving lanes on the south leg on 6th Street, and is currently under construction and estimated to be complete prior to 2024. Signal timing was also optimized at the Central Way/6th Street intersection for future year 2024 No Action conditions with the planned improvements.

The weekday AM peak hour, afternoon peak hour, and PM peak hour LOS results at the study intersections for 2024 No Action and With Project conditions are summarized in Tables 10 - 12. The LOS worksheets are included in Appendix D.

Table 10
2024 AM Peak Hour Level of Service Summary

	2024 No Action		2024 With Project	
Study Intersection / Site Access Driveway	LOS	Delay (sec)	LOS	Delay (sec)
Signalized Intersections				
4. Lake Street / Central Way [1]	B	19.6	C	20.3
5. 6th Street / Central Way	C	33.0	C	34.8
All-Way Stop-Controlled Intersection [2]				
2. 4th Street / 18th Avenue (all-way stop)	B	10.4	B	12.5
Eastbound Approach	*A*	*9.6*	*B*	*11.1*
Westbound Approach	*B*	*11.5*	*B*	*14.5*
Northbound Approach	*A*	*8.9*	*A*	*9.5*
Southbound Approach	*A*	*9.1*	*A*	*9.8*
Side-Street Stop-Controlled Intersections				
1. Market Street / 18th Avenue				
Westbound Approach	B	13.7	C	15.5
Southbound Left-Turn	A	8.3	A	8.4
3. 5th Place / 18th Avenue				
Westbound Left-Turn	A	7.9	A	8.1
Northbound Approach	C	17.9	D	28.9
A. 19th Avenue / KiMS West Driveway				
Westbound Left-Turn	A	0.0	A	0.0
Northbound Approach	B	10.1	B	10.2
B. 19th Ave / 5th Street / KiMS East Driveway				
Eastbound Left-Turn	A	7.4	A	7.4
Westbound Left-Turn	A	7.3	A	7.3
Northbound Approach	A	8.9	A	8.9
Southbound Approach	A	8.5	A	8.5
C. 18th Avenue / KiMS West Driveway				
Southbound Left-Turn	B	13.4	C	17.0
Southbound Right-Turn	A	10.3	B	11.2
D. 18th Avenue / KiMS East Driveway				
Eastbound Left-Turn	A	8.5	A	9.1
Westbound Left-Turn	A	7.6	A	7.7
Northbound Approach	A	9.3	A	9.6

[1] Synchro LOS methodology results reported due to custom phasing not supported by HCM 6th methodology.

[2] LOS and delay for all-way stop-controlled intersections are reported as a weighted average of all approaches based on HCM methodology. The LOS and delay for the individual approaches are presented for disclosure. BOLD = Worst approach.

Table 11
2024 Afternoon Peak Hour Level of Service Summary

	2024 No Action		2024 With Project	
Study Intersection / Site Access Driveway	LOS	Delay (sec)	LOS	Delay (sec)
Signalized Intersections				
4. Lake Street / Central Way [1]	--	--	--	--
5. 6th Street / Central Way	--	--	--	--
All-Way Stop-Controlled Intersection[2]				
2. 4th Street / 18th Avenue (all-way stop)	A	8.3	A	8.6
Eastbound Approach	*A*	*8.0*	*A*	*8.2*
Westbound Approach	*A*	*8.6*	*A*	*9.1*
Northbound Approach	*A*	*8.1*	*A*	*8.3*
Southbound Approach	*A*	*8.0*	*A*	*8.2*
Side-Street Stop-Controlled Intersections				
1. Market Street / 18th Avenue				
Westbound Approach	--	--	--	--
Southbound Left-Turn	--	--	--	--
3. 5th Place / 18th Avenue				
Westbound Left-Turn	A	7.6	A	7.7
Northbound Approach	B	11.7	B	12.8
A. 19th Avenue / KiMS West Driveway				
Westbound Left-Turn	A	0.0	A	0.0
Northbound Approach	B	10.8	B	11.1
B. 19th Ave / 5th Street / KiMS East Driveway				
Eastbound Left-Turn	A	7.3	A	7.3
Westbound Left-Turn	A	7.3	A	7.3
Northbound Approach	A	9.4	A	9.5
Southbound Approach	A	8.7	A	8.7
C. 18th Avenue / KiMS West Driveway				
Southbound Left-Turn	B	10.4	B	10.8
Southbound Right-Turn	A	9.0	A	9.3
D. 18th Avenue / KiMS East Driveway				
Eastbound Left-Turn	A	7.6	A	7.7
Westbound Left-Turn	A	0.0	A	0.0
Northbound Approach	A	9.1	A	9.2

--Not studied during afternoon peak hour

[1] Synchro LOS methodology results reported due to custom phasing not supported by HCM 6th methodology.

[2] LOS and delay for all-way stop-controlled intersections are reported as a weighted average of all approaches based on HCM methodology. The LOS and delay for the individual approaches are presented for disclosure. BOLD = Worst approach.

Table 12
2024 PM Peak Hour Level of Service Summary

Study Intersection / Site Access Driveway	2024 No Action LOS	2024 No Action Delay (sec)	2024 With Project LOS	2024 With Project Delay (sec)
Signalized Intersections				
4. Lake Street / Central Way [1]	C	34.7	C	34.8
5. 6th Street / Central Way	D	50.5	D	51.1
All-Way Stop-Controlled Intersection[2]				
2. 4th Street / 18th Avenue (all-way stop)	A	7.7	A	7.8
Eastbound Approach	*A*	*7.4*	*A*	*7.5*
Westbound Approach	*A*	*8.1*	*A*	*8.3*
Northbound Approach	*A*	*7.8*	*A*	*7.8*
Southbound Approach	*A*	*7.7*	*A*	*7.7*
Side-Street Stop-Controlled Intersections				
1. Market Street / 18th Avenue				
Westbound Approach	C	18.4	C	19.2
Southbound Left-Turn	B	11.5	B	11.5
3. 5th Place / 18th Avenue				
Westbound Left-Turn	A	7.3	A	7.4
Northbound Approach	A	9.5	A	9.7
A. 19th Avenue / KiMS West Driveway				
Westbound Left-Turn	A	0.0	A	0.0
Northbound Approach	A	9.6	A	9.7
B. 19th Ave / 5th Street / KiMS East Driveway				
Eastbound Left-Turn	A	7.3	A	7.3
Westbound Left-Turn	A	7.4	A	7.4
Northbound Approach	A	9.3	A	9.3
Southbound Approach	A	8.6	A	8.6
C. 18th Avenue / KiMS West Driveway				
Southbound Left-Turn	A	9.9	B	10.1
Southbound Right-Turn	A	8.8	A	8.8
D. 18th Avenue / KiMS East Driveway				
Eastbound Left-Turn	A	7.5	A	7.6
Westbound Left-Turn	A	7.4	A	7.5
Northbound Approach	A	8.9	A	8.9

[1] Synchro LOS methodology results reported due to custom phasing not supported by HCM 6th methodology.

[2] LOS and delay for all-way stop-controlled intersections are reported as a weighted average of all approaches based on HCM methodology. The LOS and delay for the individual approaches are presented for disclosure. BOLD = Worst approach.

As shown in Tables 10 - 12, the signalized study intersections and individual movements at the stop-controlled intersections and site access driveways are all anticipated to operate at LOS D or better in 2024 during the weekday AM, afternoon, and PM peak hours without or with the proposed *KiMS Addition* project..

The installation of site-specific improvements under SEPA is primarily determined by the results of both the proportional share analysis (shown in Table 9, and the LOS analysis at the study intersections (shown in Table 10 - 12). Table 13 is used as a guide by the City of Kirkland in determining when mitigation under SEPA is required.

Table 13
Guidelines for Installation of Improvements under SEPA

Peak Hour Intersection LOS with Project Traffic	Install Improvements?
A thru D	No
E	If intersection proportional share > 15%
F	If intersection proportional share > 5%

As shown in Tables 10 - 12, all study intersections and site access driveways are anticipated to operate at LOS D or better in 2024 during the weekday AM, afternoon, and PM peak hours without or with the proposed *KiMS Addition* project. Therefore, the installation of improvements under SEPA is not required at any of the study intersections.

Queuing Analysis

Per the request of the City, a future year weekday peak hour queuing analysis was conducted at two study intersections and the site access driveways on 18th Avenue and 19th Avenue for future year 2024 No Action (without project) conditions and future year 2024 conditions with the proposed *KiMS Addition* project. The queuing analysis was based on the methodology and procedures outlined in the 6th Edition of the *Highway Capacity Manual* (HCM) using the *Synchro 11* software program. The reported queue lengths are 95th percentile queues and represent a condition that is exceeded only five percent of the time. The 2024 No Action and With-Project peak hour traffic volumes at the driveways used in these analyses are shown in Figures 8 - 13.

The results of the weekday peak hour queuing analysis are summarized in Table 14. The queue worksheets are included in Appendix D.

Table 14
2024 Peak Hour Queuing Analysis Summary

		95th % Queue Length (ft)[1]					
		AM PEAK HOUR		AFTERNOON PEAK HOUR		PM PEAK HOUR	
Intersection / Movement	Storage (ft)	2024 No Action	2024 With Project	2024 No Action	2024 With Project	2024 No Action	2024 With Project
1. Market St / 18th Avenue							
Westbound Approach	225'+	25'	25'	--	--	25'	25'
Southbound Left-Turn	50'	<25'	<25'	--	--	<25'	<25'
2. 4th Street / 18th Avenue							
Eastbound Approach	450'	25'	50'	<25'	25'	<25'	<25'
Westbound Approach	175'+	50'	100'	25'	25'	<25'	<25'
Northbound Approach	320'+	<25'	25'	<25'	<25'	<25'	<25'
Southbound Approach	175'+	<25'	25'	<25'	<25'	<25'	<25'
3. 5th Pl / 18th Avenue							
Westbound Left-Turn	200'	<25'	<25'	<25'	<25'	<25'	<25'
Northbound Approach	675'	100'	200'	25'	50'	25'	25'
A. 19th Ave / KiMS West Dwy							
Westbound Left-Turn	50'+	<25'	<25'	<25'	<25'	<25'	<25'
Northbound Approach	>100'	<25'	<25'	<25'	<25'	<25'	<25'
B. 19th Ave/5th/ KiMS East Dwy							
Eastbound Left-Turn	250'+	<25'	<25'	<25'	<25'	<25'	<25'
Westbound Left-Turn	600'	<25'	<25'	<25'	<25'	<25'	<25'
Northbound Approach	>100'	<25'	<25'	<25'	<25'	<25'	<25'
Southbound Approach	75'+	<25'	<25'	<25'	<25'	<25'	<25'
C. 18th Ave / KiMS West Dwy							
Southbound Left-Turn	>100'	25'	75'	<25'	25'	<25'	<25'
Southbound Right-Turn	>100'	25'	50'	<25'	25'	<25'	<25'
D. 18th Ave / KiMS East Dwy							
Eastbound Left-Turn	175'	25'	25'	<25'	<25'	<25'	<25'
Westbound Left-Turn	300'+	<25'	<25'	<25'	<25'	<25'	<25'
Northbound Approach	--	<25'	<25'	<25'	<25'	<25'	<25'

+ Queue storage measured to nearest intersection. Additional storage may be available.

[1] Queues are 95th Percentile queues rounded to the nearest 25 feet. <25' is a queue statistically less than 1 vehicle.

As shown in Table 13, the 95th percentile queues during the AM, afternoon, and PM peak hours at the study intersections closest to Kirkland Middle School are anticipated to be 100 feet (4 vehicles or less) without and with the project in 2024 with exception to the northbound queue at the 5th Place/18th Avenue intersection which is anticipated to be 200 feet during the AM peak hour with the project. All 95th percentile queues during the AM, afternoon, and PM peak hours at the study intersections without and with the project in 2024 would be accommodated within the existing storage. Additionally, the 95th percentile queues for controlled movements at the KiMS site access

driveways during the AM, afternoon, and PM peak hours are anticipated to be 75 feet (3 vehicles) or less without and with the project in 2024 and would be accommodated within the existing storage.

Vehicular Access and Circulation

With the proposed *KiMS Addition*, vehicular access to the site would continue to be provided via the two existing driveways on 18th Avenue (one enter-only and one exit-only), and the two existing driveways on 19th Avenue (one bus/staff parking only and one that provides access to a small parking lot).

As shown in Tables 10 - 12 and Table 14, all controlled movements at the site access driveways are anticipated to operate at LOS C or better with 95th percentile queues of 75 feet (2 vehicles) or less in 2024 with the proposed *KiMS Addition* project.

The increase in AM and Afternoon peak period entering and exiting traffic volumes at the school driveways on 18th Avenue and associated drop-off and pick-up queuing as a result of the *KiMS Addition* project is anticipated to be accommodated on-site, is not expected to impact the existing circulation, and would not result in a significant adverse impact to the 7 existing single-family home driveways located within 150 feet of the KiMS main access driveways on 18th Avenue. Similarly, the increase in AM and Afternoon peak period entering and exiting traffic volumes at the school driveways on 19th Avenue as a result of the KiMS Addition project would not result in an additional significant adverse impact for the 3 single-family home driveways located within 150 feet of the KiMS access driveways on 19th Avenue.

Service vehicle circulation on the KiMS site is also expected to be maintained with the proposed project.

Non-Motorized and Transit Impacts

Pedestrian and bicycle circulation on the KiMS site is expected to be maintained with the proposed *KiMS Addition* project. The demand on pedestrian facilities in the project vicinity is expected to increase with the proposed development. While the Addition project would increase the demand on pedestrian facilities, this increased demand is not expected to result in a significant adverse impact. Existing pedestrian facilities in the vicinity area (i.e. sidewalks) are sufficient to accommodate the additional pedestrian demand. Further, any increase in pedestrian demand would be considered positive since this would result in a decrease in passenger cars on the surrounding road network.

The proposed project is also anticipated to generate some additional bicycle trips. It is anticipated that the existing bicycle facilities in the project vicinity would be adequate to accommodate any additional bicycle trips.

Because the Lake Washington School District provides bus service to/from Kirkland Middle School, impacts to the existing public transit services in the vicinity as a result of the proposed *KiMS Addition* project are not expected. Existing King County Metro bus routes in the vicinity of KiMS include routes 230, 231, and 893.

Safety

A review of crash history over the 3-year period from 2019 to 2021 showed that there were no crashes along the segment of 18th Avenue between 4th Street and 6th Street (including at the existing KiMS site access driveways), and only one crash along the segment of 19th Avenue between 4th Street and 6th Street which occurred at the intersection of 19th Avenue/6th Street. There were no crashes involving pedestrians or bicyclists at the study intersections or along the site frontages on 18th Avenue and 19th Avenue during the 3-year period from 2019 to 2021.

Therefore, new trips associated with the proposed *KiMS Addition* project are not ancitipated to have an adverse impact on vehicular, pedestrian, and/or bicycle safety within the vicinity of the school site.

Parking Analysis

The parking analysis for the *KiMS Addition* project is documented under a separate memorandum.

MITIGATION SUMMARY

Concurrency

The project was evaluated for transportation concurrency by the City of Kirkland in November 2022. Based on the results, the City has determined the project meets the City's transportation concurrency requirements. Therefore, no short-term transportation mitigation was required to obtain concurrency in the City of Kirkland.

SEPA Improvements

The installation of site-specific improvements under SEPA is determined based on the guidelines shown in Table 13. Based on the results of the LOS analysis and the proportional share calculations at the study intersections, the installation of improvements under SEPA is not required.

Transportation Impact Fees

Transportation mitigation required by the City of Kirkland is payment of an impact fee based on the project's proposed land use. The currently adopted transportation impact fee is $479.04 per middle school student as of January 1, 2023. The cost per trip is subject to change and final impact fee calculations will be conducted at the time of building permit issuance.

SCIENCE & DESIGN

August 26, 2022

Ina Holzer
Senior Project Manager, Lake Washington School District
15212 NE 95th Street
Redmond, WA 98052

Re: Arborist Report – LWSD Kirkland Middle School

The Watershed Company Reference Number: 220503

Dear Ina:

We are pleased to present you with the findings of our tree inventory and assessment for the new classroom addition at Kirkland Middle School (parcel #1245000676). ISA Certified Arborist® and Qualified Tree Risk Assessor (TRAQ) Jake Robertson with The Watershed Company, visited the property on July 28, 2022, to inventory and assess trees within the study area.

Tree attributes, including species, size, and condition, were assessed during the on-site inventory, and are summarized in the enclosed Tree Inventory Table. The following document is included with this letter:

- Annotated Tree Map

Site Characterization

The subject parcel is approximately 15.22 acres in size; however, the study area is reduced to approximately 0.86 acres to encompass only the area of new development. The parcel is developed with the middle school and associated landscape and impervious developments. The site is clear of most trees except from those along the borders and within the parking lot. Minor scattering of trees are also located between the existing school and sports fields. The parcel is

zoned Low Density Residential Zone (RS-7.2). There are no Environmentally Critical Areas on-site, per King County iMap. See Figure 1 for a map of the study area and site vicinity.

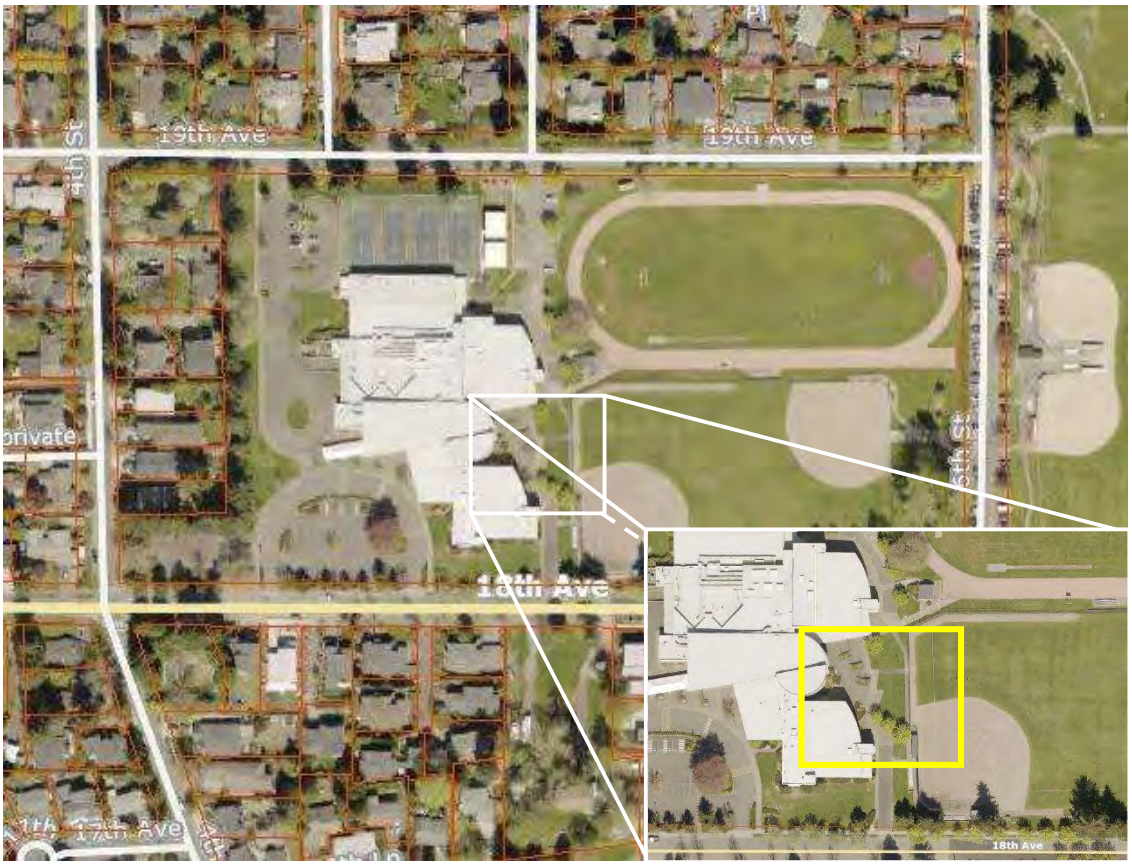

Figure 1. Vicinity map showing the approximate location of the study area (outlined in yellow). (*Image courtesy of King County iMap, 2019*.)

Project Description

The project proposes to construct a new addition for classrooms to the east of the existing school which would encroach into the baseball field from Figure 1. The goal of the project is to retain inventoried trees, minimizing impacts as much as possible. Per the Tree Protection Plan, prepared by Integrus Architecture (dated June 17, 2022), there are no planned alterations to the driveway or nearby parking lot.

Tree Assessment Methods

The trees within the study area were determined to be significant using the definition in the Kirkland Zoning Code (KZC) Chapter 95. The City of Kirkland defines a significant tree as any evergreen or deciduous tree, six inches in diameter or greater, measured four-and-a-half feet

above existing grade. For the purpose of this study, the health of significant trees shall be depicted using a rating system of Excellent, Good, Fair, and Poor (Table 1).

All significant trees were assigned a unique identification number. Each assessed tree was tagged with a rectangular aluminum, write-on tag that was affixed to the trunk of the tree.

Diameter

The diameter-at-breast-height (DBH) of all subject trees was measured at four-and-a-half feet above the surface of the ground.

Estimated Height

Tree height was determined by a visual estimate.

Canopy Radius

Canopy radius, also known as dripline, was measured horizontally from the center of the trunk to the outermost branch tips. For trees with uneven crowns, the average of two perpendicular radii was recorded.

Tree Protection Zone (TPZ)

The TPZ is a boundary that denotes the location of tree protection fencing where all construction activities are prohibited. This boundary is determined outside the Interior Critical Root Zone (ICRZ).

Critical Root Zone

The area encircling the trunk of a tree equal to one foot radius for every inch of DBH.

Interior Critical Root Zone (ICRZ)

An area half the distance of the CRZ that, when impacted, may compromise the structural integrity of the tree.

Condition

A Level 1 visual assessment was used to evaluate the health and condition of all trees within the study area in accordance with ISA and CTLA standards. The condition determination was based on the criteria outlined in Kirkland Zoning Code (KZC) Chapter 95.30 – Tree Retention Associated with Development Activity.

The ratings are summarized in Table 1 below from the City code. Each tree was given a rating from Excellent – Poor as summarized below in Table 1.

Table 1. Assessment of tree health and condition derived from KZC 95.30.1 – Tree Condition Ratings.

Condition Rating	Tree Health *Twig and leaf density, size and growth, pest/pathogen issues*	Tree Structure *Root flare, trunk condition. Branch assembly*
Excellent	High or above average vigor with little or no twig dieback, discoloration or defoliation.	Trunk and root flare exhibit no visible defects or cavities. Branch structure and attachments are normal for species and free of defects.
Good	Vigor is normal for species. No significant damage due to disease or pests. Any twig dieback, defoliation or discoloration is minor (up to 10% of the crown)	Well-developed structure. Defects are minor and can be corrected. Codominant stem formation may be present. Trees in groves may have asymmetric/deviations from an open-grown form of the same species.
Fair	Reduced vigor. Twig dieback, defoliation, discoloration, and/or dead branches up to 30% of the crown. Obvious signs of pest problems contribute to a lesser condition but is not likely to be fatal.	Visible evidence of trunk damage or cavities, large girdling roots or branch attachments that may require correction.
Poor	Poor vigor, unhealth and declining. Low foliage density with extensive (more than 50%) twig and/or branch dieback. Smaller-than-normal leaf size and little evidence of new growth.	Structural problems cannot be corrected, such as recent change in tree orientation, extensive trunk decay or poor branch attachment. Tree/tree part failure may occur at any time.

Tree Assessment Results

A total of four (4) trees were inventoried and assessed as part of this study (Table 2). Trees were identified using the tree tags #1 – #4. Species inventoried were all Norway maple (*Acer platanoides*).

Diameter

On-site assessed trees range in DBH from 8.4 inches to 12.8 inches. The average diameter is 10.4 inches.

Height

The estimated height of on-site trees within the study area range from 25 feet to 30 feet. The average height is 26.25 feet.