

Traffic Impact Study

Ramada Hotel Apartment Conversion



Final Report

March 2021

Prepared for:
Mountain Classic Real Estate

HT#K21D015
Received 3/23/2021

Prepared By:



EXECUTIVE SUMMARY

The following contains a Traffic Impact Study (TIS) for a proposed apartment conversion development to be located at 25 Hotel Circle in the city of Albuquerque (CABQ), NM. This report has been completed by Lee Engineering for Mountain Classic Real Estate. All analyses and items contained herein conform to scoping requirements set forth in a scoping meeting held on January 22, 2021. Scoping meeting notes are located in Appendix A.

BACKGROUND

The proposed development will convert 206 hotel rooms to low-rise multifamily apartments to be located at 25 Hotel Circle near the intersection of Eubanks Blvd. and Lomas Blvd. within the CABQ, NM to be completed by 2022. A detailed site plan is included in Figure 2 of this report. Access to the site is to be taken directly from Hotel Circle via two existing full access driveways. Study Intersections, as shown in Figure 1, include:

- Hotel Cir. & Hotel Ave.
- Hotel Cir./Morris St. & Lomas Blvd.
- East Site Driveway
- West Site Driveway

9-hour turning movement counts were collected on February 2, 2021, for all study intersections. Additionally, 9-hour turning movements counts were collected at the intersection of Lomas Blvd. & Eubanks Blvd. Data collected at Lomas Blvd. and Eubanks Blvd. was used in coordination with 2018 Lomas Car Wash Study to determine an adjustment factor to account for reduced traffic volumes during the COVID-19 pandemic. Furthermore, using traffic data from Eubanks Blvd. and Lomas Blvd., growth rates were forecasted using Mid Regional Council of Government (MRCOG) projected travel demands for opening year and horizon year (10 years after projected build-out). Construction is anticipated to begin in 2021 with full completion of the Development in 2022. The development is to be constructed in a single phase.

Analysis scenarios for this study include:

1. Existing adjusted conditions (2021)
2. Background - No build (2022)
3. Full Build – 206 units built (2022)
4. Horizon Year (2032)

SUMMARY OF RECOMMENDATIONS

As included at the end of this report, final recommendations are summarized as follows:

- Existing, background, build-out and horizon queueing analyses indicate the northbound left turn at Lomas Blvd and Hotel Cir/Morris St exceed 95th percentile storage capacities. Currently, approximately 120 feet of storage is provided via a double-yellow stripe that transitions back-to-back turn lanes. It is recommended that consideration be given to lengthen the northbound left turn lane to be 150 feet long plus the transition or as far as possible without encroaching on the driveway to the south.
- CABQ DPM compliance requires that the west access driveway be separated from currently shared driveway. It is recommended that consideration be given for reconstruction of the west access to be reduced to 24 feet wide and have curb return radius of 25 feet.

TABLE OF CONTENTS

Executive Summary	i
Background.....	i
Summary of Recommendations	i
Table of Figures	iii
table of tables.....	iii
List of Appendices.....	iii
Introduction.....	1
Project Location & Site Plan	1
Study Area, Area Land Use, and Streets	4
Transit.....	5
Multimodal Connectivity	5
Current Adjacent Projects	5
Analysis of Existing Conditions	5
Data Collection	5
Level of Service and Capacity Analysis	7
Analysis of Signalized Intersections.....	8
Analysis of Stop Controlled Intersections.....	9
Analysis of Future Conditions	11
Traffic Projections.....	11
Trip Generation	12
Traffic Volume Calculations.....	13
Traffic Analysis of Build-Out and Horizon Year.....	18
2022 Conditions.....	18
Analysis of Stop Controlled Intersections.....	19
2032 Horizon Year	21
Analysis of Stop Controlled Intersections.....	22
Site Access and Sight Distance Evaluation.....	24
Capacity Mitigations and Street Improvements.....	25
Summary of Recommendations	25

TABLE OF FIGURES

Figure 1. Vicinity Map	2
Figure 2. Site Plan	3
Figure 3. Existing (Adjusted) 2021 Turning Movement Counts	6
Figure 4. Background 2022 Turning Movement Traffic Volumes.....	14
Figure 5. Trip Distribution and Assignment.....	15
Figure 6. Full Build-Out 2022 Traffic Volumes	16
Figure 7. 2032 Horizon Year Traffic Volume.....	17

TABLE OF TABLES

Table 1: Intersection Peak Hours.....	5
Table 2: LOS Criteria and Descriptions for Signalized Intersections.....	7
Table 3: LOS Criteria for Unsignalized Intersections	8
Table 4: 2021 Existing Signalized Capacity Analysis Summary	8
Table 5: 2021 Existing Signalized Queue Storage Summary.....	9
Table 6: 2021 Existing Stop Control Capacity Analysis Summary.....	10
Table 7: 2021 Existing Stop Control Queue Storage Summary	10
Table 8: Growth Rate Method.....	12
Table 9: Trip Generation.....	12
Table 10: 2022 Background and Full Build-Out Signalized Capacity Analysis Summary	18
Table 11: 2022 Background and Full Build-Out Signalized Queue Storage Summary.....	18
Table 12: 2022 Background and Full Build-Out Stop Control Capacity Analysis Summary	19
Table 13: 2022 Background and Full Build-Out Stop Control Queue Storage Summary	20
Table 14: 2032 Horizon Year Signalized Capacity Analysis Summary.....	21
Table 15: 2032 Horizon Year Signalized Queue Storage Summary	21
Table 16: 2032 Horizon Year Stop Control Capacity Analysis Summary	22
Table 17: 2032 Horizon Year Stop Control Queue Storage Summary.....	23
Table 18: Sight Distance Requirements.....	24

LIST OF APPENDICES

Appendix A:	Scoping Meeting Notes
Appendix B:	Turning Movement Count Sheets
Appendix C:	Trip Generation Manual Excerpts
Appendix D:	HCS Software Level of Service and Capacity Output Sheets
Appendix E:	MRCOG Traffic Growth Data
Appendix F:	AASHTO Green Book Intersection Sight Distance Calculations

INTRODUCTION

This report details the procedures and findings of a Traffic Impact Study (TIS) performed by Lee Engineering for Mountain Classic Real Estate. This report and the analyses contained herein were performed for proposed development conversion of 206 hotel rooms to low-rise multifamily apartments, to be constructed at 25 Hotel Circle in CABQ, NM.

The scope of this report and the analyses performed were completed in agreement with the scoping requirements outlined with the CABQ. Meeting notes from the scoping meeting held on January 22, 2021, are included in Appendix A. Analysis procedures, conclusions, and recommendations for this study were developed according to the *ITE Trip Generation Manual 10th Edition*, and *Highway Capacity Manual 6th Edition*.

Construction is anticipated to begin in 2021 with full completion of the development in 2022. The development is to be constructed in one single phases.

Analysis procedures included in this report were performed for the following scenarios:

1. Existing adjusted conditions (2021)
2. Background - No build (2022)
3. Full Build – 206 units built (2022)
4. Horizon Year (2032)

PROJECT LOCATION & SITE PLAN

The proposed housing development of 206 units is to be converted from an existing Ramada Inn Hotel. The low-rise multifamily apartments are to be located on the north east side of CABQ at 25 Hotel Circle just north of Interstate 40. Surrounding major intersections include Eubanks Blvd. and Lomas Blvd. The project area is bounded by existing development. North of the study area are hotels, restaurants, and major retail shops along Hotel Ave. South of the site are several commercial and retail developments along Hotel Circle, some lots are observed to be vacant. Figure 1 shows study intersections, and the surrounding area. Figure 2 shows the proposed site plan.

SITE ACCESS

Access to the site is to be taken directly off Hotel Circle via two existing full access driveways. Review of compliance with *2020 City of Albuquerque Development Process Manual (DPM)* at proposed access points were conducted as well as driveway access. Details of the driveway's location and access are included in subsequent sections of this report.

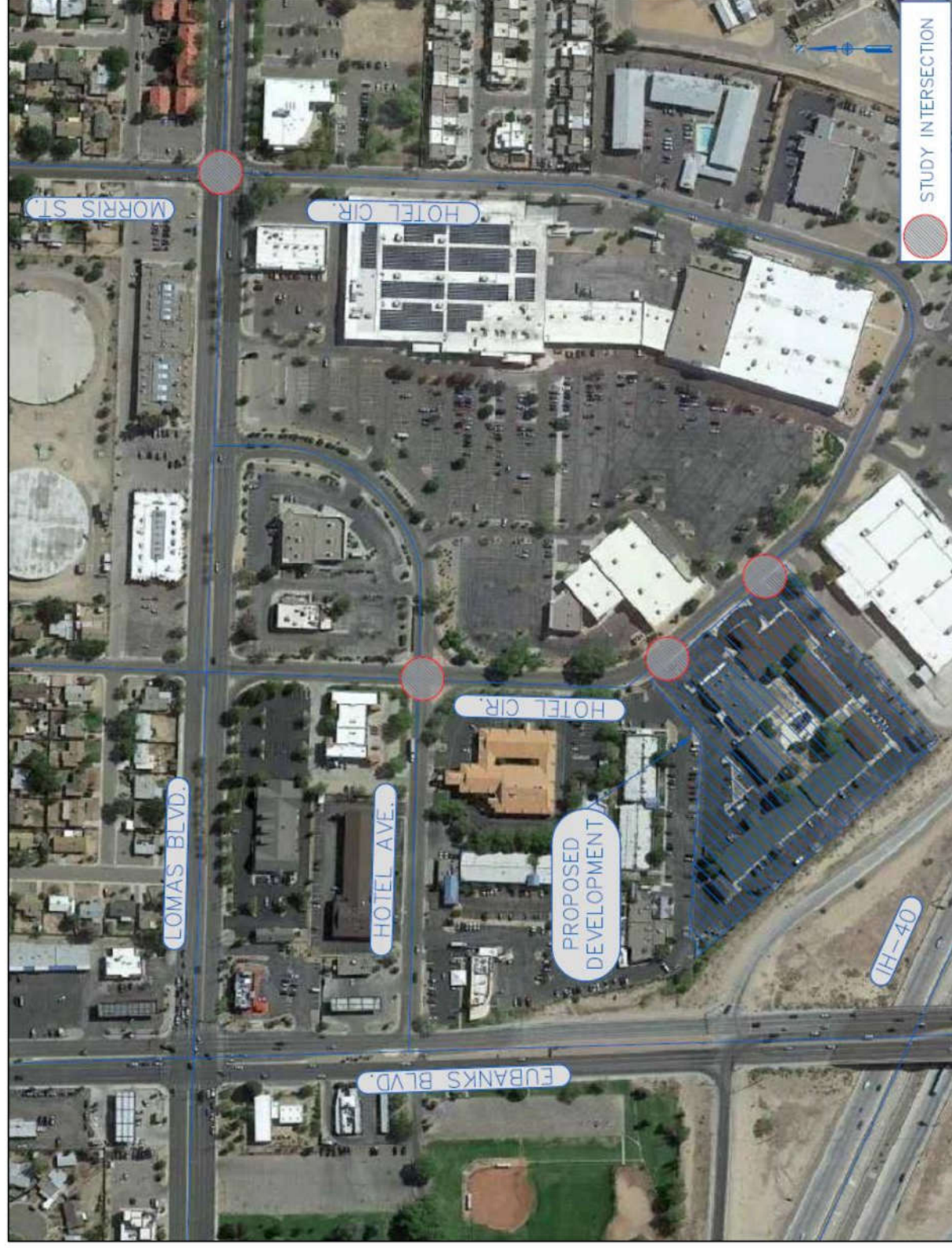


Figure 1. Vicinity Map



Figure 2. Site Plan

STUDY AREA, AREA LAND USE, AND STREETS

STUDY AREA

The study area is defined as the area between Hotel Cir. between Hotel Ave. and Lomas Blvd. The following intersections were identified and agreed upon in the scoping meeting, and will serve as the study intersections for this report:

- Hotel Cir. & Hotel Ave.
- Hotel Cir./Morris St. & Lomas Blvd.
- East Site Driveway
- West Site Driveway

AREA LAND USE

As described, the proposed low-rise multifamily apartments are to be located on the north east side of CABQ at 25 Hotel Circle just north of Interstate 40. Surrounding major intersections include Eubanks Blvd. and Lomas Blvd. Adjacent to and surrounding the project site are land uses consisting of the following:

- Commercial: A majority of the surrounding land use is commercial in nature, with commercial developments located immediately south and east of the site and throughout the Hotel Cir. corridor. These developments include a Target Supercenter, Best Buy Electronic Store, and vacant Babies R' Us space for lease.
- Hospitality and Service: Several hotels exist along the study area corridors exist, as well as a handful of restaurants.
- Residential: East of the study area existing a small multifamily housing section. Other developments in the area include a charter high school adjacent to the duplex housing development.

STREETS

The following details the characteristics and features of streets included in the study area:

Hotel Circle is a two-lane undivided roadway classified by CABQ DPM Roadway Functional Classifications Descriptions (Table 7.7.33) as a minor collector, running in semi-circle loop along the frontage proposed property from north and south. Travel lanes range from 12-15 feet wide. The roadway incorporates curb and gutter, paved shoulder, and sidewalk is present on both sides of the road. The roadway is assumed to have a speed limit of 30 MPH.

Hotel Ave is a two-lane divided roadway classified by CABQ DPM Roadway Functional Classifications Descriptions (Table 7.7.33) as a minor collector that runs east and west. Travel lanes range are approximately 16 feet wide. The roadway incorporates curb, gutter, and sidewalk is present on both sides of the road. The roadway is assumed to have a speed limit of 30 MPH.

Lomas Blvd is a three-lane median divided roadway, currently classified by MRCOG as a principal arterial and runs north and south. Travel lanes are approximately 11 feet wide with medians of various widths. Sidewalk is present on both sides of the road. The roadway incorporates auxiliary left and right turn lanes throughout the corridor at intersections and is signed with a speed limit of 40 MPH.

INTERSECTIONS

The following details the traffic control and characteristics of existing intersections in the study area:

Hotel Circle & Hotel Ave is a 4-legged unsignalized two way stop-controlled intersection maintained by the City of Albuquerque. Right-turns at northbound and eastbound approaches are flared. The channelized right-turns must yield to oncoming perpendicular traffic. Pedestrian crosswalks are present with cut-throughs on

all approaches except the northbound approach of the intersection. Crosswalks were observed to be unmarked.

Hotel Circle/Morris St & Lomas Blvd is a 4-legged signalized-controlled intersection maintained by the City of Albuquerque. The signal operates with time-of-day coordination. Pedestrian crosswalks exist at all approaches of the intersection. Crosswalk striping was observed to be faded and discolored.

TRANSIT

Currently, a bus route is present in the study area. Route 11 operates everyday with stops every 30 mins east and west directions on Lomas Blvd. Route 11 has two stops in each direction of roadway between Eubanks Blvd. and Hotel Cir/Morris St.

MULTIMODAL CONNECTIVITY

Currently, bicycle facilities are not present immediately near the development. Sidewalks exist on both sides of all streets in compliance with CABQ DPM within the study area.

CURRENT ADJACENT PROJECTS

As discussed in the scoping meeting, no known adjacent developments are present in the area.

ANALYSIS OF EXISTING CONDITIONS

DATA COLLECTION

Turning movement counts for the study intersections at Hotel Circle & Hotel Ave, Hotel Cir/Morris St & Lomas Blvd, East Site Driveway & Hotel Cir, and West Site Driveway & Hotel Cir were collected for 9 hours in 3-periods: 6:00 AM-9:00 AM (morning), 11:00 AM-2:00 PM (mid-day), and 3:00 PM-6:00 PM (evening) on February 2, 2021. Additionally, 9-hour turning movements counts were collected at the intersection of Lomas Blvd. & Eubanks Blvd for the purpose of comparison with the city provided 2018 Lomas Car Wash Study turning movement counts to establish a COVID-19 adjustment factor as necessary. The 2018 turning movement counts provided by the city were forecasted to current year (2021) using data from MRCOG projected travel demand growth rates (see growth rate section for rates & details) prior to comparison to current year (2021) traffic counts. Newly collected traffic data at Lomas Blvd and Eubank Blvd, in coordination with adjusted 2018 Lomas Car Wash Study traffic data determined an adjustment factor was needed to account for reduced traffic volumes during the COVID-19 pandemic. Factors were determined for the AM and PM peak hours and applied to all study intersections. Notably, the AM peak hour shows a difference of 2131 vehicles (an approximate change of 55%) while the PM peak hour showed a difference of 714 vehicles (an approximate change of only of 9%). Table 1 below shows the peak hours for each intersection used in the analysis. Adjusted turning movement counts, lane geometry, and traffic control for the study intersections are presented in Figure 3. Full turning movement count output sheets can be found in Appendix B.

Table 1: Intersection Peak Hours

Intersection	Data Collection Date	AM Peak Hour	PM Peak Hour
Hotel Cir. & Hotel Ave.	2/2/2021	8:00-9:00	3:45-4:45
Hotel Cir./Morris St. & Lomas Blvd.	2/2/2021	7:30-8:30	4:45-5:45
East Site Driveway & Hotel Cir.	2/2/2021	8:00-9:00	4:00-5:00
West Site Driveway & Hotel Cir.	2/2/2021	8:00-9:00	5:30-6:30

EXISTING 2021

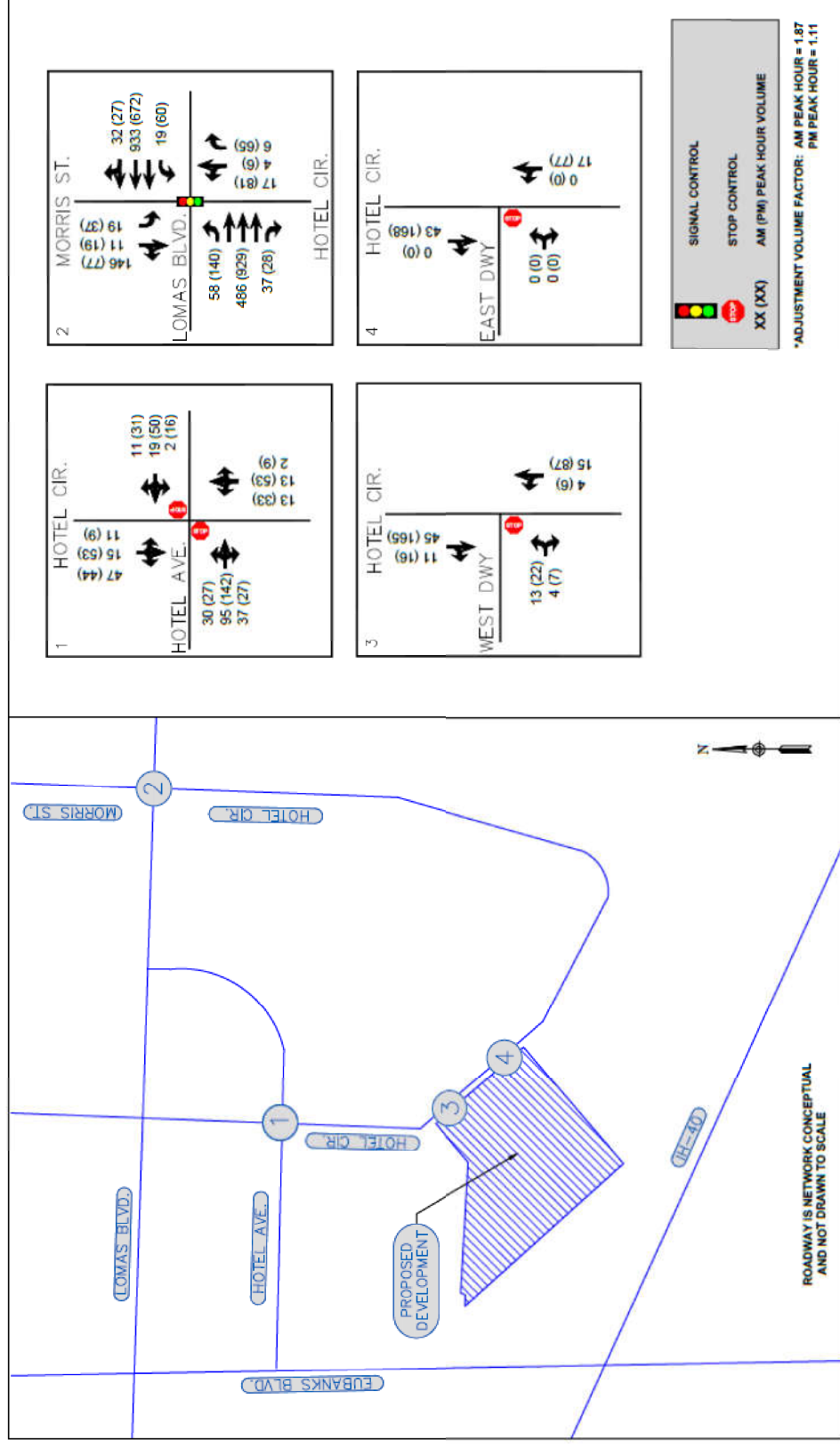


Figure 3. Existing (Adjusted) 2021 Turning Movement Counts

LEVEL OF SERVICE AND CAPACITY ANALYSIS

INTERSECTION ANALYSIS

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

Table 2 below, reproduced from the Highway Capacity Manual, shows delay thresholds and the associated Level of Service assigned to delay ranges. Generally, a LOS of D or better is considered an acceptable level of service.

Table 2: LOS Criteria and Descriptions for Signalized Intersections

Level of Service	Average Control Delay (sec/vehicle)	General Description (Signalized Intersections)
A	≤10	Free flow
B	>10 – 20	Stable flow (slight delays)
C	>20 – 35	Stable flow (acceptable delays)
D	>35 – 55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55 – 80	Unstable flow (intolerable delay)
F	>80	Forced flow (jammed)

Unsignalized intersection LOS is divided into two intersection types: all-way stop-controlled and two-way stop-controlled. All-way stop-controlled intersection LOS is expressed in terms of average vehicle delay of all the movements. Two-way stop-controlled intersection LOS is defined in terms of average vehicle delay of an individual movement. Table 3 shows LOS criteria for unsignalized intersections.

Table 3: LOS Criteria for Unsignalized Intersections

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

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

ANALYSIS OF SIGNALIZED INTERSECTIONS

Table 4 below summarizes intersection capacity and LOS analysis performed for existing conditions for the signalized intersection at Hotel Cir./Morris St. and Lomas Blvd. Per HCM6 procedures, peak hour factors obtained from collected traffic counts for the intersections were used in the existing conditions analysis and all other scenarios. Existing signal timings for Hotel Cir./Morris St and Lomas Blvd. provided by CABQ, were used in each analysis scenario unless otherwise stated. Queueing is reported as a ratio Que Storage Ratio (QSR) for signalized intersections and indicates the ratio of demand to capacity based on possible lengths of waiting vehicles during “red” times for specific movements. Table 5 below summarizes queueing results. Detailed capacity output sheets can be found in Appendix D.

Table 4: 2021 Existing Signalized Capacity Analysis Summary

Study Intersection	Scenario	Worst Case Movement LOS and Delay								Intersection LOS			
		AM				PM				AM		PM	
		Worst Case Movements	Delay ¹	V/C	LOS ²	Worst Case Movements	Delay ¹	V/C	LOS ²	Delay ¹	LOS ²	Delay ¹	LOS ²
Hotel Cir/Morris St & Lomas Blvd	Existing 2021	NBL	52.4	0.18	D	NBL	54.6	0.51	D	7.3	A	9.7	A
		SBT	50.2	0.65	D	SBL	51.2	0.22	D				

Table 5: 2021 Existing Signalized Queue Storage Summary

Study Intersection	Movement	Existing 2021		Storage Length Present (ft)
		AM	PM	
		95th Percentile (QSR)	95th Percentile (QSR)	
Hotel Cir/Morris St & Lomas Blvd	EBL	0.07	0.22	150
	EBR	0.06	0.06	120
	WBL	0.02	0.10	150
	NBL	0.20	1.03	120
	SBL	0.25	0.54	100

From the tables above, the following is summarized:

Hotel Cir/Morris St and Lomas Blvd

- Capacity Analysis:
 - Under existing conditions, the intersection is observed to operate at an acceptable level of service in both the AM and PM peak hours. Individual movements are also observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours.
- Queuing Analysis:
 - Under existing conditions, 95th percentile Queue Storage Ratio (QSR) at the intersection is observed to be accommodated and acceptable by existing storage lengths during AM peak hour. Queue Storage Ratio (QSR) is observed to exceed existing storage capacities in the PM for northbound left movement.
 - It is noted that present storage capacity is delineated by a double-yellow stripe with no physical barriers limiting storage length. Conservatively, storage length was analyzed as the 120 ft provided by the double-yellow stripe. Furthermore, in the PM peak hour this storage length is exceeded by less than 1 vehicle length (3.6 FT as calculated).

ANALYSIS OF STOP CONTROLLED INTERSECTIONS

Table 6 below summarizes stop-controlled intersection capacity and LOS analysis performed for existing conditions for the unsignalized intersections. Queuing is reported as number of vehicles in the queue for stop-controlled intersections. Table 7 below summarizes queuing results. Detailed capacity output sheets can be found in Appendix D.

Table 6: 2021 Existing Stop Control Capacity Analysis Summary

Study Intersection	Scenario	Worst Case Movement LOS and Delay							
		AM				PM			
		Worst Case Movements	Delay ¹	V/C	LOS ²	Worst Case Movements	Delay ¹	V/C	LOS ²
Hotel Cir & Hotel Ave	Existing 2021	EBL/T/R	10.6	0.30	B	EBL/T/R	12.1	0.30	B
		WBL/T/R	10.2	0.07	B	WBL/T/R	11.5	0.16	B
Hotel Cir & East Site Dwy	Existing 2021	NBL/T	7.4	0.00	A	NBL/T	7.6	0.00	A
Hotel Cir & West Site Dwy	Existing 2021	EBL/R	9.3	0.04	A	EBL/R	10.5	0.05	B
		NBL/T	7.4	0.01	A	NBL/T	7.7	0.01	A

Table 7: 2021 Existing Stop Control Queue Storage Summary

Study Intersection	Movement	Existing 2021	
		AM	PM
		95th Percentile (veh)	95th Percentile (veh)
Hotel Cir & Hotel Ave	EBL/T/R	1.3	1.3
	WBL/T/R	0.2	0.6
	NBL/T/R	0.0	0.1
	SBL/T/R	0.0	0.0
Hotel Cir & East Site Dwy	EBL/R	0.0	0.0
	NBL/T	0.0	0.0
Hotel Cir & West Site Dwy	EBL/R	0.1	0.2
	NBL/T	0.0	0.0

From the tables above, the following is summarized:

Hotel Cir and Hotel Ave

- Capacity Analysis:
 - Under existing conditions, the intersection is observed to operate at an acceptable level of service in both the AM and PM peak hours. Individual movements are also observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours.
- Queueing Analysis:
 - Under existing conditions, 95th percentile lengths at the intersection are observed to be accommodated and acceptable during AM and PM peak hours.

Hotel Cir and East Site Driveway

- Capacity Analysis:

- Under existing conditions, the intersection is observed to operate at an acceptable level of service in both the AM and PM peak hours. Individual movements are also observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours.
- Queueing Analysis:
 - Under existing conditions, 95th percentile lengths at the intersection are observed to be accommodated and acceptable during AM and PM peak hours.

For Hotel Cir and West Site Driveway

- Capacity Analysis:
 - Under existing conditions, the intersection is observed to operate at an acceptable level of service in both the AM and PM peak hours. Individual movements are also observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours.
- Queueing Analysis
 - Under existing, 95th percentile lengths at the intersection are observed to be accommodated and acceptable during AM and PM peak hours.

ANALYSIS OF FUTURE CONDITIONS

The following sections detail the methods and calculations used to obtain traffic volumes for each analysis scenario. This process used the following tools as described below: Traffic Projections, and Site Trip Distributions & Assignment. Figures at the end of this section show the resulting traffic volumes determined for each analysis scenario.

TRAFFIC PROJECTIONS

Construction is anticipated to begin in 2021 with full completion of the development in 2022. To forecast existing traffic volumes to future analysis background conditions, loading values from the 2016 & 2040 (updated) travel demand models were provided by MRCOG. These models were then compared, using AM and PM peak hour directional volumes (AMPH LOAD & PMPH LOAD), to calculate anticipated growth rates for individual roadways. To facilitate a conservative analysis, roadways calculated to have a yearly growth rate of less than 1% were analyzed with a 1% per year growth rate. Growth rates were then converted to growth factors for the specific analysis scenarios. Growth factors used in the analysis are shown in Table 8. Values provided by MRCOG are reproduced verbatim below. Growth factors were then applied to the 2021 adjusted conditions turning movement volumes to forecast future volumes.

Table 8: Growth Rate Method

Roadway			MRCOG 2016 Model "Peak Hour Load"	MRCOG 2040 Model "Peak Hour Load"	Yearly Growth Rate	Average Yearly Growth	Growth Rate for Analysis
Lomas West of Eubanks	AM	PH	1331	1503	0.51%	0.35%	1.00%
	PM	PH	2356	2551	0.33%		
Lomas East of Eubanks	AM	PH	1272	1418	0.45%		
	PM	PH	2486	2618	0.22%		
Lomas West of Hotel Ave	AM	PH	1159	1298	0.47%		
	PM	PH	2291	2434	0.25%		
Lomas East for Hotel Ave	AM	PH	1149	1290	0.48%		
	PM	PH	2616	2798	0.28%		
Lomas East of Hotel Cir	AM	PH	1116	1197	0.29%	0.08%	1.00%
	PM	PH	2354	2465	0.19%		
Eubanks North of Lomas	AM	PH	2218	2287	0.13%		
	PM	PH	1926	1986	0.13%		
Eubanks South of Lomas	AM	PH	2454	2408	-0.08%		
	PM	PH	1917	1982	0.14%		

TRIP GENERATION

Trip generation for the development was performed using the procedures and methodologies provided in the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition*. The land use category Multifamily Low-Rise Housing (ITE 220) was used to generate trips for the development. Trips were calculated using rates for daily, AM peak hour, and PM peak hour generators. As previously stated, the development is to consist of one single phases. Total development trips and trips generated are shown below in the tables. Site trips for the Development site were generated using data and procedures according to the Institute of Transportation Engineer's Trip Generation Manual. Site trips were added to background traffic volumes to create build-out traffic volumes.

Table 9 provided below, shows expected trips generated by the development. Due to the nature of this development, and as agreed in the scoping meeting, no pass-by or internal capture trips are anticipated.

Table 9: Trip Generation

Use	Units		TRIP GENERATION							PEAK HOUR TRIPS			
			Weekday	AM Peak			PM Peak			AM Peak		PM Peak	
			Trips	Rate	Enter	Exit	Rate	Enter	Exit	In	Out	In	Out
ITE 220 - Multifamily Housing (Low-Rise) Weekday, Peak Hour of Generator	206	Dwelling Units	1517	0.56	28%	72%	0.67	59%	41%	33	84	82	57

TRIP DISTRIBUTION AND ASSIGNMENT

Trip Distribution was determined based on the analysis of existing intersection demand characteristics within the study area. Overall, trips were distributed within the roadway network to and from the development

based on the proportions of existing turning movement counts/demands. Trip routing was based on logical trip attractions and destinations for commercial based trips. The figures below show the trip distribution and assignment for the development of each analysis scenario. Trips were then assigned to the background roadway networks to create build-out volumes and are shown in figures below.

TRAFFIC VOLUME CALCULATIONS

Traffic volumes used in the analysis were calculated based on the following:

1. Existing Conditions: direct turning movement counts from 2021
2. Background 2022: 2022 growth rate applied to existing conditions
3. Full Build-out 2022: Background 2022 traffic volumes plus site trips
4. Horizon Year 2032: 2032 growth rate plus site trips

As stated above, build-out traffic volumes were calculated using the growth rates and factors detailed in previous sections plus site trips from the preceding analysis year. Site trips were added to study intersections with direct access to the proposed development. Figure 4 through Figure 7 show the traffic volumes used for each individual analysis scenario.

BACKGROUND 2022

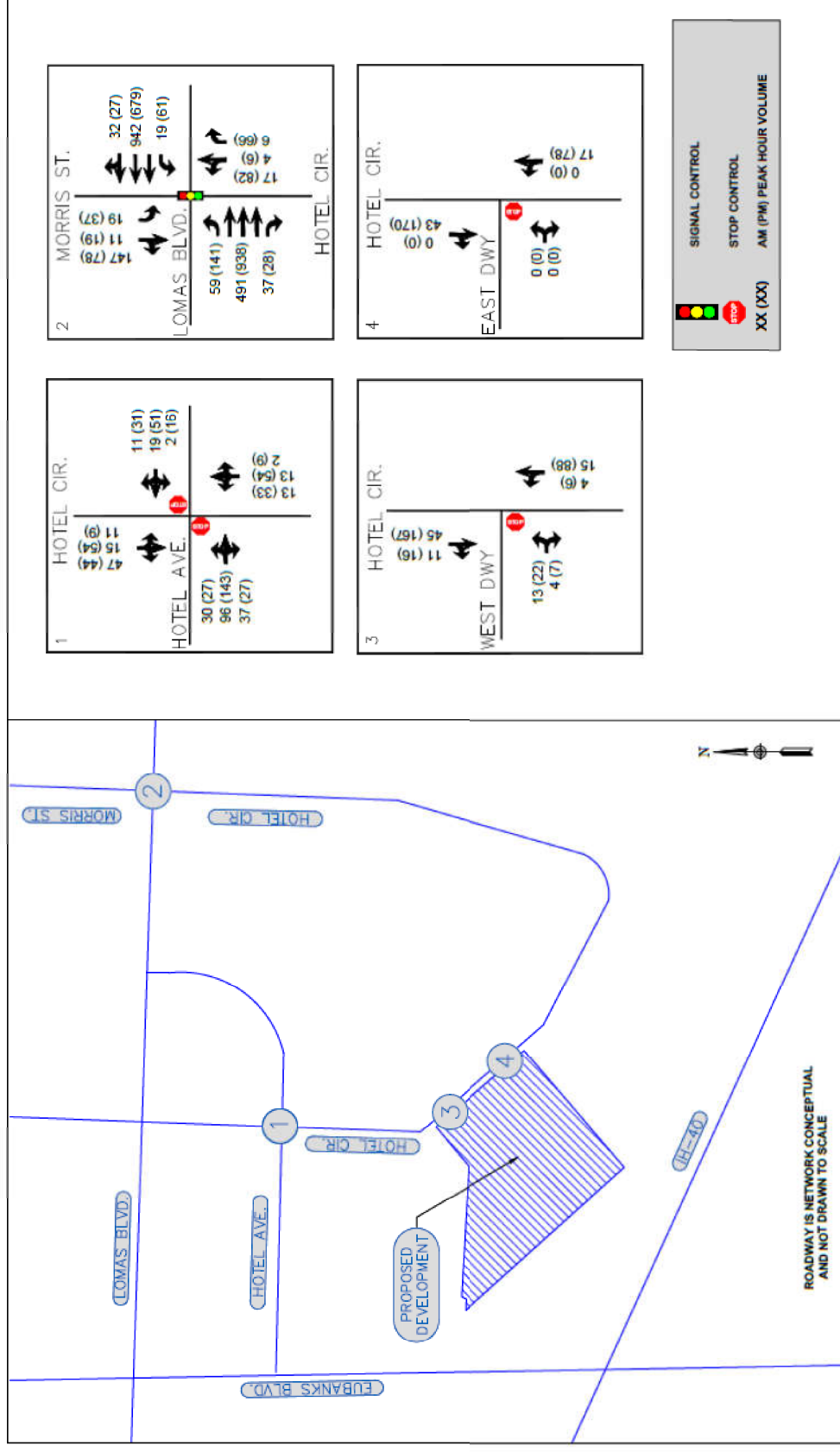


Figure 4. Background 2022 Turning Movement Traffic Volumes

TRIP DISTRIBUTION AND ASSIGNMENT

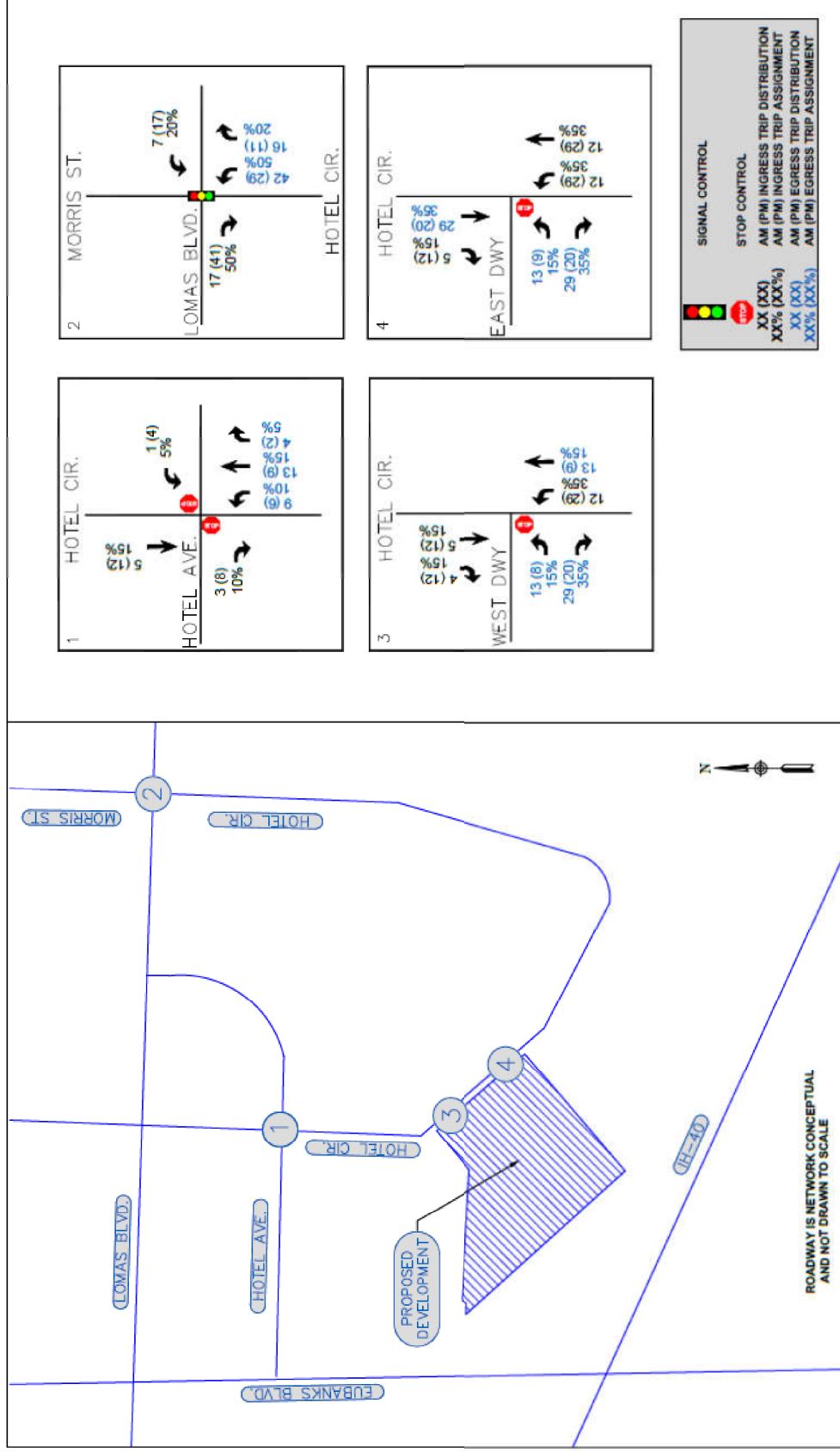


Figure 5. Trip Distribution and Assignment

FULL BUILD 2022

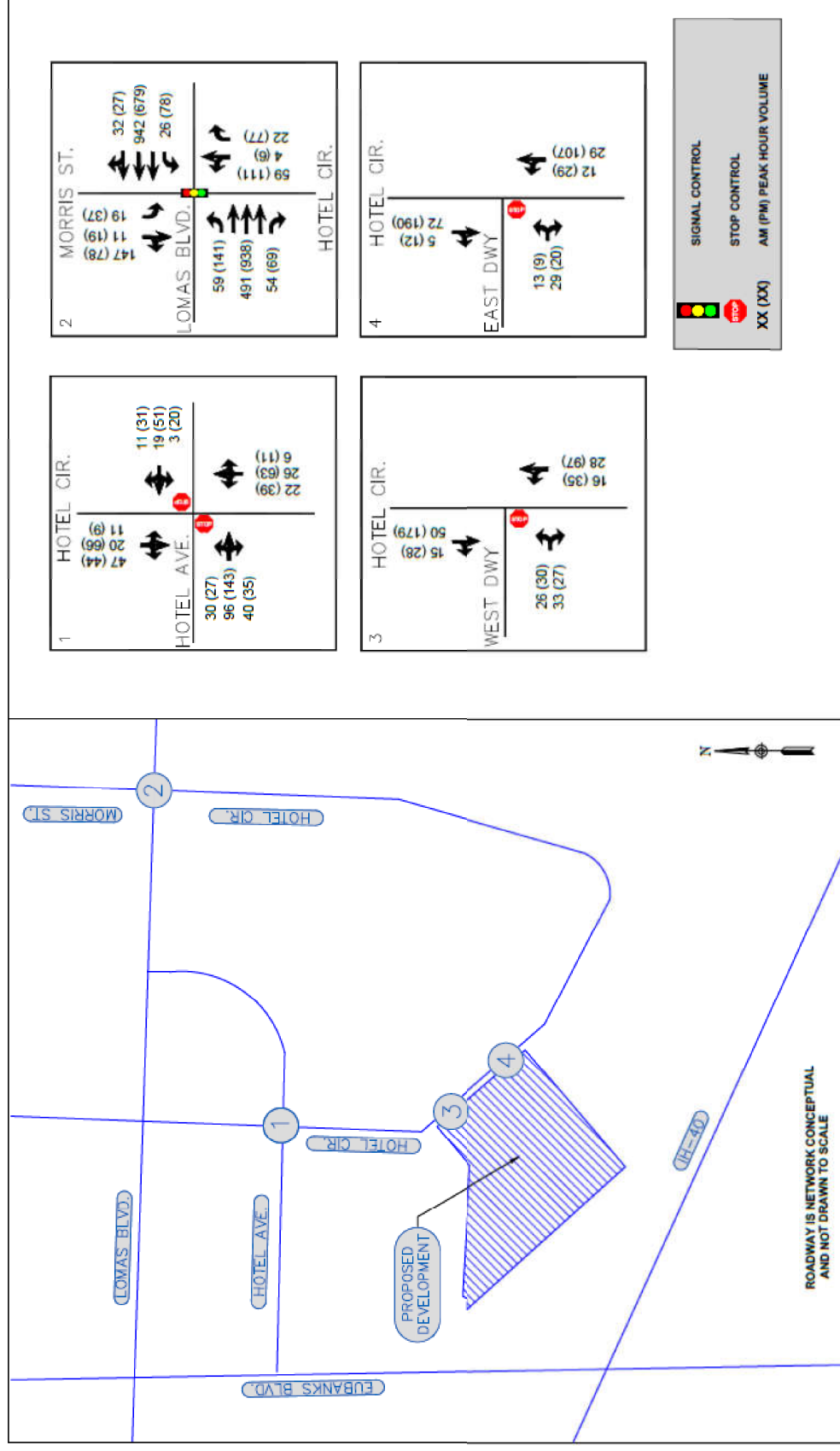


Figure 6. Full Build-Out 2022 Traffic Volumes

HORIZON YEAR 2032

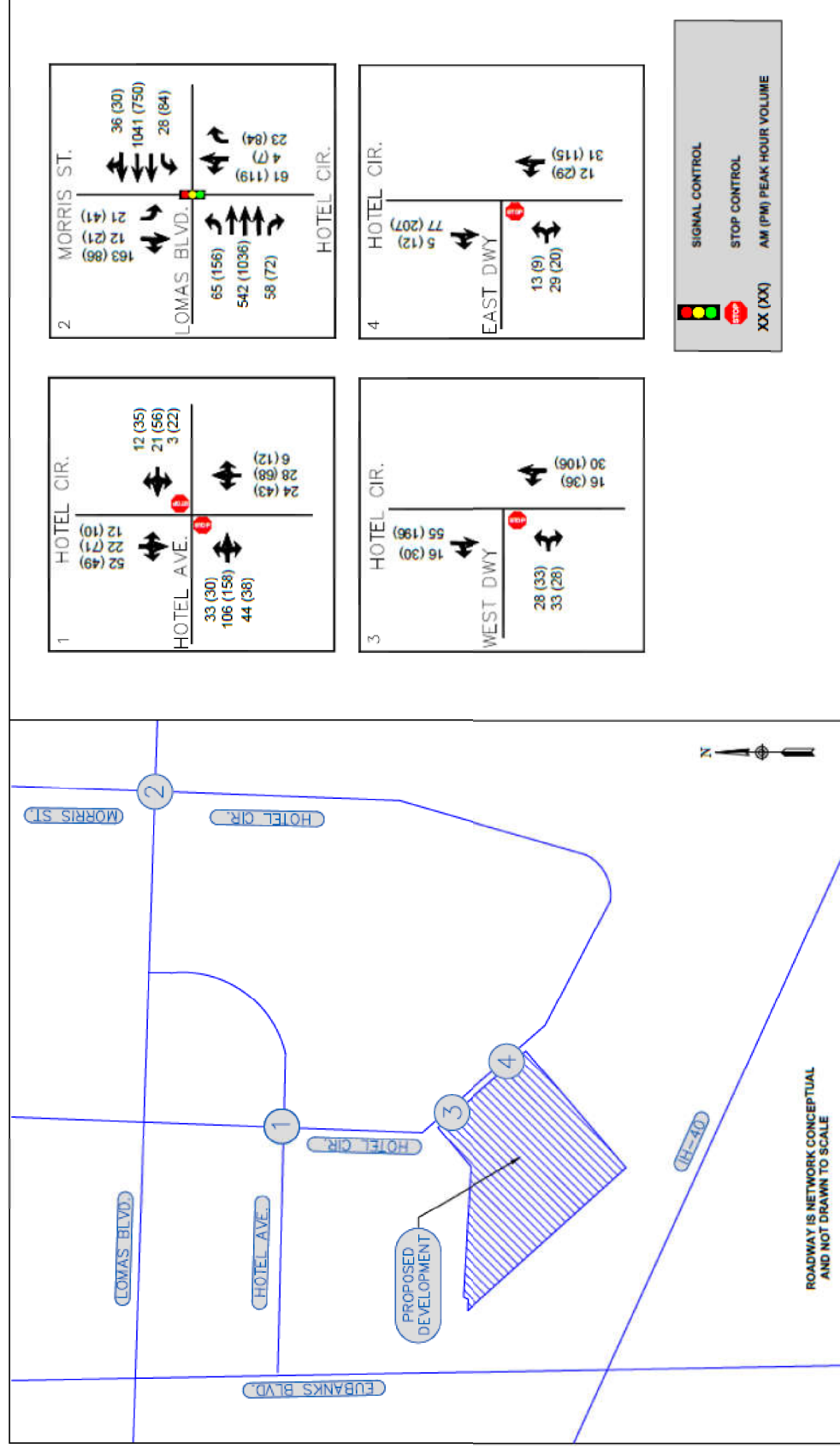


Figure 7. 2032 Horizon Year Traffic Volume

TRAFFIC ANALYSIS OF BUILD-OUT AND HORIZON YEAR

As performed for existing conditions, a LOS, capacity, and queuing analysis was performed for all future analysis scenarios using the same procedures and assumptions. Signal timings used in the existing conditions analysis were retained and used for background conditions, build-out condition analysis, and horizon year.

2022 CONDITIONS

ANALYSIS OF SIGNALIZED INTERSECTIONS

Table 10 below summarizes intersection capacity and LOS analysis performed for 2022 conditions for the signalized intersection at Hotel Cir./Morris St. and Lomas Blvd. Table 11 below summarizes queuing results. Detailed capacity output sheets can be found in Appendix D.

Table 10: 2022 Background and Full Build-Out Signalized Capacity Analysis Summary

Study Intersection	Scenario	Worst Case Movement LOS and Delay								Intersection LOS			
		AM				PM				AM		PM	
		Worst Case Movements	Delay ¹	V/C	LOS ²	Worst Case Movements	Delay ¹	V/C	LOS ²	Delay ¹	LOS ²	Delay ¹	LOS ²
Hotel Cir/Morris St & Lomas Blvd	Background 2022	NBL	52.4	0.18	D	NBL	54.6	0.52	D	7.3	A	9.7	A
		SBT	50.2	0.65	D	SBL	51.2	0.22	D				
	Full Build 2022	NBL	50.8	0.42	D	NBL	53.9	0.57	D	9.1	A	10.5	B
		SBT	45.5	0.47	D	SBL	49.8	0.19	D				

Table 11: 2022 Background and Full Build-Out Signalized Queue Storage Summary

Study Intersection	Movement	Background 2022		Build-Out 2022		Storage Length Present (ft)
		AM	PM	AM	PM	
		95th Percentile (QSR)	95th Percentile (QSR)	95th Percentile (QSR)	95th Percentile (QSR)	
Hotel Cir/Morris St & Lomas Blvd	EBL	0.07	0.23	0.09	0.22	150
	EBR	0.06	0.06	0.11	0.15	120
	WBL	0.02	0.11	0.04	0.13	150
	NBL	0.20	1.04	0.69	1.27	120
	SBL	0.25	0.54	0.24	0.47	100

From the tables above, the following is summarized:

Hotel Cir/Morris St and Lomas Blvd

- Capacity Analysis:
 - Under background conditions, the intersection is observed to operate at an acceptable level of service in both the AM and PM peak hours. Individual movements are also observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours.
 - Under build-out conditions, the intersection is observed to operate at an acceptable level of service in both the AM and PM peak hours. Individual movements are also observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours.
- Queueing Analysis:

- Background queue conditions, 95th percentile Queue Storage Ratio (QSR) at the intersection is observed to be accommodated and acceptable by existing storage lengths during AM. Queue Storage Ratio (QSR) is observed to be overcapacity in the PM for northbound left movement.
- Build-Out queue conditions, 95th percentile Queue Storage Ratio (QSR) at the intersection is observed to be accommodated and acceptable by existing storage lengths during AM. Similar to background conditions, Queue Storage Ratio (QSR) is observed to be overcapacity in the PM for northbound left movement.
 - It is noted that present storage capacity is delineated by a double-yellow stripe with no physical barriers limiting storage length. Conservatively, storage length was analyzed as the 120 ft provided by the double-yellow stripe. Furthermore, in the PM peak hour this storage length is exceeded by less than 1 vehicle length (4.8 ft as calculated) in background 2022 conditions and by less than 2 vehicle lengths (32.4 ft as calculated) in buildout 2022 conditions.

ANALYSIS OF STOP CONTROLLED INTERSECTIONS

Table 12 below summarizes stop-controlled intersection capacity and LOS analysis performed for 2022 conditions for the unsignalized intersections. Queueing is reported as number of vehicles in the queue for stop-controlled intersections. Table 13 below summarizes queuing results. Detailed capacity output sheets can be found in Appendix D.

Table 12: 2022 Background and Full Build-Out Stop Control Capacity Analysis Summary

Study Intersection	Scenario	Worst Case Movement LOS and Delay							
		AM				PM			
		Worst Case Movements	Delay ¹	V/C	LOS ²	Worst Case Movements	Delay ¹	V/C	LOS ²
Hotel Cir & Hotel Ave	Background 2022	EBL/T/R	10.6	0.30	B	EBL/T/R	12.2	0.30	B
		WBL/T/R	10.2	0.07	B	WBL/T/R	11.5	0.16	B
	Full Build 2022	EBL/T/R	11.4	0.33	B	EBL/T/R	12.5	0.32	B
		WBL/T/R	10.8	0.08	B	WBL/T/R	12.2	0.18	B
Hotel Cir & East Site Dwy	Background 2022	NBL/T	7.4	0.00	A	NBL/T	7.6	0.00	A
	Full Build 2022	EBL/R	9.8	0.10	A	EBL/R	9.6	0.04	A
		NBL/T	7.6	0.02	A	NBL/T	7.8	0.03	A
Hotel Cir & West Site Dwy	Background 2022	EBL/R	9.3	0.04	A	EBL/R	10.6	0.05	B
		NBL/T	7.4	0.01	A	NBL/T	7.7	0.01	A
	Full Build 2022	EBL/R	9.9	0.13	A	EBL/R	11.3	0.11	B
		NBL/T	7.5	0.02	A	NBL/T	7.9	0.03	A

Table 13: 2022 Background and Full Build-Out Stop Control Queue Storage Summary

Study Intersection	Movement	Background 2022		Build-Out 2022	
		AM	PM	AM	PM
		95th Percentile (veh)	95th Percentile (veh)	95th Percentile (veh)	95th Percentile (veh)
Hotel Cir & Hotel Ave	EBL/T/R	1.3	1.3	1.5	1.4
	WBL/T/R	0.2	0.6	0.3	0.7
	NBL/T/R	0.0	0.1	0.1	0.1
	SBL/T/R	0.0	0.0	0.0	0.0
Hotel Cir & East Site Dwy	EBL/R	0.0	0.0	0.3	0.1
	NBL/T	0.0	0.0	0.1	0.1
Hotel Cir & West Site Dwy	EBL/R	0.1	0.2	0.5	0.4
	NBL/T	0.0	0.0	0.1	0.1

From the tables above, the following is summarized:

Hotel Cir and Hotel Ave

- Capacity Analysis:
 - Under background conditions, the intersection is observed to operate at an acceptable level of service in both the AM and PM peak hours. Individual movements are also observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours.
 - Under build-out conditions, the intersection is observed to operate at an acceptable level of service in both the AM and PM peak hours. Individual movements are also observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours.
 -
- Queueing Analysis:
 - Under background conditions, 95th percentile lengths at the intersection are observed to be accommodated and acceptable during AM and PM peak hours.
 - Under build-out conditions, 95th percentile lengths at the intersection are observed to be accommodated and acceptable during AM and PM peak hours.

Hotel Cir and East Site Driveway

- Capacity Analysis:
 - Under background conditions, the intersection is observed to operate at an acceptable level of service in both the AM and PM peak hours. Individual movements are also observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours.
 - Under build-out conditions, the intersection is observed to operate at an acceptable level of service in both the AM and PM peak hours. Individual movements are also observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours.
- Queueing Analysis:
 - Under background conditions, 95th percentile lengths at the intersection are observed to be accommodated and acceptable during AM and PM peak hours.

- Under build-out conditions, 95th percentile lengths at the intersection are observed to be accommodated and acceptable during AM and PM peak hours.

For Hotel Cir and West Site Driveway

- Capacity Analysis:
 - Under background conditions, the intersection is observed to operate at an acceptable level of service in both the AM and PM peak hours. Individual movements are also observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours.
 - Under build-out conditions, the intersection is observed to operate at an acceptable level of service in both the AM and PM peak hours. Individual movements are also observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours.
- Queueing Analysis
 - Under background conditions, 95th percentile lengths at the intersection are observed to be accommodated and acceptable during AM and PM peak hours.
 - Under build-out conditions, 95th percentile lengths at the intersection are observed to be accommodated and acceptable during AM and PM peak hours.

2032 HORIZON YEAR

ANALYSIS OF SIGNALIZED INTERSECTIONS

Table 14 below summarizes intersection capacity and LOS analysis performed for 2032 Horizon Year for the signalized intersection at Hotel Cir./Morris St. and Lomas Blvd. Table 15 below summarizes queueing results. Detailed capacity output sheets can be found in Appendix D.

Table 14: 2032 Horizon Year Signalized Capacity Analysis Summary

Study Intersection	Scenario	Worst Case Movement LOS and Delay								Intersection LOS			
		AM				PM				AM		PM	
		Worst Case Movements	Delay ¹	V/C	LOS ²	Worst Case Movements	Delay ¹	V/C	LOS ²	Delay ¹	LOS ²	Delay ¹	LOS ²
Hotel Cir/Morris St & Lomas Blvd	2032 Horizon Year	NBL	50.6	0.43	D	NBL	53.0	0.61	D	9.4	A	11.5	B
		SBT	44.9	0.49	D	SBL	48.4	0.21	D				

Table 15: 2032 Horizon Year Signalized Queue Storage Summary

Study Intersection	Movement	Horizon Year 2032		Storage Length Present (ft)
		AM	PM	
		95th Percentile (QSR)	95th Percentile (QSR)	
Hotel Cir/Morris St & Lomas Blvd	EBL	0.11	0.32	150
	EBR	0.12	0.20	120
	WBL	0.05	0.18	150
	NBL	0.71	1.51	120
	SBL	0.26	0.58	100

From the tables above, the following is summarized:

Hotel Cir/Morris St and Lomas Blvd

- Capacity Analysis:

- Under horizon year conditions, the intersection is observed to operate at an acceptable level of service in both the AM and PM peak hours. Individual movements are also observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours.
- Queueing Analysis:
 - Under horizon year conditions, queue conditions, 95th percentile Queue Storage Ratio (QSR) at the intersection is observed to be accommodated and acceptable by existing storage lengths during AM. Similar to existing and 2022 conditions, Queue Storage Ratio (QSR) is observed to be exceeded in the PM peak hour for northbound left movement.

ANALYSIS OF STOP CONTROLLED INTERSECTIONS

Table 16 below summarizes stop-controlled intersection capacity and LOS analysis performed for 2032 Horizon Year for the unsignalized intersections. Queueing is reported as number of vehicles in the queue for stop-controlled intersections. Table 17 below summarizes queueing results. Detailed capacity output sheets can be found in Appendix D.

Table 16: 2032 Horizon Year Stop Control Capacity Analysis Summary

Study Intersection	Scenario	Worst Case Movement LOS and Delay							
		AM				PM			
		Worst Case Movements	Delay ¹	V/C	LOS ²	Worst Case Movements	Delay ¹	V/C	LOS ²
Hotel Cir & Hotel Ave	2032 Horizon Year	EBL/T/R	12.1	0.38	B	EBL/T/R	13.4	0.36	B
		WBL/T/R	11.1	0.09	B	WBL/T/R	12.8	0.21	B
Hotel Cir & East Site Dwy	2032 Horizon Year	EBL/R	9.9	0.10	A	EBL/R	9.7	0.04	A
		NBL/T	7.6	0.02	A	NBL/T	7.8	0.03	A
Hotel Cir & West Site Dwy	2032 Horizon Year	EBL/R	10.1	0.14	B	EBL/R	11.7	0.12	B
		NBL/T	7.5	0.02	A	NBL/T	7.9	0.03	A

Table 17: 2032 Horizon Year Stop Control Queue Storage Summary

Study Intersection	Movement	Horizon Year 2032	
		AM	PM
		95th Percentile (veh)	95th Percentile (veh)
Hotel Cir & Hotel Ave	EBL/T/R	1.8	1.7
	WBL/T/R	0.3	0.8
	NBL/T/R	0.1	0.1
	SBL/T/R	0.0	0.0
Hotel Cir & East Site Dwy	EBL/R	0.3	0.1
	NBL/T	0.1	0.1
Hotel Cir & West Site Dwy	EBL/R	0.5	0.4
	NBL/T	0.1	0.1

From the tables above, the following is summarized:

Hotel Cir and Hotel Ave

- Capacity Analysis:
 - Under horizon conditions, the intersection is observed to operate at an acceptable level of service in both the AM and PM peak hours. Individual movements are also observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours.
- Queueing Analysis:
 - Under horizon conditions, 95th percentile lengths at the intersection are observed to be accommodated and acceptable during AM and PM peak hours.
 - Under build-out conditions, 95th percentile lengths at the intersection are observed to be accommodated and acceptable during AM and PM peak hours.

Hotel Cir and East Site Driveway

- Capacity Analysis:
 - Under horizon conditions, the intersection is observed to operate at an acceptable level of service in both the AM and PM peak hours. Individual movements are also observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours.
- Queueing Analysis:
 - Under horizon conditions, 95th percentile lengths at the intersection are observed to be accommodated and acceptable during AM and PM peak hours.

For Hotel Cir and West Site Driveway

- Capacity Analysis:
 - Under horizon conditions, the intersection is observed to operate at an acceptable level of service in both the AM and PM peak hours. Individual movements are also observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours.
- Queueing Analysis
 - Under horizon conditions, 95th percentile lengths at the intersection are observed to be accommodated and acceptable during AM and PM peak hours.

SITE ACCESS AND SIGHT DISTANCE EVALUATION

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

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

Intersection sight distances were calculated based on the following assumptions:

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

Due to the nature of this development, a single passenger vehicle was used as the design vehicle. Values shown below in

Table 18 were rounded up to the nearest 5-foot increment. Formulas, values, and calculations used in the sight distance analysis can be found in the appendix.

Table 18: Sight Distance Requirements

Case	Location	Speed	Sight Distance
Case B1 – Turning Left	Access Driveway on Hotel Cir - East	30 MPH	340 FT
Case B2 – Turning Right	Access Driveway on Hotel Cir - East	30 MPH	290 FT
Case B1 – Turning Left	Access Driveway on Hotel Cir - West	30 MPH	340 FT
Case B2 – Turning Right	Access Driveway on Hotel Cir - West	30 MPH	290 FT

Using the values shown above, it is recommended that all development driveways adhere to the sight distance provisions detailed in the AASHTO “Green Book.” An area bounded by the above sight distances with the decision point placed 14.5 feet back from the edge of the shoulder midway between the outbound driving lane should be maintained clear of any obstructions.

In addition, review of CABQ DPM compliance at proposed access points were conducted as well as driveway access. The west access driveway is constructed a shared driveway that is approximately 70 feet in length. However, at the center of the shared driveway a concrete wall barrier at the property line divides the two properties. It is therefore recommended that, if access is to be kept for both properties, the east driveway should be re-constructed to be separate from the west driveway.

CAPACITY MITIGATIONS AND STREET IMPROVEMENTS

As shown in the above section, capacity issues are not anticipated in the study area under buildout conditions. Therefore, no capacity mitigations are recommended.

SUMMARY OF RECOMMENDATIONS

A brief summary of the proposed recommendations is as follows:

- Existing, background, build-out and horizon queueing analyses indicate the northbound left turn at Lomas Blvd and Hotel Cir/Morris St exceed 95th percentile storage capacities. Currently, approximately 120 feet of storage is provided via a double-yellow stripe that transitions back-to-back turn lanes. It is recommended that consideration be given to lengthen the northbound left turn lane to be 150 feet long plus the transition or as far as possible without encroaching on the driveway to the south.
- CABQ DPM compliance requires that the west access driveway be separated from currently shared driveway. It is recommended that consideration be given for reconstruction of the west access to be reduced to 24 feet wide and have curb return radius of 25 feet.