

Traffic Impact Study Proposed Dunkin Drive-Through

Albuquerque, New Mexico



Prepared For:

NMR, LLC



Kenig, Lindgren, O'Hara, Aboona, Inc.

December 14, 2023

Table of Contents

List of Figures and Tables

| | |
|--|----|
| I. Executive Summary | 1 |
| 1. Introduction | 2 |
| 2. Existing Conditions | 5 |
| Site Location | 5 |
| Existing Roadway Characteristics | 5 |
| Existing Traffic Volumes | 7 |
| Crash Data | 9 |
| 3. Traffic Characteristics of the Proposed Development | 12 |
| Proposed Site and Use Plan | 12 |
| Directional Distribution of Site Traffic | 12 |
| Proposed Site Traffic Generation | 14 |
| 4. Projected Traffic Conditions | 15 |
| Development Traffic Assignment | 15 |
| Ambient Traffic Growth | 15 |
| Year 2024 Total Projected Traffic Volumes | 15 |
| 5. Traffic Analysis and Recommendations | 20 |
| Traffic Analyses | 20 |
| Discussion and Recommendations | 26 |
| On-Site Circulation and Drive-Through Stacking | 27 |
| 6. Conclusion | 29 |
| Appendix | |

List of Figures and Tables

Figures

| | |
|--|----|
| Figure 1 – Site Location..... | 3 |
| Figure 2 – Aerial View of Site..... | 4 |
| Figure 3 – Existing Roadway Characteristics..... | 6 |
| Figure 4 – Existing Traffic Volumes | 8 |
| Figure 5 – Directional Distribution..... | 13 |
| Figure 6 – New Site Traffic Assignment | 16 |
| Figure 7 – Pass-By Site Traffic Assignment..... | 17 |
| Figure 8 – Year 2024 No-Build Traffic Volumes..... | 18 |
| Figure 9 – Year 2024 Total Projected Traffic Volumes | 19 |

Tables

| | |
|--|----|
| Table 1 – Menaul Boulevard with Carlisle Boulevard – Crash Summary | 10 |
| Table 2 – Carlisle Boulevard with Prospect Avenue – Crash Summary | 11 |
| Table 3 – Estimated Peak Hour Vehicle Trip Generation | 14 |
| Table 4 – Capacity Analysis Results – Menaul Boulevard with Carlisle Boulevard | 21 |
| Table 5 – Capacity Analysis Results – Menaul Boulevard with Carlisle Boulevard – V/C Ratio and 95 th Percentile Queue | 22 |
| Table 6 – Capacity Analysis Results – Existing Conditions..... | 23 |
| Table 7 – Capacity Analysis Results – Existing Conditions – V/C Ratio and 95th Percentile Queue | 23 |
| Table 8 – Capacity Analysis Results – No-Build Conditions..... | 24 |
| Table 9 – Capacity Analysis Results – No-Build Conditions – V/C Ratio and 95th Percentile Queue | 24 |
| Table 10 – Capacity Analysis Results – Projected Conditions..... | 25 |
| Table 11 – Capacity Analysis Results – Projected Conditions – V/C Ratio and 95th Percentile Queue | 25 |

I. Executive Summary

This report summarizes the results of a traffic impact study conducted by Kenig, Lindgren, O'Hara, Aboona, Inc. (KLOA, Inc.) for a proposed Dunkin Drive-Through (Dunkin) to be located at 3520 Menaul Boulevard NE in Albuquerque, New Mexico. The objectives of the traffic study are as follows:

- Determine the existing vehicular conditions in the study area to establish a base condition.
- Assess the impact that the proposed development will have on traffic conditions in the area.
- Determine any roadway or access modifications and/or improvements that will be necessary to effectively accommodate and mitigate future conditions.

Vehicle, pedestrian, and bicycle counts were conducted during the weekday morning and weekday evening peak periods at the intersections of Carlisle Boulevard with Menaul Boulevard and Prospect Avenue/BLVD 2500 access drive to determine the peak hour of traffic activity during these time periods.

As proposed, the Dunkin will be approximately 1,200 square feet in size and will provide a drive through lane that will accommodate 12 vehicles. A total of 10 parking spaces will serve the site. Access to the site will be provided via a right-in/right-out access drive off Menaul Boulevard and a right-in/right-out access drive off Carlisle Boulevard.

Based on the proceeding analyses and recommendations, the following conclusions have been made:

- The proposed Dunkin will be located at 3520 Menaul Boulevard NE and will be an approximately 1,200 square-foot building providing double drive-through lanes that will accommodate 12 vehicles and a parking lot with 10 parking spaces.
- Access to the site will be provided via the two right-in/right-out access drives with one located off Menaul Boulevard and the second located off Carlisle Boulevard.
- The volume of traffic estimated to be generated by Dunkin will be reduced due to the volume of pass-by trips anticipated to be diverted from the existing traffic on Carlisle Boulevard and Menaul Boulevard.
- The access drives are projected to be adequate in accommodating the traffic estimated to be generated by Dunkin and will provide flexible and efficient access to the site.
- As part of the proposed development, stop signs should be provided for outbound traffic from both access drives.
- The drive-through stacking of 12 vehicles will be adequate in accommodating the peak drive-through activity for the coffee shop. The final site traffic layout and queueing acceptance is dependent on the Traffic Circulation Layout (TCL) approval by the City.
- Clear intersection sight distance should be provided at each driveway as per COA DPM 7-4(I)(5)(iii) Intersection Sight Distance

1. Introduction

This report summarizes the results of a traffic study conducted by Kenig, Lindgren, O'Hara, Aboona, Inc. (KLOA, Inc.) for a proposed Dunkin' to be located at 3520 Menaul Boulevard NE in Albuquerque, New Mexico. The site, which is currently occupied by a fuel center building, is located on the southwest corner of the intersection of Menaul Boulevard with Carlisle Boulevard. The scoping document for this traffic impact study can be found in the Appendix.

As proposed, the proposed Dunkin' will be approximately 1,200 square feet in size and will provide a drive through that will accommodate 12 vehicles. A total of 10 parking spaces will serve the site. Access to the site will be provided via a right-in/right-out access drive off Menaul Boulevard and a right-in/right-out access drive off Carlisle Boulevard.

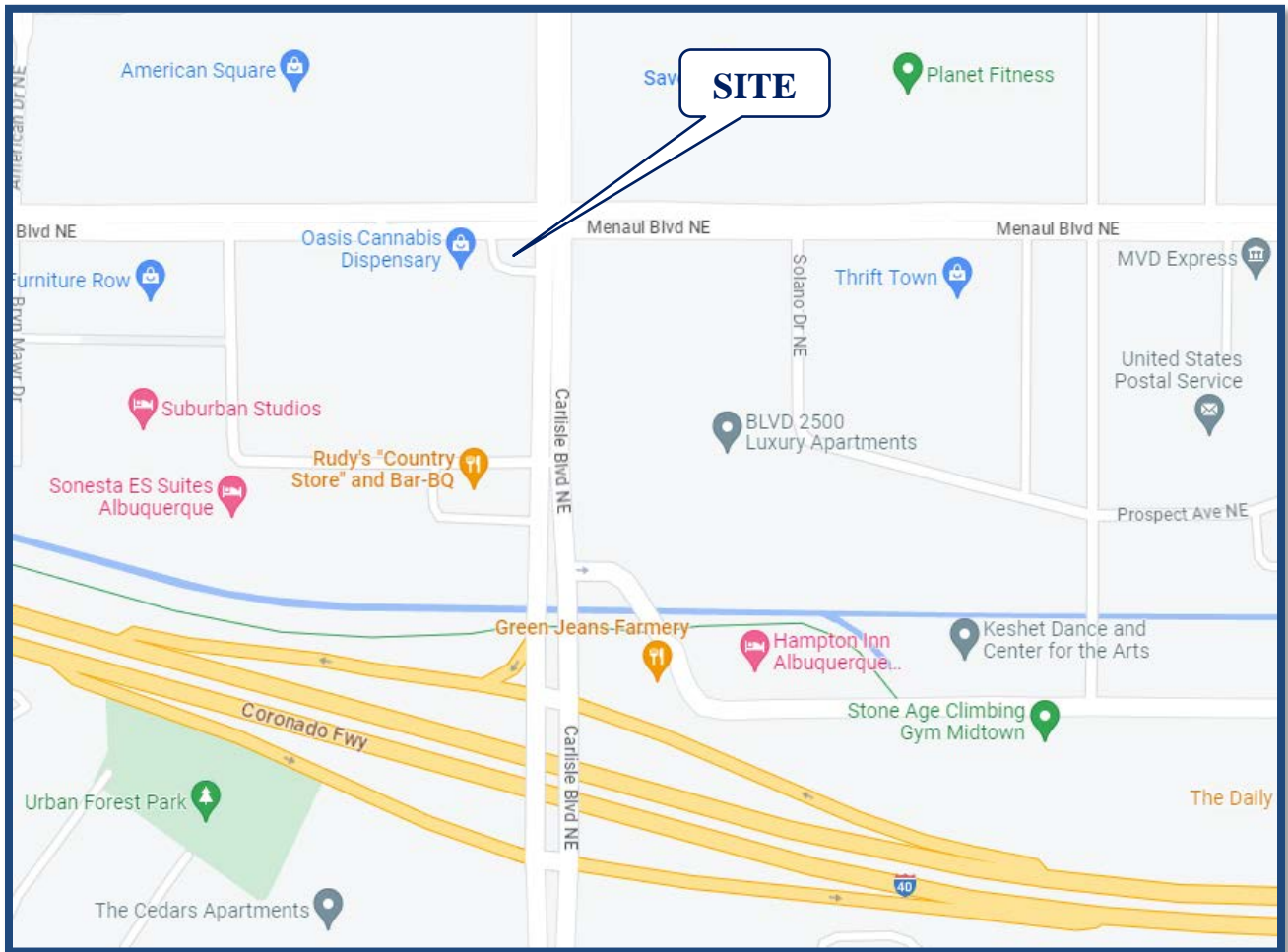
Figure 1 shows the location of the site in relation to the area roadway network. **Figure 2** shows an aerial view of the site.

The sections of this report present the following:

- Existing roadway conditions
- A description of the proposed site
- Directional distribution of the site traffic
- Vehicle trip generation for the site
- Future traffic conditions, including access to the site.
- Traffic analyses for the weekday morning and weekday evening peak hours
- Crash summary for the intersections of Carlisle Boulevard with Menaul Boulevard and Prospect Avenue/BLVD 2500 access drive
- Recommendations with respect to the adequacy of site access and adjacent roadway system

Traffic capacity analyses were conducted for the weekday morning and weekday evening peak hours for the following conditions:

1. Existing Conditions – Analyzes the capacity of the existing roadway system using existing peak hour traffic volumes in the surrounding area.
2. Year 2024 No-Build Conditions – Analyzes the capacity of the existing roadway system using the ambient area growth, not attributable to any particular development and the traffic anticipated to be generated by the proposed 2500 Carlisle Boulevard development.
3. Year 2024 Total Projected Conditions – Analyzes the capacity of the future roadway system using the projected traffic volumes that include the existing traffic volumes, ambient area growth, the traffic generated by the proposed 2500 Carlisle Boulevard development, and traffic estimated to be generated by the proposed development.



Site Location

Figure 1



Aerial View of Site

Figure 2

2. Existing Conditions

The following provides a detailed description of the physical characteristics of the adjacent roadways, including geometry and traffic control, adjacent land uses, and peak hour traffic flows.

Site Location

The site of the proposed Dunkin is located on the southwest corner of the intersection of Menaul Boulevard with Carlisle Boulevard which is currently occupied by a gas station building. Land uses within the vicinity of the site are primarily commercial along Menaul Boulevard and Carlisle Boulevard and include Starbucks and American Home Furniture & Mattress to the north of the site, Oasis Cannabis Dispensary to the west, Firestone Auto Care to the east, and the Department of Public Safety and the New Mexico State Police to the south of the site.

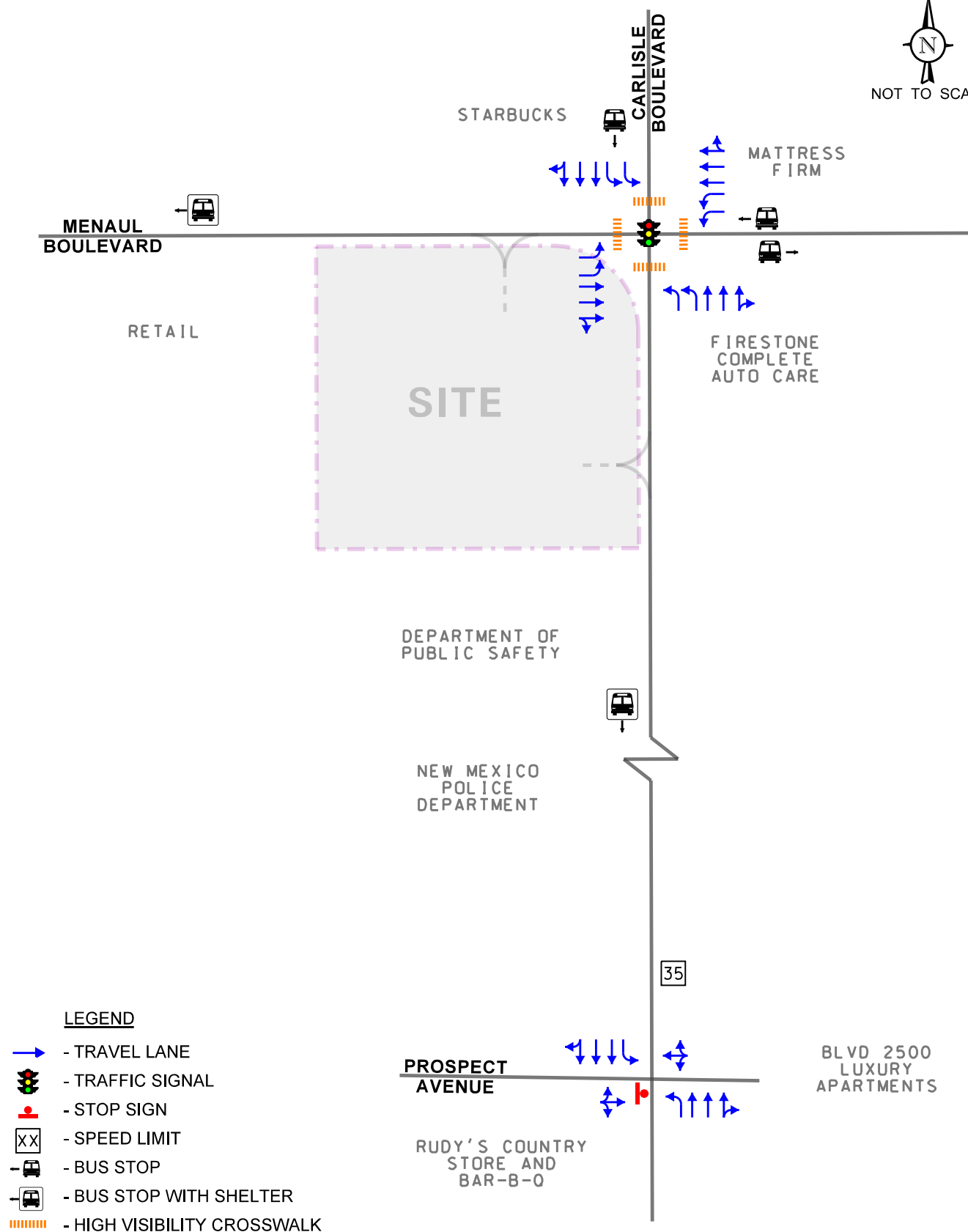
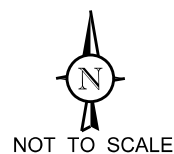
Existing Roadway Characteristics

Some of the key characteristics of the existing roadways within the study area are described below and illustrated in **Figure 3**.

Menaul Boulevard NE is an east-west principal arterial roadway that generally provides three travel lanes in each direction. At its signalized intersection with Carlisle Boulevard, Menaul Boulevard provides dual left-turn lanes, two through lanes, and a shared through/right-turn lane on both approaches. High visibility crosswalks and pedestrian signals are provided at all four legs of this intersection. Menaul Boulevard is under the jurisdiction of the City of Albuquerque and carries an Annual Average Daily Traffic (AADT) volume of 31,861 vehicles (NMDOT 2017) east of Menaul Boulevard and 15,370 vehicles (NMDOT 2020) west of Carlisle Boulevard. Menaul Boulevard has a posted speed limit of 40 miles per hour.

Carlisle Boulevard NE is a north-south minor arterial roadway that provides three lanes in each direction. At its signalized intersection with Menaul Boulevard, Carlisle Boulevard provides dual left-turn lanes, two through lane, and a shared through/right-turn lane on both approaches. At its unsignalized intersection with Prospect Avenue/BLVD 2500 access drive, Carlisle Boulevard provides an exclusive left-turn lane, two through lanes, and a shared through/right-turn lane on both approaches. Carlisle Boulevard is under the jurisdiction of the City of Albuquerque, carries an AADT volume of 29,556 vehicles (NMDOT 2018), and has a posted speed limit of 35 miles per hour.

Prospect Avenue is a north-south local roadway that that extends approximately 830 feet west from Carlisle Boulevard to its terminus at Wellesley Drive providing one lane in each direction. At its unsignalized intersection with Carlisle Boulevard, Prospect Avenue provides a shared left-turn/through/right-turn lane on the eastbound approach that is under stop sign control. The east leg of this intersection is the access drive serving BLVD 2500 which provides a shared left/through/right-turn lane that is under stop sign control. Prospect Avenue is under the jurisdiction of the City of Albuquerque.



Existing Traffic Volumes

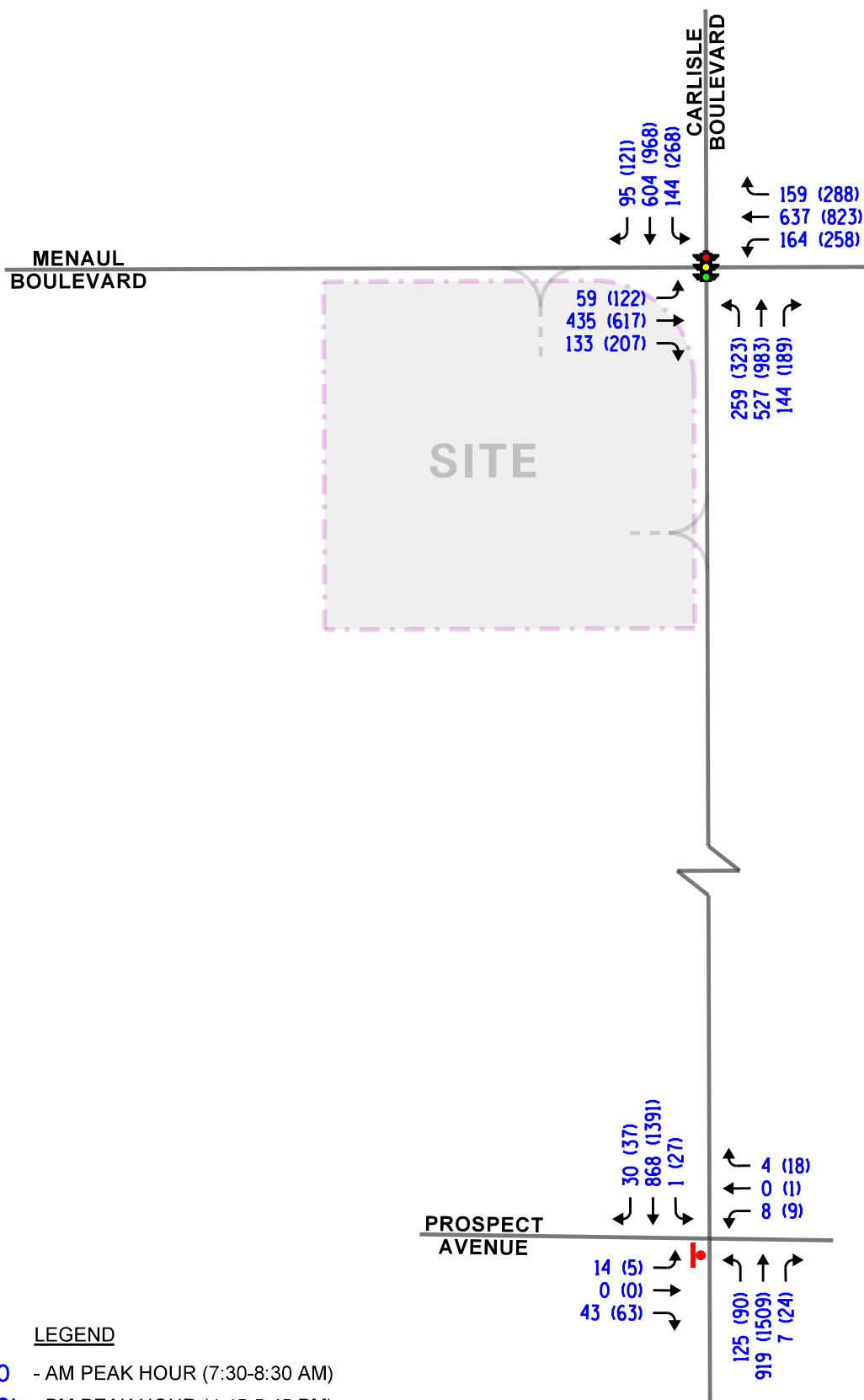
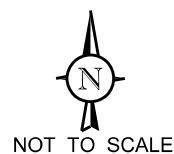
In order to determine current vehicle, pedestrian, and bicycle conditions within the study area, peak period traffic, pedestrian, and bicycle counts were conducted during the weekday morning (7:00 A.M. to 9:00 A.M.) and evening (4:00 P.M. to 6:00 P.M.) peak periods on Monday, May 22, 2023 at the following intersections:

- Menaul Boulevard with Carlisle Boulevard
- Carlisle Boulevard with Prospect Avenue/BLVD 2500 Access Drive

The results of the traffic counts show that the peak hours generally occur from 7:30 A.M. to 8:30 A.M. during the weekday morning peak hour and 4:45 P.M. and 5:45 P.M. during the weekday evening peak hour.

The traffic volumes were compared to hourly counts conducted by Lee Engineering as part of the traffic impact study prepared for the 2500 Carlisle Boulevard proposed development. The previously counts were collected on May 18 and May 20, 2021 at the intersection of Menaul Boulevard with Carlisle Boulevard. The 2023 traffic counts were found to be approximately ten percent higher than 2021 counts during the weekday evening peak hour and approximately the same during the weekday morning peak hour. As such, the May 2023 traffic counts reflect typical traffic conditions.

Figure 4 illustrates the existing peak hour vehicle traffic volumes. Summaries of the traffic counts are included in the Appendix.



Crash Data

KLOA, Inc. obtained crash data from the New Mexico Department of Transportation (NMDOT) for the most recent available past five years (2017 to 2021) for the intersections of Menaul Boulevard with Carlisle Boulevard and Carlisle Boulevard with Prospect Avenue. The crash data for the intersections including severity and crash type by year is summarized in **Tables 1** and **2**. As can be seen from Table 1 and based on a review of the crash data, the following was determined:

- During the review period, a total of 72 crashes occurred at the intersection of Menaul Boulevard with Carlisle Boulevard.
 - Over 90 percent of the crashes occurred during clear weather.
 - Approximately 80 percent of the crashes occurred during daylight.
 - Approximately 70 percent of the crashes resulted in property damage only, while approximately 15 percent of the crashes resulted in a Class C severity.
 - No fatal crashes were reported during the review period.
 - One crash involved a pedestrian and one crash involved a fixed object.
 - The only repetitive crash types involved angled/turning vehicles, rear end collisions, or the “Other Vehicle – From Opposite Direction” classification.
- During the review period, a total of 16 crashes occurred at the intersection of Carlisle Boulevard with Prospect Avenue.
 - Fourteen of the crashes occurred during clear weather.
 - Eleven of the crashes occurred during daylight.
 - Eleven of the crashes resulted in property damage, two resulted in Class B severity, and two resulted in Class C severity.
 - One fatal crash was reported during the review period. This crash involved a collusion with a vehicle traveling straight and a pedestrian. The weather was raining and it occurred in January at 7:41 P.M.
 - There is no real trend to be established by the cause/type of the crashes.

Table 1

MENAUL BOULEVARD WITH CARLISLE BOULEVARD – CRASH SUMMARY

| Year | Type of Crash Frequency | | | | | | |
|---|-------------------------|-----------|-----------|-----------|-----------|-----------|---------------|
| | 2017 | 2018 | 2019 | 2020 | 2021 | Total | Average |
| Property Damage Only | 9 | 16 | 11 | 7 | 7 | 50 | 10 |
| Class A Severity | 0 | 0 | 0 | 0 | 2 | 2 | < 1 |
| Class B Severity | 2 | 2 | 0 | 4 | 1 | 9 | 1.8 |
| Class C severity | 2 | 1 | 2 | 3 | 3 | 11 | 2.2 |
| Fatalities | <u>0</u> | <u>0</u> | <u>0</u> | <u>0</u> | <u>0</u> | <u>0</u> | <u>0</u> |
| Total | 13 | 19 | 13 | 14 | 13 | 72 | 14.4 |
| Other Vehicle – Both Going Straight/Entering At Angle | 2 | 3 | 1 | 0 | 0 | 6 | 1.2 |
| Other Vehicle – Both Turn Left/Entering At Angle | 0 | 1 | 1 | 0 | 0 | 2 | < 1 |
| Other Vehicle – Both Turn Right/Entering at Angle | 0 | 1 | 0 | 0 | 0 | 1 | < 1 |
| Other Vehicle – From Same Direction/Both Going Straight | 1 | 1 | 2 | 1 | 0 | 5 | 1 |
| Other Vehicle – From Same Direction/Sideswipe Collision | 0 | 0 | 1 | 0 | 0 | 1 | < 1 |
| Other Vehicle – One Left Turn/Entering At Angle | 1 | 2 | 1 | 1 | 0 | 5 | 1 |
| Other Vehicle – One Right Turn/Entering at Angle | 0 | 2 | 2 | 1 | 0 | 5 | 1 |
| Other Vehicle – From Opposite Direction | 0 | 0 | 0 | 3 | 3 | 6 | 1.2 |
| Other Vehicle – From Opposite Direction/Both Going Straight | 0 | 0 | 1 | 1 | 0 | 2 | < 1 |
| Fixed Object – Traffic Signal Standard | 1 | 0 | 0 | 0 | 0 | 1 | < 1 |
| Overturn/Rollover – Left Side of Road | 1 | 0 | 0 | 0 | 0 | 1 | < 1 |
| Other Vehicle – From Same Direction/One Left Turn | 1 | 0 | 0 | 0 | 0 | 1 | < 1 |
| Other Vehicle – From Same Direction/Rear End Collision | 1 | 2 | 0 | 0 | 0 | 3 | < 1 |
| Other Vehicle – From Same Direction/One Right Turn | 1 | 0 | 0 | 0 | 0 | 1 | < 1 |
| Other Vehicle – From Same Direction/Vehicle Backing | 0 | 1 | 0 | 0 | 0 | 1 | < 1 |
| Vehicle on Other Roadway – Not Stated | 0 | 0 | 0 | 1 | 0 | 1 | < 1 |
| Left Blank | 4 | 6 | 4 | 6 | 10 | 30 | 6 |

Table 2

CARLISLE BOULEVARD WITH PROSPECT AVENUE – CRASH SUMMARY

| Year | Type of Crash Frequency | | | | | | |
|---|-------------------------|----------|----------|----------|----------|-----------|---------------|
| | 2017 | 2018 | 2019 | 2020 | 2021 | Total | Average |
| Property Damage Only | 0 | 2 | 3 | 3 | 3 | 11 | 2.2 |
| Class A Severity | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Class B Severity | 0 | 0 | 0 | 1 | 1 | 2 | < 1 |
| Class C severity | 0 | 1 | 0 | 1 | 0 | 2 | < 1 |
| Fatalities | <u>0</u> | <u>0</u> | <u>0</u> | <u>1</u> | <u>0</u> | <u>1</u> | <u>< 1</u> |
| Total | 0 | 3 | 3 | 6 | 4 | 16 | 3.2 |
| Other Vehicle – From Opposite Direction/Both Turn Left | 0 | 0 | 1 | 0 | 0 | 1 | < 1 |
| Other Vehicle – Both Going Straight/Entering At Angle | 0 | 0 | 1 | 1 | 0 | 2 | < 1 |
| Other Vehicle – From Same Direction/Both Going Straight | 0 | 2 | 1 | 0 | 0 | 3 | < 1 |
| Other Vehicle – One Left Turn/Entering At Angle | 0 | 1 | 0 | 0 | 0 | 1 | < 1 |
| Pedestrian Collision – Vehicle Going Straight | 0 | 0 | 0 | 1 | 0 | 1 | < 1 |
| Other Vehicle – From Opposite Direction | 0 | 0 | 0 | 2 | 0 | 2 | < 1 |
| Left Blank | 0 | 0 | 0 | 2 | 4 | 6 | 1.2 |

3. Traffic Characteristics of the Proposed Development

In order to properly evaluate future traffic conditions in the surrounding area, it was necessary to determine the traffic characteristics of the proposed development including the directional distribution and volumes of traffic that it will generate.

Proposed Site and Use Plan

As proposed, Dunkin will be approximately 1,200 square feet in size and will provide double drive-through lanes with stacking for 12 vehicles. A total of 10 parking spaces will serve Dunkin. Five of the parking spaces are located to the east of the proposed building and the remaining five spaces will be located on the east of the site. Access will be provided via two access drives that will serve the site which consist of the following:

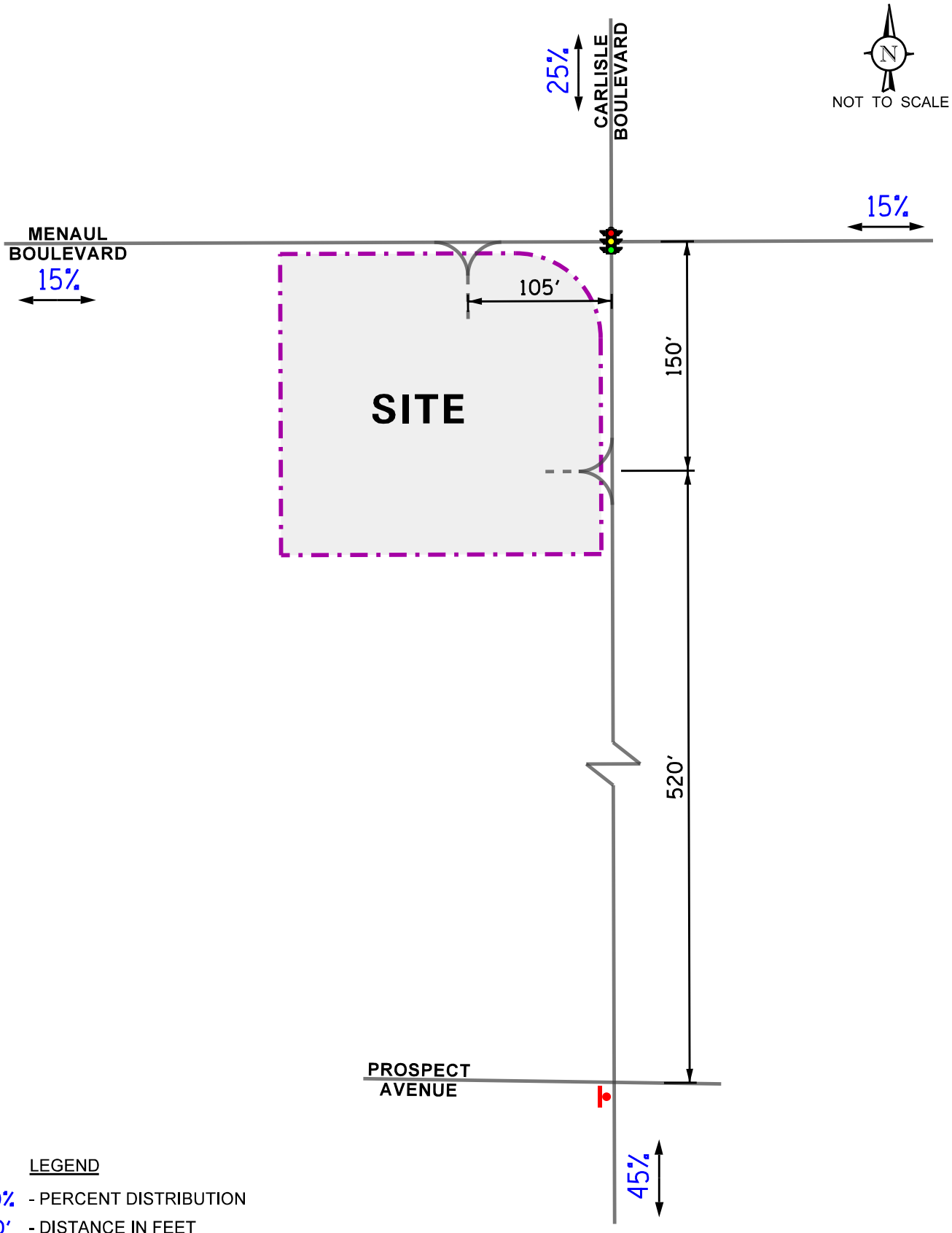
- A right-in/right-out access drive off Menaul Boulevard which will be located approximately 105 feet west of Carlisle Boulevard. This access drive will provide one inbound lane and one outbound lane. While the location of this access drive does not meet the City's minimum distance between commercial site access and intersections, the location of this access drive and orientation of the building and drive-through were chosen to provide maximum on-site stacking for drive-through vehicles.
- A right-in/right-out access drive off Carlisle Boulevard which will be located approximately 150 feet south of Menaul Boulevard. This access drive will provide one inbound lane and one outbound lane.

It should be noted that outbound movements from the access drives should be under stop sign control and that turning movements at these access drives will be restricted to right-turn movements only via the raised barrier medians along both Menaul Boulevard and Carlisle Boulevard.

A copy of the proposed site plan is included in the Appendix.

Directional Distribution of Site Traffic

The directional distribution of how traffic will approach and depart the site was estimated based on the general travel patterns through the study area derived from the peak hour traffic volumes, in combination with the population information and socioeconomic forecasts provided by the Mid-Region Council of Governments (MRCOG) for the subareas surrounding the site and in coordination with the estimated directional distribution determined as part of the traffic impact study previously prepared for the 2500 Carlisle Boulevard proposed development. **Figure 5** shows the established directional distribution for the proposed Dunkin and illustrates the distance in feet between the access drives and the existing roadways.



LEGEND

00% - PERCENT DISTRIBUTION

00' - DISTANCE IN FEET

Proposed Site Traffic Generation

The estimate of vehicle traffic to be generated by the proposed Dunkin is based upon the proposed land use types and sizes. The vehicle trip generation was calculated using data published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11th Edition. Land-Use Code 937 (Coffee/Donut Shop with Drive-Through Window) was utilized. The ITE trip generation sheets are included in the Appendix.

It is important to note that surveys conducted by ITE have shown that a percentage of trips made to coffee/donut shops with drive-through lanes are diverted from the existing traffic on the roadway system. This is particularly true during the weekday morning and weekday evening peak hours when traffic is diverted from work-to-lunch and work-to-home trips. Such diverted trips are referred to as “pass-by” trips. Based on information published by ITE for coffee/donut shops, approximately 85 to 95 percent of trips are pass-by trips. However, in order to provide a conservative analysis, only a 70 percent pass-by reduction was applied to the trips estimated to be generated by Dunkin.

Table 3 shows the estimated vehicle trip generation for the weekday morning peak hour, weekday evening peak hour, and daily trips.

Table 3

ESTIMATED PEAK HOUR VEHICLE TRIP GENERATION

| ITE Land Use Code | Type/Size | Weekday Morning Peak Hour | | | Weekday Evening Peak Hour | | | Daily Two-Way Trips | | |
|-------------------|---|---------------------------|------------|------------|---------------------------|------------|------------|---------------------|-------------|-------------|
| | | In | Out | Total | In | Out | Total | In | Out | Total |
| 937 | Coffee/Donut Shop with Drive-Through (1,200 s.f.) | 53 | 50 | 103 | 23 | 24 | 47 | 320 | 320 | 640 |
| | <i>70% Pass-By Reduction</i> | <i>-35</i> | <i>-35</i> | <i>-70</i> | <i>-16</i> | <i>-16</i> | <i>-32</i> | <i>-224</i> | <i>-224</i> | <i>-448</i> |
| | Total New Trips | 18 | 15 | 33 | 7 | 8 | 15 | 96 | 96 | 192 |

4. Projected Traffic Conditions

The total projected traffic volumes include the base traffic volumes, increase in background traffic due to growth, and the traffic estimated to be generated by the proposed Dunkin.

Development Traffic Assignment

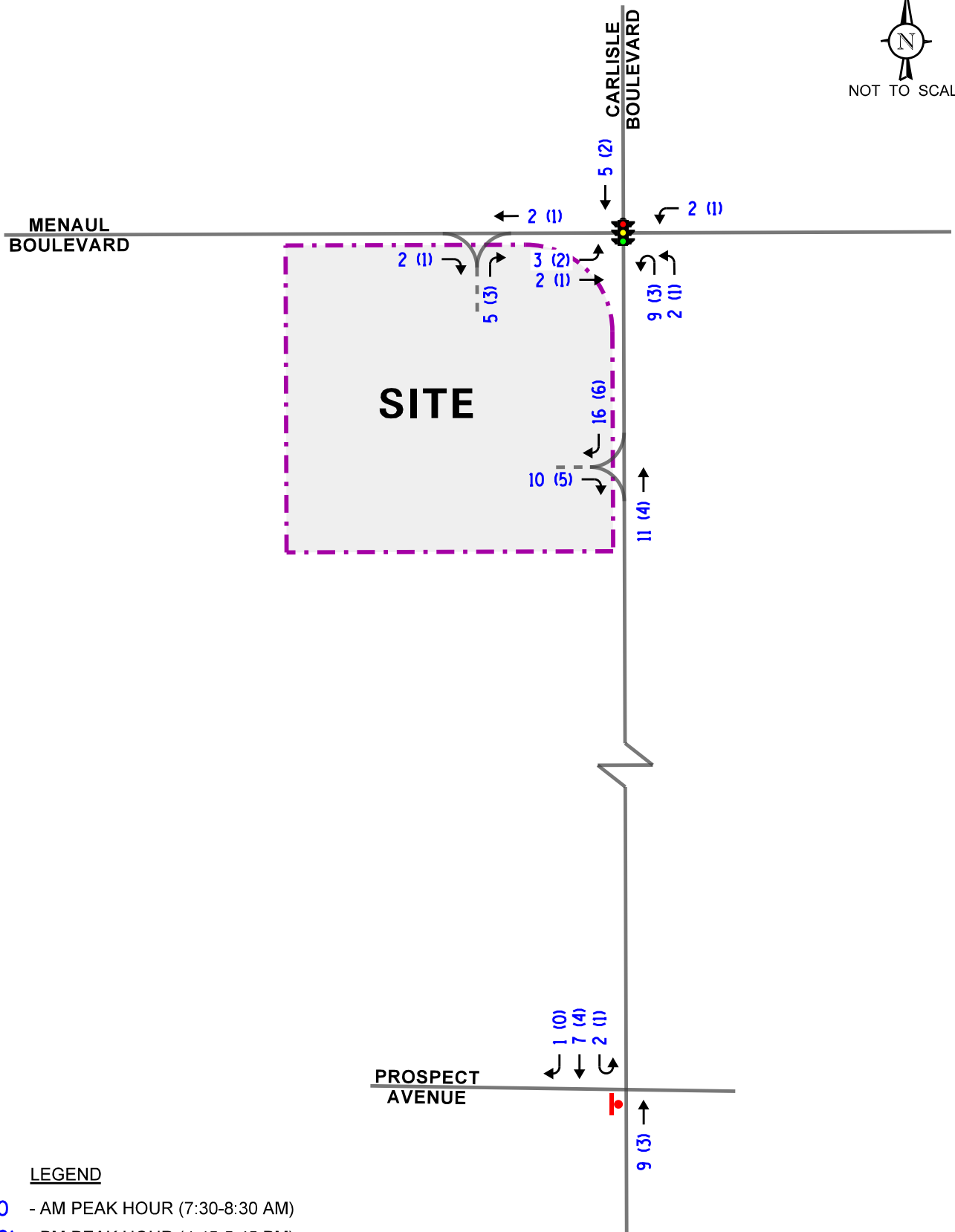
The estimated weekday morning and weekday evening peak hour traffic volumes that will be generated by the proposed Dunkin were assigned to the roadway system in accordance with the previously described directional distribution (Figure 5). **Figure 6** illustrated the traffic assignment of the new passenger vehicle trips and **Figure 7** illustrates the traffic assignment of the pass-by vehicles trips.

Ambient Traffic Growth

The existing traffic volumes were increased by an ambient growth factor of 1.0 percent per year for one year (project completion year) to represent Year 2024 no-build conditions. This background growth was determined from the population information and socioeconomic forecasts provided by the Mid-Region Council of Governments (MRCOG) for the subareas surrounding the site and in coordination with the estimated background growth as determined as part of the traffic impact study previously prepared for the 2500 Carlisle Boulevard proposed development. Furthermore, the peak hour trips anticipated to be generated by the proposed mixed-use development to be located at 2500 Carlisle Boulevard was included in the Year 2024 no-build traffic volumes, to provide a conservative analysis. **Figure 8** shows the Year 2024 no-build traffic volumes.

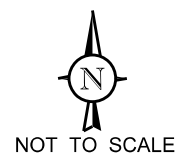
Year 2024 Total Projected Traffic Volumes

The new and pass-by development-generated traffic (Figures 6 and 7) was added to the no-build traffic volumes (Figure 8) to determine the Year 2024 total projected traffic volumes. These volumes are illustrated in **Figure 9**.



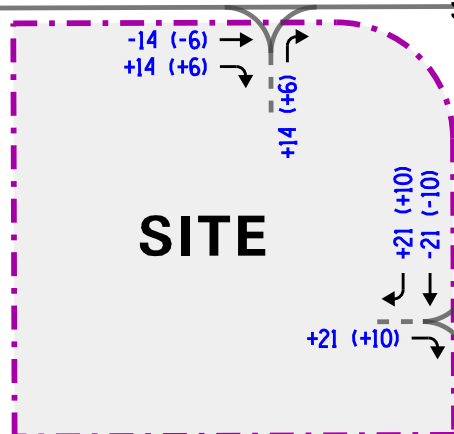
LEGEND

- 00 - AM PEAK HOUR (7:30-8:30 AM)
- (00) - PM PEAK HOUR (4:45-5:45 PM)



MENAU
BOULEVARD

CARLISLE
BOULEVARD



PROSPECT
AVENUE

LEGEND

- 00 - AM PEAK HOUR (7:30-8:30 AM)
- (00) - PM PEAK HOUR (4:45-5:45 PM)

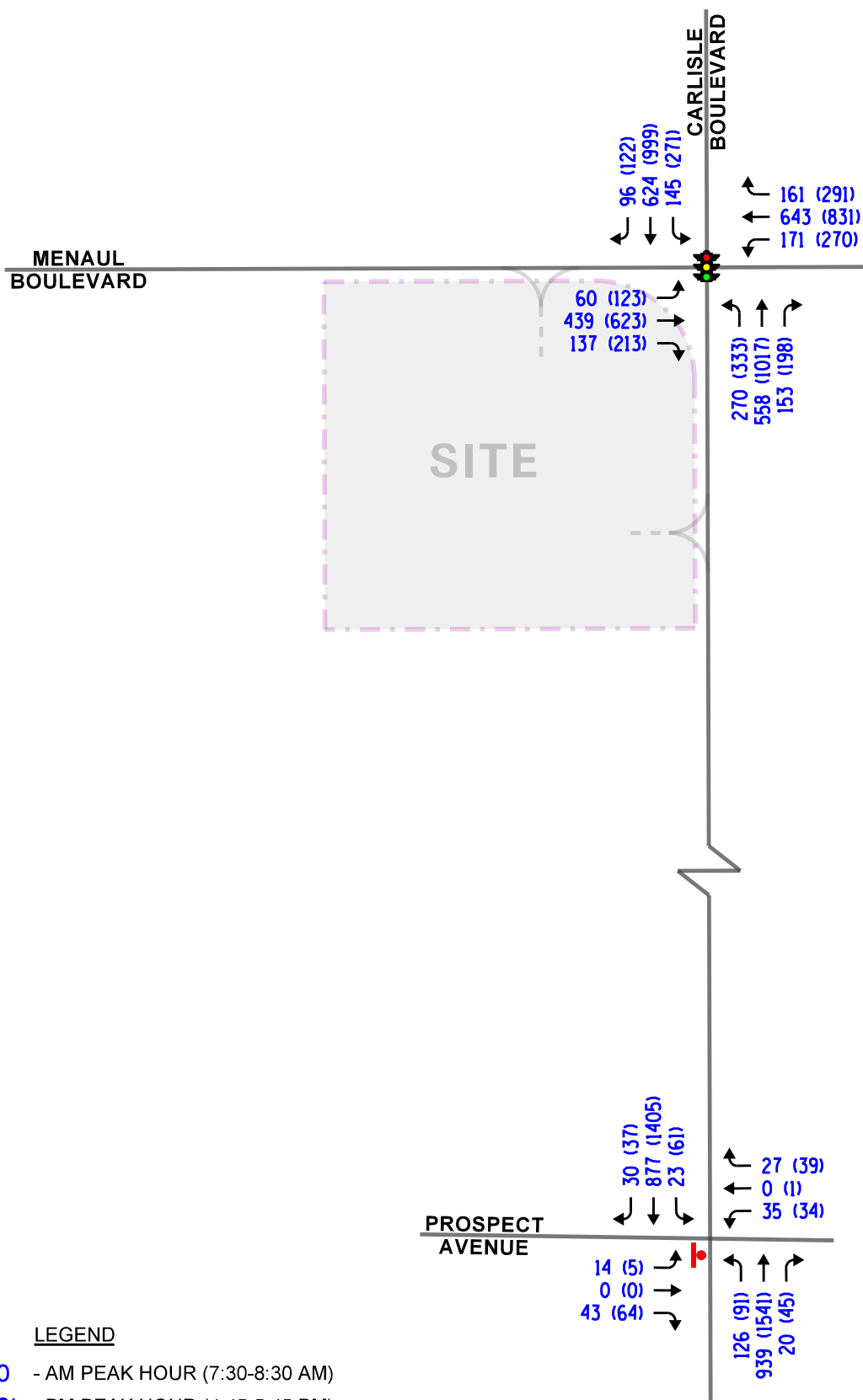
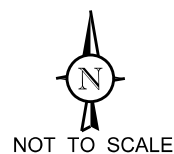
Dunkin Drive-Through
Albuquerque,
New Mexico

Pass-By Traffic Volumes



Job No: 23-159

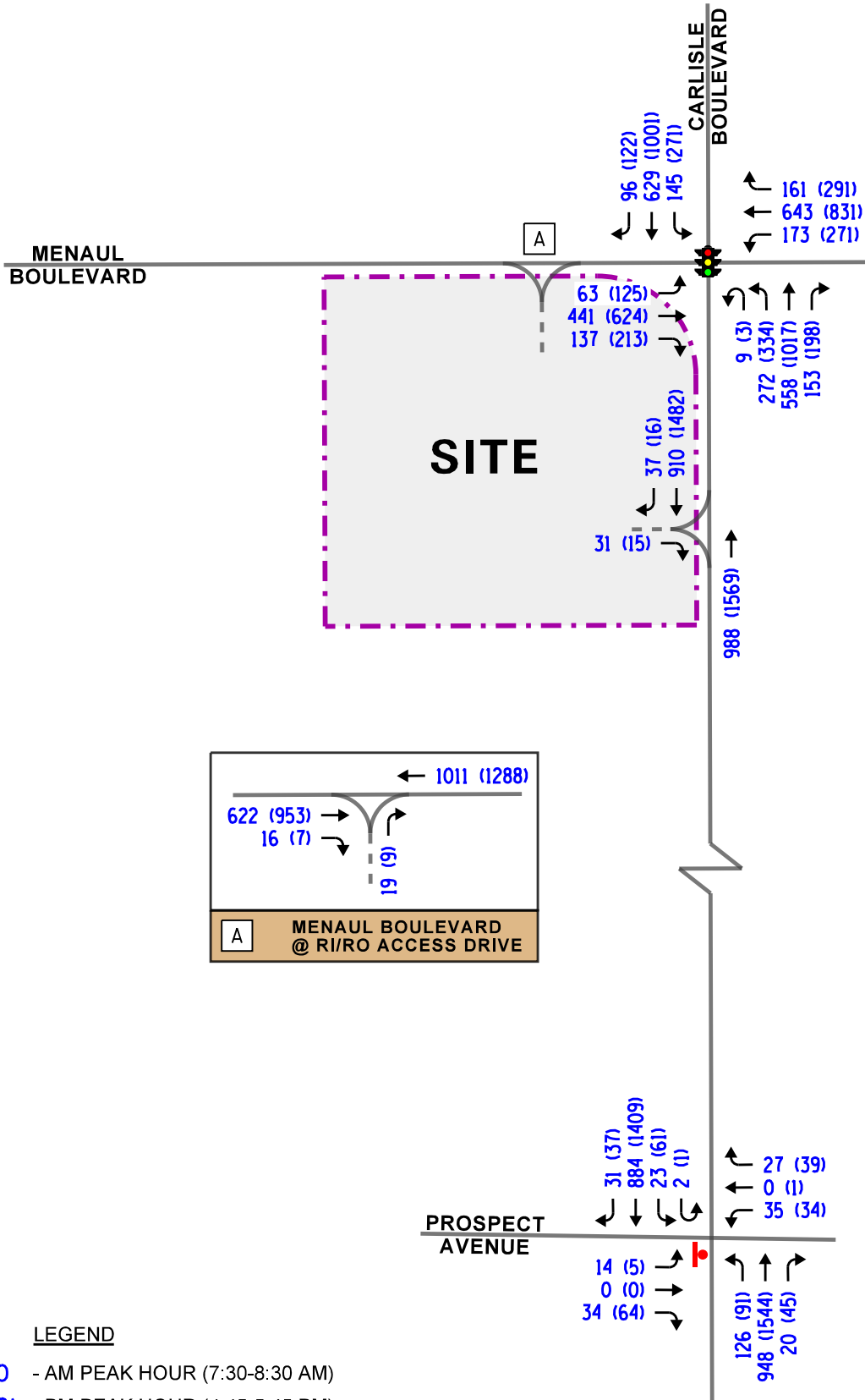
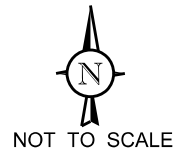
Figure: 7



LEGEND

00 - AM PEAK HOUR (7:30-8:30 AM)

(00) - PM PEAK HOUR (4:45-5:45 PM)



5. Traffic Analysis and Recommendations

The following provides an evaluation conducted for the weekday morning and weekday evening peak hours. The analysis includes conducting capacity analyses to determine how well the roadway system and access drives are projected to operate and whether any roadway improvements or modifications are required.

Traffic Analyses

Intersection analyses were performed for the weekday morning and weekday evening peak hours for the existing, no-build (Year 2024), and total projected (Year 2024) traffic volumes.

The traffic analyses were performed using the methodologies outlined in the Transportation Research Board's *Highway Capacity Manual (HCM)*, 6th Edition and analyzed using Synchro/SimTraffic 11 software. The analysis for the signalized intersection of Menaul Boulevard with Carlisle Boulevard was accomplished utilizing actual cycle lengths and phasings.

The analyses for the unsignalized intersections determine the average control delay to vehicles at an intersection. Control delay is the elapsed time from a vehicle joining the queue at a stop sign (includes the time required to decelerate to a stop) until its departure from the stop sign and resumption of free flow speed. The methodology analyzes each intersection approach controlled by a stop sign and considers traffic volumes on all approaches and lane characteristics.

The ability of an intersection to accommodate traffic flow is expressed in terms of level of service, which is assigned a letter from A to F based on the average control delay experienced by vehicles passing through the intersection. The *Highway Capacity Manual* definitions for levels of service and the corresponding control delay for signalized intersections and unsignalized intersections are included in the Appendix of this report.

Summaries of the traffic analysis results showing the level of service, overall intersection delay (measured in seconds), volume-to-capacity ratios, and 95th percentile queues for the existing, no-build, and Year 2024 total projected conditions are presented in **Tables 4** through **11**. A discussion of the intersections follows. Summary sheets for the capacity analyses are included in the Appendix.

Table 4

CAPACITY ANALYSIS RESULTS – SIGNALIZED – MENAUL BOULEVARD WITH CARLISLE BOULEVARD

| | Peak Hour | Eastbound | | Westbound | | Northbound | | Southbound | | Overall |
|--|-----------------|-----------|-----------|-----------|-----------|------------|-----------|------------|-----------|-----------|
| | | L | T/R | L | T/R | L | T/R | L | T/R | |
| Existing Conditions | Weekday Morning | D 51.4 | C 28.4 | D 52.4 | C 28.1 | E 56.4 | C 26.5 | D 52.2 | C 30.7 | C 33.2 |
| | | C – 30.6 | | C – 32.2 | | C – 34.8 | | C – 34.4 | | |
| | Weekday Evening | E 57.4 | C 31.7 | E 60.1 | C 32.2 | E 69.2 | D 45.6 | E 60.8 | D 44.6 | D 43.5 |
| | | C – 35.0 | | D – 37.4 | | D – 50.7 | | D – 47.8 | | |
| No-Build Conditions | Weekday Morning | D 51.5 | C 28.6 | D 52.6 | C 28.2 | E 57.4 | C 27.0 | D 52.1 | C 31.1 | C 33.5 |
| | | C – 30.7 | | C – 32.4 | | D – 35.4 | | C – 34.6 | | |
| | Weekday Evening | E 57.4 | C 32.0 | E 60.9 | C 32.4 | E 71.2 | D 47.9 | E 61.0 | D 45.9 | D 44.7 |
| | | D – 35.2 | | D – 37.9 | | D – 52.9 | | D – 48.9 | | |
| Projected Conditions | Weekday Morning | D 51.6 | C 28.7 | D 52.6 | C 28.2 | E 58.4 | C 27.0 | D 52.1 | C 31.3 | C 33.8 |
| | | C – 31.0 | | C – 32.5 | | D – 35.9 | | C – 34.7 | | |
| | Weekday Evening | E 57.4 | C 32.0 | E 61.0 | C 32.4 | E 71.9 | D 47.9 | E 61.0 | D 46.1 | D 44.8 |
| | | D – 35.3 | | D – 38.0 | | D – 53.1 | | D – 49.0 | | |
| Letter denotes Level of Service L – Left Turn R – Right Turn Delay is measured in seconds. T – Through | | | | | | | | | | |

Table 5

CAPACITY ANALYSIS RESULTS – SIGNALIZED – MENAUL BOULEVARD WITH CARLISLE BOULEVARD
V/C RATIO (95TH PERCENTILE QUEUE)

| | Peak Hour | Eastbound | | Westbound | | Northbound | | Southbound | |
|-----------------------------------|-----------------|------------------------------|---------------|----------------|---------------|---------------|---------------|---------------|---------------|
| | | L | T/R | L | T/R | L | T/R | L | T/R |
| Existing Conditions | Weekday Morning | 0.29 (44) | 0.43 (156) | 0.52 (96) | 0.50 (218) | 0.71 (145) | 0.43 (178) | 0.50 (86) | 0.50 (197) |
| | Weekday Evening | 0.46 (82) | 0.54 (238) | 0.69 (154) | 0.66 (331) | 0.84 (209) | 0.85 (399) | 0.71 (159) | 0.81 (368) |
| No-Build Conditions | Weekday Morning | 0.29 (44) | 0.44 (158) | 0.54 (100) | 0.51 (221) | 0.73 (151) | 0.45 (190) | 0.50 (87) | 0.51 (204) |
| | Weekday Evening | 0.47 (82) | 0.55 (242) | 0.71 (160) | 0.67 (336) | 0.86 (220) | 0.88 (442) | 0.72 (161) | 0.84 (381) |
| Projected Conditions | Weekday Morning | 0.30 (46) | 0.45 (159) | 0.54 (102) | 0.51 (221) | 0.75 (157) | 0.45 (190) | 0.50 (87) | 0.52 (205) |
| | Weekday Evening | 0.47 (84) | 0.55 (243) | 0.72 (161) | 0.67 (336) | 0.87 (223) | 0.88 (442) | 0.72 (161) | 0.84 (381) |
| Queue length is measured in feet. | | L – Left Turn T – Through | | R – Right Turn | | | | | |

Table 6

CAPACITY ANALYSIS RESULTS – EXISTING CONDITIONS

| Intersection | Weekday Morning Peak Hour | | Weekday Evening Peak Hour | |
|--|---------------------------|-------|---------------------------|-------|
| | LOS | Delay | LOS | Delay |
| Carlisle Boulevard with Prospect Avenue/BLVD 2500 Access Drive¹ | | | | |
| • Eastbound Approach | C | 17.4 | C | 24.0 |
| • Westbound Approach | C | 17.1 | C | 23.2 |
| • Northbound Left Turn | C | 17.2 | D | 32.8 |
| • Southbound Left Turn | A | 9.1 | B | 10.8 |
| LOS = Level of Service 1 – Two-way stop control. Delay is measured in seconds. | | | | |

Table 7

CAPACITY ANALYSIS RESULTS – EXISTING CONDITIONS

V/C RATIO (95TH PERCENTILE QUEUE)

| Intersection | Weekday Morning Peak Hour | | Weekday Evening Peak Hour | |
|--|---------------------------|------------------------------|---------------------------|------------------------------|
| | V/C Ratio | 95 th Queues (ft) | V/C Ratio | 95 th Queues (ft) |
| Carlisle Boulevard with Prospect Avenue/BLVD 2500 Access Drive¹ | | | | |
| • Eastbound Approach | 0.170 | 15 | 0.275 | 28 |
| • Westbound Approach | 0.040 | 3 | 0.122 | 10 |
| • Northbound Left Turn | 0.307 | 33 | 0.427 | 50 |
| • Southbound Left Turn | 0.001 | 0 | 0.044 | 3 |
| LOS = Level of Service 1 – Two-way stop control. Delay is measured in seconds. | | | | |

Table 8

CAPACITY ANALYSIS RESULTS – NO-BUILD CONDITIONS

| Intersection | Weekday Morning Peak Hour | | Weekday Evening Peak Hour | |
|--|---------------------------|-------|---------------------------|-------|
| | LOS | Delay | LOS | Delay |
| Carlisle Boulevard with Prospect Avenue/BLVD 2500 Access Drive¹ | | | | |
| • Eastbound Approach | C | 18.7 | D | 26.5 |
| • Westbound Approach | C | 19.7 | E | 41.5 |
| • Northbound Left Turn | C | 17.5 | D | 33.9 |
| • Southbound Left Turn | A | 9.4 | B | 11.2 |
| LOS = Level of Service 1 – Two-way stop control. Delay is measured in seconds. | | | | |

Table 9

CAPACITY ANALYSIS RESULTS – NO-BUILD CONDITIONS

V/C RATIO (95TH PERCENTILE QUEUE)

| Intersection | Weekday Morning Peak Hour | | Weekday Evening Peak Hour | |
|---|---------------------------|------------------------------|---------------------------|------------------------------|
| | V/C Ratio | 95 th Queues (ft) | V/C Ratio | 95 th Queues (ft) |
| Carlisle Boulevard with Prospect Avenue/BLVD 2500 Access Drive¹ | | | | |
| • Eastbound Approach | 0.185 | 18 | 0.304 | 30 |
| • Westbound Approach | 0.209 | 20 | 0.448 | 53 |
| • Northbound Left Turn | 0.313 | 33 | 0.439 | 53 |
| • Southbound Left Turn | 0.028 | 3 | 0.100 | 8 |
| Queue length is measured in feet. 1 – Two-way stop control. | | | | |

Table 10

CAPACITY ANALYSIS RESULTS – PROJECTED CONDITIONS

| Intersection | Weekday Morning Peak Hour | | Weekday Evening Peak Hour | |
|---|---------------------------|-------|---------------------------|-------|
| | LOS | Delay | LOS | Delay |
| Carlisle Boulevard with Prospect Avenue/BLVD 2500 Access Drive¹ | | | | |
| • Eastbound Approach | C | 18.0 | D | 26.8 |
| • Westbound Approach | C | 18.6 | E | 41.8 |
| • Northbound Left Turn | C | 17.6 | D | 34.1 |
| • Southbound Left Turn | A | 9.2 | B | 11.2 |
| Menaul Boulevard with Proposed Right-In/Right-Out Access Drive² | | | | |
| • Northbound Approach | B | 11.6 | B | 13.3 |
| Carlisle Boulevard with Proposed Right-In/Right-Out Access Drive² | | | | |
| • Eastbound Approach | B | 13.7 | C | 18.1 |
| LOS = Level of Service 1 – Two-way stop control. Delay is measured in seconds. 2 – One-way stop control. | | | | |

Table 11

CAPACITY ANALYSIS RESULTS – PROJECTED CONDITIONS

V/C RATIO (95TH PERCENTILE QUEUE)

| Intersection | Weekday Morning Peak Hour | | Weekday Evening Peak Hour | |
|---|---------------------------|------------------------------|---------------------------|------------------------------|
| | V/C Ratio | 95 th Queues (ft) | V/C Ratio | 95 th Queues (ft) |
| Carlisle Boulevard with Prospect Avenue/BLVD 2500 Access Drive¹ | | | | |
| • Eastbound Approach | 0.177 | 15 | 0.306 | 25 |
| • Westbound Approach | 0.196 | 18 | 0.450 | 50 |
| • Northbound Left Turn | 0.316 | 33 | 0.441 | 50 |
| • Southbound Left Turn | 0.030 | 3 | 0.101 | 8 |
| Menaul Boulevard with Proposed Right-In/Right-Out Access Drive² | | | | |
| • Northbound Approach | 0.035 | 3 | 0.021 | 3 |
| Carlisle Boulevard with Proposed Right-In/Right-Out Access Drive² | | | | |
| • Eastbound Approach | 0.073 | 5 | 0.054 | 5 |
| Queue length is measured in feet. 1 – Two-way stop control. 2 – One-way stop control. | | | | |

Discussion and Recommendations

The following summarizes how the intersections are projected to operate and identifies any roadway and traffic control improvements necessary to accommodate the site-generated traffic.

Menaul Boulevard with Carlisle Boulevard

The results of the capacity analysis indicate that overall this intersection currently operates at Level of Service (LOS) C during the weekday morning peak hour and LOS D during the weekday evening peak hour. All the approaches currently operate at LOS C or D during the peak hours. It should be noted that the northbound left-turn movement currently operates at LOS E during the weekday morning peak hour and all four left-turn movements operate at LOS E during the weekday evening peak hour.

Under Year 2024 no-build and total projected conditions, the intersection is projected to continue operating at LOS C during the weekday morning peak hour and LOS D during the weekday evening peak hour with increases in delay of less than two seconds. All the approaches are projected to operate at LOS C or D during the peak hours with increases in delay of less than three seconds.

The 95th percentile queue for the eastbound through movement is projected to be approximately 240 feet during the weekday evening peak hour that will extend back to the proposed right-in/right-out access drive on Menaul Boulevard but a review of the traffic simulation showed that the queue will clear the intersection during one cycle. The 95th percentile queue for the northbound approach is projected to be approximately 225 feet which is an increase of one vehicle over no-build conditions and will continue to be accommodated with the left-turn lane storage provided. The 95th percentile queues for the westbound approach are projected to be approximately 160 feet which is an increase of one vehicle over no-build conditions and will continue to be provided within the left-turn lane storage provided.

Overall, the proposed Dunkin is only projected to increase the volume of traffic traversing this intersection by less than one percent during both peak hours. As such, this intersection has adequate reserve capacity to accommodate the traffic estimated to be generated by the proposed Dunkin Drive-Through and no roadway improvement or traffic control adjustments will be required.

Carlisle Boulevard with Prospect Avenue/BLVD 2500 Access Drive

The results of the capacity analysis indicate that the eastbound and westbound approach currently operates at LOS C during the weekday morning and weekday evening peak hour. The northbound and southbound left-turn movements operate at LOS C or better during the peak hours except for the northbound left-turn movement that operates at LOS D during the weekday evening peak hour.

Under Year 2024 no-build conditions, the eastbound approach is projected to operate at LOS C during the weekday morning peak hour and LOS D during the weekday evening peak hour with increases in delay of less than three seconds while the westbound approach is projected to operate at LOS C during the weekday morning peak hour and LOS E during the weekday evening peak hour with increases in delay of less than three seconds and less than 19 seconds, respectively. The northbound and southbound left-turn movements are projected to continue operating at the same existing levels of service during the peak hour with increases in delay of less than two seconds.

Under Year 2024 total projected conditions, the eastbound is projected to continue to operate at LOS C during the weekday morning peak hour and LOS D during the weekday evening peak hour as in no-build conditions. In addition, the westbound approach is projected to continue to operate at LOS C during the weekday morning peak hour and LOS E during the weekday evening peak hour as under no-build conditions. The northbound and southbound left-turn movements are projected to continue operating at no-build levels of service during the peak hours with increases in delay of less than one second. The 95th percentile queues for the northbound and southbound left-turn movements are projected to be approximately two vehicles that can be accommodated within the existing left-turn lanes at this intersection. As such, this intersection has adequate reserve capacity to accommodate the traffic estimated to be generated by the proposed Dunkin and no roadway improvements or traffic control adjustments will be required.

Menaul Boulevard with Proposed Right-In/Right-Out Access Drive

The results of the capacity analysis indicate that the northbound approach is projected to operate at LOS B during the weekday morning and weekday evening peak hours. As such, this access drive will be adequate to accommodate the traffic estimated to be generated by the proposed Dunkin Drive-Through and will provide efficient and flexible access to the site.

Carlisle Boulevard with Proposed Right-In/Right-Out Access Drive

The results of the capacity analysis indicate the eastbound approach is projected to operate at LOS B during the weekday morning peak hour and LOS C during the weekday evening peak hour. As such, this access drive will be adequate to accommodate the traffic estimated to be generated by the proposed Dunkin Drive-Through and will provide efficient and flexible access to the site.

On-Site Circulation and Drive-Through Stacking

Based on a review of the site plan, vehicles will enter the drive-through lanes on the northwest corner of the site then travel south along the west side of the site and make a left turn towards the pick-up window located on the southwest corner of the building. Vehicles will then exit the drive-through from the southeast corner of the building and will be able to proceed either left to the access drive on Menaul Boulevard or continue east to the access drive on Carlisle Boulevard.

A stop sign should be provided for outbound movements from the drive-through onto the main circulation drive aisles and a “Do Not Enter” sign should be provided at the drive-through exit facing west.

Based on the site plan, the drive-through facility will provide stacking for approximately four vehicles before the ordering boards and eight vehicles from the dual order boards to the pick-up window for a total of 12 stacked vehicles.

Observations conducted by KLOA, Inc. at existing coffee shops in the Chicagoland area indicated the following:

- During the weekday morning peak period (6:30 A.M. to 9:00 A.M.), an average queue of seven vehicles and a maximum queue of 12 vehicles were observed.
- During the weekday evening peak period (4:00 P.M. to 6:30 P.M.), an average queue of one vehicle and a maximum queue of two vehicles were observed.

As such, the proposed stacking for 12 vehicles will be adequate in accommodating the average and peak drive-through stacking anticipated for the coffee shop. However, it should be noted that final approval of the on-site circulation and drive-through stacking is dependent on the City's TCL review and acceptance

6. Conclusion

Based on the proceeding analyses and recommendations, the following conclusions have been made:

- The proposed Dunkin will be located at 3520 Menaul Boulevard NE and will be an approximately 1,200 square-foot building providing a drive-through that will accommodate 12 vehicles and a parking lot with 10 parking spaces.
- Access to the site will be provided via the two right-in/right-out access drives with one located off Menaul Boulevard and the second located off Carlisle Boulevard.
- The volume of traffic estimated to be generated by Dunkin will be reduced due to the volume of pass-by trips anticipated to be diverted from the existing traffic on the roadways.
- The access drives are projected to be adequate in accommodating the traffic estimated to be generated by Dunkin and will provide flexible and efficient access to the site.
- As part of the proposed development, stop signs should be provided for outbound traffic from both access drives.
- The drive-through stacking of 12 vehicles will be adequate in accommodating the peak drive-through activity for the coffee shop. This layout is dependent on the TCL approval by the City.
- Parking for the site shall comply with the City's IDO parking requirements.
- While the proposed access drive on Menaul Boulevard is less than 300 feet from Carlisle Boulevard, the location of this access was chosen to provide maximum on-site stacking for drive-through vehicles and the location of the drive-through prohibits the ability to provide cross access to the west.

Appendix

TIS Scoping Form
Traffic Count Summary Sheets
Site Plan
ITE Trip Generation Summary Sheets
Level of Service Criteria
Capacity Analysis Summary Sheets

TIS Scoping Form

SCOPE OF TRAFFIC IMPACT STUDY (TIS)

TO: Brendan May, PE, PTOE
KLOA, Inc.
9575 W. Higgins Road, Suite 400
Rosemont, Illinois 60018

MEETING DATE: Wednesday, April 26, 2023 – Was a virtual meeting held

ATTENDEES: Matthew Grush, P.E. (City of Albuquerque), Brendan May, PE, PTOE (KLOA, Inc.), Luay Aboona, PE, PTOE (KLOA, Inc.), Jeff Wooten, PE, LEED AP (Wooten Engineering, LLC)

PROJECT: Dunkin Donuts (3520 Menaul Boulevard NE)

REQUESTED CITY ACTION: ☐ Zone Change ☒ Site Development Plan

☐ Subdivision ☐ Building Permit ☐ Sector Plan ☐ Sector Plan Amendment

☐ Curb Cut Permit ☐ Conditional Use ☐ Annexation ☐ Site Plan Amendment

ASSOCIATED APPLICATION: Coffee Shop with Drive-Through Window (1,200 s.f.)

SCOPE OF REPORT:

The Traffic Impact Study should follow the standard report format, which is outlined in the DPM. The following supplemental information is provided for the preparation of this specific study.

1. Trip Generation - Use Trip Generation Manual, 11th Edition.
2. Appropriate study area:
Signalized Intersections; N/A
 - a. Carlisle Boulevard NE with Menaul Boulevard NE
Unsignalized Intersections;
 - b. Carlisle Boulevard NE with Prospect Avenue NE
Driveway Intersections: all site drives.- confirmed
3. Intersection turning movement counts
Study Time – 7-9 a.m. peak hour, 4-6 p.m. peak hour
Consultant to provide for all intersections listed above.
4. Type of intersection progression and factors to be used.
Information to be determined from the results of the traffic counts
5. Boundaries of area to be used for trip distribution.
2 mile radius – commercial;

6. Basis for trip distribution.

Commercial - Use relationship based upon population. Use population data from 2040 Socioeconomic Forecasts, MRCOG – See MRCOG website for most current data.

Commercial -

$$Ts = (Tt) (Sp) / (Sp)$$

Ts = Development to Individual Subarea Trips

Tt = Total Trips

Sp = Subarea Population

7. Traffic Assignment. Logical routing on the major street system.

8. Proposed developments which have been approved but not constructed that are to be Included in the analyses. Projects in the area include: 2500 Carlisle Boulevard

9. Method of intersection capacity analysis - planning or operational (see “2016 Highway Capacity Manual” or equivalent [i.e. HCS, Synchro, Teapac, etc.] as approved by staff). Must use latest version of design software and/or current edition of design manual.
Implementation Year: 2024

10. Traffic conditions for analysis:

- a. Existing analysis ☒ yes ___ no - year (2023);
- b. Phase implementation year(s) without proposed development – N/A
- c. Phase implementation year(s) with proposed development – N/A
- d. Project completion year without proposed development – 2025
- e. Project completion year with proposed development – 2025
- f. Other –

11. Background traffic growth.

Method: use 10-year historical growth based on standard data from the MRCOG Traffic Flow Maps. Minimum growth rate to be used is 1/2%.

12. Planned (programmed) traffic improvements.

List planned CIP improvements in study area and projected project implementation year:
a. N/A

13. Items to be included in the study:

- a. Intersection analysis. Yes
- b. Signal progression - An analysis is required if the driveway analysis indicates a traffic signal is possibly warranted. Analysis Method: N/A
- c. Arterial LOS analysis; N/A
- d. Recommended street, intersection and signal improvements. Yes
- e. Site design features such as turning lanes, median cuts, queuing requirements and site circulation, including driveway signalization and visibility. Yes
- f. Transportation system impacts.
- g. Other mitigating measures. Yes
- h. Accident analyses ☒ yes ___ no; Location(s): Carlisle Boulevard with Menaul Boulevard and Carlisle with Prospect avenue (5 years)
- i. Weaving analyses ___ yes ☒ no; Location(s): N/A

14. Other: N/A

SUBMITTAL REQUIREMENTS:

1. Number of copies of report required
 - a. 1 digital copy
2. Submittal Fee – \$1300 for up to 3 reviews plus technology fee

The Traffic Impact Study for this development proposal, project name, shall be performed in accordance with the above criteria. If there are any questions regarding the above items, please contact me at 505-924-3362.

 P.E.

6/13/2023

Matt Grush, P.E.
Senior Engineer
City of Albuquerque, Planning
Transportation Development Section

Date

via: email

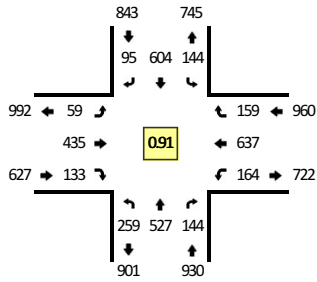
C: TIS Task Force Attendees, file

Traffic Count Summary Sheets

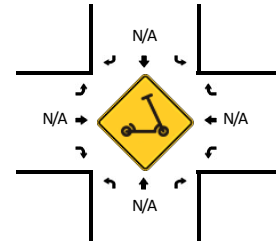
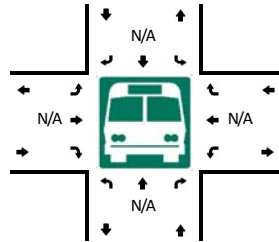
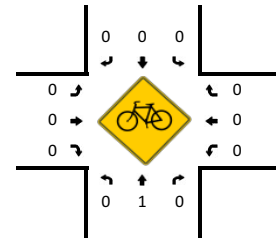
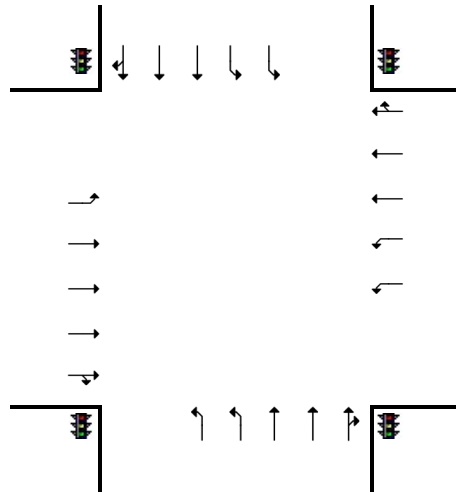
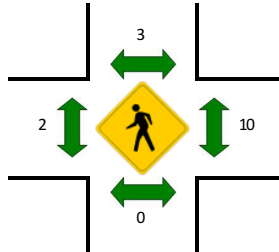
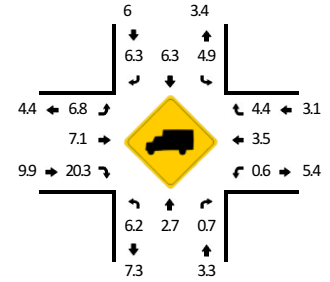
LOCATION: Carlisle Blvd NE -- Menaul Blvd NE
CITY/STATE: Albuquerque, NM

QC JOB #: 16204828
DATE: Tue, May 23 2023

Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM



TRUE DATA TO IMPROVE MOBILITY



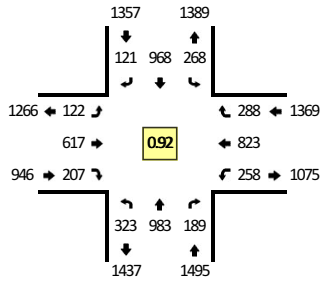
| 15-Min Count Period Beginning At | Carlisle Blvd NE (Northbound) | | | | Carlisle Blvd NE (Southbound) | | | | Menaul Blvd NE (Eastbound) | | | | Menaul Blvd NE (Westbound) | | | | Total | Hourly Totals |
|----------------------------------|-------------------------------|------|-------|---|-------------------------------|------|-------|---|----------------------------|------|-------|---|----------------------------|------|-------|---|-------|---------------|
| | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | | |
| 7:00 AM | 40 | 113 | 22 | 0 | 23 | 87 | 17 | 0 | 5 | 69 | 19 | 0 | 18 | 74 | 27 | 0 | 514 | |
| 7:15 AM | 54 | 100 | 22 | 0 | 28 | 105 | 15 | 0 | 10 | 70 | 28 | 0 | 24 | 115 | 25 | 0 | 596 | |
| 7:30 AM | 69 | 134 | 28 | 0 | 23 | 140 | 23 | 2 | 14 | 104 | 27 | 0 | 36 | 153 | 44 | 0 | 797 | |
| 7:45 AM | 56 | 119 | 34 | 0 | 44 | 167 | 31 | 0 | 15 | 130 | 40 | 1 | 40 | 209 | 41 | 0 | 927 | 2834 |
| 8:00 AM | 73 | 131 | 40 | 0 | 47 | 142 | 20 | 0 | 13 | 107 | 33 | 1 | 44 | 152 | 37 | 0 | 840 | 3160 |
| 8:15 AM | 60 | 143 | 42 | 1 | 28 | 155 | 21 | 0 | 15 | 94 | 33 | 0 | 43 | 123 | 37 | 1 | 796 | 3360 |
| 8:30 AM | 51 | 136 | 27 | 1 | 37 | 140 | 21 | 0 | 8 | 116 | 43 | 1 | 37 | 116 | 40 | 0 | 774 | 3337 |
| 8:45 AM | 64 | 153 | 46 | 2 | 36 | 132 | 20 | 0 | 19 | 129 | 43 | 0 | 31 | 102 | 32 | 1 | 810 | 3220 |
| Peak 15-Min Flowrates | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | Total | |
| | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | | |
| All Vehicles | 224 | 476 | 136 | 0 | 176 | 668 | 124 | 0 | 60 | 520 | 160 | 4 | 160 | 836 | 164 | 0 | 3708 | |
| Heavy Trucks | 12 | 8 | 0 | | 0 | 40 | 12 | | 0 | 28 | 28 | | 4 | 12 | 4 | | 148 | |
| Buses | | | | | | | | | | | | | | | | | | |
| Pedestrians | 0 | 0 | | | 0 | | | | 4 | | | | 4 | | | | 8 | |
| Bicycles | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | |
| Scooters | | | | | | | | | | | | | | | | | | |

Comments:

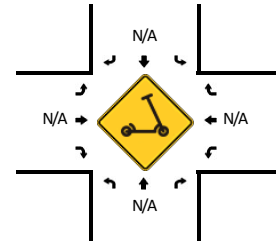
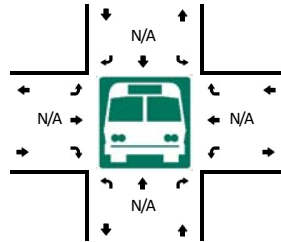
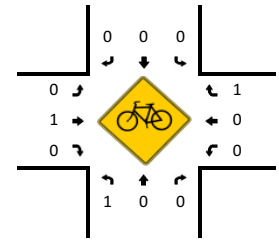
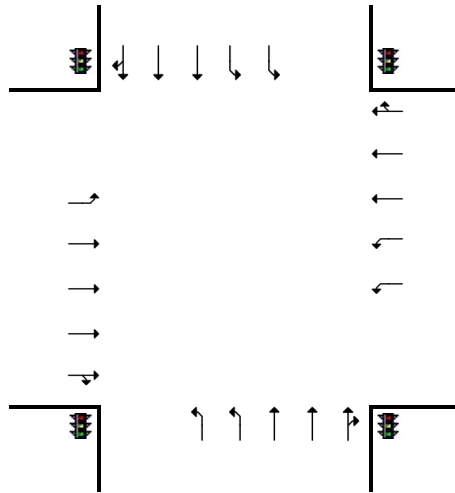
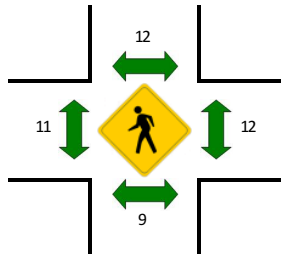
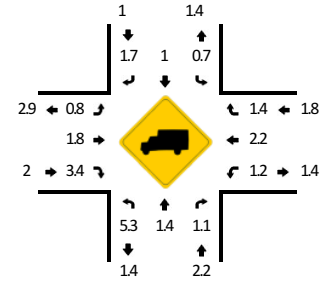
LOCATION: Carlisle Blvd NE -- Menaul Blvd NE
CITY/STATE: Albuquerque, NM

QC JOB #: 16204829
DATE: Mon, May 22 2023

Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:15 PM -- 5:30 PM



TRUE DATA TO IMPROVE MOBILITY



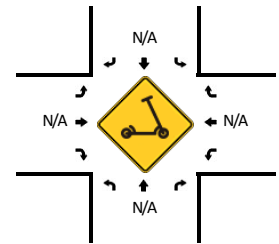
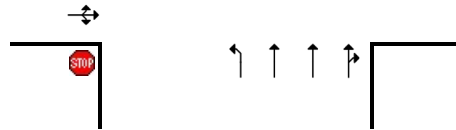
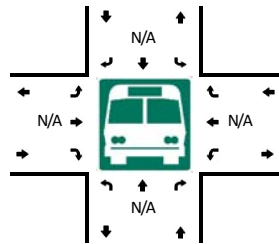
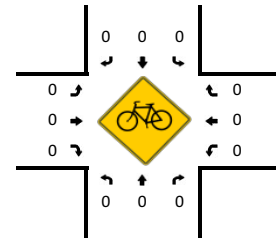
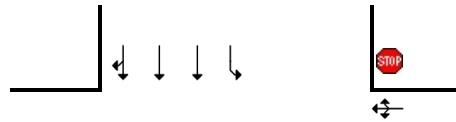
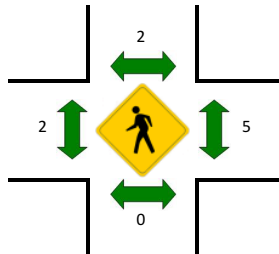
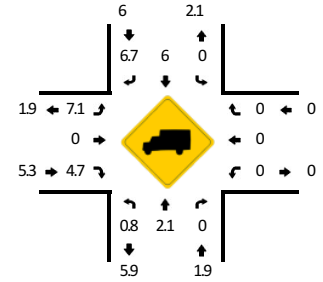
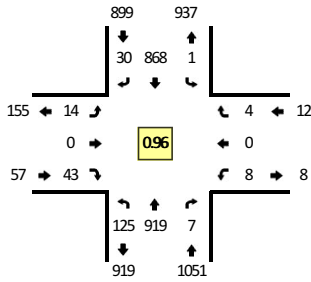
| 15-Min Count Period Beginning At | Carlisle Blvd NE (Northbound) | | | | Carlisle Blvd NE (Southbound) | | | | Menaul Blvd NE (Eastbound) | | | | Menaul Blvd NE (Westbound) | | | | Total | Hourly Totals |
|----------------------------------|-------------------------------|------|-------|---|-------------------------------|------|-------|---|----------------------------|------|-------|---|----------------------------|------|-------|---|-------|---------------|
| | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | | |
| 4:00 PM | 61 | 168 | 39 | 1 | 70 | 228 | 15 | 2 | 11 | 184 | 49 | 0 | 51 | 164 | 86 | 0 | 1129 | |
| 4:15 PM | 49 | 210 | 57 | 1 | 75 | 255 | 21 | 0 | 20 | 154 | 38 | 1 | 63 | 178 | 62 | 0 | 1184 | |
| 4:30 PM | 61 | 190 | 46 | 0 | 65 | 212 | 20 | 0 | 26 | 198 | 59 | 1 | 55 | 168 | 75 | 0 | 1176 | |
| 4:45 PM | 62 | 247 | 63 | 0 | 61 | 233 | 33 | 0 | 38 | 153 | 50 | 1 | 70 | 165 | 66 | 0 | 1242 | 4731 |
| 5:00 PM | 88 | 235 | 35 | 2 | 71 | 225 | 31 | 0 | 27 | 178 | 57 | 1 | 66 | 210 | 86 | 0 | 1312 | 4914 |
| 5:15 PM | 78 | 282 | 56 | 2 | 81 | 286 | 28 | 0 | 26 | 159 | 55 | 1 | 51 | 236 | 57 | 1 | 1399 | 5129 |
| 5:30 PM | 90 | 219 | 35 | 1 | 55 | 224 | 29 | 0 | 27 | 127 | 45 | 1 | 70 | 212 | 79 | 0 | 1214 | 5167 |
| 5:45 PM | 84 | 234 | 44 | 0 | 60 | 206 | 30 | 1 | 26 | 146 | 37 | 2 | 65 | 148 | 78 | 2 | 1163 | 5088 |
| Peak 15-Min Flowrates | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | Total | |
| | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | | |
| All Vehicles | 312 | 1128 | 224 | 8 | 324 | 1144 | 112 | 0 | 104 | 636 | 220 | 4 | 204 | 944 | 228 | 4 | 5596 | |
| Heavy Trucks | 20 | 8 | 4 | | 0 | 12 | 0 | | 0 | 16 | 12 | | 4 | 24 | 0 | | 100 | |
| Buses | | | | | | | | | | | | | | | | | | |
| Pedestrians | | 4 | | | | 8 | | | | 12 | | | | 12 | | | 36 | |
| Bicycles | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | |
| Scooters | | | | | | | | | | | | | | | | | | |

Comments:

LOCATION: Carlisle Blvd NE -- Prospect Ave NE/Apartment Dwy
CITY/STATE: Albuquerque, NM

QC JOB #: 16204830
DATE: Tue, May 23 2023

Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM



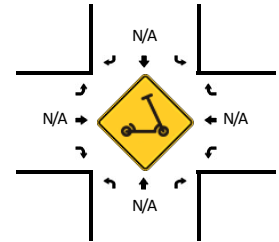
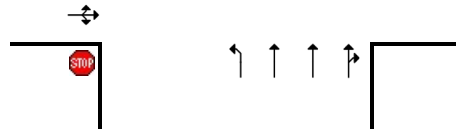
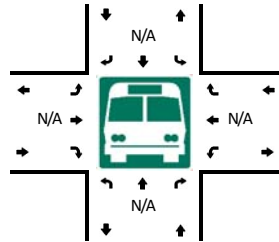
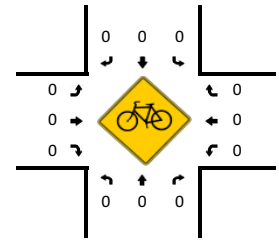
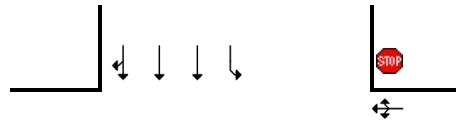
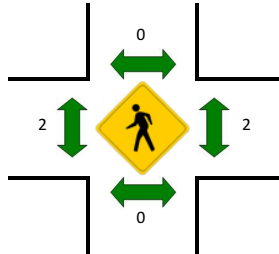
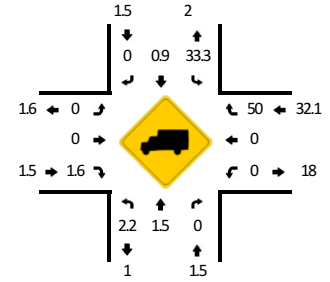
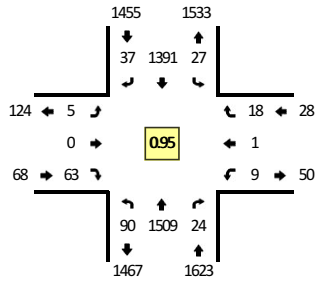
| 15-Min Count Period Beginning At | Carlisle Blvd NE (Northbound) | | | | Carlisle Blvd NE (Southbound) | | | | Prospect Ave NE/Apartment Dwy (Eastbound) | | | | Prospect Ave NE/Apartment Dwy (Westbound) | | | | Total | Hourly Totals |
|----------------------------------|-------------------------------|------|-------|---|-------------------------------|------|-------|---|---|------|-------|---|---|------|-------|---|-------|---------------|
| | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | | |
| 7:00 AM | 11 | 165 | 1 | 0 | 0 | 129 | 2 | 0 | 1 | 0 | 6 | 0 | 6 | 0 | 2 | 0 | 323 | |
| 7:15 AM | 27 | 172 | 3 | 0 | 1 | 154 | 3 | 0 | 3 | 0 | 10 | 0 | 5 | 0 | 2 | 0 | 380 | |
| 7:30 AM | 18 | 234 | 2 | 0 | 0 | 192 | 10 | 0 | 2 | 0 | 7 | 0 | 0 | 0 | 2 | 0 | 467 | |
| 7:45 AM | 33 | 220 | 3 | 0 | 0 | 243 | 7 | 0 | 5 | 0 | 11 | 0 | 3 | 0 | 0 | 0 | 525 | 1695 |
| 8:00 AM | 36 | 234 | 1 | 0 | 0 | 214 | 5 | 0 | 3 | 0 | 11 | 0 | 0 | 0 | 1 | 0 | 505 | 1877 |
| 8:15 AM | 38 | 231 | 1 | 0 | 1 | 219 | 8 | 0 | 4 | 0 | 14 | 0 | 5 | 0 | 1 | 0 | 522 | 2019 |
| 8:30 AM | 23 | 208 | 2 | 1 | 1 | 222 | 5 | 0 | 5 | 0 | 14 | 0 | 1 | 0 | 1 | 0 | 483 | 2035 |
| 8:45 AM | 20 | 274 | 2 | 1 | 4 | 199 | 5 | 0 | 4 | 0 | 10 | 0 | 2 | 0 | 1 | 0 | 522 | 2032 |
| Peak 15-Min Flowrates | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | Total | |
| | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | | |
| All Vehicles | 132 | 880 | 12 | 0 | 0 | 972 | 28 | 0 | 20 | 0 | 44 | 0 | 12 | 0 | 0 | 0 | 2100 | |
| Heavy Trucks | 0 | 8 | 0 | 0 | 0 | 64 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 76 | |
| Buses | | | | | | | | | | | | | | | | | | |
| Pedestrians | | 0 | | | | 4 | | | | 0 | | | | 8 | | | 12 | |
| Bicycles | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | |
| Scooters | | | | | | | | | | | | | | | | | | |

Comments:

LOCATION: Carlisle Blvd NE -- Prospect Ave NE/Apartment Dwy
CITY/STATE: Albuquerque, NM

QC JOB #: 16204831
DATE: Mon, May 22 2023

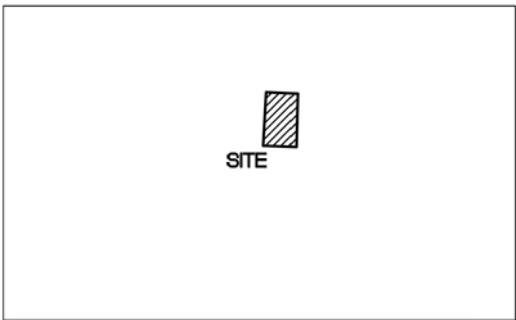
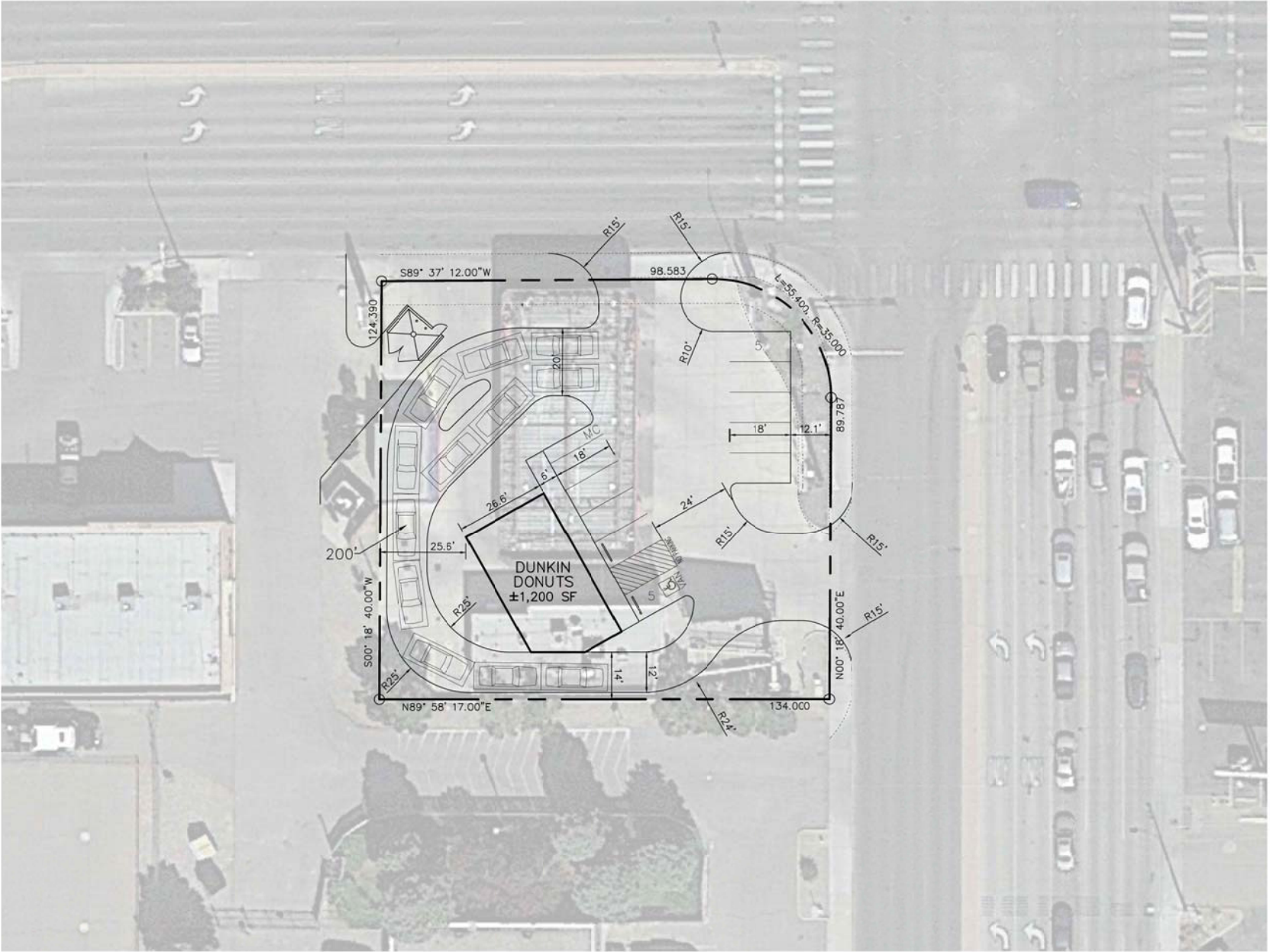
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:15 PM -- 5:30 PM



| 15-Min Count Period Beginning At | Carlisle Blvd NE (Northbound) | | | | Carlisle Blvd NE (Southbound) | | | | Prospect Ave NE/Apartment Dwy (Eastbound) | | | | Prospect Ave NE/Apartment Dwy (Westbound) | | | | Total | Hourly Totals |
|----------------------------------|-------------------------------|------|-------|---|-------------------------------|------|-------|---|---|------|-------|---|---|------|-------|---|-------|---------------|
| | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | | |
| 4:00 PM | 14 | 294 | 2 | 1 | 6 | 325 | 7 | 0 | 3 | 0 | 14 | 0 | 2 | 0 | 3 | 0 | 671 | |
| 4:15 PM | 23 | 279 | 4 | 0 | 4 | 340 | 6 | 1 | 4 | 0 | 20 | 0 | 1 | 0 | 4 | 0 | 686 | |
| 4:30 PM | 20 | 321 | 11 | 0 | 15 | 326 | 6 | 0 | 2 | 0 | 26 | 0 | 8 | 0 | 4 | 0 | 739 | |
| 4:45 PM | 24 | 345 | 3 | 2 | 4 | 344 | 5 | 0 | 1 | 0 | 26 | 0 | 2 | 0 | 7 | 0 | 763 | 2859 |
| 5:00 PM | 19 | 398 | 9 | 1 | 3 | 349 | 7 | 1 | 1 | 0 | 16 | 0 | 0 | 0 | 2 | 0 | 806 | 2994 |
| 5:15 PM | 29 | 386 | 8 | 1 | 11 | 369 | 11 | 0 | 3 | 0 | 9 | 0 | 2 | 1 | 3 | 0 | 833 | 3141 |
| 5:30 PM | 14 | 380 | 4 | 0 | 8 | 329 | 14 | 0 | 0 | 0 | 12 | 0 | 5 | 0 | 6 | 0 | 772 | 3174 |
| 5:45 PM | 20 | 315 | 5 | 2 | 2 | 287 | 15 | 1 | 0 | 1 | 15 | 0 | 2 | 0 | 2 | 0 | 667 | 3078 |
| Peak 15-Min Flowrates | Northbound | | | | Southbound | | | | Eastbound | | | | Westbound | | | | Total | |
| | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | | |
| All Vehicles | 116 | 1544 | 32 | 4 | 44 | 1476 | 44 | 0 | 12 | 0 | 36 | 0 | 8 | 4 | 12 | 0 | 3332 | |
| Heavy Trucks | 4 | 8 | 0 | | 16 | 20 | 0 | | 0 | 0 | 0 | | 0 | 0 | 4 | | 52 | |
| Buses | | | | | | | | | | | | | | | | | | |
| Pedestrians | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | |
| Bicycles | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | |
| Scooters | | | | | | | | | | | | | | | | | | |

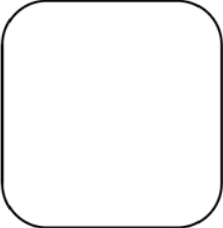
Comments:

Site Plan



**LEGAL DESCRIPTION: TR G-1 PLAT OF SOUTH BARELAS
INDUSTRIAL PARK UNIT #2 CONT 0.8394 AC**

| | |
|------------------------------|-----------|
| TOTAL PARKING SPACES = | 10 SPACES |
| Total Required (8/1,000 SF): | 10 spaces |
| Provided: | 10 spaces |

[illegible]

| | |
|---|-------------------------|
| <p>Dunkin Donuts MENAU AND CARLISLE Albuquerque, NM</p> | <p>SITE PLAN</p> |
|---|-------------------------|

C1.0

ITE Trip Generation Summary Sheets

Coffee/Donut Shop with Drive-Through Window (937)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 6

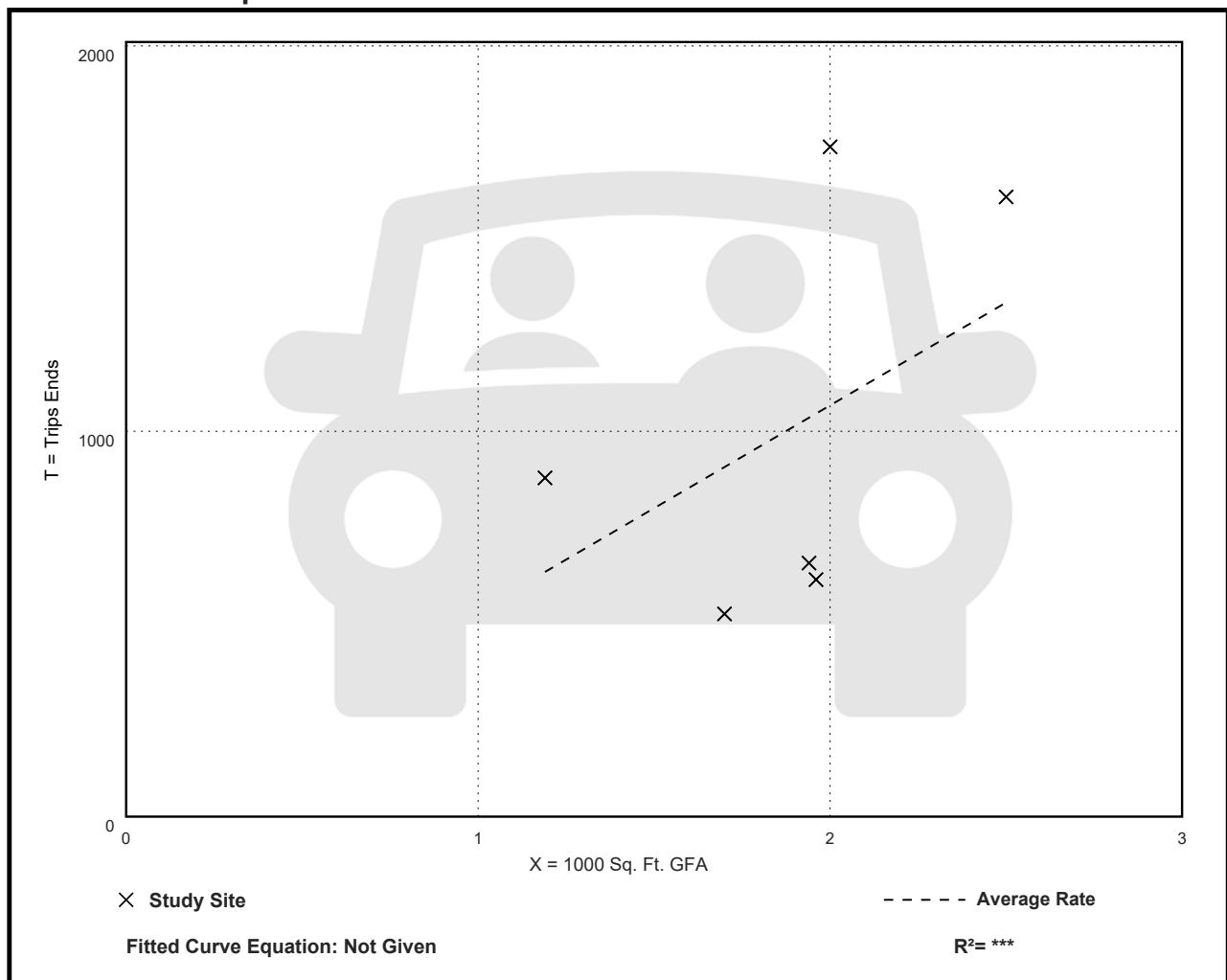
Avg. 1000 Sq. Ft. GFA: 2

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

| Average Rate | Range of Rates | Standard Deviation |
|--------------|-----------------|--------------------|
| 533.57 | 309.41 - 869.00 | 243.65 |

Data Plot and Equation



Coffee/Donut Shop with Drive-Through Window (937)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 78

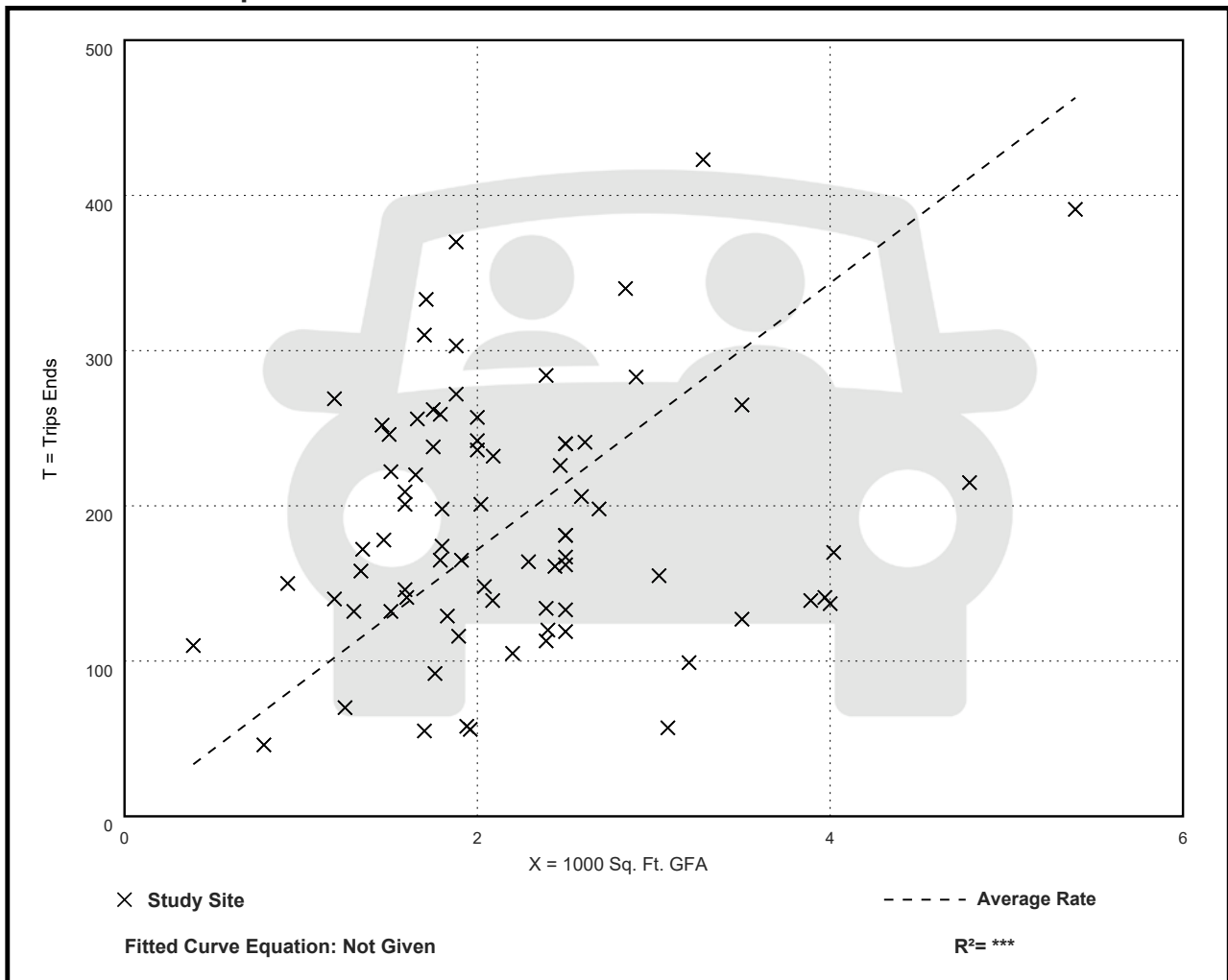
Avg. 1000 Sq. Ft. GFA: 2

Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 85.88 | 18.51 - 282.05 | 44.92 |

Data Plot and Equation



Coffee/Donut Shop with Drive-Through Window (937)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 36

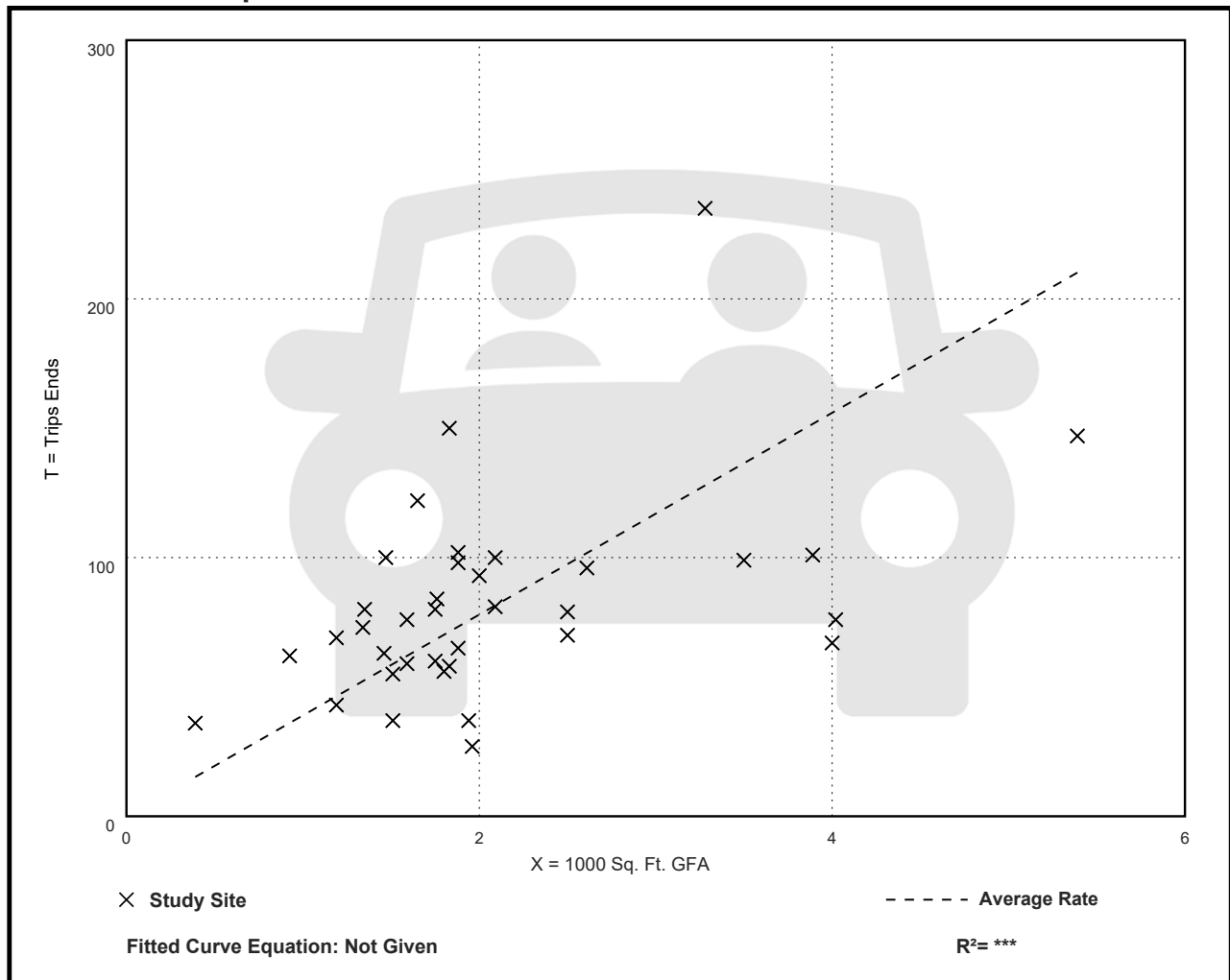
Avg. 1000 Sq. Ft. GFA: 2

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 38.99 | 13.78 - 92.31 | 17.79 |

Data Plot and Equation



Level of Service Criteria

LEVEL OF SERVICE CRITERIA

































| Signalized Intersections | | |
|---|--|--|
| Level of Service | Interpretation | Average Control Delay (seconds per vehicle) |
| A | Favorable progression. Most vehicles arrive during the green indication and travel through the intersection without stopping. | ≤ 10 |
| B | Good progression, with more vehicles stopping than for Level of Service A. | $> 10 - 20$ |
| C | Individual cycle failures (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear. Number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping. | $> 20 - 35$ |
| D | The volume-to-capacity ratio is high and either progression is ineffective or the cycle length is too long. Many vehicles stop and individual cycle failures are noticeable. | $> 35 - 55$ |
| E | Progression is unfavorable. The volume-to-capacity ratio is high and the cycle length is long. Individual cycle failures are frequent. | $> 55 - 80$ |
| F | The volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue. | > 80 |
| Unsignalized Intersections | | |
| Level of Service | | Average Total Delay (sec/veh) |
| A | | 0 - 10 |
| B | | $> 10 - 15$ |
| C | | $> 15 - 25$ |
| D | | $> 25 - 35$ |
| E | | $> 35 - 50$ |
| F | | > 50 |
| Source: <i>Highway Capacity Manual</i> , 6 th Edition. | | |

Capacity Analysis Summary Sheets
Existing Weekday Morning Peak Hour

Lanes, Volumes, Timings

3: Carlisle Boulevard & Menaul Boulevard













08/18/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |   |    | |   |    | |   |    | |   |    | |
| Traffic Volume (vph) | 59 | 435 | 133 | 164 | 637 | 159 | 259 | 527 | 144 | 144 | 604 | 95 |
| Future Volume (vph) | 59 | 435 | 133 | 164 | 637 | 159 | 259 | 527 | 144 | 144 | 604 | 95 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 210 | | 0 | 160 | | 0 | 190 | | 0 | 200 | | 0 |
| Storage Lanes | 2 | | 0 | 2 | | 0 | 2 | | 0 | 2 | | 0 |
| Taper Length (ft) | 100 | | | 110 | | | 150 | | | 80 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.91 | 0.91 | 0.97 | 0.91 | 0.91 | 0.97 | 0.91 | 0.91 |
| Frt | | 0.965 | | | 0.970 | | | 0.968 | | | 0.980 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3273 | 4549 | 0 | 3467 | 4838 | 0 | 3303 | 4895 | 0 | 3335 | 4796 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3273 | 4549 | 0 | 3467 | 4838 | 0 | 3303 | 4895 | 0 | 3335 | 4796 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 70 | | | 55 | | | 60 | | | 28 | |
| Link Speed (mph) | | 35 | | | 35 | | | 35 | | | 35 | |
| Link Distance (ft) | | 212 | | | 603 | | | 166 | | | 716 | |
| Travel Time (s) | | 4.1 | | | 11.7 | | | 3.2 | | | 13.9 | |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Heavy Vehicles (%) | 7% | 7% | 20% | 1% | 4% | 4% | 6% | 3% | 1% | 5% | 6% | 6% |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 65 | 624 | 0 | 180 | 875 | 0 | 285 | 737 | 0 | 158 | 768 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | | | | | | |
| Detector Phase | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 3.0 | 16.0 | | 3.0 | 16.0 | | 3.0 | 16.0 | | 3.0 | 16.0 | |
| Minimum Split (s) | 16.0 | 23.0 | | 9.5 | 23.0 | | 18.0 | 23.0 | | 19.0 | 23.0 | |
| Total Split (s) | 16.0 | 36.0 | | 17.0 | 37.0 | | 18.0 | 33.0 | | 24.0 | 39.0 | |
| Total Split (%) | 14.5% | 32.7% | | 15.5% | 33.6% | | 16.4% | 30.0% | | 21.8% | 35.5% | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | | 3.0 | 4.0 | | 3.0 | 4.0 | |
| All-Red Time (s) | 0.5 | 1.0 | | 0.5 | 1.0 | | 0.5 | 1.0 | | 0.5 | 1.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Lost Time (s) | 3.5 | 5.0 | | 3.5 | 5.0 | | 3.5 | 5.0 | | 3.5 | 5.0 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | Yes | Yes | | Yes | Yes | | Yes | Yes | | Yes | Yes | |
| Recall Mode | None | C-Max | | None | C-Max | | None | Max | | None | Max | |
| Act Effect Green (s) | 7.6 | 33.6 | | 10.9 | 38.7 | | 13.4 | 38.0 | | 10.5 | 35.1 | |
| Actuated g/C Ratio | 0.07 | 0.31 | | 0.10 | 0.35 | | 0.12 | 0.35 | | 0.10 | 0.32 | |
| v/c Ratio | 0.29 | 0.43 | | 0.52 | 0.50 | | 0.71 | 0.43 | | 0.50 | 0.50 | |
| Control Delay | 51.4 | 28.4 | | 52.4 | 28.1 | | 56.4 | 26.5 | | 52.2 | 30.7 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 51.4 | 28.4 | | 52.4 | 28.1 | | 56.4 | 26.5 | | 52.2 | 30.7 | |
| LOS | D | C | | D | C | | E | C | | D | C | |
| Approach Delay | | 30.6 | | | 32.2 | | | 34.8 | | | 34.4 | |
| Approach LOS | | C | | | C | | | C | | | C | |
| Queue Length 50th (ft) | 22 | 113 | | 63 | 169 | | 100 | 132 | | 55 | 156 | |
| Queue Length 95th (ft) | 44 | 156 | | 96 | 218 | | 145 | 178 | | 86 | 197 | |

Lanes, Volumes, Timings

3: Carlisle Boulevard & Menaul Boulevard

08/18/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Internal Link Dist (ft) | | 132 | | | 523 | | | 86 | | | 636 | |
| Turn Bay Length (ft) | 210 | | | 160 | | | 190 | | | 200 | | |
| Base Capacity (vph) | 371 | 1438 | | 425 | 1739 | | 435 | 1728 | | 621 | 1547 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Reduced v/c Ratio | 0.18 | 0.43 | | 0.42 | 0.50 | | 0.66 | 0.43 | | 0.25 | 0.50 | |

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 33.2









Intersection LOS: C

Intersection Capacity Utilization 55.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Carlisle Boulevard & Menaul Boulevard

| | | | |
|--|--|--|--|
|  Ø1 |  Ø2 (R) |  Ø3 |  Ø4 |
| 17 s | 36 s | 18 s | 39 s |
|  Ø5 |  Ø6 (R) |  Ø7 |  Ø8 |
| 16 s | 37 s | 24 s | 33 s |

































| Intersection | | | | | | | | | | | | |
|----------------------------|--------|------------------------|--------|----------------------------|--------|-------|--------|--------------------------------|------|-------|------|------|
| Int Delay, s/veh | 1.6 | | | | | | | | | | | |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | | ↕ | | | ↕ | | ↵ ↑↑↑ | | | ↵ ↑↑↑ | | |
| Traffic Vol, veh/h | 14 | 0 | 43 | 8 | 0 | 4 | 125 | 919 | 7 | 1 | 868 | 30 |
| Future Vol, veh/h | 14 | 0 | 43 | 8 | 0 | 4 | 125 | 919 | 7 | 1 | 868 | 30 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 125 | - | - | 80 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 1 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 |
| Heavy Vehicles, % | 7 | 0 | 5 | 0 | 0 | 0 | 1 | 2 | 0 | 7 | 6 | 0 |
| Mvmt Flow | 15 | 0 | 45 | 8 | 0 | 4 | 130 | 957 | 7 | 1 | 904 | 31 |
| | | | | | | | | | | | | |
| Major/Minor | Minor2 | | Minor1 | | Major1 | | Major2 | | | | | |
| Conflicting Flow All | 1565 | 2146 | 468 | 1585 | 2158 | 482 | 935 | 0 | 0 | 964 | 0 | 0 |
| Stage 1 | 922 | 922 | - | 1221 | 1221 | - | - | - | - | - | - | - |
| Stage 2 | 643 | 1224 | - | 364 | 937 | - | - | - | - | - | - | - |
| Critical Hdwy | 6.54 | 6.5 | 7.2 | 6.4 | 6.5 | 7.1 | 5.32 | - | - | 5.44 | - | - |
| Critical Hdwy Stg 1 | 7.44 | 5.5 | - | 7.3 | 5.5 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.84 | 5.5 | - | 6.7 | 5.5 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.87 | 4 | 3.95 | 3.8 | 4 | 3.9 | 3.11 | - | - | 3.17 | - | - |
| Pot Cap-1 Maneuver | *266 | 96 | 457 | 268 | 94 | *726 | 424 | - | - | 888 | - | - |
| Stage 1 | *218 | 352 | - | 450 | 509 | - | - | - | - | - | - | - |
| Stage 2 | *731 | 508 | - | 580 | 346 | - | - | - | - | - | - | - |
| Platoon blocked, % | 1 | 1 | | 1 | 1 | 1 | | - | - | 1 | - | - |
| Mov Cap-1 Maneuver | *202 | 66 | 457 | 184 | 65 | *726 | 424 | - | - | 888 | - | - |
| Mov Cap-2 Maneuver | *202 | 66 | - | 240 | 150 | - | - | - | - | - | - | - |
| Stage 1 | *151 | 352 | - | 312 | 353 | - | - | - | - | - | - | - |
| Stage 2 | *504 | 352 | - | 523 | 346 | - | - | - | - | - | - | - |
| | | | | | | | | | | | | |
| Approach | EB | | WB | | NB | | SB | | | | | |
| HCM Control Delay, s | 17.4 | | 17.1 | | 2 | | 0 | | | | | |
| HCM LOS | C | | C | | | | | | | | | |
| | | | | | | | | | | | | |
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1WBLn1 | SBL | SBT | SBR | | | | | |
| Capacity (veh/h) | 424 | - | - | 349 | 309 | 888 | - | - | | | | |
| HCM Lane V/C Ratio | 0.307 | - | - | 0.17 | 0.04 | 0.001 | - | - | | | | |
| HCM Control Delay (s) | 17.2 | - | - | 17.4 | 17.1 | 9.1 | - | - | | | | |
| HCM Lane LOS | C | - | - | C | C | A | - | - | | | | |
| HCM 95th %tile Q(veh) | 1.3 | - | - | 0.6 | 0.1 | 0 | - | - | | | | |
| Notes | | | | | | | | | | | | |
| ~: Volume exceeds capacity | | \$: Delay exceeds 300s | | +: Computation Not Defined | | | | *: All major volume in platoon | | | | |

Capacity Analysis Summary Sheets
Existing Weekday Evening Peak Hour

Lanes, Volumes, Timings

3: Carlisle Boulevard & Menaul Boulevard













08/18/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |   |    | |   |    | |   |    | |   |    | |
| Traffic Volume (vph) | 122 | 617 | 207 | 258 | 823 | 288 | 323 | 983 | 189 | 268 | 968 | 121 |
| Future Volume (vph) | 122 | 617 | 207 | 258 | 823 | 288 | 323 | 983 | 189 | 268 | 968 | 121 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 210 | | 0 | 160 | | 0 | 190 | | 0 | 200 | | 0 |
| Storage Lanes | 2 | | 0 | 2 | | 0 | 2 | | 0 | 2 | | 0 |
| Taper Length (ft) | 100 | | | 110 | | | 150 | | | 80 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.91 | 0.91 | 0.97 | 0.91 | 0.91 | 0.97 | 0.91 | 0.91 |
| Frt | | 0.962 | | | 0.961 | | | 0.976 | | | 0.983 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3467 | 4880 | 0 | 3467 | 4899 | 0 | 3335 | 5012 | 0 | 3467 | 5043 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3467 | 4880 | 0 | 3467 | 4899 | 0 | 3335 | 5012 | 0 | 3467 | 5043 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 74 | | | 79 | | | 33 | | | 18 | |
| Link Speed (mph) | | 35 | | | 35 | | | 35 | | | 35 | |
| Link Distance (ft) | | 212 | | | 603 | | | 166 | | | 716 | |
| Travel Time (s) | | 4.1 | | | 11.7 | | | 3.2 | | | 13.9 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 1% | 2% | 3% | 1% | 2% | 1% | 5% | 1% | 1% | 1% | 1% | 2% |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 133 | 896 | 0 | 280 | 1208 | 0 | 351 | 1273 | 0 | 291 | 1184 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | | | | | | |
| Detector Phase | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 3.0 | 16.0 | | 3.0 | 16.0 | | 3.0 | 16.0 | | 3.0 | 16.0 | |
| Minimum Split (s) | 17.0 | 23.0 | | 9.5 | 23.0 | | 19.0 | 23.0 | | 19.0 | 23.0 | |
| Total Split (s) | 17.0 | 43.0 | | 19.0 | 45.0 | | 19.0 | 39.0 | | 19.0 | 39.0 | |
| Total Split (%) | 14.2% | 35.8% | | 15.8% | 37.5% | | 15.8% | 32.5% | | 15.8% | 32.5% | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | | 3.0 | 4.0 | | 3.0 | 4.0 | |
| All-Red Time (s) | 0.5 | 1.0 | | 0.5 | 1.0 | | 0.5 | 1.0 | | 0.5 | 1.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Lost Time (s) | 3.5 | 5.0 | | 3.5 | 5.0 | | 3.5 | 5.0 | | 3.5 | 5.0 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | Yes | Yes | | Yes | Yes | | Yes | Yes | | Yes | Yes | |
| Recall Mode | None | C-Max | | None | C-Max | | None | Max | | None | Max | |
| Act Effect Green (s) | 9.9 | 39.5 | | 14.0 | 43.6 | | 15.1 | 35.3 | | 14.2 | 34.4 | |
| Actuated g/C Ratio | 0.08 | 0.33 | | 0.12 | 0.36 | | 0.13 | 0.29 | | 0.12 | 0.29 | |
| v/c Ratio | 0.46 | 0.54 | | 0.69 | 0.66 | | 0.84 | 0.85 | | 0.71 | 0.81 | |
| Control Delay | 57.4 | 31.7 | | 60.1 | 32.2 | | 69.2 | 45.6 | | 60.8 | 44.6 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 57.4 | 31.7 | | 60.1 | 32.2 | | 69.2 | 45.6 | | 60.8 | 44.6 | |
| LOS | E | C | | E | C | | E | D | | E | D | |
| Approach Delay | | 35.0 | | | 37.4 | | | 50.7 | | | 47.8 | |
| Approach LOS | | C | | | D | | | D | | | D | |
| Queue Length 50th (ft) | 51 | 191 | | 108 | 266 | | 138 | 336 | | 112 | 309 | |
| Queue Length 95th (ft) | 82 | 238 | | 154 | 331 | | #209 | 399 | | 159 | 368 | |

Lanes, Volumes, Timings

3: Carlisle Boulevard & Menaul Boulevard

08/18/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Internal Link Dist (ft) | | 132 | | | 523 | | | 86 | | | 636 | |
| Turn Bay Length (ft) | 210 | | | 160 | | | 190 | | | 200 | | |
| Base Capacity (vph) | 390 | 1654 | | 447 | 1828 | | 430 | 1496 | | 447 | 1457 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Reduced v/c Ratio | 0.34 | 0.54 | | 0.63 | 0.66 | | 0.82 | 0.85 | | 0.65 | 0.81 | |

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 43.5

Intersection LOS: D

Intersection Capacity Utilization 71.7%









ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Carlisle Boulevard & Menaul Boulevard

| | | | |
|--|--|--|--|
|  Ø1 |  Ø2 (R) |  Ø3 |  Ø4 |
| 19 s | 43 s | 19 s | 39 s |
|  Ø5 |  Ø6 (R) |  Ø7 |  Ø8 |
| 17 s | 45 s | 19 s | 39 s |

| Intersection | | | | | | | | | | | | |
|--------------------------|------|------|------|------|------|------|-------|------|------|-------|------|------|
| Int Delay, s/veh | 1.7 | | | | | | | | | | | |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | | ↕ | | | ↕ | | ↕ ↑↑↑ | | | ↕ ↑↑↑ | | |
| Traffic Vol, veh/h | 5 | 0 | 63 | 9 | 1 | 16 | 90 | 1509 | 24 | 27 | 1391 | 37 |
| Future Vol, veh/h | 5 | 0 | 63 | 9 | 1 | 16 | 90 | 1509 | 24 | 27 | 1391 | 37 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 125 | - | - | 80 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 1 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 |
| Heavy Vehicles, % | 2 | 0 | 2 | 0 | 0 | 50 | 2 | 2 | 0 | 33 | 1 | 0 |
| Mvmt Flow | 5 | 0 | 66 | 9 | 1 | 17 | 95 | 1588 | 25 | 28 | 1464 | 39 |

| Major/Minor | Minor2 | | Minor1 | | Major1 | | Major2 | | Major2 | | Major2 | |
|----------------------|--------|------|--------|------|--------|------|--------|---|--------|------|--------|---|
| Conflicting Flow All | 2366 | 3343 | 752 | 2433 | 3350 | 807 | 1503 | 0 | 0 | 1613 | 0 | 0 |
| Stage 1 | 1540 | 1540 | - | 1791 | 1791 | - | - | - | - | - | - | - |
| Stage 2 | 826 | 1803 | - | 642 | 1559 | - | - | - | - | - | - | - |
| Critical Hdwy | 6.44 | 6.5 | 7.14 | 6.4 | 6.5 | 8.1 | 5.34 | - | - | 5.96 | - | - |
| Critical Hdwy Stg 1 | 7.34 | 5.5 | - | 7.3 | 5.5 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.74 | 5.5 | - | 6.7 | 5.5 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.82 | 4 | 3.92 | 3.8 | 4 | 4.4 | 3.12 | - | - | 3.43 | - | - |
| Pot Cap-1 Maneuver | *151 | 15 | 303 | 132 | 15 | *503 | 222 | - | - | *645 | - | - |
| Stage 1 | *83 | 179 | - | 504 | 504 | - | - | - | - | - | - | - |
| Stage 2 | *579 | 494 | - | 395 | 175 | - | - | - | - | - | - | - |
| Platoon blocked, % | 1 | 1 | | 1 | 1 | 1 | | - | - | 1 | - | - |
| Mov Cap-1 Maneuver | *93 | 8 | 303 | 67 | 8 | *503 | 222 | - | - | *645 | - | - |
| Mov Cap-2 Maneuver | *93 | 8 | - | 137 | 55 | - | - | - | - | - | - | - |
| Stage 1 | *47 | 171 | - | 288 | 288 | - | - | - | - | - | - | - |
| Stage 2 | *319 | 283 | - | 295 | 167 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|----------------------|----|------|-----|-----|
| HCM Control Delay, s | 24 | 23.2 | 1.8 | 0.2 |
| HCM LOS | C | C | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1WBLn1 | SBL | SBT | SBR |
|-----------------------|-------|-----|-----|------------|-------|-------|-----|
| Capacity (veh/h) | 222 | - | - | 260 | 225 | *645 | - |
| HCM Lane V/C Ratio | 0.427 | - | - | 0.275 | 0.122 | 0.044 | - |
| HCM Control Delay (s) | 32.8 | - | - | 24 | 23.2 | 10.8 | - |
| HCM Lane LOS | D | - | - | C | C | B | - |
| HCM 95th %tile Q(veh) | 2 | - | - | 1.1 | 0.4 | 0.1 | - |

































| Notes | | | |
|----------------------------|------------------------|----------------------------|--------------------------------|
| ~: Volume exceeds capacity | \$: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

Capacity Analysis Summary Sheets
Year 2024 No-Build Weekday Morning Peak Hour

Lanes, Volumes, Timings

3: Carlisle Boulevard & Menaul Boulevard













08/18/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |   |    | |   |    | |   |    | |   |    | |
| Traffic Volume (vph) | 60 | 439 | 137 | 171 | 643 | 161 | 270 | 558 | 153 | 145 | 624 | 96 |
| Future Volume (vph) | 60 | 439 | 137 | 171 | 643 | 161 | 270 | 558 | 153 | 145 | 624 | 96 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 210 | | 0 | 160 | | 0 | 190 | | 0 | 200 | | 0 |
| Storage Lanes | 2 | | 0 | 2 | | 0 | 2 | | 0 | 2 | | 0 |
| Taper Length (ft) | 100 | | | 110 | | | 150 | | | 80 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.91 | 0.91 | 0.97 | 0.91 | 0.91 | 0.97 | 0.91 | 0.91 |
| Frt | | 0.964 | | | 0.970 | | | 0.968 | | | 0.980 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3273 | 4542 | 0 | 3467 | 4838 | 0 | 3303 | 4895 | 0 | 3335 | 4796 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3273 | 4542 | 0 | 3467 | 4838 | 0 | 3303 | 4895 | 0 | 3335 | 4796 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 72 | | | 56 | | | 60 | | | 27 | |
| Link Speed (mph) | | 35 | | | 35 | | | 35 | | | 35 | |
| Link Distance (ft) | | 212 | | | 603 | | | 166 | | | 716 | |
| Travel Time (s) | | 4.1 | | | 11.7 | | | 3.2 | | | 13.9 | |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Heavy Vehicles (%) | 7% | 7% | 20% | 1% | 4% | 4% | 6% | 3% | 1% | 5% | 6% | 6% |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 66 | 633 | 0 | 188 | 884 | 0 | 297 | 781 | 0 | 159 | 791 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | | | | | | |
| Detector Phase | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 3.0 | 16.0 | | 3.0 | 16.0 | | 3.0 | 16.0 | | 3.0 | 16.0 | |
| Minimum Split (s) | 16.0 | 23.0 | | 9.5 | 23.0 | | 18.0 | 23.0 | | 19.0 | 23.0 | |
| Total Split (s) | 16.0 | 36.0 | | 17.0 | 37.0 | | 18.0 | 33.0 | | 24.0 | 39.0 | |
| Total Split (%) | 14.5% | 32.7% | | 15.5% | 33.6% | | 16.4% | 30.0% | | 21.8% | 35.5% | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | | 3.0 | 4.0 | | 3.0 | 4.0 | |
| All-Red Time (s) | 0.5 | 1.0 | | 0.5 | 1.0 | | 0.5 | 1.0 | | 0.5 | 1.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Lost Time (s) | 3.5 | 5.0 | | 3.5 | 5.0 | | 3.5 | 5.0 | | 3.5 | 5.0 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | Yes | Yes | | Yes | Yes | | Yes | Yes | | Yes | Yes | |
| Recall Mode | None | C-Max | | None | C-Max | | None | Max | | None | Max | |
| Act Effect Green (s) | 7.6 | 33.4 | | 11.1 | 38.7 | | 13.6 | 37.9 | | 10.6 | 34.9 | |
| Actuated g/C Ratio | 0.07 | 0.30 | | 0.10 | 0.35 | | 0.12 | 0.34 | | 0.10 | 0.32 | |
| v/c Ratio | 0.29 | 0.44 | | 0.54 | 0.51 | | 0.73 | 0.45 | | 0.50 | 0.51 | |
| Control Delay | 51.5 | 28.6 | | 52.6 | 28.2 | | 57.4 | 27.0 | | 52.1 | 31.1 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 51.5 | 28.6 | | 52.6 | 28.2 | | 57.4 | 27.0 | | 52.1 | 31.1 | |
| LOS | D | C | | D | C | | E | C | | D | C | |
| Approach Delay | | 30.7 | | | 32.4 | | | 35.4 | | | 34.6 | |
| Approach LOS | | C | | | C | | | D | | | C | |
| Queue Length 50th (ft) | 23 | 116 | | 65 | 172 | | 104 | 143 | | 55 | 162 | |
| Queue Length 95th (ft) | 44 | 158 | | 100 | 221 | | 151 | 190 | | 87 | 204 | |

Lanes, Volumes, Timings

3: Carlisle Boulevard & Menaul Boulevard

08/18/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Internal Link Dist (ft) | | 132 | | | 523 | | | 86 | | | 636 | |
| Turn Bay Length (ft) | 210 | | | 160 | | | 190 | | | 200 | | |
| Base Capacity (vph) | 371 | 1430 | | 425 | 1739 | | 435 | 1725 | | 621 | 1541 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Reduced v/c Ratio | 0.18 | 0.44 | | 0.44 | 0.51 | | 0.68 | 0.45 | | 0.26 | 0.51 | |

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 33.5









Intersection LOS: C

Intersection Capacity Utilization 56.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Carlisle Boulevard & Menaul Boulevard

| | | | |
|--|--|--|--|
|  Ø1 |  Ø2 (R) |  Ø3 |  Ø4 |
| 17 s | 36 s | 18 s | 39 s |
|  Ø5 |  Ø6 (R) |  Ø7 |  Ø8 |
| 16 s | 37 s | 24 s | 33 s |

| Intersection | | | | | | | | | | | | |
|--------------------------|------|------|------|------|------|------|-------|-------|------|-------|-------|------|
| Int Delay, s/veh | 2.2 | | | | | | | | | | | |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | | ↕ | | | ↕ | | ↕ ↕ ↕ | ↕ ↕ ↕ | | ↕ ↕ ↕ | ↕ ↕ ↕ | |
| Traffic Vol, veh/h | 14 | 0 | 43 | 35 | 0 | 27 | 126 | 939 | 20 | 23 | 877 | 30 |
| Future Vol, veh/h | 14 | 0 | 43 | 35 | 0 | 27 | 126 | 939 | 20 | 23 | 877 | 30 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 125 | - | - | 80 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 1 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 |
| Heavy Vehicles, % | 7 | 0 | 5 | 0 | 0 | 0 | 1 | 2 | 0 | 7 | 6 | 0 |
| Mvmt Flow | 15 | 0 | 45 | 36 | 0 | 28 | 131 | 978 | 21 | 24 | 914 | 31 |

| Major/Minor | Minor2 | | Minor1 | | Major1 | | Major2 | | | | | |
|----------------------|--------|------|--------|------|--------|------|--------|---|---|------|---|---|
| Conflicting Flow All | 1631 | 2239 | 473 | 1665 | 2244 | 500 | 945 | 0 | 0 | 999 | 0 | 0 |
| Stage 1 | 978 | 978 | - | 1251 | 1251 | - | - | - | - | - | - | - |
| Stage 2 | 653 | 1261 | - | 414 | 993 | - | - | - | - | - | - | - |
| Critical Hdwy | 6.54 | 6.5 | 7.2 | 6.4 | 6.5 | 7.1 | 5.32 | - | - | 5.44 | - | - |
| Critical Hdwy Stg 1 | 7.44 | 5.5 | - | 7.3 | 5.5 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.84 | 5.5 | - | 6.7 | 5.5 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.87 | 4 | 3.95 | 3.8 | 4 | 3.9 | 3.11 | - | - | 3.17 | - | - |
| Pot Cap-1 Maneuver | *237 | 81 | 454 | 234 | 80 | *726 | 419 | - | - | 846 | - | - |
| Stage 1 | *199 | 331 | - | 425 | 490 | - | - | - | - | - | - | - |
| Stage 2 | *731 | 484 | - | 541 | 326 | - | - | - | - | - | - | - |
| Platoon blocked, % | 1 | 1 | | 1 | 1 | 1 | | - | - | 1 | - | - |
| Mov Cap-1 Maneuver | *169 | 54 | 454 | 156 | 54 | *726 | 419 | - | - | 846 | - | - |
| Mov Cap-2 Maneuver | *169 | 54 | - | 214 | 131 | - | - | - | - | - | - | - |
| Stage 1 | *137 | 322 | - | 292 | 337 | - | - | - | - | - | - | - |
| Stage 2 | *483 | 332 | - | 474 | 317 | - | - | - | - | - | - | - |

| Approach | EB | | WB | | NB | | SB | |
|----------------------|------|--|------|--|----|--|-----|--|
| HCM Control Delay, s | 18.7 | | 19.7 | | 2 | | 0.2 | |
| HCM LOS | C | | C | | | | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1WBLn1 | SBL | SBT | SBR |
|-----------------------|-------|-----|-----|------------|-------|-------|-----|
| Capacity (veh/h) | 419 | - | - | 321 | 309 | 846 | - |
| HCM Lane V/C Ratio | 0.313 | - | - | 0.185 | 0.209 | 0.028 | - |
| HCM Control Delay (s) | 17.5 | - | - | 18.7 | 19.7 | 9.4 | - |
| HCM Lane LOS | C | - | - | C | C | A | - |
| HCM 95th %tile Q(veh) | 1.3 | - | - | 0.7 | 0.8 | 0.1 | - |


































| Notes | | | |
|----------------------------|------------------------|----------------------------|--------------------------------|
| ~: Volume exceeds capacity | \$: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

Capacity Analysis Summary Sheets
Year 2024 No-Build Weekday Evening Peak Hour

Lanes, Volumes, Timings

3: Carlisle Boulevard & Menaul Boulevard













08/18/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |   |    | |   |    | |   |    | |   |    |  |
| Traffic Volume (vph) | 123 | 623 | 213 | 270 | 831 | 291 | 333 | 1017 | 198 | 271 | 999 | 122 |
| Future Volume (vph) | 123 | 623 | 213 | 270 | 831 | 291 | 333 | 1017 | 198 | 271 | 999 | 122 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 210 | | 0 | 160 | | 0 | 190 | | 0 | 200 | | 0 |
| Storage Lanes | 2 | | 0 | 2 | | 0 | 2 | | 0 | 2 | | 0 |
| Taper Length (ft) | 100 | | | 110 | | | 150 | | | 80 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.91 | 0.91 | 0.97 | 0.91 | 0.91 | 0.97 | 0.91 | 0.91 |
| Frt | | 0.962 | | | 0.961 | | | 0.976 | | | 0.984 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3467 | 4880 | 0 | 3467 | 4899 | 0 | 3335 | 5012 | 0 | 3467 | 5048 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3467 | 4880 | 0 | 3467 | 4899 | 0 | 3335 | 5012 | 0 | 3467 | 5048 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 75 | | | 79 | | | 33 | | | 18 | |
| Link Speed (mph) | | 35 | | | 35 | | | 35 | | | 35 | |
| Link Distance (ft) | | 212 | | | 603 | | | 166 | | | 716 | |
| Travel Time (s) | | 4.1 | | | 11.7 | | | 3.2 | | | 13.9 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 1% | 2% | 3% | 1% | 2% | 1% | 5% | 1% | 1% | 1% | 1% | 2% |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 134 | 909 | 0 | 293 | 1219 | 0 | 362 | 1320 | 0 | 295 | 1219 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | | | | | | |
| Detector Phase | 5 | 2 | | 1 | 6 | | 3 | 8 | | 7 | 4 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 3.0 | 16.0 | | 3.0 | 16.0 | | 3.0 | 16.0 | | 3.0 | 16.0 | |
| Minimum Split (s) | 17.0 | 23.0 | | 9.5 | 23.0 | | 19.0 | 23.0 | | 19.0 | 23.0 | |
| Total Split (s) | 17.0 | 43.0 | | 19.0 | 45.0 | | 19.0 | 39.0 | | 19.0 | 39.0 | |
| Total Split (%) | 14.2% | 35.8% | | 15.8% | 37.5% | | 15.8% | 32.5% | | 15.8% | 32.5% | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | | 3.0 | 4.0 | | 3.0 | 4.0 | |
| All-Red Time (s) | 0.5 | 1.0 | | 0.5 | 1.0 | | 0.5 | 1.0 | | 0.5 | 1.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Lost Time (s) | 3.5 | 5.0 | | 3.5 | 5.0 | | 3.5 | 5.0 | | 3.5 | 5.0 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | Yes | Yes | | Yes | Yes | | Yes | Yes | | Yes | Yes | |
| Recall Mode | None | C-Max | | None | C-Max | | None | Max | | None | Max | |
| Act Effect Green (s) | 10.0 | 39.2 | | 14.3 | 43.5 | | 15.2 | 35.2 | | 14.3 | 34.3 | |
| Actuated g/C Ratio | 0.08 | 0.33 | | 0.12 | 0.36 | | 0.13 | 0.29 | | 0.12 | 0.29 | |
| v/c Ratio | 0.47 | 0.55 | | 0.71 | 0.67 | | 0.86 | 0.88 | | 0.72 | 0.84 | |
| Control Delay | 57.4 | 32.0 | | 60.9 | 32.4 | | 71.2 | 47.9 | | 61.0 | 45.9 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 57.4 | 32.0 | | 60.9 | 32.4 | | 71.2 | 47.9 | | 61.0 | 45.9 | |
| LOS | E | C | | E | C | | E | D | | E | D | |
| Approach Delay | | 35.2 | | | 37.9 | | | 52.9 | | | 48.9 | |
| Approach LOS | | D | | | D | | | D | | | D | |
| Queue Length 50th (ft) | 52 | 196 | | 113 | 270 | | 143 | 354 | | 113 | 321 | |
| Queue Length 95th (ft) | 82 | 242 | | 160 | 336 | | #220 | #442 | | 161 | 381 | |

Lanes, Volumes, Timings

3: Carlisle Boulevard & Menaul Boulevard

08/18/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Internal Link Dist (ft) | 132 | | | 523 | | | 86 | | | 636 | | |
| Turn Bay Length (ft) | 210 | | | 160 | | | 190 | | | 200 | | |
| Base Capacity (vph) | 390 | 1646 | | 447 | 1827 | | 430 | 1493 | | 447 | 1455 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Reduced v/c Ratio | 0.34 | 0.55 | | 0.66 | 0.67 | | 0.84 | 0.88 | | 0.66 | 0.84 | |

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 44.7

Intersection LOS: D

Intersection Capacity Utilization 72.9%









ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Carlisle Boulevard & Menaul Boulevard

| | | | |
|--|--|--|--|
|  Ø1 |  Ø2 (R) |  Ø3 |  Ø4 |
| 19 s | 43 s | 19 s | 39 s |
|  Ø5 |  Ø6 (R) |  Ø7 |  Ø8 |
| 17 s | 45 s | 19 s | 39 s |

| Intersection | | | | | | | | | | | | |
|--------------------------|------|------|------|------|------|------|-------|------|------|-------|------|------|
| Int Delay, s/veh | 2.6 | | | | | | | | | | | |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | | ↕ | | | ↕ | | ↕ ↑↑↑ | | | ↕ ↑↑↑ | | |
| Traffic Vol, veh/h | 5 | 0 | 64 | 34 | 1 | 39 | 91 | 1541 | 45 | 61 | 1405 | 37 |
| Future Vol, veh/h | 5 | 0 | 64 | 34 | 1 | 39 | 91 | 1541 | 45 | 61 | 1405 | 37 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 125 | - | - | 80 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 1 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 |
| Heavy Vehicles, % | 2 | 0 | 2 | 0 | 0 | 50 | 2 | 2 | 0 | 33 | 1 | 0 |
| Mvmt Flow | 5 | 0 | 67 | 36 | 1 | 41 | 96 | 1622 | 47 | 64 | 1479 | 39 |

| Major/Minor | Minor2 | | Minor1 | | Major1 | | Major2 | | | | | |
|----------------------|--------|------|--------|------|--------|------|--------|---|---|------|---|---|
| Conflicting Flow All | 2468 | 3488 | 759 | 2558 | 3484 | 835 | 1518 | 0 | 0 | 1669 | 0 | 0 |
| Stage 1 | 1627 | 1627 | - | 1838 | 1838 | - | - | - | - | - | - | - |
| Stage 2 | 841 | 1861 | - | 720 | 1646 | - | - | - | - | - | - | - |
| Critical Hdwy | 6.44 | 6.5 | 7.14 | 6.4 | 6.5 | 8.1 | 5.34 | - | - | 5.96 | - | - |
| Critical Hdwy Stg 1 | 7.34 | 5.5 | - | 7.3 | 5.5 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.74 | 5.5 | - | 6.7 | 5.5 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.82 | 4 | 3.92 | 3.8 | 4 | 4.4 | 3.12 | - | - | 3.43 | - | - |
| Pot Cap-1 Maneuver | *120 | 10 | 300 | 100 | 10 | *503 | 218 | - | - | *645 | - | - |
| Stage 1 | *72 | 162 | - | 449 | 467 | - | - | - | - | - | - | - |
| Stage 2 | *579 | 450 | - | 354 | 159 | - | - | - | - | - | - | - |
| Platoon blocked, % | 1 | 1 | | 1 | 1 | 1 | | - | - | 1 | - | - |
| Mov Cap-1 Maneuver | *66 | 5 | 300 | 47 | 5 | *503 | 218 | - | - | *645 | - | - |
| Mov Cap-2 Maneuver | *66 | 5 | - | 106 | 38 | - | - | - | - | - | - | - |
| Stage 1 | *40 | 146 | - | 251 | 262 | - | - | - | - | - | - | - |
| Stage 2 | *296 | 252 | - | 247 | 143 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|----------------------|------|------|-----|-----|
| HCM Control Delay, s | 26.5 | 41.5 | 1.8 | 0.5 |
| HCM LOS | D | E | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1WBLn1 | SBL | SBT | SBR |
|-----------------------|-------|-----|-----|-------------|------|-----|-----|
| Capacity (veh/h) | 218 | - | - | 239 174 | *645 | - | - |
| HCM Lane V/C Ratio | 0.439 | - | - | 0.304 0.448 | 0.1 | - | - |
| HCM Control Delay (s) | 33.9 | - | - | 26.5 41.5 | 11.2 | - | - |
| HCM Lane LOS | D | - | - | D E | B | - | - |
| HCM 95th %tile Q(veh) | 2.1 | - | - | 1.2 2.1 | 0.3 | - | - |

































| Notes | | | |
|----------------------------|------------------------|----------------------------|--------------------------------|
| ~: Volume exceeds capacity | \$: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

Capacity Analysis Summary Sheets
Year 2024 Total Projected Weekday Morning Peak Hour

Lanes, Volumes, Timings

3: Carlisle Boulevard & Menaul Boulevard

08/18/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBU | NBL | NBT | NBR | SBL | SBT |
| Lane Configurations |   |    | |   |    | | |   |    | |   |    |
| Traffic Volume (vph) | 63 | 441 | 137 | 173 | 643 | 161 | 9 | 272 | 558 | 153 | 145 | 629 |
| Future Volume (vph) | 63 | 441 | 137 | 173 | 643 | 161 | 9 | 272 | 558 | 153 | 145 | 629 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 210 | | 0 | 160 | | 0 | | 190 | | 0 | 200 | |
| Storage Lanes | 2 | | 0 | 2 | | 0 | | 2 | | 0 | 2 | |
| Taper Length (ft) | 100 | | | 110 | | | | 150 | | | 80 | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.91 | 0.91 | 0.91 | 0.97 | 0.91 | 0.91 | 0.97 | 0.91 |
| Frt | | 0.964 | | | 0.970 | | | | 0.968 | | | 0.980 |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.950 | | | 0.950 | |
| Satd. Flow (prot) | 3273 | 4542 | 0 | 3467 | 4838 | 0 | 0 | 3308 | 4895 | 0 | 3335 | 4796 |
| Flt Permitted | 0.950 | | | 0.950 | | | | 0.950 | | | 0.950 | |
| Satd. Flow (perm) | 3273 | 4542 | 0 | 3467 | 4838 | 0 | 0 | 3308 | 4895 | 0 | 3335 | 4796 |
| Right Turn on Red | | | Yes | | | Yes | | | | Yes | | |
| Satd. Flow (RTOR) | | 71 | | | 56 | | | | 60 | | | 27 |
| Link Speed (mph) | | 35 | | | 35 | | | | 35 | | | 35 |
| Link Distance (ft) | | 212 | | | 603 | | | | 166 | | | 716 |
| Travel Time (s) | | 4.1 | | | 11.7 | | | | 3.2 | | | 13.9 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.92 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Heavy Vehicles (%) | 7% | 7% | 20% | 1% | 4% | 4% | 2% | 6% | 3% | 1% | 5% | 6% |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 69 | 636 | 0 | 190 | 884 | 0 | 0 | 309 | 781 | 0 | 159 | 796 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | Prot | NA | | Prot | NA |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 3 | 8 | | 7 | 4 |
| Permitted Phases | | | | | | | | | | | | |
| Detector Phase | 5 | 2 | | 1 | 6 | | 3 | 3 | 8 | | 7 | 4 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 3.0 | 16.0 | | 3.0 | 16.0 | | 3.0 | 3.0 | 16.0 | | 3.0 | 16.0 |
| Minimum Split (s) | 16.0 | 23.0 | | 9.5 | 23.0 | | 18.0 | 18.0 | 23.0 | | 19.0 | 23.0 |
| Total Split (s) | 16.0 | 36.0 | | 17.0 | 37.0 | | 18.0 | 18.0 | 33.0 | | 24.0 | 39.0 |
| Total Split (%) | 14.5% | 32.7% | | 15.5% | 33.6% | | 16.4% | 16.4% | 30.0% | | 21.8% | 35.5% |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 |
| All-Red Time (s) | 0.5 | 1.0 | | 0.5 | 1.0 | | 0.5 | 0.5 | 1.0 | | 0.5 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Lost Time (s) | 3.5 | 5.0 | | 3.5 | 5.0 | | | 3.5 | 5.0 | | 3.5 | 5.0 |
| Lead/Lag | Lead | Lag | | Lead | Lag | | Lead | Lead | Lag | | Lead | Lag |
| Lead-Lag Optimize? | Yes | Yes | | Yes | Yes | | Yes | Yes | Yes | | Yes | Yes |
| Recall Mode | None | C-Max | | None | C-Max | | None | None | Max | | None | Max |
| Act Effect Green (s) | 7.7 | 33.4 | | 11.1 | 38.6 | | | 13.7 | 37.9 | | 10.6 | 34.8 |
| Actuated g/C Ratio | 0.07 | 0.30 | | 0.10 | 0.35 | | | 0.12 | 0.34 | | 0.10 | 0.32 |
| v/c Ratio | 0.30 | 0.45 | | 0.54 | 0.51 | | | 0.75 | 0.45 | | 0.50 | 0.52 |
| Control Delay | 51.6 | 28.7 | | 52.6 | 28.2 | | | 58.4 | 27.0 | | 52.1 | 31.3 |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Delay | 51.6 | 28.7 | | 52.6 | 28.2 | | | 58.4 | 27.0 | | 52.1 | 31.3 |
| LOS | D | C | | D | C | | | E | C | | D | C |
| Approach Delay | | 31.0 | | | 32.5 | | | | 35.9 | | | 34.7 |
| Approach LOS | | C | | | C | | | | D | | | C |
| Queue Length 50th (ft) | 24 | 117 | | 67 | 172 | | | 109 | 143 | | 55 | 163 |
| Queue Length 95th (ft) | 46 | 159 | | 102 | 221 | | | 157 | 190 | | 87 | 205 |

Lanes, Volumes, Timings

3: Carlisle Boulevard & Menaul Boulevard













08/18/2023

| | |
|-------------------------|------|
| Lane Group | SBR |
| Lane Configurations | |
| Traffic Volume (vph) | 96 |
| Future Volume (vph) | 96 |
| Ideal Flow (vphpl) | 1900 |
| Storage Length (ft) | 0 |
| Storage Lanes | 0 |
| Taper Length (ft) | |
| Lane Util. Factor | 0.91 |
| Frt | |
| Flt Protected | |
| Satd. Flow (prot) | 0 |
| Flt Permitted | |
| Satd. Flow (perm) | 0 |
| Right Turn on Red | Yes |
| Satd. Flow (RTOR) | |
| Link Speed (mph) | |
| Link Distance (ft) | |
| Travel Time (s) | |
| Peak Hour Factor | 0.91 |
| Heavy Vehicles (%) | 6% |
| Shared Lane Traffic (%) | |
| Lane Group Flow (vph) | 0 |
| Turn Type | |
| Protected Phases | |
| Permitted Phases | |
| Detector Phase | |
| Switch Phase | |
| Minimum Initial (s) | |
| Minimum Split (s) | |
| Total Split (s) | |
| Total Split (%) | |
| Yellow Time (s) | |
| All-Red Time (s) | |
| Lost Time Adjust (s) | |
| Total Lost Time (s) | |
| Lead/Lag | |
| Lead-Lag Optimize? | |
| Recall Mode | |
| Act Effct Green (s) | |
| Actuated g/C Ratio | |
| v/c Ratio | |
| Control Delay | |
| Queue Delay | |
| Total Delay | |
| LOS | |
| Approach Delay | |
| Approach LOS | |
| Queue Length 50th (ft) | |
| Queue Length 95th (ft) | |

Lanes, Volumes, Timings

3: Carlisle Boulevard & Menaul Boulevard

08/18/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBU | NBL | NBT | NBR | SBL | SBT |
| Internal Link Dist (ft) | | 132 | | | 523 | | | | 86 | | | 636 |
| Turn Bay Length (ft) | 210 | | | 160 | | | | 190 | | | 200 | |
| Base Capacity (vph) | 371 | 1427 | | 425 | 1735 | | | 436 | 1725 | | 621 | 1535 |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | | | 0 | 0 | | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | | | 0 | 0 | | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | | | 0 | 0 | | 0 | 0 |
| Reduced v/c Ratio | 0.19 | 0.45 | | 0.45 | 0.51 | | | 0.71 | 0.45 | | 0.26 | 0.52 |

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 33.8









Intersection LOS: C

Intersection Capacity Utilization 56.7%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Carlisle Boulevard & Menaul Boulevard

| | | | |
|--|--|--|--|
|  Ø1 |  Ø2 (R) |  Ø3 |  Ø4 |
| 17 s | 36 s | 18 s | 39 s |
|  Ø5 |  Ø6 (R) |  Ø7 |  Ø8 |
| 16 s | 37 s | 24 s | 33 s |



| | |
|-------------------------|-----|
| Lane Group | SBR |
| Internal Link Dist (ft) | |
| Turn Bay Length (ft) | |
| Base Capacity (vph) | |
| Starvation Cap Reductn | |
| Spillback Cap Reductn | |
| Storage Cap Reductn | |
| Reduced v/c Ratio | |
| Intersection Summary | |

| Intersection | | | | | | | | | | | | | |
|----------------------------|--------|------------------------|--------|----------------------------|--------|------|--------|--------------------------------|------|-------|-------|------|------|
| Int Delay, s/veh | 2.1 | | | | | | | | | | | | |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBU | SBL | SBT | SBR |
| Lane Configurations | | ↕ | | | ↕ | | ↗ ↑↑↑ | | | | ↗ ↑↑↑ | | |
| Traffic Vol, veh/h | 14 | 0 | 43 | 35 | 0 | 27 | 126 | 948 | 20 | 2 | 23 | 884 | 31 |
| Future Vol, veh/h | 14 | 0 | 43 | 35 | 0 | 27 | 126 | 948 | 20 | 2 | 23 | 884 | 31 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | - | None |
| Storage Length | - | - | - | - | - | - | 125 | - | - | - | 80 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 1 | - | - | 0 | - | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | - | 0 | - |
| Peak Hour Factor | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 92 | 96 | 96 | 96 |
| Heavy Vehicles, % | 7 | 0 | 5 | 0 | 0 | 0 | 1 | 2 | 0 | 2 | 7 | 6 | 0 |
| Mvmt Flow | 15 | 0 | 45 | 36 | 0 | 28 | 131 | 988 | 21 | 2 | 24 | 921 | 32 |
| | | | | | | | | | | | | | |
| Major/Minor | Minor2 | | Minor1 | | Major1 | | Major2 | | | | | | |
| Conflicting Flow All | 1646 | 2260 | 477 | 1681 | 2266 | 505 | 953 | 0 | 0 | 736 | 1009 | 0 | 0 |
| Stage 1 | 989 | 989 | - | 1261 | 1261 | - | - | - | - | - | - | - | - |
| Stage 2 | 657 | 1271 | - | 420 | 1005 | - | - | - | - | - | - | - | - |
| Critical Hdwy | 6.54 | 6.5 | 7.2 | 6.4 | 6.5 | 7.1 | 5.32 | - | - | 5.64 | 5.44 | - | - |
| Critical Hdwy Stg 1 | 7.44 | 5.5 | - | 7.3 | 5.5 | - | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.84 | 5.5 | - | 6.7 | 5.5 | - | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.87 | 4 | 3.95 | 3.8 | 4 | 3.9 | 3.11 | - | - | 2.32 | 3.17 | - | - |
| Pot Cap-1 Maneuver | *264 | 87 | 451 | 259 | 86 | *702 | 415 | - | - | *1180 | *863 | - | - |
| Stage 1 | *196 | 327 | - | 498 | 539 | - | - | - | - | - | - | - | - |
| Stage 2 | *707 | 531 | - | 537 | 322 | - | - | - | - | - | - | - | - |
| Platoon blocked, % | 1 | 1 | | 1 | 1 | 1 | | - | - | 1 | 1 | - | - |
| Mov Cap-1 Maneuver | *188 | 58 | 451 | 172 | 57 | *702 | 415 | - | - | *881 | *881 | - | - |
| Mov Cap-2 Maneuver | *188 | 58 | - | 233 | 133 | - | - | - | - | - | - | - | - |
| Stage 1 | *134 | 317 | - | 341 | 369 | - | - | - | - | - | - | - | - |
| Stage 2 | *464 | 363 | - | 469 | 312 | - | - | - | - | - | - | - | - |
| | | | | | | | | | | | | | |
| Approach | EB | | WB | | NB | | SB | | | | | | |
| HCM Control Delay, s | 18 | | 18.6 | | 2 | | 0.2 | | | | | | |
| HCM LOS | C | | C | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1WBLn1 | SBL | SBT | SBR | | | | | | |
| Capacity (veh/h) | 415 | - | - | 336 | 329 | *881 | - | - | | | | | |
| HCM Lane V/C Ratio | 0.316 | - | - | 0.177 | 0.196 | 0.03 | - | - | | | | | |
| HCM Control Delay (s) | 17.6 | - | - | 18 | 18.6 | 9.2 | - | - | | | | | |
| HCM Lane LOS | C | - | - | C | C | A | - | - | | | | | |
| HCM 95th %tile Q(veh) | 1.3 | - | - | 0.6 | 0.7 | 0.1 | - | - | | | | | |
| Notes | | | | | | | | | | | | | |
| ~: Volume exceeds capacity | | \$: Delay exceeds 300s | | +: Computation Not Defined | | | | *: All major volume in platoon | | | | | |

Intersection

Int Delay, s/veh 0.1

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | ↑↑↑ | | | ↑↑↑ | | ↑ |
| Traffic Vol, veh/h | 622 | 16 | 0 | 1011 | 0 | 19 |
| Future Vol, veh/h | 622 | 16 | 0 | 1011 | 0 | 19 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | - | 0 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 95 | 95 | 95 | 95 | 95 | 95 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 655 | 17 | 0 | 1064 | 0 | 20 |

| Major/Minor | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|-----------|
| Conflicting Flow All | 0 | 0 | - - - 336 |
| Stage 1 | - | - | - - - |
| Stage 2 | - | - | - - - |
| Critical Hdwy | - | - | - - - 7.1 |
| Critical Hdwy Stg 1 | - | - | - - - |
| Critical Hdwy Stg 2 | - | - | - - - |
| Follow-up Hdwy | - | - | - - - 3.9 |
| Pot Cap-1 Maneuver | - | - | 0 - 0 568 |
| Stage 1 | - | - | 0 - 0 |
| Stage 2 | - | - | 0 - 0 |
| Platoon blocked, % | - | - | - |
| Mov Cap-1 Maneuver | - | - | - - - 568 |
| Mov Cap-2 Maneuver | - | - | - - - |
| Stage 1 | - | - | - - - |
| Stage 2 | - | - | - - - |

| Approach | EB | WB | NB |
|----------------------|----|----|------|
| HCM Control Delay, s | 0 | 0 | 11.6 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBT |
|-----------------------|-------|-----|-----|-----|
| Capacity (veh/h) | 568 | - | - | - |
| HCM Lane V/C Ratio | 0.035 | - | - | - |
| HCM Control Delay (s) | 11.6 | - | - | - |
| HCM Lane LOS | B | - | - | - |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - |

HCM 6th TWSC
12: Carlisle Boulevard & Proposed Access Drive

08/18/2023

































| Intersection | | | | | | |
|--------------------------|-----------|--------|------|--------|------|------|
| Int Delay, s/veh | 0.2 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | | ↗ | | ↑↑↑ | ↑↑↑ | |
| Traffic Vol, veh/h | 0 | 31 | 0 | 988 | 910 | 37 |
| Future Vol, veh/h | 0 | 31 | 0 | 988 | 910 | 37 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | 0 | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 95 | 95 | 95 | 95 | 95 | 95 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 0 | 33 | 0 | 1040 | 958 | 39 |
| Major/Minor | Minor2 | Major1 | | Major2 | | |
| Conflicting Flow All | - | 499 | - | 0 | - | 0 |
| Stage 1 | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |
| Critical Hdwy | - | 7.1 | - | - | - | - |
| Critical Hdwy Stg 1 | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - |
| Follow-up Hdwy | - | 3.9 | - | - | - | - |
| Pot Cap-1 Maneuver | 0 | 447 | 0 | - | - | - |
| Stage 1 | 0 | - | 0 | - | - | - |
| Stage 2 | 0 | - | 0 | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | - | 447 | - | - | - | - |
| Mov Cap-2 Maneuver | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |
| Approach | EB | NB | | SB | | |
| HCM Control Delay, s | 13.7 | 0 | | 0 | | |
| HCM LOS | B | | | | | |
| Minor Lane/Major Mvmt | NBT EBLn1 | | SBT | SBR | | |
| Capacity (veh/h) | - 447 | | - | - | | |
| HCM Lane V/C Ratio | - 0.073 | | - | - | | |
| HCM Control Delay (s) | - 13.7 | | - | - | | |
| HCM Lane LOS | - B | | - | - | | |
| HCM 95th %tile Q(veh) | - 0.2 | | - | - | | |

Capacity Analysis Summary Sheets
Year 2024 Total Projected Weekday Evening Peak Hour

Lanes, Volumes, Timings

3: Carlisle Boulevard & Menaul Boulevard

08/18/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBU | NBL | NBT | NBR | SBL | SBT |
| Lane Configurations |   |    | |   |    | | |   |    | |   |    |
| Traffic Volume (vph) | 125 | 624 | 213 | 271 | 831 | 291 | 3 | 334 | 1017 | 198 | 271 | 1001 |
| Future Volume (vph) | 125 | 624 | 213 | 271 | 831 | 291 | 3 | 334 | 1017 | 198 | 271 | 1001 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 210 | | 0 | 160 | | 0 | | 190 | | 0 | 200 | |
| Storage Lanes | 2 | | 0 | 2 | | 0 | | 2 | | 0 | 2 | |
| Taper Length (ft) | 100 | | | 110 | | | | 150 | | | 80 | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.91 | 0.91 | 0.91 | 0.97 | 0.91 | 0.91 | 0.97 | 0.91 |
| Frt | | 0.962 | | | 0.961 | | | | 0.976 | | | 0.984 |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.950 | | | 0.950 | |
| Satd. Flow (prot) | 3467 | 4880 | 0 | 3467 | 4899 | 0 | 0 | 3336 | 5012 | 0 | 3467 | 5048 |
| Flt Permitted | 0.950 | | | 0.950 | | | | 0.950 | | | 0.950 | |
| Satd. Flow (perm) | 3467 | 4880 | 0 | 3467 | 4899 | 0 | 0 | 3336 | 5012 | 0 | 3467 | 5048 |
| Right Turn on Red | | | Yes | | | Yes | | | | Yes | | |
| Satd. Flow (RTOR) | | 75 | | | 79 | | | | 33 | | | 18 |
| Link Speed (mph) | | 35 | | | 35 | | | | 35 | | | 35 |
| Link Distance (ft) | | 212 | | | 603 | | | | 166 | | | 716 |
| Travel Time (s) | | 4.1 | | | 11.7 | | | | 3.2 | | | 13.9 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 1% | 2% | 3% | 1% | 2% | 1% | 2% | 5% | 1% | 1% | 1% | 1% |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 136 | 910 | 0 | 295 | 1219 | 0 | 0 | 366 | 1320 | 0 | 295 | 1221 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | Prot | NA | | Prot | NA |
| Protected Phases | 5 | 2 | | 1 | 6 | | 3 | 3 | 8 | | 7 | 4 |
| Permitted Phases | | | | | | | | | | | | |
| Detector Phase | 5 | 2 | | 1 | 6 | | 3 | 3 | 8 | | 7 | 4 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 3.0 | 16.0 | | 3.0 | 16.0 | | 3.0 | 3.0 | 16.0 | | 3.0 | 16.0 |
| Minimum Split (s) | 17.0 | 23.0 | | 9.5 | 23.0 | | 19.0 | 19.0 | 23.0 | | 19.0 | 23.0 |
| Total Split (s) | 17.0 | 43.0 | | 19.0 | 45.0 | | 19.0 | 19.0 | 39.0 | | 19.0 | 39.0 |
| Total Split (%) | 14.2% | 35.8% | | 15.8% | 37.5% | | 15.8% | 15.8% | 32.5% | | 15.8% | 32.5% |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | | 3.0 | 3.0 | 4.0 | | 3.0 | 4.0 |
| All-Red Time (s) | 0.5 | 1.0 | | 0.5 | 1.0 | | 0.5 | 0.5 | 1.0 | | 0.5 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Lost Time (s) | 3.5 | 5.0 | | 3.5 | 5.0 | | | 3.5 | 5.0 | | 3.5 | 5.0 |
| Lead/Lag | Lead | Lag | | Lead | Lag | | Lead | Lead | Lag | | Lead | Lag |
| Lead-Lag Optimize? | Yes | Yes | | Yes | Yes | | Yes | Yes | Yes | | Yes | Yes |
| Recall Mode | None | C-Max | | None | C-Max | | None | None | Max | | None | Max |
| Act Effct Green (s) | 10.0 | 39.2 | | 14.3 | 43.5 | | | 15.3 | 35.2 | | 14.3 | 34.2 |
| Actuated g/C Ratio | 0.08 | 0.33 | | 0.12 | 0.36 | | | 0.13 | 0.29 | | 0.12 | 0.28 |
| v/c Ratio | 0.47 | 0.55 | | 0.72 | 0.67 | | | 0.87 | 0.88 | | 0.72 | 0.84 |
| Control Delay | 57.4 | 32.0 | | 61.0 | 32.4 | | | 71.9 | 47.9 | | 61.0 | 46.1 |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Delay | 57.4 | 32.0 | | 61.0 | 32.4 | | | 71.9 | 47.9 | | 61.0 | 46.1 |
| LOS | E | C | | E | C | | | E | D | | E | D |
| Approach Delay | | 35.3 | | | 38.0 | | | | 53.1 | | | 49.0 |
| Approach LOS | | D | | | D | | | | D | | | D |
| Queue Length 50th (ft) | 52 | 196 | | 113 | 270 | | | 144 | 354 | | 113 | 322 |
| Queue Length 95th (ft) | 84 | 243 | | 161 | 336 | | | #223 | #442 | | 161 | 381 |

Lanes, Volumes, Timings

3: Carlisle Boulevard & Menaul Boulevard













08/18/2023

| | |
|-------------------------|------|
| Lane Group | SBR |
| Lane Configurations | |
| Traffic Volume (vph) | 122 |
| Future Volume (vph) | 122 |
| Ideal Flow (vphpl) | 1900 |
| Storage Length (ft) | 0 |
| Storage Lanes | 0 |
| Taper Length (ft) | |
| Lane Util. Factor | 0.91 |
| Frt | |
| Flt Protected | |
| Satd. Flow (prot) | 0 |
| Flt Permitted | |
| Satd. Flow (perm) | 0 |
| Right Turn on Red | Yes |
| Satd. Flow (RTOR) | |
| Link Speed (mph) | |
| Link Distance (ft) | |
| Travel Time (s) | |
| Peak Hour Factor | 0.92 |
| Heavy Vehicles (%) | 2% |
| Shared Lane Traffic (%) | |
| Lane Group Flow (vph) | 0 |
| Turn Type | |
| Protected Phases | |
| Permitted Phases | |
| Detector Phase | |
| Switch Phase | |
| Minimum Initial (s) | |
| Minimum Split (s) | |
| Total Split (s) | |
| Total Split (%) | |
| Yellow Time (s) | |
| All-Red Time (s) | |
| Lost Time Adjust (s) | |
| Total Lost Time (s) | |
| Lead/Lag | |
| Lead-Lag Optimize? | |
| Recall Mode | |
| Act Effct Green (s) | |
| Actuated g/C Ratio | |
| v/c Ratio | |
| Control Delay | |
| Queue Delay | |
| Total Delay | |
| LOS | |
| Approach Delay | |
| Approach LOS | |
| Queue Length 50th (ft) | |
| Queue Length 95th (ft) | |

Lanes, Volumes, Timings

3: Carlisle Boulevard & Menaul Boulevard

08/18/2023

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBU | NBL | NBT | NBR | SBL | SBT |
| Internal Link Dist (ft) | | 132 | | | 523 | | | | 86 | | | 636 |
| Turn Bay Length (ft) | 210 | | | 160 | | | | 190 | | | 200 | |
| Base Capacity (vph) | 390 | 1644 | | 447 | 1824 | | | 430 | 1493 | | 447 | 1453 |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | | | 0 | 0 | | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | | | 0 | 0 | | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | | | 0 | 0 | | 0 | 0 |
| Reduced v/c Ratio | 0.35 | 0.55 | | 0.66 | 0.67 | | | 0.85 | 0.88 | | 0.66 | 0.84 |

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 44.8

Intersection LOS: D

Intersection Capacity Utilization 72.9%









ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Carlisle Boulevard & Menaul Boulevard

| | | | |
|--|--|--|--|
|  Ø1 |  Ø2 (R) |  Ø3 |  Ø4 |
| 19 s | 43 s | 19 s | 39 s |
|  Ø5 |  Ø6 (R) |  Ø7 |  Ø8 |
| 17 s | 45 s | 19 s | 39 s |



| | |
|-------------------------|-----|
| Lane Group | SBR |
| Internal Link Dist (ft) | |
| Turn Bay Length (ft) | |
| Base Capacity (vph) | |
| Starvation Cap Reductn | |
| Spillback Cap Reductn | |
| Storage Cap Reductn | |
| Reduced v/c Ratio | |
| Intersection Summary | |

| Intersection | | | | | | | | | | | | | |
|--------------------------|------|------|------|------|------|------|-------|------|------|------|-------|------|------|
| Int Delay, s/veh | 2.6 | | | | | | | | | | | | |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBU | SBL | SBT | SBR |
| Lane Configurations | | ↕ | | | ↕ | | ↕ ↑↑↑ | | | | ↕ ↑↑↑ | | |
| Traffic Vol, veh/h | 5 | 0 | 64 | 34 | 1 | 39 | 91 | 1544 | 45 | 1 | 61 | 1409 | 37 |
| Future Vol, veh/h | 5 | 0 | 64 | 34 | 1 | 39 | 91 | 1544 | 45 | 1 | 61 | 1409 | 37 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | - | None |
| Storage Length | - | - | - | - | - | - | 125 | - | - | - | 80 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 1 | - | - | 0 | - | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | - | 0 | - |
| Peak Hour Factor | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 92 | 95 | 95 | 95 |
| Heavy Vehicles, % | 2 | 0 | 2 | 0 | 0 | 50 | 2 | 2 | 0 | 2 | 33 | 1 | 0 |
| Mvmt Flow | 5 | 0 | 67 | 36 | 1 | 41 | 96 | 1625 | 47 | 1 | 64 | 1483 | 39 |

| Major/Minor | Minor2 | | Minor1 | | Major1 | | Major2 | | | | | | |
|----------------------|--------|------|--------|------|--------|------|--------|---|---|------|------|---|---|
| Conflicting Flow All | 2476 | 3497 | 761 | 2564 | 3493 | 836 | 1522 | 0 | 0 | 1221 | 1672 | 0 | 0 |
| Stage 1 | 1633 | 1633 | - | 1841 | 1841 | - | - | - | - | - | - | - | - |
| Stage 2 | 843 | 1864 | - | 723 | 1652 | - | - | - | - | - | - | - | - |
| Critical Hdwy | 6.44 | 6.5 | 7.14 | 6.4 | 6.5 | 8.1 | 5.34 | - | - | 5.64 | 5.96 | - | - |
| Critical Hdwy Stg 1 | 7.34 | 5.5 | - | 7.3 | 5.5 | - | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.74 | 5.5 | - | 6.7 | 5.5 | - | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.82 | 4 | 3.92 | 3.8 | 4 | 4.4 | 3.12 | - | - | 2.32 | 3.43 | - | - |
| Pot Cap-1 Maneuver | *118 | 10 | 299 | 99 | 10 | *503 | 217 | - | - | *954 | *645 | - | - |
| Stage 1 | *71 | 161 | - | 445 | 465 | - | - | - | - | - | - | - | - |
| Stage 2 | *579 | 448 | - | 353 | 158 | - | - | - | - | - | - | - | - |
| Platoon blocked, % | 1 | 1 | | 1 | 1 | 1 | | - | - | 1 | 1 | - | - |
| Mov Cap-1 Maneuver | *65 | 5 | 299 | 47 | 5 | *503 | 217 | - | - | *648 | *648 | - | - |
| Mov Cap-2 Maneuver | *65 | 5 | - | 105 | 37 | - | - | - | - | - | - | - | - |
| Stage 1 | *40 | 145 | - | 249 | 260 | - | - | - | - | - | - | - | - |
| Stage 2 | *295 | 250 | - | 246 | 142 | - | - | - | - | - | - | - | - |

| Approach | EB | | WB | | NB | | SB | |
|----------------------|------|--|------|--|-----|--|-----|--|
| HCM Control Delay, s | 26.8 | | 41.8 | | 1.8 | | 0.5 | |
| HCM LOS | D | | E | | | | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1WBLn1 | SBL | SBT | SBR |
|-----------------------|-------|-----|-----|------------|------|-------|-----|
| Capacity (veh/h) | 217 | - | - | 237 | 173 | *648 | - |
| HCM Lane V/C Ratio | 0.441 | - | - | 0.306 | 0.45 | 0.101 | - |
| HCM Control Delay (s) | 34.1 | - | - | 26.8 | 41.8 | 11.2 | - |
| HCM Lane LOS | D | - | - | D | E | B | - |
| HCM 95th %tile Q(veh) | 2.1 | - | - | 1.2 | 2.1 | 0.3 | - |

| Notes | | | |
|----------------------------|------------------------|----------------------------|--------------------------------|
| ~: Volume exceeds capacity | \$: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

Intersection

Int Delay, s/veh 0.1

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | ↑↑↑ | | | ↑↑↑ | | ↑ |
| Traffic Vol, veh/h | 953 | 7 | 0 | 1288 | 0 | 9 |
| Future Vol, veh/h | 953 | 7 | 0 | 1288 | 0 | 9 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | - | 0 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 95 | 95 | 95 | 95 | 95 | 95 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 1003 | 7 | 0 | 1356 | 0 | 9 |

| Major/Minor | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|-----------|
| Conflicting Flow All | 0 | 0 | - - - 505 |
| Stage 1 | - | - | - - - |
| Stage 2 | - | - | - - - |
| Critical Hdwy | - | - | - - - 7.1 |
| Critical Hdwy Stg 1 | - | - | - - - |
| Critical Hdwy Stg 2 | - | - | - - - |
| Follow-up Hdwy | - | - | - - - 3.9 |
| Pot Cap-1 Maneuver | - | - 0 | - 0 443 |
| Stage 1 | - | - 0 | - 0 - |
| Stage 2 | - | - 0 | - 0 - |
| Platoon blocked, % | - | - | - |
| Mov Cap-1 Maneuver | - | - | - - - 443 |
| Mov Cap-2 Maneuver | - | - | - - - |
| Stage 1 | - | - | - - - |
| Stage 2 | - | - | - - - |

| Approach | EB | WB | NB |
|----------------------|----|----|------|
| HCM Control Delay, s | 0 | 0 | 13.3 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBT |
|-----------------------|-------|-----|-----|-----|
| Capacity (veh/h) | 443 | - | - | - |
| HCM Lane V/C Ratio | 0.021 | - | - | - |
| HCM Control Delay (s) | 13.3 | - | - | - |
| HCM Lane LOS | B | - | - | - |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - |

HCM 6th TWSC
12: Carlisle Boulevard & Proposed Access Drive

08/18/2023

Intersection

Int Delay, s/veh 0.1

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↗ | | ↑↑↑ | ↑↑↑ | |
| Traffic Vol, veh/h | 0 | 15 | 0 | 1569 | 1482 | 16 |
| Future Vol, veh/h | 0 | 15 | 0 | 1569 | 1482 | 16 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | 0 | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 95 | 95 | 95 | 95 | 95 | 95 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 0 | 16 | 0 | 1652 | 1560 | 17 |

| Major/Minor | Minor2 | Major1 | Major2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | - 789 | - 0 | - 0 |
| Stage 1 | - - | - - | - - |
| Stage 2 | - - | - - | - - |
| Critical Hdwy | - 7.1 | - - | - - |
| Critical Hdwy Stg 1 | - - | - - | - - |
| Critical Hdwy Stg 2 | - - | - - | - - |
| Follow-up Hdwy | - 3.9 | - - | - - |
| Pot Cap-1 Maneuver | 0 290 | 0 - | - - |
| Stage 1 | 0 - | 0 - | - - |
| Stage 2 | 0 - | 0 - | - - |
| Platoon blocked, % | | - - | - - |
| Mov Cap-1 Maneuver | - 290 | - - | - - |
| Mov Cap-2 Maneuver | - - | - - | - - |
| Stage 1 | - - | - - | - - |
| Stage 2 | - - | - - | - - |

| Approach | EB | NB | SB |
|----------------------|------|----|----|
| HCM Control Delay, s | 18.1 | 0 | 0 |
| HCM LOS | C | | |

| Minor Lane/Major Mvmt | NBT EBLn1 | SBT | SBR |
|-----------------------|-----------|-----|-----|
| Capacity (veh/h) | - 290 | - - | - - |
| HCM Lane V/C Ratio | - 0.054 | - - | - - |
| HCM Control Delay (s) | - 18.1 | - - | - - |
| HCM Lane LOS | - C | - - | - - |
| HCM 95th %tile Q(veh) | - 0.2 | - - | - - |