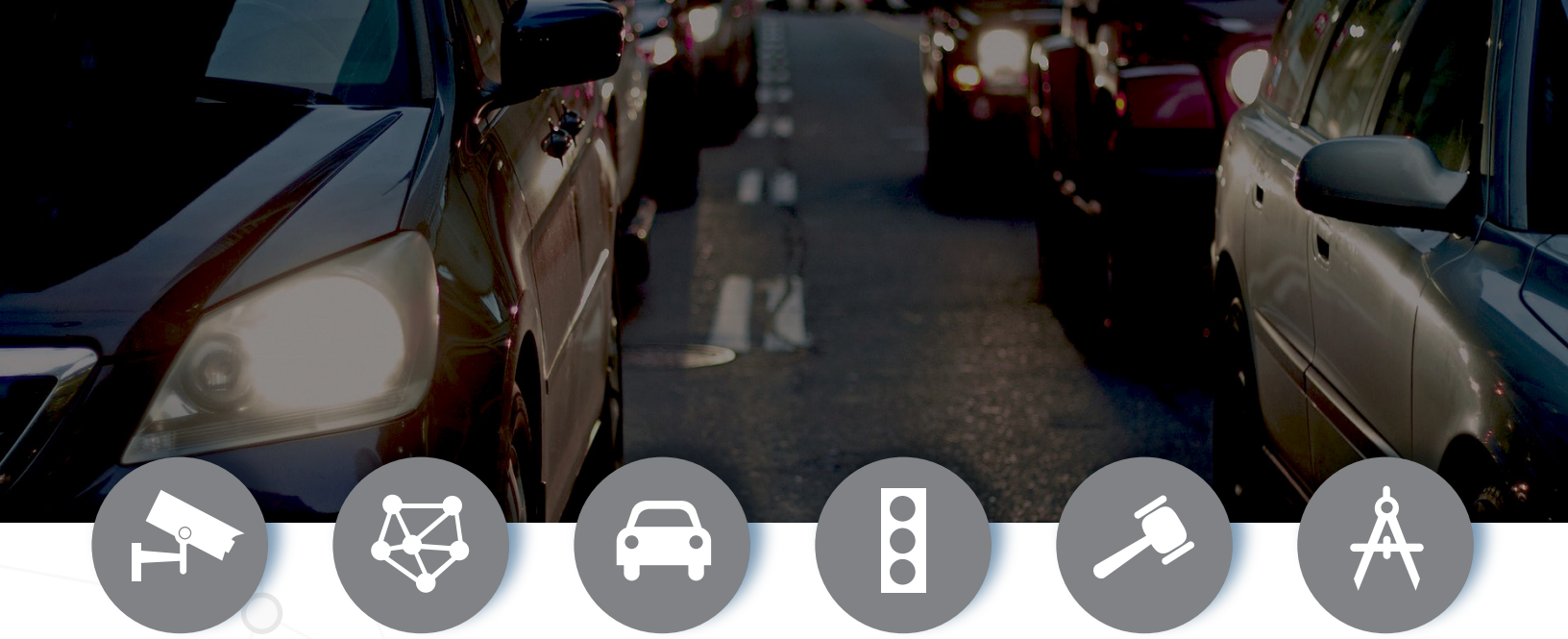

NEIGHBORHOOD IMPACT ASSESSMENT

MAS Charter School

Report

April 2022

HT#L16D037
received 4/5/2022

Prepared for
Charter School Property Solutions

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LEE ENGINEERING

Executive Summary

Lee Engineering has completed this report for Charter School Property Solutions. The following is a Neighborhood Impact Assessment (NIA) for Mission Achievement and Success (MAS) Charter School located at 1718 Yale Blvd. in the southeast quadrant of Albuquerque, NM. All analyses and items herein conform to scoping requirements outlined in the CABQ Traffic Scoping Form dated December 8, 2021. Scoping forms are in Appendix A.

Background

MAS Charter School is located at 1718 Yale Boulevard. Two options are proposed to address traffic concerns along Yale Boulevard and Ross Avenue adjacent to the school. First, the West Loop consists of constructing an additional parking lot and student drop-off/pick-up loop on the northwest corner of Yale Boulevard SE and Ross Avenue SE, 1717 Yale Boulevard. The improvement of the parking lot is expected to be completed by the 2022/2023 academic year. Secondly, a community initiative was proposed using Centre Avenue and International Avenue, the South Loop. Figure 1 is a detailed site plan. Study Intersections, as shown in Figure 2, include:

1. Yale Blvd. & Kathryn Ave.
2. Kathryn Ave. at East Alley Loop
3. Yale Blvd. & Anderson Ave.
4. Yale Blvd. & Ross Ave.
5. Yale Blvd. & International Ave.
6. Yale Blvd. & Center Ave.

9-hour turning movement counts were collected on December 8, 2021, for study intersections 1 through 4, and December 15, 2021, for study intersections 5 and 6. Construction is anticipated to begin in 2022, with full completion of the development by Fall 2022. Analysis scenarios for this study include:

1. Existing Conditions (2021)
2. West Loop Build-out w/Yale Boulevard Road Diet (2022)
3. South Loop Build-out (2022)

Summary of Recommendations

The West Loop Build-out with a concurrent Road Diet on Yale Boulevard is recommended with adherence to the following recommendations:

- Access to the site is maintained via the drop-off/pick-up operations map provided in this report.
- Auxiliary Right-Turn lane established on Yale boulevard for Driveway 1 of the proposed development.
- Yale Boulevard is restriped to two travel lanes in each direction. The additional traveled way is designated for bicycle facilities and/or turn lanes.
- A school zone is established on Yale Boulevard specific to MAS Charter School.
- While waiting to pick up students, parents should be instructed to turn their vehicles off when not actively in motion.
- Left turns from and to Yale Boulevard should be managed during pick-up and drop-off.
    - Critically, left turns exiting the West Loop should be restricted to ensure entering Yale does not back up into and strict the efficiency of the loading and unloading zone during drop-off/pick-up hours.
    - Left turns entering the West Loop, and parking lot should be monitored and managed. Queues should not be allowed to exceed the left turn lane from the West Loop entrance to the pedestrian crossing median island at Ross Avenue. If issues are observed, traffic demand can be managed, or left turns restricted during drop-off/pick-up hours.
- Left turns to Ross Avenue are restricted for vehicles dropping off/picking up students via the East Alley Loop drop-off/pick-up hours.
- The West Loop active drop-off/pick-up loop shall consist of two lanes within the active loading and unloading areas. While student drop-off is only allowed in the rightmost curb lane, a second lane should be provided to enhance circulation, mitigate delays, and minimize queue lengths.
- All pedestrian traffic uses existing sidewalks and marked crosswalks.
- Implementation of a Pedestrian Hybrid Beacon for the established crosswalk on the northern leg of the intersection of Yale Boulevard and Ross Avenue.
- Enhanced lighting at Yale Blvd. and Ross Ave to address safety concerns.
- As detailed in the sight distance section of this report, intersection sight distance should be provided and maintained.

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INTRODUCTION

This report details the procedures and findings of a Neighborhood Impact Assessment (NIA) performed by Lee Engineering for Charter School Property Solutions. This report and the analyses herein were performed for Mission Achievement and Success (MAS) Charter School located at 1718 Yale Boulevard in the southeast quadrant of Albuquerque, NM. All analyses and items herein conform to the requirements outlined in the CABQ Traffic Scoping Form dated December 8, 2021. Scoping forms are in Appendix A. Analysis procedures, conclusions, and recommendations for this study use guidance from the *ITE Trip Generation Manual 11th Edition and Highway Capacity Manual 6th Edition*.

This report documents the results of the following scenarios:

1. Existing Conditions (2021)
2. West Loop Build-out w/Yale Boulevard Road Diet (2022)
3. South Loop Build-out (2022)

PROJECT LOCATION & SITE PLAN

MAS Charter School plans to expand its existing parking area and develop a student drop-off/pick-up loop at 1717 Yale Boulevard. The parking lot improvement is expected to be completed before the 2022/2023 academic year. The development is in southeast Albuquerque, north of Albuquerque International Sunport. The project area is bound by existing commercial, residential, and community developments. North of the study area is Loma Linda Community Center. To the south are several hotels. The East and West of the development are zoned for residential use. Figure 1 shows the proposed site plan.

Two options are proposed to address traffic concerns along Yale Boulevard and Ross Avenue adjacent to the school. First, the West Loop consists of constructing an additional parking lot and student drop-off/pick-up loop on the northwest corner of Yale Boulevard SE and Ross Avenue SE, 1717 Yale Boulevard. Secondly, a community initiative was proposed using Centre Avenue and International Avenue, the South Loop.

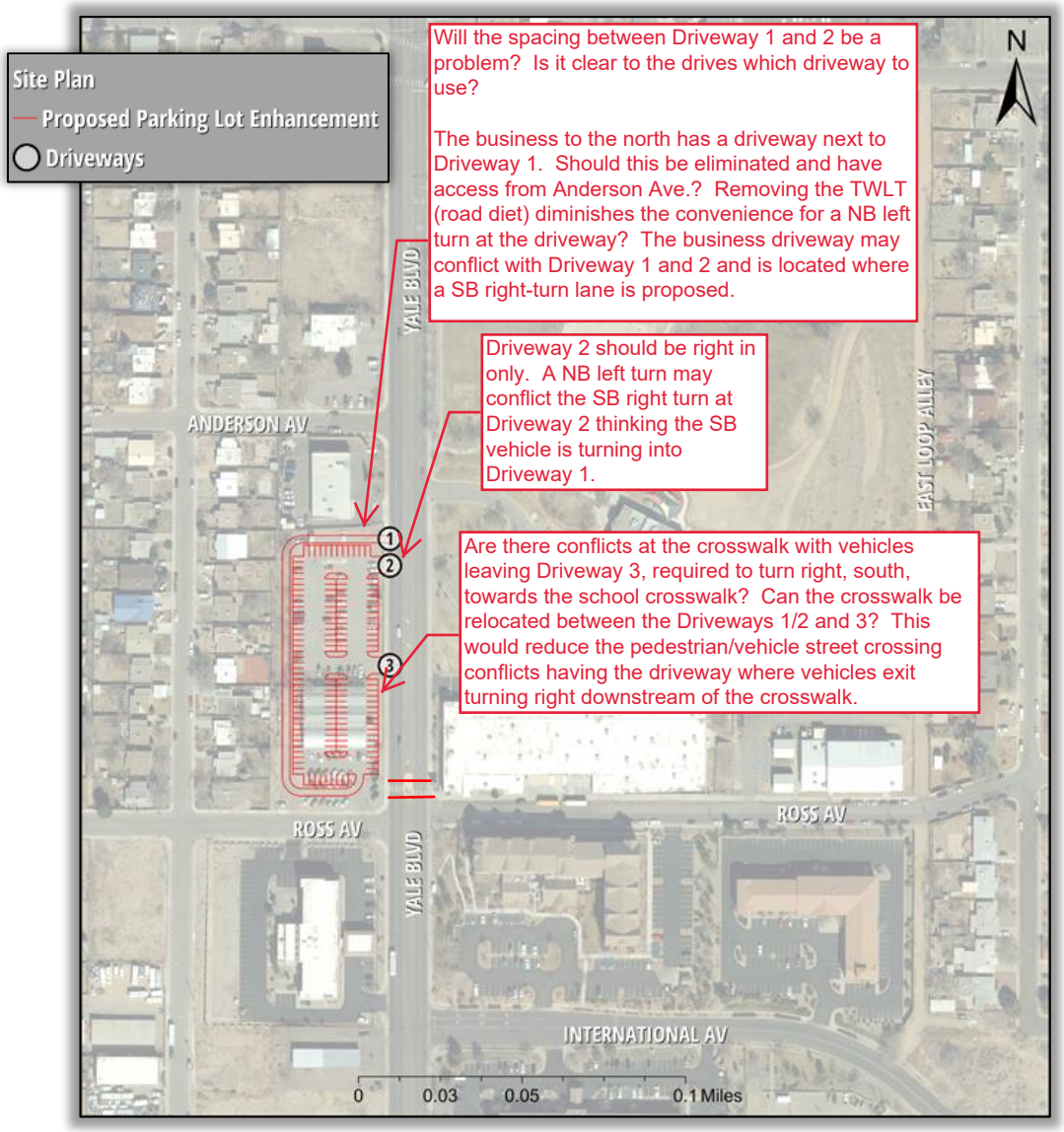

Figure 1. Site Plan

Site Access

Three driveways provide access to the site via Yale Boulevard. Driveway 1 will serve as the ingress to the west drop-off/pick-up loop for passenger vehicles and will operate as a right-in driveway. Driveway 2 is an ingress point of the parking area for passenger vehicles and buses. Driveway 3 will serve as an egress point from the parking area and west drop-off/pick-up loop, operating as a right-out driveway. Figure 1 shows the driveway locations and configuration.

Study Area, Area Land Use, and Streets

Study Area

Kathryn Avenue binds the study area on the north and Centre Avenue to the south. The alleyway to the east of MAS Charter School binds the study area on the east and the proposed parking lot development on the west. The following intersections, identified and agreed upon in the scoping form, and are the study intersections for this Neighborhood Impact Analysis:

1. Yale Blvd. & Kathryn Ave.
2. Kathryn Ave. at East Alley Loop
3. Yale Blvd. & Anderson Ave.
4. Yale Blvd. & Ross Ave.
5. Yale Blvd. & International Ave.
6. Yale Blvd. & Center Ave.

Figure 2. Vicinity Map

Area Land Use

MAS Charter School is located at 1718 Yale Boulevard at the northeast corner of the intersection of Yale Boulevard and Ross Avenue in the southeast quadrant of Albuquerque, New Mexico. Adjacent to and surrounding the project site are land uses consisting of the following:

- Commercial: Some adjacent land use is commercial, with commercial developments located south of MAS Charter School and proposed parking lot development.
- Community: Abutting the school's property to the north is a community center; its property is zoned for community use.
- Residential: Just beyond the community and commercial developments to the north and the east and west of the school property and proposed parking lot development are multi-family and single-family residential zoned areas.
- Other uses within a quarter-mile of the school property and proposed parking lot development include office, drainage, and industrial.

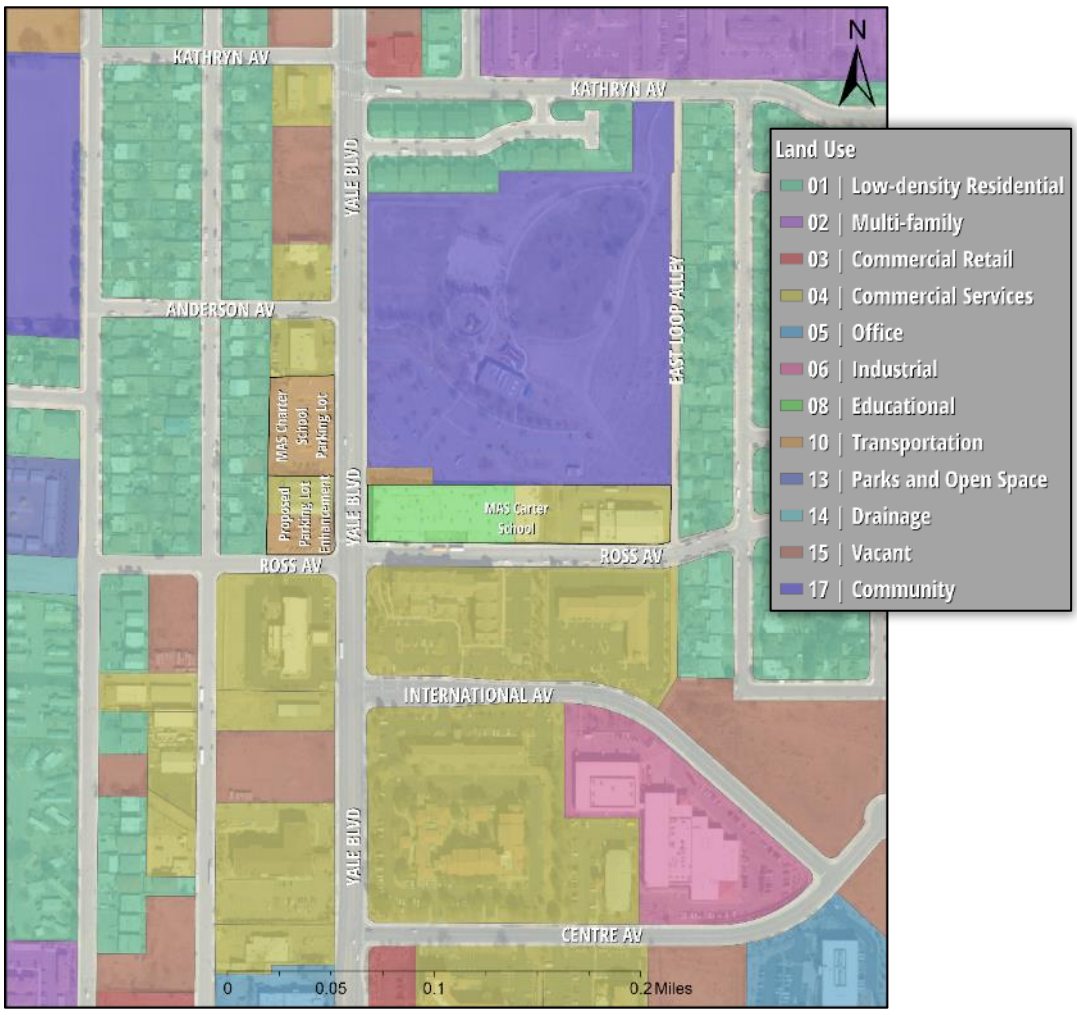

Figure 3: Adjacent Land Uses

Streets

Yale Boulevard is a two-way, undivided five-lane roadway, with a shared two-way left-turn lane in the center. There are four 11-foot travel lanes; two lanes are for southbound travel and two for northbound. The roadway incorporates a curb and gutter, and a sidewalk is present on both sides. Its functional class is urban minor arterial and has a posted speed limit of 40 MPH. A school zone is not implemented for MAS Charter School.

Kathryn Avenue is a two-lane, two-way undivided roadway, classified as a local urban street running east and west. The traveled way is approximately 28-feet wide west of Yale Boulevard and 36-wide on the east side. Sidewalks are present on both sides of the road, and the roadway has a posted speed limit of 25 MPH.

Anderson Avenue is a two-lane, two-way undivided roadway, classified as a local urban street and runs east and west. The traveled way is approximately 28 feet wide, with sidewalks present on both sides of the road. The roadway has the standard speed limit for local urban streets of 25 MPH per the City of Albuquerque Code of Ordinances.

Ross Avenue is a two-lane undivided roadway, classified as a local urban street running east and west. The traveled way is approximately 36-feet wide. A sidewalk is present on both sides of the road. The roadway has a standard speed limit for local urban streets of 25 MPH.

International Avenue is a two-lane undivided roadway, classified as a local urban street running east from Yale Boulevard to Centre Avenue. The traveled way ranges between 56-feet wide on the approach to Yale Boulevard and 36-feet wide. A sidewalk is present along both sides of the road. The roadway has a standard speed limit for local urban streets of 25 MPH.

Centre Avenue is a two-lane undivided roadway, classified as a local urban street running east and west between Yale Boulevard and International Avenue. The traveled way is approximately 36-feet wide. Detached sidewalks are present along the road. The roadway has a standard speed limit for local urban streets of 25 MPH.

Intersections

The City of Albuquerque maintains all intersections in the study area.

Yale Blvd. & Kathryn Ave. is a 3-legged, signalized intersection with crosswalks are marked at all approaches. Kathryn Avenue also extends to the west via an offset connection. The west side leg of Kathryn is not included in this study as it is not part of the signalized intersection, and no trips are projected to use this facility.

Yale Blvd. & Anderson Ave. is a 3-legged unsignalized intersection with stop control on Anderson Avenue. Pedestrian crossings are not marked on any approach of the intersection.

Yale Blvd. & Ross Ave. is a 4-legged, unsignalized intersection with stop control on Ross Avenue. A marked pedestrian crosswalk with a center refuge island exists on the northern intersection approach. All other pedestrian crossings are unmarked.

Yale Blvd. & International Ave. is a 3-legged, unsignalized intersection with stop control on International Avenue. Pedestrian crossings are unmarked.

Yale Blvd. & Centre Ave. is a 3-legged, unsignalized intersection with stop control on Centre Avenue. Crosswalks are unmarked.

TRANSIT

Two bus routes operate within the study area: Route 50 and Route 16. These routes operate on weekdays with stops every 30 minutes and weekends with stops every hour, in the northbound and southbound directions on Yale Boulevard. The stops nearest the school are located south of Ross Avenue on the east side of Yale Boulevard for the northbound direction and the west side of Yale Boulevard for the southbound direction.

MULTIMODAL CONNECTIVITY

Bicycle facilities are not present on any road in the study area. Sidewalks exist on all streets within the study area in compliance with CABQ DPM. In addition, a crosswalk with a pedestrian refuge island is present on the northern leg of the intersection of Yale Boulevard and Ross Avenue.

CURRENT ADJACENT PROJECTS

There are pending improvements for commercial land use on the southwest corner of Gibson and Yale Boulevards.

ANALYSIS OF EXISTING CONDITIONS

DROP-OFF AND PICK-UP OPERATIONS

A map showing the existing parent drop-off/pick-up loops and bus drop-off/pick-up location are shown in Figure 4. The routes are designed to avoid conflicts between parent drop-off/pick-up and bus drop-off/pick-up while upholding student safety, not adversely impacting traffic operations on Yale Boulevard, and not posing a nuisance to adjacent neighborhoods during drop-off/pick-up operations. The East Alley Loop and existing drop-off/pick-up loop at 1717 Yale Boulevard, the Church Lot, are in use today, with buses dropping students off curbside via westbound Ross Avenue. The East Alley Loop is designated for use by students in Pre-K through fourth grade. This loop is accessible for vehicles traveling east- or westbound on Kathryn Avenue. Upon dropping students off on school property, parent vehicles can make a left or right turn on Ross Avenue to leave the school's property.

Figure 4: Existing Drop-Off/Pick-Up Operations

Students in grades 5 through 12 use the Church Lot drop-off/pick-up area. The Church Lot is on the northwest corner of Yale Boulevard and Ross Avenue. Vehicles dropping off/picking up students from the Church Lot access the parking lot by turning westbound from Yale Boulevard or eastbound from Wilmoore or Buena Vista Drives. Student traffic crosses Yale Boulevard via a marked crossing with pedestrian refuge island on the northern leg of the intersection to access MAS Charter School.

MAS Charter School has developed specific operational rules governing drop-off and pick-up times and has communicated these to the parents. The standards apply to grades Pre-K to grade 4, grades 5 to 12, after-school program participants, and students who utilize the school's buses. This information is critical to

understanding the current measures and factors that provide operational context to the study and how the parents and students interface with the drop-off and pick-up daily.

The school's normal hours of operation are Monday through Friday, 8:20 AM to 4:20 PM (Before school program starts at 7:00 AM and after school program ends at 6:00 PM). Student drop-off in the morning is between 7:00 AM and 8:15 AM. Student pick-up is between 4:15 PM and 4:35 PM. Students that participate in before and after school programs do not impact the peak drop-off and pick-up numbers.

The school owns five buses that pick students up at locations around the City and drop off students between 7:30 AM to 8:00 AM on Ross Avenue in the morning and pick up students at 4:20 PM. There are approximately 208 students that currently utilize the MAS buses.

MAS has approximately 40 staff that assist with the drop-off and pick-up operations. This includes a contract crossing attendant that provides crossing assistance at Yale Boulevard and Ross Avenue. Staff and older siblings physically accompany younger students dropped off or picked up at the West Loop through the crosswalk from Ross Avenue to the Yale Boulevard campus. There are multiple families with more than one child that attend MAS Charter School. If siblings are apart in age, the younger child accompanies the older sibling to and from the West Loop. Table 1 shows real-world counts taken year at the existing Church Parking Lot that demonstrate the student to vehicle ratio.

Table 1: Observed Student-to-Vehicle Ratio

	Church Parking Lot					
	AM			PM		
Day of the Week	Vehicles	Students	Students per Vehicle	Vehicles	Students	Students per Vehicle
Monday (2/28/22)	97	154	1.6	57	110	1.9
Tuesday (3/1/22)	-	-	-	65	118	1.8
Wednesday (3/2/22)	87	132	1.5	52	97	1.9
Thursday (3/4/22)	99	148	1.5	55	115	2.1

Grades K-12 students use the East Alley Loop for the after-school program pick-up and range in pick-up time over an hour and a half outside of the PM peak hour. Approximately 226 students participate in after-school programs. These students are not part of the normal pick-up time slot and are picked up by their parents by 6:00 PM.

DATA COLLECTION

Turning movement counts for the study intersections were collected for 9 hours in 2-periods: 6:00 AM-10:00 AM (morning) and 1:00 PM-6:00 PM (afternoon) on December 8 and December 15, 2021. Table 2 shows the observed peak hours for each intersection used in the analysis. Current year turning movement counts, lane geometry, and traffic control for the study intersections are presented in Figure 5. Complete turning movement count sheets are in Appendix B.

Table 2: Intersection Peak Hours

Intersection	Data Collection Date	AM Peak Hour	PM Peak Hour
Yale Blvd. & Kathryn Ave.	December 8, 2021	7:30 - 8:30	4:00 - 5:00
Kathryn Ave. at East Alley Loop	December 8, 2021	7:15 - 8:15	4:15 - 5:15
Yale Blvd. & Anderson Ave.	December 8, 2021	7:30 - 8:30	4:00 - 5:00
Yale Blvd. & Ross Ave.	December 8, 2021	7:30 - 8:30	4:00 - 5:00
Yale Blvd. & International Ave.	December 15, 2021	7:15 - 8:15	4:15 - 5:15
Yale Blvd. & Center Ave.	December 15, 2021	7:15 - 8:15	4:00 - 5:00

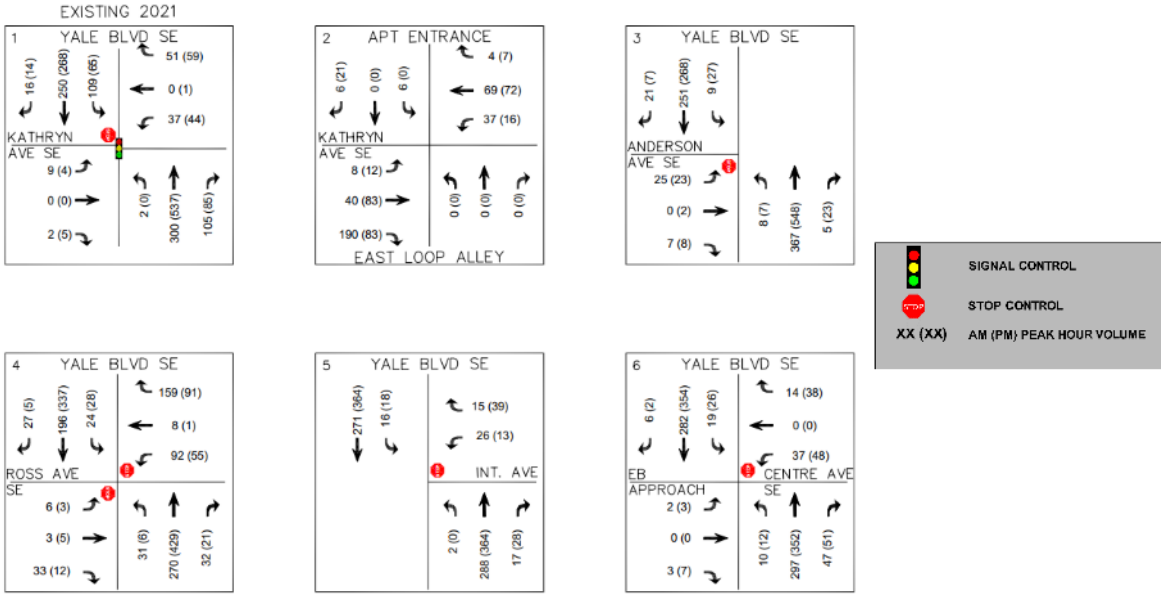

Figure 5. Existing 2021 Turning Movement Counts

CRASH SUMMARY

This study analyzed five years of crashes occurring in the study corridor between 2015 and 2019 provided by The University of New Mexico, Geospatial and Population Studies, Traffic Research Unit. This crash dataset, the most recent available, contained forty-six crashes. Crash data is extracted from crash reports filed by law enforcement officers. The following injury codes identify crash severity in New Mexico:

- K – Killed (Fatal)
- A – Incapacitated (Serious Injury)
- B – Visible Injury (Minor Injury)
- C – Complaint of Injury (Suspected Injury)
- O – Property Damage Only (No Apparent Injury)

Of the reported crashes, one was fatal. None resulted in a serious injury, nineteen were minor or suspected injuries, and twenty-six did not involve an injury. A pedestrian involved in a crash at Yale Boulevard and Ross Avenue had a suspected injury. Bicyclists were involved in two crashes; one was reported as having a suspected injury from a crash at Yale and Kathryn. The other bicyclist was involved in the fatal crash at Yale And Ross. Only one crash involved alcohol or drugs. Table 3 summarizes the crashes by year, type, lighting conditions, severity, and top contributing factor.

Table 3: Crash Summary (2015-2019)

	Intersection/Segment	Yale Blvd & Kathryn Ave	Kathryn Ave to East Alley Loop	Yale Blvd & Academic Pl	Yale Blvd & Anderson Ave	Yale Blvd & Ross Ave	Yale Blvd & International Ave	International Ave to Centre Ave	Yale Blvd & Centre Ave
	Total Crashes	**11**	**4**	**1**	**4**	**18**	**2**	**2**	**4**
By Year	2015	1	1	1	2	1	0	0	1
	2016	5	0	0	1	6	0	1	2
	2017	1	1	0	1	3	2	0	0
	2018	3	2	0	0	6	0	1	0
	2019	1	0	0	0	2	0	0	1
By Type	Fixed Object - Median Raised Or Curb	0	0	0	0	2	0	0	0
	Fixed Object - Traffic Signal Standard	1	0	0	0	0	0	0	0
	Fixed Object - Tree	0	1	0	0	0	0	0	0
	Left Blank	2	1	0	0	3	0	1	0
	Non-Collision - Person Fell/Jumped/Pushed From Vehicle	1	0	0	0	0	0	0	0
	Other Vehicle - Both Going Straight/Entering At Angle	3	0	0	2	4	1	0	1
	Other Vehicle - Both Turn Left/Entering At Angle	0	0	0	0	1	0	0	0
	Other Vehicle - From Opposite Direction	0	0	0	0	0	0	0	1
	Other Vehicle - From Opposite Direction/One Left Turn	0	0	0	1	0	0	0	0
	Other Vehicle - From Same Direction/Both Going Straight	1	0	0	1	0	0	0	0
	Other Vehicle - From Same Direction/Rear End Collision	0	0	0	0	1	0	0	0
	Other Vehicle - One Left Turn/Entering At Angle	2	2	1	0	4	1	0	2
	Other Vehicle - One Right Turn/Entering At Angle	0	0	0	0	1	0	0	0
	Pedestrian Collision - Vehicle Going Straight	0	0	0	0	1	0	0	0
	Vehicle Parked in Proper Location	0	0	0	0	0	0	1	0
	Vehicle Struck Pedalcyclist At Angle	1	0	0	0	0	0	0	0
	Vehicle Struck Pedalcyclist From Behind	0	0	0	0	1	0	0	0
	%Other Vehicle - One Left Turn/Entering At Angle	18%	50%	100%	0%	22%	50%	0%	50%
	%Other Vehicle - Both Going Straight/Entering At Angle	27%	0%	0%	50%	22%	50%	0%	25%
	%Left Blank	18%	25%	0%	0%	17%	0%	50%	0%
By Lighting Conditions	Daylight	8	4	1	4	11	0	0	3
	Dawn/Dusk	0	0	0	0	2	1	0	0
	Dark	2	0	0	0	5	1	0	1
	Invalid Code/Not Specified	1	0	0	0	0	0	1	0
	%Daylight	73%	100%	100%	100%	61%	0%	0%	75%
	%Dark	18%	0%	0%	0%	28%	50%	0%	25%
By Severity	Fatal (K)	0	0	0	0	1	0	0	0
	Serious Injury (A)	0	0	0	0	0	0	0	0
	Visible Injury (B)	1	0	0	0	5	0	0	0
	Complaint of Injury (C)	4	0	0	1	7	0	0	1
	Property Damage Only (O)	6	4	1	3	5	2	2	3
	%Property Damage Only (O)	55%	100%	100%	75%	28%	100%	100%	75%
	%Complaint of Injury (C)	36%	0%	0%	25%	39%	0%	0%	25%
	%Visible Injury (B)	9%	0%	0%	0%	28%	0%	0%	0%
By Contributing Factors	Alcohol/Drug Involved	0	1	0	0	0	0	0	0
	Avoid No Contact - Vehicle	1	0	0	0	0	0	0	0
	Driver Inattention	2	1	0	1	5	0	0	4
	Excessive Speed	2	1	0	0	1	0	0	0
	Failed to Yield Right of Way	2	1	1	3	6	1	0	0
	Improper Backing	0	0	0	0	0	0	1	0
	Improper Lane Change	1	0	0	0	0	0	0	0
	Made Improper Turn	1	0	0	0	1	1	0	0
	Missing Data	1	0	0	0	1	0	1	0
	Other - No Driver Error	0	0	0	0	1	0	0	0
	Other Mechanical Defect	1	0	0	0	0	0	0	0
	Passed Stop Sign	0	0	0	0	2	0	0	0
	Pedestrian Error	0	0	0	0	1	0	0	0
	%Failed to Yield Right of Way	18%	25%	100%	75%	33%	50%	0%	0%
	%Driver Inattention	18%	25%	0%	25%	28%	0%	0%	100%
	%Excessive Speed	18%	25%	0%	0%	6%	0%	0%	0%
	%Made Improper Turn	9%	0%	0%	0%	6%	50%	0%	0%

Crash Summaries for Intersections/Segments

Yale Blvd. & Kathryn Ave.:

- 11 crashes
- The most common crash classification is *Other Vehicle – Both Going Straight/Entering at Angle*.
- 18% of crashes occurred under low light conditions.
- No fatal crashes were reported, but minor injury crashes accounted for 45% of crashes.
- The most common contributing factors are *Failed to Yield Right of Way, Driver Inattention, and Excessive Speed*.

Kathryn Ave. between Yale Blvd. and the East Alley Loop:

- 4 crashes
- The most common crash classification *is Other Vehicle – One Left Turn/Entering at Angle.*
- All crashes occurred during daylight conditions.
- None of the crashes were fatal or involved injuries.
- Alcohol/Drugs were a contributing factor in one crash.
- The most common contributing factors are *Failed to Yield Right of Way, Driver Inattention, and Excessive Speed*.

Yale Blvd & Anderson Ave.

- 4 crashes
- The most common crash classification is *Other Vehicle – Both Going Straight/Entering at Angle.*
- All crashes occurred during daylight conditions.
- None of the crashes were fatal, and only one had a suspected injury.
- The most common contributing factor is *Failed to Yield Right of Way*.

Yale Blvd. & Ross Ave.

- 18 crashes
- The most common crash classifications are *Other Vehicle – One Left Turn/Entering at Angle and Other Vehicle – Both Going Straight/Entering at Angle.*
- 28% of crashes occurred under low light conditions.
- None of the crashes were fatal; however, 67% of crashes resulted in injuries.
- The most common contributing factor is *Failed to Yield Right of Way.*

Yale Blvd. between International and Centre Avenues

- 8 crashes
- The most common crash classifications are *Other Vehicle – One Left Turn/Entering at Angle*.
- 43% of crashes occurred under low light conditions.
- None of the crashes were fatal, and only one had a suspected injury.
- The most common contributing factor is *Driver Inattention.*

LEVEL OF SERVICE AND CAPACITY ANALYSIS

Intersection Analysis

Intersection Capacity and Level of Service (LOS) analysis were performed according to the methods and procedures provided in the *Highway Capacity Manual, 6th Edition (HCM6).* Highway Capacity software was used to facilitate the analysis. According to the Highway Capacity Manual, LOS is presented as a letter grade (A through F) based on the average delay for an intersection or movement. Delay is calculated as a function of several variables, including signal phasing operations, cycle length, traffic volumes, and opposing traffic volumes; it is the average wait time a driver can expect when moving through an intersection. Factors such as total cycle time (for all movements), queueing restrictions, and vehicle volumes can affect delay measurements, especially for lower volume movements and side streets. Generally, these factors are only realized when delays reach or exceed LOS E thresholds. In such cases, a narrative is offered in subsequent sections specific to the individual movement in question. Table 4, reproduced from the Highway Capacity Manual, shows delay thresholds and the associated Level of Service assigned to delay ranges. Generally, a LOS of D or better is considered an acceptable level of service.

Table 4: LOS Criteria and Descriptions for Signalized Intersections

Level of Service	Average Control Delay (sec/vehicle)	General Description (Signalized Intersections)
A	≤10	Free flow
B	>10 – 20	Stable flow (slight delays)
C	>10 – 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)

Unsignalized intersection LOS is divided into two intersection types: all-way stop-controlled and two-way stop-controlled. All-way stop-controlled intersection LOS is expressed in the average vehicle delay of all the movements. Two-way stop-controlled intersection LOS is defined as the average vehicle delay of an individual movement. Table 5 shows LOS criteria for unsignalized intersections.

Table 5: LOS Criteria for Unsignalized Intersections

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

Based on procedures outlined in the Highway Capacity Manual, intersection delay and LOS for study intersections are reported as the delay and level of service for the worst-case movement. Per HCM6 procedures, peak hour factors obtained from collected traffic counts for the intersections were used in the existing conditions analysis and all other scenarios. Queues are reported for queue measurements falling within the 95th percentile. It should be noted that 95th percentile queues are statistically expected to occur during only 5% of the peak hour's sign cycles. It is also stated that un-reported average queueing at an intersection would statistically be much shorter than 95th percentile queueing.

Analysis of Signalized Intersections

Table 6 summarizes the intersection capacity and LOS analysis performed for existing conditions at Yale Boulevard and Kathryn Avenue. Per HCM6 procedures, peak hour factors are derived from the collected traffic counts for the intersections are used in the existing conditions analysis and all other scenarios. The current signal timings for Yale Boulevard and Kathryn Avenue, provided by CABQ, were used in each analysis scenario unless otherwise stated.

Table 6: 2021 Existing Signalized Capacity Analysis Summary

Intersection	Scenario	Worst Case Movement	Delay (sec/veh)	V/C	LOS	Intersection Delay (sec/veh)	Intersection LOS
Yale Blvd. & Kathryn Ave.	AM	WB L/R	57.9	0.65	E	6.3	A
	PM	WB L/R	39.9	0.22	D	8.8	A

Queueing is reported as a ratio Queue Storage Ratio (QSR) for signalized intersections. It indicates the ratio of demand to capacity based on possible lengths of vehicles waiting during "red" times for specific movements. Table 7 summarizes the queuing results for the existing conditions. Detailed capacity output sheets are in Appendix D.

Table 7: 2021 Existing Signalized Queue Storage Summary

Intersection	Scenario	Movement	95th Percentile (QSR)	Storage Length (ft)
Kathryn Ave. at East Alley Loop	AM	WB T	0.37	240
		NB T/R	0.16	105
		SB L/T	0.05	360
	PM	WB T	0.45	240
		NB T/R	0.27	105
		SB L/T	0.00	360

*95th Percentile (QSR)= Queue Storage Ratio

The summaries in Table 6 and Table 7 indicate:

Yale Blvd. & Kathryn Ave.

- Capacity Analysis:
  - Under existing conditions, the intersection operates at an acceptable level of service in both the AM and PM peak hours. Individual movements operate at a tolerable LOS for the PM peak. Still, the AM peak hour operates at a level of intolerable delay.
- Queueing Analysis:
  - 95th percentile Queue Storage Ratios (QSR) is accommodated by existing storage lengths during the AM and PM peak hours.

Analysis of Stop Controlled Intersections

Table 8 summarizes stop-controlled intersection capacity and LOS analysis performed for existing conditions of the unsignalized intersections.

Table 8: 2021 Existing Stop Control Capacity Analysis Summary

Intersection	Scenario	Worst Case Movement	Delay (sec/veh)	V/C	LOS
Kathryn Ave at East Alley Loop	AM	SB T	10.2	0.02	A
	PM	SB T	8.8	0.03	A
Yale Blvd. & Anderson Ave.	AM	EB L	12.3	0.05	B
	PM	EB L	13.7	0.06	B
Yale Blvd. & Ross Ave.	AM	WB T	19.5	0.13	C
	PM	WB T	31.0	0.69	D
Yale Blvd. & International Ave.	AM	WB L	11.8	0.05	B
	PM	WB L	12.7	0.03	B
Yale Blvd. & Centre Ave.	AM	WB T	12.7	0.11	B
	PM	WB T	13.4	0.18	B

Queueing is reported as the number of vehicles in the queue for stop-controlled intersections. Table 9 summarizes the queuing results. Detailed capacity output sheets are in Appendix D.

Table 9: 2021 Existing Stop Control Queue Storage Summary

Study Intersection	Movement	Existing 2021 AM 95th Percentile (veh)	Existing 2021 PM 95th Percentile (veh)
Kathryn Ave at East Alley Loop	EB L	0.0	0.0
	WB L	0.1	0.0
	SB T	0.1	0.1
Yale Blvd. & Anderson Ave.	EB L	0.2	0.2
	EB R	0.0	0.0
	NB L	0.0	0.0
	SB L	0.0	0.1
Yale Blvd. & Ross Ave.	EB T	0.3	0.0
	WB T	6.1	0.4
	NB L	0.1	0.0
	SB L	0.1	0.1
Yale Blvd. & International Ave.	WB L	0.2	0.1
	WB R	0.1	0.2
	SB L	0.0	0.1
Yale Blvd. & Centre Ave.	EB T	0.0	0.1
	WB T	0.4	0.7
	NB L	0.0	0.0
	SB L	0.1	0.1

*95th Percentile Queues are calculated in vehicles

The summaries in Table 8 and Table 9 indicate:

Kathryn Ave. at East Alley Loop

- Capacity Analysis:
  - Individual movements operate at an acceptable LOS for AM and PM peak hours.
- Queueing Analysis:
  - 95th percentile lengths at the intersection are less than one vehicle during the AM and PM peak hours.

Yale Blvd. & Anderson Ave.

- Capacity Analysis:
  - Individual movements operate at an acceptable LOS for AM and PM peak hours.
- Queueing Analysis:
  - 95th percentile lengths at the intersection are less than one vehicle during the AM and PM peak hours.

Yale Blvd. & Ross Ave.

- Capacity Analysis:
  - Individual movements operate at an acceptable LOS for the AM Peak Hour and a tolerable LOS for the PM peak hour.
- Queueing Analysis:
  - 95th percentile lengths at the intersection are less than one vehicle during the AM and PM peak hours except for the westbound through movement in the AM Peak hour.

Yale Blvd. & International Ave.

- Capacity Analysis:
  - Individual movements operate at an acceptable LOS for AM and PM peak hours.
- Queueing Analysis:
  - 95th percentile lengths at the intersection are less than one vehicle during the AM and PM peak hours.

Yale Blvd. & Centre Ave.

- Capacity Analysis:
  - Individual movements operate at an acceptable LOS for AM and PM peak hours.
- Queueing Analysis:
  - 95th percentile lengths at the intersection are less than one vehicle during the AM and PM peak hours.

ANALYSIS OF FUTURE CONDITIONS

SITE ACCESS AND SIGHT DISTANCE EVALUATION

The following presents a narrative detailing recommended intersection sight distance requirements for the development. Intersection sight distance requirements were calculated per the City of Albuquerque Design Process Manual using the 2018 AASHTO "Green Book" chapter 9.5. Two sight distance cases were used for this analysis:

- Case B1 – A stopped vehicle turning left from a minor street approach onto a major road.
- Case B2 – A stopped vehicle turning right from a minor street approach onto a major road.

Intersection sight distances were calculated based on the following assumptions:

- Required intersection sight distance for Case B1 at all four access driveways was calculated based on the design vehicle crossing two lanes of traffic on an undivided roadway.
- Required intersection sight distance for Case B2 at all four access driveways was calculated based on the design vehicle crossing into the nearest traffic lane.

The values in Table 10 are rounded up to the nearest 5-foot increment. A single passenger vehicle was used as the design vehicle. Formulas, values, and calculations used in the sight distance analysis can be found in Appendix E.

Table 10: Sight Distance Requirements

Location	Speed	Case	Sight Distance (ft)
Driveway 2 (Exit) on Yale Blvd.	40 MPH	B1 - Turning Left	530
		B2 - Turning Right	385

Using the values shown above, all development driveways are recommended to adhere to the sight distance provisions detailed in the AASHTO "Green Book." An area bounded by the above sight distances with the decision point placed 15 feet back from the edge of the shoulder midway between the outbound driving lane should be maintained clear of any obstructions.

Turn Lane Analysis

The City of Albuquerque 2020 Development Process Manual (DPM) turn lane warrants were reviewed for the site access driveways. DPM Table 7.4.67 was used to determine if turn lanes are warranted, and Tables 7.4.68, 7.4.69, and 7.4.70 were used to assess deceleration length, transition length, and taper length, if applicable. West Loop Build-out turning movement volumes and trips were used in the analysis. The results of this analysis are in Table 11.

Table 11: Right turn Auxiliary Lane Analysis

Warrant Location	Design Speed (MPH)	Turning Volume AM(PM)	Warrant Result[1]	Required Length[2]	Required Transition Length[2]
Driveway 1 (Entrance) on Yale Blvd.	40	114 (56)	50	240'	150'

1 - Per Table 7.4.67
2 - Per Table 7.4.68

Driveway 1 warrants a right-turn lane based on the analysis presented above.

School Bus drop-off/pick-up

The bus drop-off/pick-up occurs on Ross Avenue in front of the school. Buses will not use the parking lot development other than for after-hours storage.

Pedestrian and Bicycle Circulation

The proposed development will not create a change in pedestrian or bicycle traffic. Sidewalks are present along all roadways in the study area. Students should use the sidewalk and cross at the marked crosswalk at Ross Avenue and Yale Boulevard. No bicycle facilities are not present on any road in the study area. Charter schools do not typically generate a lot of pedestrian or bicycle traffic; most students ride the bus or are driven by parents.

Traffic Projections

The West Loop development has an expected time of Fall of 2022, within the same year as the data collection for the study. Therefore, forecasting existing traffic volumes to future analysis conditions was not performed.

Trip Generation

Trip generation for the development was performed using the procedures and methodologies provided in the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 11th Edition.* This analysis uses trip generation tables from the ITE 528 Charter School (K-12) land use category. Trips were calculated using rates

for AM peak hour and PM peak hour generators. Total development trips and trips generated are shown in Table 12. Site trips for the development site were generated using data and procedures according to the Institute of Transportation Engineer's Trip Generation Manual. ITE Code 538 – Charter School (K-12) does not account for bus operations within the trip generation. Therefore, the number of students expected to ride the bus, 208, was removed from the total number of students, 1180, to reflect the trip generation better.

Table 12: Trip Generation

Land Use Category	Units	Trip Generation				Peak Hour Trips	
	Students	Period	Total	Enter	Exit	In	Out
ITE 538 Charter School (K-12)	1180	AM Peak	1104	53%	47%	585	519
		PM Peak	853	50%	50%	426	427

Trip Distribution and Assignment

Trip Distribution was determined based on the analysis of existing intersection demand characteristics within the study area. Overall, trips were distributed within the roadway network to and from the development based on the proportions of existing turning movement counts/demands. Trip routing was based on logical trip attractions and destinations for school-based trips. The figures below show the trip distribution and assignment for the development of each analysis scenario.

Traffic Volume Calculations

As stated above, build-out traffic volumes are calculated using the existing traffic volumes. No traffic growth factors are used as the development is anticipated to be occupied in the same year as the data collection. Primary site trips were added to study intersections with direct access to the proposed development.

West Loop Build-out

Drop-off and Pick-up Operations

A map showing the parent drop-off/pick-up loops and bus drop-off/pick-up location for the West Loop Build-out is shown in Figure 6. The West Loop Build-out offers more queuing space for vehicles than the existing configuration. Under the West Loop Build-out scenario, drop-off/pick-up operations for grades 5 through 12 will utilize the West Loop accessing the development with a southbound right turn into Driveway 1 and depart using Driveway 3 with an eastbound right turn out of the development. Students dropped off via the West Loop will still cross Yale Boulevard at the marked crosswalk on the north leg of the intersection.

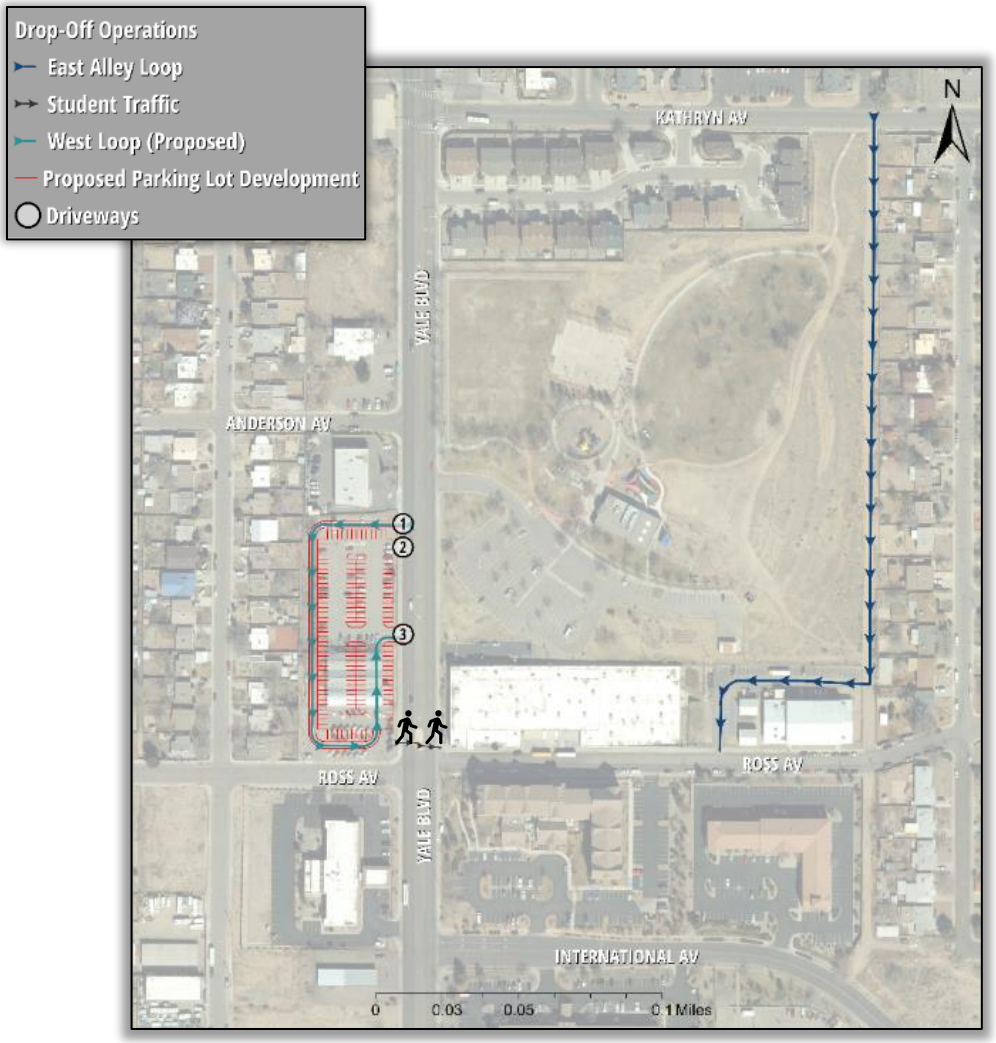

Figure 6. West Loop Build-out Drop-Off/Pick-Up Operations

Queuing Analysis Methodology Applicability and Variances

The queuing analysis uses a methodology to estimate the maximum queue lengths. This method is a linear model using the school's student enrollment as the dependent variable. This model estimates the maximum queue length derived from observations at 55 public elementary schools in Houston, Texas[1].

While these analyses provide a best estimate of queue lengths during drop-off/pick-up operations, it is based on operational and procedural projections. The linear model used to determine maximum queue lengths is derived from the busiest time of day at a sample of Texas elementary schools, PM Peak hour pick-up

[1] Qualls, "Strategies for the Greening of Student Pick-Ups at School Dismissal."

operations. MAS Charter School's busiest time of day is AM Peak Hour. This may be due to their extended school day and no-cost after-school program used by 226 students.

Additionally, MAS Charter School's student body consists of grades Pre-K through 12, which may indicate a higher student to vehicle ratio than an elementary school. In other words, multiple children from the same household arrive in one vehicle.

This analysis also assumes full adherence to the outlined drop-off/pick-up procedures. It does not account for students who may be dropped off or picked up at other locations adjacent to the school.

West Loop Parent drop-off/pick-up and Queuing Analysis

Queue length is estimated for the current student enrollment (1180, PreK-12) and future charter maximum student enrollment (1600, PreK-12). For the current conditions, the total student population not riding the bus is 972, and for the future conditions, 1,318. The East Alley Loop has approximately 1400 feet. The development of the West Loop will add an additional 700 feet of on-site storage, increasing the total vehicle storage capacity to 2100 feet. Table 13 summarizes the maximum queue lengths for existing and future conditions.

Table 13: Queuing Analysis

Enrollment (n)	1180	1600
Students (n)	972	1318
Max. Queue Length (ft)	1460	1980
Available Vehicle Storage (ft)	2100	

The queuing analysis indicates that with the West Loop development, MAS Charter School can provide sufficient storage space for the maximum queue resulting from drop-off/pick-up operations.

West Loop Build-out (w/Yale Road Diet)

This scenario evaluates the West Loop Build-out considering a road diet is implemented on Yale Boulevard from Avenida Cesar Chavez/Santa Clara Avenue to Ross Avenue. The Yale Road Diet involves removing a travel lane for vehicles in each direction. The additional road space can provide an auxiliary right turn lane to access the West Loop parking lot development and will add more queuing space for drop/pick-up operations. Additionally, the road diet will provide other transportation modes, such as bicycles, with appropriate facilities. The narrowed vehicle traveled way can improve safety conditions for students crossing Yale Boulevard by reducing travel speeds of motor vehicles. The road diet also provides a safer environment for pedestrians when crossing the street by reducing the number of travel lanes crossed when traversing the street. In this analysis, the same traffic volumes on Yale Boulevard as the existing conditions are modeled with one less thru lane for each direction.

Analysis of Signalized Intersections

Table 14 summarizes intersection capacity and LOS analysis performed for West Loop Build-out and Yale Road Diet conditions for the signalized intersection at Yale Boulevard and Kathryn Avenue.

Table 14: West Loop Build-out Signalized Capacity Analysis Summary (Yale Road Diet)

Intersection	Scenario	Worst Case Movement	Delay (sec/veh)	V/C	LOS	Intersection Delay (sec/veh)	Intersection LOS
Yale Blvd. & Kathryn Ave.	AM	WB L/R	57.9	0.65	E	6.7	A
	PM	WB L/R	61.2	0.79	E	6.9	A

Table 15 summarizes queuing results. Detailed capacity output sheets are in Appendix D.

Table 15: West Loop Build-Out Signalized Queue Storage Summary (Yale Road Diet)

Intersection	Scenario	Movement	95th Percentile (QSR)	Storage Length (ft)
Yale Blvd. & Kathryn Ave.	AM	WB T	0.37	240
		NB T	0.35	105
		SB T	0.10	360
	PM	WB T	0.45	240
		NB T	0.66	105
		SB T	0.10	360

*95th Percentile (QSR)= Queue Storage Ratio

The summaries in Table 14 and Table 15 indicate:

Yale Blvd. & Kathryn Ave.

- Capacity Analysis:
  - The intersection operates at an acceptable level of service in both the AM and PM peak hours. Individual westbound movements operate at an intolerable LOS for the AM and PM peak hours.
- Queueing Analysis:
  - 95th percentile Queue Storage Ratios (QSR) is accommodated by existing storage lengths during the AM and PM peak hours.

Analysis of Stop Controlled Intersections

Table 16 summarizes stop-controlled intersection capacity and LOS analysis performed for West Loop Build-out and Yale Road Diet conditions for the unsignalized intersections.

Table 16: West Loop Build-Out Stop Control Capacity Analysis Summary (Yale Road Diet)

Intersection	Scenario	Worst Case Movement	Delay (sec/veh)	V/C	LOS
Kathryn Ave at East Alley Loop	AM	SB T	10.0	0.02	B
	PM	SB T	8.8	0.03	A
Yale Blvd. & Anderson Ave.	AM	EB L	13.8	0.06	B
	PM	EB L	16.7	0.08	C
Yale Blvd. & Ross Ave.	AM	WB L	24.2	0.35	C
	PM	WB R	24.8	0.09	C
Yale Blvd. & International Ave.	AM	WB L	12.3	0.05	B
	PM	WB L	13.4	0.03	B
Yale Blvd. & Centre Ave.	AM	WB T	13.8	0.13	B
	PM	WB T	15.0	0.21	C

Queueing is reported as the number of vehicles in the queue for stop-controlled intersections. Table 17 summarizes queuing results. Detailed capacity output sheets can be found in Appendix D.

Table 17: West Loop Build-Out Stop Control Queue Storage Summary (Yale Road Diet)

Study Intersection	Movement	Existing 2021 AM 95th Percentile (veh)	Existing 2021 PM 95th Percentile (veh)
Kathryn Ave at East Alley Loop	EB L	0.0	0.0
	WB L	0.1	0.0
	SB T	0.1	0.1
Yale Blvd. & Anderson Ave.	EB L	0.2	0.3
	EB R	0.7	0.0
	NB L	0.0	0.0
	SB L	0.0	0.1
Yale Blvd. & Ross Ave.	EB T	0.3	0.1
	WB L	1.6	0.2
	WB R	1.9	0.3
	NB L	0.1	0.0
	SB L	0.1	0.1
Yale Blvd. & International Ave.	WB L	0.2	0.1
	WB R	0.1	0.2
	SB L	0.0	0.1
Yale Blvd. & Centre Ave.	EB T	0.0	0.1
	WB T	0.4	0.8
	NB L	0.0	0.0
	SB L	0.1	0.1

*95th Percentile Queues are calculated in vehicles

The summaries in Table 16 and Table 17 indicate:

Kathryn Ave at East Alley Loop

- Capacity Analysis:
  - Individual movements operate at an acceptable LOS for AM and PM peak hours.
- Queueing Analysis:
  - 95th percentile lengths at the intersection are less than one vehicle during the AM and PM peak hours.

Yale Blvd. & Anderson Ave.

- Capacity Analysis:
  - Individual movements operate at an acceptable LOS for AM and PM peak hours.
- Queueing Analysis:
  - 95th percentile lengths at the intersection are less than one vehicle during the AM and PM peak hours.

Yale Blvd. & Ross Ave.

- Capacity Analysis:
  - Individual movements operate at an acceptable LOS for AM and PM peak hours.
- Queueing Analysis:
  - 95th percentile lengths at the intersection are less than one vehicle during the PM peak hour. During the AM peak hour, the 95th percentile lengths for westbound movements are more than one vehicle.

Yale Blvd. & International Ave.

- Capacity Analysis:
  - Individual movements operate at an acceptable LOS for AM and PM peak hours.
- Queueing Analysis:
  - 95th percentile lengths at the intersection are less than one vehicle during the AM and PM peak hours.

Yale Blvd. & Centre Ave.

- Capacity Analysis:
  - Individual movements operate at an acceptable LOS for AM and PM peak hours.
- Queueing Analysis:
  - 95th percentile lengths at the intersection are less than one vehicle during the AM and PM peak hours.

Noise and Air Quality Impacts

EPA MOVES was used to generate emission factors corresponding to the motor vehicle activity associated with the east alley drop-off/pick-up loop. Using county-level data available through the MOVES database and observed vehicle volumes during AM and PM peak hours utilizing the east alley loop, average yearly emission factors were generated for $PM_{2.5}$ and CO.

Table 18 summarizes the generated emission factors.

Table 18: Emission Factors, Annual Average

	PM 2.5 (µg /mile)	CO (g/mile)
7:30 AM - 8:30 AM	0.34	218.24
4:00 PM - 5:00 PM	0.34	267.00

This study used CALINE4 to model $PM_{2.5}$ and CO dispersion along the study route. Figure 7 shows the link and receptor locations used to estimate $PM_{2.5}$ and CO concentrations. The blue links represent the vehicle travel path using the East Alley Loop. The green boxes are receptors located 100 feet from the East Alley Loop. The receptors were placed 100 feet from the emission source at 6 feet high. The 100-foot distance represents the distance from the center of the East Alley to the first row of houses abutting the alleyway, where concentrations will be relatively high; concentrations dissipate with increasing distance from the source.

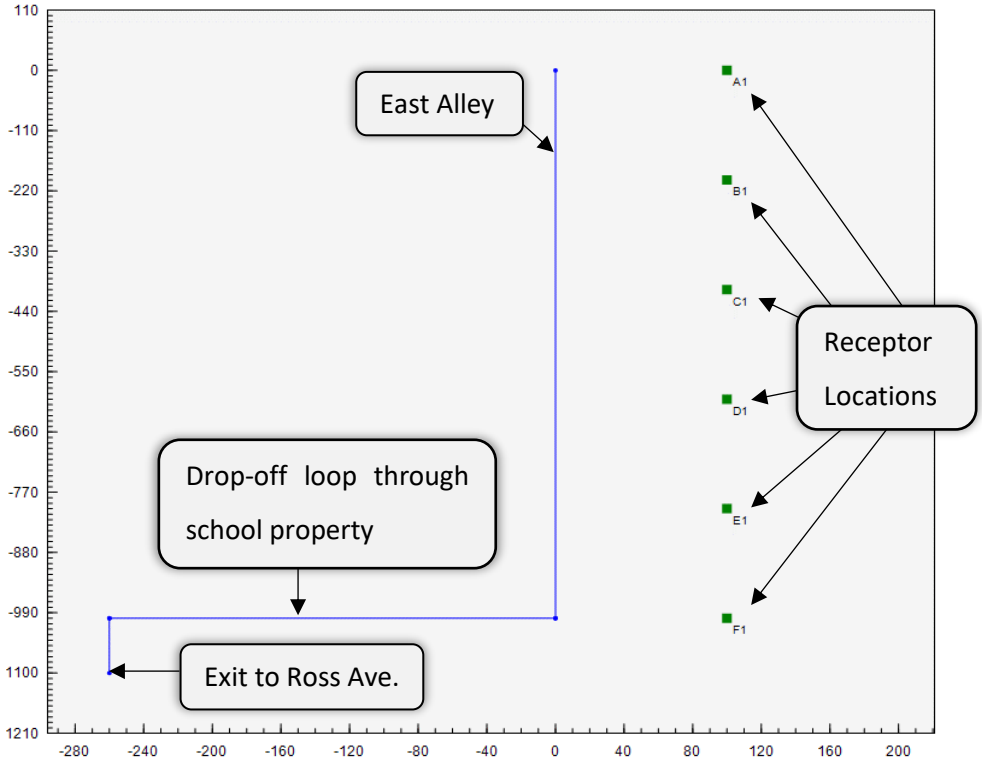

Figure 7: Diagram of links and receptors used in CALINE4.

Table 19 contains the modeled concentrations at the receptor locations for AM and PM peak hours. Concentrations for both pollutants resulting from drop-off and pick-up activity are minimal. For comparison, the annual average $PM_{2.5}$ concentration in Albuquerque for 2011-2020 was 6.14 µg/m^3 and for CO was 1.15 ppm.

Table 19: Emission concentrations at 100 feet from the source.

	PM 2.5 (µg/m^3)	CO (ppm)
7:30 AM - 8:30 AM	0.16	0.10
4:00 PM - 5:00 PM	0.11	0.07

Parents queued to pick up students shall be instructed to wait for their children with their vehicles turned off when not actively in motion. Once adopted and consistently practiced, this method will help minimize air and noise pollution associated with the East Alley drop-off/pick-up activity.

South Loop Build-out (Centre and International Avenues)

Another drop-off/pick-up loop scheme utilizes Centre and International Avenues instead of the East Alley and West Loops. This option requires vehicles to access Centre Avenue from Yale Boulevard and travel eastbound to International Avenue. This alternative depends on an alleyway east of the Extended Stay America being constructed to allow student drop-off/pick-up activity. This land is privately owned, and a legal public alleyway does not currently exist. Students would walk through the alleyway and cross Ross Avenue to access the school's campus. In this scenario, school traffic is assigned to Centre and International Avenues. The adjusted traffic volumes are shown in Figure 9.

Drop-off and Pick-up Operations

Another drop-off/pick-up option is to utilize Centre and International Avenues as a drop-off/pick-up loop. This option, shown in Figure 8, requires vehicles to enter Centre Avenue from Yale Boulevard, travel eastbound, and make a left turn on to International Avenue. Dropping students off on International Avenue requires them to utilize the alleyway east of Extended Stay America and cross Ross Avenue to access MAS Charter School.

Figure 8: South Loop Build-out Drop-Off/Pick-Up Operations

A LOS, capacity, and queuing analysis was performed using the same procedures and assumptions for the West Build-out. Signal timings used in the existing conditions analysis were retained and used for build-out conditions. Figure 9 shows the traffic volumes used to analyze the South Loop Build-out scenario.

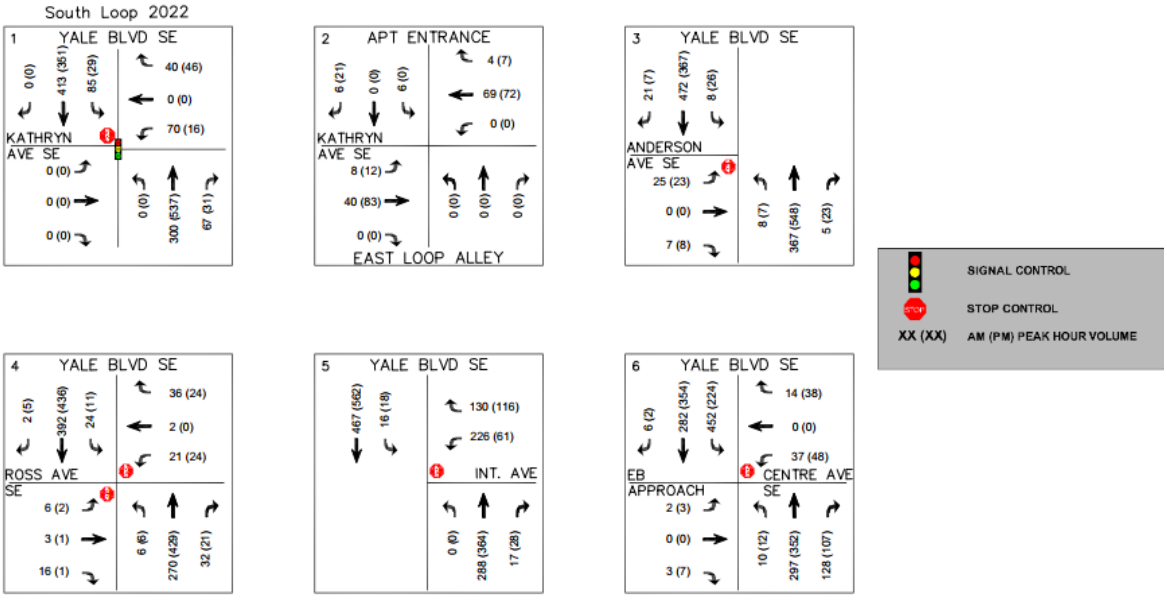

Figure 9: South Loop Build-out Traffic Volumes

Analysis of Signalized Intersections

Table 20 summarizes the intersection capacity and LOS analysis performed for the South Loop Build-out conditions at Yale Boulevard and Kathryn Avenue for the signalized intersection. Table 21 summarizes queuing results. Detailed capacity output sheets are in Appendix D.

Table 20: South Loop Build-out Signalized Capacity Analysis Summary

Intersection	Scenario	Worst Case Movement	Delay (sec/veh)	V/C	LOS	Intersection Delay (sec/veh)	Intersection LOS
Yale Blvd. & Kathryn Ave.	AM	WB L/R	59.5	0.57	E	7.9	A
	PM	WB L/R	58.0	0.59	E	4.3	A

Table 21 summarizes queuing results. Detailed capacity output sheets are in Appendix D.

Table 21: South Loop Build-out Signalized Queue Storage Summary

Intersection	Scenario	Movement	95th Percentile (QSR)	Storage Length (ft)
Yale Blvd. & Kathryn Ave.	AM	WB T	0.37	240
		NB T/R	0.15	105
		SB L/T	0.05	360
	PM	WB T	0.45	240
		NB T/R	0.27	105
		SB L/T	0.05	360

*95th Percentile (QSR)= Queue Storage Ratio

The summaries in Table 20 and Table 21 indicate:

Yale Blvd. & Kathryn Ave.

- Capacity Analysis:
    - The intersection operates at an acceptable level of service in both the AM and PM peak hours. Individual westbound movements operate at an intolerable LOS for the AM and PM peak hours.
- Queueing Analysis:
    - 95th percentile Queue Storage Ratios (QSR) is accommodated by existing storage lengths during the AM and PM peak hours.

Analysis of Stop Controlled Intersections

Table 22 summarizes stop-controlled intersection capacity and LOS analysis performed for South Loop Build-out conditions for the unsignalized intersections.

Table 22: South Loop Build-out Stop Control Capacity Analysis Summary

Intersection	Scenario	Worst Case Movement	Delay (sec/veh)	V/C	LOS
Kathryn Ave at East Alley Loop	AM	SB T	9.2	0.02	A
	PM	SB T	8.8	0.03	A
Yale Blvd. & Anderson Ave.	AM	EB L	14.9	0.07	B
	PM	EB L	14.9	0.06	B
Yale Blvd. & Ross Ave.	AM	WB L	15.3	0.07	C
	PM	WB R	16.9	0.08	C
Yale Blvd. & International Ave.	AM	WB L	18.5	0.48	C
	PM	WB L	14.6	0.15	B
Yale Blvd. & Centre Ave.	AM	WB T	88.7	0.59	F
	PM	WB T	21.2	0.3	C

Queueing is reported as the number of vehicles in the queue for stop-controlled intersections. Table 23 summarizes queuing results. Detailed capacity output sheets can be found in Appendix D.

Table 23: South Loop Build-out Stop Control Queue Storage Summary

Study Intersection	Movement	Existing 2021 AM 95th Percentile (veh)	Existing 2021 PM 95th Percentile (veh)
Kathryn Ave at East Alley Loop	EB L	0.0	0.0
	WB L	0.0	0.0
	SB T	0.1	0.1
Yale Blvd. & Anderson Ave.	EB L	0.2	0.2
	EB R	0.0	0.0
	NB L	0.0	0.0
	SB L	0.0	0.1
Yale Blvd. & Ross Ave.	EB T	0.2	0.0
	WB L	0.2	0.3
	WB R	0.2	0.1
	NB L	0.0	0.0
	SB L	0.1	0.0
Yale Blvd. & International Ave.	WB L	2.7	0.5
	WB R	0.6	0.6
	SB L	0.0	0.1
Yale Blvd. & Centre Ave.	EB T	-	0.1
	WB T	3.6	1.3
	NB L	0.0	0.0
	SB L	2.9	0.9

*95th Percentile Queues are calculated in vehicles

The summaries in Table 22 and Table 23 indicate:

Kathryn Ave at East Alley Loop

- Capacity Analysis:
  - Individual movements operate at an acceptable LOS for AM and PM peak hours.
- Queueing Analysis:
  - 95th percentile lengths at the intersection are less than one vehicle during the AM and PM peak hours.

Yale Blvd. & Anderson Ave.

- Capacity Analysis:
  - Individual movements operate at an acceptable LOS for AM and PM peak hours.
- Queueing Analysis:
  - 95th percentile lengths at the intersection are less than one vehicle during the AM and PM peak hours.

Yale Blvd. & Ross Ave.

- Capacity Analysis:
  - Individual movements operate at an acceptable LOS for AM and PM peak hours.
- Queueing Analysis:
  - 95th percentile lengths at the intersection are less than one vehicle during the AM and PM peak hours.

Yale Blvd. & International Ave.

- Capacity Analysis:
  - Individual movements operate at an acceptable LOS for AM and PM peak hours.
- Queueing Analysis:
  - 95th percentile lengths at the intersection are less than one vehicle during the AM and PM peak hours except for the westbound left-turn movement during the AM peak hour.

Yale Blvd. & Centre Ave.

- Capacity Analysis:
  - The intersection operates at an acceptable LOS for the PM peak hour and a congested LOS for the westbound through movement during the AM peak hour
- Queueing Analysis:
  - 95th percentile lengths at the intersection are more than one vehicle during the AM and PM peak hours for the westbound through movement and the southbound left movement in the AM peak.

South Loop Parent drop-off/pick-up and Queuing Analysis

The available storage space, measured from the east side of Extended stay America's driveway to the easternmost driveway of Towne Place Suites on Centre Avenue, is approximately 1400 feet. The maximum queue length and available storage are shown in Table 24.

Table 24: Queuing Analysis, South Loop Build-out

Enrollment (n)	1180	1600
Non-Bus Students (n)	972	1318
Max. Queue Length (ft)	1460	1980
Available Vehicle Storage (ft)	1400	

The queuing analysis indicates that the South Loop has sufficient storage space for the maximum queue resulting from drop-off/pick-up operations.

The alleyway east of Extended Stay America is partially owned by Extended Stay America and the State of New Mexico. The City of Albuquerque would have to use its eminent domain powers to provide a public or

private alleyway to allow for public access. Additionally, an ADA-compliant curb ramp will need to be developed on both ends of the alleyway, and a mid-block crossing established on Ross Avenue to ensure students safely arrive at the school's campus. Moreover, while this option does move traffic from the residential areas adjacent to the school, the challenges associated with the school's traffic have yet to be mitigated. They are now for the commercial businesses on Centre/International to manage.

CONCLUSION

While the South Loop scenario maintains LOS at the intersections of Kathryn at East Alley Loop and Yale Boulevard and Anderson, the LOS at Yale Boulevard and Ross Avenue is similar between the South Loop and West Loop scenarios. The South Loop adversely impacts traffic operations on Yale Boulevard at Center and International Avenues. Furthermore, the South Loop does not have sufficient storage space to accommodate drop-off/pick-up operations without imposing on adjacent commercial businesses. Regarding student activity resulting from the South Loop, there are no sightlines from the school to the drop-off/pick-up area, students need to walk through an open alleyway, a new mid-block crossing on Ross Avenue will need to be established, and the alleyway property is adjacent to Extended Stay America, the property owner and is not municipal property. As a result, the West Loop is the recommended scenario for MAS Charter School.

The West Loop with Yale Road Diet Scenario is the recommended scenario. It maintains an acceptable LOS during AM and PM peak hours for all the study intersections. Additionally, the West Loop provides MAS Charter School with enough vehicle storage to accommodate drop-off/pick-up operations during AM and PM peak hours. Moreover, the Yale Road Diet improves safety on Yale Boulevard for all roadway users, especially students accessing MAS Charter School from the West Loop parking lot development.

While the West Loop is recommended, there are some concurrent measures than must be taken to mitigate traffic impacts and improve safety conditions in the study area. Improving the driving surface of the East Alley by laying pavement will minimize dust and noise impacts on the adjacent residences. Adhering to right-out from the West Loop will ensure smooth and expeditious drop-off/pick-up operations during AM and PM peak hours. Reconfiguring Yale Boulevard with new striping to two travel lanes in each direction will aid with speed limit compliance and shorten the crossing distance for pedestrians utilizing the crosswalk at Ross Avenue. The additional road space can be used to add an auxiliary right turn lane for Driveway 1 of the proposed development and bicycle lanes between Avenida Cesar Chavez/Santa Clara and Ross Avenue. To further address safety of students crossing Yale Boulevard, a School Zone with appropriate School Speed Limit sign

assembly needs to be implemented. Additionally, implementing a Pedestrian Hybrid Beacon and enhanced roadway lighting at Yale Boulevard and Ross Avenue will further aid in improving the safety at this crossing location.

SUMMARY OF RECOMMENDATIONS

The West Loop Build-out with a concurrent Road Diet on Yale Boulevard is recommended with adherence to the following recommendations:

- Access to the site is maintained via the drop-off/pick-up operations map provided in this report.
- Auxiliary Right-Turn lane established on Yale boulevard for Driveway 1 of the proposed development.
- Yale Boulevard is restriped to two travel lanes in each direction. The additional traveled way is designated for bicycle facilities and/or turn lanes.
- A school zone is established on Yale Boulevard specific to MAS Charter School.
- While waiting to pick up students, parents should be instructed to turn their vehicles off when not actively in motion.
- Left turns from and to Yale Boulevard should be managed during pick-up and drop-off.
    - Critically, left turns exiting the West Loop should be restricted to ensure entering Yale does not back up into and strict the efficiency of the loading and unloading zone during drop-off/pick-up hours.
    - Left turns entering the West Loop, and parking lot should be monitored and managed. Queues should not be allowed to exceed the left turn lane from the West Loop entrance to the pedestrian crossing median island at Ross Avenue. If issues are observed, traffic demand can be managed or left turns restricted during drop-off/pick-up hours.
- Left turns to Ross Avenue are restricted for vehicles dropping off/picking up students via the East Alley Loop drop-off/pick-up hours.
- The West Loop active drop-off/pick-up loop shall consist of two lanes within the active loading and unloading areas. While student drop-off is only allowed in the rightmost curb lane, a second lane should be provided to enhance circulation, mitigate delays, and minimize queue lengths.
- All pedestrian traffic uses existing sidewalks and marked crosswalks.
- Implementation of a Pedestrian Hybrid Beacon for the established crosswalk on the northern leg of the intersection of Yale Boulevard and Ross Avenue.
- Enhanced lighting at Yale Blvd. and Ross Ave to address safety concerns.
- As detailed in the sight distance section of this report, intersection sight distance should be provided and maintained.