

Traffic Impact Study Burger King – Juan Tabo

Draft Report

May 2021

Prepared for:
P.J. Developments Inc.

Prepared By:

HT#K22D035B
received 5/18/2021



EXECUTIVE SUMMARY

The following contains a Traffic Impact Study (TIS) for a fast-food restaurant with drive-thru to be located at 880 Juan Tabo Blvd within the Manzano Shopping Center in the city of Albuquerque (CABQ), NM. This report has been completed by Lee Engineering for P.J. Developments Inc. All analyses and items contained herein conform to scoping requirements set forth in the CABQ Traffic Scoping Form dated on April 19, 2021. Scoping forms are located in Appendix A.

BACKGROUND

The proposed development will consist of a 2,877 square foot fast-food restaurant with drive-thru to be located at 880 Juan Tabo Blvd near the intersection of Juan Tabo 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 from Juan Tabo Blvd via three existing driveways: one right-in/right-out and one full access on Juan Tabo Blvd, and one existing full access driveway on Lomas Blvd. Study Intersections, as shown in Figure 1, include:

- Juan Tabo Blvd & Lomas Blvd
- Lomas Blvd & Full Access Driveway
- Juan Tabo Blvd & Right-in/Right-out Driveway
- Juan Tabo Blvd & Full Access Driveway

9-hour turning movement counts were collected on April 14, 2021, for all study intersections. An adjustment factor, from the Ramada Hotel Apartment Conversion (Ramada) TIS provided by the City, was used to account for reduced traffic volumes during the COVID-19 pandemic. Growth rates were also obtained from the nearby traffic study 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 Conditions (2021)
2. Background - No Build (2022)
3. Full Build – Complete Construction (2022)
4. Horizon Year (2032)

SUMMARY OF RECOMMENDATIONS

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

- It is recommended that access to the site be maintained via the existing driveways analyzed in this report.
- It is recommended that intersection sight distance, as detailed in the sight distance section of this report, be provided/maintained.
- It is recommended that the intersection of Juan Tabo Blvd & Lomas Blvd be re-timed upon opening of the development. Signal timings should be performed by a registered Professional Traffic Operations Engineer (PTOE) at least one month after the opening of the development.

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INTRODUCTION

This report details the procedures and findings of a Traffic Impact Study (TIS) performed by Lee Engineering for PJ Developments Inc. This report and the analyses contained herein were performed for proposed quick service restaurant development to be constructed on the southeast corner of Juan Tabo Blvd & Lomas Blvd in Albuquerque, NM.

All analyses and items contained herein conform to scoping requirements set forth in the CABQ Traffic Scoping Form dated on April 19, 2021. Scoping forms are located 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 Conditions (2021)
2. Background - No Build (2022)
3. Full Build – Complete Construction (2022)
4. Horizon Year (2032)

PROJECT LOCATION & SITE PLAN

The proposed fast-food restaurant with drive-thru will consist of a 2,877 square foot building with a drive-thru. The development will to be located in the northeast quadrant of Albuquerque, NM at 880 Juan Tabo Blvd. Specifically, the development will be located near the intersection of Juan Tabo Blvd. and Lomas Blvd. within the Manzano Shopping Center, north of Interstate 40. Surrounding major intersections include Juan Tabo Blvd. and Lomas Blvd. The project area is bounded by existing development. North of the study area are restaurants and shopping centers along Juan Tabo Blvd. South of the site are several commercial and retail developments along Juan Tabo Blvd. Just east of the development is Manzano High School. Figure 2 shows the proposed site plan.

SITE ACCESS

Access to the site is to be taken from Juan Tabo Blvd via via three existing driveways: one right-in/right-out and one full access on Juan Tabo Blvd, and one existing full access driveway on Lomas Blvd. Details of the driveway's location and access are included in subsequent sections of this report.



Figure 1. Vicinity Map

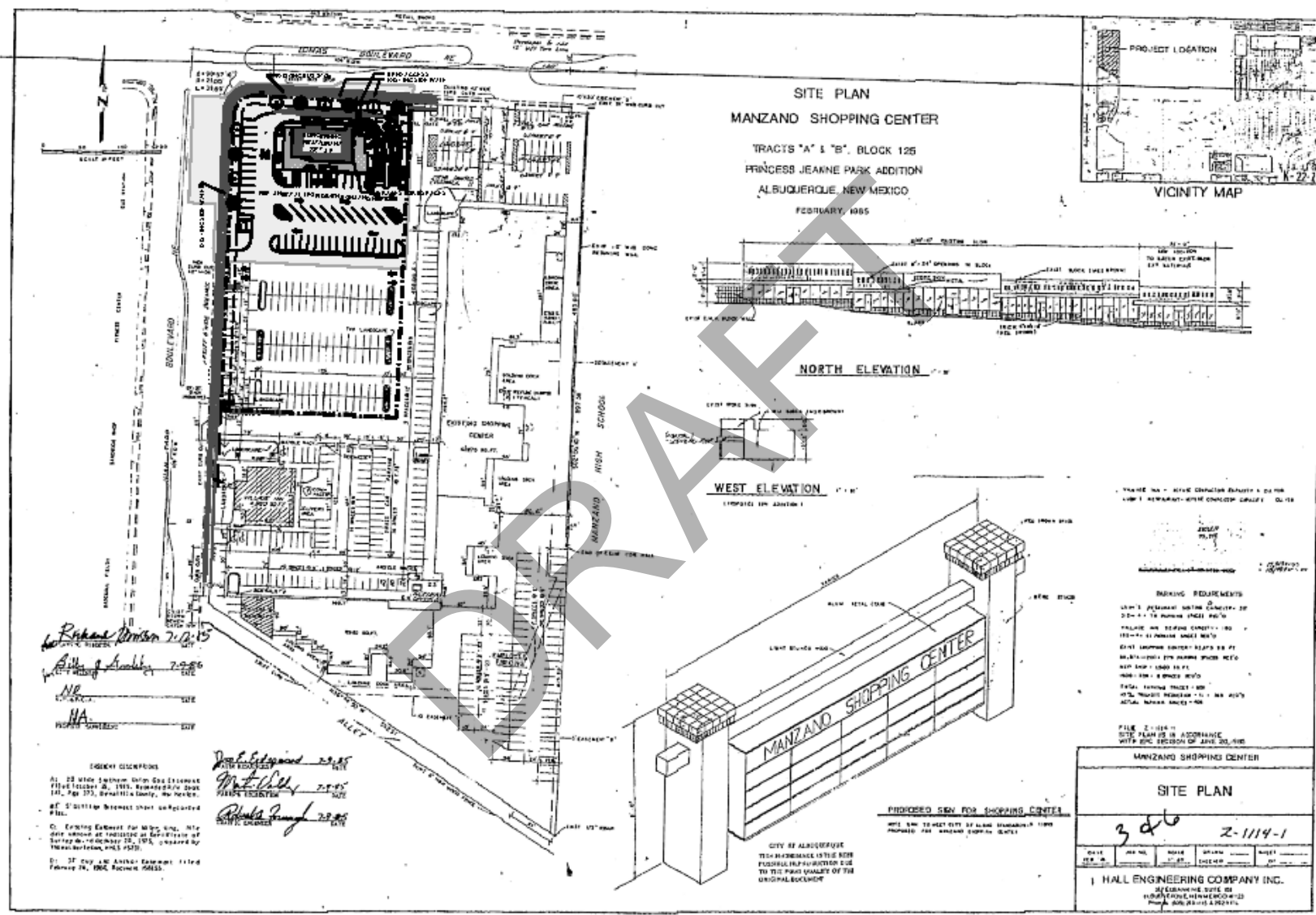


Figure 2. Site Plan

STUDY AREA, AREA LAND USE, AND STREETS

STUDY AREA

The study area is defined as the area bounded by Lomas Blvd and Juan Tabo Blvd immediately surrounding the site. The following intersections were identified and agreed upon in the scoping form, and will serve as the study intersections for this report:

- Juan Tabo Blvd & Lomas Blvd
- Lomas Blvd & Full Access Driveway
- Juan Tabo Blvd & Right-in/Right-out Driveway
- Juan Tabo Blvd & Full Access Driveway

AREA LAND USE

As described, the proposed fast-food restaurant with drive-thru is to be located on the north east side of CABQ at 880 Juan Tabo Blvd within the Manzano Sopping Center. Surrounding major intersections include Juan Tabo 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 on all corners of the Juan Tabo Blvd and Lomas Blvd Intersection.
- Hospitality and Service: Several fast-food restaurants exist along the study area corridors, as well as gas stations.
- Residential: Just beyond the commercial and service developments, there is multi-family housing as well as a large area of single-family housing. Other developments in the area include a Manzano High School just east of the Manzano Shopping Center.

STREETS

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

Juan Tabo Blvd is a six-lane median divided roadway classified by MRCOG as a Community Principal Arterial, running north and south along the frontage proposed property. Travel lanes range from 10-12 feet wide. The roadway incorporates curb and gutter, and sidewalk is present on both sides of the road. The roadway has a posted speed limit of 40 MPH.

Lomas Blvd is a six-lane median divided roadway, currently classified by MRCOG as a Regional Principal Arterial and runs east and west. 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 has a posted speed limit of 40 MPH.

INTERSECTIONS

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

Juan Tabo Blvd & Lomas Blvd is a 4-legged signalized intersection maintained by the City of Albuquerque. The signal operates with time-of-day coordination. Pedestrian crosswalks exist at all approaches of the intersection.

TRANSIT

Currently, a two bus routes are present in the study area. Route 1 operates everyday with stops every 30 minutes in the northbound and southbound directions on Juan Tabo Blvd. There is a bus stop adjacent to the proposed development on the southeast corner of the intersection. Route 11 operates everyday with

stops every 30 mins in the eastbound and westbound directions on Lomas Blvd. with a bus stop adjacent to the proposed development on the south east corner of the intersection.

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 Juan Tabo Blvd. & Lomas Blvd., Lomas Blvd. & Full Access Dwy, Juan Tabo Blvd. & Right-In/Right-Out Dwy, and Juan Tabo Blvd. & Full Access Dwy 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 April 14, 2021. An adjustment factor, from the Ramada Hotel Apartment Conversion (Ramada) TIS provided by the City, was used to account for reduced traffic volumes during the COVID-19 pandemic. Growth rates were also obtained from the nearby traffic study for opening year and horizon year (10 years after projected build-out) analyses. Table 1 below shows the peak hours for each intersection used in the analysis. Current year turning movement counts, lane geometry, and traffic control for the study intersections are presented in Figure 3. Full turning movement count sheets can be found in Appendix B.

Table 1: Intersection Peak Hours

Intersection	Data Collection Date	AM Peak Hour	PM Peak Hour
Juan Tabo Blvd. & Lomas Blvd.	4/14/2021	7:15-8:15	3:30-4:30
Lomas Blvd. & Full Access Dwy	4/14/2021	7:00-8:00	3:30-4:30
Juan Tabo Blvd. & Right-In/Right-Out Dwy	4/14/2021	7:00-8:00	4:15-5:15
Juan Tabo Blvd. & Full Access Dwy	4/14/2021	7:15-8:15	4:45-5:45

EXISTING 2021

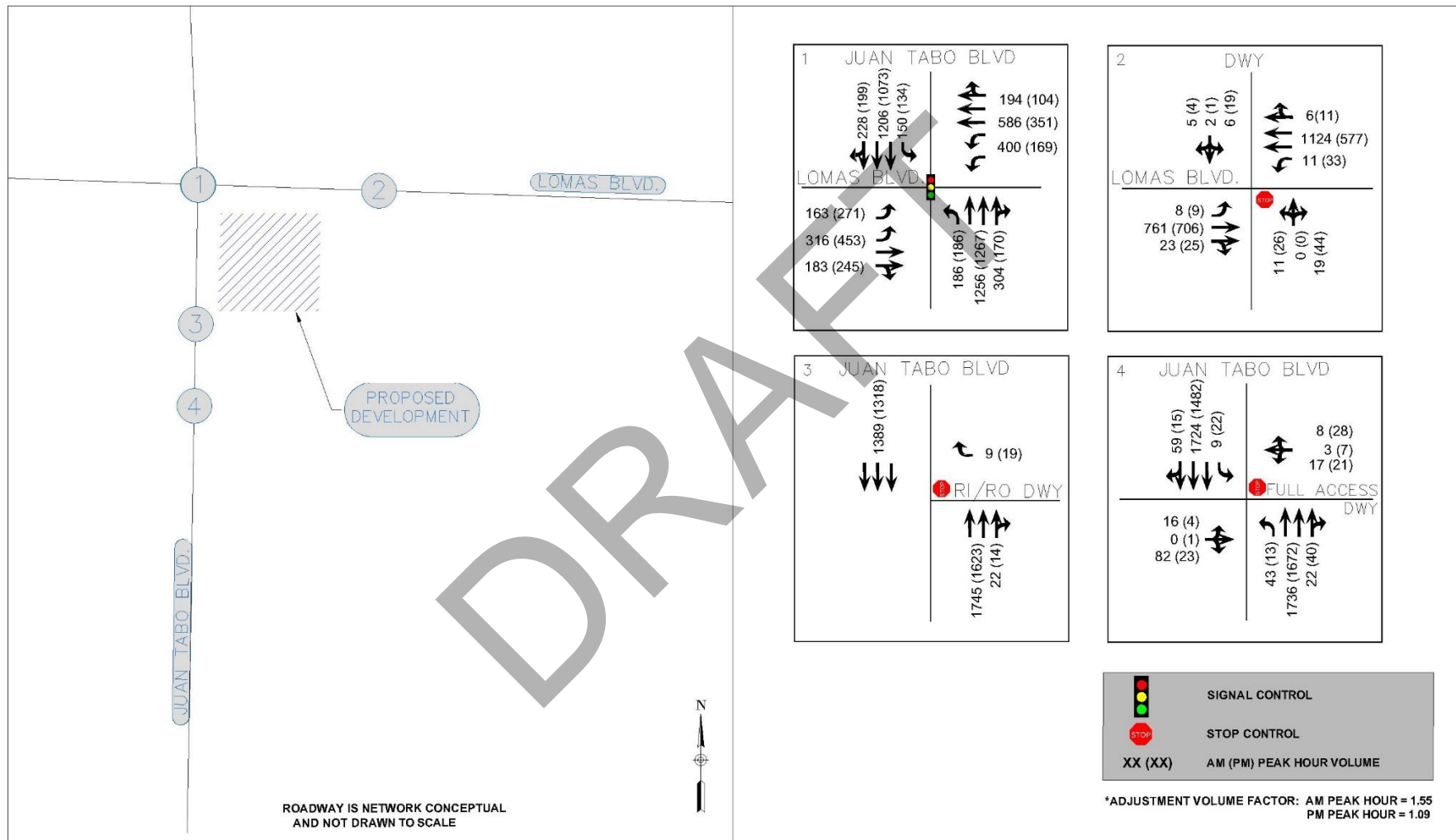


Figure 3. Existing (Adjusted) 2021 Turning Movement Counts

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 Juan Tabo Blvd. 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 Juan Tabo Blvd 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
Juan Tabo Blvd & Lomas Blvd	Existing 2021	EBL/T/R	42.5	0.57	D	EBL/T/R	43.2	0.64	D	36.1	D	34.1	C
		WBL/T/R	42.4	0.57	D	WBL/T/R	40.7	0.43	D				

¹ Average delay in seconds per vehicle.

² LOS stands for Level of Service.

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)	
Juan Tabo Blvd & Lomas Blvd	EBL	0.46	0.83	220
	WBL	1.77	0.76	150
	NBL	0.93	0.91	150
	SBL	0.53	0.50	200

*95th Percentile (QSR)= Queue Storage Ratio

From the tables above, the following is summarized:

Juan Tabo Blvd & 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 with the exception of the eastbound left turn in the AM & PM peak hours and the westbound left turn in the PM peak hour. It is noted that the v/c ratios for these movements do not indicate that the movements exceed capacity.
- Queueing Analysis:
 - Under existing conditions, 95th percentile Queue Storage Ratios (QSR) at the intersection are observed to be accommodated by existing storage lengths during the AM and PM peak hours except for the eastbound left turn in the AM peak hour which shows a QSR greater than 1.

ANALYSIS OF STOP CONTROLLED INTERSECTIONS

Table 6 below summarizes stop-controlled intersection capacity and LOS analysis performed for existing conditions for the unsignalized intersections. Queueing is reported as number of vehicles in the queue for stop-controlled intersections. Table 7 below summarizes queueing 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								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
Lomas Blvd & Full Access Dwy	Existing 2021	NBL/T/R	15.0	0.09	C	NBL/T/R	13.8	0.15	B	-	-	-	-
		SBL/T/R	44.3	0.14	E	SBL/T/R	17.0	0.07	C	-	-	-	-
Juan Tabo Blvd & Right-In/Right-Out Dwy	Existing 2021	WBR	50.3	0.15	F	WBR	53.6	0.31	F	-	-	-	-
Juan Tabo Blvd & Full Access Dwy	Existing 2021	EBL/T/R	300.0	1.02	F	EBL/T/R	28.1	0.16	D	-	-	-	-
		WBL/T/R	833.4	1.17	F	WBL/T/R	151.3	0.73	F	-	-	-	-

¹Average delay in seconds per vehicle.

²LOS stands for Level of Service.

Table 7: 2021 Existing Stop Control Queue Storage Summary

Study Intersection	Movement	Existing 2021	
		AM	PM
		95th Percentile (veh)	95th Percentile (veh)
Lomas Blvd & Full Access Dwy	EBL	0.1	0.0
	WBL	0.1	0.1
	NBL/T/R	0.3	0.5
	SBL/T/R	0.5	0.2
Juan Tabo Blvd & Right-In/Right-Out Dwy	WBR	0.5	1.3
Juan Tabo Blvd & Full Access Dwy	EBL/T/R	13.5	0.6
	WBL/T/R	8.2	5.4

*95th Percentile Queues are calculated in vehicles

From the tables above, the following is summarized:

Lomas Blvd & Full Access Driveway

- Capacity Analysis:
 - Under existing conditions, individual movements are observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours except for the southbound approach in the AM peak hour. It is noted that the v/c ratio for this movement indicates that the movement does not exceed capacity and is therefore attributed to gap-delays for the movement.
- Queueing Analysis:
 - Under existing conditions, 95th percentile lengths at the intersection are observed to be less than 1 vehicle during the AM and PM peak hours.

Juan Tabo Blvd & Right-in/Right-out Driveway

- Capacity Analysis:
 - Under existing conditions, individual movements are observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours except for the westbound approach in the AM and PM peak hour. It is noted that the v/c ratio for this movement indicates that the movement does not exceed capacity and is therefore attributed to gap-delays for the movement.
- Queueing Analysis:
 - Under existing conditions, 95th percentile lengths at the intersection are observed to be less than 5 vehicles during the AM and PM peak hours but are contained within the development site.

Juan Tabo Blvd & Full Access Driveway

- Capacity Analysis:
 - Under existing conditions, individual movements are observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours except for the eastbound approach, westbound approach, and NBL and SBL in the AM and PM peak hour. It is noted that the v/c ratio for the NBL and SBL movements indicates that the movement does not exceed capacity and is therefore attributed to gap-delays for the movement. It is also noted that this analysis used adjust traffic volumes and may overestimate driveway traffic. Additionally, high delays

are likely to alter driver behavior by seeking alternative routes and potential “stacking” of vehicles side-by-side on the westbound approach where the driveway is approximately 40 FT wide.

- Queueing Analysis
 - Under existing conditions, queueing is observed to be accommodated by existing storage lengths and driveway site storage.

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, a 1% per year growth rate was used. This growth rate was obtained from a previously prepared TIS located along Lomas Blvd within 1 mile from the proposed development. The growth rate was then converted to a growth factor for the specific analysis scenarios. Growth factors were then applied to the 2021 adjusted conditions turning movement volumes to forecast future volumes.

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 Fast Food Restaurant with Drive-Through Window (ITE 934) 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 phase. 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. Due to the nature of this development, pass-by trips were calculated per the ITE Trip Generation Manual 10th Edition and assigned to new project trips. The net site generated trips (gross trips generated minus pass-by trips), shown as primary trips, were added to background traffic volumes to create the build-out traffic volumes.

Table 8 provided below, shows expected unadjusted trips, pass-by trips, and primary trips generated by the development.

Table 8: Trip Generation and Pass-by Trips

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 934 - Fast-Food Restaurant with Drive-Through Window Weekday, Peak Hour of Generator	2.88	1,000 sq. ft. FGA	1356	40.19	51%	49%	32.67	52%	48%	59	57	49	45
							Unadjusted Total Trips			59	57	49	45
Pass-By Trips													
Use			Weekday	AM Peak			PM Peak			AM Peak		PM Peak	
			Trips	% Pass-by Trips			% Pass-by Trips			In	Out	In	Out
Fast-Food Restaurant with Drive-Through			664	49%			50%			29	28	25	23
							Total Pass-by Trips			29	28	25	23
							Primary Trips			30	29	24	22

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. Primary site trips were added to study intersections with direct access to the proposed development. Figure 4 through Figure 8 show the traffic volumes used for each individual analysis scenario.

BACKGROUND 2022

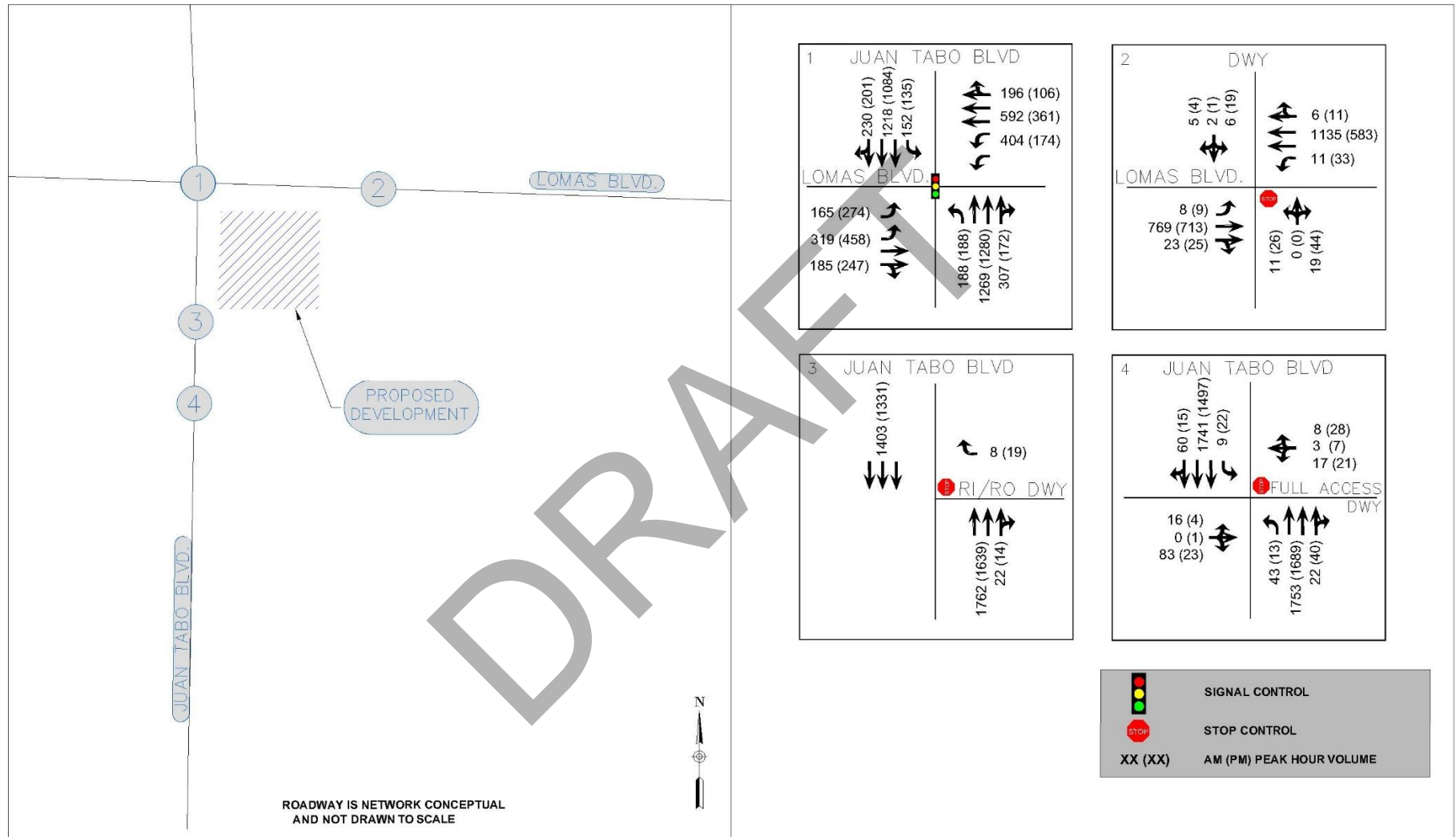


Figure 4. Background 2022 Turning Movement Traffic Volumes

TRIP DISTRIBUTION AND ASSIGNMENT

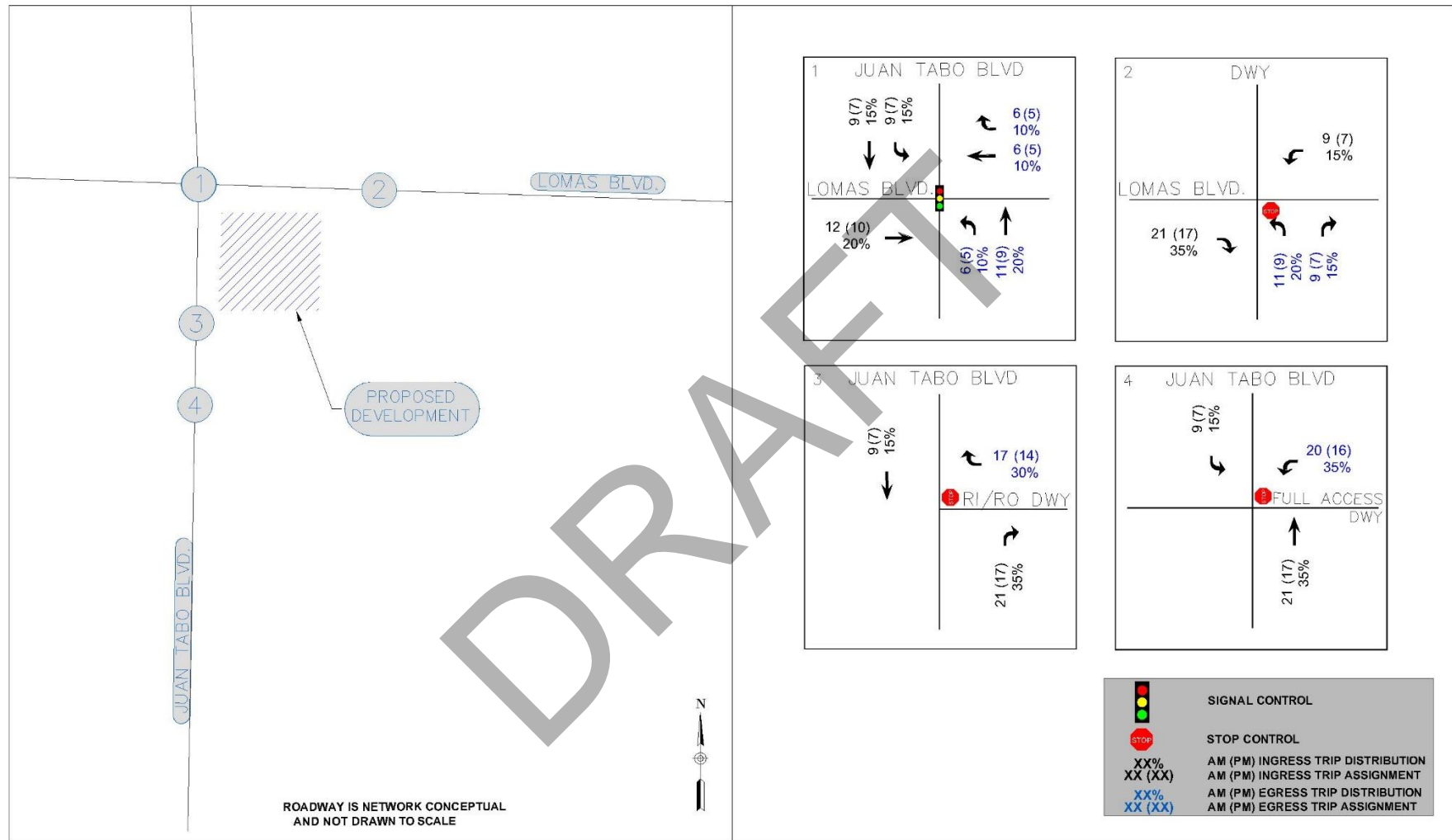


Figure 5. Trip Distribution and Assignment

PASS-BY TRIP DISTRIBUTION AND ASSIGNMENT

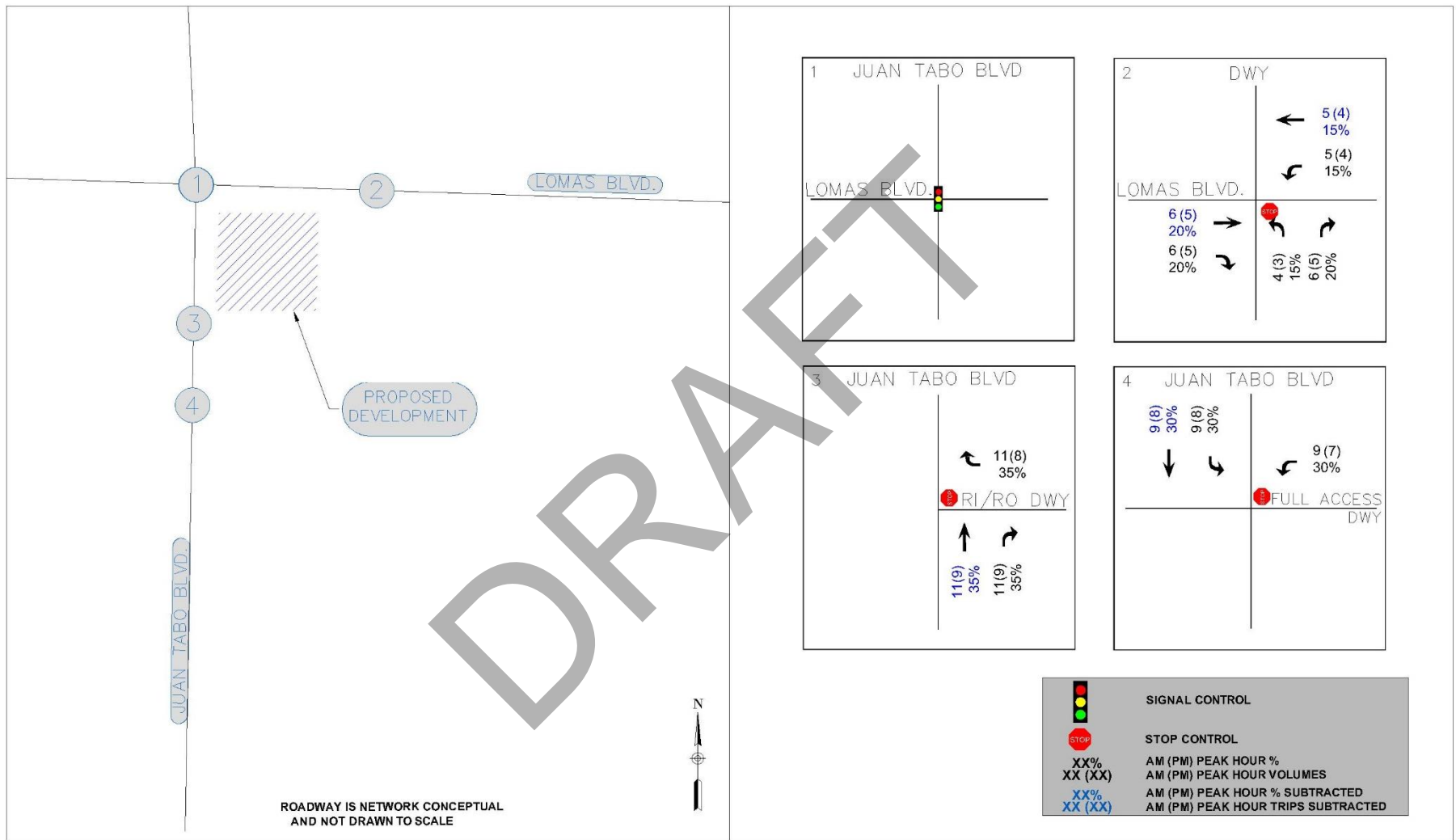


Figure 6. Pass-by Trip Distribution and Assignment

FULL BUILD 2022

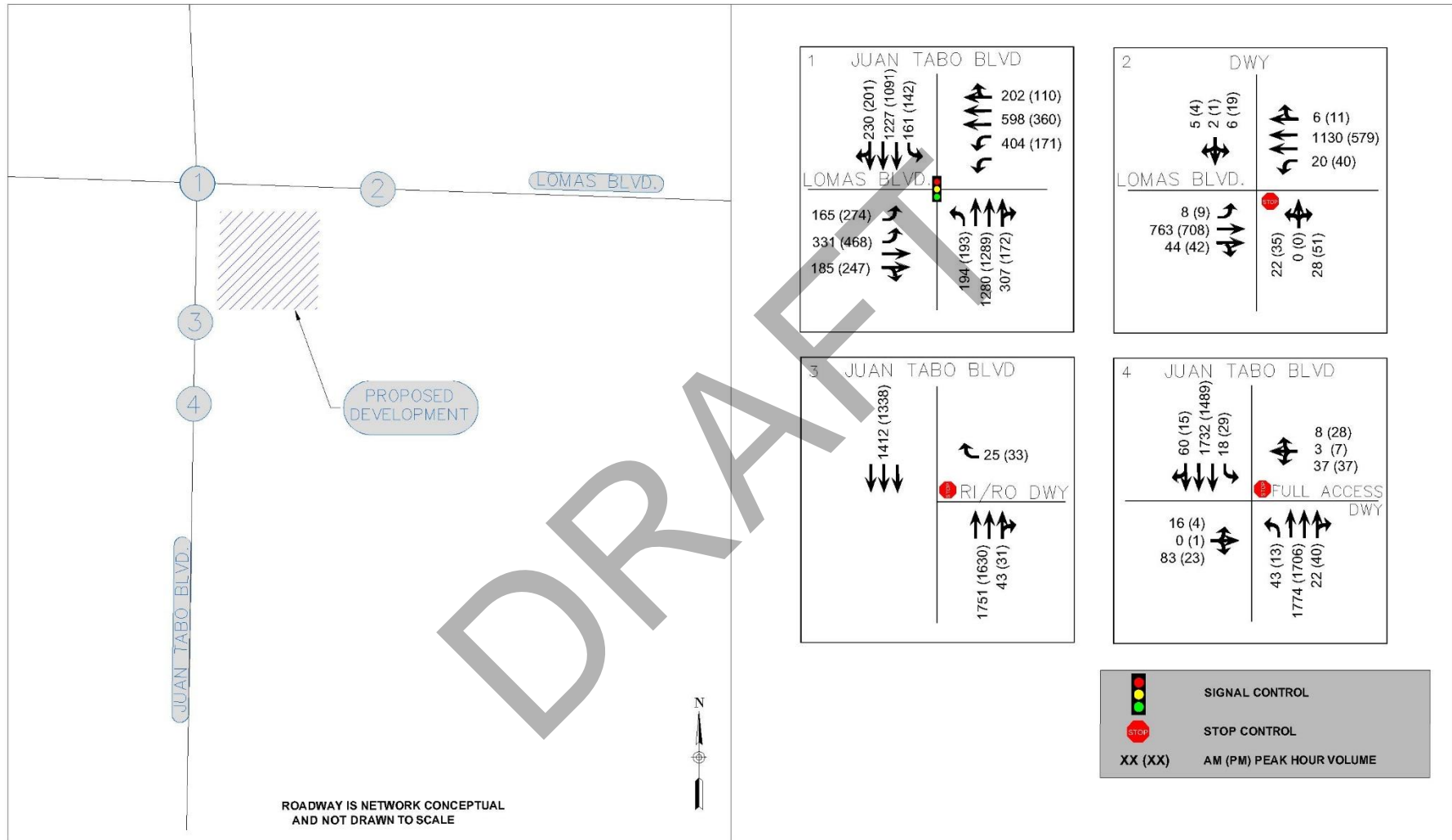


Figure 7. Full Build-Out 2022 Traffic Volumes

HORIZON YEAR 2032

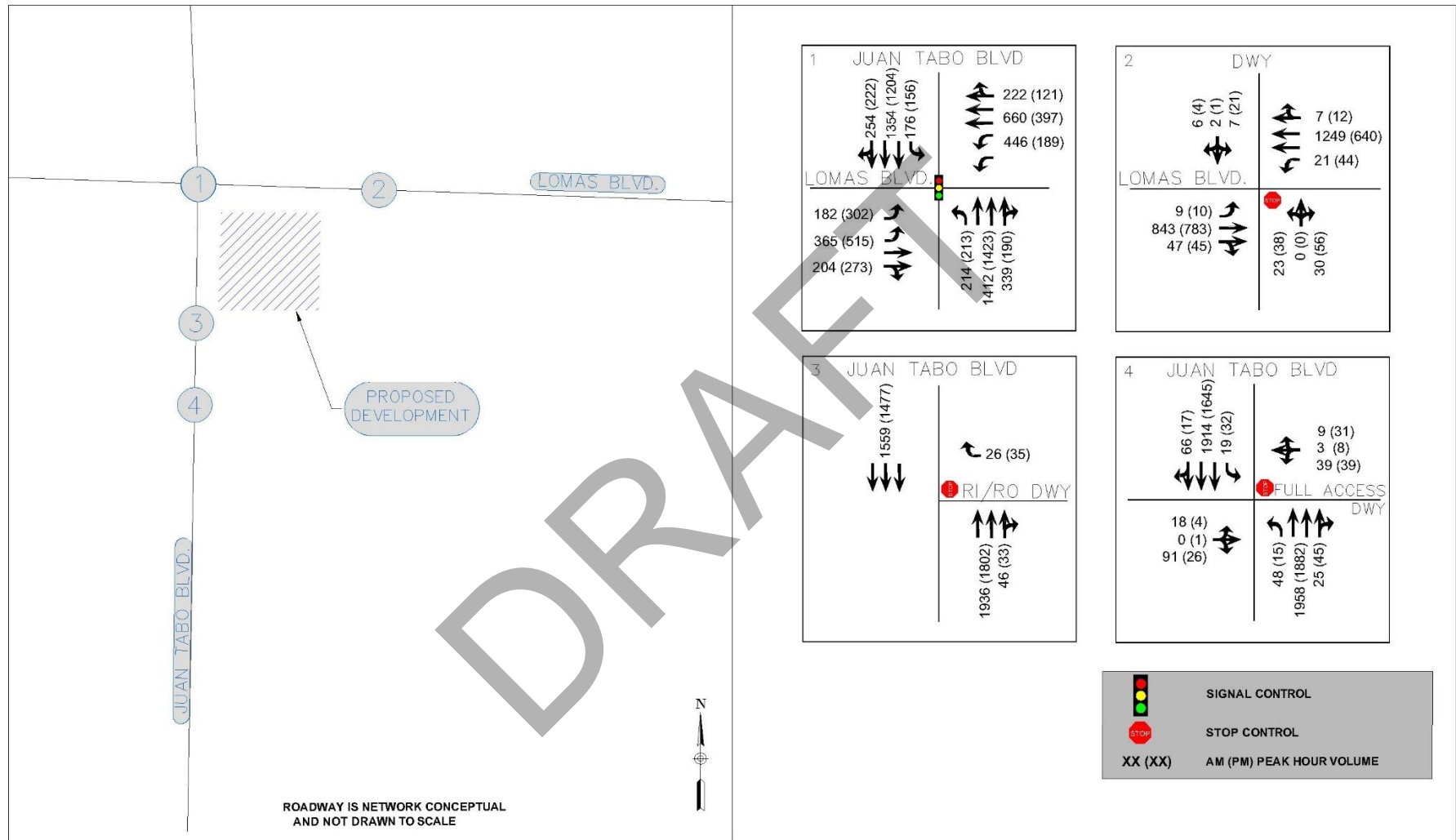


Figure 8. 2032 Horizon Year Traffic Volume

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 9 below summarizes intersection capacity and LOS analysis performed for 2022 conditions for the signalized intersection at Lomas Blvd & Juan Tabo Blvd.

Table 10 below summarizes queuing results. Detailed capacity output sheets can be found in Appendix D.

Table 9: 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
Juan Tabo Blvd & Lomas Blvd	Background 2022	EBL/T/R	42.7	0.57	D	EBL/T/R	43.4	0.64	D	36.4	D	34.3	C
		WBL/T/R	42.7	0.56	D	WBL/T/R	40.8	0.43	D				
	Full Build 2022	EBL/T/R	42.8	0.58	D	EBL/T/R	43.5	0.65	D	36.8	D	34.5	C
		WBL/T/R	42.6	0.57	D	WBL/T/R	40.8	0.44	D				

¹Average delay in seconds per vehicle.

²LOS stands for Level of Service.

Table 10: 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)	
Juan Tabo Blvd & Lomas Blvd	EBL	0.46	0.84	0.46	0.84	220
	WBL	1.79	0.77	1.79	0.77	150
	NBL	0.95	0.92	1.00	0.95	150
	SBL	0.54	0.51	0.58	0.54	200

*95th Percentile (QSR)= Queue Storage Ratio

From the tables

above, the following is summarized:

Juan Tabo Blvd & Lomas Blvd

- Capacity Analysis:
 - Under 2022 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 with the exception of the eastbound left turn in the AM & PM peak hours and the westbound left turn in the PM peak hour. It is noted that the v/c ratios for these movements do not indicate that the movements exceed capacity.
 - Under Full-Build 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 with the exception of the eastbound left turn in the AM & PM peak hours and the westbound left turn in the PM peak hour. It is noted that the v/c ratios for these movements do not indicate that the movements exceed capacity.

- Queueing Analysis:
 - Under 2022 background conditions, 95th percentile Queue Storage Ratios (QSR) at the intersection are observed to be accommodated by existing storage lengths during the AM and PM peak hours except for the eastbound left turn in the AM peak hour which shows a QSR greater than 1.
 - Under Full-Build conditions, 95th percentile Queue Storage Ratios (QSR) at the intersection are observed to be accommodated by existing storage lengths during the AM and PM peak hours except for the eastbound left turn and northbound left turn in the AM peak hour which shows a QSR greater than 1.

ANALYSIS OF STOP CONTROLLED INTERSECTIONS

Table 11 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 12 below summarizes queueing results. Detailed capacity output sheets can be found in Appendix D.

Table 11: 2022 Background and Full Build-Out Stop Control 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
Lomas Blvd & Full Access Dwy	Background 2022	NBL/T/R	15.2	0.30	C	NBL/T/R	15.5	0.18	C	-	-	-	-
		SBL/T/R	45.5	0.50	E	SBL/T/R	17.1	0.08	C	-	-	-	-
	Full Build 2022	NBL/T/R	16.8	0.16	C	NBL/T/R	14.6	0.19	B	-	-	-	-
		SBL/T/R	47.8	0.15	E	SBL/T/R	17.4	0.08	C	-	-	-	-
Juan Tabo Blvd & Right-In/Right-Out Dwy	Background 2022	WBR	50.3	0.15	F	WBR	50.7	0.29	F	-	-	-	-
	Full Build 2022	WBR	83.7	0.49	F	WBR	70.9	0.51	F	-	-	-	-
Juan Tabo Blvd & Full Access Dwy	Background 2022	EBL/T/R	371.8	1.08	F	EBL/T/R	29.2	0.16	D	-	-	-	-
		WBL/T/R	1031.3	1.28	F	WBL/T/R	111.5	0.65	F	-	-	-	-
	Full Build 2022	EBL/T/R	479.9	1.15	F	EBL/T/R	30.2	0.17	D	-	-	-	-
		WBL/T/R	3542.0	2.72	F	WBL/T/R	372.7	1.02	F	-	-	-	-

¹Average delay in seconds per vehicle.

²LOS stands for Level of Service.

Table 12: 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)
Lomas Blvd & Full Access Dwy	EBL	0.1	0.0	0.1	0.0
	WBL	0.1	0.1	0.1	0.1
	NBL/T/R	0.3	0.7	0.6	0.7
	SBL/T/R	0.5	0.2	0.5	0.3
Juan Tabo Blvd & Right-In/Right-Out Dwy	WBR	0.5	1.2	2.6	2.8
Juan Tabo Blvd & Full Access Dwy	EBL/T/R	15.2	0.6	17.3	0.6
	WBL/T/R	8.9	4.3	21.3	11.0

*95th Percentile Queues are calculated in vehicles

From the tables above, the following is summarized:

Lomas Blvd & Full Access Driveway

- Capacity Analysis:
 - Under 2022 Background Conditions, individual movements are observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours except for the southbound approach in the AM peak hour. It is noted that the v/c ratio for this movement indicates that the movement does not exceed capacity and is therefore attributed to gap-delays for the movement.
 - Under 2022 Full-Build Conditions, the individual movements are observed to operate at similar levels of service to background conditions.
- Queueing Analysis:
 - Under 2022 Background Conditions, 95th percentile lengths at the intersection are observed to be less than 1 vehicle during the AM and PM peak hours.
 - Under 2022 Full-Build Conditions, 95th percentile lengths at the intersection are observed to be less than 1 vehicle during the AM and PM peak hours.

Juan Tabo Blvd & Right-In/Right-Out Driveway

- Capacity Analysis:
 - Under 2022 Background Conditions, individual movements are observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours except for the westbound approach in the AM and PM peak hour. It is noted that the v/c ratio for this movement indicates that the movement does not exceed capacity and is therefore attributed to gap-delays for the movement.
 - Under 2022 Full-Build Conditions, the individual movements are observed to operate at similar levels of service to background conditions.
- Queueing Analysis:
 - Under 2022 Background Conditions, 95th percentile lengths at the intersection are observed to be less than 5 vehicles during the AM and PM peak hours but are contained within the development site.
 - Under 2022 Full-Build Conditions, 95th percentile lengths at the intersection are observed to be less than 5 vehicles during the AM and PM peak hours but are contained within the development site.

Juan Tabo Blvd & Full Access Driveway

- Capacity Analysis:
 - Under 2022 Background Conditions, individual movements are observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours except for the eastbound approach, westbound approach, and NBL and SBL in the AM and PM peak hour. It is noted that the v/c ratio for the NBL and SBL movements indicates that the movement does not exceed capacity and is therefore attributed to gap-delays for the movement. It is also noted that this analysis used adjust traffic volumes and may overestimate driveway traffic. Additionally, high delays are likely to alter driver behavior by seeking alternative routes and potential “stacking” of vehicles side-by-side on the westbound approach where the driveway is approximately 40 FT wide.
 - Under 2022 Full-Build Conditions, individual movements are observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours except for the eastbound

approach, westbound approach, and NBL and SBL in the AM and PM peak hour. It is noted that the v/c ratio for the NBL and SBL movements indicates that the movement does not exceed capacity and is therefore attributed to gap-delays for the movement. It is also noted that this analysis used adjust traffic volumes and may overestimate driveway traffic. Additionally, high delays are likely to alter driver behavior by seeking alternative routes and potential “stacking” of vehicles side-by-side on the westbound approach where the driveway is approximately 40 FT wide.

- Queueing Analysis
 - Under 2022 Background Conditions, queuing is observed to be accommodated by existing storage lengths and driveway site storage.
 - Under 2022 Full-Build Conditions, queuing is observed to be accommodated by existing storage lengths and driveway site storage.

2032 HORIZON YEAR

ANALYSIS OF SIGNALIZED INTERSECTIONS

Table 13 below summarizes intersection capacity and LOS analysis performed for 2032 Horizon Year for the signalized intersection at Juan Tabo Blvd and Lomas Blvd.

Table 14 below summarizes queuing results. Detailed capacity output sheets can be found in Appendix D.

Table 13: 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
Juan Tabo Blvd & Lomas Blvd	2032 Horizon Year	EBL/T/R	44.8	0.64	D	EBL/T/R	45.7	0.70	D	41.3	D	36.8	D
		WBL/T/R	47.3	0.62	D	WBL/T/R	41.6	0.47	D				

¹Average delay in seconds per vehicle.

²LOS stands for Level of Service.

Table 14: 2032 Horizon Year Signalized Queue Storage Summary

Study Intersection	Horizon Year 2032		Storage Length Present (ft)
	AM	PM	
	95th Percentile (QSR)	95th Percentile (QSR)	
Juan Tabo Blvd & Lomas Blvd	0.51	0.92	220
	2.09	0.85	150
	1.29	1.08	150
	0.65	0.60	200

*95th Percentile (QSR)= Queue Storage Ratio

From the tables above, the following is summarized:

Juan Tabo Blvd & 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 with the exception of the eastbound left turn in the AM & PM peak hours and the westbound left turn in the PM peak hour. It is noted that the v/c ratios for these movements do not indicate that the movements exceed capacity.

- Queueing Analysis:
 - Under Horizon Year conditions, 95th percentile Queue Storage Ratios (QSR) at the intersection are observed to be accommodated by existing storage lengths during the AM and PM peak hours except for the eastbound left turn and northbound left turn in the AM peak hour and the northbound left in the PM peak hour which show a QSR greater than 1.

ANALYSIS OF STOP CONTROLLED INTERSECTIONS

Table 15 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 16 below summarizes queueing results. Detailed capacity output sheets can be found in Appendix D.

Table 15: 2032 Horizon Year Stop Control 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
Lomas Blvd & Full Access Dwy	2032 Horizon Year	NBL/T/R	18.7	0.19	C	NBT	15.9	0.22	C	-	-	-	-
		SBL/T/R	64.0	0.22	F	SBT	19.4	0.09	C	-	-	-	-
Juan Tabo Blvd & Right-In/Right-Out Dwy	2032 Horizon Year	WBR	147.6	0.66	F	WBR	125.3	0.68	F	-	-	-	-
Juan Tabo Blvd & Full Access Dwy	2032 Horizon Year	EBL/T/R	UNREPORTED - HCS SOFTWARE UNABLE TO ANALYZE			EBL/T/R	38.8	0.23	E	-	-	-	-
		WBL/T/R				WBL/T/R	1142.0	1.50	F	-	-	-	-

¹Average delay in seconds per vehicle.

²LOS stands for Level of Service.

Table 16: 2032 Horizon Year Stop Control Queue Storage Summary

Study Intersection	Movement	Horizon Year 2032	
		AM	PM
		95th Percentile (veh)	95th Percentile (veh)
Lomas Blvd & Full Access Dwy	EBL	0.1	0.1
	WBL	0.1	0.2
	NBL/T/R	0.7	0.9
	SBL/T/R	0.8	0.3
Juan Tabo Blvd & Right-In/Right-Out Dwy	WBR	4.3	4.8
Juan Tabo Blvd & Full Access Dwy	EBL/T/R	UNREPORTED - HCS SOFTWARE UNABLE TO ANALYZE	
	WBL/T/R		

*95th Percentile Queues are calculated in vehicles

From the tables above, the following is summarized:

Lomas Blvd Full Access Driveway

- Capacity Analysis:
 - Under Horizon Year Conditions, individual movements are observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours except for the southbound approach in the AM peak hour. It is noted that the v/c ratio for this movement indicates that the movement does not exceed capacity and is therefore attributed to gap-delays for the movement.
- Queueing Analysis:
 - Under Horizon Year Conditions, 95th percentile lengths at the intersection are observed to be less than 1 vehicle during the AM and PM peak hours.

Juan Tabo Blvd & Right-In/Right-Out Driveway

- Capacity Analysis:
 - Under Horizon Year Conditions, individual movements are observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours except for the westbound approach in the AM and PM peak hour. It is noted that the v/c ratio for this movement indicates that the movement does not exceed capacity and is therefore attributed to gap-delays for the movement.
- Queueing Analysis:
 - Under Horizon Year Conditions, 95th percentile lengths at the intersection are observed to be less than 5 vehicles during the AM and PM peak hours but are contained within the development site

Juan Tabo Blvd & Full Access Driveway

- Capacity Analysis:
 - Under 2023 Horizon Conditions, individual movements are observed to operate at an acceptable Level of Service (LOS) for both AM and PM peak hours except for the eastbound approach, westbound approach, and NBL and SBL in the AM and PM peak hour. It is noted that the v/c ratio for the NBL and SBL movements indicates that the movement does not exceed capacity and is therefore attributed to gap-delays for the movement. It is also noted that this analysis used adjust traffic volumes and may overestimate driveway traffic. Additionally, high delays are likely to alter driver behavior by seeking alternative routes and potential “stacking” of vehicles side-by-side on the westbound approach where the driveway is approximately 40 FT wide.
- Queueing Analysis
 - Under 2023 Horizon Conditions, queuing is observed to be accommodated by existing storage lengths and driveway site storage.

DEVELOPMENT SITE SPECIFIC OBSERVATIONS AND RECOMMENDATIONS

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 17 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 17: Sight Distance Requirements

Case	Location	Speed	Sight Distance
Case B1 - Turning Left	Full Access Driveway on Lomas Blvd	40 MPH	445 Feet
Case B2 - Turning Right	Full Access Driveway on Lomas Blvd	40 MPH	385 Feet
Case B1 - Turning Left	Right-In/Right-Out Driveway on Juan Tabo Blvd	40 MPH	445 Feet
Case B2 - Turning Right	Right-In/Right-Out Driveway on Juan Tabo Blvd	40 MPH	385 Feet
Case B1 - Turning Left	Full Access Driveway on Juan Tabo Blvd	40 MPH	445 Feet
Case B2 - Turning Right	Full Access Driveway on Juan Tabo Blvd	40 MPH	385 Feet

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.

TURN LANE ANALYSIS

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

Table 18: Auxiliary Lane Analysis

Warrant Location	Design Speed (MPH)	Right Turning Volume AM(PM)	Right Turn Warrant Result (per Table 7.4.67)	Required Right Turn Length (per Table 7.4.68)	Required Right Turn Transition Length (per Table 7.4.68)	Required Taper (per Table 7.4.69)
Lomas Blvd (Full Access)	40	44 (42)	Not Required	N/A	N/A	N/A
Access Point 2 (Cedro Way)	40	43 (31)	Not Required	N/A	N/A	N/A
Access Point 3 (Crestone Way)	40	22 (40)	Not Required	N/A	N/A	N/A

Based on the analysis presented above, turn lanes are not warranted for the site driveways.

CRASH SUMMARY

Aggregate crash data was obtained for the intersection of Lomas Blvd & Juan Tabo Blvd for the most recently available five years of data. This included 2015 to 2019. Crashes are summarized by year, type, lighting conditions, severity, and cause. The table below summarizes crashes occurring at the intersection.

Can a rate be derived? How does it compare to average.

Table 19: Crash Summary

Crash Summary		Lomas Blvd & Juan Tabo Blvd
Total Crashes		259
By Year	2015	59
	2016	50
	2017	49
	2018	44
	2019	57
By Type	Fixed Object	9
	Invalid Code/Left Blank	67
	Other (Object)	2
	Other Vehicle - All Others/Entering At Angle	2
	Other Vehicle - Both Going Straight/Entering At Angle	24
	Other Vehicle - Both Turn Left/Entering At Angle	1
	Other Vehicle - Both Turn Right/Entering At Angle	1
	Other Vehicle - From Opposite Direction	17
	Other Vehicle - From Opposite Direction/Both Going Straight	3
	Other Vehicle - From Opposite Direction/Both Going Straight	1
	Other Vehicle - From Opposite Direction/Both Turn Left	1
	Other Vehicle - From Opposite Direction/One Left Turn	6
	Other Vehicle - From Opposite Direction/Sideswipe Collision	2
	Other Vehicle - From Same Direction/Both Going Straight	19
	Other Vehicle - From Same Direction/Both Turn Left	4
	Other Vehicle - From Same Direction/All Others	1
	Other Vehicle - From Same Direction/One Right Turn	3
	Other Vehicle - From Same Direction/One Stopped	6
	Other Vehicle - From Same Direction/One Left Turn	1
	Other Vehicle - From Same Direction/Rear End Collision	28
	Other Vehicle - From Same Direction/Sideswipe Collision	8
	Other Vehicle - From Same Direction/Vehicle Backing	1
	Other Vehicle - One Left Turn/Entering At Angle	31
	Other Vehicle - One Right Turn/Entering At Angle	10
	Other Vehicle - One Stopped/Entering At Angle	4
	Pedalcyclist	1
	Pedestrian	6
	% Other Vehicle - One Left Turn/Entering At Angle	12%
	% Other Vehicle - From Same Direction/Rear End Collision	11%
	% Other Vehicle - Both Going Straight/Entering At Angle	9%
Crash Summary		Lomas Blvd & Juan Tabo Blvd
Total Crashes		259
By Lighting Conditions	Day	197
	Dawn/Dusk	10
	Dark	42
	Invalid Code/Not Specified	10
By Severity	%Day	76%
	%Dark	16%
	PDO	185
	Injury	74
By Contributing Factors	%PDO	71%
	%Injury	29%
	Alcohol/Drug Involved	10
	Avoid No Contact - Other	2
	Avoid No Contact - Vehicle	4
	Defective Steering	1
	Defective Tires	1
	Disregarded Traffic Signal	30
	Driver Inattention	70
	Drove Left Of Center	1
	Excessive Speed	8
	Failed to Yield Right of Way	42
	Following Too Closely	20
	Improper Backing	1
	Improper Lane Change	7
	Improper Overtaking	3
	Inadequate Brakes	3
	Made Improper Turn	10
	Other Mechanical Defect	1
	None/Missing Data	31
	Other - No Driver Error	4
	Other Improper Driving	3
	Pedestrian Error	1
	Road Defect	1
	Speed Too Fast for Conditions	3
	Vehicle Skidded Before Brake	2
	%Driver Inattention	27%
	%Failed to Yield Right of Way	16%
	%Disregarded Traffic Signal	12%
	%Following Too Closely	8%

Based on the above table, the following is observed:

- For the 5 years of data summarized, 259 crashes occurred.
- The most common classification of crash (other than an invalid code) is observed to be Other Vehicle – One Left Turn/Entering at Angle.
- A majority of the crashes occurred during daylight hours totaling 76% of the crashes.
- For the data reviewed, no fatal crashes were reported but injury crashes accounted for 29% of the total crashes.

- The most common contributing factor was observed to be Driver Inattention.

CAPACITY MITIGATIONS AND STREET IMPROVEMENTS

As shown in the above section, several capacity and queueing issues are observed for full build conditions and horizon year conditions within the study area. The following provides a summary of the capacity and queueing issues as well as recommended mitigations for the study intersections.

For Juan Tabo Blvd & Lomas Blvd, capacity and queueing issues are summarized as follows:

- Westbound Left Turn LOS in the PM peak hour.
- Eastbound Left Turn QSR in the AM peak hour.
- Northbound Left Turn QSR in the AM peak hour.

It is recommended that the traffic signal be re-time upon opening of the development. Signal timings should be performed by a registered Professional Traffic Operations Engineer (PTOE) at least one month after the opening of the development.

For Juan Tabo Blvd & Full Access Driveway, capacity and queueing issues are summarized as follows:

- Southbound approach in the AM peak hour.

No recommendations are made as the LOS issues are attributed to gap delays for the movement and all queueing is contained within the driveway approach.

For Lomas Blvd & Right-In/Right-Out Driveway, capacity and queueing issues are summarized as follows:

- Westbound approach in the AM and PM peak hour.
- Westbound 95th percentile queue in the AM and PM peak hours.

No recommendations are made as the LOS issues are attributed to gap delays for the movement and all queueing is contained within the driveway approach.

For Lomas Blvd & Full Access Driveway, capacity and queueing issues are summarized as follows:

- Eastbound and westbound approaches in the AM and PM peak hours
- NBL and SBL in the AM and PM peak hours.

No recommendations are made as the LOS issues for the NBL and SBL movements are attributed to gap delays for the movements. No recommendations are made for the eastbound and westbound approaches as all queuing is contained within site driveways and delays shown are likely an overestimate of actual delay. Additionally, approaches were analyzed with single lane movements. However, the 40-ft wide driveway for the westbound approach likely provides side-by-side stacking of vehicles thereby providing separated movements.

SUMMARY OF RECOMMENDATIONS

Based on the findings of this report, recommendations are summarized as follows:

- It is recommended that access to the site be maintained via the existing driveways analyzed in this report.
- It is recommended that intersection sight distance, as detailed in the sight distance section of this report, be provided/maintained.
- It is recommended that the intersection of Juan Tabo Blvd & Lomas Blvd be re-timed upon opening of the development. Signal timings should be performed by a registered Professional Traffic Operations Engineer (PTOE) at least one month after the opening of the development.

DRAFT