



# TRAFFIC IMPACT STUDY

## CAP STORAGE FALCON LLC TRAFFIC IMPACT STUDY

El Paso County, Colorado

PREPARED FOR:  
Centennial American Properties

PREPARED BY:  
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DATE:  
December 20, 2023




PCD File No. CS 23-XXX

CS241



**Traffic Engineer's Statement**

The attached traffic report and supporting information were prepared under my responsible charge and they comport with the standard of care. So far as is consistent with the standard of care, said report was prepared in general conformance with the criteria established by the County for traffic reports.

  
\_\_\_\_\_  
Brian Horan, P.E. PTOE #53042

12-20-23  
\_\_\_\_\_  
Date

**Developer's Statement**

I, the Developer, have read and will comply with all commitments made on my behalf within this report.

  
\_\_\_\_\_  
John McDonough  
Centennial American Properties  
P.O. Box 10588  
Greenville SC 29603

12-21-23  
\_\_\_\_\_  
Date

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## Executive Summary

This traffic impact study (TIS) analyzes the impact that the proposed Rolling Thunder Storage development in El Paso County, CO will have on traffic operations at the intersections proximate to the site and determines whether any additional improvements are needed to accommodate the development through the study area.

### Site Location and Study Area

The Applicant, Centennial American Properties, proposes to develop the site with up to 750 self-storage units. Since the site will be rezoned, El Paso County has requested that the maximum trip generating land use allowed on the rezoned area be analyzed as well. As such, this study will analyze a scenario in which a 18,557 square foot (SF) shopping plaza has been developed, although it should be noted that the developer has no intention of developing this higher trip generating option.

The site is bound by Rolling Thunder Way to the south, McLaughlin Road to the east, 5<sup>th</sup> Street to the north, and the business access road to the west, as detailed in Figure 1-1. The study area for the project includes the following intersections that may see impacts to traffic operations as a result of the proposed development:

- Rolling Thunder Way & McLaughlin Road & Old Meridian Road
- McLaughlin Road & 5<sup>th</sup> Street
- 5<sup>th</sup> Street & Business Access Road
- Proposed Site Accesses

## Conclusions and Recommendations

### Conclusions

Based on the results of this traffic impact study, the following may be concluded:

- Under existing conditions, the study intersections operate with all movements level of service (LOS) "A". No queuing issues exist.
- In the background 2024 scenario, all intersections operate at LOS "A". No queuing issues are forecasted in background conditions.
- The proposed warehouse development will generate 9 weekday AM and 13 weekday PM peak hour vehicle trips as well as 135 weekday daily trips.
- The total scenarios in which the warehouse has been built will have very similar operations to the background scenarios. No operational or queuing issues are forecasted.
- As requested by El Paso County, the maximum trip generator allowed on a site zoned as Commercial Service was analyzed. This was found to be an 18,557 SF strip retail. In this scenario, the shopping plaza would generate 44 weekday AM and 122 weekday PM peak hour vehicle trips as well as 1,013 weekday daily trips.

- The total scenarios in which the retail has been built will have very similar operations to the background scenarios. No operational or queueing issues are forecasted.
- Road Impact Fees will be due by the Applicant at the last land use approval consistent with the use and Impact Fee schedule.

## Recommendations

- It is recommended that the proposed development be designed as shown in the site plan.

## I. Introduction

### Overview

This Traffic Impact Study (TIS) was conducted in support of Centennial American Properties proposed Rolling Thunder Storage development in El Paso County, Colorado. This study evaluates an existing conditions scenario, year 2024 background and total scenarios. By analyzing and comparing the background and total future scenarios, this study will be able to assess the impact that the site will have on traffic operations through the immediate roadway network. In addition, El Paso County has requested that the maximum trip generator allowed on a site zoned as Commercial Service be analyzed. As such, this study will analyze a scenario in which the maximum trip generator has been constructed in place of the proposed storage use.

### Site Location and Study Area

The property that comprises the application area is located on El Paso County Parcel Number 5312114004. Upon completion, the site will be bounded by Rolling Thunder Way to the south, McLaughlin Road to the east, and 5<sup>th</sup> Street to the north and the business access road to the west. The site is currently zoned as CR and is vacant. The site is in the process of being rezoned to Commercial Service (CS). Access to the site is proposed via the existing curb cuts to the property. This would include access to 5<sup>th</sup> Street and two access locations to the shared business access road.

The Applicant proposes to develop the site with up to 750 self-storage units. A reduction of the Applicant's proposed conceptual site plan is provided in Figure 1-2. A full-size copy of the plan is provided in Appendix A.

Tasks undertaken in the course of this study included the following:

1. The Applicant's proposed development plans and other background data were reviewed.
2. A virtual field reconnaissance of existing roadway and intersection geometries, traffic controls, and speed limits was conducted.
3. Turning movement counts that were taken on November 16, 2023, for the Rolling Thunder Storage traffic study were used in this study.
4. Using Synchro 12, the existing Level of Service (LOS) for each intersection was reported based on the methodology prescribed by the Highway Capacity Guidelines 7<sup>th</sup> Edition. Synchro was also used to conduct a queuing analysis.
5. The AM and PM peak hour background 2024 traffic volumes were forecasted by using the existing volumes, and a background growth rate.
6. The LOS for the background scenarios was reported by incorporating the forecasted background volumes.
7. The site trip generation was calculated utilizing the Institute of Transportation Engineers (ITE) Trip Generation 11<sup>th</sup> Ed.

8. The total 2024 traffic forecasts were calculated by adding the background volume forecasts and the projected site trips.
9. The LOS was reported for the total scenarios by incorporating the forecasted total future volumes.
10. The trip generation for the maximum trip generating scenario was calculated utilizing the Institute of Transportation Engineers (ITE) Trip Generation 11<sup>th</sup> Ed.
11. The total 2024 traffic forecasts were calculated by adding the background volume forecasts and the projected maximum use site.
12. The LOS was reported for the maximum use scenarios by incorporating the forecasted total future volumes.

Sources of data for this analysis included the Highway Capacity Guidelines (HCM) 7<sup>th</sup>, ITE 11<sup>th</sup> Ed, El Paso County, and the files/library of Galloway.

## Site Description and Access

### **Site Conditions**

The topography proximate to and surrounding the site is generally classified as “level”.

### **Hazardous Conditions**

Based on the field reconnaissance in the vicinity of the subject site, no hazardous features or constraints were identified.

### **Proposed Site Access**

The site would be accessed by the existing curb cuts that were constructed for the lot. One access exists along 5<sup>th</sup> Street and two exist along the business access drive.

### **Existing Zoning**

The site is currently zoned as CR and is being rezoned to CS (Commercial Service). The existing zoning is shown in Figure 1-3.

### **Nearby Uses**

The properties surrounding the subject site are primarily commercial. The proposed use is consistent with the nearby uses.





FIGURE 1-1  
Site Location

Rolling Thunder Storage  
El Paso County, CO

- ← MOVEMENT
- 🚦 SIGNALIZED INTERSECTION
- 🛑 STOP SIGN
- 🚧 YIELD SIGN



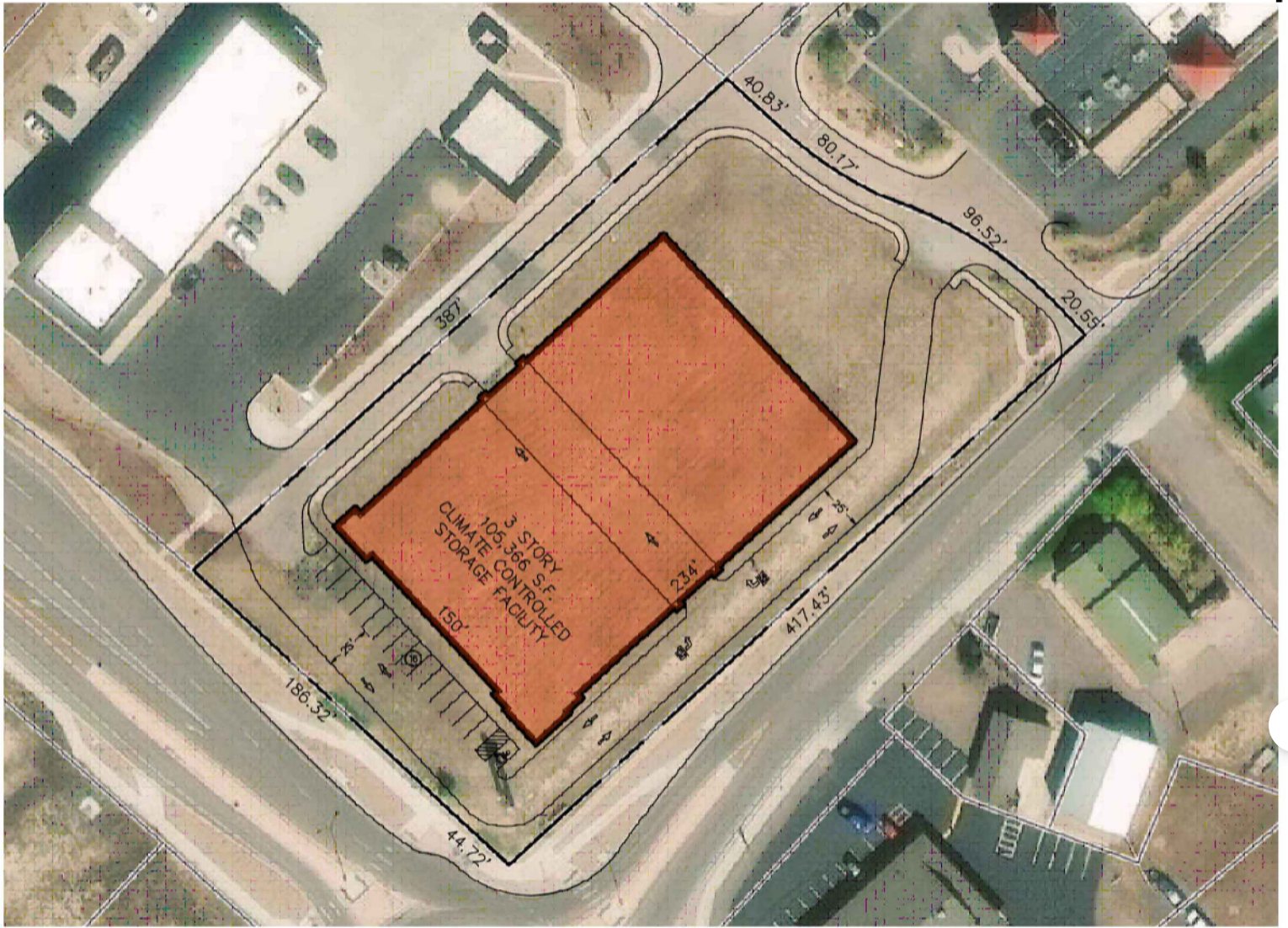
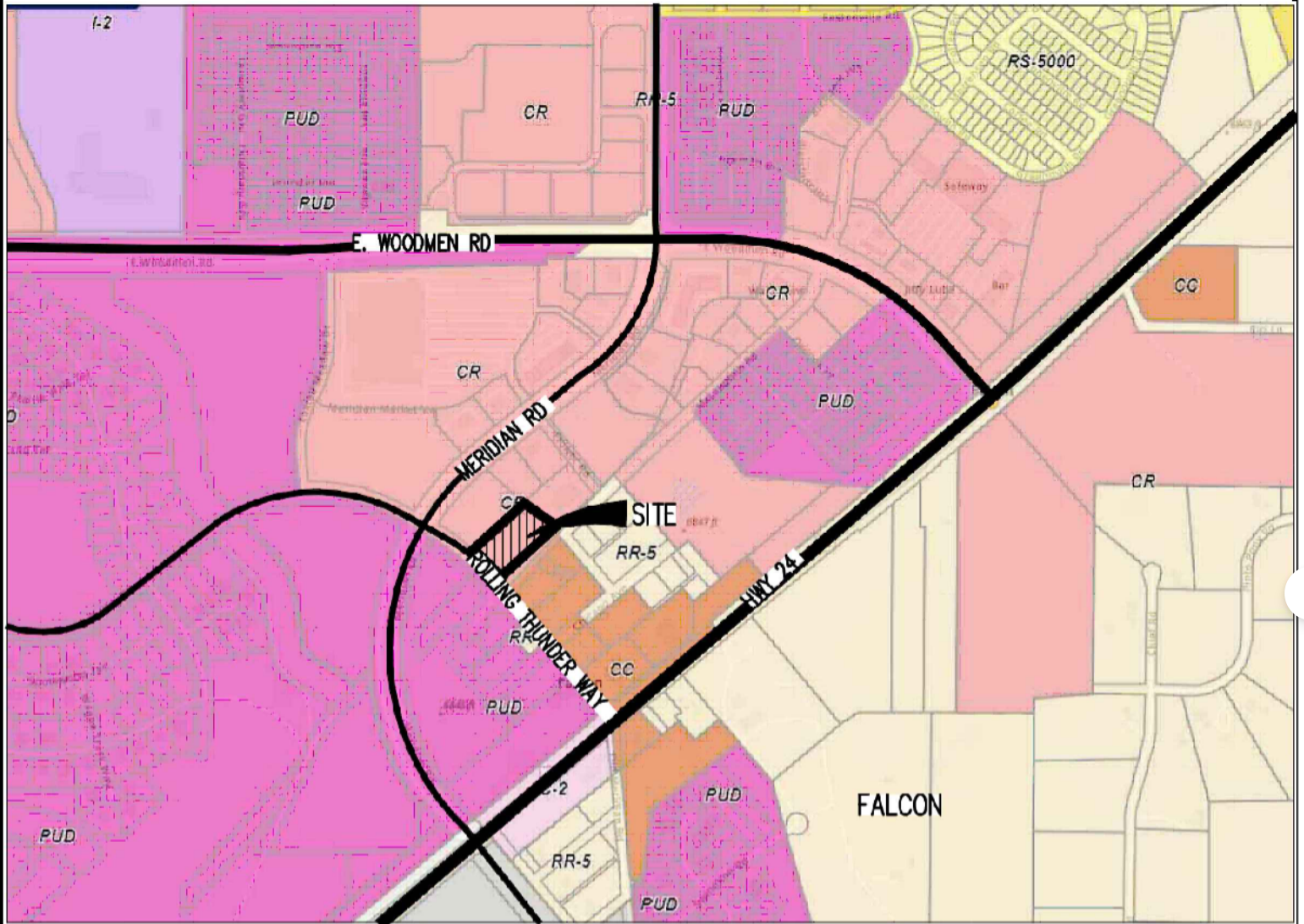


FIGURE 1-2  
Site Plan

Rolling Thunder Storage  
El Paso County, CO

- ← MOVEMENT
- 🚦 SIGNALIZED INTERSECTION
- 🛑 STOP SIGN
- 🚶 YIELD SIGN





VICINITY MAP  
N.T.S.



FIGURE 1-3  
Zoning

Rolling Thunder Storage  
El Paso County, CO

- ← MOVEMENT
- 🚦 SIGNALIZED INTERSECTION
- 🛑 STOP SIGN
- 🚧 YIELD SIGN



## II. Background Information

### Study Area

The study area was determined by a review of intersections that would experience a significant portion of turning movement volumes generated by the site. The study area for the project includes the following intersections that may see impacts to traffic operations as a result of the proposed development:

#### **Study Intersections**

- Rolling Thunder Way & McLaughlin Road & Old Meridian Road
- McLaughlin Road & 5<sup>th</sup> Street
- 5<sup>th</sup> Street & Business Access Road
- Proposed Site Accesses

### Study Assumptions

For purposes of this analysis only, it is assumed that the proposed development will be completed by 2024. A background growth rate of 1% year was applied to the existing collectors.

### Study Methodology

Synchro software version 12 was used to evaluate levels of service at each of the study intersections during the weekday AM and PM peak hours. Synchro is a macroscopic model used for optimizing traffic signal timing and performing capacity analyses. The software can model existing traffic signal timings or optimize splits, offsets, and cycle lengths for individual intersections, an arterial, or a complete network. Synchro allows the user to evaluate the effects of changing intersection geometrics, traffic demands, traffic control, and/or traffic signal settings as well as optimize traffic signal timings.

The levels of service reported for the signalized and unsignalized intersections analyzed were taken from the Highway Capacity Manual (HCM) 7<sup>th</sup> reports, generated by Synchro 12. Level of service descriptions are included in Appendix B.

### Existing Roadway Network

Figure 2-1 depicts existing lane use and traffic controls in the vicinity of the subject site. The following provides a description of each of the roadways within the study network.

#### **Rolling Thunder Way/Old Meridian Road**

**Major Collector**

Rolling Thunder Way is a four-lane, east/west, collector through the study area. It provides connection between Highway 24 and Woodmen Road through the region. It operates as a roundabout control with its intersection with McLaughlin Road.

#### **McLaughlin Road**

**minor collector**

McLaughlin Road is a three-lane, north/south roadway with a posted speed limit of 35 mph through the study area. It provides access to many of the nearby commercial developments.

#### **5<sup>th</sup> Street**

5<sup>th</sup> Street is a local street through the study area. It operates under STOP control at the intersections with McLaughlin Road and the business access road.

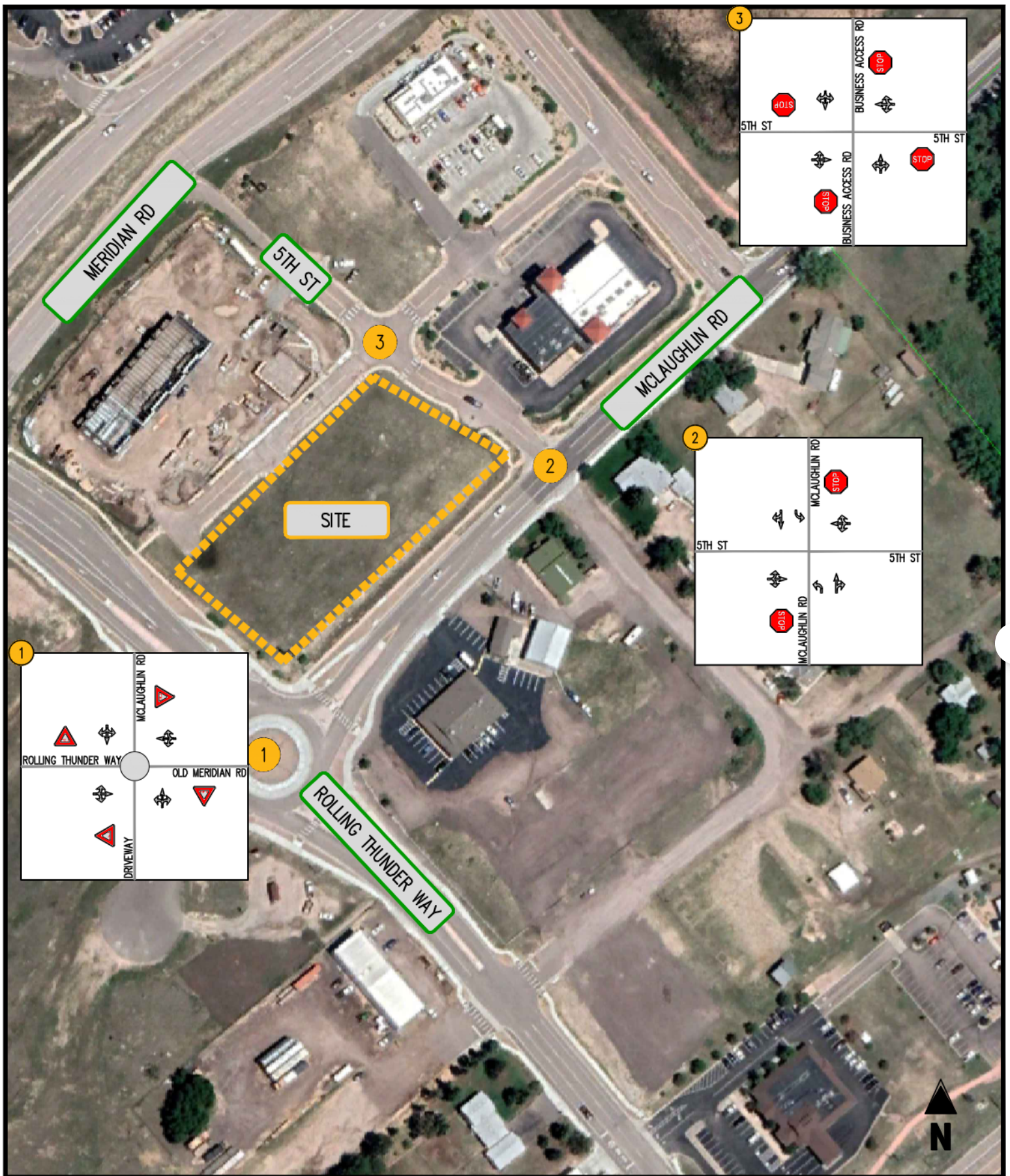


FIGURE 2-1  
Existing Lane Use and Traffic Control

Rolling Thunder Storage  
El Paso County, CO

- MOVEMENT
- SIGNALIZED INTERSECTION
- STOP SIGN
- YIELD SIGN



### **III. Analysis of Existing Conditions**

#### **Traffic Volumes**

Weekday AM and PM peak hour traffic volumes counts were conducted on November 16, 2023, from 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM at the study intersections by IDAX Data Solutions.

For purposes of this study, the peak hour of the intersection was selected. The existing volumes are summarized on Figure 3-1. Copies of traffic counts are included in Appendix C. Existing peak hour factors (PHF) were also computed by approach from the traffic counts and applied to the analysis with a minimum of 0.85 and a maximum of 0.92.

#### **Operational Analysis**

Capacity/level of service (LOS) analyses were conducted at the study intersections based on the existing lane use and traffic controls shown on Figure 2-1 and existing baseline vehicular traffic volumes shown on Figure 3-1. The capacity analysis results are presented in Appendix D and summarized in Table 3-1 and on Figure 3-2.

As shown in Table 3-1, the stop control intersections operate at LOS "A" during the weekday peak hours.

#### **Existing Intersection Queues**

An analysis of intersection 95<sup>th</sup>-percentile queues was performed at key locations. The results of the queuing analysis, as reported by Synchro, are summarized in Table 3-2. As shown in the table, no queueing issues were observed.

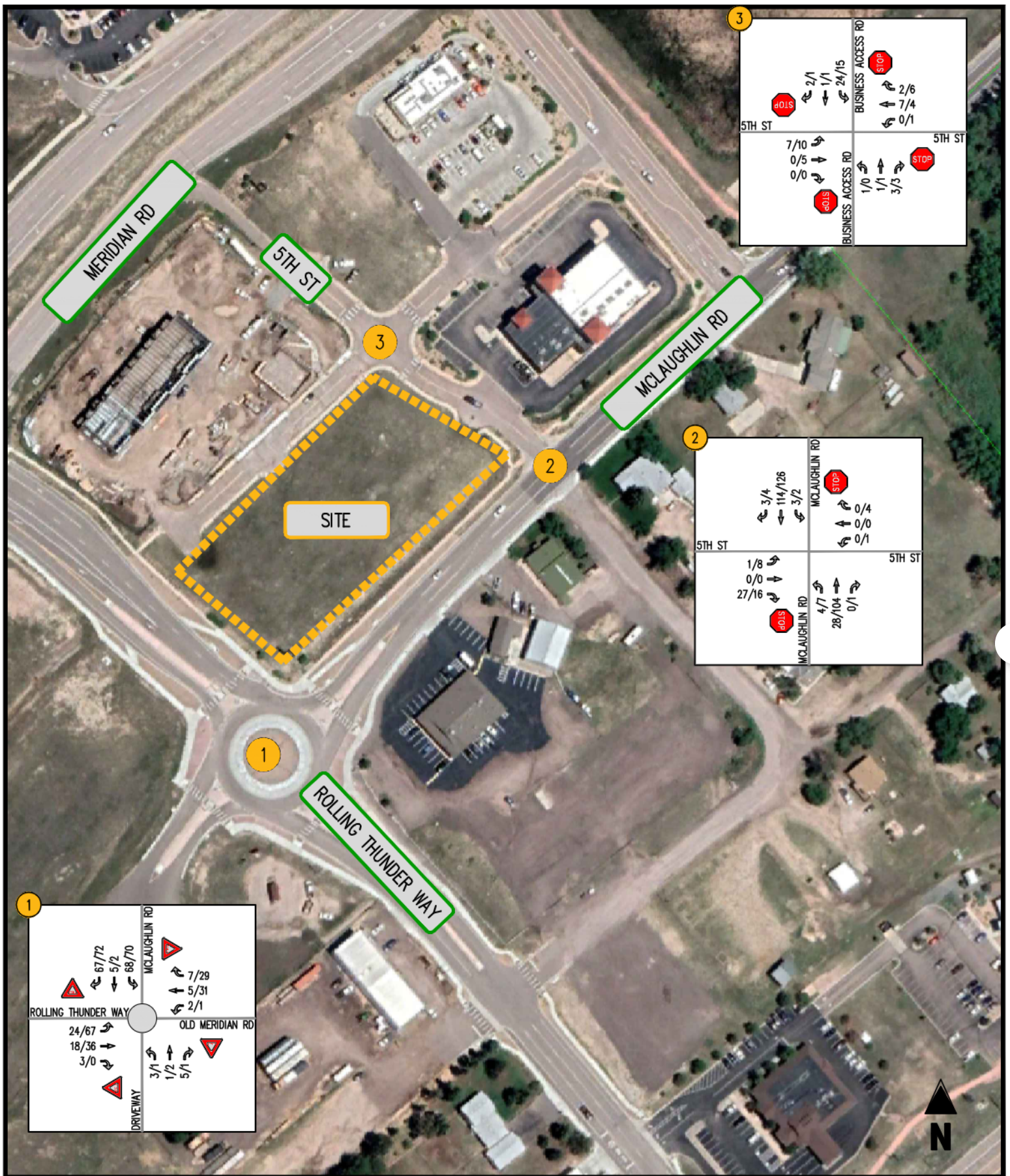


FIGURE 3-1  
Existing Volumes

Rolling Thunder Storage  
El Paso County, CO

0000/0000 (AM PEAK HOUR/PM PEAK HOUR)

- ← MOVEMENT
- 🚦 SIGNALIZED INTERSECTION
- 🛑 STOP SIGN
- 🚧 YIELD SIGN



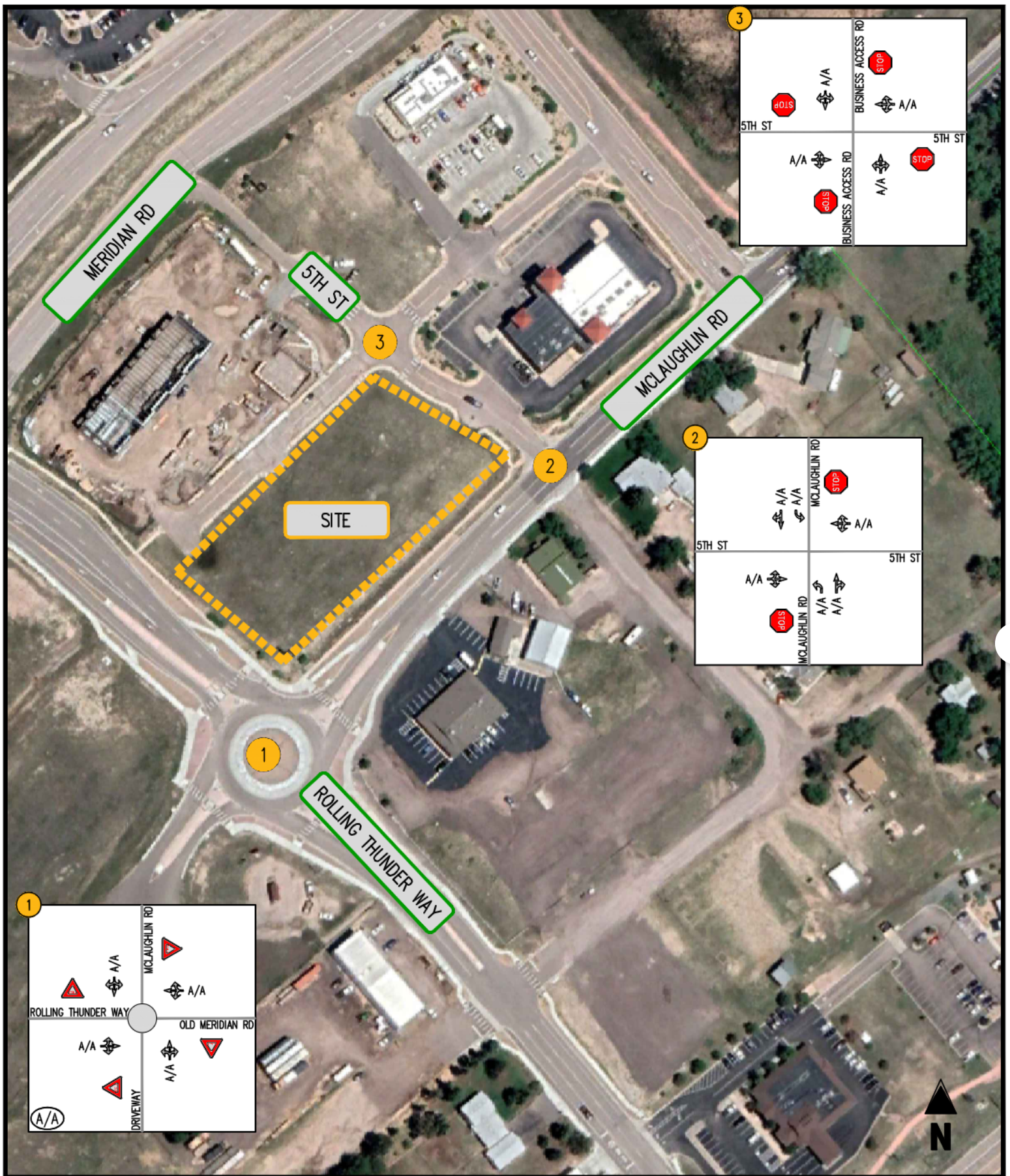


FIGURE 3-2  
Existing Level of Service

Rolling Thunder Storage  
El Paso County, CO

(A/A) INTERSECTION LOS

- ← MOVEMENT
- 🚦 SIGNALIZED INTERSECTION
- 🛑 STOP SIGN
- 🚧 YIELD SIGN





Table 3-1  
Rolling Thunder Storage  
Existing Intersection Level of Service Summary (1)

Intersection	Operating Condition	Street Name	Approach/Movement	Existing 2023	
				AM Peak Hour	PM Peak Hour
1 McLaughlin Road/Meridian Road	CIRCLE	Rolling Thunder Way	EBLTR	A [3.2]	A [3.6]
		Old Meridian Road	WBLTR	A [2.8]	A [3.3]
		Driveway	NBLTR	A [3.0]	A [3.2]
		McLaughlin Road	SBLTR	A [3.6]	A [3.8]
		<b>Overall</b>		<b>A (3.4)</b>	<b>A (3.6)</b>
2 McLaughlin Road/5th Street	STOP	5th Street	EBLTR	A [9.0]	A [9.6]
		5th Street	WBLTR	A [0.0]	A [9.2]
		McLaughlin Road	NBL	A [7.5]	A [7.5]
		McLaughlin Road	NBTR	A [0.0]	A [0.0]
		McLaughlin Road	SBL SBTR	A [7.3] A [0.0]	A [7.4] A [0.0]
3 5th Street/Business Access	STOP	5th Street	EBLTR	A [7.3]	A [7.2]
		5th Street	WBLTR	A [6.9]	A [6.7]
		Business Access	NBLTR	A [6.7]	A [6.6]
		Business Access	SBLTR	A [7.3]	A [7.2]

Notes : (1) Numbers in brackets [] represent delay at unsignalized intersections in seconds per vehicle.

Table 3-2  
 Rolling Thunder Storage  
 Existing Intersection Queueing Summary (1)

Intersection	Operating Condition	Street Name	Approach/Movement	Available Storage	Existing 2021	
					AM Peak Hour	PM Peak Hour
1 McLaughlin Road/Meridian Road	CIRCLE	Rolling Thunder Way	EBLTR	-	0	0
		Old Meridian Road Driveway	WBLTR	-	0	0
			NBLTR	-	0	0
		McLaughlin Road	SBLTR	-	0	0
2 McLaughlin Road/5th Street	STOP	5th Street	EBLTR	-	2.5	2.5
		5th Street	WBLTR	-	0.0	0.0
		McLaughlin Road	NBL	130	0.0	0.0
			NBTR	-	0.0	0.0
		McLaughlin Road	SBL	130	0.0	0.0
	SBTR	-	0.0	0.0		
3 5th Street/Business Access	STOP	5th Street	EBLTR	-	0	2.5
		5th Street	WBLTR	-	0	0
		Business Access	NBLTR	-	0	0
		Business Access	SBLTR	-	2.5	2.5

Notes (1) Queue length is based on the 95th percentile queue in feet as reported by Synchro, Version 11.

Include long range period for traffic generation and LOS. 2024 is current year. Should see ~2040 See ECM Appdx B Section B.8 Ensure Exhibits are labeled with time horizon

## IV. Analysis of Future Conditions without Site Development

### Methodology

The future traffic forecasts, without the proposed new use, were developed for 2024 conditions based on a composite of existing baseline traffic volumes and regional traffic. A 1.0% growth factor per year was applied to existing traffic on the study area collectors.

### Regional Growth

Increases in traffic associated with regional growth were estimated at 1.0 percent per year compounded up to 2024. This growth accounts for increases in traffic resulting from influences outside of the immediate study area. The resulting increases in volumes within the study area are reflected on Figure 4-1 for 2024 conditions.

### Background Traffic Forecasts

The existing traffic forecasts depicted on Figure 3-1 and the regional growth shown on Figure 4-1 were added together to yield the background future traffic forecasts shown on Figure 4-2 for 2024.

### Background Future Levels of Service

Capacity analyses of 2024 future traffic conditions without the proposed development are provided in Appendix E and summarized in Table 4-1. The forecasted levels of service are also depicted graphically on Figure 4-3 for 2024 conditions.

As shown on Table 4-1, the stop control intersections are forecasted to operate at LOS "A" during the weekday peak hours.

### Background Future Queueing

An analysis of intersection queues was performed at key locations under background future traffic conditions. The results of the queuing analysis are summarized in Table 4-2.

As shown in the table, queues within the study network are expected to be contained in their effective storage. No queueing issues are forecasted in background conditions.

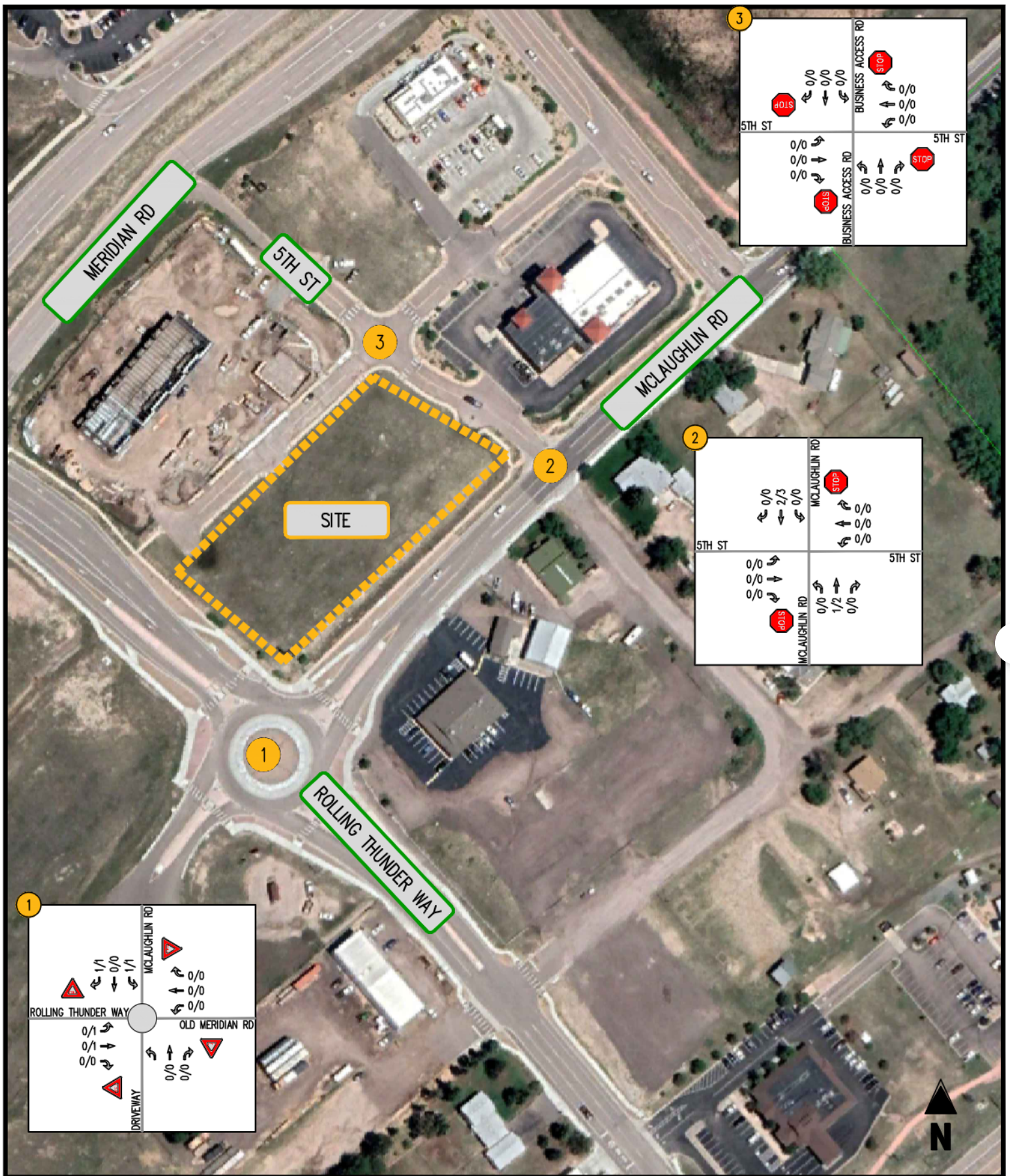


FIGURE 4-1  
Background Growth

Rolling Thunder Storage  
El Paso County, CO

0000/0000 (AM PEAK HOUR/PM PEAK HOUR)

- ← MOVEMENT
- 🚦 SIGNALIZED INTERSECTION
- 🛑 STOP SIGN
- 🚧 YIELD SIGN



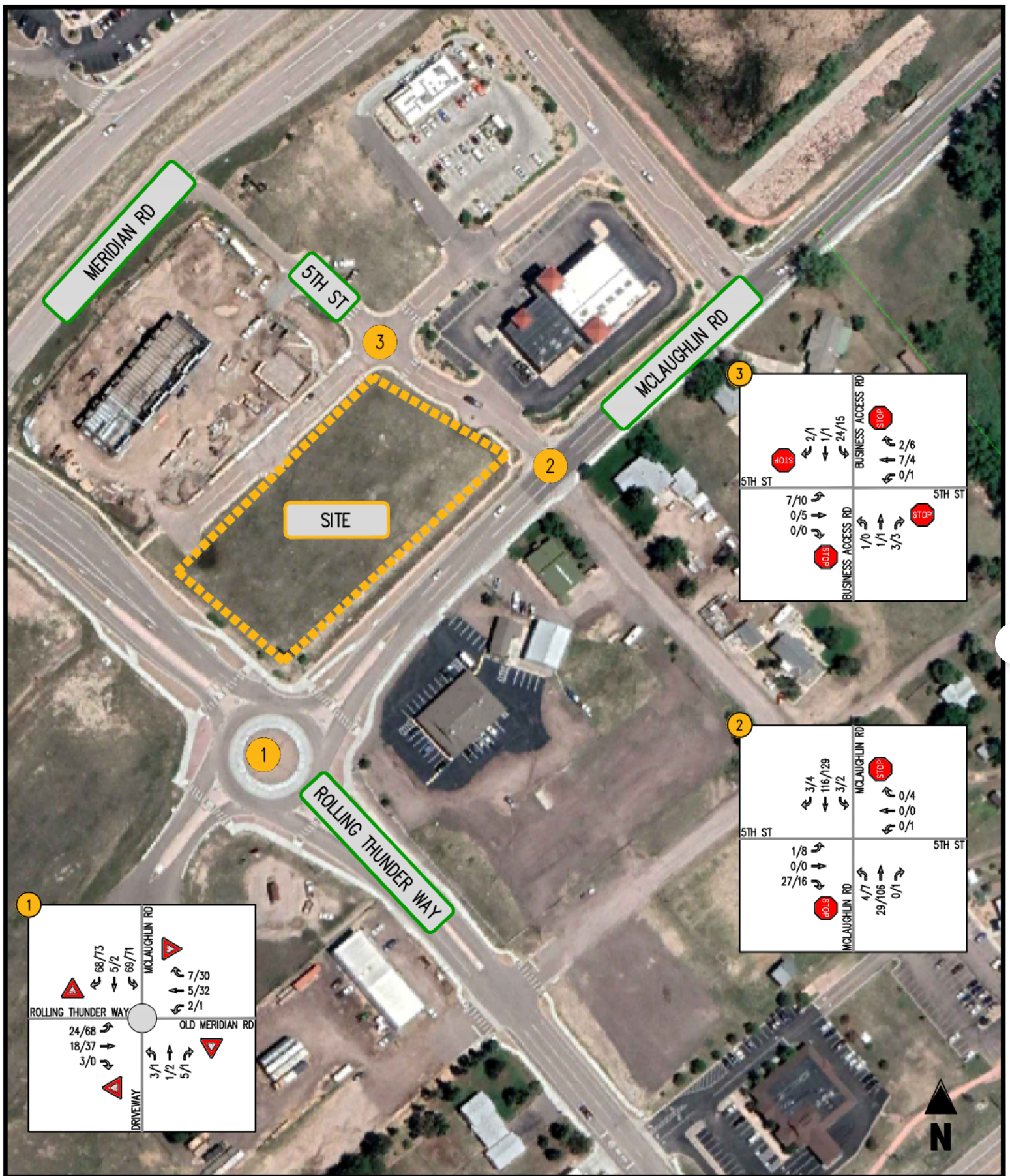


FIGURE 4-2  
Background Future Forecasts

0000/0000 (AM PEAK HOUR/PM PEAK HOUR)

Rolling Thunder Storage  
El Paso County, CO

- ← MOVEMENT
- 🚦 SIGNALIZED INTERSECTION
- 🛑 STOP SIGN
- 🚧 YIELD SIGN



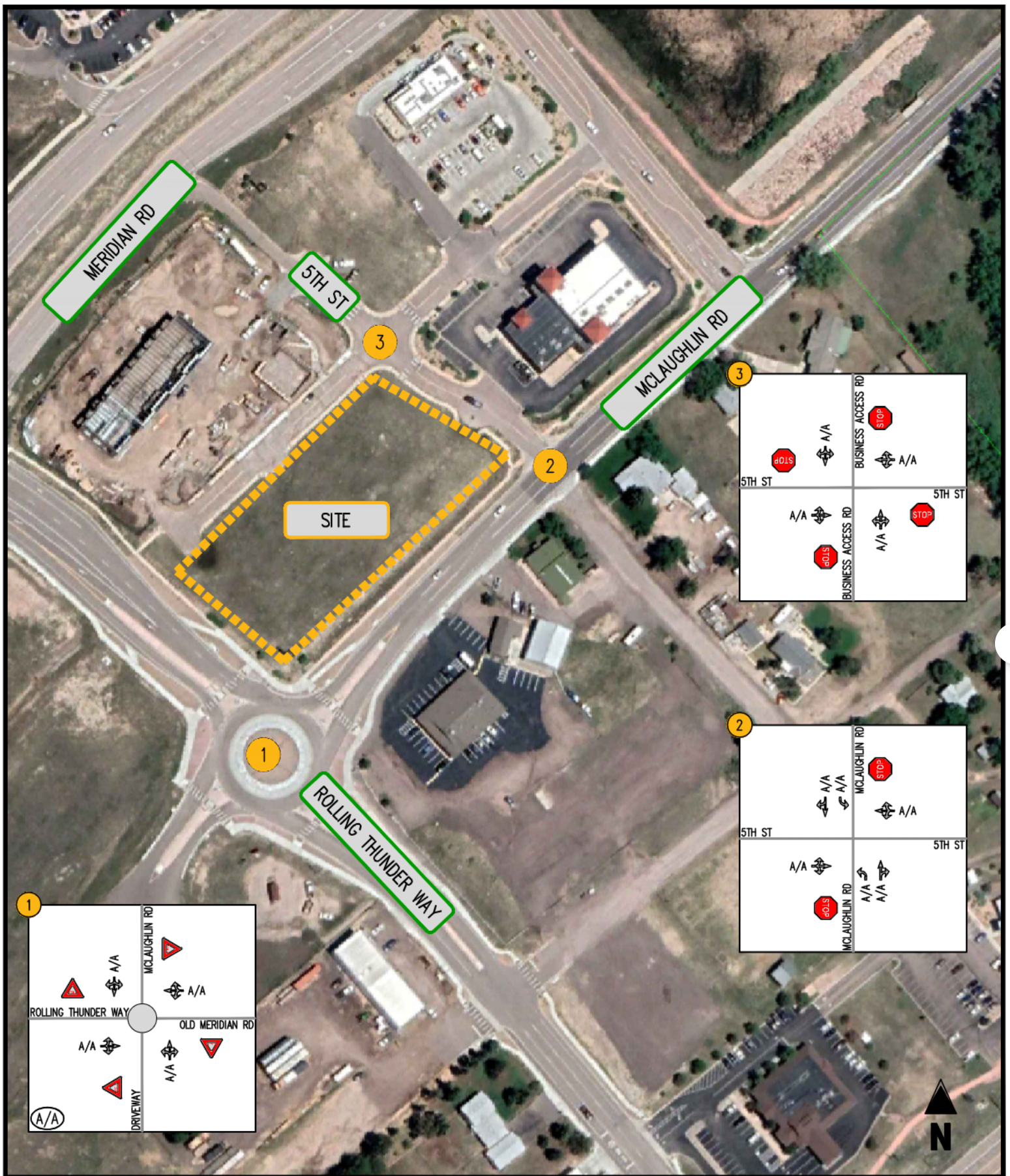


FIGURE 4-3  
Background Future Levels of Service

Rolling Thunder Storage  
El Paso County, CO

(A/A) INTERSECTION LOS

- ← MOVEMENT
- 🚦 SIGNALIZED INTERSECTION
- 🛑 STOP SIGN
- 🚧 YIELD SIGN



Table 4-1  
 Rolling Thunder Storage  
 Background Intersection Level of Service Summary (1)

Intersection	Operating Condition	Street Name	Approach/Movement	Existing 2023		Background 2024	
				AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
1 McLaughlin Road/Meridian Road	CIRCLE	Rolling Thunder Way	EBLTR	A [3.2]	A [3.6]	A [3.2]	A [3.6]
		Old Meridian Road	WBLTR	A [2.8]	A [3.3]	A [2.8]	A [3.3]
		Driveway	NBLTR	A [3.0]	A [3.2]	A [3.0]	A [3.2]
		McLaughlin Road	SBLTR	A [3.6]	A [3.8]	A [3.6]	A [3.8]
		<b>Overall</b>		<b>A (3.4)</b>	<b>A (3.6)</b>	<b>A (3.5)</b>	<b>A (3.6)</b>
2 McLaughlin Road/5th Street	STOP	5th Street	EBLTR	A [9.0]	A [9.6]	A [9.1]	A [9.6]
		5th Street	WBLTR	A [0.0]	A [9.2]	A [0.0]	A [9.2]
		McLaughlin Road	NBL	A [7.5]	A [7.5]	A [7.5]	A [7.5]
		McLaughlin Road	NBTR	A [0.0]	A [0.0]	A [0.0]	A [0.0]
		McLaughlin Road	SBL	A [7.3]	A [7.4]	A [7.3]	A [7.4]
		McLaughlin Road	SBTR	A [0.0]	A [0.0]	A [0.0]	A [0.0]
3 5th Street/Business Access	STOP	5th Street	EBLTR	A [7.3]	A [7.2]	A [7.3]	A [7.2]
		5th Street	WBLTR	A [6.9]	A [6.7]	A [6.9]	A [6.7]
		Business Access	NBLTR	A [6.7]	A [6.6]	A [6.7]	A [6.6]
		Business Access	SBLTR	A [7.3]	A [7.2]	A [7.3]	A [7.2]

Notes : (1) Numbers in brackets [j] represent delay at unsignalized intersections in seconds per vehicle.

Table 4-2  
 Rolling Thunder Storage  
 Background Intersection Queueing Summary (1)

Intersection	Operating Condition	Street Name	Approach/Movement	Available Storage	Existing 2021		Background 2024	
					AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
1 McLaughlin Road/Meridian Road	CIRCLE	Rolling Thunder Way	EBLTR	-	0	0	0	0
		Old Meridian Road	WBLTR	-	0	0	0	0
		Driveway	NBLTR	-	0	0	0	0
		McLaughlin Road	SBLTR	-	0	0	0	0
2 McLaughlin Road/5th Street	STOP	5th Street	EBLTR	-	2.5	2.5	2.5	2.5
		5th Street	WBLTR	-	0.0	0.0	0.0	0.0
		McLaughlin Road	NBL	1.0	0.0	0.0	0.0	0.0
		McLaughlin Road	NBLTR	-	0.0	0.0	0.0	0.0
		McLaughlin Road	SBL	1.0	0.0	0.0	0.0	0.0
3 5th Street Business Access	STOP	5th Street	EBLTR	-	0	2.5	0	2.5
		5th Street	WBLTR	-	0	0	0	0
		Business Access	NBLTR	-	0	0	0	0
		Business Access	SBLTR	-	2.5	2.5	2.5	2.5

Queueing (1) Queue lengths are based on the 95th percentile queue in feet as reported by Synchro, Version 11.



## V. Site Analysis

### Overview

The Applicant proposes to construct a development consisting of up to 750 self-storage units. Since the site is being rezoned to Commercial Service, El Paso County has requested that this study also analyze the highest trip generating development that would be allowed on the proposed zoning. It was determined that a shopping plaza would be the highest realistic trip generator. Typically, this type of development is allowed to occupy 20% of a site's square footage. Since the site is 2.13 acres, it would allow for a 18,557 SF shopping plaza.

### Proposed Site Access

The development proposes to utilize the existing curb cuts that were constructed for the site. This would allow for access along 5<sup>th</sup> Street as well as two access points along the business access road. The multiple access locations will support circulation through the site as well as dispersing site trips. A detailed site plan has been included in Appendix A.

### Trip Generation

Trip generation estimates for the weekday AM and PM peak hours, as well as the weekday average daily traffic (ADT), were derived from the standard Institute of Transportation Engineers (ITE) Trip Generation Manual rates/equations, as published in the 11<sup>th</sup> edition.

#### **Site Trips**

The site trips for both the proposed development (Mini-Warehouse) and the maximum trip generator (Strip Retail) are shown in Table 5-1. As shown in Table 5-1, the proposed development will generate 9 vph in the AM peak hour, 13 vph in the PM peak hour, and 135 daily weekday trips. The maximum trip generator will generate 44 vph in the AM peak hour, 122 vph in the PM peak hour, and 1,013 daily weekday trips.

#### **Site Trip Distributions**

The distribution of the generated trips was based on an examination of existing traffic counts as well as the development's location relative to nearby population centers and major roads. The following trip distribution was used for the site generated trips:

- To/from the west on Rolling Thunder Way: 15%
- To/from the east on Rolling Thunder Way: 15%
- To/from the north on McLaughlin Road: 30%
- To/from the north on Business Access Road: 20%
- To/from the west on 5<sup>th</sup> Street: 20%

The site trips were distributed through the study area based on the distribution above. The trip distribution for the proposed warehouse is shown in Figure 5-1. The trip distribution for the maximum trip generator (strip retail) is shown in Figure 5-2.

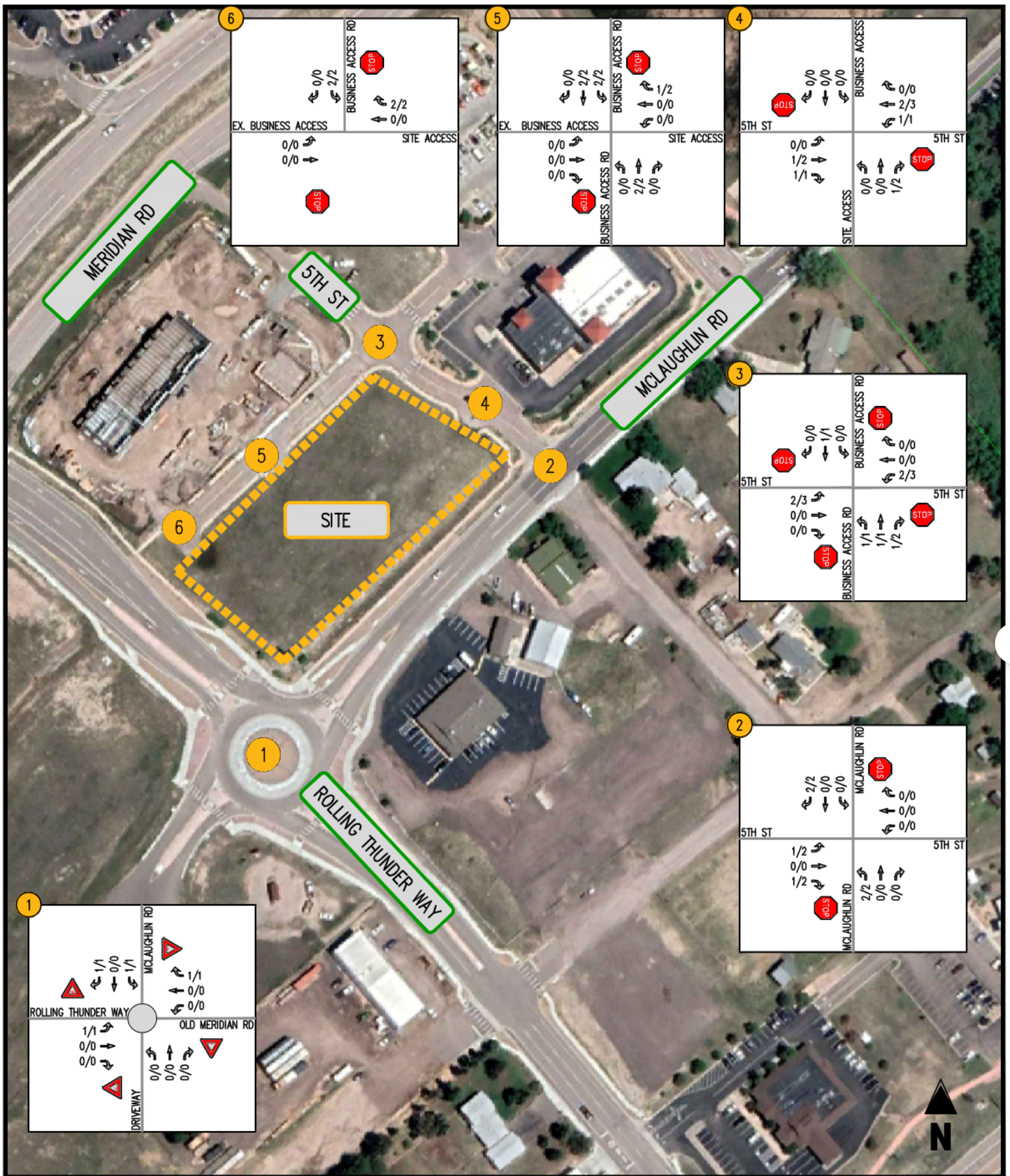


FIGURE 5-1  
Proposed Development (Warehouse) Site Trips

Rolling Thunder Storage  
El Paso County, CO

0000/0000 (AM PEAK HOUR/PM PEAK HOUR)  
26



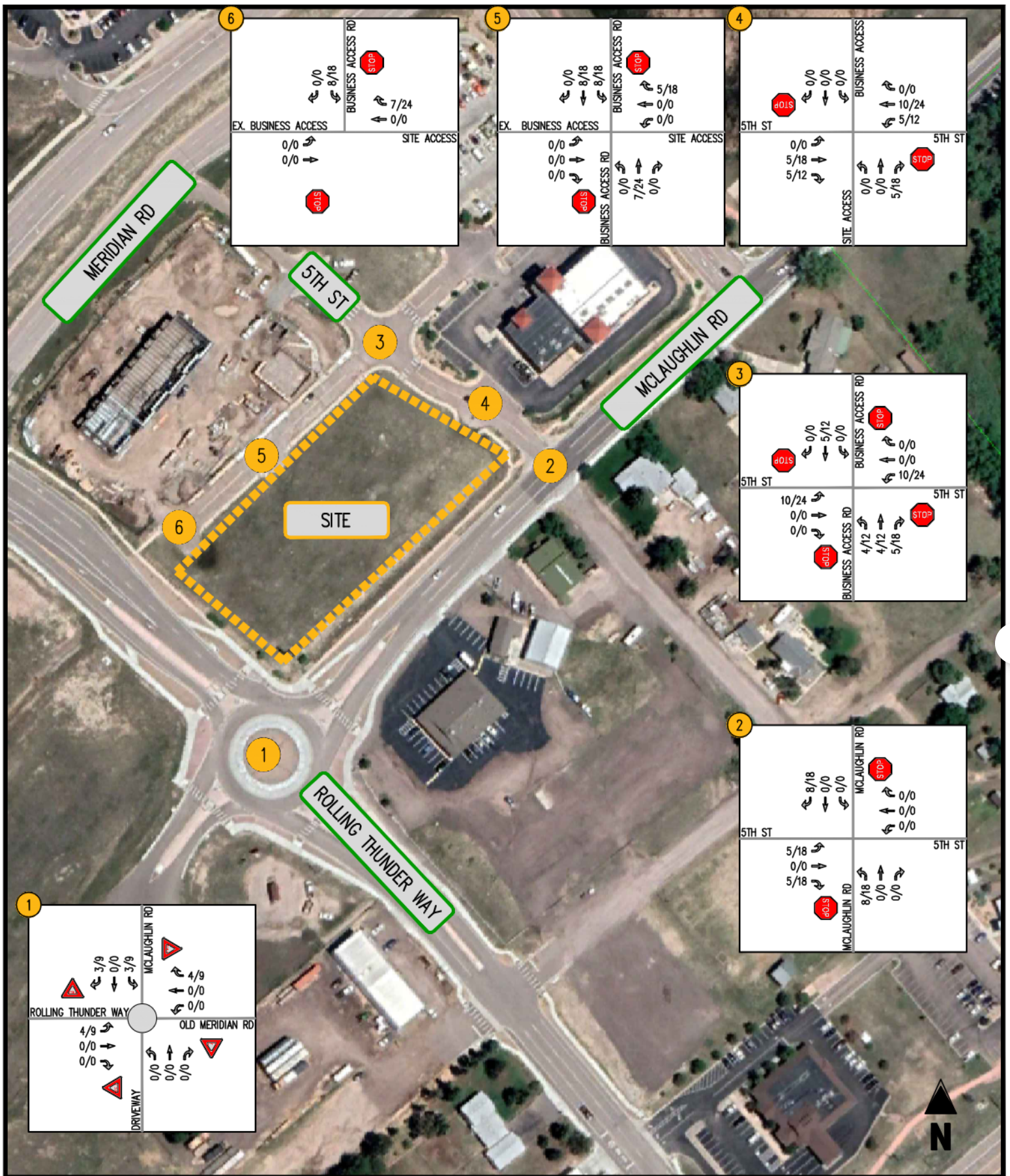


FIGURE 5-2  
Maximum Trip Generator (Strip Retail) Site Trips

Rolling Thunder Storage  
El Paso County, CO

0000/0000 (AM PEAK HOUR/PM PEAK HOUR)  
27

- MOVEMENT
- SIGNALIZED INTERSECTION
- STOP SIGN
- YIELD SIGN



Table 5-1

Rolling Thunder Storage

Site Trip Generation

Land Use	Use Code	Amount	Units	AM Peak Hour			PM Peak Hour			Average Daily Trips
				In	Out	Total	In	Out	Total	
Proposed Development (Mini-Warehouse)	151	750	Units	5	4	9	7	6	13	135
Maximum Trip Generator (Stip Retail Plaza <40k)	822	18,557	SF	26	18	44	61	61	122	1,013

Note(s):

(1) Trip generation based on the Institute of Transportation Engineers' Trip Generation Manual, 11th Edition

## **VI. Analysis of Future Conditions with Site Development**

### **Total Future Traffic Forecasts**

The total future traffic forecasts associated with the proposed development were developed by combining the background future forecasts shown on Figure 4-2 and the site trip assignments shown on Figure 5-1 (Warehouse) and Figure 5-2 (Strip Retail). The resulting total future traffic forecasts are provided on Figure 6-1 for warehouse build-out conditions, and Figure 6-2 for strip retail build-out conditions.

### **Total Future Levels of Service with Proposed Development**

Future levels of service with the proposed development plan were estimated at key study intersections based on the future traffic volumes shown on Figures 6-1 and Figure 6-2, the total future lane use on Figure 5-1, and the HCM 7<sup>th</sup> methodologies for unsignalized intersections and roundabouts. The results of these analyses are provided in Appendix F and presented in Table 6-1. Total future levels of service are also presented graphically on Figure 6-3 (warehouse) and Figure 6-4 (strip retail).

As shown in Table 6-1, levels of service under future site development conditions would remain generally consistent with future background conditions (i.e., without site development). The unsignalized intersections in the study area are forecasted to operate at LOS “B” or better during the AM and PM peak hours.

### **Total Future Queuing**

Total future queues were forecasted using Synchro. The results of the queuing analysis are summarized in Table 6-2. The forecasted queues are expected to remain within their effective storage lengths, consistent with background conditions.

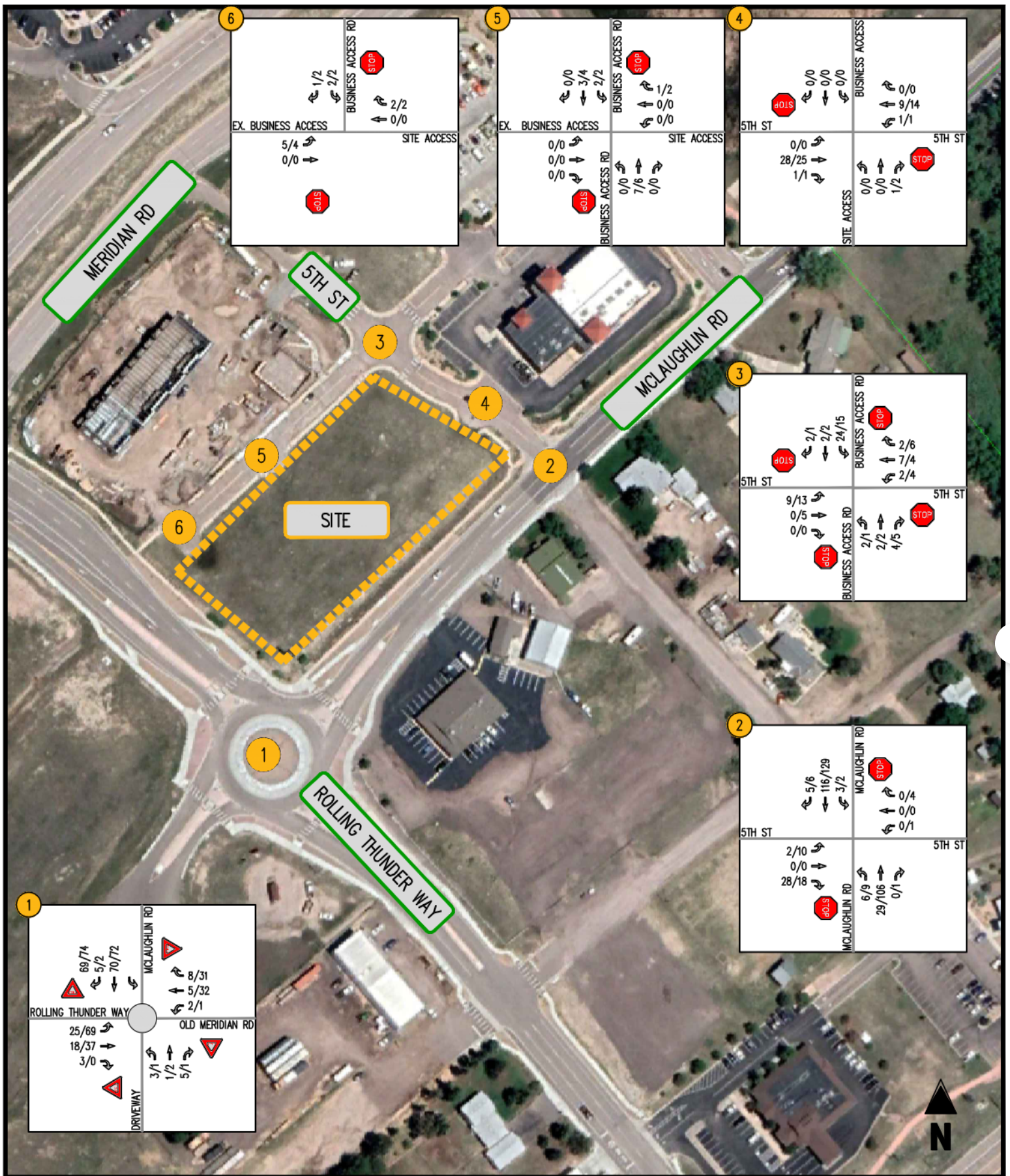


FIGURE 6-1  
Total Future Forecasts (Warehouse)

Rolling Thunder Storage  
El Paso County, CO



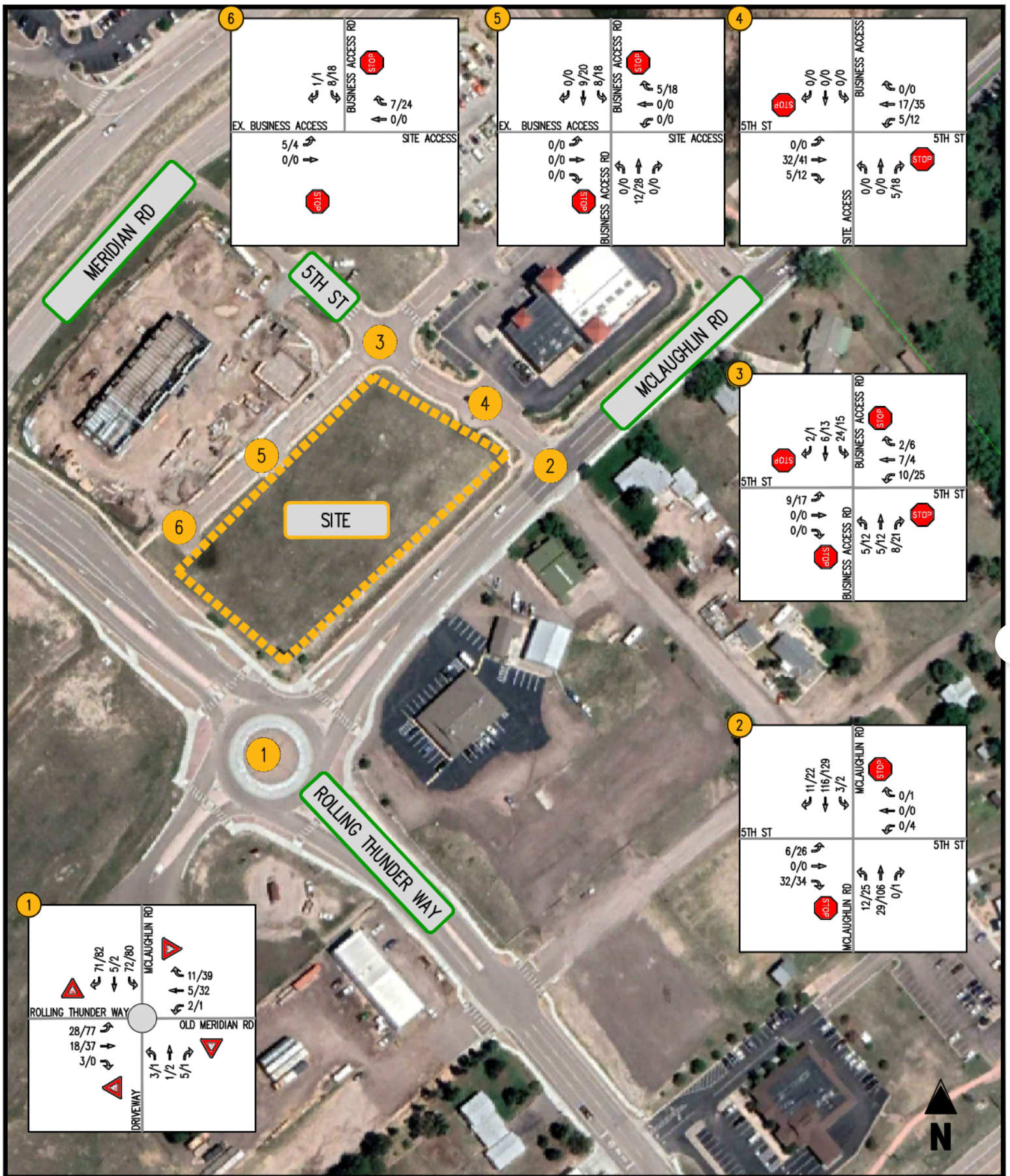


FIGURE 6-2  
Total Future Forecasts (Strip Retail)

Rolling Thunder Storage  
El Paso County, CO

- ← MOVEMENT
- 🚦 SIGNALIZED INTERSECTION
- 🛑 STOP SIGN
- 🚧 YIELD SIGN



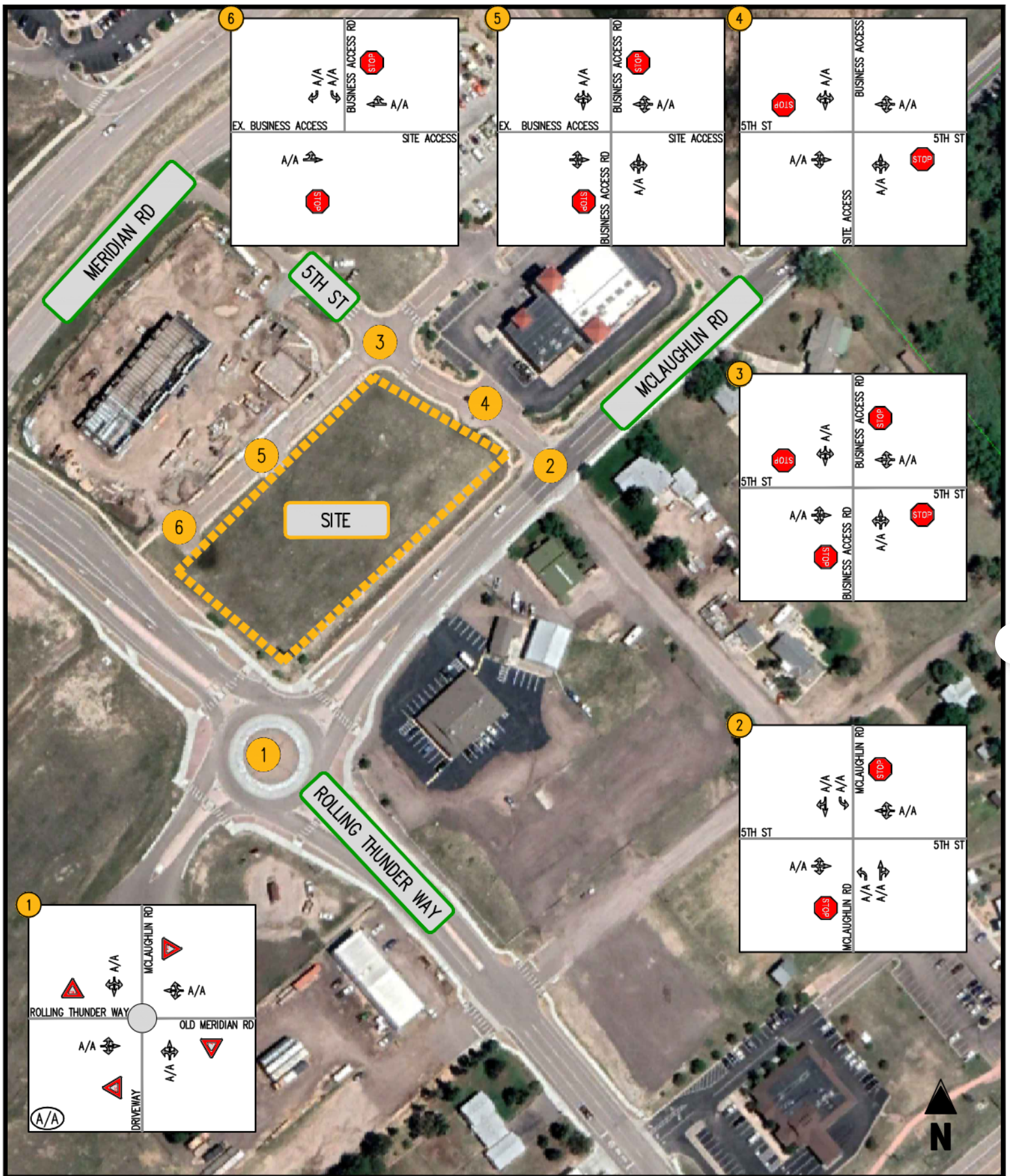


FIGURE 6-3  
Total Future Levels of Service (Warehouse)

Rolling Thunder Storage  
El Paso County, CO

(A/A) INTERSECTION LOS

- ← MOVEMENT
- 🚦 SIGNALIZED INTERSECTION
- 🛑 STOP SIGN
- 🚧 YIELD SIGN





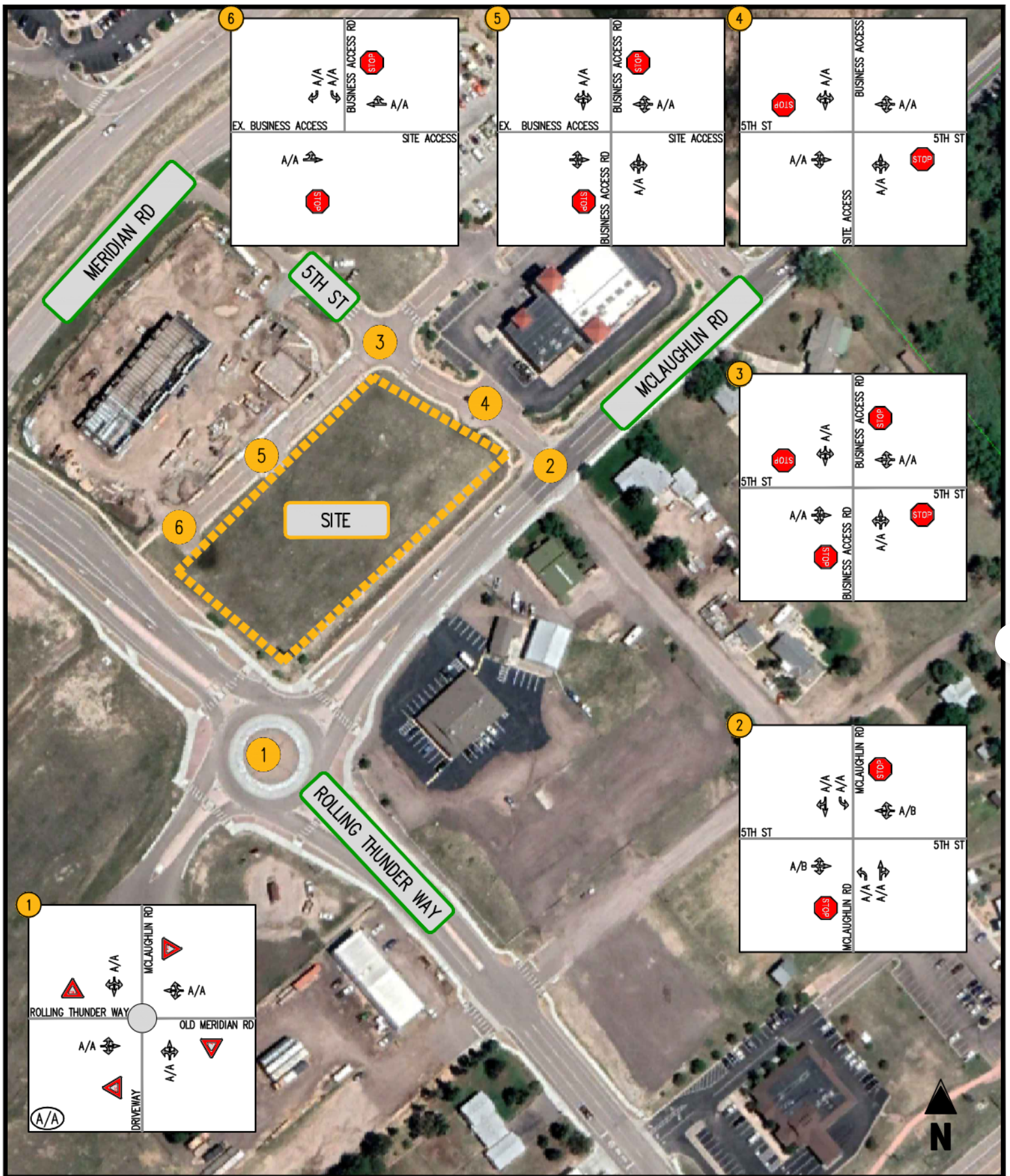


FIGURE 6-4  
Total Future Levels of Service (Strip Retail)

Rolling Thunder Storage  
El Paso County, CO

(A/A) INTERSECTION LOS

- ← MOVEMENT
- 🚦 SIGNALIZED INTERSECTION
- 🛑 STOP SIGN
- 🚧 YIELD SIGN



Table 6-1  
Rolling Thunder Storage  
Total Future Intersection Level of Service Summary (1)

Intersection	Operating Condition	Street Name	Approach/Movement	Background 2024		Total Future Storage		Total Future Retail	
				AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
1 McLaughlin Road/Meridian Road	CIRCLE	Rolling Thunder Way Old Meridian Road Driveway McLaughlin Road	EBLTR WBLTR NBLTR SBLTR	A [3.2]	A [3.6]	A [3.2]	A [3.7]	A [3.3]	A [3.8]
				A [2.8]	A [3.3]	A [2.8]	A [3.4]	A [2.8]	A [3.4]
2 McLaughlin Road/5th Street	STOP	5th Street 5th Street McLaughlin Road McLaughlin Road	EBLTR WBLTR NBL SBL SBTR	A [9.1]	A [9.6]	A [9.1]	A [9.6]	A [9.3]	B [10.4]
				A [0.0]	A [9.2]	A [9.1]	A [9.4]	A [9.2]	B [10.2]
3 5th Street/Business Access	STOP	5th Street 5th Street Business Access Business Access	EBLTR WBLTR NBLTR SBLTR	A [7.3]	A [7.2]	A [7.3]	A [7.2]	A [7.4]	A [7.6]
				A [6.9]	A [6.7]	A [7.0]	A [6.8]	A [7.2]	A [7.4]
4 5th Street/Site Access	STOP	5th Street 5th Street Site Access	EBTR WBLT NBLR	na	na	A [0.0]	A [0.0]	A [0.0]	A [0.0]
				na	na	A [7.3]	A [7.3]	A [7.3]	A [7.3]
5 Business Access/Site Access	STOP	Site Access Business Access Business Access	WBLR NBTR SBLT	na	na	A [8.6]	A [8.3]	A [8.7]	A [8.5]
				na	na	A [0.0]	A [0.0]	A [0.0]	A [0.0]
6 Business Access/Site Access	STOP	Driveway Site Access Business Access	EBLT WBTR SBLR	na	na	A [8.6]	A [8.6]	A [8.7]	A [9.0]
				na	na	A [8.3]	A [8.3]	A [8.3]	A [8.4]
				na	na	A [3.6]	A [2.4]	A [6.5]	A [6.6]

Notes: (1) Numbers in brackets [ ] represent delay at unsignalized intersections in seconds per vehicle.

Table 6-2  
Rolling Thunder Storage  
Total Future Intersection Queueing Summary (1)

Intersection	Operating Condition	Street Name	Approach/ Movement	Available Storage	Background 2024			Total Future Storage			Total Future Retail		
					AM Peak Hour	PM Peak Hour	Peak Hour	AM Peak Hour	PM Peak Hour	Peak Hour	AM Peak Hour	PM Peak Hour	Peak Hour
1 McLaughlin Road/Meridian Road	CIRCLE	Rolling Thunder Way	EBLTR	-	0	0	0	0	0	0	0	0	
		Old Meridian Road	WBLTR	-	0	0	0	0	0	0	0	0	
		Driveway	NBLTR	-	0	0	0	0	0	0	0	0	
		McLaughlin Road	SBLTR	-	0	0	0	0	0	0	0	0	
2 McLaughlin Road/5th Street	STOP	5th Street	EBLTR	-	2.5	2.5	2.5	2.5	2.5	2.5	7.5		
		5th Street	WBLTR	-	0.0	0.0	0.0	0.0	0.0	0.0	5.0		
		McLaughlin Road	NBLTR	130	0.0	0.0	0.0	0.0	0.0	0.0	2.5		
		McLaughlin Road	NBTR	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		McLaughlin Road	SBLTR	130	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
3 5th Street/Business Access	STOP	5th Street	EBLTR	-	0	2.5	2.5	0	2.5	2.5	5		
		5th Street	WBLTR	-	0	0	0	0	0	2.5			
		Business Access	NBLTR	-	0	0	0	0	0	2.5			
		Business Access	SBLTR	-	2.5	2.5	2.5	2.5	2.5	2.5			
4 5th Street/Site Access	STOP	5th Street	EBTR	-	na	na	na	0	0	0	0		
		5th Street	WBLT	-	na	na	na	0	0	0	0		
		Site Access	NBLR	-	na	na	na	0	0	0	2.5		
5 Business Access/Site Access	STOP	Site Access	WBLR	-	na	na	na	0	0	0	2.5		
		Business Access	NBTR	-	na	na	na	0	0	0	0		
		Business Access	SBLT	-	na	na	na	0	0	0	0		
6 Business Access/Site Access	STOP	Driveway	EBLT	-	na	na	na	0	0	0	0		
		Site Access	WBTR	-	na	na	na	0	0	0	0		
		Business Access	SBLR	-	na	na	na	0	0	0	0		

Note: (1) Queue length is based on the 95th percentile queue in feet as reported by Synchro, Version 11.

## VII. Conclusions and Recommendations

### Conclusions

Based on the results of this traffic impact study, the following may be concluded:

- Under existing conditions, the study intersections operate with all movements level of service (LOS) "A". No queuing issues exist.
- In the background 2024 scenario, all intersections operate at LOS "A". No queuing issues are forecasted in background conditions.
- The proposed warehouse development will generate 9 weekday AM and 13 weekday PM peak hour vehicle trips as well as 135 weekday daily trips.
- The total scenarios in which the warehouse has been built will have very similar operations to the background scenarios. No operational or queuing issues are forecasted.
- As requested by El Paso County, the maximum trip generator allowed on a site zoned as Commercial Service was analyzed. This was found to be an 18,557 SF strip retail. In this scenario, the shopping plaza would generate 44 weekday AM and 122 weekday PM peak hour vehicle trips as well as 1,013 weekday daily trips.
- The total scenarios in which the retail has been built will have very similar operations to the background scenarios. No operational or queuing issues are forecasted.
- Road Impact Fees will be due by the Applicant at the last land use approval consistent with the use and Impact Fee schedule.

### Recommendations

- It is recommended that the proposed development be designed as shown in the site plan.

State if any improvements are needed for proposed use and best use for the access and adjacent intersections for both current and long term. Reference ECM B.8

## **APPENDIX A – Full Sized Site Plan**

# Climate Controlled Storage Facility

N Meridian Rd & Rolling Thunder Way  
Peyton, Colorado

## FOR

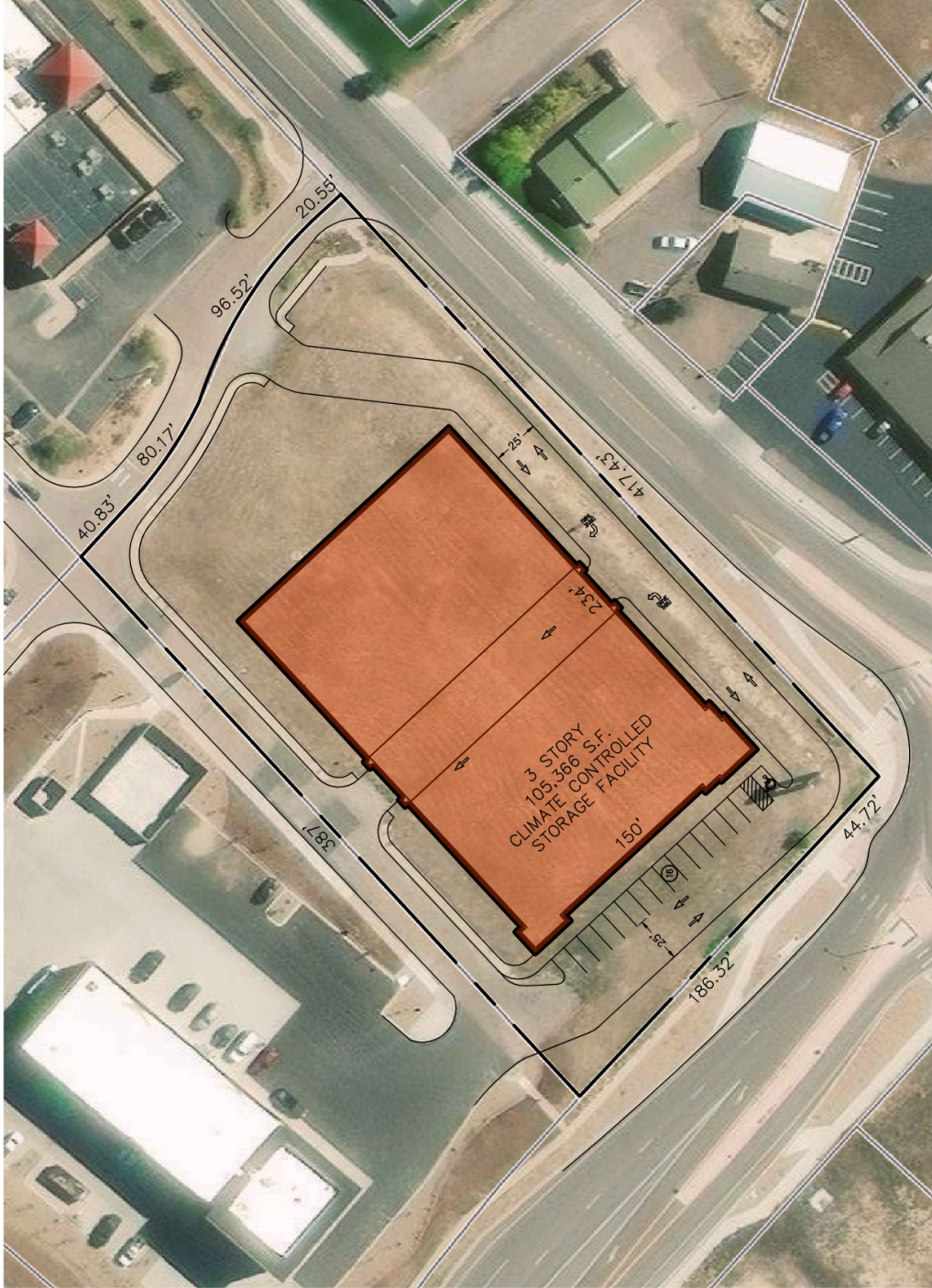
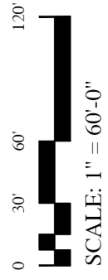
Centennial American Properties  
105 E North, Suite #101  
Greenville, SC 29601  
(864)-271-3894

# Storage Facility

Total Land Area	2.13 +/-	Acres
Total Building Area	105,366	S.F.
Parking Required	--	Cars
Parking Provided	16	Cars

Option 1  
September 16, 2023

**GENERAL NOTES**  
1. PROPERTY LINES BASED ON INFORMATION PROVIDED BY OTHERS.  
2. BOUNDARIES, SETBACKS, EASEMENTS, ETC. TO BE DETERMINED BY SURVEY AND ZONING REQUIREMENTS.



## **APPENDIX B – LOS Descriptions**

## Level of Service for Signalized Intersections

Level of service for signalized intersections is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. Specifically, level-of-service (LOS) criteria are stated in terms of the average stopped delay per vehicle for a 15-min analysis period. The criteria are given in Exhibit 16-2. Delay may be measured in the field or estimated using procedures presented later in this chapter. Delay is a complex measure and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the  $v/c$  ratio for the lane group in question.

**LOS A** describes operations with very low delay, up to 10 sec per vehicle. This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

**LOS B** describes operations with delay greater than 10 and up to 20 sec per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay.

Exhibit 16-2. Level-of-Service Criteria for Signalized Intersections

LEVEL OF SERVICE	STOPPED DELAY PER VEHICLE (SEC)
A	$\leq 10.0$
B	$> 10.0$ and $\leq 20.0$
C	$> 20.0$ and $\leq 35.0$
D	$> 35.0$ and $\leq 55.0$
E	$> 55.0$ and $\leq 80.0$
F	$> 80.0$

**LOS C** describes operations with delay greater than 20 and up to 35 sec per vehicle. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

**LOS D** describes operations with delay greater than 35 and up to 55 sec per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high  $v/c$  ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

**LOS E** describes operations with delay greater than 55 and up to 80 sec per vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high  $v/c$  ratios. Individual cycle failures are frequent occurrences.

**LOS F** describes operations with delay in excess of 80 sec per vehicle. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high  $v/c$  ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Source: Highway Capacity Manual, 2000. Transportation Research Board, National Research Council



## Level of Service Criteria for Stop Sign Controlled Intersections

The level of service criteria are given in Table 17-2. As used here, control delay is defined as the total elapsed time from the time a vehicle stops at the end of the queue until the vehicle departs from the stop line; this time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position, including deceleration of vehicles from free-flow speed to the speed of vehicles in queue.

The average total delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation. . . .

Table 17-2. Level of Service Criteria for TWSC Intersections

LEVEL OF SERVICE	AVERAGE CONTROL DELAY (sec/veh)
A	$\leq 10$
B	$> 10$ and $\leq 15$
C	$> 15$ and $\leq 25$
D	$> 25$ and $\leq 35$
E	$> 35$ and $\leq 50$
F	$> 50$

Average total delay less than 10 sec/veh is defined as Level of Service (LOS) A. Follow-up times of less than 5 sec have been measured when there is no conflicting traffic for a minor street movement, so control delays of less than 10 sec/veh are appropriate for low flow conditions. To remain consistent with the AWSC intersection analysis procedure described later in this chapter, a total delay of 50 sec/veh is assumed as the break point between LOS E and F.

The proposed level of service criteria for TWSC intersections are somewhat different from the criteria used in Chapter 16 for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, several driver behavior considerations combine to make delays at signalized intersections less onerous than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, where drivers on the minor approaches to unsignalized intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized than signalized intersections. For these reasons, it is considered that the total delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection. . . .

LOS F exists when there are insufficient gaps of suitable size to allow a side street demand to cross safely through a major street traffic stream. This level of service is generally evident from extremely long total delays experienced by side street traffic and by queueing on the minor approaches. The method, however, is based on a constant critical gap size - that is, the critical gap remains constant, no matter how long the side street motorist waits. LOS F may also appear in the form of side street vehicles' selecting smaller-than-usual gaps. In such cases, safety may be a problem and some disruption to the major traffic stream may result. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal gap acceptance behavior. The latter is more difficult to observe on the field than queueing, which is more obvious.

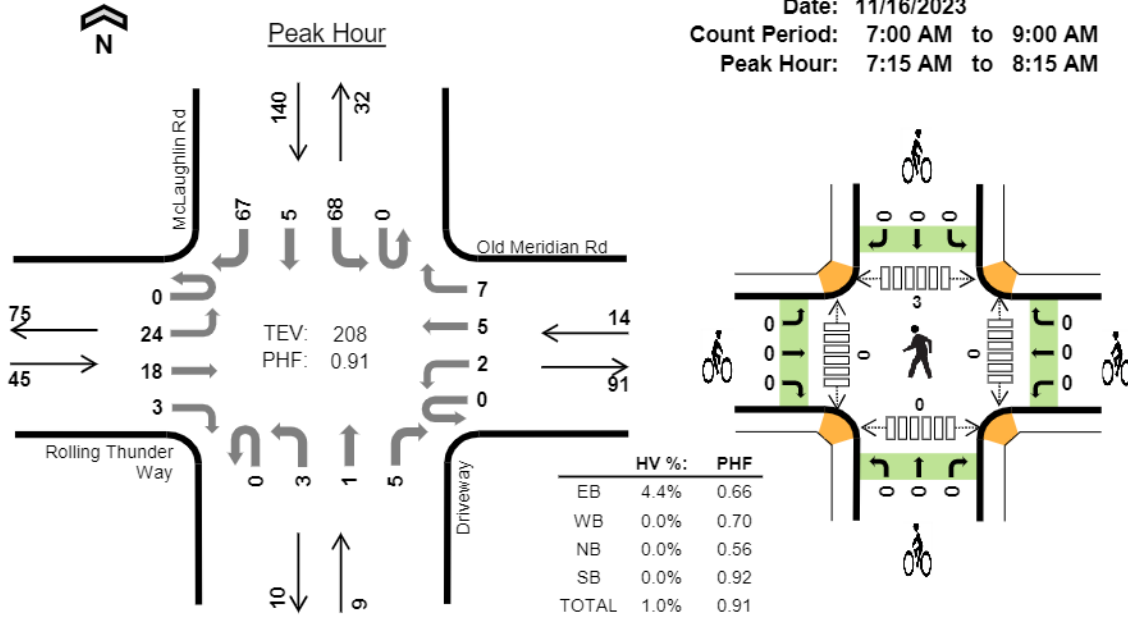
Source: Highway Capacity Manual, 2000. Transportation Research Board, National Research Council

## APPENDIX C – Traffic Counts

# McLaughlin Rd Rolling Thunder Way



Date: 11/16/2023  
 Count Period: 7:00 AM to 9:00 AM  
 Peak Hour: 7:15 AM to 8:15 AM



### Two-Hour Count Summaries

Interval Start	Rolling Thunder Way				Old Meridian Rd				Driveway				McLaughlin Rd				15-min Total	Rolling One Hour	
	Eastbound				Westbound				Northbound				Southbound						
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
7:00 AM	0	8	0	1	0	0	5	0	0	1	0	0	1	20	0	9	45	0	
7:15 AM	0	6	2	0	0	0	1	0	0	0	0	1	0	21	3	13	47	0	
7:30 AM	0	2	5	1	0	0	0	4	0	1	0	3	0	15	1	22	54	0	
7:45 AM	0	10	6	1	0	0	2	3	0	0	1	0	0	13	0	21	57	203	
8:00 AM	0	6	5	1	0	2	2	0	0	2	0	1	0	19	1	11	50	203	
8:15 AM	0	1	3	0	0	0	4	1	0	1	0	1	0	1	1	12	40	20	
8:30 AM	0	10	6	0	0	7	2	0	0	0	0	0	0	12	0	6	45	192	
8:45 AM	0	11	5	0	1	1	3	4	0	1	0	0	0	1	0	1	52	187	
Count Total	0	54	36	4	2	0	24	14	0	6	1	6	1	133	6	100	390	0	
Peak Hour	All	0	24	18	3	0	2	5	7	0	3	1	5	0	68	5	67	208	0
	HV	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
	HV%	-	4%	6%	0%	-	0%	0%	0%	-	0%	0%	0%	-	0%	0%	0%	1%	0

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

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	1	
8:00 AM	2	0	0	0	2	0	0	0	0	0	0	0	2	2	
8:15 AM	0	1	0	1	2	0	0	0	0	0	0	0	0	0	
8:30 AM	1	2	0	0	3	0	0	0	0	0	0	0	0	0	
8:45 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	
Count Total	3	4	0	2	9	0	0	0	0	0	0	0	4	4	
Peak Hour	2	0	0	0	2	0	0	0	0	0	0	0	3	3	

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Rolling Thunder Way				Old Meridian Rd				Driveway				McLaughlin Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:00 AM	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
8:15 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	2	4
8:30 AM	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	3	7
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	8
Count Total	0	2	1	0	0	0	4	0	0	0	0	0	0	2	0	0	9	0
Peak Hour	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0

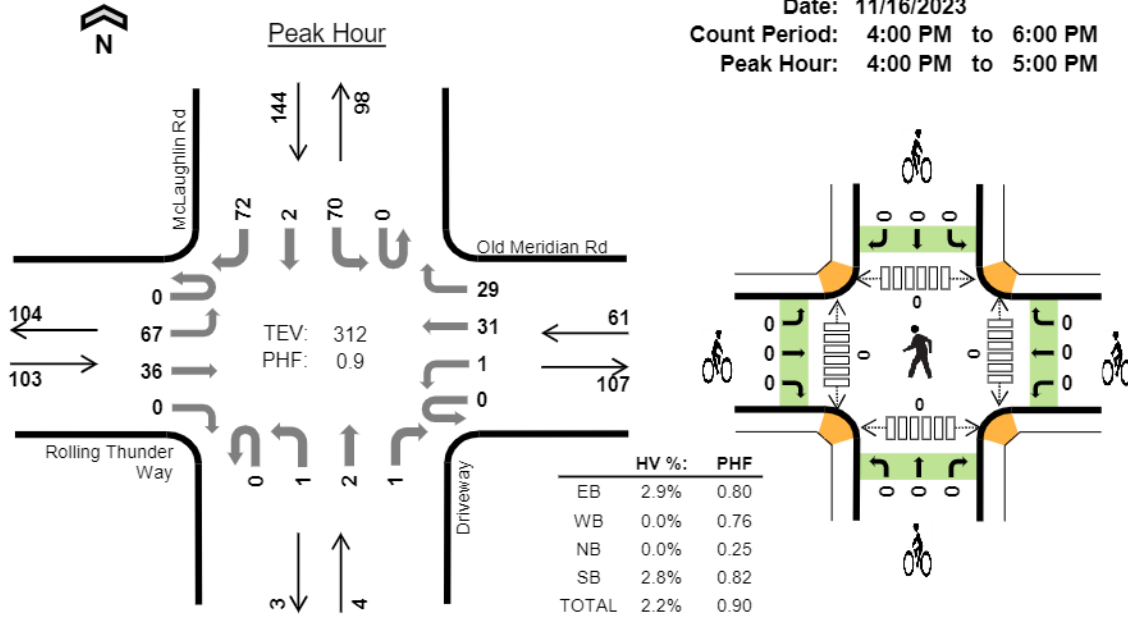
Two-Hour Count Summaries - Bikes														
Interval Start	Rolling Thunder Way			Old Meridian Rd			Driveway			McLaughlin Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

# McLaughlin Rd Rolling Thunder Way



Date: 11/16/2023  
Count Period: 4:00 PM to 6:00 PM  
Peak Hour: 4:00 PM to 5:00 PM



## Two-Hour Count Summaries

Interval Start	Rolling Thunder Way				Old Meridian Rd				Driveway				McLaughlin Rd				15-min Total	Rolling One Hour	
	Eastbound				Westbound				Northbound				Southbound						
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
4:00 PM	0	14	14	0	0	0	11	9	0	0	0	0	0	20	0	19	87	0	
4:15 PM	0	14	6	0	0	1	6	9	0	1	2	1	0	23	2	19	84	0	
4:30 PM	0	13	10	0	0	0	7	8	0	0	0	0	0	13	0	18	69	0	
4:45 PM	0	26	6	0	0	0	7	3	0	0	0	0	0	14	0	16	72	312	
5:00 PM	0	12	7	0	0	0	7	15	0	0	0	0	1	19	0	19	80	305	
5:15 PM	0	22	6	0	0	0	2	6	0	0	0	0	1	12	0	24	73	294	
5:30 PM	0	20	9	1	0	0	5	5	0	1	0	0	0	12	0	16	69	294	
5:45 PM	0	19	9	0	0	0	7	4	0	0	0	0	0	15	0	9	63	285	
Count Total	0	140	67	1	0	1	52	59	0	2	2	1	2	12	2	140	597	0	
Peak Hour	All	0	67	36	0	0	1	31	29	0	1	2	1	0	70	2	72	312	0
	HV	0	1	2	0	0	0	0	0	0	0	0	0	0	2	0	2	7	0
	HV%	-	1%	6%	-	-	0%	0%	0%	-	0%	0%	0%	-	3%	0%	3%	2%	0

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

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	2	0	0	1	3	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
5:30 PM	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	4	1	0	6	11	0	0	0	0	0	0	0	1	0	1
Peak Hour	3	0	0	4	7	0	0	0	0	0	0	0	0	0	0

<b>Two-Hour Count Summaries - Heavy Vehicles</b>																		
Interval Start	Rolling Thunder Way				Old Meridian Rd				Driveway				McLaughlin Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	3	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	6
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5:30 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2	5
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Count Total	0	1	3	0	0	0	1	0	0	0	0	0	4	0	2	0	11	0
Peak Hour	0	1	2	0	0	0	0	0	0	0	0	0	2	0	2	0	7	0

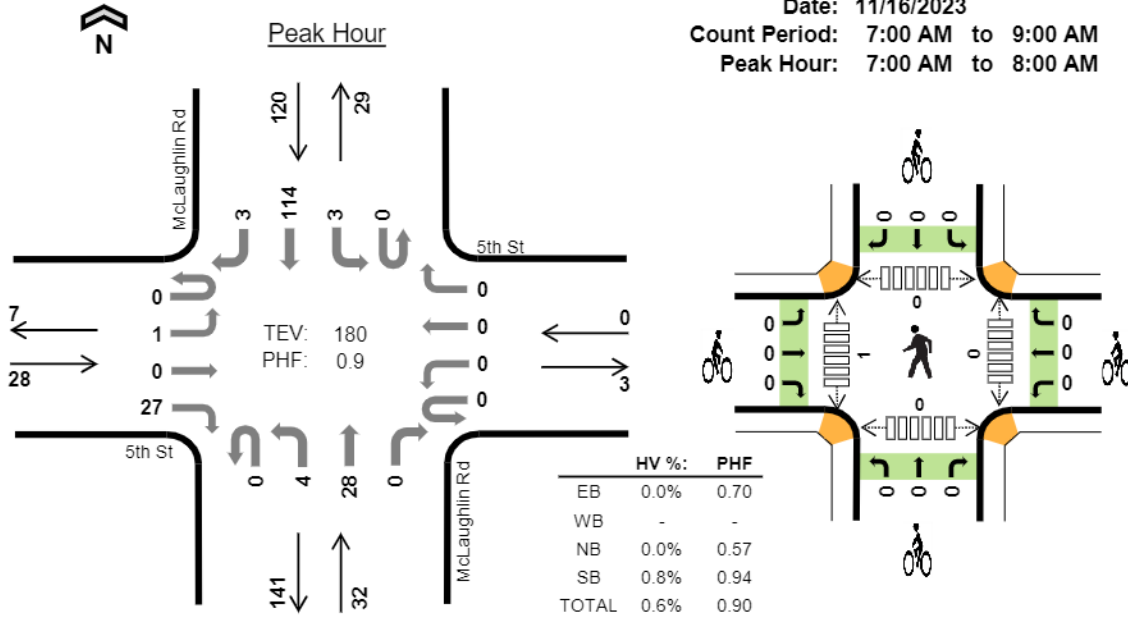
<b>Two-Hour Count Summaries - Bikes</b>														
Interval Start	Rolling Thunder Way			Old Meridian Rd			Driveway			McLaughlin Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

### McLaughlin Rd 5th St



Date: 11/16/2023  
 Count Period: 7:00 AM to 9:00 AM  
 Peak Hour: 7:00 AM to 8:00 AM



#### Two-Hour Count Summaries

Interval Start	5th St Eastbound				5th St Westbound				McLaughlin Rd Northbound				McLaughlin Rd Southbound				15-min Total	Rolling One Hour	
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
7:00 AM	0	0	0	5	0	0	0	0	0	0	7	0	0	0	26	0	38	0	
7:15 AM	0	0	0	7	0	0	0	0	0	0	5	0	0	0	30	2	44	0	
7:30 AM	0	1	0	9	0	0	0	0	0	0	6	0	0	1	30	1	48	0	
7:45 AM	0	0	0	6	0	0	0	0	0	4	10	0	0	2	28	0	50	180	
8:00 AM	0	0	0	6	0	0	0	0	0	0	6	0	0	0	24	0	36	178	
8:15 AM	0	1	0	8	0	0	0	0	0	0	2	0	0	0	21	3	35	169	
8:30 AM	0	1	0	5	0	0	0	0	0	1	11	0	0	1	14	1	34	155	
8:45 AM	0	0	0	6	0	0	0	0	0	3	13	0	0	0	18	1	41	146	
Count Total	0	3	0	52	0	0	0	0	0	8	60	0	0	4	191	8	326	0	
Peak Hour	All	0	1	0	27	0	0	0	0	0	4	28	0	0	3	114	3	180	0
	HV	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
	HV%	-	0%	-	0%	-	-	-	-	-	0%	0%	-	-	33%	0%	0%	1%	0

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

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
8:00 AM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
8:15 AM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Count Total	1	0	2	2	5	0	0	0	0	0	0	1	0	0	1
Peak Hour	0	0	0	1	1	0	0	0	0	0	0	1	0	0	1

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	5th St				5th St				McLaughlin Rd				McLaughlin Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
8:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	
8:15 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	3	
8:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	3	
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	4	
Count Total	0	0	0	1	0	0	0	0	0	0	2	0	0	1	1	5	0	
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	

Two-Hour Count Summaries - Bikes																
Interval Start	5th St			5th St			McLaughlin Rd			McLaughlin Rd			15-min Total	Rolling One Hour		
	Eastbound			Westbound			Northbound			Southbound						
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT				
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

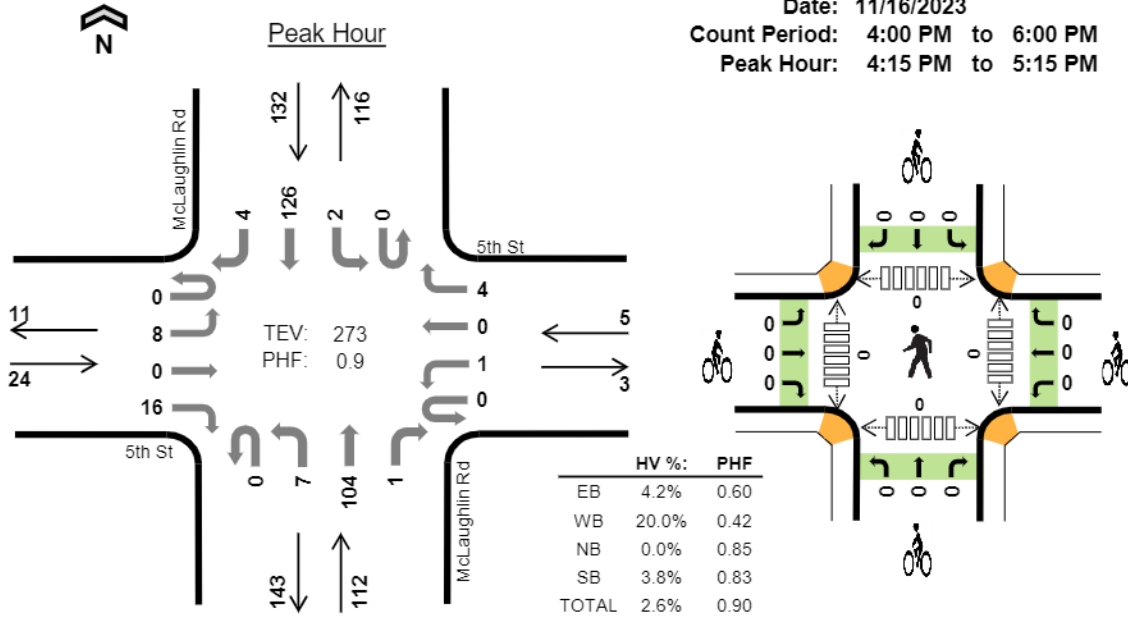
Note: U-Turn volumes for bikes are included in Left-Turn, if any.



### McLaughlin Rd 5th St



Date: 11/16/2023  
 Count Period: 4:00 PM to 6:00 PM  
 Peak Hour: 4:15 PM to 5:15 PM



#### Two-Hour Count Summaries

Interval Start	5th St Eastbound				5th St Westbound				McLaughlin Rd Northbound				McLaughlin Rd Southbound				15-min Total	Rolling One Hour	
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
4:00 PM	0	1	0	6	0	0	0	0	0	1	23	0	0	0	34	4	69	0	
<b>4:15 PM</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>22</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>39</b>	<b>1</b>	<b>76</b>	<b>0</b>	
4:30 PM	0	0	0	2	0	1	0	0	0	1	21	1	0	0	27	0	53	0	
4:45 PM	0	2	0	3	0	0	0	3	0	1	30	0	0	0	29	2	70	268	
5:00 PM	0	2	0	5	0	0	0	0	0	2	31	0	0	2	31	1	74	273	
5:15 PM	0	2	0	8	0	0	0	0	0	3	25	0	0	1	30	0	69	266	
5:30 PM	0	1	0	3	0	0	0	1	0	0	25	0	0	1	24	2	57	270	
5:45 PM	0	0	0	5	0	0	0	0	0	0	22	0	0	2	19	1	49	249	
Count Total	0	12	0	38	0	1	0	5	0	11	199	1	0	6	233	11	517	0	
Peak Hour	All	0	8	0	16	0	1	0	4	0	7	104	1	0	2	126	4	273	0
	HV	0	0	0	1	0	0	0	1	0	0	0	0	0	0	4	1	7	0
	HV%	-	0%	-	6%	-	0%	-	25%	-	0%	0%	0%	-	0%	3%	25%	3%	0

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

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	1	1	2	0	0	0	0	0	1	0	0	0	1
<b>4:15 PM</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	1	0	0	2	3	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	1	1	1	6	9	0	0	0	0	0	1	0	0	0	1
Peak Hour	1	1	0	5	7	0	0	0	0	0	0	0	0	0	0

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	5th St				5th St				McLaughlin Rd				15-min Total	Rolling One Hour				
	Eastbound				Westbound				Northbound						Southbound			
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			UT	LT	TH	RT
4:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2	0
4:15 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3	0	4	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
5:00 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	3	7
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Count Total	0	0	0	1	0	0	0	1	0	0	1	0	0	0	5	1	9	0
Peak Hour	0	0	0	1	0	0	0	1	0	0	0	0	0	0	4	1	7	0

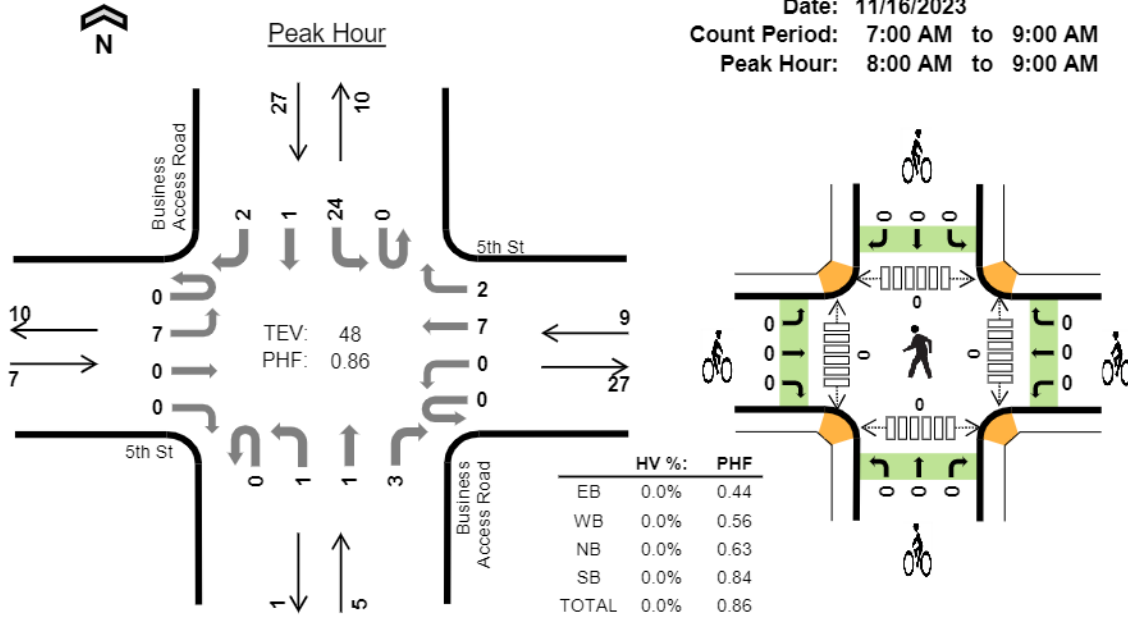
Two-Hour Count Summaries - Bikes														
Interval Start	5th St			5th St			McLaughlin Rd			McLaughlin Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0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

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

# Business Access Road 5th St



Date: 11/16/2023  
 Count Period: 7:00 AM to 9:00 AM  
 Peak Hour: 8:00 AM to 9:00 AM



### Two-Hour Count Summaries

Interval Start	5th St Eastbound				5th St Westbound				Business Access Road Northbound				Business Access Road Southbound				15-min Total	Rolling One Hour	
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	
7:15 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	5	0	0	6	0	
7:30 AM	0	2	0	0	0	0	1	0	0	0	0	0	0	10	0	1	14	0	
7:45 AM	0	1	0	0	0	1	1	2	0	0	0	0	0	5	0	1	11	36	
8:00 AM	0	1	0	0	0	0	0	0	0	0	1	0	0	6	1	1	10	41	
8:15 AM	0	0	0	0	0	0	2	1	0	0	0	1	0	8	0	0	12	47	
8:30 AM	0	4	0	0	0	0	1	1	0	0	0	1	0	5	0	0	12	45	
8:45 AM	0	2	0	0	0	0	4	0	0	1	0	1	0	5	0	1	14	48	
Count Total	0	10	0	0	0	1	10	4	0	1	1	3	0	49	1	4	84	0	
Peak Hour	All	0	7	0	0	0	0	7	2	0	1	1	3	0	24	1	2	48	0
	HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HV%	-	0%	-	-	-	-	0%	0%	-	0%	0%	0%	-	0%	0%	0%	0%	0

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

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	5th St				5th St				Business Access Road				Business Access Road				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

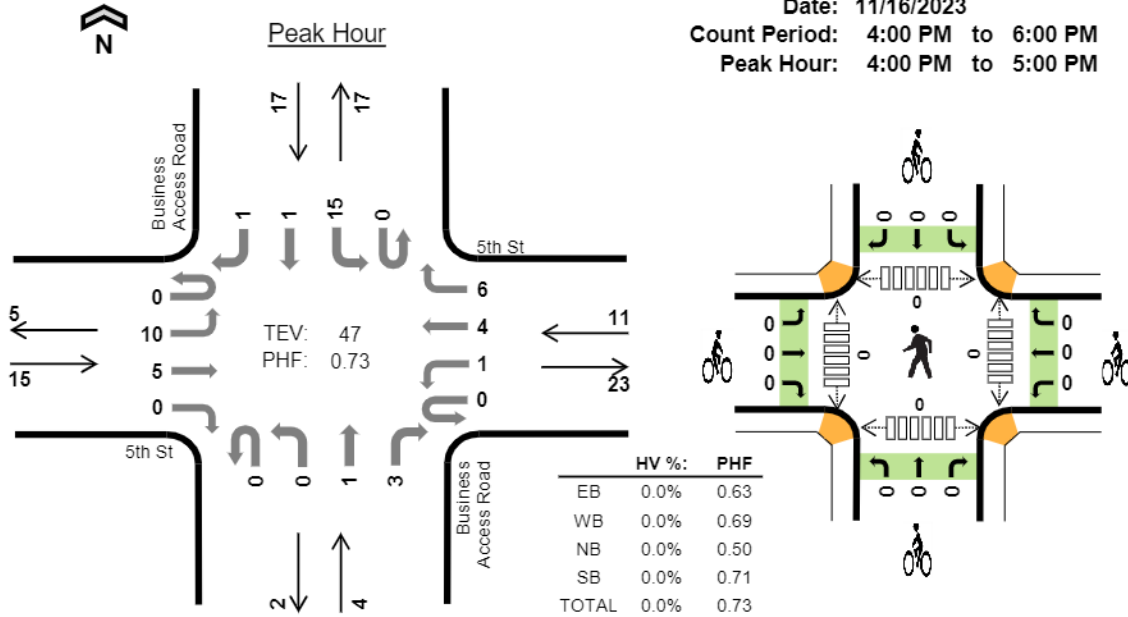
Two-Hour Count Summaries - Bikes														
Interval Start	5th St			5th St			Business Access Road			Business Access Road			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

## Business Access Road 5th St



Date: 11/16/2023  
 Count Period: 4:00 PM to 6:00 PM  
 Peak Hour: 4:00 PM to 5:00 PM



### Two-Hour Count Summaries

Interval Start	5th St Eastbound				5th St Westbound				Business Access Road Northbound				Business Access Road Southbound				15-min Total	Rolling One Hour	
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
4:00 PM	0	4	2	0	0	1	1	2	0	0	0	0	0	4	1	1	16	0	
4:15 PM	0	2	2	0	0	0	2	2	0	0	0	2	0	6	0	0	16	0	
4:30 PM	0	4	0	0	0	0	0	1	0	0	0	1	0	1	0	0	7	0	
4:45 PM	0	0	1	0	0	0	1	1	0	0	1	0	0	4	0	0	8	47	
5:00 PM	0	0	0	0	0	1	0	3	0	0	0	0	0	7	0	1	12	43	
5:15 PM	0	3	3	0	0	0	1	2	0	0	0	0	0	7	1	1	18	45	
5:30 PM	0	0	1	0	0	0	1	1	0	0	0	0	0	3	0	1	7	45	
5:45 PM	0	1	0	0	0	0	1	0	0	1	1	0	0	5	0	0	9	46	
Count Total	0	14	9	0	0	2	7	12	0	1	2	3	0	37	2	4	93	0	
Peak Hour	All	0	10	5	0	0	1	4	6	0	0	1	3	0	15	1	1	47	0
	HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HV%	-	0%	0%	-	-	0%	0%	0%	-	-	0%	0%	-	0%	0%	0%	0%	0

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

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	5th St				5th St				Business Access Road				Business Access Road				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	2	2
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Count Total	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	2	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Two-Hour Count Summaries - Bikes														
Interval Start	5th St			5th St			Business Access Road			Business Access Road			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

## APPENDIX D – Existing Synchro Outputs

HCM 7th Roundabout  
 1: Driveway/McLaughlin Road & Meridian Road

12/18/2023

Intersection				
Intersection Delay, s/veh	3.4			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	49	15	9	152
Demand Flow Rate, veh/h	50	15	9	154
Vehicles Circulating, veh/h	82	31	122	10
Vehicles Exiting, veh/h	82	100	10	36
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.2	2.8	3.0	3.6
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	50	15	9	154
Cap Entry Lane, veh/h	1269	1337	1218	1366
Entry HV Adj Factor	0.972	0.993	0.998	0.986
Flow Entry, veh/h	49	15	9	152
Cap Entry, veh/h	1234	1328	1216	1347
V/C Ratio	0.039	0.011	0.007	0.113
Control Delay, s/veh	3.2	2.8	3.0	3.6
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0



HCM 7th TWSC  
2: McLaughlin Road & 5th Street

12/18/2023

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	1	0	27	0	0	0	4	28	0	3	114	3
Future Vol, veh/h	1	0	27	0	0	0	4	28	0	3	114	3
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	-	-	-	-	-	-	140	-	-	140	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	0	29	0	0	0	4	30	0	3	124	3

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	171	171	126	170	173	30	127	0	-	30	0	0
Stage 1	132	132	-	39	39	-	-	-	-	-	-	-
Stage 2	39	39	-	130	134	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	792	722	925	794	720	1044	1459	-	0	1582	-	-
Stage 1	871	787	-	976	862	-	-	-	0	-	-	-
Stage 2	976	862	-	873	786	-	-	-	0	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	788	718	925	765	717	1044	1459	-	-	1582	-	-
Mov Cap-2 Maneuver	788	718	-	765	717	-	-	-	-	-	-	-
Stage 1	870	785	-	973	860	-	-	-	-	-	-	-
Stage 2	973	860	-	844	784	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	9.05	0	0.93	0.18
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1459	-	919	-	1582	-
HCM Lane V/C Ratio	0.003	-	0.033	-	0.002	-
HCM Control Delay (s/veh)	7.5	-	9.1	0	7.3	-
HCM Lane LOS	A	-	A	A	A	-
HCM 95th %tile Q(veh)	0	-	0.1	-	0	-

Intersection	
Intersection Delay, s/veh	7.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	7	0	0	0	7	2	1	1	3	24	1	2
Future Vol, veh/h	7	0	0	0	7	2	1	1	3	24	1	2
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	0	0	0	8	2	1	1	3	26	1	2
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	7.3	6.9	6.7	7.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	20%	100%	0%	89%
Vol Thru, %	20%	0%	78%	4%
Vol Right, %	60%	0%	22%	7%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	7	9	27
LT Vol	1	7	0	24
Through Vol	1	0	7	1
RT Vol	3	0	2	2
Lane Flow Rate	5	8	10	29
Geometry Grp	1	1	1	1
Degree of Util (X)	0.006	0.009	0.011	0.033
Departure Headway (Hd)	3.667	4.202	3.867	4.103
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	978	853	927	876
Service Time	1.681	2.22	1.885	2.112
HCM Lane V/C Ratio	0.005	0.009	0.011	0.033
HCM Control Delay, s/veh	6.7	7.3	6.9	7.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0	0	0	0.1

HCM 7th Roundabout  
 1: Driveway/McLaughlin Road & Meridian Road

12/18/2023

Intersection				
Intersection Delay, s/veh	3.6			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	112	67	4	156
Demand Flow Rate, veh/h	114	69	4	160
Vehicles Circulating, veh/h	81	77	192	37
Vehicles Exiting, veh/h	116	119	3	109
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.6	3.3	3.2	3.8
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	114	69	4	160
Cap Entry Lane, veh/h	1270	1276	1134	1329
Entry HV Adj Factor	0.984	0.976	0.990	0.975
Flow Entry, veh/h	112	67	4	156
Cap Entry, veh/h	1251	1244	1123	1295
V/C Ratio	0.090	0.054	0.004	0.120
Control Delay, s/veh	3.6	3.3	3.2	3.8
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

HCM 7th TWSC  
2: McLaughlin Road & 5th Street

12/18/2023

Intersection												
Int Delay, s/veh	1.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↑	↑		↑	↑	
Traffic Vol, veh/h	8	0	16	1	0	4	7	104	1	2	126	4
Future Vol, veh/h	8	0	16	1	0	4	7	104	1	2	126	4
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	-	-	-	-	-	-	140	-	-	140	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	0	17	1	0	4	8	113	1	2	137	4

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	272	273	139	270	274	114	141	0	0	114	0	0
Stage 1	143	143	-	129	129	-	-	-	-	-	-	-
Stage 2	128	129	-	141	146	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	681	634	909	682	633	939	1442	-	-	1475	-	-
Stage 1	859	778	-	875	790	-	-	-	-	-	-	-
Stage 2	875	789	-	862	776	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	673	630	909	665	628	939	1442	-	-	1475	-	-
Mov Cap-2 Maneuver	673	630	-	665	628	-	-	-	-	-	-	-
Stage 1	858	777	-	870	785	-	-	-	-	-	-	-
Stage 2	867	785	-	844	775	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	9.57	9.18	0.47	0.11
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1442	-	-	814	868	1475	-
HCM Lane V/C Ratio	0.005	-	-	0.032	0.006	0.001	-
HCM Control Delay (s/veh)	7.5	-	-	9.6	9.2	7.4	-
HCM Lane LOS	A	-	-	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-

Intersection	
Intersection Delay, s/veh	7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	10	5	0	1	4	6	0	1	3	15	1	1
Future Vol, veh/h	10	5	0	1	4	6	0	1	3	15	1	1
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	5	0	1	4	7	0	1	3	16	1	1
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	7.2	6.7	6.6	7.2
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	67%	9%	88%
Vol Thru, %	25%	33%	36%	6%
Vol Right, %	75%	0%	55%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	4	15	11	17
LT Vol	0	10	1	15
Through Vol	1	5	4	1
RT Vol	3	0	6	1
Lane Flow Rate	4	16	12	18
Geometry Grp	1	1	1	1
Degree of Util (X)	0.004	0.019	0.012	0.021
Departure Headway (Hd)	3.546	4.116	3.676	4.128
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	1011	873	976	870
Service Time	1.562	2.126	1.69	2.139
HCM Lane V/C Ratio	0.004	0.018	0.012	0.021
HCM Control Delay, s/veh	6.6	7.2	6.7	7.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0	0.1	0	0.1

**APPENDIX E - Background (without site development) Synchro  
Outputs**

HCM 7th Roundabout  
 1: Driveway/McLaughlin Road & Meridian Road

12/18/2023

Intersection				
Intersection Delay, s/veh	3.5			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	49	15	9	154
Demand Flow Rate, veh/h	50	15	9	157
Vehicles Circulating, veh/h	83	31	123	10
Vehicles Exiting, veh/h	83	102	10	36
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.2	2.8	3.0	3.6
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	50	15	9	157
Cap Entry Lane, veh/h	1268	1337	1217	1366
Entry HV Adj Factor	0.972	0.993	0.998	0.980
Flow Entry, veh/h	49	15	9	154
Cap Entry, veh/h	1233	1328	1215	1339
V/C Ratio	0.039	0.011	0.007	0.115
Control Delay, s/veh	3.2	2.8	3.0	3.6
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

HCM 7th TWSC  
2: McLaughlin Road & 5th Street

12/18/2023

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	1	0	27	0	0	0	4	29	0	3	116	3
Future Vol, veh/h	1	0	27	0	0	0	4	29	0	3	116	3
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	-	-	-	-	-	-	140	-	-	140	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	0	29	0	0	0	4	32	0	3	126	3

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	174	174	128	173	176	32	129	0	-	32	0	0
Stage 1	134	134	-	40	40	-	-	-	-	-	-	-
Stage 2	40	40	-	133	136	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	788	719	922	790	717	1042	1456	-	0	1581	-	-
Stage 1	869	785	-	975	861	-	-	-	0	-	-	-
Stage 2	975	861	-	871	784	-	-	-	0	-	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	784	715	922	761	714	1042	1456	-	-	1581	-	-
Mov Cap-2 Maneuver	784	715	-	761	714	-	-	-	-	-	-	-
Stage 1	867	784	-	972	859	-	-	-	-	-	-	-
Stage 2	972	859	-	841	782	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	9.06	0	0.91	0.18
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1456	-	917	-	1581	-
HCM Lane V/C Ratio	0.003	-	0.033	-	0.002	-
HCM Control Delay (s/veh)	7.5	-	9.1	0	7.3	-
HCM Lane LOS	A	-	A	A	A	-
HCM 95th %tile Q(veh)	0	-	0.1	-	0	-



Intersection	
Intersection Delay, s/veh	7.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	7	0	0	0	7	2	1	1	3	24	1	2
Future Vol, veh/h	7	0	0	0	7	2	1	1	3	24	1	2
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	0	0	0	8	2	1	1	3	26	1	2
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	7.3	6.9	6.7	7.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	20%	100%	0%	89%
Vol Thru, %	20%	0%	78%	4%
Vol Right, %	60%	0%	22%	7%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	7	9	27
LT Vol	1	7	0	24
Through Vol	1	0	7	1
RT Vol	3	0	2	2
Lane Flow Rate	5	8	10	29
Geometry Grp	1	1	1	1
Degree of Util (X)	0.006	0.009	0.011	0.033
Departure Headway (Hd)	3.667	4.202	3.867	4.103
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	978	853	927	876
Service Time	1.681	2.22	1.885	2.112
HCM Lane V/C Ratio	0.005	0.009	0.011	0.033
HCM Control Delay, s/veh	6.7	7.3	6.9	7.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0	0	0	0.1

HCM 7th Roundabout  
 1: Driveway/McLaughlin Road & Meridian Road

12/18/2023

Intersection				
Intersection Delay, s/veh	3.6			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	114	69	4	158
Demand Flow Rate, veh/h	116	71	4	162
Vehicles Circulating, veh/h	82	78	195	38
Vehicles Exiting, veh/h	118	121	3	111
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.6	3.3	3.2	3.8
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	116	71	4	162
Cap Entry Lane, veh/h	1269	1274	1131	1327
Entry HV Adj Factor	0.984	0.976	0.990	0.975
Flow Entry, veh/h	114	69	4	158
Cap Entry, veh/h	1249	1244	1120	1294
V/C Ratio	0.091	0.056	0.004	0.122
Control Delay, s/veh	3.6	3.3	3.2	3.8
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

HCM 7th TWSC  
2: McLaughlin Road & 5th Street

12/18/2023

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↑	↑		↑	↑	
Traffic Vol, veh/h	8	0	16	1	0	4	7	106	1	2	129	4
Future Vol, veh/h	8	0	16	1	0	4	7	106	1	2	129	4
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	-	-	-	-	-	-	140	-	-	140	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	0	17	1	0	4	8	115	1	2	140	4

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	277	278	142	276	280	116	145	0	0	116	0	0
Stage 1	147	147	-	131	131	-	-	-	-	-	-	-
Stage 2	130	132	-	145	149	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	675	630	905	677	628	937	1438	-	-	1472	-	-
Stage 1	856	776	-	873	788	-	-	-	-	-	-	-
Stage 2	873	787	-	858	774	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	668	625	905	659	624	937	1438	-	-	1472	-	-
Mov Cap-2 Maneuver	668	625	-	659	624	-	-	-	-	-	-	-
Stage 1	855	774	-	868	784	-	-	-	-	-	-	-
Stage 2	865	783	-	840	773	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s/v	9.6		9.19		0.46		0.11	
HCM LOS	A		A					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1438	-	-	809	864	1472	-
HCM Lane V/C Ratio	0.005	-	-	0.032	0.006	0.001	-
HCM Control Delay (s/veh)	7.5	-	-	9.6	9.2	7.4	-
HCM Lane LOS	A	-	-	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-

Intersection	
Intersection Delay, s/veh	7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	10	5	0	1	4	6	0	1	3	15	1	1
Future Vol, veh/h	10	5	0	1	4	6	0	1	3	15	1	1
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	5	0	1	4	7	0	1	3	16	1	1
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	7.2	6.7	6.6	7.2
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	67%	9%	88%
Vol Thru, %	25%	33%	36%	6%
Vol Right, %	75%	0%	55%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	4	15	11	17
LT Vol	0	10	1	15
Through Vol	1	5	4	1
RT Vol	3	0	6	1
Lane Flow Rate	4	16	12	18
Geometry Grp	1	1	1	1
Degree of Util (X)	0.004	0.019	0.012	0.021
Departure Headway (Hd)	3.546	4.116	3.676	4.128
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	1011	873	976	870
Service Time	1.562	2.126	1.69	2.139
HCM Lane V/C Ratio	0.004	0.018	0.012	0.021
HCM Control Delay, s/veh	6.6	7.2	6.7	7.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0	0.1	0	0.1

**APPENDIX F – Total Future (with site development) Synchro Outputs**

HCM 7th Roundabout  
 1: Driveway/McLaughlin Road & Meridian Road

12/18/2023

Intersection				
Intersection Delay, s/veh	3.5			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	49	15	9	154
Demand Flow Rate, veh/h	50	15	9	157
Vehicles Circulating, veh/h	83	31	123	10
Vehicles Exiting, veh/h	83	102	10	36
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.2	2.8	3.0	3.6
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	50	15	9	157
Cap Entry Lane, veh/h	1268	1337	1217	1366
Entry HV Adj Factor	0.972	0.993	0.998	0.980
Flow Entry, veh/h	49	15	9	154
Cap Entry, veh/h	1233	1328	1215	1339
V/C Ratio	0.039	0.011	0.007	0.115
Control Delay, s/veh	3.2	2.8	3.0	3.6
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

HCM 7th TWSC  
2: McLaughlin Road & 5th Street

12/18/2023

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↑	↑		↑	↑	
Traffic Vol, veh/h	2	0	28	1	0	1	5	29	0	3	116	4
Future Vol, veh/h	2	0	28	1	0	1	5	29	0	3	116	4
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	-	-	-	-	-	-	140	-	-	140	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	0	30	1	0	1	5	32	0	3	126	4

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	177	177	128	175	179	32	130	0	-	32	0	0
Stage 1	135	135	-	42	42	-	-	-	-	-	-	-
Stage 2	42	42	-	133	137	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	785	716	922	788	714	1042	1455	-	0	1581	-	-
Stage 1	869	785	-	972	860	-	-	-	0	-	-	-
Stage 2	972	860	-	871	783	-	-	-	0	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	780	712	922	757	710	1042	1455	-	-	1581	-	-
Mov Cap-2 Maneuver	780	712	-	757	710	-	-	-	-	-	-	-
Stage 1	867	783	-	968	856	-	-	-	-	-	-	-
Stage 2	967	856	-	840	782	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	9.1	9.11	1.1	0.18
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1455	-	911	877	1581	-
HCM Lane V/C Ratio	0.004	-	0.036	0.002	0.002	-
HCM Control Delay (s/veh)	7.5	-	9.1	9.1	7.3	-
HCM Lane LOS	A	-	A	A	A	-
HCM 95th %tile Q(veh)	0	-	0.1	0	0	-

Intersection	
Intersection Delay, s/veh	7.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	8	0	0	1	7	2	2	2	4	24	2	2
Future Vol, veh/h	8	0	0	1	7	2	2	2	4	24	2	2
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	0	0	1	8	2	2	2	4	26	2	2
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	7.3	7	6.8	7.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	25%	100%	10%	86%
Vol Thru, %	25%	0%	70%	7%
Vol Right, %	50%	0%	20%	7%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	8	8	10	28
LT Vol	2	8	1	24
Through Vol	2	0	7	2
RT Vol	4	0	2	2
Lane Flow Rate	9	9	11	30
Geometry Grp	1	1	1	1
Degree of Util (X)	0.009	0.01	0.012	0.035
Departure Headway (Hd)	3.742	4.211	3.909	4.105
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	959	851	917	876
Service Time	1.756	2.23	1.928	2.113
HCM Lane V/C Ratio	0.009	0.011	0.012	0.034
HCM Control Delay, s/veh	6.8	7.3	7	7.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0	0	0	0.1



Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Vol, veh/h	28	1	1	8	0	1
Future Vol, veh/h	28	1	1	8	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	1	1	9	0	1

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	32	0	42
Stage 1	-	-	-	-	31
Stage 2	-	-	-	-	11
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1581	-	969
Stage 1	-	-	-	-	992
Stage 2	-	-	-	-	1012
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1581	-	969
Mov Cap-2 Maneuver	-	-	-	-	969
Stage 1	-	-	-	-	992
Stage 2	-	-	-	-	1011

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0.81	8.45
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1043	-	-	200	-
HCM Lane V/C Ratio	0.001	-	-	0.001	-
HCM Control Delay (s/veh)	8.5	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	1.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	1	0	6	0	1	2
Future Vol, veh/h	1	0	6	0	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	0	7	0	1	2

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	11	7	0
Stage 1	7	-	-
Stage 2	4	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	1009	1076	-
Stage 1	1017	-	-
Stage 2	1019	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	1008	1076	-
Mov Cap-2 Maneuver	1008	-	-
Stage 1	1017	-	-
Stage 2	1018	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	8.57	0	2.41
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	1008	600
HCM Lane V/C Ratio	-	-	0.001	0.001
HCM Control Delay (s/veh)	-	-	8.6	7.2
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

HCM 7th Roundabout  
 1: Driveway/McLaughlin Road & Meridian Road

12/18/2023

Intersection				
Intersection Delay, s/veh	3.7			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	115	70	4	160
Demand Flow Rate, veh/h	118	72	4	164
Vehicles Circulating, veh/h	83	79	197	38
Vehicles Exiting, veh/h	119	122	3	114
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.7	3.4	3.3	3.8
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	118	72	4	164
Cap Entry Lane, veh/h	1268	1273	1129	1327
Entry HV Adj Factor	0.976	0.976	0.990	0.975
Flow Entry, veh/h	115	70	4	160
Cap Entry, veh/h	1238	1243	1118	1295
V/C Ratio	0.093	0.057	0.004	0.124
Control Delay, s/veh	3.7	3.4	3.3	3.8
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

HCM 7th TWSC  
2: McLaughlin Road & 5th Street

12/18/2023

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↖		↗	↖	
Traffic Vol, veh/h	9	0	17	2	0	5	8	106	1	2	129	5
Future Vol, veh/h	9	0	17	2	0	5	8	106	1	2	129	5
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	-	-	-	-	-	-	140	-	-	140	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	18	2	0	5	9	115	1	2	140	5

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	280	281	143	278	283	116	146	0	0	116	0	0
Stage 1	147	147	-	133	133	-	-	-	-	-	-	-
Stage 2	133	134	-	145	150	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	672	627	905	675	626	937	1436	-	-	1472	-	-
Stage 1	855	775	-	870	786	-	-	-	-	-	-	-
Stage 2	871	786	-	858	773	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	663	623	905	656	621	937	1436	-	-	1472	-	-
Mov Cap-2 Maneuver	663	623	-	656	621	-	-	-	-	-	-	-
Stage 1	854	774	-	865	781	-	-	-	-	-	-	-
Stage 2	861	781	-	839	772	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s/v	9.64		9.35		0.52		0.11	
HCM LOS	A		A					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1436	-	-	804	835	1472	-
HCM Lane V/C Ratio	0.006	-	-	0.035	0.009	0.001	-
HCM Control Delay (s/veh)	7.5	-	-	9.6	9.4	7.4	-
HCM Lane LOS	A	-	-	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-

Intersection	
Intersection Delay, s/veh	7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	12	5	0	3	4	6	1	2	4	15	2	1
Future Vol, veh/h	12	5	0	3	4	6	1	2	4	15	2	1
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	5	0	3	4	7	1	2	4	16	2	1
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	7.2	6.8	6.7	7.2
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	14%	71%	23%	83%
Vol Thru, %	29%	29%	31%	11%
Vol Right, %	57%	0%	46%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	7	17	13	18
LT Vol	1	12	3	15
Through Vol	2	5	4	2
RT Vol	4	0	6	1
Lane Flow Rate	8	18	14	20
Geometry Grp	1	1	1	1
Degree of Util (X)	0.008	0.021	0.015	0.022
Departure Headway (Hd)	3.691	4.133	3.764	4.13
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	971	868	953	869
Service Time	1.708	2.147	1.78	2.145
HCM Lane V/C Ratio	0.008	0.021	0.015	0.023
HCM Control Delay, s/veh	6.7	7.2	6.8	7.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0	0.1	0	0.1

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Vol, veh/h	24	1	1	13	0	1
Future Vol, veh/h	24	1	1	13	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	1	1	14	0	1

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	27	0	43
Stage 1	-	-	-	-	27
Stage 2	-	-	-	-	16
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1587	-	968
Stage 1	-	-	-	-	996
Stage 2	-	-	-	-	1006
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1587	-	967
Mov Cap-2 Maneuver	-	-	-	-	967
Stage 1	-	-	-	-	996
Stage 2	-	-	-	-	1006

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0.52	8.44
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1049	-	-	129	-
HCM Lane V/C Ratio	0.001	-	-	0.001	-
HCM Control Delay (s/veh)	8.4	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	1.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	0	1	6	0	1	3
Future Vol, veh/h	0	1	6	0	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	7	0	1	3

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	12	7	0
Stage 1	7	-	-
Stage 2	5	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	1008	1076	-
Stage 1	1017	-	-
Stage 2	1018	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	1007	1076	-
Mov Cap-2 Maneuver	1007	-	-
Stage 1	1017	-	-
Stage 2	1017	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	8.35	0	1.81
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	1076	450
HCM Lane V/C Ratio	-	-	0.001	0.001
HCM Control Delay (s/veh)	-	-	8.3	7.2
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

HCM 7th Roundabout  
 1: Driveway/McLaughlin Road & Meridian Road

12/18/2023

Intersection				
Intersection Delay, s/veh	3.5			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	53	19	9	160
Demand Flow Rate, veh/h	54	19	9	164
Vehicles Circulating, veh/h	87	35	131	10
Vehicles Exiting, veh/h	87	105	10	44
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.3	2.8	3.0	3.7
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	54	19	9	164
Cap Entry Lane, veh/h	1263	1331	1207	1366
Entry HV Adj Factor	0.974	0.995	0.998	0.975
Flow Entry, veh/h	53	19	9	160
Cap Entry, veh/h	1230	1325	1205	1332
V/C Ratio	0.043	0.014	0.007	0.120
Control Delay, s/veh	3.3	2.8	3.0	3.7
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0



HCM 7th TWSC  
2: McLaughlin Road & 5th Street

12/18/2023

Intersection												
Int Delay, s/veh	2.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↑		↕	↑	
Traffic Vol, veh/h	6	0	32	5	0	5	12	29	0	3	116	11
Future Vol, veh/h	6	0	32	5	0	5	12	29	0	3	116	11
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	-	-	-	-	-	-	140	-	-	140	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	0	35	5	0	5	13	32	0	3	126	12

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	196	196	132	190	202	32	138	0	-	32	0	0
Stage 1	139	139	-	58	58	-	-	-	-	-	-	-
Stage 2	58	58	-	133	145	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	763	699	917	770	694	1042	1446	-	0	1581	-	-
Stage 1	864	782	-	954	847	-	-	-	0	-	-	-
Stage 2	954	847	-	871	777	-	-	-	0	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	751	692	917	732	686	1042	1446	-	-	1581	-	-
Mov Cap-2 Maneuver	751	692	-	732	686	-	-	-	-	-	-	-
Stage 1	863	780	-	946	839	-	-	-	-	-	-	-
Stage 2	941	839	-	836	776	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s/v	9.26		9.24		2.2		0.17	
HCM LOS	A		A					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1446	-	886	860	1581	-	-
HCM Lane V/C Ratio	0.009	-	0.047	0.013	0.002	-	-
HCM Control Delay (s/veh)	7.5	-	9.3	9.2	7.3	-	-
HCM Lane LOS	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0	0	-	-

Intersection	
Intersection Delay, s/veh	7.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	0	0	10	7	2	5	5	8	24	6	2
Future Vol, veh/h	17	0	0	10	7	2	5	5	8	24	6	2
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	0	0	11	8	2	5	5	9	26	7	2
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	7.4	7.2	6.9	7.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	28%	100%	53%	75%
Vol Thru, %	28%	0%	37%	19%
Vol Right, %	44%	0%	11%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	18	17	19	32
LT Vol	5	17	10	24
Through Vol	5	0	7	6
RT Vol	8	0	2	2
Lane Flow Rate	20	18	21	35
Geometry Grp	1	1	1	1
Degree of Util (X)	0.021	0.022	0.023	0.04
Departure Headway (Hd)	3.815	4.243	4.084	4.127
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	937	843	875	867
Service Time	1.845	2.273	2.114	2.152
HCM Lane V/C Ratio	0.021	0.021	0.024	0.04
HCM Control Delay, s/veh	6.9	7.4	7.2	7.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.1	0.1

HCM 7th TWSC  
4: Access & 5th Street

12/18/2023

**Intersection**

Int Delay, s/veh 1.2

**Movement** EBT EBR WBL WBT NBL NBR

Lane Configurations	↔			↔	↔	
Traffic Vol, veh/h	32	5	5	17	0	5
Future Vol, veh/h	32	5	5	17	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	35	5	5	18	0	5

**Major/Minor** Major1 Major2 Minor1

Conflicting Flow All	0	0	40	0	67	38
Stage 1	-	-	-	-	38	-
Stage 2	-	-	-	-	29	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1569	-	938	1035
Stage 1	-	-	-	-	985	-
Stage 2	-	-	-	-	993	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1569	-	935	1035
Mov Cap-2 Maneuver	-	-	-	-	935	-
Stage 1	-	-	-	-	985	-
Stage 2	-	-	-	-	990	-

**Approach** EB WB NB

HCM Control Delay, s/v	0	1.66	8.5
HCM LOS			A

**Minor Lane/Major Mvmt** NBLn1 EBT EBR WBL WBT

Capacity (veh/h)	1035	-	-	409	-
HCM Lane V/C Ratio	0.005	-	-	0.003	-
HCM Control Delay (s/veh)	8.5	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 7th TWSC  
5: Business Access & Site Access

12/18/2023

Intersection						
Int Delay, s/veh	3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	5	0	12	0	8	9
Future Vol, veh/h	5	0	12	0	8	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	0	13	0	9	10

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	40	13	0
Stage 1	13	-	-
Stage 2	27	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	971	1067	-
Stage 1	1010	-	-
Stage 2	995	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	966	1067	-
Mov Cap-2 Maneuver	966	-	-
Stage 1	1010	-	-
Stage 2	990	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	8.75	0	3.41
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	966	847
HCM Lane V/C Ratio	-	-	0.006	0.005
HCM Control Delay (s/veh)	-	-	8.7	7.3
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

HCM 7th Roundabout  
 1: Driveway/McLaughlin Road & Meridian Road

12/18/2023

Intersection				
Intersection Delay, s/veh	3.8			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	124	78	4	178
Demand Flow Rate, veh/h	127	80	4	182
Vehicles Circulating, veh/h	92	89	216	38
Vehicles Exiting, veh/h	128	131	3	131
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.8	3.4	3.3	3.9
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	127	80	4	182
Cap Entry Lane, veh/h	1256	1260	1107	1327
Entry HV Adj Factor	0.978	0.979	0.990	0.978
Flow Entry, veh/h	124	78	4	178
Cap Entry, veh/h	1229	1233	1096	1298
V/C Ratio	0.101	0.063	0.004	0.137
Control Delay, s/veh	3.8	3.4	3.3	3.9
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

HCM 7th TWSC  
2: McLaughlin Road & 5th Street

12/18/2023

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↗	↖		↗	↖	
Traffic Vol, veh/h	26	0	34	19	0	22	25	106	1	2	129	22
Future Vol, veh/h	26	0	34	19	0	22	25	106	1	2	129	22
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	-	-	-	-	-	-	140	-	-	140	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	0	37	21	0	24	27	115	1	2	140	24

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	326	327	152	315	339	116	164	0	0	116	0	0
Stage 1	157	157	-	170	170	-	-	-	-	-	-	-
Stage 2	170	171	-	145	168	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	627	591	894	638	583	937	1414	-	-	1472	-	-
Stage 1	846	768	-	832	758	-	-	-	-	-	-	-
Stage 2	832	757	-	858	759	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	598	579	894	599	571	937	1414	-	-	1472	-	-
Mov Cap-2 Maneuver	598	579	-	599	571	-	-	-	-	-	-	-
Stage 1	844	767	-	816	743	-	-	-	-	-	-	-
Stage 2	796	743	-	822	758	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v10.36		10.16	1.44	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1414	-	-	736	743	1472	-
HCM Lane V/C Ratio	0.019	-	-	0.089	0.06	0.001	-
HCM Control Delay (s/veh)	7.6	-	-	10.4	10.2	7.4	-
HCM Lane LOS	A	-	-	B	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.2	0	-

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	34	5	0	25	4	6	12	13	21	15	13	1
Future Vol, veh/h	34	5	0	25	4	6	12	13	21	15	13	1
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	37	5	0	27	4	7	13	14	23	16	14	1
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	7.6	7.4	7.2	7.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	26%	87%	71%	52%
Vol Thru, %	28%	13%	11%	45%
Vol Right, %	46%	0%	17%	3%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	46	39	35	29
LT Vol	12	34	25	15
Through Vol	13	5	4	13
RT Vol	21	0	6	1
Lane Flow Rate	50	42	38	32
Geometry Grp	1	1	1	1
Degree of Util (X)	0.054	0.05	0.044	0.037
Departure Headway (Hd)	3.876	4.278	4.147	4.195
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	918	833	859	848
Service Time	1.927	2.324	2.195	2.247
HCM Lane V/C Ratio	0.054	0.05	0.044	0.038
HCM Control Delay, s/veh	7.2	7.6	7.4	7.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.2	0.1	0.1

Intersection						
Int Delay, s/veh	2.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	41	12	12	35	0	18
Future Vol, veh/h	41	12	12	35	0	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	13	13	38	0	20

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	58	0	115
Stage 1	-	-	-	-	51
Stage 2	-	-	-	-	64
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1547	-	881
Stage 1	-	-	-	-	971
Stage 2	-	-	-	-	959
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1547	-	873
Mov Cap-2 Maneuver	-	-	-	-	873
Stage 1	-	-	-	-	971
Stage 2	-	-	-	-	950

Approach	EB	WB	NB
HCM Control Delay, s/v	0	1.88	8.61
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1017	-	-	460	-
HCM Lane V/C Ratio	0.019	-	-	0.008	-
HCM Control Delay (s/veh)	8.6	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-



Intersection						
Int Delay, s/veh	3.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	0	18	28	0	18	20
Future Vol, veh/h	0	18	28	0	18	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	20	30	0	20	22

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	91	30	0
Stage 1	30	-	-
Stage 2	61	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	909	1044	-
Stage 1	992	-	-
Stage 2	962	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	898	1044	-
Mov Cap-2 Maneuver	898	-	-
Stage 1	992	-	-
Stage 2	950	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	8.51	0	3.46
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	1044	853
HCM Lane V/C Ratio	-	-	0.019	0.012
HCM Control Delay (s/veh)	-	-	8.5	7.3
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0