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VOLCANO CLIFFS SUBDIVISION
TRAFFIC IMPACT ANALYSIS

ALBUQUERQUE, NEW MEXICO

HUITT-ZOLLARS

333 Rio Rancho Drive NE, Suite 101
Rio Rancho, New Mexico 87124
Phone: (505) 892-5141

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EXECUTIVE SUMMARY

Study Purpose

This report analyzes the traffic impacts of the proposed Volcano Cliffs subdivision, which will be located in the northwest area of Albuquerque, New Mexico. This analysis will identify the traffic impacts of the Volcano Cliffs development and develop mitigations for intersections that are adversely impacted.

Site Location and Study Area

The proposed Volcano Cliffs subdivision will include the developments listed below, which will be built in separate phases. A site plan of the proposed site is provided in **Appendix A**.

- Phase I – 162 townhome units (Opening Year 2023)
- Phase II – 192 apartment units (Opening Year 2025)
- Phase III – 13,800 GSF pharmacy without drive-through and 16,725 GSF commercial building (Opening Year 2027)

The proposed subdivision will be located about 5 miles north of Interstate Highway 40 (IH 40) and about 7 miles west of Interstate Highway 25 (IH 25). The subdivision can be accessed through Universe Blvd, which connects to Paseo Del Norte Blvd and Rainbow Blvd. Currently the site of the proposed subdivision is vacant. Once the subdivision is built, it will only have access to Universe Blvd through driveways and the proposed Rosa Parks Rd and Perezoso Dr cross streets. The subdivision will have two driveways intersecting Universe Blvd, three driveways intersecting Rosa Parks Rd, and one driveway intersecting Perezoso Dr.

Major intersections in the vicinity of the project area were investigated for this study. **Table A** includes the intersections investigated, the intersection numbering used in this report, and the intersection control type. The study intersections are also identified with corresponding intersection numbers in **Figure 1** (**Appendix B**)**.**

Table A – Intersections Identified for Impact Analysis Numbering and Control Type

Intersection Numbering	Location	Control Type
1	Universe Blvd & Paseo Del Norte Blvd	Signalized
2	Universe Blvd & School Access Road	Unsignalized
3	Universe Blvd & Rosa Parks Rd	Unsignalized
4	Universe Blvd & Driveway 1	Unsignalized
5	Universe Blvd & Driveway 2	Unsignalized
6	Universe Blvd & Perezoso Dr	Unsignalized
7	Universe Blvd & Rainbow Blvd	Signalized
8	Rosa Parks Rd & Driveway 3	Unsignalized
9	Rosa Parks Rd & Driveway 4	Unsignalized
10	Rosa Parks Rd & Driveway 5	Unsignalized
11	Perezoso Dr & Driveway 6	Unsignalized

For this study, Synchro 11 software was used to analyze the traffic conditions for the following scenarios:

- 2022 Existing Conditions
- Phase I No Build Conditions (Year 2023 without Volcano Cliffs subdivision)
- Phase I Build Conditions (Year 2023 with Volcano Cliffs subdivision)
- Phase II No Build Conditions (Year 2025 without Volcano Cliffs subdivision)
- Phase II Build Conditions (Year 2025 with Volcano Cliffs subdivision)
- Phase III No Build Conditions (Year 2027 without Volcano Cliffs subdivision)
- Phase IIII Build Conditions (Year 2027 with Volcano Cliffs subdivision)
- Horizon Year No Build (Year 2033 without Volcano Cliffs subdivision)
- Horizon Year No Build (Year 2033 with Volcano Cliffs subdivision)

The sight distance was also evaluated for the proposed access points along Universe Blvd (Rosa Parks Rd, Driveway 1, Driveway 2, and Perezoso Dr). AASHTO's *A Policy on Geometric Design of Highways and Streets, 2018 7th Edition* methodology was followed in the sight distance evaluation.

Principal Findings

Based on the results of the traffic analysis, it was concluded that the development will not adversely impact the intersections in the Phase I (2023), Phase II (2025), and Phase III (2027) scenarios. All intersections perform at a LOS D or better in 2027 for all scenarios, except for:

- Intersection 1 (Universe Blvd & Paseo del Norte Blvd) – The intersection is expected to deteriorate to a LOS E and F during the 2025 AM and PM peak hour, respectively. However, this deterioration in LOS is expected to occur even without the proposed development which only increases the delay by less than one second during both peak hours. It was also noted that the EB and SB left-turns and NB right-turn auxiliary lane storage lengths are exceeded in the No Build conditions. The City may consider increasing the storage length for these movements to accommodate the turning traffic.

By the Horizon 2033 year, all intersections are still expected to perform at a LOS D or better except for:

- Intersection 1 (Universe Blvd & Paseo del Norte Blvd) – The intersection is expected to deteriorate to a LOS F by 2033 during both peak hours. However, this deterioration in LOS is expected to occur even without the proposed development, which only increases the delay by less than one second during both peak hours.
- Intersection 2 (Universe Blvd and School Access Road) – A LOS E is expected during the 2033 AM Build peak hour for 1-stage EB left turns. However, the proposed cross section of Universe Blvd will include a median, which will allow a 2-staged left turn movement for the EB approach. This will improve the LOS to a C or better during both peak hours.
- Intersection 7 (Universe Blvd & Rainbow Blvd intersection) – The intersection is expected to deteriorate to a LOS E in the AM No Build and Build peak hour. However, the proposed development will increase the delay by almost 20 seconds. It can also be noted that the Existing

2022 queue (without the development) exceeds the SB left-turn storage. The City may consider modifying the lane configuration for the SB movement to accommodate the high SB left-turn volumes.

Based on the traffic analysis results, it can be concluded that the Volcano Cliffs development will adversely impact Intersection 7.

Also, from the sight distance analysis performed, it can be concluded that there will be no sight distance issues at the proposed Rosa Parks Rd and Perezoso Dr intersections with Universe Blvd, and the two driveway access points along Universe Blvd.

Recommendations

To mitigate the impacts to Intersection 7, a WB right-turn auxiliary lane with a 200-ft storage and signal optimization are recommended. These mitigations will improve the LOS to a D and maintain a LOS C in the AM and PM peak hours, respectively. No other improvements are recommended for the study area.

INTRODUCTION

This report analyzes the traffic impacts of the proposed Volcano Cliffs subdivision. The subdivision will include 162 townhome units, 192 apartment units, a pharmacy with no drive-through (13,800 GSF), and a commercial building (16,725 GSF). This analysis will determine the traffic impacts of the development and develop mitigations for intersections that are adversely impacted.

PROPOSED DEVELOPMENT

The proposed Volcano Cliffs subdivision will be located in the northwest area of Albuquerque, New Mexico. It will include the developments listed below, which will be built in separate phases. A site plan of the proposed development is provided in **Appendix A**.

- Phase I – 162 townhome units (Opening Year 2023)
- Phase II – 192 apartment units (Opening Year 2025)
- Phase III – 13,800 GSF pharmacy without drive-through and 16,725 GSF commercial building (Opening Year 2027)

The Volcano Cliffs subdivision will be located about 5 miles north of Interstate Highway 40 (IH 40) and about 7 miles west of Interstate Highway 25 (IH 25). The subdivision can be accessed through Universe Blvd, which connects to Paseo Del Norte Blvd. Paseo Del Norte Blvd is a principal arterial that provides direct access to IH 25. Access to IH 40 is also possible through Unser Blvd, a principal arterial east of the Volcano Cliffs subdivision. **Figure 1** (**Appendix B**) identifies the project area in relation to the surrounding roadway network.

Currently the site of the proposed subdivision is vacant. Once the subdivision is built, it will have access to Universe Blvd through driveways and the proposed Rosa Parks Rd and Perezoso Dr cross streets. The subdivision will have two driveways intersecting Universe Blvd, three driveways intersecting Rosa Parks Rd, and one driveway intersecting Perezoso Dr. The characteristics of the main access roads to the subdivision site are presented in **Table 1**.

Table 1 – Access Road Characteristics

Roadway	Number of Lanes	Classification	Speed Limit (mph)
Universe Blvd	2	Minor Arterial	35
Rosa Parks Rd (Proposed)	2	Local Road	30
Perezoso Dr (Proposed)	2	Local Road	25

STUDY AREA

Study Intersections

Major intersections in the vicinity of the project area were investigated for this study. **Table 2** includes the intersections investigated, the numbering used in this report, and the intersection control type. The study intersections are also identified with corresponding intersection numbers in **Figure 1** (**Appendix B**).

Table 2 – Study Intersections Numbering and Control Type

Intersection Numbering	Location	Control Type
1	Universe Blvd & Paseo Del Norte Blvd	Signalized
2	Universe Blvd & School Access Road	Unsignalized
3	Universe Blvd & Rosa Parks Rd	Unsignalized
4	Universe Blvd & Driveway 1	Unsignalized
5	Universe Blvd & Driveway 2	Unsignalized
6	Universe Blvd & Perezoso Dr	Unsignalized
7	Universe Blvd & Rainbow Blvd	Signalized
8	Rosa Parks Rd & Driveway 3	Unsignalized
9	Rosa Parks Rd & Driveway 4	Unsignalized
10	Rosa Parks Rd & Driveway 5	Unsignalized
11	Perezoso Dr & Driveway 6	Unsignalized

Intersection 1 is an existing signalized intersection at Universe Blvd and Paseo Del Norte Blvd. Universe Blvd southbound (SB) and Paseo Del Norte Blvd westbound (WB) include one channelized right-turn lane, one through lane, and one dedicated left-turn auxiliary lane. Universe Blvd northbound (NB) and Paseo Del Norte Blvd eastbound (EB) include one dedicated left-turn auxiliary lane, one through lane, and one right-turn auxiliary lane. All left-turns are permitted-protected.

Intersection 2 is an existing unsignalized intersection at Universe Blvd and an access road to Volcano Vista High School. The NB approach of Universe Blvd includes one auxiliary left-turn lane and one through lane. The SB approach of Universe Blvd includes one shared through/right-turn lane. The EB approach of the driveway includes one wide lane where vehicles separate into a left-turn lane and right-turn lane.

Intersection 3 is an unsignalized intersection at Universe Blvd and Rosa Park Rd. Currently, Rosa Parks Rd is an unpaved road. The Volcano Cliffs subdivision will pave a segment of Rosa Parks Rd east of Universe Blvd and provide a two-lane street (one lane in each direction). The NB and SB directions along Universe Blvd will be free flow, and the WB direction will be stop-controlled.

Intersection 4 is a future unsignalized three-way intersection at Universe Blvd and Driveway 1. The driveway includes one entry and one exit lane to the development. The NB and SB directions along Universe Blvd will be free flow, and the WB direction will be stop-controlled.

Intersection 5 is a future unsignalized three-way intersection at Universe Blvd and Driveway 2. The driveway includes one entry and one exit lane to the development. The NB and SB directions along Universe Blvd will be free flow, and the WB direction will be stop-controlled.

Intersection 6 is an unsignalized intersection at Universe Blvd and Perezoso Dr. Currently, Perezoso Dr is an unpaved road. The Volcano Cliffs subdivision will pave a segment of Perezoso Dr east of Universe Blvd and provide a two-lane road (one lane in each direction). The NB and SB directions along Universe Blvd will be free flow, and the WB direction will be stop-controlled.

Intersection 7 is an existing signalized intersection at Universe Blvd and Rainbow Blvd. Universe Blvd, NB and SB, include one dedicated left-turn auxiliary lane and one shared through/right-turn lane. Rainbow Blvd, EB and WB, include one dedicated left-turn auxiliary lane, one through lane, and one shared through/right-turn lane. All left-turns are permitted-protected.

Intersection 8 is a future unsignalized three-way intersection at Rosa Parks Rd and Driveway 3. The driveway includes one entry and one exit lane to the development. The EB and WB directions along Rosa Parks Rd will be free flow, and the NB direction will be stop-controlled.

Intersection 9 is a future unsignalized three-way intersection at Rosa Parks Rd and Driveway 4. The driveway includes one entry and one exit lane to the development. The EB and WB directions along Rosa Parks Rd will be free flow, and the NB direction will be stop-controlled.

Intersection 10 is a future unsignalized three-way intersection at Rosa Parks Rd and Driveway 5. The driveway includes one entry and one exit lane to the development. The EB and WB directions along Rosa Parks Rd will be free flow, and the NB direction will be stop-controlled.

Intersection 11 is a future unsignalized three-way intersection at Perezoso Dr and Driveway 6. The driveway includes one entry and one exit lane to the development. The EB and WB directions along Perezoso Dr will be free flow, and the SB direction will be stop-controlled.

Adjacent Developments

The proposed project site is primarily surrounded by vacant land east and west of the project site, and residential developments north of the school access road and south of Rainbow Blvd. Volcano Vista High School and Tony Hillerman Middle School are located within a mile northwest of the project site. Ventana Ranch Park, Ventana Ranch Elementary, Sunset View Elementary, James Monroe Middle school, and a small shopping center are located north of Paseo del Norte within about 1.5 miles from the project site.

Future Developments

Four future developments planned in the vicinity of the project site were identified. The developments considered are described below and are labeled in **Figure 1** (**Appendix B**). Two of these developments were under construction during the data collection process, and the other two will be constructed in future years. Therefore, the expected generated trips for all developments will need to be considered in this study.

The traffic studies provided by the City of Albuquerque for the four developments were reviewed to identify the expected trip generation for each. The traffic generated by the developments was distributed through the roadway network and study intersections to consider their impact in the study area. The generated trips considered for the study intersections are presented in **Figures 7** through **10** in **Appendix B**.

- Sonata Apartments
  - Description: 245-unit multi-family residential development on approximately 29.9 acres
  - Location: located along the east side of Universe Blvd, south of Paseo del Norte Blvd
  - Completion Year: 2022
- Trails Tract 1
  - Description: 333 multi-family residential units
  - Location: located in the southwest corner of Paseo del Norte and Woodmont Ave
  - Completion Year: 2022.
- La Cuentista
  - Description: 244-unit single family residential development on approximately 59.08 acres
  - Location: southeast of the Paseo del Norte Blvd and Unser Blvd intersection
  - Completion Year: 2024
- Ventana Ranch Retail Commercial Development
  - Description: 92,240 SF of retail commercial floor space on 11 acres of land
  - Location: northeast corner of the Paseo del Norte Blvd and Universe Blvd intersection
  - Completion Year: 2025

Study Scenarios

For this study, Synchro 11 software was used to analyze the traffic conditions for the following scenarios:

- 2022 Existing Conditions
- Phase I No Build Conditions (Year 2023 without Volcano Cliffs subdivision)
- Phase I Build Conditions (Year 2023 with Volcano Cliffs subdivision)
- Phase II No Build Conditions (Year 2025 without Volcano Cliffs subdivision)
- Phase II Build Conditions (Year 2025 with Volcano Cliffs subdivision)
- Phase III No Build Conditions (Year 2027 without Volcano Cliffs subdivision)
- Phase IIII Build Conditions (Year 2027 with Volcano Cliffs subdivision)

- Horizon Year No Build (Year 2033 without Volcano Cliffs subdivision)
- Horizon Year No Build (Year 2033 with Volcano Cliffs subdivision)

All No Build and Build scenarios will include background traffic growth and the four future developments identified in the previous section.

TRAFFIC VOLUMES

Existing Traffic Volumes

Existing turning movement counts for the three existing project intersections were collected during the AM and PM peak hours on March 16 and 17 of year 2022. The data was collected between the hours of 7 AM to 9 AM and 4 PM to 6 PM for the Universe Blvd & Paseo del Norte Blvd intersection. For the Universe Blvd & School access road and Universe Blvd & Rainbow Blvd intersections, traffic volumes were collected from 6:45 AM to 8:45 AM, and 3:45 PM and 5:45 PM. Turning movement count data is included in the **Appendix C**.

Traffic volumes were analyzed to determine the AM and PM peak hour volumes (PHV) and peak hour factors (PHF). PHVs were calculated by taking the highest four-consecutive 15-minute total volumes for the intersection over their respective hour data collection period. Using this calculated peak hour, corresponding peak hour factors were calculated for each turning movement.

Peak hour factors are a traffic parameter used to describe the relationship between the peak 15-minute flow rate within the peak hour and the total peak hour volume. A high PHF (closer to 1) indicates that traffic is spread out relatively evenly throughout the peak hour. A low PHF (closer to 0) indicates that traffic is concentrated within the peak 15 minutes. **Table 3** shows the peak hour starting time, the peak hour turning movement volumes, and peak hour factors for the AM and PM periods. **Figure 2** in **Appendix B** shows the 2022 AM and PM turning movement volumes for the study intersections. Existing 2022 traffic volumes for Intersections 3 through 6 were determined by balancing traffic volumes between Intersections 2 and 7. Traffic volumes for Intersections 8 through 11 will be zero for all movements since the driveways to the Volcano Cliffs development currently do not exist.

From **Table 3**, it is observed that AM peak hours mainly occurred at 6:45 AM or 7:00 AM. PHFs during the AM period range from 0.39 to 0.87. During the PM period, the PM peak hours mainly occurred at 4:30 PM or 4:45 PM. PHFs during the PM period range from 0.25 to 0.95.

Table 3 – Existing Peak Hour Movements

2022 Existing Peak Hour Movements*																	
Intersection		Peak Hour	Southbound				Westbound				Northbound				Eastbound			
			Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn
1	Universe Blvd & Paseo Del Norte Blvd	AM PH Start	7:00 AM	7:00 AM	7:00 AM	-	7:00 AM	7:00 AM	7:00 AM	-	7:00 AM	7:00 AM	7:00 AM	-	7:00 AM	7:00 AM	7:00 AM	-
		AM PHV	278	455	237	-	71	152	120	-	9	198	89	-	148	333	57	-
		AM PHF	0.869	0.784	0.884	-	0.612	0.691	0.732	-	0.450	0.786	0.586	-	0.841	0.816	0.792	-
		PM PH Start	4:45 PM	4:45 PM	4:45 PM	-	4:45 PM	4:45 PM	4:45 PM	-	4:45 PM	4:45 PM	4:45 PM	-	4:45 PM	4:45 PM	4:45 PM	-
		PM PHV	143	302	252	-	99	321	288	-	6	351	75	-	204	234	5	-
		PM PHF	0.794	0.812	0.955	-	0.798	0.912	0.947	-	0.750	0.852	0.815	-	0.729	0.813	0.625	-
2	Universe Blvd & School Access Road	AM PH Start	6:45 AM	6:45 AM	6:45 AM	-	-	-	-	-	6:45 AM	6:45 AM	6:45 AM	-	6:45 AM	6:45 AM	6:45 AM	-
		AM PHV	0	0	125	-	-	-	-	-	53	0	0	-	11	0	25	-
		AM PHF	0	0	0.473	-	-	-	-	-	0.491	0	0	-	0.393	0	0.446	-
		PM PH Start	4:30PM	4:30PM	4:30 PM	-	-	-	-	-	4:30PM	4:30 PM	4:30 PM	-	4:30 PM	4:30 PM	4:30 PM	-
		PM PHV	0	254	0	-	-	-	-	-	1	402	0	-	2	0	4	-
		PM PHF	0	0.934	0	-	-	-	-	-	0.250	0.922	0	-	0.500	0	0.333	-
7	Universe Blvd & Rainbow Blvd	AM PH Start	6:45 AM	6:45 AM	6:45 AM	-	6:45 AM	6:45 AM	6:45 AM	-	6:45 AM	6:45 AM	6:45 AM	-	6:45 AM	6:45 AM	6:45 AM	-
		AM PHV	524	27	15	-	10	338	165	-	53	40	47	-	2	406	14	-
		AM PHF	0.868	0.750	0.417	-	0.500	0.665	0.859	-	0.491	0.714	0.734	-	0.500	0.775	0.500	-
		PM PH Start	4:30 PM	4:30 PM	4:30 PM	-	4:30 PM	4:30 PM	4:30 PM	-	4:30 PM	4:30 PM	4:30 PM	-	4:30 PM	4:30 PM	4:30 PM	-
		PM PHV	214	45	2	-	58	337	383	-	34	47	10	-	2	221	10	-
		PM PHF	0.836	0.662	0.500	-	0.853	0.896	0.878	-	0.625	0.783	0.850	-	0.500	0.650	0.625	-

* The "-" indicates that there is no traffic for that movement

Background Growth

The study area population and corresponding traffic volumes will continue to grow in future years. To account for future traffic growth, existing traffic counts were projected using a growth rate (GR) and a growth factor (GF). The growth rate is expressed as a percentage of growth over a year. For this study, a 3.1% growth rate was used to forecast existing 2022 traffic to the build-out years 2023, 2025 and 2027, and Horizon year 2033. This growth rate was determined from a linear regression of the historical average weekday daily traffic (AWDT) data obtained from the Mid-Region Council of Governments' (MRCOG) website. The traffic data and linear regression worksheet are provided in **Appendix D.**

In this study, future traffic forecasts were determined using a growth factor, which is dependent on the growth rate. This growth factor is calculated using the equation GF = (1+GR)^n, where n is time in years. The calculated growth factors for 2023, 2025, 2027 and 2033 are 1.03, 1.10, 1.16, and 1.40, respectively. The existing 2022 AM and PM turning movement volumes were multiplied by these growth factors to determine the forecasted turning movements for 2023, 2025, 2027, and 2033. **Figures 3** through **6** in **Appendix B** include the projected peak hour traffic volumes for the 2023, 2025, 2027, and 2033 AM and PM scenarios.

In addition to considering traffic growth expected to occur by population growth, the generated traffic for the four future developments in the vicinity of the project area were included in the analysis years based on their respective completion year. Therefore, only the generated traffic for the Sonata and Trails Track 1 developments was included in the 2023 analysis scenarios. All developments were included in the 2025, 2027, and 2033 analysis scenarios. **Figures 11** through **14** in **Appendix B** include the No Build peak hour traffic volumes for the 2023, 2025, 2027, and 2033 AM and PM scenarios. These volumes were calculated by adding the generated traffic of the four future developments to the projected traffic volumes.

Trip Generation

The number of trips generated by the proposed developments were calculated using the *ITE Trip Generation Manual*, 11th *Edition*. The average trip rates for the peak hour of the adjacent street traffic were used for this study. These trips represent the highest peak hour vehicle trip ends generated by the development for a peak hour between 7 to 9 AM and a peak hour between 4 to 6 PM. The proposed Volcano Cliffs subdivision developments were categorized into four different land uses. The developments were classified as follows:

- Phase I – 162 townhome units → Single-Family Attached Housing (Land Use 215)
- Phase II – 192 apartment units → Multifamily Housing (Low-Rise) (Land Use 220)
- Phase III –
    - 13,800 GSF pharmacy without drive-through → Pharmacy/Drugstore without Drive-Through Window (Land Use 880)
    - 16,725 GSF commercial building (Opening Year 2027) → Strip Retail Plaza (<40K) (Land Use 822)

Trip generation for these developments was calculated using the fitted curve equations for Land Use Codes 215, 220, 822 and 880. The generated trips for the AM and PM peak hour are presented in **Table 4**. Directional distribution for the generated trips were also determined using the *ITE Trip Generation Manual*. The number of vehicles entering and exiting the facilty are also presented in **Table 4**.

Table 4 – Proposed Development Generated Trips

	Single-Family Attached Housing Land Use 215		Multifamily Housing (Low-Rise) Land Use 220		Strip Retail Plaza (<40K) Land Use 822		Pharmacy/Drugstore without Drive-Through Window (Land Use 880	
	AM	PM	AM	PM	AM	PM	AM	PM
TOTAL GENERATED TRIPS	**79**	**93**	**82**	**103**	**40**	**112**	**65**	**117**
% Entering	30%	57%	24%	63%	60%	50%	65%	49%
Trips Entering	24	53	19	65	24	56	42	57
%Exiting	70%	43%	76%	37%	40%	50%	35%	51%
Trips Exiting	55	40	63	38	16	56	23	60

Internal capture and pass-by trips were also considered in this study and are described in the following sections.

Internal Capture

According to the *ITE Trip Generation Handbook 3rd Edition, i*nternal capture occurs at a site when two or more land uses have a possibility of interacting with each other, particullarly where the trip can be made by walking. This can result in the total generation of trips being reduced. Internal capture was considered between the proposed apartments and the pharmacy and commercial developments since they will be directly connected through an internal street system and pedestrian walkways. The methodology outlined in Chapter 6 of the *ITE Trip Generation Handbook 3rd Edition* and the National Cooperative Highway Research Program (NCHRP) 684 Internal Trip Capture Estimation Tool were used to calculate internal capture for these developments. The spreadsheet tool considers the total trip generation of the proposed developments, vehicle occupancy, percent transit/non-motorized trips for entering and exiting traffic, and the distance between the developments. The total generated trips for the commercial development and pharmacy were considered retail trips in the spreadsheet calculations. An average weighted distance between the residential and commercial developments of 865-ft was calculated using the methodology presented in the handbook. Vehicle occupancy and percent transit/non-motorized trips were determined from Table B.2 of the *ITE Trip Generation Handbook*. To be conservative, smaller internal capture percentages than those calculated with the spreadsheet tool were considered for the outbound retail and inbound residential trips for the PM peak hour. The internal capture percentages used in the analysis are presented in **Table 5**. Additional information on the internal capture calculations is provided in **Appendix E**.

Table 5 – Internal Capture Percentages by Land Use

Peak Hour	Land Use	Entering Trips	Exiting Trips
AM Peak Hour	Retail	1%	0%
	Residential	0%	1%
PM Peak Hour	Retail	8%	20%
	Residential	35%	24%

Pass-By Trips

Pass-by trips are defined as intermediate stops on the way from an origin to a primary trip destination without a route diversion. Pass-by trips were considered in this study since the pharmacy and commercial developments are an attractive stop for commuters on Universe Blvd. Pass-by trips were only considered for the Universe Blvd & Rosa Parks Rd and Universe Blvd & Driveway 1 intersections. These two intersections are the access points for the pharmacy and commercial developments.

Using data from the *ITE Trip Generation Handbook 3rd Edition*, pass-by trip volume adjustments for the pharmacy and commercial developments were calculated. A 53% and 40% average pass-by trip adjustment was applied to the PM peak hour generated trips of the pharmacy and commercial development, respectively. Pass-by trips were applied to the trips adjusted by internal capture; however, the number of entering and exiting trips to/from the driveways providing access to the pharmacy and commercial developments were not reduced by the pass-by trips.

Trip Adjustment Summary

Internal capture only affected the trips generated by the apartments, pharmacy, and commercial developments. Pass-by trips only affected trips generated by the pharmacy and commercial developments. The internal capture and pass-by trip adjustments for each development are presented in **Tables 6** through **8**.

Table 6 – Trip Adjustments for Proposed Apartments

Generated Trips	AM Peak Hour		PM Peak Hour	
	Original Generated Trips	Final Trips Adjusted for Internal Capture	Original Generated Trips	Final Trips Adjusted for Internal Capture
Total Trips	82	81	103	71
Entering	19	19	65	42
Exiting	63	62	38	29

Table 7 – Trip Adjustments for Commercial Development

Generated Trips	AM Peak Hour				PM Peak Hour			
	Original Generated Trips	Trips Adjusted for Internal Capture*	Pass-By Trips	Non-Pass-By Trips	Original Generated Trips	Trips Adjusted for Internal Capture	Pass-By Trips	Non-Pass-By Trips
Total Trips	40	40	16	24	112	97	39	58
Entering	24	24	10	14	56	52	21	31
Exiting	16	16	6	10	56	45	18	27

*Internal capture reductions were less than one trip, so they were not considered.

Table 8 – Trip Adjustments for Pharmacy

Generated Trips	AM Peak Hour				PM Peak Hour			
	Original Generated Trips	Trips Adjusted for Internal Capture	Pass-By Trips	Non-Pass-By Trips	Original Generated Trips	Trips Adjusted for Internal Capture	Pass-By Trips	Non-Pass-By Trips
Total Trips	65	64	34	30	117	100	53	47
Entering	42	41	22	19	57	52	28	24
Exiting	23	23*	12	11	60	48	25	23

*Internal capture reductions were less than one trip, so they were not considered.

Trip Distribution

Traffic generated by the proposed developments was distributed and assigned to the study area intersections using the Gravity Model distributions. Population and employment data for years 2016 and 2040 was obtained for all Data Analysis Subzones (DASZ) within a 2-mile radius of the proposed Volcano Cliffs development. The data was obtained from the 2040 Socioeconomic Forecasts by Subareas for the Mid-Region of New Mexico supplied by MRCOG. Population data was used to determine the pharmacy and commercial development trip distributions, while employment data was used to determine the townhome and apartment trip distributions. Population and employment data was interpolated for each of the implementation years (Phase I – 2023, Phase II-2025, and Phase III- 2027). The DASZ were then grouped based on the possible origins/destinations of the trips generated by the proposed Volcano Cliffs development. The figure in **Appendix F** shows the DASZ, possible origins/destinations (A through G), and the percentage of trips of each DASZ in route to/from the destinations/origins (A through G). The trip distribution calculations are also included in **Appendix F**. The following assumptions were also considered for the trip distribution of each driveway:

1. The townhomes will be accessed through the Universe Blvd & Rosa Parks Rd intersection, and Driveways 2, 4 and 5.
2. The apartments will be accessed through the Universe Blvd & Perezoso Dr intersection, and Driveways 1, 2 and 6.
3. The pharmacy and commercial developments will be accessed through Universe Blvd & Rosa Parks Rd intersection, and Driveways 1 and 3.

Considering the Gravity Model distributions and the assumptions mentioned, the trip distributions were assumed and generated trips were calculated for the turning movements. **Figures 15** through **30 (Appendix B)** summarize the inbound and outbound trip distribution and number of generated trips for the study intersections for the AM and PM peak hours. To determine the 2023, 2025, 2027 and 2033 Build traffic volumes, the generated trips of each development were then added to the 2023, 2025, 2027, and 2033 No Build traffic volumes according to opening year of each development. **Figures 31** through **34 (Appendix B)** show the AM and PM peak hour turning movements for the Build scenarios.

TRAFFIC ANALYSIS

Methodology

To determine the traffic impact, the intersection level of service (LOS) and delay were evaluated for the study intersections.

Intersection LOS is a measure of driving conditions and vehicle delay. In addition, the LOS describes the quality of traffic operation on roadway facilities. The traffic capacity of intersections was evaluated to determine the LOS for the AM and PM peak hours. LOS range from A (best) to F (poorest). LOS A, B, and C indicate conditions where traffic can move freely. LOS D describes conditions where delay is noticeable. LOS E and F indicate conditions where traffic volumes are close to capacity or beyond capacity, experiencing significant delays, slow speeds or stop-and-go conditions, and queuing at signalized intersections. **Table 9** outlines the LOS definitions for signalized and unsignalized intersections as defined in the Highway Capacity Manual.

Table 9 – Level of Service Standards

LOS	Signalized Intersection Delay (sec)	Unsignalized Intersection Delay (sec)	Traffic Flow Characteristics
A	<10	0-10	Virtually free flow, completely unimpeded
B	>10-20	>10-15	Stable Flow with slight delays, less freedom to maneuver
C	>20-35	>15-25	Stable flow with delays, less freedom to maneuver
D	>35-55	>25-35	High density, but stable flow
E	>55-80	>35-50	Operating conditions at or near capacity, unstable flow
F	>80	>50	Forced flow, breakdown conditions

< indicates less than > indicates greater than

Intersection delay is calculated by taking a weighted average of the total delays for each intersection lane group. Total delay includes queue delay and delay from stopping for signalized intersections.

Intersection delay for unsignalized intersections does not include queue delay. Using this intersection delay, a LOS value is assigned to the intersection.

For this study, Synchro 11 software was used to analyze the traffic conditions for the following scenarios:

- 2022 Existing Conditions
- Phase I No Build Conditions (Year 2023 without Volcano Cliffs subdivision)
- Phase I Build Conditions (Year 2023 with Volcano Cliffs subdivision)
- Phase II No Build Conditions (Year 2025 without Volcano Cliffs subdivision)
- Phase II Build Conditions (Year 2025 with Volcano Cliffs subdivision)
- Phase III No Build Conditions (Year 2027 without Volcano Cliffs subdivision)
- Phase IIII Build Conditions (Year 2027 with Volcano Cliffs subdivision)
- Horizon Year No Build (Year 2033 without Volcano Cliffs subdivision)
- Horizon Year No Build (Year 2033 with Volcano Cliffs subdivision)

Traffic Analysis Results

The LOS and delay for all scenarios were calculated using the HCM 6th edition methodology included in Synchro Version 11. These parameters are summarized in **Tables 10** through **20** for both AM and PM peak hours. The volume to capacity (v/c) ratio and 95th percentile queue length are also included in the tables. Detailed results are included in the following appendices:

- **Appendix G** – Existing
- **Appendix H** – Phase I 2023, No Build
- **Appendix I** – Phase I 2023, Build
- **Appendix J** – Phase II 2025, No Build
- **Appendix K** – Phase II 2025, Build
- **Appendix L** – Phase III 2027, No Build
- **Appendix M** – Phase III 2027, Build
- **Appendix N** – Horizon 2033, No Build
- **Appendix O** – Horizon 2033, Build
- **Appendix P** – Mitigation 2033

Table 10 summarizes the intersection LOS, approach LOS, 95th percentile queue length, and volume to capacity (v/c) ratio for all traffic movements of the signalized Intersection 1. The results are presented for the Existing, Phase I, Phase II, Phase III, and Horizon year AM and PM peak hours of the No Build and Build scenarios. Based on the analysis results, Intersection 1 is expected to fail in future years even without the proposed Volcano Cliffs development. It can be noted that the proposed development will only increase the intersection delay by less than one second. Minimal impacts are also observed for the 95th percentile queue and v/c ratio. Therefore, no recommendations are made for Intersection 1. The City may consider optimizing the signal timing in the future to improve the intersection delay. **Table 10** also shows the approximate left-turn and right turn auxiliary lane storage lengths in the top row. It can be noted that the EB and SB left-turn and NB right-turn auxiliary lane storage lengths are exceeded in the No Build conditions. The City may consider increasing the storage length for these movements to accommodate the turning traffic.

Table 10 – Intersection 1 Traffic Analysis Results

INTERSECTION		PK HR	SCENARIO	INTERSECTION		APPROACH LOS				95th PERCENTILE QUEUE										V/C RATIO									
				LOS	DELAY	EB	WB	NB	SB	EBL (70')	EBT	EBR (70')	WBL (160')	WBT	WBR	NBL (125')	NBT	NBR (35')	SBL (295')	SBT	SBR (295')	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	Universe Blvd & Paseo Del Norte Blvd	AM	Existing 2022	C	31.4	D	E	B	B	120	#377	0	61	259	-	9	169	0	169	359	41	0.67	0.86	0.15	0.53	0.91	-	0.06	0.35	0.21	0.53	0.61	0.28
			Phase 1-No Build 2023	D	42.5	E	E	B	B	136	#514	0	77	#330	-	10	175	37	175	375	42	0.75	1.05	0.15	0.71	1.01	-	0.08	0.37	0.37	0.56	0.66	0.31
			Phase 1- Build 2023	D	43.0	E	E	B	B	136	#514	1	83	#330	-	11	176	50	175	377	42	0.75	1.06	0.15	0.75	1.01	-	0.09	0.37	0.42	0.56	0.66	0.31
			Phase 2-No Build 2025	E	56.6	F	F	B	C	#179	#564	3	80	#408	-	10	192	41	195	416	51	0.81	1.13	0.16	0.73	0.12	-	0.09	0.41	0.39	0.64	0.71	0.34
			Phase 2- Build 2025	E	57.2	F	F	C	C	#178	#564	4	90	#408	-	11	196	67	195	419	51	0.81	1.14	0.17	0.82	0.12	-	0.11	0.42	0.49	0.64	0.72	0.34
			Phase 3-No Build 2027	E	64.7	F	F	C	C	#197	#600	6	83	#438	-	11	203	44	207	448	59	0.84	1.18	0.17	0.76	1.27	-	0.11	0.43	0.41	0.69	0.75	0.36
			Phase 3- Build 2027	E	65.4	F	F	C	C	#195	#600	12	94	#438	-	11	207	72	207	461	61	0.84	1.2	0.19	0.85	1.27	-	0.14	0.44	0.51	0.69	0.76	0.36
			Future - No Build 2033	F	101.4	F	F	C	C	#263	#741	17	95	#551	-	11	246	58	#324	#615	102	0.94	1.41	0.21	0.86	1.54	-	0.21	0.53	0.46	0.91	0.91	0.43
			Future - Build 2033	F	101.5	F	F	C	C	#263	#741	22	107	#551	-	13	250	88	#329	#657	105	0.94	1.41	0.23	0.97	1.54	-	0.24	0.54	0.57	0.91	0.92	0.43
		PM	Existing 2022	D	47.1	E	E	D	C	#235	201	0	67	#692	-	11	#369	29	113	278	56	1.10	0.40	0.01	0.25	1.01	-	0.02	0.78	0.18	0.64	0.51	0.34
			Phase 1-No Build 2023	E	61.6	E	F	D	C	#254	250	0	105	#855	-	13	#404	61	116	290	58	1.16	0.51	0.02	0.45	1.16	-	0.03	0.81	0.27	0.69	0.53	0.36
			Phase 1- Build 2023	E	61.3	E	F	D	C	#254	250	0	116	#855	-	14	#406	73	116	293	58	1.16	0.51	0.02	0.5	1.16	-	0.04	0.81	0.31	0.69	0.53	0.36
			Phase 2-No Build 2025	F	95.4	F	F	D	C	#313	629	0	110	#1070	-	13	#462	65	#181	319	61	1.32	0.55	0.02	0.49	1.37	-	0.04	0.91	0.29	0.88	0.58	0.39
			Phase 2- Build 2025	F	94.2	F	F	D	C	#311	269	0	130	#1070	-	14	#467	87	#181	324	61	1.32	0.55	0.02	0.58	1.37	-	0.05	0.91	0.35	0.88	0.61	0.4
			Phase 3-No Build 2027	F	106.8	F	F	E	C	#335	282	0	114	#1131	-	13	#498	69	#195	338	62	1.39	0.57	0.02	0.53	1.44	62	0.04	0.96	0.3	0.91	0.61	0.41
			Phase 3- Build 2027	F	105.6	F	F	E	C	#334	282	0	136	#1131	-	21	#521	93	#195	360	63	1.39	0.58	0.04	0.63	1.44	63	0.09	0.99	0.37	0.91	0.66	0.42
			Horizon - No Build 2033	F	157.4	F	F	F	D	#426	340	0	129	#1375	-	14	#648	84	#262	425	88	1.65	0.68	0.02	0.69	1.68	-	0.07	1.16	0.35	1.08	0.76	0.48
			Horizon - Build 2033	F	156.5	F	F	F	D	#424	340	0	152	#1375	-	22	#669	109	#262	#482	100	1.65	0.69	0.04	0.81	1.68	-	0.14	1.19	0.41	1.08	0.82	0.5

- Indicates that the volume for the 95th percentile cycle exceeds capacity.

Table 11 summarizes the intersection LOS, approach LOS, 95th percentile queue length, and volume to capacity (v/c) ratio for all traffic movements of the unsignalized Intersection 2. The results are presented for the Existing, Phase I, Phase II, Phase III, and Horizon year AM and PM peak hours of the No Build and Build scenarios. The three-way intersection is stop controlled in the EB direction, and free flow in the NB and SB directions; therefore, Synchro only evaluates the EB approach and NB left-turn movement. The LOS E for the Horizon 2033 AM peak hour scenario is based on a single stage left turn movement. Since the proposed cross section of Universe Blvd will include a median, a 2-staged left turn movement will be allowed for the EB approach. This will improve the LOS to a C in the AM peak. Therefore, no recommendations are made for Intersection 2. The Synchro results for the2- staged left turn analysis are provided in **Appendix P**.

Table 11 – Intersection 2 Traffic Analysis Results

INTERSECTION		PK HR	SCENARIO	INTERSECTION		APPROACH LOS				95th PERCENTILE QUEUE												V/C RATIO											
				LOS	DELAY	EB	WB	NB	SB	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Universe & School Driveway	AM	Existing 2022	-	-	C	-	-	-	10	-	10	-	-	-	12.5	-	-	-	-	-	0.117	-	0.109	-	-	-	0.138	-	-	-	-	-
			Phase 1-No Build 2023	-	-	C	-	-	-	12.5	-	10	-	-	-	12.5	-	-	-	-	-	0.141	-	0.12	-	-	-	0.15	-	-	-	-	-
			Phase 1- Build 2023	-	-	C	-	-	-	12.5	-	10	-	-	-	15	-	-	-	-	-	0.154	-	0.127	-	-	-	0.157	-	-	-	-	-
			Phase 2-No Build 2025	-	-	C	-	-	-	15	-	12.5	-	-	-	15	-	-	-	-	-	0.174	-	0.137	-	-	-	0.17	-	-	-	-	-
			Phase 2- Build 2025	-	-	C	-	-	-	20	-	12.5	-	-	-	17.5	-	-	-	-	-	0.208	-	0.152	-	-	-	0.188	-	-	-	-	-
			Phase 3-No Build 2027	-	-	C	-	-	-	17.5	-	12.5	-	-	-	17.5	-	-	-	-	-	0.193	-	0.149	-	-	-	0.186	-	-	-	-	-
			Phase 3- Build 2027	-	-	C	-	-	-	22.5	-	15	-	-	-	20	-	-	-	-	-	0.24	-	0.179	-	-	-	0.212	-	-	-	-	-
			Horizon - No Build 2033	-	-	D	-	-	-	37.5	-	20	-	-	-	27.5	-	-	-	-	-	0.363	-	0.217	-	-	-	0.269	-	-	-	-	-
			Horizon - Build 2033	-	-	E	-	-	-	47.5	-	25	-	-	-	32.5	-	-	-	-	-	0.461	-	0.256	-	-	-	0.302	-	-	-	-	-
		PM	Existing 2022	-	-	B	-	-	-	0	-	0	-	-	-	0	-	-	-	-	-	0.011	-	0.016	-	-	-	0.003	-	-	-	-	-
			Phase 1-No Build 2023	-	-	B	-	-	-	2.5	-	2.5	-	-	-	0	-	-	-	-	-	0.018	-	0.02	-	-	-	0.006	-	-	-	-	-
			Phase 1- Build 2023	-	-	B	-	-	-	2.5	-	2.5	-	-	-	0	-	-	-	-	-	0.019	-	0.03	-	-	-	0.013	-	-	-	-	-
			Phase 2-No Build 2025	-	-	B	-	-	-	2.5	-	2.5	-	-	-	0	-	-	-	-	-	0.019	-	0.021	-	-	-	0.006	-	-	-	-	-
			Phase 2- Build 2025	-	-	B	-	-	-	2.5	-	2.5	-	-	-	2.5	-	-	-	-	-	0.023	-	0.041	-	-	-	0.017	-	-	-	-	-
			Phase 3-No Build 2027	-	-	B	-	-	-	2.5	-	2.5	-	-	-	0	-	-	-	-	-	0.02	-	0.022	-	-	-	0.007	-	-	-	-	-
			Phase 3- Build 2027	-	-	B	-	-	-	5	-	2.5	-	-	-	2.5	-	-	-	-	-	0.028	-	0.053	-	-	-	0.035	-	-	-	-	-
			Horizon - No Build 2033	-	-	B	-	-	-	2.5	-	2.5	-	-	-	0	-	-	-	-	-	0.026	-	0.028	-	-	-	0.007	-	-	-	-	-
			Horizon - Build 2033	-	-	B	-	-	-	2.5	-	5	-	-	-	2.5	-	-	-	-	-	0.036	-	0.063	-	-	-	0.037	-	-	-	-	-

Table 12 through **15** summarize the intersection LOS, approach LOS, 95th percentile queue length, and volume to capacity (v/c) ratio for all traffic movements of unsignalized Intersections 3 through 6. The results are presented for the Existing, Phase I, Phase II, Phase III, and Horizon year AM and PM peak hours of the No Build and Build scenarios. The three-way intersections are stop controlled in the WB direction, and free flow in the NB and SB directions; therefore, Synchro only evaluates the WB approach and SB left-turn movement. It can be noted that all scenarios evaluated meet the minimum acceptable LOS standard (LOS D or better); therefore, no recommendations are made for Intersections 3 through 6.

Table 12 – Intersection 3 Traffic Analysis Results

INTERSECTION		PK HR	SCENARIO	INTERSECTION		APPROACH LOS				95th PERCENTILE QUEUE										V/C RATIO									
				LOS	DELAY	EB	WB	NB	SB	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
3	Universe Blvd & Rosa Parks Rd	AM	Existing 2022	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1-No Build 2023	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1- Build 2023	-	-	-	B	-	-	-	-	-	5	-	-	-	-	-	0	-	-	-	-	-	0.056	-	-	-	-	-	0.009	-	-
			Phase 2-No Build 2025	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2- Build 2025	-	-	-	B	-	-	-	-	-	5	-	-	-	-	-	0	-	-	-	-	-	0.062	-	-	-	-	-	0.01	-	-
			Phase 3-No Build 2027	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 3- Build 2027	-	-	-	B	-	-	-	-	-	10	-	-	-	-	-	2.5	-	-	-	-	-	0.128	-	-	-	-	-	0.025	-	-
			Future - No Build 2033	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Future - Build 2033	-	-	-	C	-	-	-	-	-	15	-	-	-	-	-	2.5	-	-	-	-	-	0.159	-	-	-	-	-	0.026	-	-
		PM	Existing 2022	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1-No Build 2023	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1- Build 2023	-	-	-	B	-	-	-	-	-	2.5	-	-	-	-	-	2.5	-	-	-	-	-	0.047	-	-	-	-	-	0.023	-	-
			Phase 2-No Build 2025	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2- Build 2025	-	-	-	B	-	-	-	-	-	5	-	-	-	-	-	2.5	-	-	-	-	-	0.052	-	-	-	-	-	0.024	-	-
			Phase 3-No Build 2027	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 3- Build 2027	-	-	-	C	-	-	-	-	-	20	-	-	-	-	-	5	-	-	-	-	-	0.225	-	-	-	-	-	0.057	-	-
			Future - No Build 2033	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Future - Build 2033	-	-	-	C	-	-	-	-	-	27.5	-	-	-	-	-	5	-	-	-	-	-	0.279	-	-	-	-	-	0.063	-	-

Table 13 – Intersection 4 Traffic Analysis Results

INTERSECTION		PK HR	SCENARIO	INTERSECTION		APPROACH LOS				95th PERCENTILE QUEUE													V/C RATIO											
				LOS	DELAY	EB	WB	NB	SB	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
4	Universe Blvd & Driveway 1	AM	Existing 2022	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1-No Build 2023	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1- Build 2023	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2-No Build 2025	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2- Build 2025	-	-	-	B	-	-	-	-	-	5	-	-	-	-	-	0	-	-	-	-	-	0.057	-	-	-	-	-	0.003	-	-
			Phase 3-No Build 2027	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 3- Build 2027	-	-	-	C	-	-	-	-	-	10	-	-	-	-	-	2.5	-	-	-	-	-	0.128	-	-	-	-	-	0.019	-	-
			Future - No Build 2033	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Future - Build 2033	-	-	-	C	-	-	-	-	-	15	-	-	-	-	-	2.5	-	-	-	-	-	0.161	-	-	-	-	-	0.019	-	-
		PM	Existing 2022	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1-No Build 2023	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1- Build 2023	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2-No Build 2025	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2- Build 2025	-	-	-	B	-	-	-	-	-	2.5	-	-	-	-	-	0	-	-	-	-	-	0.032	-	-	-	-	-	0.01	-	-
			Phase 3-No Build 2027	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 3- Build 2027	-	-	-	C	-	-	-	-	-	25.7	-	-	-	-	-	2.5	-	-	-	-	-	0.191	-	-	-	-	-	0.042	-	-
			Horizon - No Build 2033	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Horizon - Build 2033	-	-	-	C	-	-	-	-	-	22.5	-	-	-	-	-	2.5	-	-	-	-	-	0.237	-	-	-	-	-	0.047	-	-

Table 14 – Intersection 5 Traffic Analysis Results

NTERSECTION		PK HR	SCENARIO	INTERSECTION		APPROACH LOS				95th PERCENTILE QUEUE												V/C RATIO											
				LOS	DELAY	EB	WB	NB	SB	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
5	Universe Blvd & Driveway 2	AM	Existing 2022	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1-No Build 2023	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1- Build 2023	-	-	-	C	-	-	-	-	-	5	-	-	-	-	-	0	-	-	-	-	-	0.073	-	-	-	-	-	0.002	-	-
			Phase 2-No Build 2025	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2- Build 2025	-	-	-	C	-	-	-	-	-	15	-	-	-	-	-	0	-	-	-	-	-	0.162	-	-	-	-	-	0.007	-	-
			Phase 3-No Build 2027	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 3- Build 2027	-	-	-	C	-	-	-	-	-	15	-	-	-	-	-	0	-	-	-	-	-	0.176	-	-	-	-	-	0.007	-	-
			Horizon - No Build 2033	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Horizon - Build 2033	-	-	-	C	-	-	-	-	-	20	-	-	-	-	-	0	-	-	-	-	-	0.225	-	-	-	-	-	0.007	-	-
		PM	Existing 2022	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1-No Build 2023	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1- Build 2023	-	-	-	C	-	-	-	-	-	5	-	-	-	-	-	0	-	-	-	-	-	0.055	-	-	-	-	-	0.008	-	-
			Phase 2-No Build 2025	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2- Build 2025	-	-	-	C	-	-	-	-	-	7.5	-	-	-	-	-	2.5	-	-	-	-	-	0.097	-	-	-	-	-	0.02	-	-
			Phase 3-No Build 2027	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 3- Build 2027	-	-	-	C	-	-	-	-	-	10	-	-	-	-	-	2.5	-	-	-	-	-	0.116	-	-	-	-	-	0.022	-	-
			Horizon - No Build 2033	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Horizon - Build 2033	-	-	-	C	-	-	-	-	-	12.5	-	-	-	-	-	2.5	-	-	-	-	-	0.145	-	-	-	-	-	0.024	-	-

Table 15 – Intersection 6 Traffic Analysis Results

INTERSECTION		PK HR	SCENARIO	INTERSECTION		APPROACH LOS				95th PERCENTILE QUEUE										V/C RATIO									
				LOS	DELAY	EB	WB	NB	SB	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
6	Universe Blvd & Perezoso Rd	AM	Existing 2022	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1-No Build 2023	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1- Build 2023	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2-No Build 2025	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2- Build 2025	-	-	-	B	-	-	-	-	-	2.5	-	-	-	-	-	0	-	-	-	-	-	0.024	-	-	-	-	-	0.002	-	-
			Phase 3-No Build 2027	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 3- Build 2027	-	-	-	B	-	-	-	-	-	2.5	-	-	-	-	-	0	-	-	-	-	-	0.026	-	-	-	-	-	0.002	-	-
			Horizon - No Build 2033	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Horizon - Build 2033	-	-	-	C	-	-	-	-	-	2.5	-	-	-	-	-	0	-	-	-	-	-	0.033	-	-	-	-	-	0.002	-	-
		PM	Existing 2022	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1-No Build 2023	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1- Build 2023	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2-No Build 2025	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2- Build 2025	-	-	-	B	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0.01	-	-	-	-	-	0.004	-	-
			Phase 3-No Build 2027	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 3- Build 2027	-	-	-	B	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0.011	-	-	-	-	-	0.005	-	-
			Horizon - No Build 2033	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Horizon - Build 2033	-	-	-	C	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0.014	-	-	-	-	-	0.005	-	-

Table 16 summarizes the intersection LOS, approach LOS, 95th percentile queue length, and volume to capacity (v/c) ratio for all traffic movements of the signalized Intersection 7. The results are presented for the Existing, Phase I, Phase II, Phase III, and Horizon year AM and PM peak hours of the No Build and Build scenarios. Based on the analysis results, Intersection 7 will only exceed the minimum LOS D standard in the Horizon 2033 AM peak hour for the No Build and Build scenarios. However, the Build scenario will increase the delay by almost 20 seconds. To mitigate these impacts, a WB right-turn auxiliary lane with a 200-ft storage and signal optimization are recommended. This will improve the LOS to a C and maintain a LOS C in the AM and PM peak hour, respectively. It can also be noted that the Existing 2022 queue exceeds the SB left-turn storage. The City may consider modifying the lane configuration for the SB movement to accommodate the high SB left-turn volumes.

Table 16 – Intersection 7 Traffic Analysis Results

INTERSECTION		PK HR	SCENARIO	INTERSECTION		APPROACH LOS				95th PERCENTILE QUEUE										V/C RATIO									
				LOS	DELAY	EB	WB	NB	SB	EBL 120'	EBT	EBR	WBL 130'	WBT	WBR	NBL 80'	NBT	NBR	SBL 100'	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
7	Universe Blvd & Rainbow Blvd	AM	Existing 2022	C	28	D	D	B	B	4	168	-	12	162	-	33	63	-	374	34	-	0.02	0.64	-	0.1	0.75	-	0.2	0.22	-	0.68	0.08	-
			Phase 1-No Build 2023	C	29	D	C	B	B	5	186	-	12	172	-	35	67	-	#522	36	-	0.04	0.67	-	0.11	0.75	-	0.26	0.31	-	0.73	0.09	-
			Phase 1- Build 2023	C	29.3	D	C	C	C	6	185	-	12	173	-	35	68	-	#623	38	-	0.05	0.67	-	0.11	0.76	-	0.28	0.35	-	0.76	0.09	-
			Phase 2-No Build 2025	C	30	D	C	C	C	5	192	-	12	178	-	39	71	-	#677	41	-	0.04	0.67	-	0.11	0.76	-	0.3	0.37	-	0.81	0.1	-
			Phase 2- Build 2025	C	31.4	C	C	C	C	7	188	-	11	178	-	40	75	-	#761	43	-	0.06	0.66	-	0.11	0.77	-	0.3	0.38	-	0.88	0.11	-
			Phase 3-No Build 2027	C	31.7	C	C	C	C	5	196	-	12	184	-	42	78	-	#753	44	-	0.04	0.68	-	0.12	0.77	-	0.32	0.4	-	0.88	0.11	-
			Phase 3- Build 2027	D	36.4	C	C	C	D	8	193	-	12	187	-	43	83	-	#841	48	-	0.09	0.64	-	0.11	0.8	-	0.32	0.42	-	0.98	0.13	-
			Horizon - No Build 2033	E	59.4	C	C	C	F	5	236	-	13	226	-	50	95	-	#863	53	-	0.04	0.73	-	0.14	0.81	-	0.37	0.47	-	1.22	0.15	-
			Horizon - Build 2033	E	78.2	C	C	C	F	8	236	-	13	233	-	50	101	-	#940	57	-	0.09	0.68	-	0.13	0.82	-	0.37	0.5	-	1.37	0.17	-
			2033 Mitigation	D	53.9	E	D	D	E	14	405	-	24	321	136	49	147	-	#1009	50	-	0.12	0.90		0.25	0.83	0.51	0.39	0.45	-	1.03	0.12	-
		PM	Existing 2022	C	21.4	C	C	B	B	4	85	-	45	193	-	10	55	-	116	37	-	0.02	0.51	-	0.22	0.73	-	0.02	0.13	-	0.33	0.07	-
			Phase 1-No Build 2023	C	22.2	C	C	B	B	5	98	-	47	245	-	10	59	-	128	38	-	0.04	0.5	-	0.22	0.76	-	0.03	0.15	-	0.38	0.08	-
			Phase 1- Build 2023	C	21.8	C	C	B	B	6	98	-	47	251	-	10	62	-	136	39	-	0.05	0.48	-	0.21	0.75	-	0.03	0.17	-	0.41	0.09	-
			Phase 2-No Build 2025	C	21.1	C	C	B	B	5	104	-	48	269	-	10	66	-	136	40	-	0.04	0.44	-	0.21	0.72	-	0.03	0.19	-	0.44	0.1	-
			Phase 2- Build 2025	C	21.4	C	C	B	B	7	104	-	48	269	-	10	71	-	151	42	-	0.06	0.45	-	0.21	0.73	-	0.03	0.21	-	0.48	0.1	-
			Phase 3-No Build 2027	C	21.1	C	C	B	B	5	110	-	51	#322	-	11	70	-	144	43	-	0.03	0.44	-	0.22	0.73	-	0.04	0.22	-	0.48	0.11	-
			Phase 3- Build 2027	C	21.7	C	C	C	B	8	110	-	51	#355	-	11	77	-	167	45	-	0.07	0.44	-	0.22	0.77	-	0.04	0.25	-	0.54	0.12	-
			Horizon - No Build 2033	C	25.4	C	C	C	C	5	131	-	59	#448	-	12	86	-	174	49	-	0.04	0.53	-	0.29	0.87	-	0.05	0.29	-	0.57	0.13	-
			Horizon - Build 2033	C	27.1	C	C	C	C	8	131	-	59	#483	-	12	93	-	199	52	-	0.07	0.53	-	0.29	0.91	-	0.05	0.32	-	0.64	0.14	-
			2033 Mitigation	C	21.4	C	B	C	B	8	131	-	59	#345	64	12	93	-	199	52	-	0.06	0.53	-	0.29	0.70	0.50	0.05	0.32	-	0.64	0.14	-

Table 17 through **20** summarize the intersection LOS, approach LOS, 95th percentile queue length, and volume to capacity (v/c) ratio for all traffic movements of unsignalized Intersections 8 through 11. The results are presented for the Existing, Phase I, Phase II, Phase III, and Horizon year AM and PM peak hours of the No Build and Build scenarios. The three-way intersections are stop controlled in the NB or SB direction, and free flow in the EB and WB directions; therefore, Synchro only evaluates the NB approach and WB left-turn movement, or SB approach and EB left-turn movement. It can be noted that all scenarios evaluated meet the minimum acceptable LOS standard (LOS D or better); therefore, no recommendations are made for Intersections 8 through 11.

Table 17 – Intersection 8 Traffic Analysis Results

INTERSECTION		PK HR	SCENARIO	INTERSECTION		APPROACH LOS				95th PERCENTILE QUEUE												V/C RATIO											
				LOS	DELAY	EB	WB	NB	SB	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
8	Rosa Parks Rd & Driveway 3	AM	Existing 2022	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1-No Build 2023	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1- Build 2023	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2-No Build 2025	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2- Build 2025	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 3-No Build 2027	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 3- Build 2027	-	-	-	-	A	-	-	-	-	0	-	-	2.5	-	-	-	-	-	-	-	-	-	-	-	-	0.03	-	-	-	-	-
			Horizon - No Build 2033	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Horizon - Build 2033	-	-	-	-	A	-	-	-	-	0	-	-	2.5	-	-	-	-	-	-	-	-	-	-	-	-	0.03	-	-	-	-	-
		PM	Existing 2022	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1-No Build 2023	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1- Build 2023	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2-No Build 2025	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2- Build 2025	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 3-No Build 2027	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 3- Build 2027	-	-	-	-	A	-	-	-	-	0	-	-	5	-	-	-	-	-	-	-	-	-	-	-	0.015	-	-	0.058	-	-	-	-
			Horizon - No Build 2033	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Horizon - Build 2033	-	-	-	-	A	-	-	-	-	0	-	-	5	-	-	-	-	-	-	-	-	-	-	-	0.015	-	-	0.058	-	-	-	-

Table 18 – Intersection 9 Traffic Analysis Results

ERSECTION		PK HR	SCENARIO	INTERSECTION		APPROACH LOS				95th PERCENTILE QUEUE												V/C RATIO											
				LOS	DELAY	EB	WB	NB	SB	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
9	Rosa Parks Rd & Driveway 4	AM	Existing 2022	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1-No Build 2023	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1- Build 2023	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2-No Build 2025	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2- Build 2025	-	-	-	-	A	-	-	-	-	0	-	-	2.5	-	-	-	-	-	-	-	-	-	-	-	-	0.017	-	-	-	-	-
			Phase 3-No Build 2027	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 3- Build 2027	-	-	-	-	A	-	-	-	-	0	-	-	2.5	-	-	-	-	-	-	-	-	-	-	-	-	0.017	-	-	-	-	-
			Horizon - No Build 2033	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Horizon - Build 2033	-	-	-	-	A	-	-	-	-	0	-	-	2.5	-	-	-	-	-	-	-	-	-	-	-	-	0.017	-	-	-	-	-
		PM	Existing 2022	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1-No Build 2023	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1- Build 2023	-	-	-	-	A	-	-	-	-	0	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0.012	-	-	-	-	-
			Phase 2-No Build 2025	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2- Build 2025	-	-	-	-	A	-	-	-	-	0	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0.012	-	-	-	-	-
			Phase 3-No Build 2027	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 3- Build 2027	-	-	-	-	A	-	-	-	-	0	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0.012	-	-	-	-	-
			Horizon - No Build 2033	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Horizon - Build 2033	-	-	-	-	A	-	-	-	-	0	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0.012	-	-	-	-	-

Table 19 – Intersection 10 Traffic Analysis Results

INTERSECTION		PK HR	SCENARIO	INTERSECTION		APPROACH LOS				95th PERCENTILE QUEUE										V/C RATIO									
				LOS	DELAY	EB	WB	NB	SB	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
10	Rosa Parks Rd & Driveway 5	AM	Existing 2022	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1-No Build 2023	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1- Build 2023	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2-No Build 2025	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2- Build 2025	-	-	-	-	A	-	-	-	-	0	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0.016	-	-	-	-	-
			Phase 3-No Build 2027	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 3- Build 2027	-	-	-	-	A	-	-	-	-	0	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0.016	-	-	-	-	-
			Horizon - No Build 2033	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Horizon - Build 2033	-	-	-	-	A	-	-	-	-	0	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0.016	-	-	-	-	-
		PM	Existing 2022	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1-No Build 2023	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1- Build 2023	-	-	-	-	A	-	-	-	-	0	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0.011	-	-	-	-	-
			Phase 2-No Build 2025	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2- Build 2025	-	-	-	-	A	-	-	-	-	0	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0.011	-	-	-	-	-
			Phase 3-No Build 2027	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 3- Build 2027	-	-	-	-	A	-	-	-	-	0	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0.011	-	-	-	-	-
			Horizon - No Build 2033	-	-	-	-	A	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Horizon - Build 2033	-	-	-	-	A	-	-	-	-	0	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0.011	-	-	-	-	-

Table 20 – Intersection 11 Traffic Analysis Results

NTERSECTION		PK HR	SCENARIO	INTERSECTION		APPROACH LOS				95th PERCENTILE QUEUE										V/C RATIO											
				LOS	DELAY	EB	WB	NB	SB	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
11	Perezoso Dr & Driveway 6	AM	Existing 2022	-	-	-	-	-	A	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1-No Build 2023	-	-	-	-	-	A	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1- Build 2023	-	-	-	-	-	A	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2-No Build 2025	-	-	-	-	-	A	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2- Build 2025	-	-	-	-	-	A	0	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	0.009	-	-
			Phase 3-No Build 2027	-	-	-	-	-	A	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 3- Build 2027	-	-	-	-	-	A	0	-	-	-	-	-	-	-	-	0	-	-	0.002	-	-	-	-	-	-	-	-	0.009	-	-
			Horizon - No Build 2033	-	-	-	-	-	A	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Horizon - Build 2033	-	-	-	-	-	A	0	-	-	-	-	-	-	-	-	0	-	-	0.002	-	-	-	-	-	-	-	-	0.009	-	-
		PM	Existing 2022	-	-	-	-	-	A	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1- Build 2023	-	-	-	-	-	A	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2-No Build 2025	-	-	-	-	-	A	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2- Build 2025	-	-	-	-	-	A	0	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	0.004	-	-
			Phase 3-No Build 2027	-	-	-	-	-	A	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 3- Build 2027	-	-	-	-	-	A	0	-	-	-	-	-	-	-	-	0	-	-	0.005	-	-	-	-	-	-	-	-	0.004	-	-
			Horizon - No Build 2033	-	-	-	-	-	A	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Horizon - Build 2033	-	-	-	-	-	A	0	-	-	-	-	-	-	-	-	-	-	-	0.005	-	-	-	-	-	-	-	-	0.004	-	-

INTERSECTION SIGHT DISTANCE

The ability of drivers to safely maneuver turns from the proposed development to Universe Blvd was analyzed. Areas near the intersection should be clear of obstructions that might block a driver's view of potentially conflicting vehicles. These areas are known as clear sight triangles. The sight triangle leg dimensions depend on the design speeds of the intersecting roadways and the type of traffic control used at the intersection.

The sight distance was evaluated for the minor roads intersecting Universe Blvd (Rosa Parks Rd, Driveway 1, Driveway 2, and Perezoso Dr). AASHTO's *A Policy on Geometric Design of Highways and Streets, 2018 7th Edition* methodology was followed in the sight distance evaluation. The sight distance is affected by the type of stop control and speed along the major roadway (Universe Blvd). For the intersections evaluated, the control type can be classified as a Case B – "Intersection with stop control on the minor road". The existing speed along the major road, Universe Blvd is 35 miles per hour (mph). In the case for right turns from a minor road to a major road, the departure sight triangle distance for traffic approaching from the left is 490 ft for trucks and passenger cars. In the case for left turns from a minor road to a major road, the departure sight triangle distance for traffic approaching from the right is 440 ft. **Figure 35** shows the sight distance triangles for right turns at all four intersections. **Figure 36** shows the sight distance triangles for left turns at all four intersections. The sight triangles are also presented in **Appendix Q. Figure 37** shows the street view from the proposed intersections for vehicles turning left and right. Currently, from the point of departure at the evaluated intersections, there are no obstructions that might block a driver's view of approaching vehicles. It is recommended that a driver's view be considered when making improvements to Universe Blvd. No obstructions should be placed within the driver's sight distance.

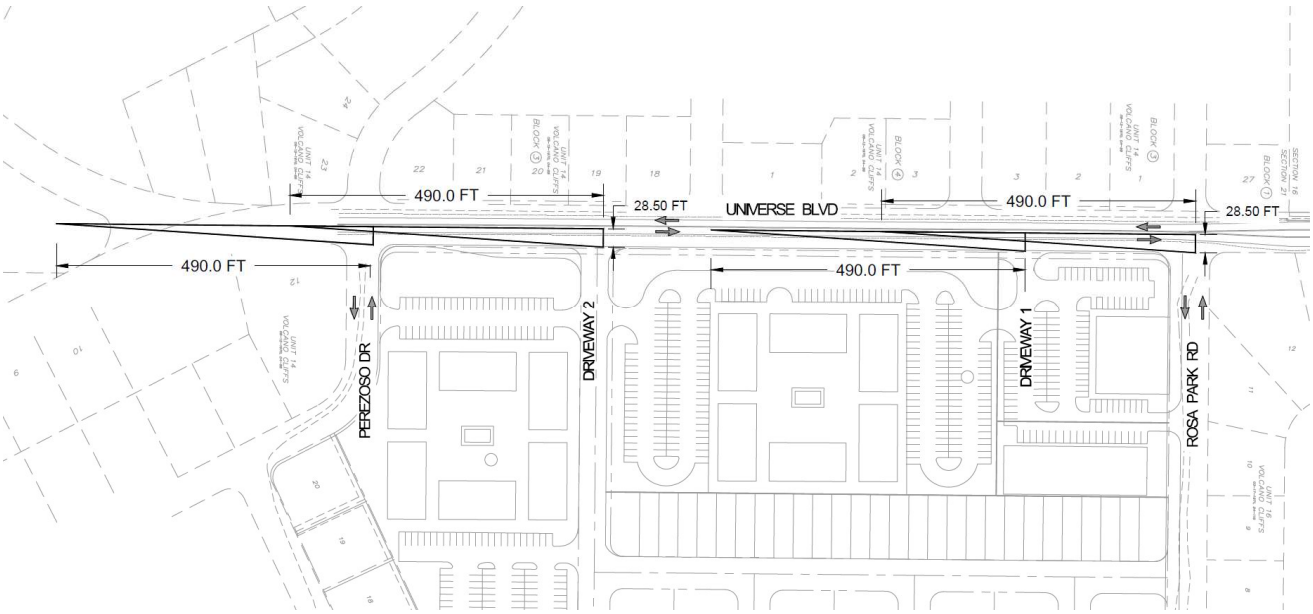

Figure 35 – Sight Distance Triangles for Right Turns at Proposed Intersections

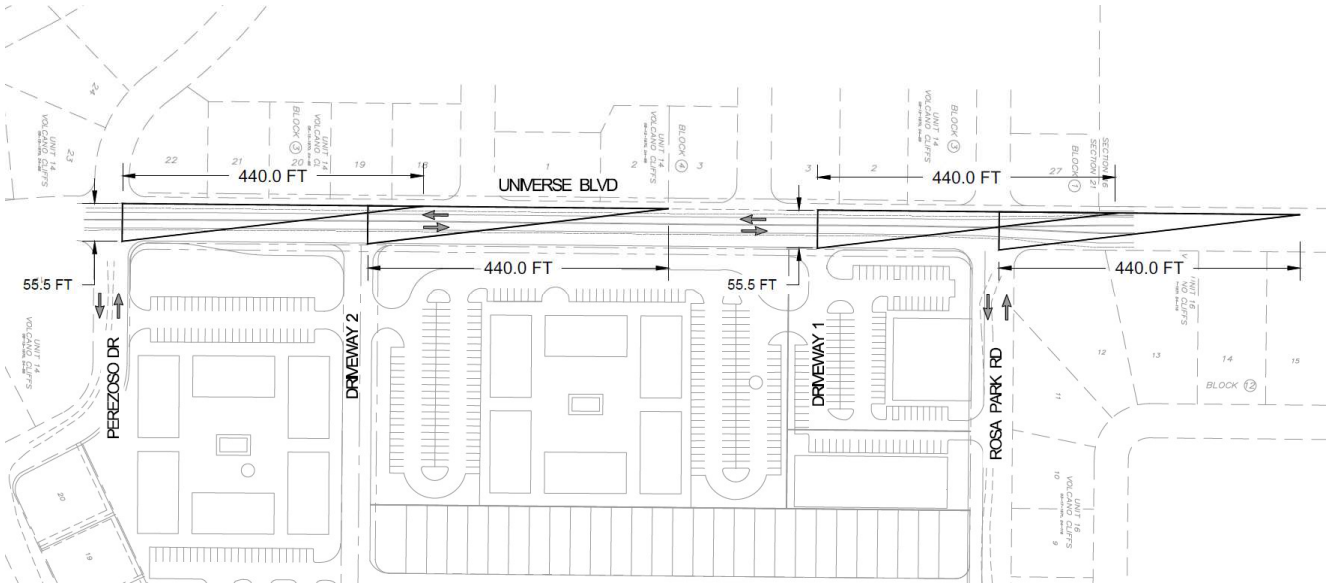

Figure 36 – Sight Distance Triangles for Left Turns at Proposed Intersections

Rosa Parks Rd North View (Left Turn View)

Rosa Parks Rd South View (Right Turn View)

Driveway 1 North View (Left Turn View)

Driveway 1 South View (Right Turn View)

Driveway 2 North View (Left Turn View)

Driveway 2 South View (Right Turn View)

Perezoso Dr North View (Left Turn View)

Perezoso Dr South View (Right Turn View)

Figure 37 –Proposed Intersection Street View Obstruction Analysis

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based on the results of the traffic analysis, it was concluded that the development will not adversely impact the intersections in the Phase I (2023), Phase II (2025), and Phase III (2027) scenarios. All intersections perform at a LOS D or better in 2027 for all scenarios, except for:

- Intersection 1 (Universe Blvd & Paseo del Norte Blvd) – The intersection is expected to deteriorate to a LOS E and F during the 2025 AM and PM peak hour, respectively. However, this deterioration in LOS is expected to occur even without the proposed development which only increases the delay by less than one second during both peak hours. It was also noted that the EB and SB left-turns and NB right-turn auxiliary lane storage lengths are exceeded in the No Build conditions. The City may consider increasing the storage length for these movements to accommodate the turning traffic.

By the Horizon 2033 year, all intersections are still expected to perform at a LOS D or better except for:

- Intersection 1 (Universe Blvd & Paseo del Norte Blvd) – The intersection is expected to deteriorate to a LOS F by 2033 during both peak hours. However, this deterioration in LOS is expected to occur even without the proposed development which only increases the delay by less than one second during both peak hours.
- Intersection 2 (Universe Blvd and School Driveway) – A LOS E is expected during the 2033 AM Build peak hour for 1-stage EB left turns. However, the proposed cross section of Universe Blvd will include a median, which will allow a 2-staged left turn movement for the EB approach. This will improve the LOS to a C or better during both peak hours.
- Intersection 7 (Universe Blvd & Rainbow Blvd intersection) – The intersection is expected to deteriorate to a LOS E in the AM No Build and Build peak hour. However, the proposed development will increase the delay by almost 20 seconds. It can also be noted that the Existing 2022 queue (without the development) exceeds the SB left-turn storage. The City may consider modifying the lane configuration for the SB movement to accommodate the high SB left-turn volumes.

Based on the traffic analysis results, it can be concluded that the Volcano Cliffs development will adversely impact Intersection 7.

Also, from the sight distance analysis performed, it can be concluded that there will be no sight distance issues at the proposed Rosa Parks Rd and Perezoso Dr intersections with Universe Blvd, and the two driveway access points along Universe Blvd.

Recommendations

To mitigate the impacts to Intersection 7, a WB right-turn auxiliary lane with a 200-ft storage and signal optimization are recommended. These mitigations will improve the LOS to a D and maintain a LOS C in the AM and PM peak hours, respectively. No other improvements are recommended for the study area.