

# Mountain Shadows Resort

Traffic Impact Study

5445 E. Lincoln Drive in  
Town of Paradise Valley

November 2019  
Project No. 17-0765

Prepared For:  
**Westroc Hospitality, LLC**  
15035 N. 73rd Street, Suite D  
Scottsdale, Arizona 85260

For Submittal to:  
**Town of Paradise Valley**

Prepared By:



10605 North Hayden Road  
Suite 140  
Scottsdale, Arizona 85260  
480-659-4250

# MOUNTAIN SHADOWS RESORT TRAFFIC IMPACT ANALYSIS

**5445 East Lincoln Drive  
Town of Paradise Valley, Arizona**

**Prepared for:**  
Westroc Hospitality  
15035 N 73<sup>rd</sup> Street, Suite D  
Scottsdale, Arizona 85260

**For Submittal to:**  
Town of Paradise Valley

---

**Prepared By:**



CivTech, Inc.  
10605 North Hayden Road  
Suite 140  
Scottsdale, Arizona 85260  
(480) 659-4250



---

**November 2019**

CivTech Project No. 17-0765

## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>1</b>
<b>INTRODUCTION.....</b>	<b>3</b>
<b>EXISTING CONDITIONS .....</b>	<b>5</b>
SURROUNDING LAND USE .....	5
EXISTING ROADWAY NETWORK .....	5
EXISTING INTERSECTION CONFIGURATION .....	6
EXISTING TRAFFIC VOLUMES .....	6
EXISTING CAPACITY ANALYSIS.....	10
<b>PROPOSED DEVELOPMENT.....</b>	<b>11</b>
SITE LOCATION .....	11
SITE ACCESS.....	11
TRIP GENERATION.....	13
TRIP DISTRIBUTION AND ASSIGNMENT .....	13
FUTURE BACKGROUND TRAFFIC.....	17
TOTAL TRAFFIC .....	17
<b>TRAFFIC AND IMPROVEMENT ANALYSIS .....</b>	<b>20</b>
INTERSECTION CAPACITY ANALYSIS.....	20
LEFT TURN LANE ANALYSIS .....	22
QUEUE LENGTH ANALYSIS.....	23
<b>CONCLUSIONS.....</b>	<b>25</b>
<b>LIST OF REFERENCES .....</b>	<b>27</b>
<b>TECHNICAL APPENDIX .....</b>	<b>28</b>

### LIST OF TABLES

Table 1: Level of Service Criteria..... 10

Table 2: Existing Peak Hour Levels of Service..... 11

Table 3: Trip Generation Summary..... 13

Table 4: Site Trip Distribution ..... 14

Table 5: Growth Rate Expansion Factors ..... 17

Table 6: 2020 Peak Hour Analysis ..... 20

Table 7: Queue Storage Lengths ..... 23

### LIST OF FIGURES

Figure 1: Vicinity Map ..... 4

Figure 2: Existing Lane Configurations and Stop Control ..... 8

Figure 3: Existing Traffic Volumes ..... 9

Figure 4: Site Plan and Access ..... 12

Figure 5: Trip Distribution ..... 15

Figure 6: Site Generated Traffic Volumes ..... 16

Figure 7: 2020 Background Traffic Volumes ..... 18

Figure 8: 2020 Total Traffic Volumes..... 19

Figure 9: Proposed Lane Configurations and Traffic Control..... 21

## EXECUTIVE SUMMARY

This report documents a traffic impact analysis (TIA) performed for the Mountain Shadows Resort. The Resort consists of an existing 183-room hotel and 41 condominiums. A new Bianco restaurant is proposed for the northeast corner of the site and will consist of approximately 5,000 square feet.

CivTech, Inc. has been retained by Westroc Hospitality LLC to perform the TIA for the proposed median break at the west driveway. The purpose of this TIA is to determine if a westbound left turn lane is warranted at the existing Mountain Shadows West Driveway. This driveway currently operates as a right in/right out driveway only.

The following conclusions have been documented for this study.

### General

- The proposed restaurant is anticipated to generate approximately 420 additional weekday daily trips, with 4 (3 in/1 out) additional trips occurring in the AM peak hour and 39 (26 in/13 out) additional trips occurring in the PM peak hour.

### Existing Conditions

- The results of the existing conditions analysis summarized in **Table 2** indicates that all intersections currently operate at an overall acceptable level of service (LOS C or better) under existing lane configurations and signal timing.

### Opening Year 2020

- The results of the 2020 opening year Synchro analysis indicates that all study intersections are anticipated to experience an acceptable level of service LOS C or better.

### Left Turn Lane Analysis

- The Town of Paradise Valley does not provide explicit criteria for the installation of dedicated left turn lanes; they typically defer to City of Scottsdale design standards.
  - Per the City of Scottsdale Design Standards and Policy Manual (DS&PM), driveways located on arterial roadways must be spaced 330 feet apart, with a minimum spacing of 250 feet with no restrictions. The eastern and western driveways for the Mountain Shadows Resort are spaced approximately 530 feet apart, meaning that a left turn lane into the site at the western driveway should be permitted. A dedicated westbound left turn lane is also safer than making a U-turn at an unprotected signalized intersection or at a median break, which was observed to be happening during both the AM and PM peak hours.

Queue Storage

- The recommended storage lengths are provided for horizon year 2020 using the total traffic projections.
  - There is an existing median break along Lincoln Drive directly east of the proposed median break at the west driveway. This median break is utilized as emergency access for the Colonia Miramonte housing development north of the Mountain Shadows Resort. Since this is a gated emergency access only not available to residents for daily usage, it was determined this median break can be utilized in the design of a westbound left turn lane into the Mountain Shadows Resort west driveway. The determination was provided by the Town based on concept designs provided by the Town's consultant as part of earlier review comments for this project. A minimum of 75 feet of storage is recommended with a 90-foot taper for a total length of 165 feet.
  - It is recommended that the median be constructed with mountable curb in the areas proximate to the Colonia Miramonte emergency access.

## INTRODUCTION

Mountain Shadows Resort currently consists of a 183-room hotel and 41 condominiums. A new Bianco Restaurant is proposed for the northeast corner of the existing site. The Mountain Shadows Resort is located at 5445 E Lincoln Drive in the Town of Paradise Valley, Arizona.

### Study Requirements

The purpose of this study is to determine if a median break and dedicated westbound left turn lane is warranted at the Mountain Shadows West Driveway on Lincoln Drive. CivTech has been informed that vehicles utilize the signalized intersection of Desert Fairways Drive and Lincoln Drive to access the west driveway after driving past 56<sup>th</sup> Street and the Mountain Shadows East Driveway. Vehicles travelling west on Lincoln Drive and miss the entrance to the resort, either from 56<sup>th</sup> Street or the east driveway, typically attempt to make a U-turn at the first opportunity. Most of the U-turns observed occurred at the median break west of the site and east of the signalized intersection of Desert Fairways Drive and Lincoln Drive; there is a “No U-turn” sign at this location. The U-turns in this area have caused issues with the neighbors in the area and also create an unsafe situation for other vehicles on Lincoln Drive.

The specific objectives of the study are:

- To determine if enough vehicles are making U-turns at Desert Fairways Drive on Lincoln Drive to warrant the addition of a median break and dedicated westbound left turn lane at the Mountain Shadows West Driveway.
- To recommend additional street or traffic control improvements, where necessary, to mitigate existing and future delays at all study intersections.

### Study Area

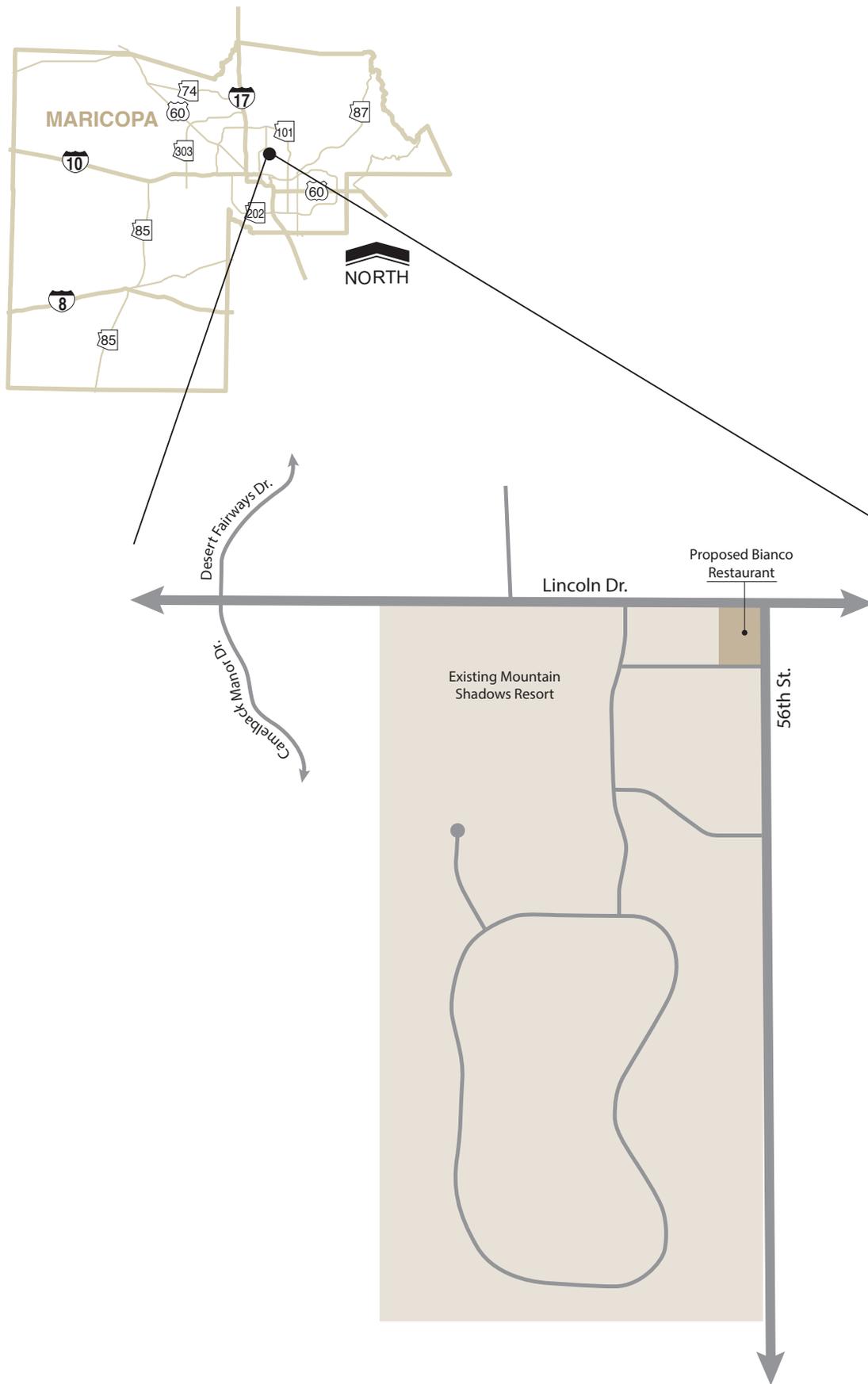
This study technically does not require a full TIA based alone on the addition of the new Bianco Restaurant. However, since U-turns have been observed at the signalized intersection of Desert Fairways Drive and Lincoln Drive and the need for a westbound left turn lane into the site at the west driveway is being assessed, a full TIA has been performed. The following study area intersections have been evaluated:

- Desert Fairways Drive & Lincoln Drive
- Mountain Shadows West & Lincoln Drive
- Mountain Shadows East & Lincoln Drive
- 56<sup>th</sup> Street & Lincoln Drive

### Horizon Years

The proposed opening of the new Bianco Restaurant is spring of 2020, therefore an opening year of 2020 will be analyzed.

A location map of the study area is provided in **Figure 1**.



**Figure 1:** Vicinity Map

## EXISTING CONDITIONS

### *SURROUNDING LAND USE*

The surrounding area includes various land uses. Directly north of the site, on the north side of Lincoln Drive, is the site for the Colonia Miramonte housing development and El Chorro Restaurant. South, East, and West of the site are detached single-family homes.

### *EXISTING ROADWAY NETWORK*

The existing roadway network analyzed in this study includes Desert Fairways Drive, Lincoln Drive, and 56<sup>th</sup> Street.

**Desert Fairways Drive** is a north-south road with one lane in each travelling direction. Desert Fairways Drive begins at the intersection with Tatum Boulevard and continues east for approximately 0.25 miles before looping to the south and continuing south until the intersection with Lincoln Drive, at which point it transitions to Camelback Manor Drive. The posted speed limit is 25 miles per hour along Desert Fairways Drive. Once becoming Camelback Manor there is no posted speed limit.

**Lincoln Drive** is an east-west four-lane major arterial with two lanes in each travelling direction. Within the vicinity of the site, there are raised medians along portions of the road. Lincoln Drive begins just east of the State Route 51 freeway and continues east for approximately 7 miles before terminating at the intersection with Cattletrack Road, just west of the Arizona Canal. The posted speed limit is 40 miles per hour (mph) within the vicinity of the site.

**56<sup>th</sup> Street** is a north-south two-lane collector road with one lane in each travelling direction. 56<sup>th</sup> Street begins just north of Lincoln Drive at the El Chorro Restaurant driveway and continues south for approximately 0.5 miles before terminating at the intersection with McDonald Drive. The posted speed limit is 25 mph within the vicinity of the site.

### **EXISTING INTERSECTION CONFIGURATION**

The intersection of **Desert Fairways Drive and Lincoln Drive** is a four-legged signalized intersection with permissive/protected left turns on the eastbound approach and permissive phasing on the northbound, southbound and westbound approaches. The northbound approach consists of one shared left-turn/through/right-turn lane. The southbound approach consists of one dedicated left-turn lane and a shared through/right-turn lane. The eastbound and westbound approaches each have one dedicated left-turn lane, one through lane and a shared through/right-turn lane. There are pedestrian crosswalks across all legs of the intersection.

The intersection of **Mountain Shadows West and Lincoln Drive** is a three-legged, stop-controlled “T” intersection with free movements on the eastbound and westbound approaches and a stop sign on the northbound approach. The northbound approach consists of one right turn lane. The eastbound approach consists of two through lanes and a dedicated right-turn lane. The westbound approach has two through lanes and a median to restrict left-turns into the site.

The intersection of **Mountain Shadows East and Lincoln Drive** is a three-legged, stop-controlled “T” intersection with free movements on the eastbound and westbound approaches and a stop sign on the northbound approach. The northbound approach consists of one shared left-turn/right-turn lane. The eastbound approach consists of two through lanes and a dedicated right-turn lane. The westbound approach consists of one dedicated left-turn lane and two through lanes.

The intersection of **56<sup>th</sup> Street and Lincoln Drive** is a four-legged signalized intersection with permissive phasing on all approaches. The northbound approach consists of one shared left-turn/through lane and a dedicated right-turn lane. The southbound approach consists of one shared left-turn/through/right-turn lane. The eastbound and westbound approaches each consist of a dedicated left-turn lane, one through lane and a shared through/right-turn lane.

The existing intersection configurations and traffic control is illustrated in **Figure 2**.

### **EXISTING TRAFFIC VOLUMES**

CivTech engaged Field Data Services of Arizona, Inc. to record traffic volumes at the four study intersections within the project vicinity. Peak hour volume turning movement counts were performed from 7:00-9:00 AM and 4:00-6:00 PM on Thursday, March 7, 2019. Peak hour turning movement counts were conducted at the following study intersections:

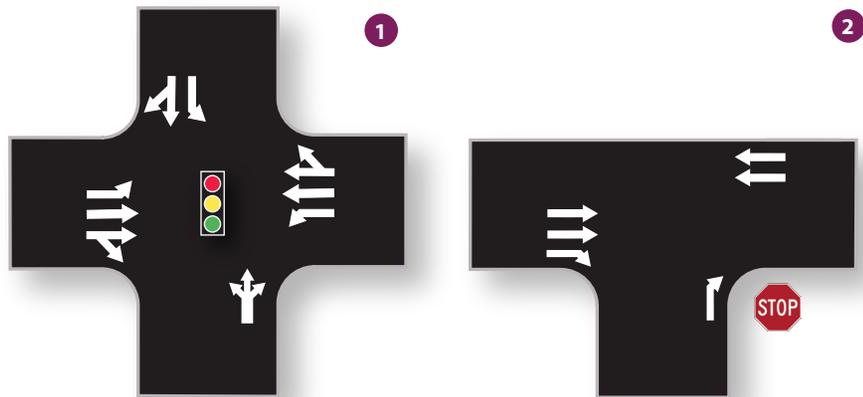
- Desert Fairways Drive & Lincoln Drive
- Mountain Shadows West Driveway & Lincoln Drive
- Mountain Shadows East Driveway & Lincoln Drive
- 56<sup>th</sup> Street & Lincoln Drive

Due to the nature of this study, U-turn data was also collected at the following intersections to determine if an eastbound left turn lane into the Mountain Shadows Resort site would be warranted. Field Data Services of Arizona, Inc. recorded U-turns at the following intersection from 7:00-9:00 AM and 4:00-6:00 PM on Thursday, March 7, 2019.

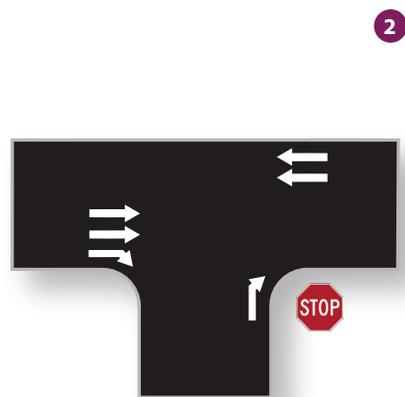
- Desert Fairways Drive & Lincoln Drive

CivTech recorded U-turn data at the median break west of the Mountain Shadows West Driveway, but east of the intersection with Desert Fairways Drive from 7:00-9:00 AM and 4:00-6:00 PM on Thursday, March 7, 2019. These counts were conducted because it was noted by the client that U-turns also occur at this location.

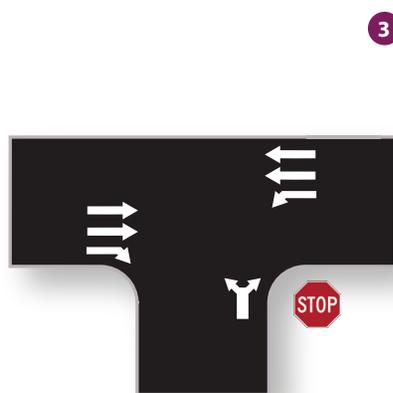
The Town of Paradise Valley requires that a seasonal adjustment factor be applied to existing traffic counts taken outside of typical months. These traffic counts were conducted in March, and winter months typically have higher amounts of traffic due to the high number of seasonal visitors. The City of Scottsdale 2016 Average Daily Traffic Volumes seasonal adjustment factor for March is 0.93. Existing 2019 traffic volumes with the seasonal adjustment factor applied are presented in **Figure 3** for the weekday AM and PM peak hours. Raw traffic volume data obtained for this study has been included in **Appendix B**.



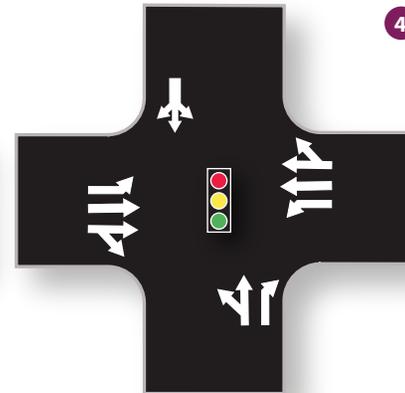
Desert Fairways Dr & Lincoln Dr



Mountain Shadows West & Lincoln Dr



Mountain Shadows East & Lincoln Dr



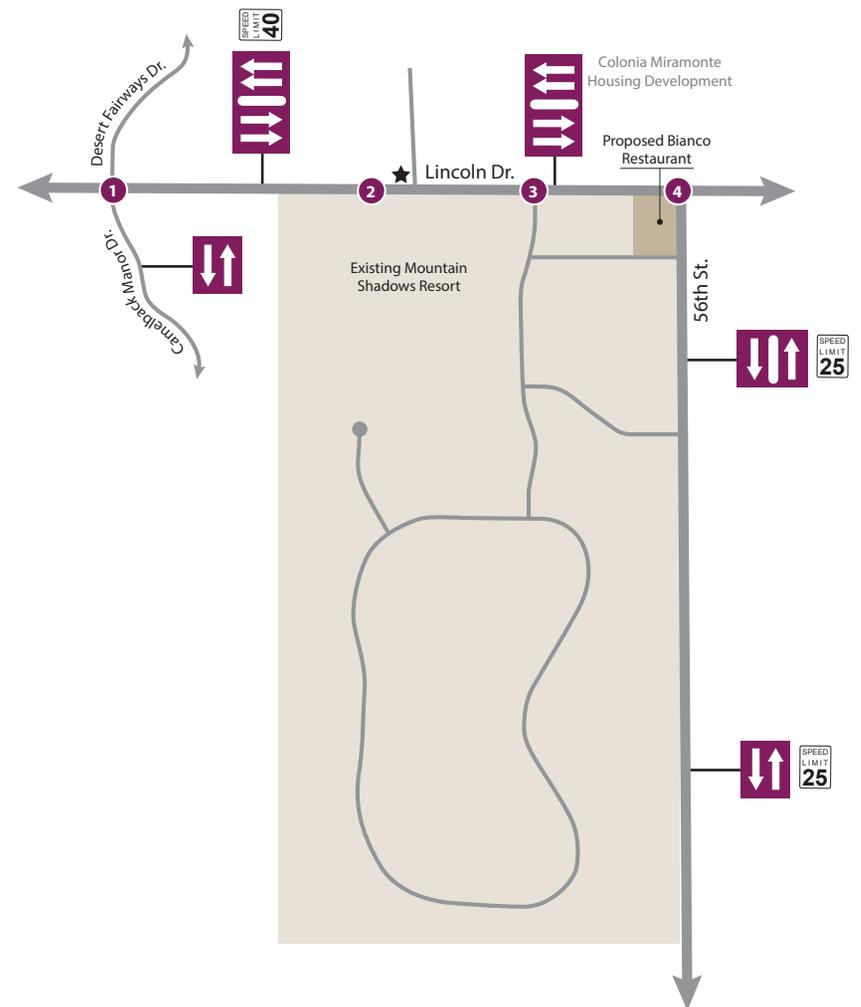
56th St & Lincoln Dr

**LEGEND**

-  Thru or Turning
-  Two-Way Left Turn-Lane
-  Raised Median
-  Bike Lane
-  Traffic Signal
-  Stop Sign
-  Speed Limit 40
-  Speed Limit 25



★ Colonia Miramonte Gated Emergency Access



**Figure 2:** Existing Lane Configurations and Traffic Controls

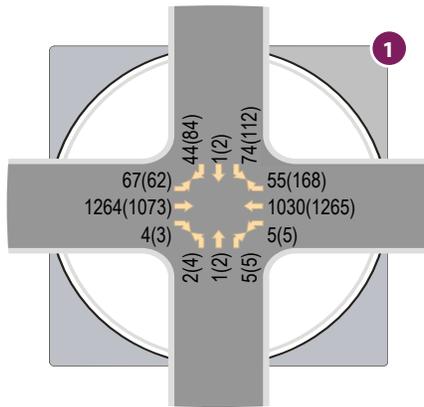
**Legend**

XX(XX) - AM(PM) Peak Hour Traffic Volumes

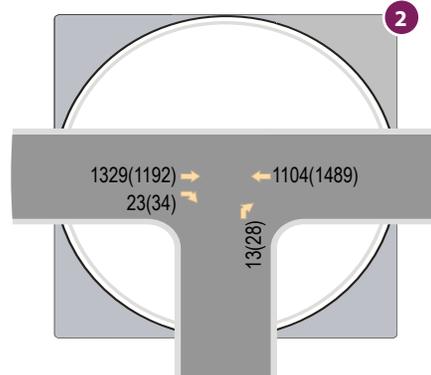
↩XX(XX) - AM(PM) Peak Hour U-Turn Volumes

Note: U-Turns not included in the left turning Volumes at Intersection "1"

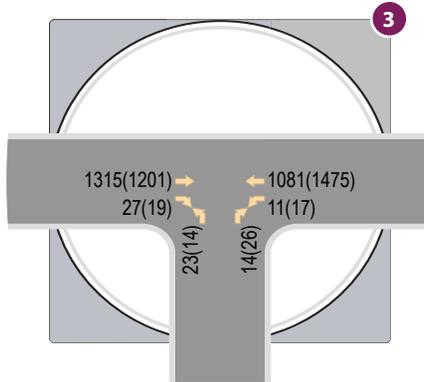
★ Colonia Miramonte Gated Emergency Access



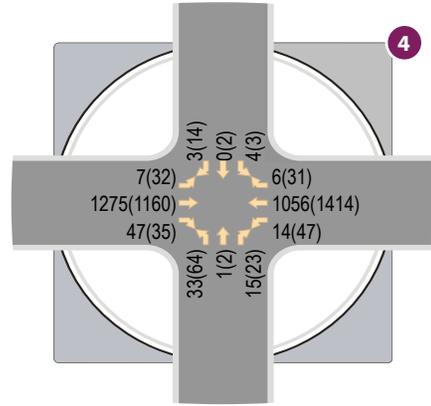
Desert Fairways Dr & Lincoln Dr



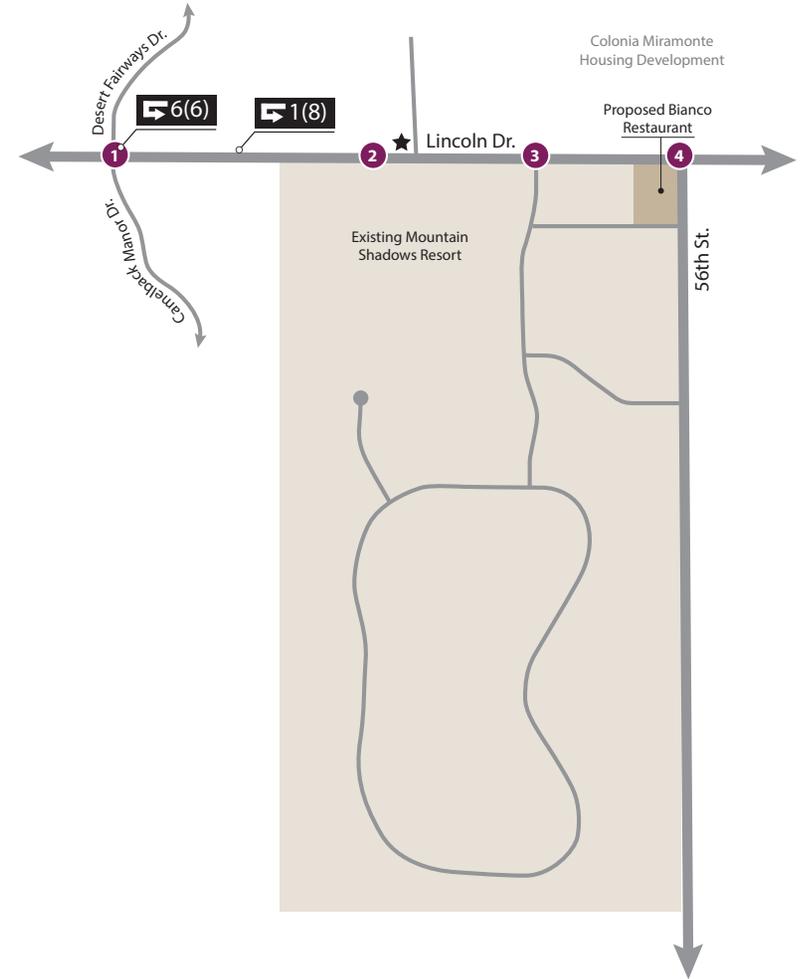
Mountain Shadows West & Lincoln Dr



Mountain Shadows East & Lincoln Dr



56th St & Lincoln Dr



**Figure 3: Existing Traffic Volumes**

## EXISTING CAPACITY ANALYSIS

Peak hour capacity analyses have been conducted for the study intersections based on existing intersection configurations and traffic volumes. All intersections have been analyzed using the methodologies presented in the *Highway Capacity Manual (HCM)*, *Special Report 209*, and Updated 2016 and using Synchro software, version 10.0 under the HCM 6<sup>th</sup> edition methodology.

The concept of level of service (LOS) uses qualitative measures that characterize operational conditions within the traffic stream. The individual levels of service are described by factors that include speed, travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Six levels of service are defined for each type of facility for which analysis procedures are available. They are given letter designations A through F, with LOS A representing the best operating conditions and LOS F the worst. Each level of service represents a range of operating conditions. Levels of service for intersections are defined in terms of delay ranges. **Table 1** lists the level of service criteria for signalized and unsignalized intersections, respectively.

**Table 1: Level of Service Criteria**

Level of Service	Control Delay (seconds/vehicle)	
	Signalized Intersections	Unsignalized Intersections
A	≤ 10	≤ 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80	> 50

Source: Exhibit 19-8, Exhibit 20-2, Exhibit 21-8 and Exhibit 22-8, Highway Capacity Manual 2017

Synchro 10.0 software calculates the LOS per the HCM 6<sup>th</sup> edition methodology. The 6<sup>th</sup> edition HCM documents the signalized LOS calculation methodology which takes into account lane geometry, traffic volumes and cycle length/phasing to compute LOS. Synchro analysis worksheets report individual movement delay/LOS and overall delay/LOS for signalized intersections; unsignalized intersection worksheets report the worst-case delay/LOS and the average overall intersection delay. Signal timing data for the intersections of Lincoln Drive/Desert Fairways Drive and Lincoln Drive/56<sup>th</sup> Street were provided by the Town of Paradise Valley. Results of the existing level of service analyses are shown in **Table 2** for both AM and PM peak hours. The existing conditions analysis worksheets have been included in **Appendix C**.

**Table 2: Existing Peak Hour Levels of Service**

ID	Intersection	Intersection Control	Approach/ Movement	Existing LOS AM (PM)
1	Desert Fairways Dr & Lincoln Dr	Signal	NB	C(C)
			SB	C(C)
			EB	A(A)
			WB	B(B)
			<b>Overall</b>	<b>B(B)</b>
2	Mountain Shadows West Drwy & Lincoln Dr	1-way stop (NB)	NB Right	B(B)
3	Mountain Shadows East Drwy & Lincoln Dr	1-way stop (NB)	NB Shared WB Left	C(A) A(A)
4	56 <sup>th</sup> St & Lincoln Dr	Signal	NB	C(C)
			SB	C(C)
			EB	A(A)
			WB	A(A)
			<b>Overall</b>	<b>A(A)</b>

The results of the existing conditions analysis summarized in **Table 2** indicates that all intersections currently operate at an overall acceptable level of service (LOS C or better) under existing lane configurations and signal timing.

## PROPOSED DEVELOPMENT

### SITE LOCATION

The proposed development will be located at 5445 East Lincoln Drive in the Town of Paradise Valley, Arizona on the same site as the existing Mountain Shadows Resort.

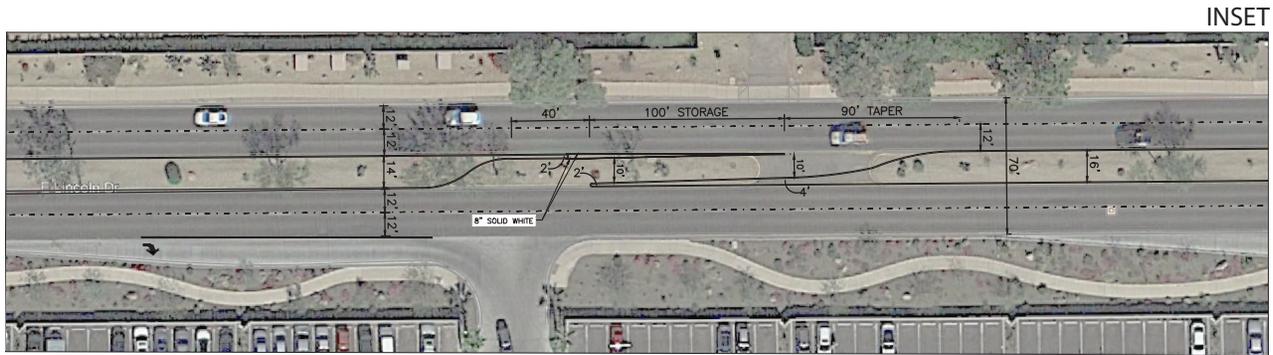
### SITE ACCESS

There are two existing access points for this development along Lincoln Drive, described as follows:

- The West Access is an existing right in/right out only access along Lincoln Drive located approximately 855 feet east of the intersection of Desert Fairways Drive and Lincoln Drive.
- The East Access is an existing full movement access along Lincoln Drive located approximately 500 feet east of the west access.

The two existing Mountain Shadows Driveways will remain in their existing location, as well as a third access on 56<sup>th</sup> Street on the eastern border of the site. Access to 56<sup>th</sup> Street from the Mountain Shadows Resort was not evaluated based on a scoping meeting for this study with Town staff. Vehicular movement to/from the 56<sup>th</sup> Street access are anticipated to remain the same and operate well in the existing conditions. The existing west access is proposed to include a dedicated westbound left turn lane to allow for left turns into the site while still restricting northbound left turns out of the site. All other access points are proposed to remain the same.

The site plan and access points are depicted in **Figure 4**.



**Figure 4:** Site Plan and Access

**TRIP GENERATION**

The potential trip generation for the proposed development was estimated utilizing the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10<sup>th</sup> Edition* and *Trip Generation Handbook, 3<sup>rd</sup> Edition*. The ITE *Trip Generation Manual* contains data collected by various transportation professionals for a wide range of different land uses. The data are summarized in the report and average rates and equations have been established that correlate the relationship between an independent variable that describes the development size and generated trips for each categorized land use. The report provides information for daily and peak hour trips.

Mountain Shadows Resort is an already existing resort with a 183-room hotel and 41 condominiums. A new Bianco restaurant is proposed for the northeast corner of the site. The restaurant will consist of 3,500 square feet (sf) of indoor seating and 1,500 sf of patio seating. The land use code (LUC) used for this restaurant is 931 for a quality restaurant. For this ITE LUC, there is no data provided for the entering/exiting percentage during the AM peak hour. This is the case for the last three editions of the Trip Generation Manual. Since no data is provided, the percentage of vehicles entering during the AM peak hour of generator was used. The peak hour of generator is typically the peak hour calculated based on the specific land use and not the typical peak hour between 7:00 and 9:00 AM. **Table 3** depicts the trip generation summary for the proposed development. Trip generation calculations are provided in **Appendix D**.

**Table 3: Trip Generation Summary**

Proposed Use	ITE LUC	Size	Units	Weekday Trips						
				Daily		AM		PM		
				Total	In	Out	Total	In	Out	Total
Quality Restaurant	931	5,000	SF	420	3	1	4	26	13	39
<b>Subtotals</b>				<b>420</b>	<b>3</b>	<b>1</b>	<b>4</b>	<b>26</b>	<b>13</b>	<b>39</b>

As shown in **Table 3**, the proposed development is anticipated to generate approximately 420 additional weekday daily trips, with 4 (3 in/1 out) additional trips occurring in the AM peak hour and 39 (26 in/13 out) additional trips occurring in the PM peak hour.

**TRIP DISTRIBUTION AND ASSIGNMENT**

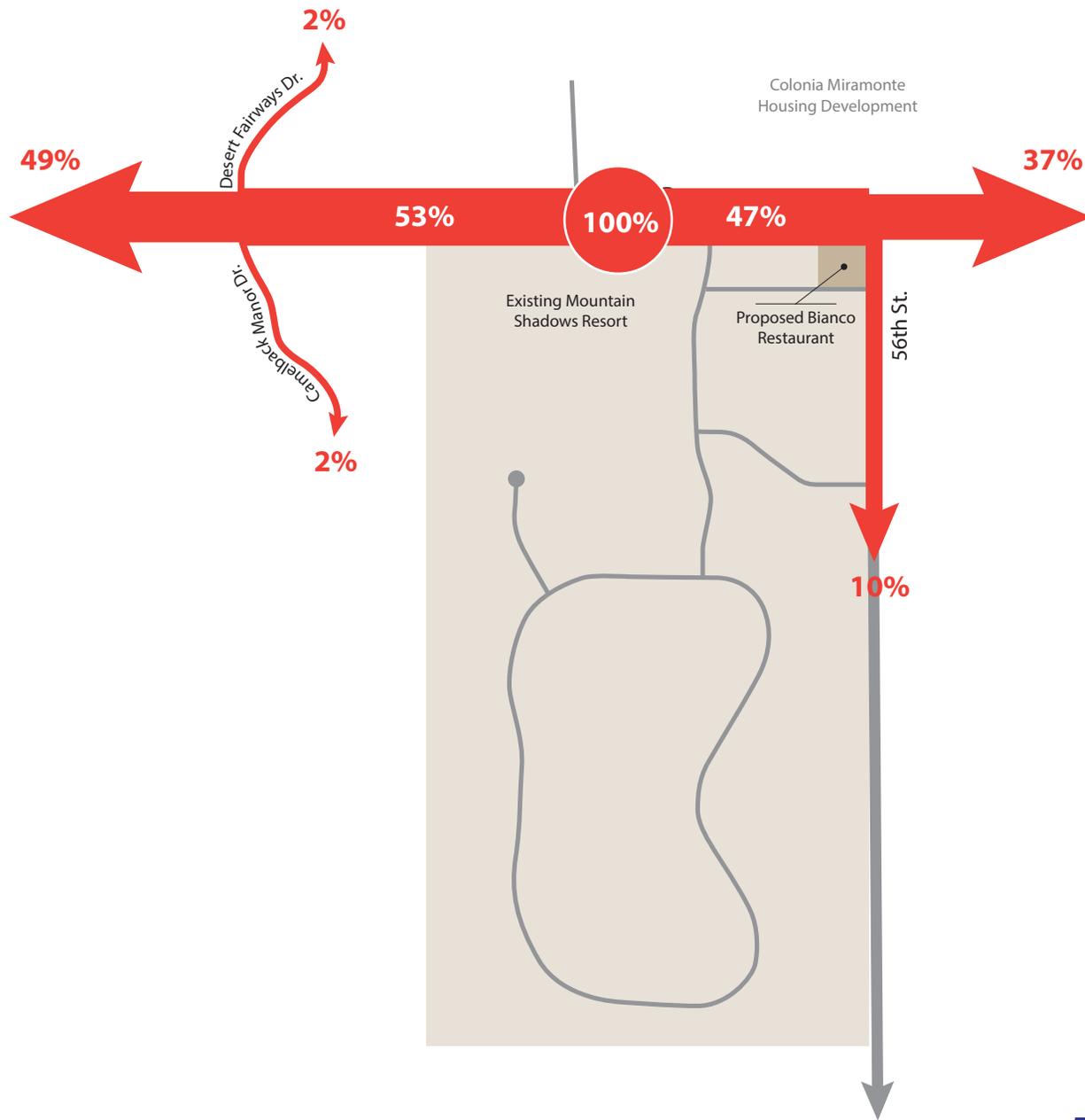
A single trip distribution pattern was assumed for the proposed development. It is expected that the quality restaurant will generate trips based on future population within a 10-mile radius of the site. Future total population within a 10-mile radius of the site, as predicted by the 2030 socio-economic data compiled by the Maricopa Association of Governments (MAG), was used as a basis to estimate trip distribution for the resort development

The resulting trip distribution percentages for the study area are shown in **Table 4**. The trip distribution calculations are included in **Appendix E**.

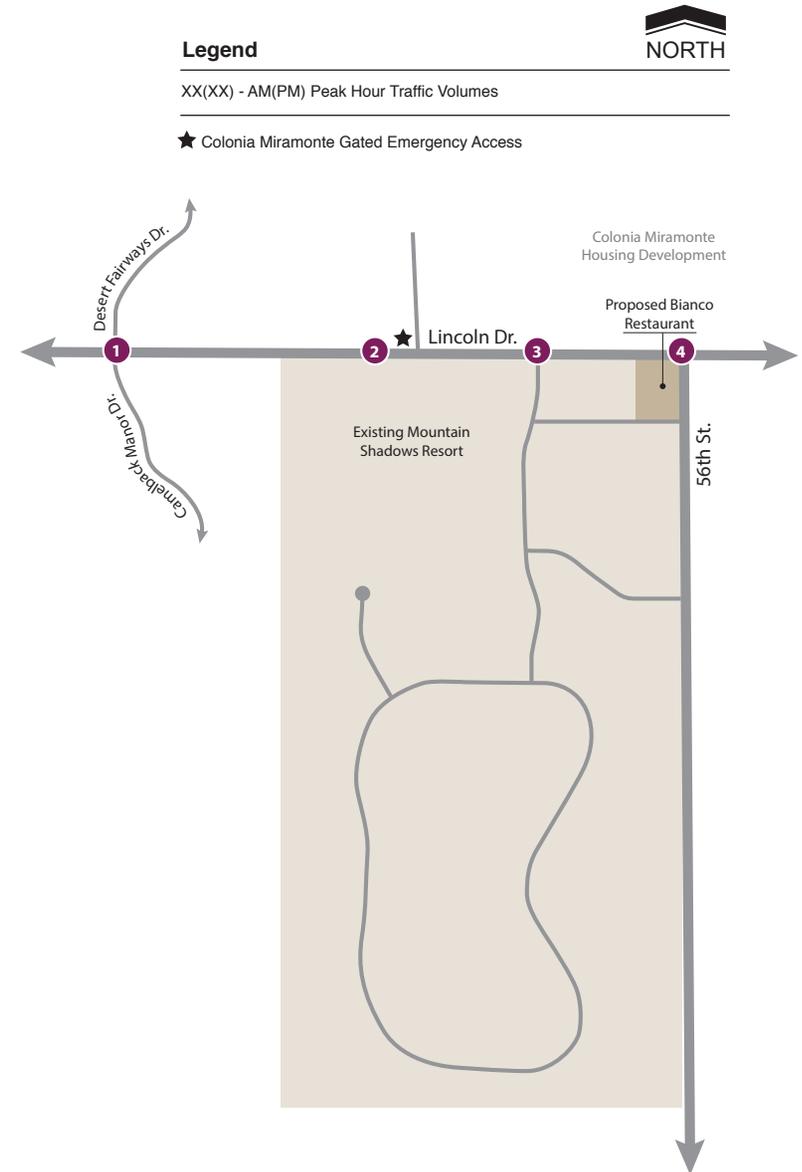
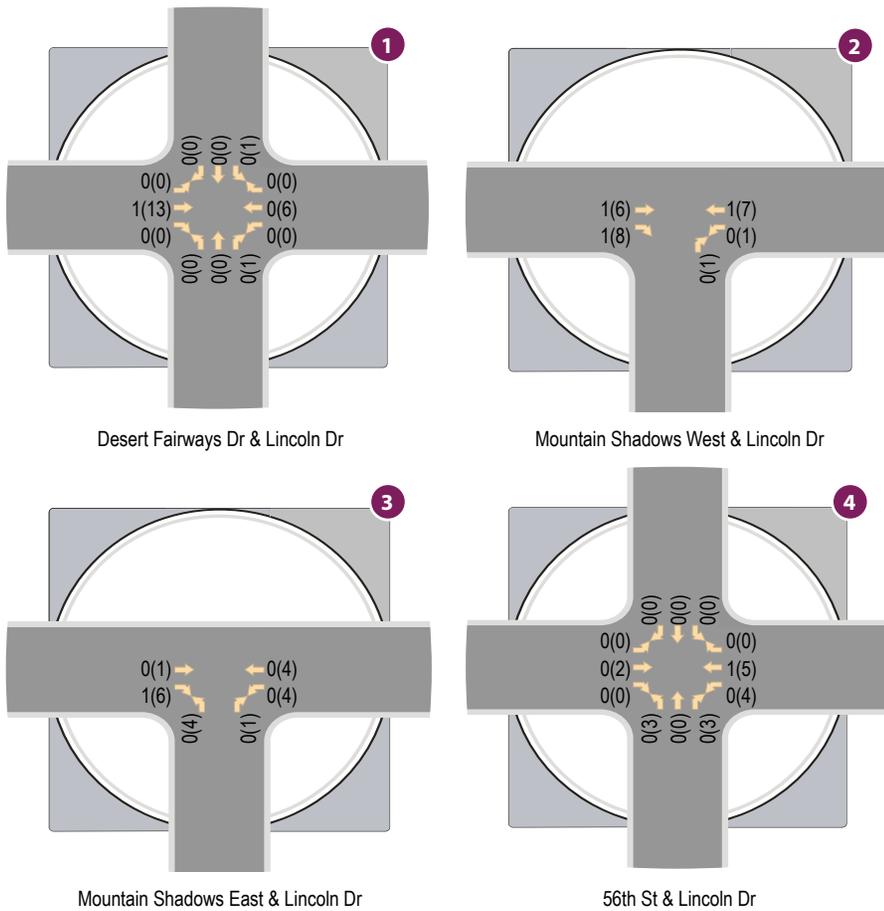
**Table 4: Site Trip Distribution**

<b>Direction (To/From)</b>	<b>Trip Distribution</b>
East on Lincoln Drive	37%
West on Lincoln Drive	49%
North on Desert Fairways Drive	2%
South on Camelback Manor Drive	2%
South on 56 <sup>th</sup> Street	10%
<b>Total</b>	<b>100%</b>

**Figure 5** illustrates the trip distribution percentages shown in **Table 4** on the existing roadway network with the study area. The percentages presented in **Figure 5** were applied to the site trips generated to determine the AM and PM peak hour site traffic at the intersections within the study area. The resulting site generated traffic for the proposed development are presented in **Figure 6**.



**Figure 5:** Trip Distribution



**Figure 6:** Site Generated Traffic Volumes

### ***FUTURE BACKGROUND TRAFFIC***

CivTech applied a growth rate to the seasonally adjusted traffic counts for this study in order to obtain the background traffic volumes along the adjacent roadway network. The Town of Paradise Valley does not publish historic traffic data; for this project, the growth rates were determined using the City of Scottsdale traffic data. In reviewing the City of Scottsdale Traffic Counts Map, a 1.7% average growth rate was found on Scottsdale Road between Indian Bend Road and Lincoln Drive. **Table 5** shows the expansion factors used for the proposed opening year 2020.

**Table 5: Growth Rate Expansion Factors**

Horizon Year	Expansion Factor
2020	1.017

Applying the growth rate expansion factors to the seasonally adjusted existing traffic volumes predicts the volume of traffic anticipated on the surrounding area roads for opening year 2020. It was assumed that all vehicles making U-turns at the median break west of the site and at the intersection of Desert Fairways Drive and Lincoln Drive were negotiating the movement to return to the Mountain Shadows Resort because they had missed an earlier left-in access. Therefore, the U-turns counted at the median break west of the site and at the intersection of Desert Fairways Drive and Lincoln Drive were re-assigned as westbound left turns into the site at the Mountain Shadows West Driveway in order to determine the feasibility of a median break and the addition of westbound left turn lane.

Calculated background traffic for the opening year 2020 is included in **Figure 7**. More detailed calculation sheets are included in **Appendix F**.

### ***TOTAL TRAFFIC***

Total traffic was determined by adding the site generated traffic to the projected background traffic. Total peak hour traffic volumes for the opening year 2020 are shown in **Figure 8**.

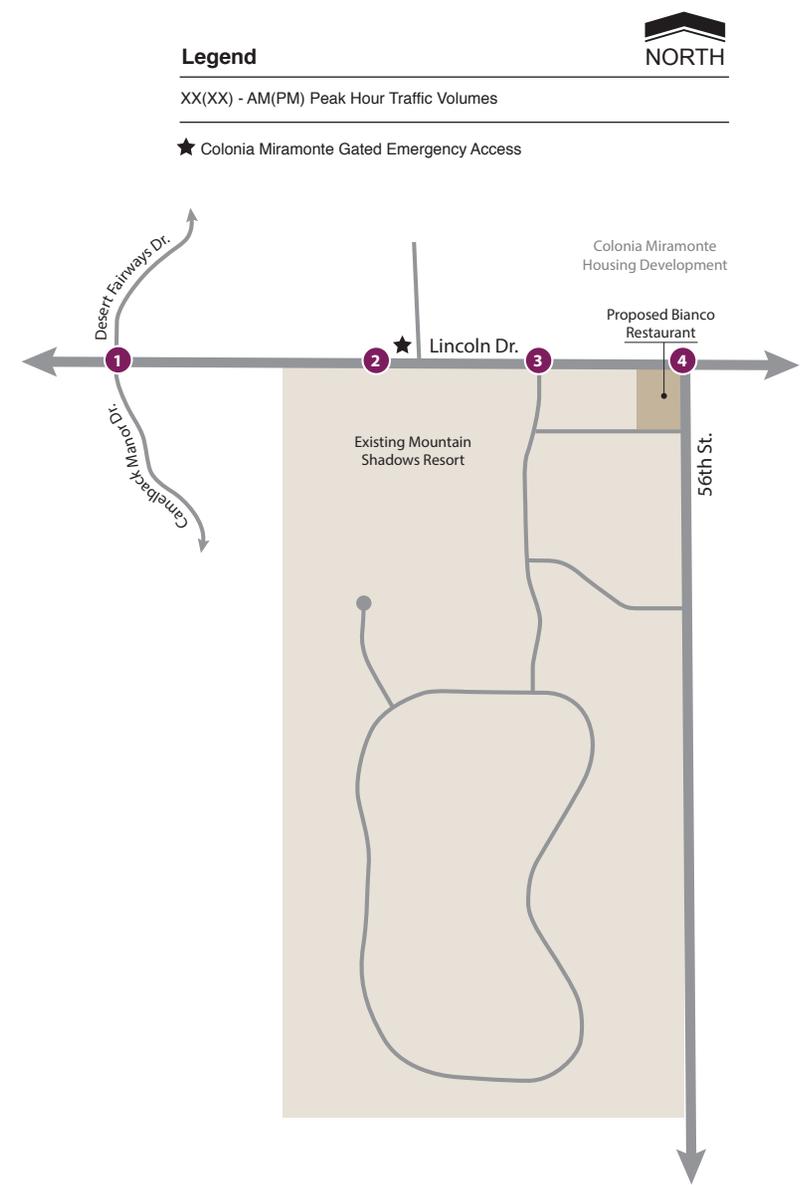
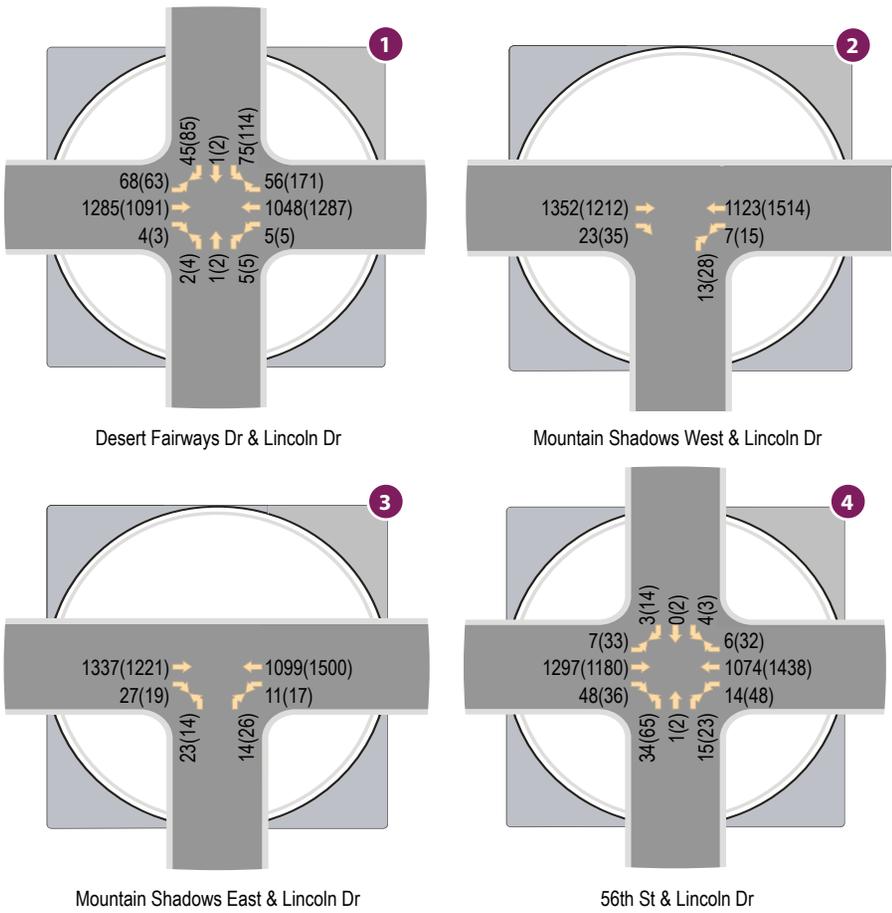
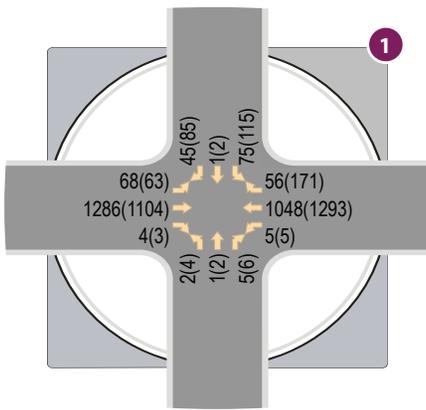
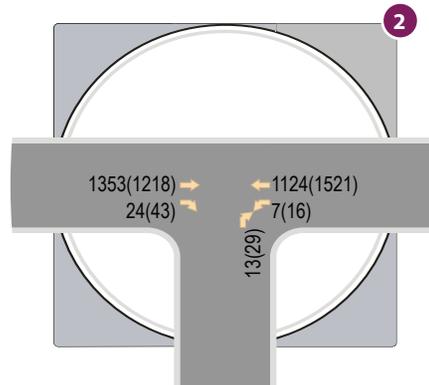


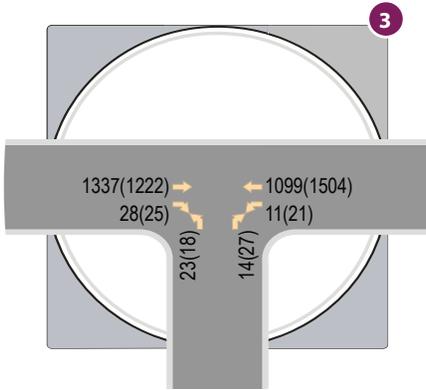
Figure 7: 2020 Background Traffic Volumes



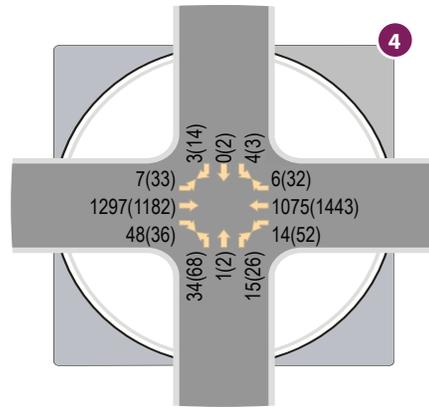
Desert Fairways Dr & Lincoln Dr



Mountain Shadows West & Lincoln Dr



Mountain Shadows East & Lincoln Dr

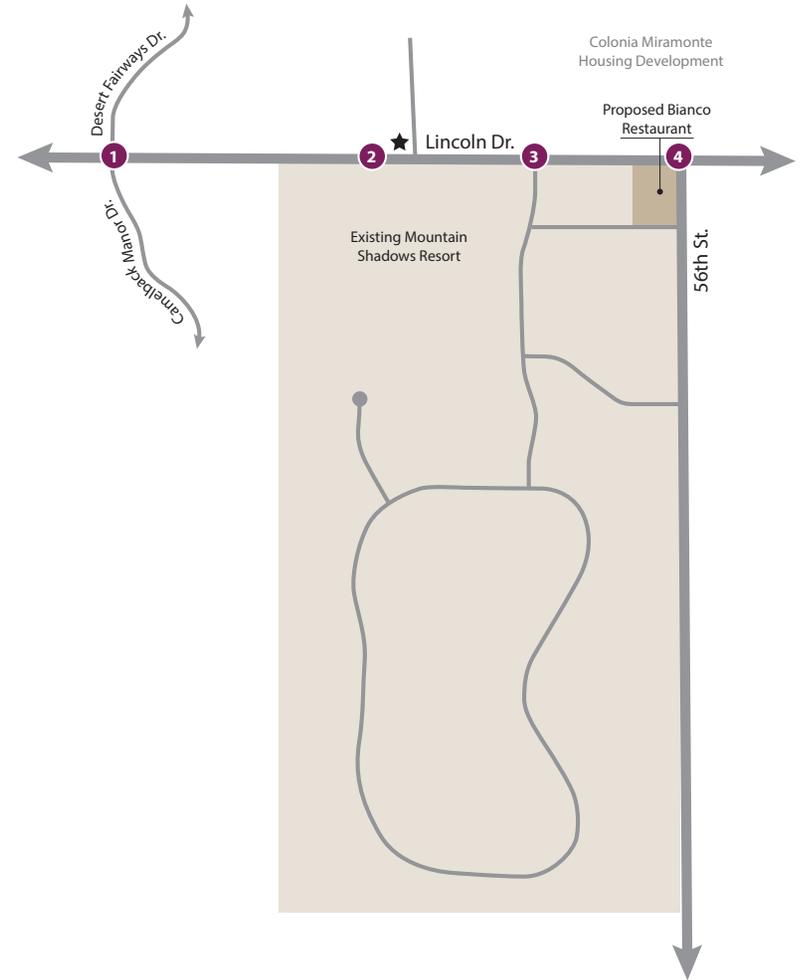


56th St & Lincoln Dr

**Legend**

XX(XX) - AM(PM) Peak Hour Traffic Volumes

★ Colonia Miramonte Gated Emergency Access



**Figure 8: 2020 Total Traffic Volumes**

## TRAFFIC AND IMPROVEMENT ANALYSIS

### INTERSECTION CAPACITY ANALYSIS

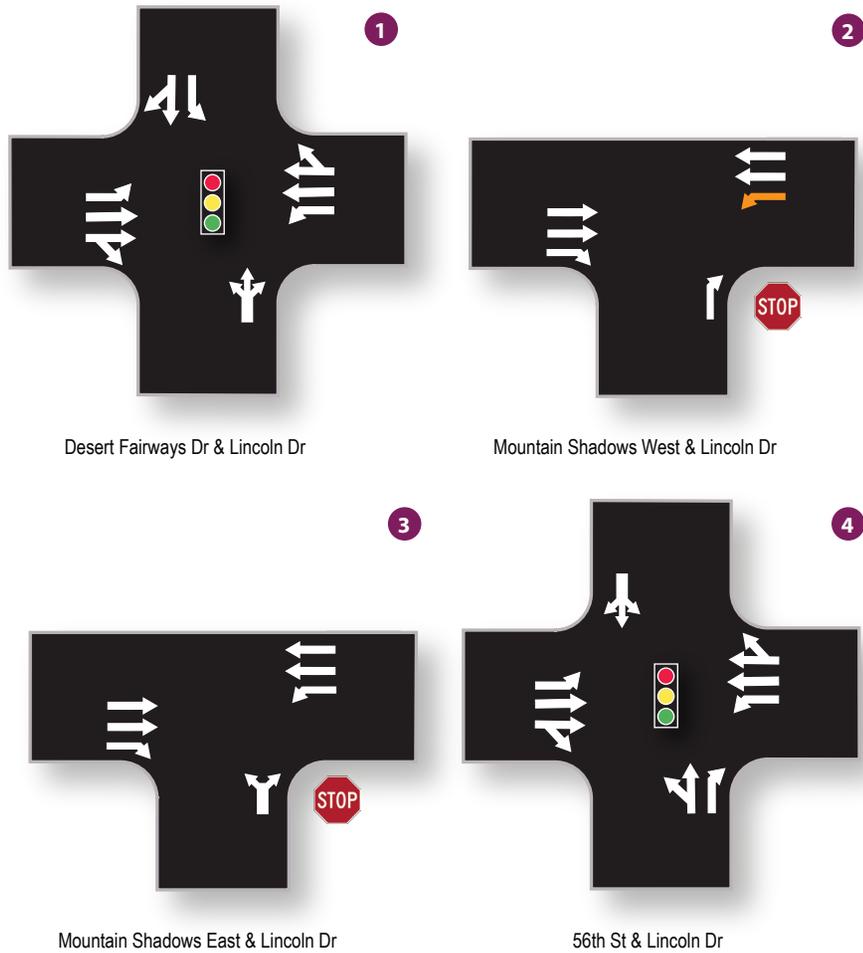
Peak hour capacity analyses have been conducted for all of the intersections within the study area. All study area intersections were analyzed using Synchro 10.0 analysis software and the methodologies previously presented. The mitigation measures proposed for the existing conditions was applied to the future conditions. The overall intersection and approach levels of service are summarized in **Table 6** for the 2020 opening year. Detailed analysis worksheets can be found in **Appendix G**.

**Table 6: 2020 Peak Hour Analysis**

ID	Intersection	Intersection Control	Approach/ Movement	2020 LOS AM(PM)	
				No-Build	Build
1	Desert Fairways Dr & Lincoln Dr	Signal	NB	C(C)	C(C)
			SB	C(C)	C(C)
			EB	A(A)	A(A)
			WB	B(B)	B(B)
			<b>Overall</b>	<b>B(B)</b>	<b>B(B)</b>
2	Mountain Shadows West Drwy & Lincoln Dr	1-way stop (NB)	NB Right WB Left	B(B) A(A)	B(B) A(A)
3	Mountain Shadows East Drwy & Lincoln Dr	1-way stop (NB)	NB Shared WB Left	C(A) A(A)	C(A) A(A)
4	56 <sup>th</sup> St & Lincoln Dr	Signal	NB	C(C)	C(C)
			SB	C(C)	C(C)
			EB	A(A)	A(A)
			WB	A(A)	A(A)
			<b>Overall</b>	<b>A(A)</b>	<b>A(A)</b>

The results of the 2020 opening year Synchro analysis summarized in **Table 6** indicates that all study intersections are anticipated to experience an acceptable level of service LOS C or better.

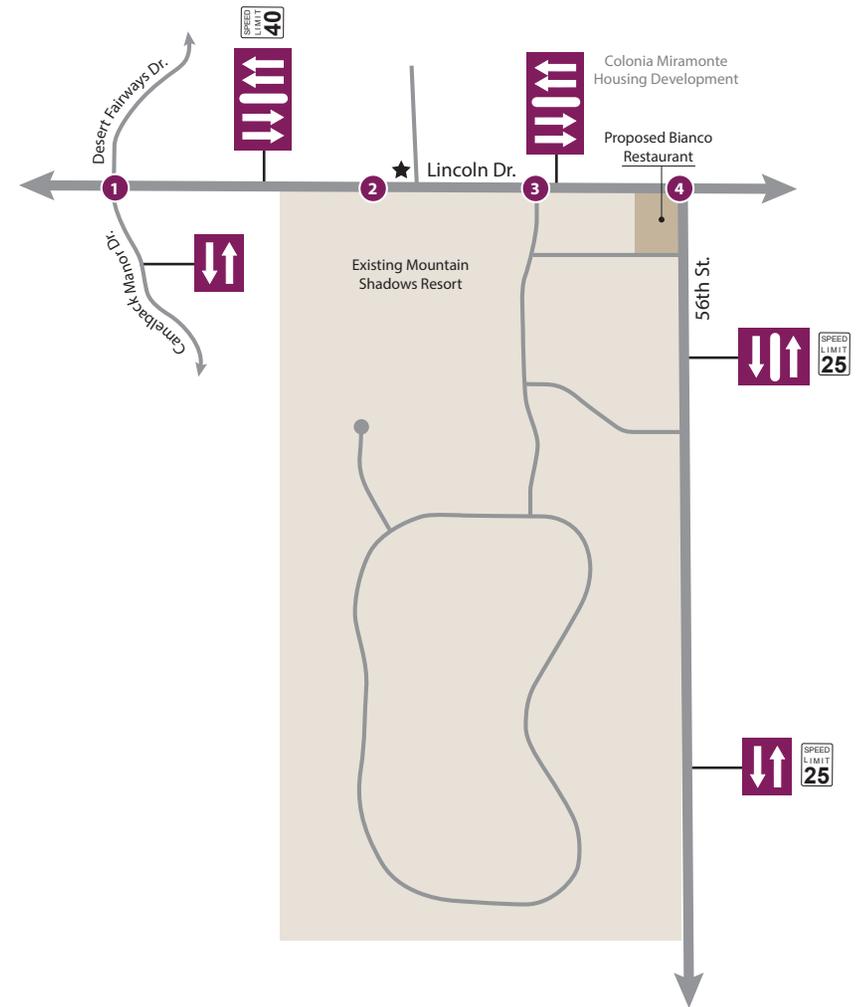
The proposed lane configurations are presented in **Figure 9**.



**LEGEND**

	Thru or Turning		Traffic Signal		NORTH
	Two-Way Left Turn-Lane		Stop Sign		
	Raised Median		Speed Limit		
	Bike Lane		Developer Improvements		

★ Colonia Miramonte Emergency Access



**Figure 9:** Proposed Lane Configurations and Traffic Controls

### **LEFT TURN LANE ANALYSIS**

The Town of Paradise Valley does not provide explicit criteria for the installation of dedicated left turn lanes; they typically defer to City of Scottsdale design standards.

According to the City of Scottsdale Design Standards and Policies Manual (DS&PM), left turn lanes should be determined based on anticipated turning volume and whether there is signalized or unsignalized traffic control. Per the DS&PM, driveways located on arterial roadways must be spaced 330 feet apart, with a minimum spacing of 250 feet with no restrictions. The eastern and western driveways for the Mountain Shadows Resort are spaced approximately 530 feet apart, meaning that a left turn lane into the site at the western driveway could be permitted. A dedicated westbound left turn lane is also safer than making a U-turn at an unprotected signalized intersection or at a median break, which was observed to be happening during both the AM and PM peak hours.

The U-turns counted at the intersection of Desert Fairways Drive and Lincoln Drive, as well as the U-turns counted at the median break just east of this intersection, were assumed to become westbound left turns at the Mountain Shadows West Driveway. These U-turns and the site trips assigned to this driveway were used to determine the need for a left turn lane. In total, there are assumed to be approximately 16 westbound left turns at the West Driveway during the PM peak hour with 1,175 oncoming eastbound trips.

City of Scottsdale DS&PM *Chapter 5, Section 5-3.201, Driveway Spacing* has been included in **Appendix H**. The proposed westbound left turn lane concept prepared by CivTech has been included in **Appendix I**.

**QUEUE LENGTH ANALYSIS**

Adequate turn storage should be supplied on any approach where turn lanes are permitted and/or warranted. A queuing analysis was performed for all warranted/recommended and existing intersection turn lanes where site traffic is expected. According to the methodology documented in *A Policy on Geometric Design of Highways and Streets* (the AASHTO “Green Book”), the storage length for a turn lane is typically estimated as the length required to hold the average number of arriving vehicles per two minutes, where unsignalized, or per one-and-a half signal cycles, where signalized.<sup>1</sup> The formulas used for the calculations are shown below.

For signalized intersections, the storage length is determined by the following formula:

$$\text{Storage Length} = [1.5 \times (\text{veh/hr})/(\text{cycles/hr})] \times 25 \text{ feet}$$

For unsignalized intersections, the storage length is determined by the following formula:

$$\text{Storage Length} = [(\text{veh/hr})/(30 \text{ periods/hr})] \times 25 \text{ feet}$$

Using the traffic volumes and lane configurations projected for the 2020 horizon year, the resulting turn lane storage for turn movements affiliated with the site using AASHTO guidelines were calculated with a 65-second cycle length and are summarized in **Table 7**. Calculations for the queue storage length recommendations are provided in **Appendix J**.

**Table 7: Queue Storage Lengths**

ID	Intersection	Intersection Control	Movement	Queue Storage			
				Existing <sup>(1)</sup>	AASHTO	95 <sup>th</sup> Percentile	Recommended
1	Desert Fairways Dr & Lincoln Dr	Signalized	SB Left	75'	125'	80'	<sup>(2)</sup> 75'
			EB Left	150'	75'	30'	150'
			WB Left	55'	25'	<25'	55'
2	Mountain Shadows West Drwy & Lincoln Dr	1-way stop (NB)	WB Left	-	25'	<25'	<sup>(3)</sup> 75'
			EB Right	115'	50'	<25'	115'
3	Mountain Shadows East Drwy & Lincoln Dr	1-way stop (NB)	WB Left	75'	25'	<25'	75'
			EB Right	100'	25'	<25'	100'
4	56 <sup>th</sup> St & Lincoln Dr	Signalized	EB Left	45'	50'	<25'	45'
			WB Left	75'	50'	30'	75'
			NB Right	285'	25'	<25'	285'

- (1) Measured from stop bar to end of storage length
- (2) Not the responsibility of the developer
- (3) Minimum recommended storage length

The recommended storage lengths in **Table 7** are provided for horizon year 2020 using the total traffic projections. The minimum storage length recommendation for the proposed westbound left turn lane at the Mountain Shadows West Driveway is 75 feet, or enough storage for 3 vehicles at a time.

<sup>1</sup> The American Association of Highway and Transportation Officials on pages 714-715 of its publication, *Geometric Design of Highways and Streets* (“AASHTO Green Book”), indicates that storage length for a turn lane, exclusive of taper, “should usually be based on one and one-half to two times the average number of vehicles that would store per cycle” at a signalized intersection.

There is an existing median break along Lincoln Drive directly east of the proposed median break at the west driveway. This median break is utilized as emergency access for the Colonia Miramonte housing development north of the Mountain Shadows Resort. Since this is a gated emergency access only not available to residents for daily usage, it was determined this median break can be utilized in the design of a westbound left turn lane into the Mountain Shadows Resort west driveway. The determination was provided by the Town based on concept designs provided by the Town's consultant as part of earlier review comments for this project. A minimum of 75 feet of storage is recommended with a 90-foot taper for a total length of 165 feet. The median located in the vicinity of the Colonia Miramonte emergency access should be constructed with mountable curb to allow access, if needed, by emergency vehicles.

## CONCLUSIONS

The following conclusions have been documented for this study.

### General

- The proposed restaurant is anticipated to generate approximately 420 additional weekday daily trips, with 4 (3 in/1 out) additional trips occurring in the AM peak hour and 39 (26 in/13 out) additional trips occurring in the PM peak hour.

### Existing Conditions

- The results of the existing conditions analysis summarized in **Table 2** indicates that all intersections currently operate at an overall acceptable level of service (LOS C or better) under existing lane configurations and signal timing.

### Opening Year 2020

- The results of the 2020 opening year Synchro analysis indicates that all study intersections are anticipated to experience an acceptable level of service LOS C or better.

### Left Turn Lane Analysis

- The Town of Paradise Valley does not provide explicit criteria for the installation of dedicated left turn lanes; they typically defer to City of Scottsdale design standards.
  - Per the City of Scottsdale Design Standards and Policy Manual (DS&PM), driveways located on arterial roadways must be spaced 330 feet apart, with a minimum spacing of 250 feet with no restrictions. The eastern and western driveways for the Mountain Shadows Resort are spaced approximately 530 feet apart, meaning that a left turn lane into the site at the western driveway should be permitted. A dedicated westbound left turn lane is also safer than making a U-turn at an unprotected signalized intersection or at a median break, which was observed to be happening during both the AM and PM peak hours.

### Queue Storage

- The recommended storage lengths are provided for horizon year 2020 using the total traffic projections.
  - There is an existing median break along Lincoln Drive directly east of the proposed median break at the west driveway. This median break is utilized as emergency access for the Colonia Miramonte housing development north of the Mountain Shadows Resort. Since this is a gated emergency access only not available to residents for daily usage, it was

determined this median break can be utilized in the design of a westbound left turn lane into the Mountain Shadows Resort west driveway. The determination was provided by the Town based on concept designs provided by the Town's consultant as part of earlier review comments for this project. A minimum of 75 feet of storage is recommended with a 90-foot taper for a total length of 165 feet.

- It is recommended that the median be constructed with mountable curb in the areas proximate to the Colonia Miramonte emergency access.

## LIST OF REFERENCES

*Highway Capacity Manual*. Transportation Research Board, Washington, D.C., 2000.

*Manual on Uniform Traffic Control Devices*. U.S. Department of Transportation, Federal Highways Administration, Washington, D.C., 2009.

*Roadway Design Manual*, Maricopa County Department of Transportation, Phoenix, Arizona, Revised April 2004.

*Trip Generation Manual, 10<sup>th</sup> Edition*, Institute of Transportation Engineers, Washington, D.C., 2016.

*Trip Generation Handbook, 3<sup>rd</sup> Edition*, Institute of Transportation Engineers, Washington, D.C., 2016.

## TECHNICAL APPENDIX

<b>APPENDIX A:</b>	<b>REVIEW COMMENTS AND RESPONSES</b>
<b>APPENDIX B:</b>	<b>EXISTING TRAFFIC COUNTS</b>
<b>APPENDIX C:</b>	<b>EXISTING PEAK HOUR ANALYSIS</b>
<b>APPENDIX D:</b>	<b>TRIP GENERATION</b>
<b>APPENDIX E:</b>	<b>TRIP DISTRIBUTION</b>
<b>APPENDIX F:</b>	<b>BACKGROUND TRAFFIC</b>
<b>APPENDIX G:</b>	<b>2020 PEAK HOUR ANALYSIS</b>
<b>APPENDIX H:</b>	<b>SCOTTSDALE DS&amp;PM SECTION 5-3.201</b>
<b>APPENDIX I:</b>	<b>LEFT TURN LANE DESIGN CONCEPT</b>
<b>APPENDIX J:</b>	<b>QUEUE STORAGE ANALYSIS</b>
<b>APPENDIX K:</b>	<b>SUP ACCESS DIAGRAMS</b>

## **APPENDIX A**

### **REVIEW COMMENTS AND RESPONSES**

**Mountain Shadows  
2nd Submittal**

**CivTech, Inc.**

**Review Comments & Responses**

Disposition Codes: (1) Will Comply (2) Will Evaluate (3) Delete Comment (4) Defer to Consultant/Owner

Reviewer Name, Agency: **Kimley Horn on behalf of Town of Paradise Valley**

Item	Review Comment	(Code) & Response
1.	Pg 1: Queue storage - based on assessor, this access [Marriott Resort emergency access] falls within the Colonia Miamonte Owners Association	(1) Marriott Resort reference was changed to Colonia Miramonte housing development.
2.	Pg 1: Queue Storage - Using ADOT's criteria for warranting left turn median break is really not appropriate. Access will be based on spacing, volumes, safety, proximity to other driveways and proximity to other signalized intersection. Like COS DS&PM indicated, the Transportation Research Board (TRB), Access Management manual would be a more appropriate document to utilize in the absence of access related criteria. It should also be noted that ADOT has access criteria for median break locations. Main concern is how the proposed left turn will work with the existing emergency access location.	(2) City of Scottsdale Design Standards and Policies Manual (DS&PM) was used to determine driveway spacing requirements instead of determining the need for a left turn lane using ADOT criteria. The recommendation for this turn lane is also based on the safety of vehicles since many vehicles now are making U-turns at Desert Fairways/Lincoln and Lincoln is not necessarily wide enough to be making this movement. Analysis proposed for the access indicate acceptable operations and sight distance. The emergency access will continue to be operational, but will now be restricted by a median, as shown in the latest median design plans being prepared by Kimley Horn. A mountalbe median is recommended in this location.
3.	Pg 2: Queue storage - This is not an accurate statement as emergency response may come from either direction depending on which fire station responds based on call volume and if existing calls for service are responded to.	(1) Statement was revised to indicate that emergency vehicles could approach the access from either the east or the west
4.	Pg 2: Queue storage - see comments in Figure 3, the volumes are not balancing between access #2 and #3. Looking at aerials, I do not see any other driveways or opportunities for u-turn maneuvers. For this reason, I am wondering if there is more traffic utilizing the emergency access?	(1) Volumes were balanced between both access points and 56th Street intersection on Lincoln Drive. The emergency access is gated without an opportunity for interim use by the residents.
5.	Pg 2: Queue storage - How would left turns out of Mountain Shadows be prohibited?	(1) Left turns out of the site will be prohibited by the median design, an Appendix K has been added to show the full design and the site plan figure will be updated with the median design.
6.	Pg 5: change "Marriott Resort" to "CM HOA and El Chorro Restaurant"	(1) Reference in text was changed
7.	Pg 5: Desert Fairways has a posted speed limit of 25 mph, Camelback Manor has no posted speed limit	(1) Speed limit for Desert Fairways Drive was updated



**Mountain Shadows  
2nd Submittal**

**CivTech, Inc.**

**Review Comments & Responses**

Disposition Codes: (1) Will Comply (2) Will Evaluate (3) Delete Comment (4) Defer to Consultant/Owner

Reviewer Name, Agency: **Kimley Horn on behalf of Town of Paradise Valley**

Item	Review Comment	(Code) & Response
8.	Pg 5: change "a private property" to "El Chorro Restaurant"	(1) Reference in text was changed
9.	Pg 6: Please verify seasonal factor with MAG. The most recent MAG volume map (2015) does not provide factor and the most recent MAG map with adjust is 2011 and says seasonal factor is 1.037	(3) After discussion with Paul Mood from the Town of Paradise Valley, it was agreed that the City of Scottsdale seasonal adjustment factor could be used in place of the MAG adjustment factor. An adjustment factor of 0.93 was used per City of Scottsdale DS&PM.
10.	Figure 2: show CM HOA emergency access and internal roadways	(1) This location has been included on the figures
11.	Figure 3: The volumes between the intersections do not add up or balance. I am especially questioning what is occurring between access #2 and #3. Is there more traffic using the emergency access?	(1) Volumes were balanced between both access points and 56th Street intersection on Lincoln Drive. The emergency access is gated without an opportunity for interim use by the residents.
12.	Figure 3: Clarify - are the 6 u-turns in addition to are part of the 5 lefts? Synchro output show 5 lefts.	(1) The 6 U-turns observed at the intersection of Desert Fairways Drive and Lincoln Drive are not included in the existing westbound left turn volume presented in Figure 3. The U-turns were included as westbound left turns at the western Mountain Shadows driveway for the background and total scenarios.
13.	Pg 10: LOS D or LOS C?	(1) LOS D was changed to LOS C
14.	Pg 10: SUP access diagram has primary access off of 56th Street	(1) Text was added to indicate that Paul Mood has agreed to allow CivTech to not analyze the access off of 56th Street since the addition of the left turn will not change the operation of anticipated volumes at the driveway on 56th Street.
15.	Pg 10: indicate both access points are off of Lincoln Drive	(1) Text included to indicate that both access points that were analyzed are on Lincoln Drive
16.	Pg 10: show volumes entering/exiting third access on 56th Street and include in traffic analysis.	(3) Text was added to indicate that Paul Mood has agreed to allow CivTech to not analyze the access off of 56th Street since the addition of the left turn will not change the operation of anticipated volumes at the driveway on 56th Street.
17.	Pg 10: provide layout of proposed left turn median break	(1) Figure 4 will be updated to show the proposed left turn median break on Lincoln Drive. The concept design is also included in Appendix K.



**Mountain Shadows  
2nd Submittal**

**CivTech, Inc.**

**Review Comments & Responses**

Disposition Codes: (1) Will Comply (2) Will Evaluate (3) Delete Comment (4) Defer to Consultant/Owner

Reviewer Name, Agency: **Kimley Horn on behalf of Town of Paradise Valley**

Item	Review Comment	(Code) & Response
18.	Figure 4: show 56th Street access point and add dimensions between the access points	(1) Dimensions have been added to Figure 4 showing the driveway spacing
19.	Figure 4: labeled currently at Figure 5	(1) Figure label has been updated to show correct figure number
20.	Figure 6: show site generated traffic at 56th Street access point	(3) Text was added to indicate that Paul Mood has agreed to allow CivTech to not analyze the access off of 56th Street since the addition of the left turn will not change the operation of anticipated volumes at the driveway on 56th Street.
21.	Figure 6: with a driveway (#3) close to the proposed restaurant, why is right turn traffic using #2 versus #3 to gain access to the restaurant? They have to drive through parking lot to get to site?	(2) While most vehicles will be making right turns at the second access on Lincoln Drive, some vehicles will see the first access and choose to turn there without knowledge that there is a second access point on Lincoln Drive. This is typical of driver behavior. Moving right turn vehicles from access 2 to access 3 does not impact the operational analysis of either intersection.
22.	Pg 16: Were all the u-turns actually observed using the driveway or is this just an assumption?	(1) Text was added to indicate that all U-turns were assumed to be making right turns into the Mountain Shadows Resort and that this was an assumption.
23.	Pg 21: Town of Paradise Valley "typically" defers to City of Scottsdale	(1) "Typically" was added to text to be more descriptive.
24.	Pg 21: As previously commented, this is access control. City of Scottsdale and other agency do have criteria on access/driveway spacing and requires for median breaks. In the absence of criteria associated with access use TRB	(1) City of Scottsdale access control standards were utilized instead of ADOT criteria.
25.	Pg 21: U-turn vehicles actually observed going to mountain shadows west driveway?	(2) As previously mentioned, this was an assumption and the text has been added to clarify the assumption.
26.	Pg 22: 75 feet recommended in table, 50 feet recommended in text. Update text to recommend 75 feet	(1) Text was updated recommending 75 feet of queue storage.
27.	Pg 22: update Marriott Resort references to CM HOA	(1) Reference changed.
28.	Pg 23: LOS C or LOD D?	(1) LOS D was changed to LOS C.
29.	Pg 23: Was City of Phoenix turn lane criteria discussed in report?	(2) This statement was deleted as it was not relevant to the discussion in the TIA body text.



**Mountain Shadows  
2nd Submittal**

**CivTech, Inc.**

**Review Comments & Responses**

Disposition Codes: (1) Will Comply (2) Will Evaluate (3) Delete Comment (4) Defer to Consultant/Owner

Reviewer Name, Agency: **Kimley Horn on behalf of Town of Paradise Valley**

Item	Review Comment	(Code) & Response
30.	Pg 23: Left Turn Lane Analysis - Access will be dependent on what occurs with the Colonia Mariamonte emergency access and treatment for closure and maintaining emergency access.	(2) Discussion was added in the text addressing emergency access.



## **APPENDIX B**

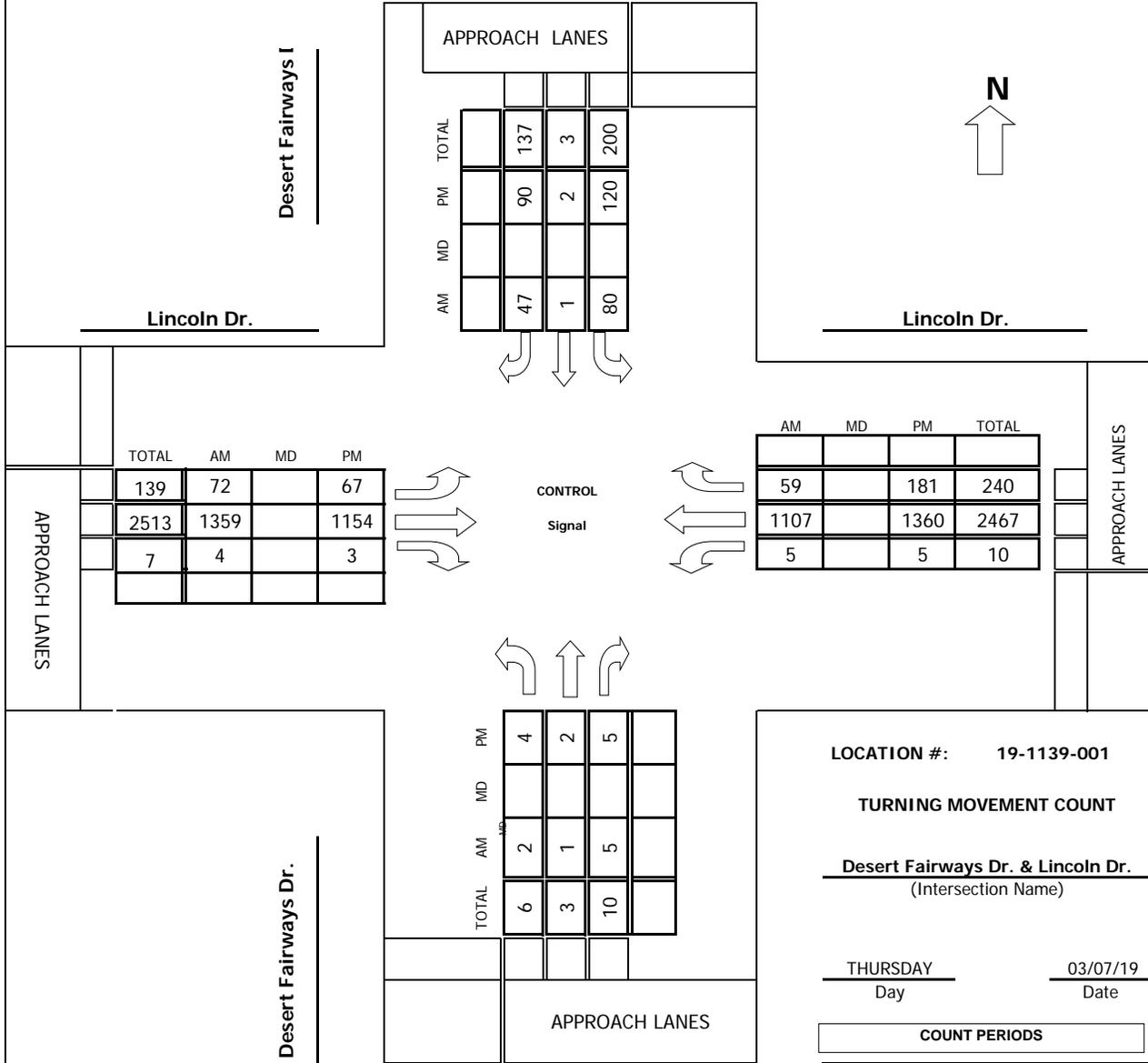
### **EXISTING TRAFFIC COUNTS**

**Intersection Turning Movement  
Prepared by:**



**Project #:** 19-1139-001

***TMC SUMMARY OF Desert Fairways Dr. & Lincoln Dr.***



TOTAL	AM	MD	PM
139	72		67
2513	1359		1154
7	4		3

AM	MD	PM	TOTAL
59		181	240
1107		1360	2467
5		5	10

TOTAL	AM	MD	PM
6	2		4
3	1		2
10	5		5

**LOCATION #:** 19-1139-001

**TURNING MOVEMENT COUNT**

**Desert Fairways Dr. & Lincoln Dr.**  
(Intersection Name)

THURSDAY                      03/07/19  
Day                                      Date

COUNT PERIODS	
<b>AM</b>	700AM - 900AM
<b>NOON</b>	-
<b>PM</b>	400PM - 600PM

AM PEAK HOUR                      730 AM  
NOON PEAK HOUR                      \_\_\_\_\_  
PM PEAK HOUR                      430 PM

# Intersection Turning Movement

Prepared by:



**FIELD DATA SERVICES OF ARIZONA, INC.**  
520.316.6745



N-S STREET: Desert Fairways Dr.      DATE: 03/07/19      LOCATION: Paradise Valley  
 E-W STREET: Lincoln Dr.      DAY: THURSDAY      PROJECT#: 19-1139-001

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	1	0	1	0.5	0.5	1	2	0	1	2	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	2	0	0	14	0	6	11	307	0	3	239	6	588
7:15 AM	1	0	3	16	0	24	10	317	0	2	252	13	638
7:30 AM	1	0	4	15	0	16	21	375	0	3	303	18	756
7:45 AM	0	0	0	22	0	16	17	326	1	0	268	14	664
8:00 AM	0	0	0	25	0	7	16	338	1	0	280	10	677
8:15 AM	1	1	1	18	1	8	18	320	2	2	256	17	645
8:30 AM	0	0	3	21	0	18	19	338	1	3	239	19	661
8:45 AM	1	0	3	17	1	3	25	327	1	2	242	21	643
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	6	1	14	148	2	98	137	2648	6	15	2079	118	5272
Approach %	28.57	4.76	66.67	59.68	0.81	39.52	4.91	94.88	0.21	0.68	93.99	5.33	
App/Depart	21	/	256	248	/	23	2791	/	2810	2212	/	2183	

AM Peak Hr Begins at: 730 AM

**PEAK**

Volumes	2	1	5	80	1	47	72	1359	4	5	1107	59	2742
Approach %	25.00	12.50	62.50	62.50	0.78	36.72	5.02	94.70	0.28	0.43	94.53	5.04	

**PEAK HR.**

FACTOR:	0.400	0.842	0.906	0.904	0.907
---------	-------	-------	-------	-------	-------

CONTROL: Signal

COMMENT 1:

GPS: 33.531053, -111.966596

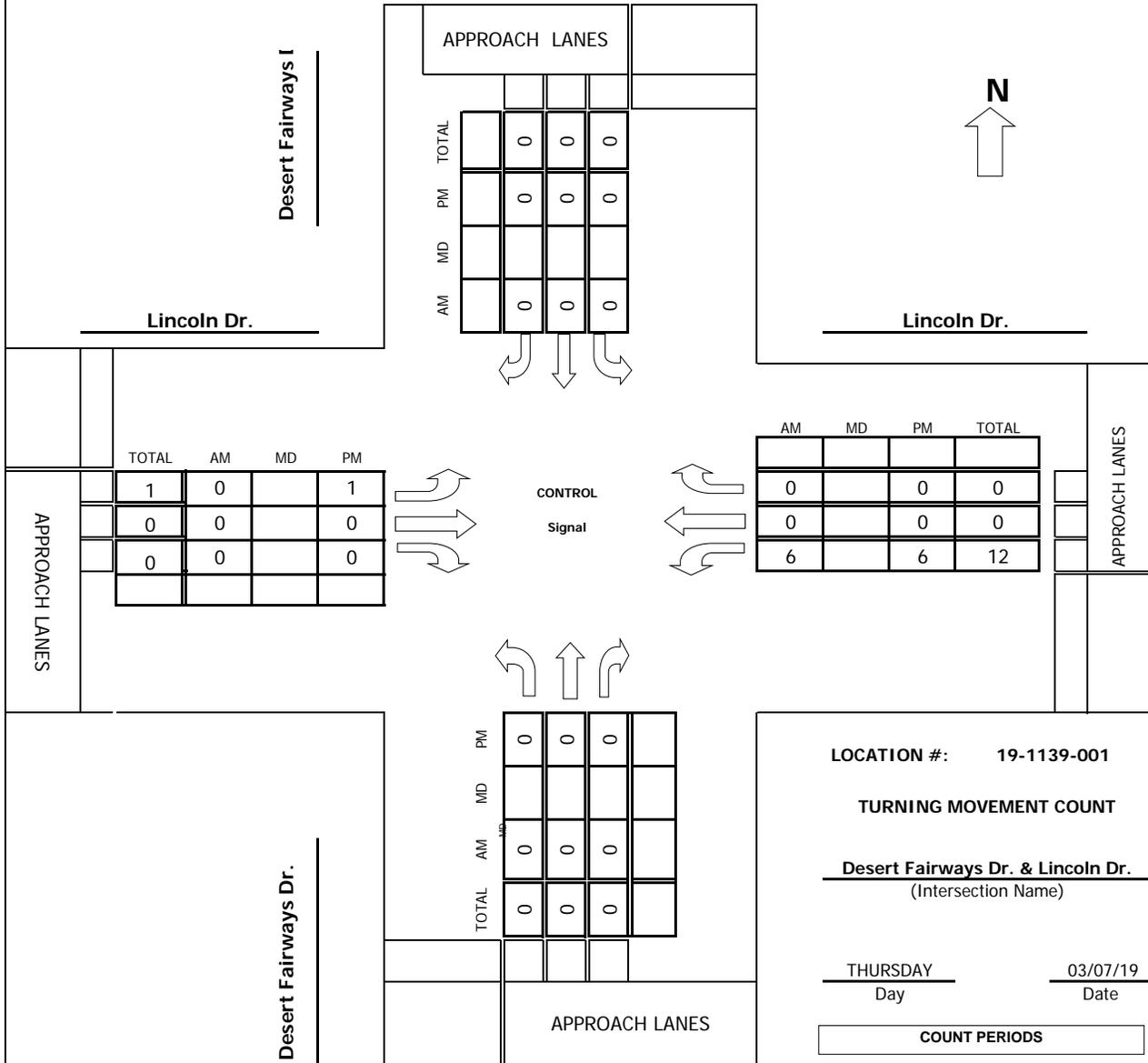


**Intersection Turning Movement  
Prepared by:**



**Project #:** 19-1139-001

***TMC SUMMARY OF Desert Fairways Dr. & Lincoln Dr.***



TOTAL	AM	MD	PM
1	0		1
0	0		0
0	0		0

AM	MD	PM	TOTAL
0		0	0
0		0	0
6		6	12

TOTAL	AM	MD	PM
0	0		0
0	0		0
0	0		0

**LOCATION #:** 19-1139-001

**TURNING MOVEMENT COUNT**

**Desert Fairways Dr. & Lincoln Dr.**  
(Intersection Name)

THURSDAY                      03/07/19  
Day                                      Date

COUNT PERIODS	
<b>AM</b>	700AM - 900AM
<b>NOON</b>	-
<b>PM</b>	400PM - 600PM

AM PEAK HOUR                      700 AM  
NOON PEAK HOUR                      \_\_\_\_\_  
PM PEAK HOUR                      500 PM

# Intersection Turning Movement

Prepared by:



**FIELD DATA SERVICES OF ARIZONA, INC.**  
520.316.6745



N-S STREET: Desert Fairways Dr.      DATE: 03/07/19      LOCATION: Paradise Valley  
 E-W STREET: Lincoln Dr.      DAY: THURSDAY      PROJECT#: 19-1139-001

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	1	0	1	0.5	0.5	1	2	0	1	2	0	
6:00 AM	<b>U-TURNS ONLY</b>												
6:15 AM	<b>U-TURNS ONLY</b>												
6:30 AM	<b>U-TURNS ONLY</b>												
6:45 AM	<b>U-TURNS ONLY</b>												
7:00 AM	0	0	0	0	0	0	0	0	0	2	0	0	2
7:15 AM	0	0	0	0	0	0	0	0	0	3	0	0	3
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	
7:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	1
8:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	1
8:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	1
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	
9:00 AM	<b>U-TURNS ONLY</b>												
9:15 AM	<b>U-TURNS ONLY</b>												
9:30 AM	<b>U-TURNS ONLY</b>												
9:45 AM	<b>U-TURNS ONLY</b>												
10:00 AM	<b>U-TURNS ONLY</b>												
10:15 AM	<b>U-TURNS ONLY</b>												
10:30 AM	<b>U-TURNS ONLY</b>												
10:45 AM	<b>U-TURNS ONLY</b>												
11:00 AM	<b>U-TURNS ONLY</b>												
11:15 AM	<b>U-TURNS ONLY</b>												
11:30 AM	<b>U-TURNS ONLY</b>												
11:45 AM	<b>U-TURNS ONLY</b>												

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	0	0	0	0	0	0	0	0	0	8	0	0	8
Approach %	####	####	####	####	####	####	####	####	####	100.00	0.00	0.00	
App/Depart	0	/	0	0	/	8	0	/	0	8	/	0	

AM Peak Hr Begins at: 700 AM

**PEAK**

Volumes	0	0	0	0	0	0	0	0	0	6	0	0	6
Approach %	####	####	####	####	####	####	####	####	####	100.00	0.00	0.00	

**PEAK HR.**

FACTOR:	0.000	0.000	0.000	0.500	0.500
---------	-------	-------	-------	-------	-------

CONTROL: Signal

COMMENT 1:

GPS: 33.531053, -111.966596

# Intersection Turning Movement



**FIELD DATA SERVICES OF ARIZONA, INC.**  
520.316.6745



N-S STREET: Desert Fairways Dr.      DATE: 03/07/19      LOCATION: Paradise Valley  
0  
 E-W STREET: Lincoln Dr.      DAY: THURSDAY      PROJECT# 19-1139-001

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	1	0	1	0.5	0.5	1	2	0	1	2	0	

1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	
4:30 PM	0	0	0	0	0	0	1	0	0	1	0	0	2
4:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	1
5:00 PM	0	0	0	0	0	0	0	0	0	2	0	0	2
5:15 PM	0	0	0	0	0	0	1	0	0	0	0	0	1
5:30 PM	0	0	0	0	0	0	0	0	0	2	0	0	2
5:45 PM	0	0	0	0	0	0	0	0	0	2	0	0	2
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

**U-TURNS ONLY**

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	0	0	0	0	0	0	2	0	0	8	0	0	10
Approach %	####	####	####	####	####	####	100.00	0.00	0.00	100.00	0.00	0.00	
App/Depart	0	/	2	0	/	8	2	/	0	8	/	0	

PM Peak Hr Begins at: 500 PM

**PEAK**

Volumes	0	0	0	0	0	0	1	0	0	6	0	0	7
Approach %	####	####	####	####	####	####	100.00	0.00	0.00	100.00	0.00	0.00	

**PEAK HR.**

FACTOR:	0.000	0.000	0.250	0.750	0.875
---------	-------	-------	-------	-------	-------

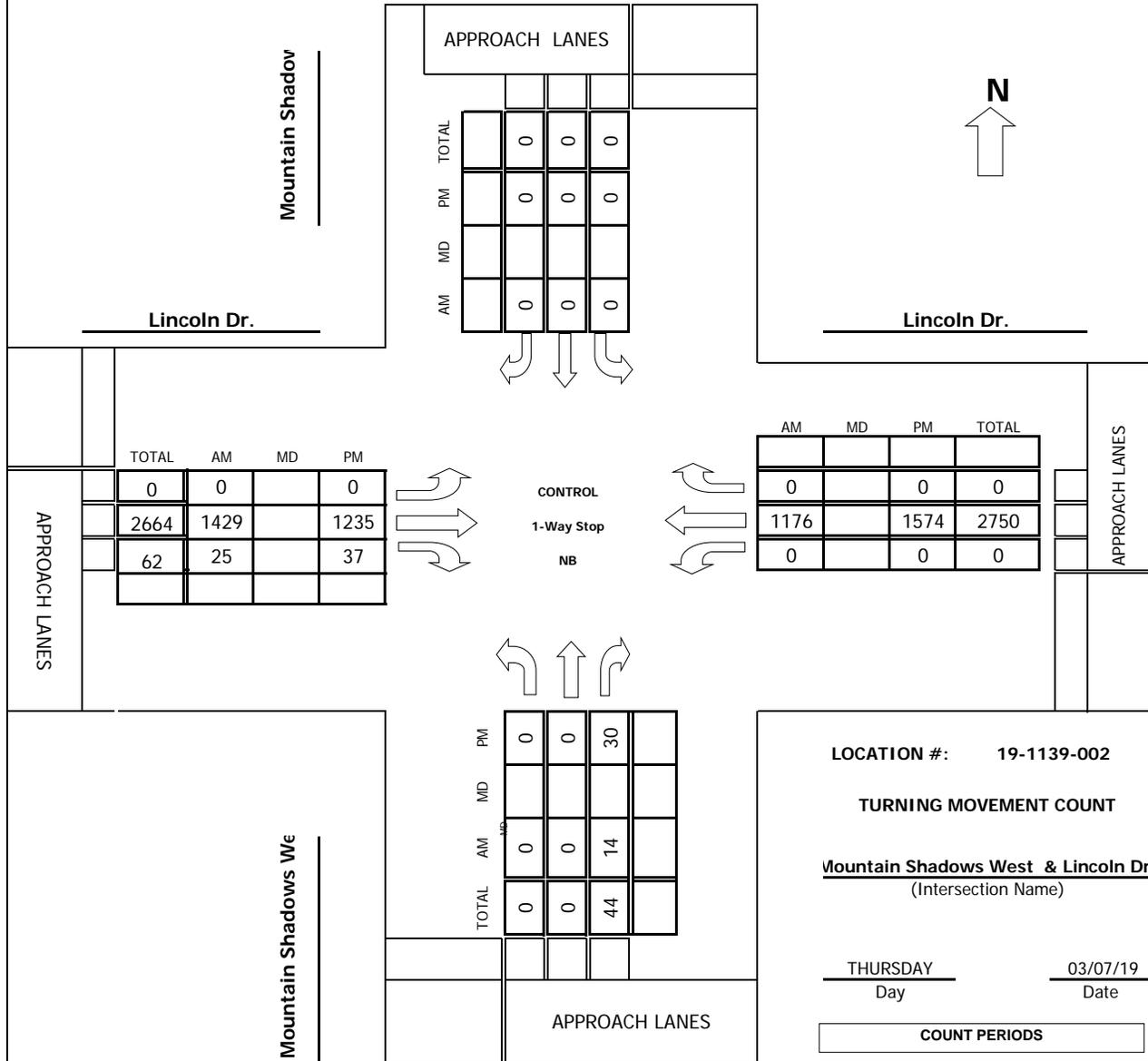
CONTROL: Signal  
 COMMENT 1: 0  
 GPS: 33.531053, -111.966596

**Intersection Turning Movement  
Prepared by:**



**Project #:** 19-1139-002

**TMC SUMMARY OF Mountain Shadows West & Lincoln Dr.**



TOTAL	AM	MD	PM
0	0		0
2664	1429		1235
62	25		37

AM	MD	PM	TOTAL
0		0	0
1176		1574	2750
0		0	0

TOTAL	AM	MD	PM
0	0		0
0	0		0
0	14		30
0	14		30

**LOCATION #:** 19-1139-002

**TURNING MOVEMENT COUNT**

**Mountain Shadows West & Lincoln Dr**  
(Intersection Name)

THURSDAY

03/07/19

Day

Date

**COUNT PERIODS**

<b>AM</b>	700AM	-	900AM
<b>NOON</b>		-	
<b>PM</b>	400PM	-	600PM

AM PEAK HOUR 730 AM

NOON PEAK HOUR \_\_\_\_\_

PM PEAK HOUR 430 PM

# Intersection Turning Movement

Prepared by:



**FIELD DATA SERVICES OF ARIZONA, INC.**  
520.316.6745



N-S STREET: Mountain Shadows West      DATE: 03/07/19      LOCATION: Paradise Valley  
 E-W STREET: Lincoln Dr.      DAY: THURSDAY      PROJECT#: 19-1139-002

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	0	1	0	0	0	0	2	1	0	2	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	0	0	1	0	0	0	0	308	7	0	228	0	544
7:15 AM	0	0	5	0	0	0	0	338	7	0	262	0	612
7:30 AM	0	0	3	0	0	0	0	346	6	0	299	0	654
7:45 AM	0	0	3	0	0	0	0	391	5	0	295	0	694
8:00 AM	0	0	4	0	0	0	0	370	10	0	272	0	656
8:15 AM	0	0	4	0	0	0	0	322	4	0	310	0	640
8:30 AM	0	0	4	0	0	0	0	341	4	0	247	0	596
8:45 AM	0	0	5	0	0	0	0	374	6	0	289	0	674
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	0	0	29	0	0	0	0	2790	49	0	2202	0	5070
Approach %	0.00	0.00	100.00	####	####	####	0.00	98.27	1.73	0.00	100.00	0.00	
App/Depart	29	/	0	0	/	49	2839	/	2819	2202	/	2202	

AM Peak Hr Begins at: 730 AM

**PEAK**

Volumes	0	0	14	0	0	0	0	1429	25	0	1176	0	2644
Approach %	0.00	0.00	100.00	####	####	####	0.00	98.28	1.72	0.00	100.00	0.00	

**PEAK HR.**

FACTOR:	0.875	0.000	0.918	0.948	0.952
---------	-------	-------	-------	-------	-------

CONTROL: 1-Way Stop (NB)  
 COMMENT 1:  
 GPS: 33.531052, -111.963798

# Intersection Turning Movement



**FIELD DATA SERVICES OF ARIZONA, INC.**  
520.316.6745



N-S STREET: Mountain Shadows West 0      DATE: 03/07/19      LOCATION: Paradise Valley  
 E-W STREET: Lincoln Dr.      DAY: THURSDAY      PROJECT#: 19-1139-002

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
1:00 PM	0	0	1	0	0	0	0	2	1	0	2	0	
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	0	0	7	0	0	0	0	238	3	0	338	0	586
4:15 PM	0	0	3	0	0	0	0	289	6	0	387	0	685
4:30 PM	0	0	5	0	0	0	0	292	11	0	379	0	687
4:45 PM	0	0	12	0	0	0	0	297	8	0	418	0	735
5:00 PM	0	0	9	0	0	0	0	321	9	0	393	0	732
5:15 PM	0	0	4	0	0	0	0	325	9	0	384	0	722
5:30 PM	0	0	5	0	0	0	0	327	11	0	298	0	641
5:45 PM	0	0	2	0	0	0	0	313	16	0	304	0	635
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	0	0	47	0	0	0	0	2402	73	0	2901	0	5423
Approach %	0.00	0.00	100.00	####	####	####	0.00	97.05	2.95	0.00	100.00	0.00	
App/Depart	47	/	0	0	/	73	2475	/	2449	2901	/	2901	

PM Peak Hr Begins at: 430 PM

**PEAK**

Volumes	0	0	30	0	0	0	0	1235	37	0	1574	0	2876
Approach %	0.00	0.00	100.00	####	####	####	0.00	97.09	2.91	0.00	100.00	0.00	

**PEAK HR.**

FACTOR:	0.625	0.000	0.952	0.941	0.978
---------	-------	-------	-------	-------	-------

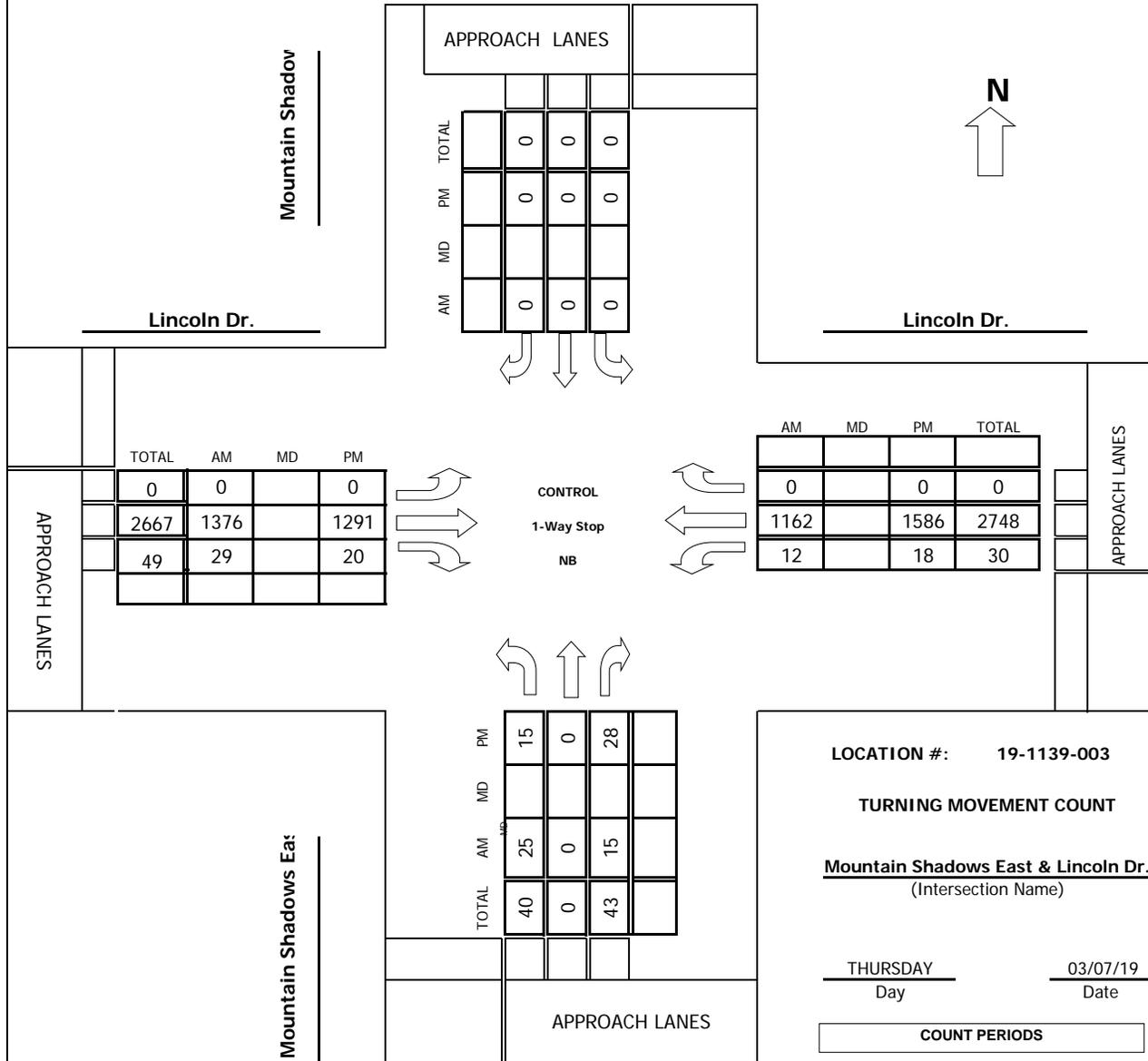
CONTROL: 1-Way Stop (NB)  
 COMMENT 1: 0  
 GPS: 33.531052, -111.963798

**Intersection Turning Movement  
Prepared by:**



**Project #:** 19-1139-003

**TMC SUMMARY OF Mountain Shadows East & Lincoln Dr.**



TOTAL	AM	MD	PM
0	0		0
2667	1376		1291
49	29		20

AM	MD	PM	TOTAL
0		0	0
1162		1586	2748
12		18	30

TOTAL	AM	MD	PM
40	25	0	15
0	0	0	0
43	15	0	28

**LOCATION #:** 19-1139-003

**TURNING MOVEMENT COUNT**

**Mountain Shadows East & Lincoln Dr.**  
(Intersection Name)

THURSDAY  
Day

03/07/19  
Date

**COUNT PERIODS**

<b>AM</b>	700AM	-	900AM
<b>NOON</b>		-	
<b>PM</b>	400PM	-	600PM

AM PEAK HOUR 730 AM

NOON PEAK HOUR \_\_\_\_\_

PM PEAK HOUR 445 PM

# Intersection Turning Movement

Prepared by:



**FIELD DATA SERVICES OF ARIZONA, INC.**  
520.316.6745



N-S STREET: Mountain Shadows East      DATE: 03/07/19      LOCATION: Paradise Valley  
 E-W STREET: Lincoln Dr.      DAY: THURSDAY      PROJECT#: 19-1139-003

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
LANES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	7	0	1	0	0	0	0	307	9	3	211	0	538
7:15 AM	4	0	2	0	0	0	0	330	10	2	260	0	608
7:30 AM	7	0	4	0	0	0	0	309	9	4	289	0	622
7:45 AM	3	0	3	0	0	0	0	381	8	4	288	0	687
8:00 AM	10	0	3	0	0	0	0	359	7	3	275	0	657
8:15 AM	5	0	5	0	0	0	0	327	5	1	310	0	653
8:30 AM	3	0	2	0	0	0	0	334	11	4	246	0	600
8:45 AM	2	0	5	0	0	0	0	357	6	1	281	0	652
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	41	0	25	0	0	0	0	2704	65	22	2160	0	5017
Approach %	62.12	0.00	37.88	####	####	####	0.00	97.65	2.35	1.01	98.99	0.00	
App/Depart	66	/	0	0	/	87	2769	/	2729	2182	/	2201	

AM Peak Hr Begins at: 730 AM

PEAK

Volumes	25	0	15	0	0	0	0	1376	29	12	1162	0	2619
Approach %	62.50	0.00	37.50	####	####	####	0.00	97.94	2.06	1.02	98.98	0.00	

PEAK HR.

FACTOR:	0.769	0.000	0.903	0.944	0.953
---------	-------	-------	-------	-------	-------

CONTROL: 1-Way Stop (NB)  
 COMMENT 1:  
 GPS: 33.531052, -111.963798

# Intersection Turning Movement



**FIELD DATA SERVICES OF ARIZONA, INC.**  
520.316.6745



N-S STREET: Mountain Shadows East 0      DATE: 03/07/19      LOCATION: Paradise Valley  
 E-W STREET: Lincoln Dr.      DAY: THURSDAY      PROJECT#: 19-1139-003

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	1	0	0	0	0	0	2	1	1	2	0	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	8	0	2	0	0	0	0	236	5	7	321	0	579
4:15 PM	5	0	4	0	0	0	0	287	2	5	373	0	676
4:30 PM	4	0	7	0	0	0	0	284	3	3	383	0	684
4:45 PM	5	0	4	0	0	0	0	304	6	2	425	0	746
5:00 PM	4	0	11	0	0	0	0	323	5	6	400	0	749
5:15 PM	2	0	9	0	0	0	0	335	6	3	369	0	724
5:30 PM	4	0	4	0	0	0	0	329	3	7	392	0	739
5:45 PM	1	0	4	0	0	0	0	313	8	14	401	0	741
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	33	0	45	0	0	0	0	2411	38	47	3064	0	5638
Approach %	42.31	0.00	57.69	####	####	####	0.00	98.45	1.55	1.51	98.49	0.00	
App/Depart	78	/	0	0	/	85	2449	/	2456	3111	/	3097	

PM Peak Hr Begins at: 445 PM

**PEAK**

Volumes	15	0	28	0	0	0	0	1291	20	18	1586	0	2958
Approach %	34.88	0.00	65.12	####	####	####	0.00	98.47	1.53	1.12	98.88	0.00	

**PEAK HR.**

FACTOR:	0.717	0.000	0.961	0.939	0.987
---------	-------	-------	-------	-------	-------

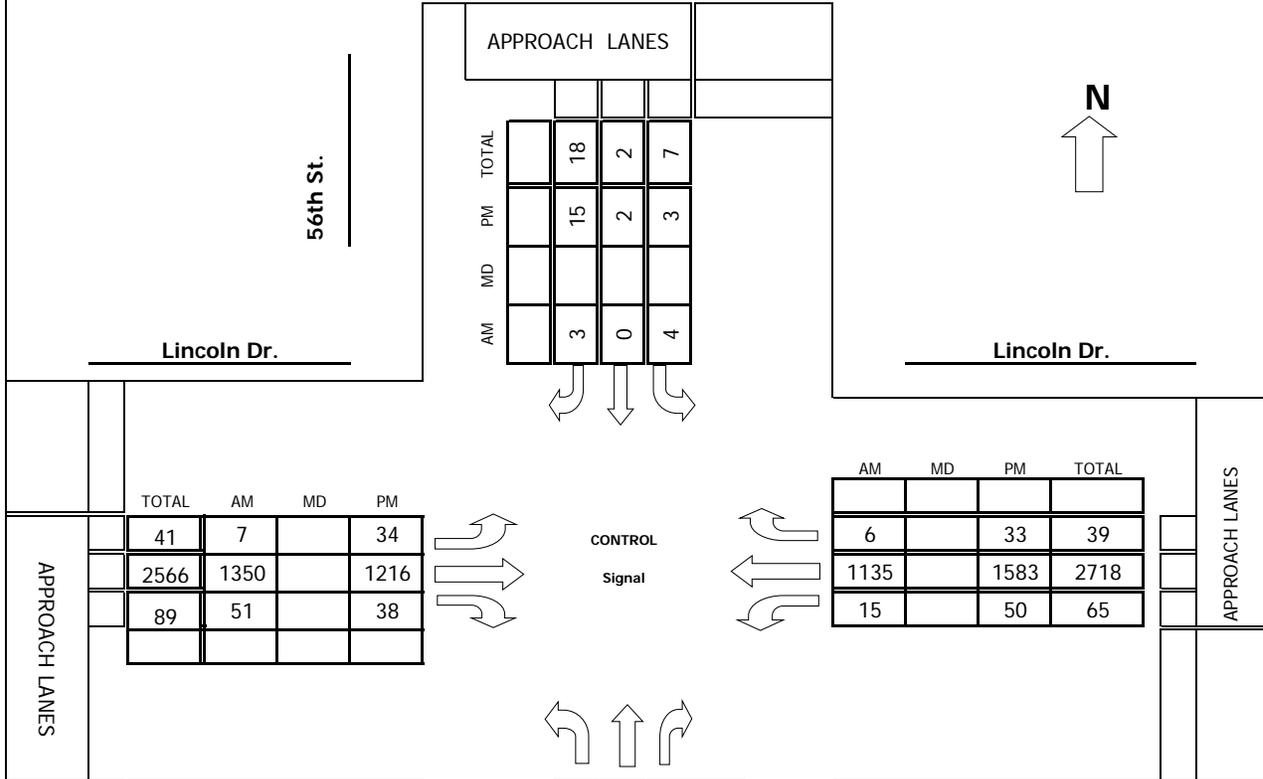
CONTROL: 1-Way Stop (NB)  
 COMMENT 1: 0  
 GPS: 33.531052, -111.963798

**Intersection Turning Movement  
Prepared by:**



**Project #:** 19-1139-004

***TMC SUMMARY OF 56th St. & Lincoln Dr.***



TOTAL	AM	MD	PM
41	7		34
2566	1350		1216
89	51		38

AM	MD	PM	TOTAL
6		33	39
1135		1583	2718
15		50	65

TOTAL	AM	MD	PM
104	35		69
3	1		2
41	16		25

**LOCATION #:** 19-1139-004

**TURNING MOVEMENT COUNT**

**56th St. & Lincoln Dr.**  
(Intersection Name)

THURSDAY  
Day

03/07/19  
Date

**COUNT PERIODS**

<b>AM</b>	700AM	-	900AM
<b>NOON</b>		-	
<b>PM</b>	400PM	-	600PM

AM PEAK HOUR 730 AM

NOON PEAK HOUR                     

PM PEAK HOUR 430 PM

# Intersection Turning Movement

Prepared by:



**FIELD DATA SERVICES OF ARIZONA, INC.**  
520.316.6745



N-S STREET: **56th St.**      DATE: **03/07/19**      LOCATION: **Paradise Valley**  
 E-W STREET: **Lincoln Dr.**      DAY: **THURSDAY**      PROJECT# **19-1139-004**

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
6:00 AM	0	1	0	0	1	0	1	2	0	1	2	0	
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	8	0	3	0	0	1	3	287	16	3	209	0	530
7:15 AM	10	0	3	0	0	0	1	311	16	7	252	0	600
7:30 AM	6	0	6	1	0	1	0	303	13	5	286	2	623
7:45 AM	10	0	4	0	0	1	5	373	16	7	285	1	702
8:00 AM	8	0	5	1	0	1	1	345	12	1	265	1	640
8:15 AM	11	1	1	2	0	0	1	329	10	2	299	2	658
8:30 AM	11	0	3	1	0	1	0	322	13	7	238	0	596
8:45 AM	14	0	6	2	0	0	2	347	21	8	274	0	674
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	78	1	31	7	0	5	13	2617	117	40	2108	6	5023
Approach %	70.91	0.91	28.18	58.33	0.00	41.67	0.47	95.27	4.26	1.86	97.86	0.28	
App/Depart	110	/	20	12	/	157	2747	/	2655	2154	/	2191	

AM Peak Hr Begins at: 730 AM

**PEAK**

Volumes	35	1	16	4	0	3	7	1350	51	15	1135	6	2623
Approach %	67.31	1.92	30.77	57.14	0.00	42.86	0.50	95.88	3.62	1.30	98.18	0.52	

**PEAK HR.**

FACTOR:	0.929	0.875	0.893	0.954	0.934
---------	-------	-------	-------	-------	-------

CONTROL: **Signal**

COMMENT 1:

GPS: **33.531070, -111.960495**

# Intersection Turning Movement



**FIELD DATA SERVICES OF ARIZONA, INC.**  
520.316.6745



N-S STREET: **56th St.**      DATE: **03/07/19**      LOCATION: **Paradise Valley**  
 E-W STREET: **Lincoln Dr.**      DAY: **THURSDAY**      PROJECT# **19-1139-004**

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	1	0	0	1	0	1	2	0	1	2	0	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	11	0	8	3	0	1	4	225	9	1	338	2	602
4:15 PM	10	0	2	2	0	3	9	279	3	5	389	6	708
4:30 PM	18	0	5	1	0	1	6	280	6	10	385	8	720
4:45 PM	21	2	2	0	1	3	11	287	10	6	423	9	775
5:00 PM	15	0	6	2	0	6	8	316	14	10	403	10	790
5:15 PM	15	0	12	0	1	5	9	333	8	24	372	6	785
5:30 PM	9	0	13	2	0	1	3	325	6	13	309	5	686
5:45 PM	10	3	8	2	0	1	10	301	7	17	327	9	695
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	109	5	56	12	2	21	60	2346	63	86	2946	55	5761
Approach %	64.12	2.94	32.94	34.29	5.71	60.00	2.43	95.02	2.55	2.79	95.43	1.78	
App/Depart	170	/	120	35	/	151	2469	/	2414	3087	/	3076	

PM Peak Hr Begins at: 430 PM

**PEAK**

Volumes	69	2	25	3	2	15	34	1216	38	50	1583	33	3070
Approach %	71.88	2.08	26.04	15.00	10.00	75.00	2.64	94.41	2.95	3.00	95.02	1.98	

**PEAK HR.**

FACTOR:	0.889	0.625	0.920	0.951	0.972
---------	-------	-------	-------	-------	-------

CONTROL: **Signal**  
 COMMENT 1: **0**  
 GPS: **33.531070, -111.960495**

## **APPENDIX C**

### **EXISTING PEAK HOUR ANALYSIS**

Mountain Shadows Resort  
Existing AM

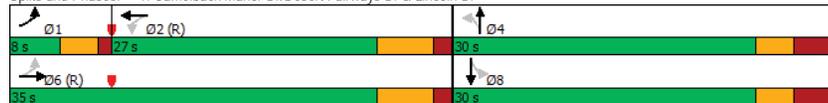
1: Camelback Manor Dr/Desert Fairways Dr & Lincoln Dr  
Timings

	↖	→	↙	←	↘	↑	↗	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↖↗	↙	↖↗	↖	↖↗	↙	↙
Traffic Volume (vph)	67	1264	5	1030	2	1	74	1
Future Volume (vph)	67	1264	5	1030	2	1	74	1
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	1	6		2		4		8
Permitted Phases	6		2		4		8	
Detector Phase	1	6	2	2	4	4	8	8
Switch Phase								
Minimum Initial (s)	4.0	15.0	15.0	15.0	7.0	7.0	7.0	7.0
Minimum Split (s)	8.0	26.0	26.0	26.0	30.0	30.0	30.0	30.0
Total Split (s)	8.0	35.0	27.0	27.0	30.0	30.0	30.0	30.0
Total Split (%)	12.3%	53.8%	41.5%	41.5%	46.2%	46.2%	46.2%	46.2%
Yellow Time (s)	3.0	4.5	4.5	4.5	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.5	1.5	1.5	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	47.8	47.0	41.0	41.0	9.8	9.8	9.8	9.8
Actuated g/C Ratio	0.74	0.72	0.63	0.63	0.15	0.15	0.15	0.15
v/c Ratio	0.22	0.54	0.03	0.54	0.08	0.42	0.19	0.19
Control Delay	5.3	7.0	8.0	10.8	15.1	30.5	9.2	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.3	7.0	8.0	10.8	15.1	30.5	9.2	9.2
LOS	A	A	A	B	B	C	A	A
Approach Delay		6.9		10.8		15.1		22.5
Approach LOS		A		B		B		C

Intersection Summary

Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.54	
Intersection Signal Delay: 9.4	Intersection LOS: A
Intersection Capacity Utilization 73.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: Camelback Manor Dr/Desert Fairways Dr & Lincoln Dr



Mountain Shadows Resort  
Existing AM

1: Camelback Manor Dr/Desert Fairways Dr & Lincoln Dr  
HCM 6th Signalized Intersection Summary

	↖	→	↙	←	↘	↑	↗	↓	↖			
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↙	↖↗			↖↗		↙	↙	
Traffic Volume (veh/h)	67	1264	4	5	1030	55	2	1	5	74	1	44
Future Volume (veh/h)	67	1264	4	5	1030	55	2	1	5	74	1	44
Initial Q (Ob), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No											
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1945	1870	1870	1870	1870
Adj Flow Rate, veh/h	74	1389	0	6	1144	28	5	2	88	1	28	28
Peak Hour Factor	0.91	0.91	0.91	0.90	0.90	0.90	0.40	0.40	0.40	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	346	2554	0	320	2169	53	151	59	35	249	5	149
Arrive On Green	0.05	0.72	0.00	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10	0.10
Sat Flow, veh/h	1781	3647	0	389	3545	87	669	609	365	1412	55	1538
Grp Volume(v), veh/h	74	1389	0	6	573	599	9	0	88	0	29	29
Grp Sat Flow(s),veh/h/ln	1781	1777	0	389	1777	1855	1643	0	0	1412	0	1593
Q Serve(g_s), s	0.9	11.7	0.0	0.8	18.7	18.7	0.0	0.0	0.0	3.5	0.0	1.1
Cycle Q Clear(g_c), s	0.9	11.7	0.0	5.6	18.7	18.7	0.3	0.0	0.0	3.8	0.0	1.1
Prop In Lane	1.00		0.00	1.00		0.05	0.56		0.22	1.00		0.97
Lane Grp Cap(c), veh/h	346	2554	0	320	1087	1135	245	0	0	249	0	154
V/C Ratio(X)	0.21	0.54	0.00	0.02	0.53	0.53	0.04	0.00	0.00	0.35	0.00	0.19
Avail Cap(c_a), veh/h	375	2554	0	320	1087	1135	674	0	0	634	0	588
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.2	4.2	0.0	14.3	17.5	17.5	26.7	0.0	0.0	28.2	0.0	27.0
Incr Delay (d2), s/veh	0.1	0.8	0.0	0.1	1.8	1.8	0.1	0.0	0.0	0.9	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.3	0.0	0.1	9.1	9.5	0.1	0.0	0.0	1.3	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.3	5.1	0.0	14.4	19.4	19.3	26.7	0.0	0.0	29.1	0.0	27.6
LnGrp LOS	A	A	A	B	B	B	C	A	A	C	A	C
Approach Vol, veh/h		1463			1178			9				117
Approach Delay, s/veh		5.2			19.3			26.7				28.7
Approach LOS		A			B			C				C
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.9	45.8		12.3		52.7		12.3				
Change Period (Y+Rc), s	4.0	6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s	4.0	21.0		24.0		29.0		24.0				
Max Q Clear Time (g_c+I1), s	2.9	20.7		2.3		13.7		5.8				
Green Ext Time (p_c), s	0.0	0.2		0.0		8.5		0.3				

Intersection Summary

HCM 6th Ctrl Delay	12.3
HCM 6th LOS	B

Mountain Shadows Resort  
Existing AM

2: Mountain Shadows West & Lincoln Dr  
HCM 6th TWSC

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑		↑
Traffic Vol, veh/h	1329	23	0	1104	0	13
Future Vol, veh/h	1329	23	0	1104	0	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	125	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	95	95	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1445	25	0	1162	0	15

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	723
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	6.94
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	3.32
Pot Cap-1 Maneuver	-	0	*540
Stage 1	-	0	0
Stage 2	-	0	0
Platoon blocked, %	-	-	1
Mov Cap-1 Maneuver	-	-	*540
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	540	-	-	-
HCM Lane V/C Ratio	0.027	-	-	-
HCM Control Delay (s)	11.9	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-

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

Mountain Shadows Resort  
Existing AM

3: Mountain Shadows East & Lincoln Dr  
HCM 6th TWSC

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Vol, veh/h	1315	27	11	1081	23	14
Future Vol, veh/h	1315	27	11	1081	23	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	135	80	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	94	94	77	77
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1461	30	12	1150	30	18

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	1491	2060
Stage 1	-	-	1461
Stage 2	-	-	599
Critical Hdwy	-	4.14	6.84
Critical Hdwy Stg 1	-	-	5.84
Critical Hdwy Stg 2	-	-	5.84
Follow-up Hdwy	-	2.22	3.52
Pot Cap-1 Maneuver	-	*808	*87
Stage 1	-	-	*510
Stage 2	-	-	*600
Platoon blocked, %	-	1	1
Mov Cap-1 Maneuver	-	*808	*86
Mov Cap-2 Maneuver	-	-	*286
Stage 1	-	-	*502
Stage 2	-	-	*600

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	17
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	348	-	-	808	-
HCM Lane V/C Ratio	0.138	-	-	0.014	-
HCM Control Delay (s)	17	-	-	9.5	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.5	-	-	0	-

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

Mountain Shadows Resort  
Existing AM

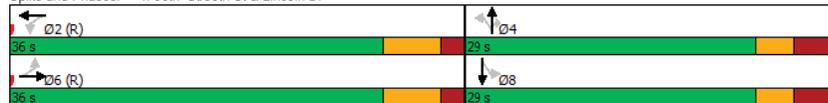
4: 56th St/56th St & Lincoln Dr  
Timings

	↖	→	↙	←	↘	↑	↗	↖	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↖	↕	↙	↕	↖	↕	↗	↖	↕
Traffic Volume (vph)	7	1275	14	1056	33	1	15	4	0
Future Volume (vph)	7	1275	14	1056	33	1	15	4	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases		6		2		4			8
Permitted Phases	6		2		4		4	8	
Detector Phase	6	6	2	2	4	4	4	8	8
Switch Phase									
Minimum Initial (s)	15.0	15.0	15.0	15.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	31.5	31.5	31.5	31.5	13.0	13.0	29.0	29.0	29.0
Total Split (s)	36.0	36.0	36.0	36.0	29.0	29.0	29.0	29.0	29.0
Total Split (%)	55.4%	55.4%	55.4%	55.4%	44.6%	44.6%	44.6%	44.6%	44.6%
Yellow Time (s)	4.5	4.5	4.5	4.5	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	52.6	52.6	52.6	52.6	7.7	7.7	7.7	7.7	7.7
Actuated g/C Ratio	0.81	0.81	0.81	0.81	0.12	0.12	0.12	0.12	0.12
v/c Ratio	0.02	0.52	0.07	0.39	0.20	0.07	0.04	0.04	0.04
Control Delay	2.1	6.0	4.6	4.0	28.4	0.5	0.3	0.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.1	6.0	4.6	4.0	28.4	0.5	0.3	0.3	0.3
LOS	A	A	A	A	C	A	A	A	A
Approach Delay		5.9		4.0		19.8			0.3
Approach LOS		A		A		B			A

Intersection Summary

Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.52	
Intersection Signal Delay: 5.4	Intersection LOS: A
Intersection Capacity Utilization 63.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: 56th St/56th St & Lincoln Dr



Mountain Shadows Resort  
Existing AM

4: 56th St/56th St & Lincoln Dr  
HCM 6th Signalized Intersection Summary

	↖	→	↙	←	↘	↑	↗	↖	↓	↙		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕	↘	↙	↕	↘	↖	↕	↗	↖	↕	↘
Traffic Volume (veh/h)	7	1275	47	14	1056	6	33	1	15	4	0	3
Future Volume (veh/h)	7	1275	47	14	1056	6	33	1	15	4	0	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No								
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	8	1433	25	15	1112	2	35	1	7	5	0	0
Peak Hour Factor	0.89	0.89	0.89	0.95	0.95	0.95	0.93	0.93	0.93	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	431	2663	46	320	2712	5	202	4	99	171	0	0
Arrive On Green	0.75	0.75	0.75	0.75	0.75	0.75	0.06	0.06	0.06	0.06	0.00	0.00
Sat Flow, veh/h	506	3574	62	364	3639	7	1489	69	1585	973	0	0
Grp Volume(v), veh/h	8	712	746	15	543	571	36	0	7	5	0	0
Grp Sat Flow(s),veh/h/ln	506	1777	1859	364	1777	1869	1558	0	1585	973	0	0
Q Serve(g_s), s	0.4	11.1	11.1	1.2	7.3	7.3	0.0	0.0	0.3	0.2	0.0	0.0
Cycle Q Clear(g_c), s	7.7	11.1	11.1	12.3	7.3	7.3	1.3	0.0	0.3	1.5	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.00	0.97		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	431	1324	1386	320	1324	1393	206	0	99	172	0	0
V/C Ratio(X)	0.02	0.54	0.54	0.05	0.41	0.41	0.17	0.00	0.07	0.03	0.00	0.00
Avail Cap(c_a), veh/h	431	1324	1386	320	1324	1393	622	0	561	582	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.4	3.5	3.5	6.1	3.0	3.0	29.2	0.0	28.7	29.9	0.0	0.0
Incr Delay (d2), s/veh	0.1	1.6	1.5	0.3	0.9	0.9	0.4	0.0	0.3	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.1	2.1	0.1	1.3	1.4	0.5	0.0	0.1	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.5	5.1	5.0	6.4	4.0	3.9	29.6	0.0	29.0	29.9	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	C	C	A	A
Approach Vol, veh/h		1466			1129			43			5	
Approach Delay, s/veh		5.1			4.0			29.5			29.9	
Approach LOS		A			A			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		54.9		10.1		54.9		10.1				
Change Period (Y+Rc), s		6.5		6.0		6.5		6.0				
Max Green Setting (Gmax), s		29.5		23.0		29.5		23.0				
Max Q Clear Time (g_c+I), s		14.3		3.3		13.1		3.5				
Green Ext Time (p_c), s		6.3		0.1		8.9		0.0				

Intersection Summary

HCM 6th Ctrl Delay	5.0
HCM 6th LOS	A

Mountain Shadows Resort  
Existing PM

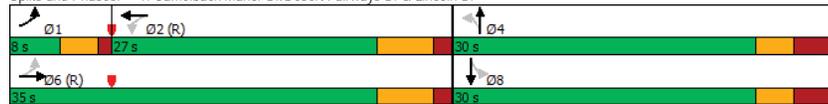
1: Camelback Manor Dr/Desert Fairways Dr & Lincoln Dr  
Timings

	↖	→	↙	←	↘	↑	↗	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↖↗	↙	↖↗		↖↗	↖	↗
Traffic Volume (vph)	62	1073	5	1265	4	2	112	2
Future Volume (vph)	62	1073	5	1265	4	2	112	2
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	1	6		2		4		8
Permitted Phases	6		2		4		8	
Detector Phase	1	6	2	2	4	4	8	8
Switch Phase								
Minimum Initial (s)	4.0	15.0	15.0	15.0	7.0	7.0	7.0	7.0
Minimum Split (s)	8.0	26.0	26.0	26.0	30.0	30.0	30.0	30.0
Total Split (s)	8.0	35.0	27.0	27.0	30.0	30.0	30.0	30.0
Total Split (%)	12.3%	53.8%	41.5%	41.5%	46.2%	46.2%	46.2%	46.2%
Yellow Time (s)	3.0	4.5	4.5	4.5	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.5	1.5	1.5	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	42.5	40.5	34.4	34.4	12.5	12.5	12.5	12.5
Actuated g/C Ratio	0.65	0.62	0.53	0.53	0.19	0.19	0.19	0.19
v/c Ratio	0.25	0.53	0.02	0.83	0.05	0.57	0.29	0.29
Control Delay	7.6	8.8	21.8	28.9	14.9	31.1	6.8	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.6	8.8	21.8	28.9	14.9	31.1	6.8	6.8
LOS	A	A	C	C	B	C	A	A
Approach Delay		8.8		28.9		14.9		20.5
Approach LOS		A		C		B		C

Intersection Summary

Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 49 (75%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 20.0	Intersection LOS: B
Intersection Capacity Utilization 70.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: Camelback Manor Dr/Desert Fairways Dr & Lincoln Dr



Mountain Shadows Resort  
Existing PM

1: Camelback Manor Dr/Desert Fairways Dr & Lincoln Dr  
HCM 6th Signalized Intersection Summary

	↖	→	↙	←	↘	↑	↗	↓	↖			
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↙	↖↗			↖↗		↖	↗	
Traffic Volume (veh/h)	62	1073	3	5	1265	168	4	2	5	112	2	84
Future Volume (veh/h)	62	1073	3	5	1265	168	4	2	5	112	2	84
Initial Q (Ob), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No								
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1945	1870	1870	1870	1870
Adj Flow Rate, veh/h	67	1166	0	5	1360	95	6	3	3	151	3	73
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.93	0.69	0.69	0.69	0.74	0.74	0.74
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	275	2429	0	365	1950	136	152	75	48	313	8	202
Arrive On Green	0.04	0.68	0.00	0.39	0.39	0.39	0.13	0.13	0.13	0.13	0.13	0.13
Sat Flow, veh/h	1781	3647	0	481	3370	235	521	570	364	1410	63	1532
Grp Volume(v), veh/h	67	1166	0	5	715	740	12	0	0	151	0	76
Grp Sat Flow(s),veh/h/ln	1781	1777	0	481	1777	1828	1454	0	0	1410	0	1595
Q Serve(g_s), s	0.9	10.0	0.0	0.4	21.9	22.1	0.0	0.0	0.0	3.1	0.0	2.8
Cycle Q Clear(g_c), s	0.9	10.0	0.0	3.7	21.9	22.1	2.8	0.0	0.0	5.9	0.0	2.8
Prop In Lane	1.00		0.00	1.00		0.13	0.50		0.25	1.00		0.96
Lane Grp Cap(c), veh/h	275	2429	0	365	1028	1058	275	0	0	313	0	210
V/C Ratio(X)	0.24	0.48	0.00	0.01	0.70	0.70	0.04	0.00	0.00	0.48	0.00	0.36
Avail Cap(c_a), veh/h	308	2429	0	365	1028	1058	644	0	0	648	0	589
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.5	4.8	0.0	10.6	15.1	15.1	24.7	0.0	0.0	26.9	0.0	25.7
Incr Delay (d2), s/veh	0.2	0.7	0.0	0.1	3.9	3.8	0.1	0.0	0.0	1.2	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	2.3	0.0	0.0	9.8	10.1	0.2	0.0	0.0	2.3	0.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.7	5.5	0.0	10.6	19.0	19.0	24.7	0.0	0.0	28.0	0.0	26.8
LnGrp LOS	A	A	A	B	B	B	C	A	A	C	A	C
Approach Vol, veh/h		1233			1460			12		227		
Approach Delay, s/veh		5.8			19.0			24.7		27.6		
Approach LOS		A			B			C		C		
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.8	43.6		14.6		50.4		14.6				
Change Period (Y+Rc), s	4.0	6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s	4.0	21.0		24.0		29.0		24.0				
Max Q Clear Time (g_c+I), s	2.9	24.1		4.8		12.0		7.9				
Green Ext Time (p_c), s	0.0	0.0		0.0		7.5		0.8				

Intersection Summary

HCM 6th Ctrl Delay	14.1
HCM 6th LOS	B



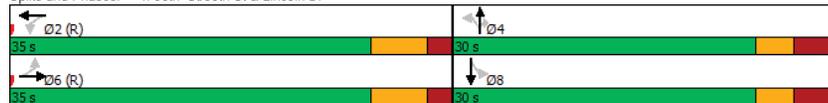
Mountain Shadows Resort  
Existing PM

4: 56th St/56th St & Lincoln Dr  
Timings

	↖	→	↘	↙	↖	↑	↗	↘	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↖	↖↗	↖	↖↗		↖	↖		↖↗
Traffic Volume (vph)	32	1160	47	1414	64	2	23	3	2
Future Volume (vph)	32	1160	47	1414	64	2	23	3	2
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases		6		2			4		8
Permitted Phases	6		2		4		4	8	
Detector Phase	6	6	2	2	4	4	4	8	8
Switch Phase									
Minimum Initial (s)	15.0	15.0	15.0	15.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	31.5	31.5	31.5	31.5	13.0	13.0	29.0	29.0	
Total Split (s)	35.0	35.0	35.0	35.0	30.0	30.0	30.0	30.0	
Total Split (%)	53.8%	53.8%	53.8%	53.8%	46.2%	46.2%	46.2%	46.2%	
Yellow Time (s)	4.5	4.5	4.5	4.5	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	47.2	47.2	47.2	47.2		9.2	9.2		9.2
Actuated g/C Ratio	0.73	0.73	0.73	0.73		0.14	0.14		0.14
v/c Ratio	0.19	0.51	0.20	0.59		0.40	0.09		0.13
Control Delay	5.4	3.4	7.5	7.4		31.0	2.9		18.9
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	5.4	3.4	7.5	7.4		31.0	2.9		18.9
LOS	A	A	A	A		C	A		B
Approach Delay		3.5		7.4		23.7			18.9
Approach LOS		A		A		C			B

Intersection Summary	
Cycle Length:	65
Actuated Cycle Length:	65
Offset:	29 (45%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green
Natural Cycle:	65
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.59
Intersection Signal Delay:	6.3
Intersection Capacity Utilization:	60.8%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 4: 56th St/56th St & Lincoln Dr



Mountain Shadows Resort  
Existing PM

4: 56th St/56th St & Lincoln Dr  
HCM 6th Signalized Intersection Summary

	↖	→	↘	↙	↖	↑	↗	↘	↓	↖		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↖	↖↗			↖	↖		↖↗	↖↗
Traffic Volume (veh/h)	32	1160	35	47	1414	31	64	2	23	3	2	14
Future Volume (veh/h)	32	1160	35	47	1414	31	64	2	23	3	2	14
Initial Q (Ob), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No											
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	35	1261	27	49	1488	22	72	2	15	5	3	14
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.95	0.89	0.89	0.89	0.63	0.63	0.63
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	288	2542	54	417	2561	38	240	5	148	85	38	96
Arrive On Green	1.00	1.00	1.00	0.71	0.71	0.71	0.09	0.09	0.09	0.09	0.09	0.09
Sat Flow, veh/h	347	3557	76	429	3585	53	1406	56	1585	179	411	1033
Grp Volume(v), veh/h	35	630	658	49	737	773	74	0	15	22	0	0
Grp Sat Flow(s), veh/h/ln	347	1777	1857	429	1777	1861	1462	0	1585	1623	0	0
Q Serve(g_s), s	2.2	0.0	0.0	2.4	13.2	13.2	2.1	0.0	0.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	15.4	0.0	0.0	2.4	13.2	13.2	3.0	0.0	0.6	0.8	0.0	0.0
Prop In Lane	1.00		0.04	1.00		0.03	0.97		1.00	0.23		0.64
Lane Grp Cap(c), veh/h	288	1270	1327	417	1270	1330	245	0	148	219	0	0
V/C Ratio(X)	0.12	0.50	0.50	0.12	0.58	0.58	0.30	0.00	0.10	0.10	0.00	0.00
Avail Cap(c_a), veh/h	288	1270	1327	417	1270	1330	633	0	585	652	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	2.2	0.0	0.0	3.0	4.5	4.5	28.0	0.0	27.0	27.1	0.0	0.0
Incr Delay (d2), s/veh	0.9	1.4	1.3	0.6	1.9	1.9	0.7	0.0	0.3	0.2	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	0.1	0.5	0.5	0.2	3.0	3.1	1.1	0.0	0.2	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	3.0	1.4	1.3	3.6	6.5	6.4	28.7	0.0	27.3	27.3	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	C	C	A	A
Approach Vol, veh/h		1323			1559			89			22	
Approach Delay, s/veh		1.4			6.3			28.5			27.3	
Approach LOS		A			A			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		52.9		12.1		52.9		12.1				
Change Period (Y+Rc), s		6.5		6.0		6.5		6.0				
Max Green Setting (Gmax), s		28.5		24.0		28.5		24.0				
Max Q Clear Time (g_c+I), s		15.2		5.0		17.4		2.8				
Green Ext Time (p_c), s		8.4		0.3		6.3		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	5.0
HCM 6th LOS	A

## **APPENDIX D**

### **TRIP GENERATION**

# Westeroc Mountain Shadows

Proposed

CIVTECH INC.

March 2019

This form facilitates trip generation estimation using data within the Institute of Transportation Engineer's (ITE) *Trip Generation Manual*, 10th Edition and methodology described within ITE *Generation Handbook*, 3rd Edition. These references will be referred to as *Manual and Handbook*, respectively. The *Manual* contains data collected by various transportation professionals for a wide range of different land uses, with each land use category represented by a land use code (LUC). Average rates and equations have been established that correlate the relationship between an independent variable that describes the development size and generated trips for each categorized LUC in various settings and time periods. The *Handbook* indicates an established methodology for how to use data contained within the Manual when to use the fitted curve instead of the average rate and when to adjustments to the volume of trips are appropriate and to do so. The methodology steps are represented visually in boxes in Figure 3.1. This worksheet applies calculations for each box if applicable.

**Box 1 - Define Study Site Land Use Type & Site Characteristics, Box 2 - Define Site Context and Box 3 - Define Analysis Objectives Types of Trips & Time Period**

The analyst is to pick an appropriate LUC(s) based on the subject's zoning/land use(s)/future land use(s). The size of the land use(s) is described in reference to an independent variable specific to (each) the land use (example: 1,000 square feet of building area is relatively common).

Context assessment is to "simply determine whether the study sites is in a multimodal setting" and "could have persons accessing the site by walking, bicycling, or riding transit." This assessment is used in Box 4. The *Manual* separates data into 4 setting categories - **Rural, General Urban/Suburban, Dense Multi-Urban Use and Center City Core**. This worksheet uses the following abbreviations, respectively: **R, G, D, and C**. The *Manual* does not have data for all settings of all land use codes. The "General Urban/Suburban" setting is used by default. This tool will focus on vehicular trips for a 24-hour period on a typical weekday as well as its AM peak hour and PM peak hour. Other time period(s) may be of interest.

**Land Use Types and Size**

Proposed Use	Amount Units	ITE LUC	ITE Land Use Name
Quality Restaurant	5.000 1,000 square feet	931	Quality Restaurant

**Equation Type: Equation Used [Equated Rate] (Type Abbreviations: Weighted Average Rate ("WA"), Fitted Curve Type: Equation Used [Equated Rate])**

Proposed Use	ADT	AM Peak Hour	PM Peak Hour	(not used)
Quality Restaurant	WA: $T=X*83.84$ [83.84]	WA: $T=X*0.73$ [0.73]	WA: $T=X*7.8$ [7.80]	

**Box 5/Box 9 - Estimate Baseline Trips/Estimate Vehicular Trips (Apply Equations and in/out Distributions)**

**Baseline Vehicular Trips**

Proposed Use	ADT				AM Peak Hour				PM Peak Hour				(not used)
	% In	In	Out	Total	% In	In	Out	Total	% In	In	Out	Total	
Quality Restaurant	50%	210	210	420	80%	3	1	4	67%	26	13	39	
<b>Totals</b>		<b>210</b>	<b>210</b>	<b>420</b>		<b>3</b>	<b>1</b>	<b>4</b>		<b>26</b>	<b>13</b>	<b>39</b>	

## **APPENDIX E**

### **TRIP DISTRIBUTION**



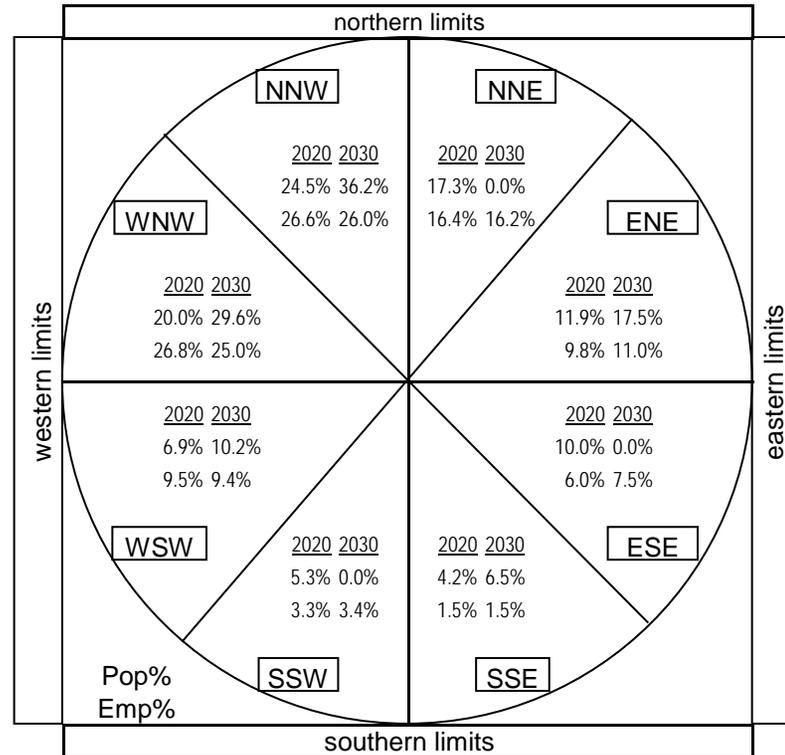
Mountain Shadows Resort

Trip Distribution - Summaries

Quadrant	2020				2030			
	Population	Percent	Employment	Percent	Population	Percent	Employment	Percent
North Northwest	225,802	24.5%	128,618	26.6%	225,802	36.2%	138,038	26.0%
North Northeast	159,900	17.3%	79,130	16.4%	-	0.0%	86,232	16.2%
<b>North</b>	<b>385,702</b>	<b>41.8%</b>	<b>207,748</b>	<b>43.0%</b>	<b>225,802</b>	<b>36.2%</b>	<b>224,270</b>	<b>42.2%</b>
East Northeast	109,464	11.9%	47,207	9.8%	109,464	17.5%	58,581	11.0%
East Southeast	92,590	10.0%	29,090	6.0%	-	0.0%	40,006	7.5%
<b>East</b>	<b>202,053</b>	<b>21.9%</b>	<b>76,297</b>	<b>15.8%</b>	<b>109,464</b>	<b>17.5%</b>	<b>98,587</b>	<b>18.5%</b>
South Southeast	38,611	4.2%	7,389	1.5%	40,655	6.5%	7,782	1.5%
South Southwest	48,469	5.3%	16,139	3.3%	-	0.0%	18,347	3.4%
<b>South</b>	<b>87,080</b>	<b>9.5%</b>	<b>23,528</b>	<b>4.8%</b>	<b>40,655</b>	<b>6.5%</b>	<b>26,129</b>	<b>4.9%</b>
West Southwest	63,344	6.9%	45,971	9.5%	63,424	10.2%	50,054	9.4%
West Northwest	184,638	20.0%	129,429	26.8%	184,638	29.6%	132,868	25.0%
<b>West</b>	<b>247,982</b>	<b>26.9%</b>	<b>175,399</b>	<b>36.3%</b>	<b>248,062</b>	<b>39.8%</b>	<b>182,922</b>	<b>34.4%</b>
Totals	922,817	100.1%	482,972	99.9%	623,983	100.0%	531,907	100.0%

Radii

Population: 10-mile Radius









## **APPENDIX F**

### **BACKGROUND TRAFFIC**

**Location of counts:** Scottsdale Road between Indian Bend and Lincoln

Source(s): <https://www.scottsdaleaz.gov/transportation/studies-reports/traffic-volume>

	Year	Volume	Avg Growth Rate to 2012	Expansion Factor to 2012
Beginning	2012	43,500		
End	2014	45,000	1.7%	0.967

Growth Rate Used            1.7%  
 Per-Year Multiplier        1.017

Year	Expansion Factor(s)	
2019	1.000	
<b>2020</b>	<b>1.017</b>	<- Expansion factor to opening
2021	1.034	
2022	1.052	
2023	1.070	
2024	1.088	
2025	1.106	
2026	1.125	
2027	1.144	
2028	1.164	
2029	1.184	
2030	1.204	
2031	1.224	
2032	1.245	
2033	1.266	
2034	1.288	
2035	1.310	
2036	1.332	
2037	1.354	
2038	1.378	
2039	1.401	

## **APPENDIX G**

### **2020 PEAK HOUR ANALYSIS**

Mountain Shadows Resort  
Background AM

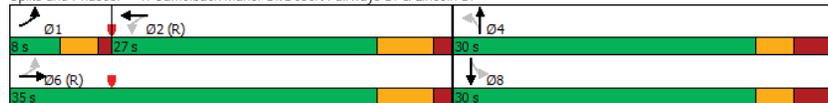
1: Camelback Manor Dr/Desert Fairways Dr & Lincoln Dr  
Timings

	↖	→	↙	←	↘	↑	↗	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↖↗	↙	↖↗	↖	↖↗	↙	↙
Traffic Volume (vph)	68	1285	5	1048	2	1	75	1
Future Volume (vph)	68	1285	5	1048	2	1	75	1
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	1	6		2		4		8
Permitted Phases	6		2		4		8	
Detector Phase	1	6	2	2	4	4	8	8
Switch Phase								
Minimum Initial (s)	4.0	15.0	15.0	15.0	7.0	7.0	7.0	7.0
Minimum Split (s)	8.0	26.0	26.0	26.0	30.0	30.0	30.0	30.0
Total Split (s)	8.0	35.0	27.0	27.0	30.0	30.0	30.0	30.0
Total Split (%)	12.3%	53.8%	41.5%	41.5%	46.2%	46.2%	46.2%	46.2%
Yellow Time (s)	3.0	4.5	4.5	4.5	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.5	1.5	1.5	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	47.8	47.0	41.0	41.0	9.8	9.8	9.8	
Actuated g/C Ratio	0.74	0.72	0.63	0.63	0.15	0.15	0.15	
v/c Ratio	0.22	0.55	0.03	0.55	0.08	0.43	0.19	
Control Delay	5.4	7.1	8.0	11.0	15.1	30.5	9.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	5.4	7.1	8.0	11.0	15.1	30.5	9.2	
LOS	A	A	A	B	B	C	A	
Approach Delay		7.0		11.0		15.1		22.4
Approach LOS		A		B		B		C

Intersection Summary

Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay: 9.5	Intersection LOS: A
Intersection Capacity Utilization 74.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: Camelback Manor Dr/Desert Fairways Dr & Lincoln Dr



Mountain Shadows Resort  
Background AM

1: Camelback Manor Dr/Desert Fairways Dr & Lincoln Dr  
HCM 6th Signalized Intersection Summary

	↖	→	↙	←	↘	↑	↗	↓	↖			
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↙	↖↗			↖↗		↙	↙	
Traffic Volume (veh/h)	68	1285	4	5	1048	56	2	1	5	75	1	45
Future Volume (veh/h)	68	1285	4	5	1048	56	2	1	5	75	1	45
Initial Q (Ob), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No								
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1945	1870	1870	1870	1870
Adj Flow Rate, veh/h	75	1412	0	6	1164	29	5	2	2	89	1	30
Peak Hour Factor	0.91	0.91	0.91	0.90	0.90	0.90	0.40	0.40	0.40	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	341	2552	0	313	2165	54	151	59	35	250	5	150
Arrive On Green	0.05	0.72	0.00	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10	0.10
Sat Flow, veh/h	1781	3647	0	381	3543	88	669	607	365	1412	51	1542
Grp Volume(v), veh/h	75	1412	0	6	584	609	9	0	0	89	0	31
Grp Sat Flow(s),veh/h/ln	1781	1777	0	381	1777	1854	1641	0	0	1412	0	1593
Q Serve(g_s), s	0.9	12.1	0.0	0.8	19.1	19.1	0.0	0.0	0.0	3.6	0.0	1.2
Cycle Q Clear(g_c), s	0.9	12.1	0.0	6.0	19.1	19.1	0.3	0.0	0.0	3.9	0.0	1.2
Prop In Lane	1.00		0.00	1.00		0.05	0.56		0.22	1.00		0.97
Lane Grp Cap(c), veh/h	341	2552	0	313	1086	1133	246	0	0	250	0	155
V/C Ratio(X)	0.22	0.55	0.00	0.02	0.54	0.54	0.04	0.00	0.00	0.36	0.00	0.20
Avail Cap(c_a), veh/h	369	2552	0	313	1086	1133	673	0	0	634	0	588
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.4	4.3	0.0	14.6	17.7	17.7	26.6	0.0	0.0	28.2	0.0	27.0
Incr Delay (d2), s/veh	0.1	0.9	0.0	0.1	1.9	1.8	0.1	0.0	0.0	0.9	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.4	0.0	0.1	9.3	9.7	0.1	0.0	0.0	1.4	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.5	5.2	0.0	14.7	19.6	19.6	26.7	0.0	0.0	29.1	0.0	27.6
LnGrp LOS	A	A	A	B	B	B	C	A	A	C	A	C
Approach Vol, veh/h		1487			1199			9				120
Approach Delay, s/veh		5.3			19.6			26.7				28.7
Approach LOS		A			B			C				C

Timer - Assigned Phs	1	2		4		6		8	
Phs Duration (G+Y+Rc), s	7.0	45.7		12.3		52.7		12.3	
Change Period (Y+Rc), s	4.0	6.0		6.0		6.0		6.0	
Max Green Setting (Gmax), s	4.0	21.0		24.0		29.0		24.0	
Max Q Clear Time (g_c+I), s	2.9	21.1		2.3		14.1		5.9	
Green Ext Time (p_c), s	0.0	0.0		0.0		8.5		0.3	

Intersection Summary

HCM 6th Ctrl Delay	12.4
HCM 6th LOS	B

Mountain Shadows Resort  
Background AM

2: Mountain Shadows West & Lincoln Dr  
HCM 6th TWSC

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑		↑
Traffic Vol, veh/h	1352	23	7	1123	0	13
Future Vol, veh/h	1352	23	7	1123	0	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	125	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	95	95	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1470	25	7	1182	0	15

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	1495
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	*808
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	1
Mov Cap-1 Maneuver	-	-	*808
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	11.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	540	-	-	*808	-
HCM Lane V/C Ratio	0.027	-	-	0.009	-
HCM Control Delay (s)	11.9	-	-	9.5	0.1
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

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

Mountain Shadows Resort  
Background AM

3: Mountain Shadows East & Lincoln Dr  
HCM 6th TWSC

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Vol, veh/h	1337	27	11	1099	23	14
Future Vol, veh/h	1337	27	11	1099	23	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	135	80	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	94	94	77	77
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1486	30	12	1169	30	18

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	1516
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	*792
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	1
Mov Cap-1 Maneuver	-	-	*792
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	17.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	345	-	-	792	-
HCM Lane V/C Ratio	0.139	-	-	0.015	-
HCM Control Delay (s)	17.1	-	-	9.6	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.5	-	-	0	-

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

Mountain Shadows Resort  
Background AM

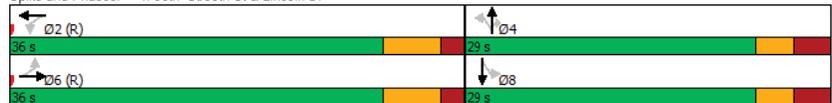
4: 56th St/56th St & Lincoln Dr  
Timings

	↖	→	↙	←	↘	↑	↗	↖	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↖	↕	↙	↕	↖	↕	↗	↖	↕
Traffic Volume (vph)	7	1297	14	1074	34	1	15	4	0
Future Volume (vph)	7	1297	14	1074	34	1	15	4	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases		6		2		4			8
Permitted Phases	6		2		4		4	8	
Detector Phase	6	6	2	2	4	4	4	8	8
Switch Phase									
Minimum Initial (s)	15.0	15.0	15.0	15.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	31.5	31.5	31.5	31.5	13.0	13.0	29.0	29.0	29.0
Total Split (s)	36.0	36.0	36.0	36.0	29.0	29.0	29.0	29.0	29.0
Total Split (%)	55.4%	55.4%	55.4%	55.4%	44.6%	44.6%	44.6%	44.6%	44.6%
Yellow Time (s)	4.5	4.5	4.5	4.5	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	52.6	52.6	52.6	52.6	7.7	7.7	7.7	7.7	7.7
Actuated g/C Ratio	0.81	0.81	0.81	0.81	0.12	0.12	0.12	0.12	0.12
v/c Ratio	0.02	0.53	0.07	0.40	0.21	0.07	0.04	0.04	0.04
Control Delay	2.3	6.1	4.7	4.0	28.5	0.5	0.3	0.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.3	6.1	4.7	4.0	28.5	0.5	0.3	0.3	0.3
LOS	A	A	A	A	C	A	A	A	A
Approach Delay		6.1		4.1	20.2			0.3	
Approach LOS		A		A	C			A	

Intersection Summary

Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 5.5	Intersection LOS: A
Intersection Capacity Utilization 64.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 4: 56th St/56th St & Lincoln Dr



Mountain Shadows Resort  
Background AM

4: 56th St/56th St & Lincoln Dr  
HCM 6th Signalized Intersection Summary

	↖	→	↙	←	↘	↑	↗	↖	↓	↙		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕	↙	↕	↕	↕	↖	↕	↗	↖	↕	↙
Traffic Volume (veh/h)	7	1297	48	14	1074	6	34	1	15	4	0	3
Future Volume (veh/h)	7	1297	48	14	1074	6	34	1	15	4	0	3
Initial Q (Ob), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No								
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	8	1457	26	15	1131	2	37	1	7	5	0	0
Peak Hour Factor	0.89	0.89	0.89	0.95	0.95	0.95	0.93	0.93	0.93	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	423	2656	47	312	2707	5	205	4	101	172	0	0
Arrive On Green	0.74	0.74	0.74	0.74	0.74	0.74	0.06	0.06	0.06	0.06	0.00	0.00
Sat Flow, veh/h	497	3572	64	356	3640	6	1495	65	1585	960	0	0
Grp Volume(v), veh/h	8	724	759	15	552	581	38	0	7	5	0	0
Grp Sat Flow(s),veh/h/ln	497	1777	1859	356	1777	1869	1560	0	1585	960	0	0
Q Serve(g_s), s	0.4	11.5	11.5	1.2	7.5	7.5	0.0	0.0	0.3	0.2	0.0	0.0
Cycle Q Clear(g_c), s	7.9	11.5	11.5	12.7	7.5	7.5	1.3	0.0	0.3	1.5	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.00	0.97		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	423	1321	1382	312	1321	1390	209	0	101	172	0	0
V/C Ratio(X)	0.02	0.55	0.55	0.05	0.42	0.42	0.18	0.00	0.07	0.03	0.00	0.00
Avail Cap(c_a), veh/h	423	1321	1382	312	1321	1390	623	0	561	580	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.6	3.6	3.6	6.4	3.1	3.1	29.1	0.0	28.6	29.8	0.0	0.0
Incr Delay (d2), s/veh	0.1	1.6	1.6	0.3	1.0	0.9	0.4	0.0	0.3	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.2	2.2	0.1	1.4	1.5	0.6	0.0	0.1	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.7	5.2	5.2	6.7	4.1	4.0	29.5	0.0	28.9	29.9	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	C	C	A	A
Approach Vol, veh/h		1491			1148			45			5	
Approach Delay, s/veh		5.2			4.1			29.4			29.9	
Approach LOS		A			A			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		54.8		10.2		54.8		10.2				
Change Period (Y+Rc), s		6.5		6.0		6.5		6.0				
Max Green Setting (Gmax), s		29.5		23.0		29.5		23.0				
Max Q Clear Time (g_c+I), s		14.7		3.3		13.5		3.5				
Green Ext Time (p_c), s		6.4		0.1		8.9		0.0				

Intersection Summary

HCM 6th Ctrl Delay	5.2
HCM 6th LOS	A

Mountain Shadows Resort  
Background PM

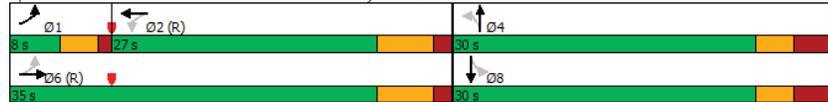
1: Camelback Manor Dr/Desert Fairways Dr & Lincoln Dr  
Timings

	↖	→	↙	←	↘	↑	↗	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↖↗	↙	↖↗		↖↗	↖	↗
Traffic Volume (vph)	63	1091	5	1287	4	2	114	2
Future Volume (vph)	63	1091	5	1287	4	2	114	2
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	1	6		2		4		8
Permitted Phases	6		2		4		8	
Detector Phase	1	6	2	2	4	4	8	8
Switch Phase								
Minimum Initial (s)	4.0	15.0	15.0	15.0	7.0	7.0	7.0	7.0
Minimum Split (s)	8.0	26.0	26.0	26.0	30.0	30.0	30.0	30.0
Total Split (s)	8.0	35.0	27.0	27.0	30.0	30.0	30.0	30.0
Total Split (%)	12.3%	53.8%	41.5%	41.5%	46.2%	46.2%	46.2%	46.2%
Yellow Time (s)	3.0	4.5	4.5	4.5	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.5	1.5	1.5	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	42.3	40.3	34.3	34.3	12.7	12.7	12.7	12.7
Actuated g/C Ratio	0.65	0.62	0.53	0.53	0.20	0.20	0.20	0.20
v/c Ratio	0.26	0.54	0.02	0.85	0.05	0.57	0.29	
Control Delay	7.7	9.0	21.6	29.8	14.8	31.1	6.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	7.7	9.0	21.6	29.8	14.8	31.1	6.7	
LOS	A	A	C	C	B	C	A	
Approach Delay		9.0		29.7		14.8		20.5
Approach LOS		A		C		B		C

Intersection Summary

Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 49 (75%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 20.5	Intersection LOS: C
Intersection Capacity Utilization 70.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: Camelback Manor Dr/Desert Fairways Dr & Lincoln Dr



Mountain Shadows Resort  
Background PM

1: Camelback Manor Dr/Desert Fairways Dr & Lincoln Dr  
HCM 6th Signalized Intersection Summary

	↖	→	↙	←	↘	↑	↗	↓	↖			
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↙	↖↗			↖↗		↖	↗	
Traffic Volume (veh/h)	63	1091	3	5	1287	171	4	2	5	114	2	85
Future Volume (veh/h)	63	1091	3	5	1287	171	4	2	5	114	2	85
Initial Q (Ob), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No											
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1945	1870	1870	1870	1870
Adj Flow Rate, veh/h	68	1186	0	5	1384	98	6	3	3	154	3	74
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.93	0.69	0.69	0.69	0.74	0.74	0.74
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	269	2421	0	357	1940	137	153	76	49	316	8	206
Arrive On Green	0.04	0.68	0.00	0.39	0.39	0.39	0.13	0.13	0.13	0.13	0.13	0.13
Sat Flow, veh/h	1781	3647	0	472	3367	238	522	566	363	1410	62	1532
Grp Volume(v), veh/h	68	1186	0	5	728	754	12	0	0	154	0	77
Grp Sat Flow(s),veh/h/ln	1781	1777	0	472	1777	1828	1451	0	0	1410	0	1595
Q Serve(g_s), s	0.9	10.4	0.0	0.5	22.5	22.7	0.0	0.0	0.0	3.2	0.0	2.9
Cycle Q Clear(g_c), s	0.9	10.4	0.0	4.0	22.5	22.7	2.9	0.0	0.0	6.1	0.0	2.9
Prop In Lane	1.00		0.00	1.00		0.13	0.50		0.25	1.00		0.96
Lane Grp Cap(c), veh/h	269	2421	0	357	1024	1053	278	0	0	316	0	214
V/C Ratio(X)	0.25	0.49	0.00	0.01	0.71	0.72	0.04	0.00	0.00	0.49	0.00	0.36
Avail Cap(c_a), veh/h	301	2421	0	357	1024	1053	643	0	0	648	0	589
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.9	5.0	0.0	10.8	15.4	15.4	24.5	0.0	0.0	26.8	0.0	25.6
Incr Delay (d2), s/veh	0.2	0.7	0.0	0.1	4.2	4.2	0.1	0.0	0.0	1.2	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	2.4	0.0	0.0	10.1	10.5	0.2	0.0	0.0	2.3	0.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.1	5.7	0.0	10.9	19.6	19.6	24.6	0.0	0.0	28.0	0.0	26.6
LnGrp LOS	B	A	A	B	B	B	C	A	A	C	A	C
Approach Vol, veh/h		1254			1487			12				231
Approach Delay, s/veh		5.9			19.6			24.6				27.5
Approach LOS		A			B			C				C
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.8	43.5		14.7		50.3		14.7				
Change Period (Y+Rc), s	4.0	6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s	4.0	21.0		24.0		29.0		24.0				
Max Q Clear Time (g_c+I), s	2.9	24.7		4.9		12.4		8.1				
Green Ext Time (p_c), s	0.0	0.0		0.0		7.5		0.8				

Intersection Summary

HCM 6th Ctrl Delay	14.5
HCM 6th LOS	B

Mountain Shadows Resort  
Background PM

2: West Access & Lincoln Dr  
HCM 6th TWSC

Intersection						
Int Delay, s/veh	0.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑		↑
Traffic Vol, veh/h	1212	35	15	1514	0	28
Future Vol, veh/h	1212	35	15	1514	0	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	125	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	94	94	63	63
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1276	37	16	1611	0	44

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	1313
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	*880
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	1
Mov Cap-1 Maneuver	-	-	*880
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	11.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	588	-	-	*880	-
HCM Lane V/C Ratio	0.076	-	-	0.018	-
HCM Control Delay (s)	11.6	-	-	9.2	0.8
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

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

Mountain Shadows Resort  
Background PM

3: East Access & Lincoln Dr  
HCM 6th TWSC

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Vol, veh/h	1221	19	17	1500	14	26
Future Vol, veh/h	1221	19	17	1500	14	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	135	80	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	94	94	72	72
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1272	20	18	1596	19	36

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	1292
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	*880
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	1
Mov Cap-1 Maneuver	-	-	*880
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	
HCM LOS			

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	*880	-
HCM Lane V/C Ratio	-	-	-	0.021	-
HCM Control Delay (s)	-	-	-	9.2	-
HCM Lane LOS	-	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0.1	-

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

Mountain Shadows Resort  
Background PM

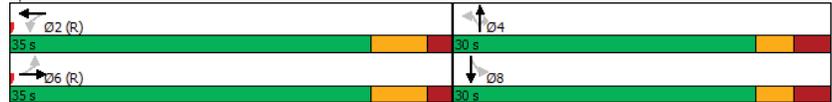
4: 56th St/56th St & Lincoln Dr  
Timings

	↖	→	↙	←	↘	↑	↗	↖	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↖	↕	↙	↕		↕	↗		↘
Traffic Volume (vph)	33	1180	48	1438	65	2	23	3	2
Future Volume (vph)	33	1180	48	1438	65	2	23	3	2
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases		6		2			4		8
Permitted Phases	6		2		4		4	8	
Detector Phase	6	6	2	2	4	4	4	8	8
Switch Phase									
Minimum Initial (s)	15.0	15.0	15.0	15.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	31.5	31.5	31.5	31.5	13.0	13.0	29.0	29.0	
Total Split (s)	35.0	35.0	35.0	35.0	30.0	30.0	30.0	30.0	
Total Split (%)	53.8%	53.8%	53.8%	53.8%	46.2%	46.2%	46.2%	46.2%	
Yellow Time (s)	4.5	4.5	4.5	4.5	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	47.1	47.1	47.1	47.1	9.3	9.3	9.3	9.3	
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.14	0.14	0.14	0.14	
v/c Ratio	0.21	0.52	0.21	0.60	0.40	0.09	0.13	0.13	
Control Delay	5.8	3.5	7.9	7.6	31.0	2.9	19.3	19.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	5.8	3.5	7.9	7.6	31.0	2.9	19.3	19.3	
LOS	A	A	A	A	C	A	B	B	
Approach Delay		3.5		7.6		23.8		19.3	
Approach LOS		A		A		C		B	

Intersection Summary

Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 29 (45%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 6.4	Intersection LOS: A
Intersection Capacity Utilization 61.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: 56th St/56th St & Lincoln Dr



Mountain Shadows Resort  
Background PM

4: 56th St/56th St & Lincoln Dr  
HCM 6th Signalized Intersection Summary

	↖	→	↙	←	↘	↑	↗	↖	↓	↘		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↙	↕			↕	↗		↘	
Traffic Volume (veh/h)	33	1180	36	48	1438	32	65	2	23	3	2	14
Future Volume (veh/h)	33	1180	36	48	1438	32	65	2	23	3	2	14
Initial Q (Ob), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No											
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	36	1283	28	51	1514	23	73	2	15	5	3	14
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.95	0.89	0.89	0.89	0.63	0.63	0.63
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	281	2540	55	410	2559	39	240	5	148	85	38	96
Arrive On Green	1.00	1.00	1.00	0.71	0.71	0.71	0.09	0.09	0.09	0.09	0.09	0.09
Sat Flow, veh/h	338	3556	78	419	3583	54	1401	55	1585	178	411	1030
Grp Volume(v), veh/h	36	641	670	51	750	787	75	0	15	22	0	0
Grp Sat Flow(s),veh/h/ln	338	1777	1856	419	1777	1861	1457	0	1585	1618	0	0
Q Serve(g_s), s	2.4	0.0	0.0	2.6	13.6	13.6	2.3	0.0	0.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	16.0	0.0	0.0	2.6	13.6	13.6	3.1	0.0	0.6	3.0	0.0	0.0
Prop In Lane	1.00		0.04	1.00		0.03	0.97		1.00	0.23		0.64
Lane Grp Cap(c), veh/h	281	1269	1326	410	1269	1329	245	0	148	219	0	0
V/C Ratio(X)	0.13	0.50	0.51	0.12	0.59	0.59	0.31	0.00	0.10	0.10	0.00	0.00
Avail Cap(c_a), veh/h	281	1269	1326	410	1269	1329	633	0	585	652	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	2.3	0.0	0.0	3.0	4.6	4.6	28.0	0.0	27.0	27.1	0.0	0.0
Incr Delay (d2), s/veh	0.9	1.4	1.4	0.6	2.0	1.9	0.7	0.0	0.3	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.5	0.5	0.2	3.1	3.2	1.1	0.0	0.2	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	3.3	1.4	1.4	3.6	6.6	6.5	28.7	0.0	27.3	27.3	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	C	C	A	A
Approach Vol, veh/h		1347			1588		90				22	
Approach Delay, s/veh		1.5			6.5		28.5				27.3	
Approach LOS		A			A		C				C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		52.9		12.1		52.9		12.1				
Change Period (Y+Rc), s		6.5		6.0		6.5		6.0				
Max Green Setting (Gmax), s		28.5		24.0		28.5		24.0				
Max Q Clear Time (g_c+I), s		15.6		5.1		18.0		5.0				
Green Ext Time (p_c), s		8.4		0.3		6.2		0.1				

Intersection Summary

HCM 6th Ctrl Delay	5.1
HCM 6th LOS	A

Mountain Shadows Resort  
Total AM

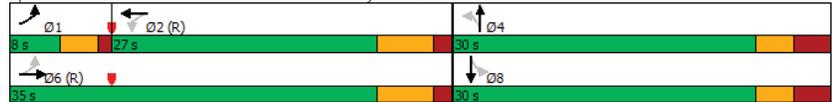
1: Camelback Manor Dr/Desert Fairways Dr & Lincoln Dr  
Timings

	↖	→	↘	↙	↖	↑	↘	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↖↗	↖	↖↗		↖↗	↖	↖
Traffic Volume (vph)	68	1286	5	1048	2	1	75	1
Future Volume (vph)	68	1286	5	1048	2	1	75	1
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	1	6		2		4		8
Permitted Phases	6		2		4		8	
Detector Phase	1	6	2	2	4	4	8	8
Switch Phase								
Minimum Initial (s)	4.0	15.0	15.0	15.0	7.0	7.0	7.0	7.0
Minimum Split (s)	8.0	26.0	26.0	26.0	30.0	30.0	30.0	30.0
Total Split (s)	8.0	35.0	27.0	27.0	30.0	30.0	30.0	30.0
Total Split (%)	12.3%	53.8%	41.5%	41.5%	46.2%	46.2%	46.2%	46.2%
Yellow Time (s)	3.0	4.5	4.5	4.5	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.5	1.5	1.5	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	47.8	47.0	41.0	41.0	9.8	9.8	9.8	
Actuated g/C Ratio	0.74	0.72	0.63	0.63	0.15	0.15	0.15	
v/c Ratio	0.22	0.55	0.03	0.55	0.08	0.43	0.19	
Control Delay	5.4	7.1	8.0	11.0	15.1	30.5	9.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	5.4	7.1	8.0	11.0	15.1	30.5	9.2	
LOS	A	A	A	B	B	C	A	
Approach Delay		7.0		11.0		15.1		22.4
Approach LOS		A		B		B		C

Intersection Summary

Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay: 9.5	Intersection LOS: A
Intersection Capacity Utilization 74.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: Camelback Manor Dr/Desert Fairways Dr & Lincoln Dr



Mountain Shadows Resort  
Total AM

1: Camelback Manor Dr/Desert Fairways Dr & Lincoln Dr  
HCM 6th Signalized Intersection Summary

	↖	→	↘	↙	↖	↑	↘	↓	↙			
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↖	↖↗			↖↗		↖	↖	
Traffic Volume (veh/h)	68	1286	4	5	1048	56	2	1	5	75	1	45
Future Volume (veh/h)	68	1286	4	5	1048	56	2	1	5	75	1	45
Initial Q (Ob), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No											
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1945	1870	1870	1870	1870
Adj Flow Rate, veh/h	75	1413	0	6	1164	29	5	2	2	89	1	30
Peak Hour Factor	0.91	0.91	0.91	0.90	0.90	0.90	0.40	0.40	0.40	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	341	2552	0	313	2165	54	151	59	35	250	5	150
Arrive On Green	0.05	0.72	0.00	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10	0.10
Sat Flow, veh/h	1781	3647	0	380	3543	88	669	607	365	1412	51	1542
Grp Volume(v), veh/h	75	1413	0	6	584	609	9	0	0	89	0	31
Grp Sat Flow(s),veh/h/ln	1781	1777	0	380	1777	1854	1641	0	0	1412	0	1593
Q Serve(g_s), s	0.9	12.1	0.0	0.8	19.1	19.1	0.0	0.0	0.0	3.6	0.0	1.2
Cycle Q Clear(g_c), s	0.9	12.1	0.0	6.0	19.1	19.1	0.3	0.0	0.0	3.9	0.0	1.2
Prop In Lane	1.00		0.00	1.00		0.05	0.56		0.22	1.00		0.97
Lane Grp Cap(c), veh/h	341	2552	0	313	1086	1133	246	0	0	250	0	155
V/C Ratio(X)	0.22	0.55	0.00	0.02	0.54	0.54	0.04	0.00	0.00	0.36	0.00	0.20
Avail Cap(c_a), veh/h	369	2552	0	313	1086	1133	673	0	0	634	0	588
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.4	4.3	0.0	14.6	17.7	17.7	26.6	0.0	0.0	28.2	0.0	27.0
Incr Delay (d2), s/veh	0.1	0.9	0.0	0.1	1.9	1.8	0.1	0.0	0.0	0.9	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.4	0.0	0.1	9.3	9.7	0.1	0.0	0.0	1.4	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.5	5.2	0.0	14.7	19.6	19.6	26.7	0.0	0.0	29.1	0.0	27.6
LnGrp LOS	A	A	A	B	B	B	C	A	A	C	A	C
Approach Vol, veh/h		1488			1199			9				120
Approach Delay, s/veh		5.3			19.6			26.7				28.7
Approach LOS		A			B			C				C

Timer - Assigned Phs	1	2		4		6		8	
Phs Duration (G+Y+Rc), s	7.0	45.7		12.3		52.7		12.3	
Change Period (Y+Rc), s	4.0	6.0		6.0		6.0		6.0	
Max Green Setting (Gmax), s	4.0	21.0		24.0		29.0		24.0	
Max Q Clear Time (g_c+I1), s	2.9	21.1		2.3		14.1		5.9	
Green Ext Time (p_c), s	0.0	0.0		0.0		8.5		0.3	

Intersection Summary

HCM 6th Ctrl Delay	12.4
HCM 6th LOS	B

Mountain Shadows Resort  
Total AM

2: Mountain Shadows West & Lincoln Dr  
HCM 6th TWSC

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑		↑
Traffic Vol, veh/h	1353	24	7	1124	0	13
Future Vol, veh/h	1353	24	7	1124	0	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	125	75	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	95	95	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1471	26	7	1183	0	15

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	1497
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	*808
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	1
Mov Cap-1 Maneuver	-	-	*808
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	11.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	540	-	-	*808	-
HCM Lane V/C Ratio	0.027	-	-	0.009	-
HCM Control Delay (s)	11.9	-	-	9.5	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

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

Mountain Shadows Resort  
Total AM

3: Mountain Shadows East & Lincoln Dr  
HCM 6th TWSC

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Vol, veh/h	1337	28	11	1099	23	14
Future Vol, veh/h	1337	28	11	1099	23	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	135	80	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	94	94	77	77
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1486	31	12	1169	30	18

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	1517
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	*791
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	1
Mov Cap-1 Maneuver	-	-	*791
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	17.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	345	-	-	791	-
HCM Lane V/C Ratio	0.139	-	-	0.015	-
HCM Control Delay (s)	17.1	-	-	9.6	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.5	-	-	0	-

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

Mountain Shadows Resort  
Total AM

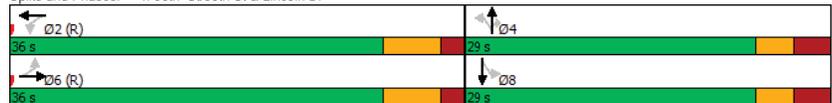
4: 56th St/56th St & Lincoln Dr  
Timings

	↖	→	↙	←	↘	↑	↗	↖	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↖	↕	↙	↕	↖	↕	↗	↖	↕
Traffic Volume (vph)	7	1297	14	1075	34	1	15	4	0
Future Volume (vph)	7	1297	14	1075	34	1	15	4	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases		6		2		4			8
Permitted Phases	6		2		4		4	8	
Detector Phase	6	6	2	2	4	4	4	8	8
Switch Phase									
Minimum Initial (s)	15.0	15.0	15.0	15.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	31.5	31.5	31.5	31.5	13.0	13.0	29.0	29.0	29.0
Total Split (s)	36.0	36.0	36.0	36.0	29.0	29.0	29.0	29.0	29.0
Total Split (%)	55.4%	55.4%	55.4%	55.4%	44.6%	44.6%	44.6%	44.6%	44.6%
Yellow Time (s)	4.5	4.5	4.5	4.5	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	52.6	52.6	52.6	52.6	7.7	7.7	7.7	7.7	7.7
Actuated g/C Ratio	0.81	0.81	0.81	0.81	0.12	0.12	0.12	0.12	0.12
v/c Ratio	0.02	0.53	0.07	0.40	0.21	0.07	0.04	0.04	0.04
Control Delay	2.3	6.1	4.7	4.0	28.5	0.5	0.3	0.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.3	6.1	4.7	4.0	28.5	0.5	0.3	0.3	0.3
LOS	A	A	A	A	C	A	A	A	A
Approach Delay		6.1		4.1	20.2			0.3	
Approach LOS		A		A	C			A	

Intersection Summary

Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 5.5	Intersection LOS: A
Intersection Capacity Utilization 64.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 4: 56th St/56th St & Lincoln Dr



Mountain Shadows Resort  
Total AM

4: 56th St/56th St & Lincoln Dr  
HCM 6th Signalized Intersection Summary

	↖	→	↙	←	↘	↑	↗	↖	↓	↙		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕	↙	↕	↕	↕	↖	↕	↗	↖	↕	↙
Traffic Volume (veh/h)	7	1297	48	14	1075	6	34	1	15	4	0	3
Future Volume (veh/h)	7	1297	48	14	1075	6	34	1	15	4	0	3
Initial Q (Ob), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No								
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	8	1457	26	15	1132	2	37	1	7	5	0	0
Peak Hour Factor	0.89	0.89	0.89	0.95	0.95	0.95	0.93	0.93	0.93	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	422	2656	47	312	2707	5	205	4	101	172	0	0
Arrive On Green	0.74	0.74	0.74	0.74	0.74	0.74	0.06	0.06	0.06	0.06	0.00	0.00
Sat Flow, veh/h	496	3572	64	356	3640	6	1495	65	1585	960	0	0
Grp Volume(v), veh/h	8	724	759	15	553	581	38	0	7	5	0	0
Grp Sat Flow(s),veh/h/ln	496	1777	1859	356	1777	1869	1560	0	1585	960	0	0
Q Serve(g_s), s	0.4	11.5	11.5	1.2	7.5	7.5	0.0	0.0	0.3	0.2	0.0	0.0
Cycle Q Clear(g_c), s	7.9	11.5	11.5	12.7	7.5	7.5	1.3	0.0	0.3	1.5	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.00	0.97		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	422	1321	1382	312	1321	1390	209	0	101	172	0	0
V/C Ratio(X)	0.02	0.55	0.55	0.05	0.42	0.42	0.18	0.00	0.07	0.03	0.00	0.00
Avail Cap(c_a), veh/h	422	1321	1382	312	1321	1390	623	0	561	580	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.6	3.6	3.6	6.4	3.1	3.1	29.1	0.0	28.6	29.8	0.0	0.0
Incr Delay (d2), s/veh	0.1	1.6	1.6	0.3	1.0	0.9	0.4	0.0	0.3	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.2	2.2	0.1	1.4	1.5	0.6	0.0	0.1	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.7	5.2	5.2	6.7	4.1	4.0	29.5	0.0	28.9	29.9	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	C	C	A	A
Approach Vol, veh/h		1491			1149			45			5	
Approach Delay, s/veh		5.2			4.1			29.4			29.9	
Approach LOS		A			A			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		54.8		10.2		54.8		10.2				
Change Period (Y+Rc), s		6.5		6.0		6.5		6.0				
Max Green Setting (Gmax), s		29.5		23.0		29.5		23.0				
Max Q Clear Time (g_c+I), s		14.7		3.3		13.5		3.5				
Green Ext Time (p_c), s		6.4		0.1		8.9		0.0				

Intersection Summary

HCM 6th Ctrl Delay	5.2
HCM 6th LOS	A

Mountain Shadows Resort  
Total PM

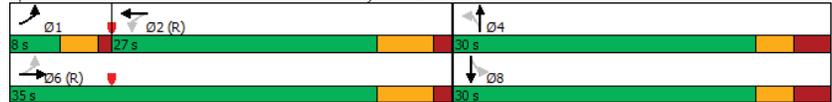
1: Camelback Manor Dr/Desert Fairways Dr & Lincoln Dr  
Timings

	↖	→	↙	←	↘	↑	↗	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↖↗	↙	↖↗	↖	↖↗	↙	↙
Traffic Volume (vph)	63	1104	5	1293	4	2	115	2
Future Volume (vph)	63	1104	5	1293	4	2	115	2
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	1	6	2	2	4	4	8	8
Permitted Phases	6	2	4	8	8	8	8	8
Detector Phase	1	6	2	2	4	4	8	8
Switch Phase								
Minimum Initial (s)	4.0	15.0	15.0	15.0	7.0	7.0	7.0	7.0
Minimum Split (s)	8.0	26.0	26.0	26.0	30.0	30.0	30.0	30.0
Total Split (s)	8.0	35.0	27.0	27.0	30.0	30.0	30.0	30.0
Total Split (%)	12.3%	53.8%	41.5%	41.5%	46.2%	46.2%	46.2%	46.2%
Yellow Time (s)	3.0	4.5	4.5	4.5	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.5	1.5	1.5	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	42.3	40.3	34.2	34.2	12.7	12.7	12.7	12.7
Actuated g/C Ratio	0.65	0.62	0.53	0.53	0.20	0.20	0.20	0.20
v/c Ratio	0.26	0.55	0.02	0.86	0.05	0.57	0.29	0.29
Control Delay	7.8	9.2	22.2	30.2	13.9	31.0	6.7	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	9.2	22.2	30.2	13.9	31.0	6.7	6.7
LOS	A	A	C	C	B	C	A	A
Approach Delay		9.1		30.1		13.9		20.5
Approach LOS		A		C		B		C

Intersection Summary

Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 49 (75%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 20.7	Intersection LOS: C
Intersection Capacity Utilization 71.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: Camelback Manor Dr/Desert Fairways Dr & Lincoln Dr



Mountain Shadows Resort  
Total PM

1: Camelback Manor Dr/Desert Fairways Dr & Lincoln Dr  
HCM 6th Signalized Intersection Summary

	↖	→	↙	←	↘	↑	↗	↓	↖			
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↙	↖↗		↖	↖↗	↙	↙	↙	↙
Traffic Volume (veh/h)	63	1104	3	5	1293	171	4	2	6	115	2	85
Future Volume (veh/h)	63	1104	3	5	1293	171	4	2	6	115	2	85
Initial Q (Ob), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No											
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1945	1870	1870	1870	1870
Adj Flow Rate, veh/h	68	1200	0	5	1390	98	6	3	5	155	3	74
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.93	0.69	0.69	0.69	0.74	0.74	0.74
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	267	2418	0	352	1938	136	140	75	75	317	8	207
Arrive On Green	0.04	0.68	0.00	0.39	0.39	0.39	0.14	0.14	0.14	0.14	0.14	0.14
Sat Flow, veh/h	1781	3647	0	466	3368	237	453	553	559	1407	62	1532
Grp Volume(v), veh/h	68	1200	0	5	731	757	14	0	0	155	0	77
Grp Sat Flow(s),veh/h/ln	1781	1777	0	466	1777	1828	1565	0	0	1407	0	1595
Q Serve(g_s), s	0.9	10.6	0.0	0.5	22.7	22.9	0.0	0.0	0.0	3.2	0.0	2.9
Cycle Q Clear(g_c), s	0.9	10.6	0.0	4.2	22.7	22.9	2.9	0.0	0.0	6.1	0.0	2.9
Prop In Lane	1.00		0.00	1.00		0.13	0.43		0.36	1.00		0.96
Lane Grp Cap(c), veh/h	267	2418	0	352	1022	1051	290	0	0	317	0	215
V/C Ratio(X)	0.25	0.50	0.00	0.01	0.72	0.72	0.05	0.00	0.00	0.49	0.00	0.36
Avail Cap(c_a), veh/h	299	2418	0	352	1022	1051	657	0	0	647	0	589
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.1	5.0	0.0	11.0	15.5	15.5	24.5	0.0	0.0	26.8	0.0	25.5
Incr Delay (d2), s/veh	0.2	0.7	0.0	0.1	4.3	4.3	0.1	0.0	0.0	1.2	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	2.4	0.0	0.0	10.2	10.6	0.2	0.0	0.0	2.3	0.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.2	5.7	0.0	11.1	19.7	19.8	24.6	0.0	0.0	27.9	0.0	26.6
LnGrp LOS	B	A	A	B	B	B	C	A	A	C	A	C
Approach Vol, veh/h		1268			1493			14		232		
Approach Delay, s/veh		6.0			19.7			24.6		27.5		
Approach LOS		A			B			C		C		

Timer - Assigned Phs	1	2	4	6	8
Phs Duration (G+Y+Rc), s	6.8	43.4	14.8	50.2	14.8
Change Period (Y+Rc), s	4.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	4.0	21.0	24.0	29.0	24.0
Max Q Clear Time (g_c+I), s	2.9	24.9	4.9	12.6	8.1
Green Ext Time (p_c), s	0.0	0.0	0.0	7.6	0.8

Intersection Summary

HCM 6th Ctrl Delay	14.6
HCM 6th LOS	B

Mountain Shadows Resort  
Total PM

2: West Access & Lincoln Dr  
HCM 6th TWSC

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑		↑
Traffic Vol, veh/h	1218	43	16	1521	0	29
Future Vol, veh/h	1218	43	16	1521	0	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	125	75	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	94	94	63	63
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1282	45	17	1618	0	46

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	1327
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	*880
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	1
Mov Cap-1 Maneuver	-	-	*880
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	11.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	588	-	-	*880	-
HCM Lane V/C Ratio	0.078	-	-	0.019	-
HCM Control Delay (s)	11.6	-	-	9.2	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

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

Mountain Shadows Resort  
Total PM

3: East Access & Lincoln Dr  
HCM 6th TWSC

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Vol, veh/h	1222	25	21	1504	18	27
Future Vol, veh/h	1222	25	21	1504	18	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	135	80	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	94	94	72	72
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1273	26	22	1600	25	38

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	1299
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	*880
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	1
Mov Cap-1 Maneuver	-	-	*880
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	
HCM LOS			-

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	*880	-
HCM Lane V/C Ratio	-	-	-	0.025	-
HCM Control Delay (s)	-	-	-	9.2	-
HCM Lane LOS	-	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0.1	-

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

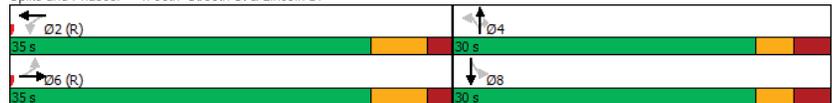
Mountain Shadows Resort  
Total PM

4: 56th St/56th St & Lincoln Dr  
Timings

	↖	→	↗	↖	↖	↑	↗	↘	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↖	↖↗	↖	↖↗	↖	↖	↖	↖	↖↗
Traffic Volume (vph)	33	1182	52	1443	68	2	26	3	2
Future Volume (vph)	33	1182	52	1443	68	2	26	3	2
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases		6		2			4		8
Permitted Phases	6		2		4		4	8	
Detector Phase	6	6	2	2	4	4	4	8	8
Switch Phase									
Minimum Initial (s)	15.0	15.0	15.0	15.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	31.5	31.5	31.5	31.5	13.0	13.0	29.0	29.0	29.0
Total Split (s)	35.0	35.0	35.0	35.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	53.8%	53.8%	53.8%	53.8%	46.2%	46.2%	46.2%	46.2%	46.2%
Yellow Time (s)	4.5	4.5	4.5	4.5	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	47.0	47.0	47.0	47.0	9.4	9.4	9.4	9.4	9.4
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.14	0.14	0.14	0.14	0.14
v/c Ratio	0.21	0.52	0.23	0.61	0.41	0.10	0.13	0.13	0.13
Control Delay	6.0	3.5	8.4	7.7	31.1	3.4	19.1	19.1	19.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.0	3.5	8.4	7.7	31.1	3.4	19.1	19.1	19.1
LOS	A	A	A	A	C	A	B	B	B
Approach Delay		3.6		7.7		23.6		19.1	
Approach LOS		A		A		C		B	

Intersection Summary	
Cycle Length:	65
Actuated Cycle Length:	65
Offset:	29 (45%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green
Natural Cycle:	70
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.61
Intersection Signal Delay:	6.6
Intersection Capacity Utilization:	64.2%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 4: 56th St/56th St & Lincoln Dr



Mountain Shadows Resort  
Total PM

4: 56th St/56th St & Lincoln Dr  
HCM 6th Signalized Intersection Summary

	↖	→	↗	↖	↖	↑	↗	↘	↓	↖		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗	↖	↖	↖↗	↖	↖	↖	↖	↖	↖↗	↖
Traffic Volume (veh/h)	33	1182	36	52	1443	32	68	2	26	3	2	14
Future Volume (veh/h)	33	1182	36	52	1443	32	68	2	26	3	2	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No											
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	36	1285	28	55	1519	23	76	2	18	5	3	14
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.95	0.89	0.89	0.89	0.63	0.63	0.63
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	279	2535	55	409	2554	39	245	5	150	85	39	98
Arrive On Green	1.00	1.00	1.00	0.71	0.71	0.71	0.09	0.09	0.09	0.09	0.09	0.09
Sat Flow, veh/h	336	3556	77	419	3583	54	1432	50	1585	177	413	1033
Grp Volume(v), veh/h	36	642	671	55	753	789	78	0	18	22	0	0
Grp Sat Flow(s), veh/h/ln	336	1777	1856	419	1777	1861	1481	0	1585	1624	0	0
Q Serve(g_s), s	2.4	0.0	0.0	2.8	13.7	13.8	1.9	0.0	0.7	0.0	0.0	0.0
Cycle Q Clear(g_c), s	16.2	0.0	0.0	2.8	13.7	13.8	3.1	0.0	0.7	0.8	0.0	0.0
Prop In Lane	1.00		0.04	1.00		0.03	0.97		1.00	0.23		0.64
Lane Grp Cap(c), veh/h	279	1267	1323	409	1267	1326	250	0	150	222	0	0
V/C Ratio(X)	0.13	0.51	0.51	0.13	0.59	0.60	0.31	0.00	0.12	0.10	0.00	0.00
Avail Cap(c_a), veh/h	279	1267	1323	409	1267	1326	635	0	585	652	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	2.4	0.0	0.0	3.1	4.7	4.7	27.9	0.0	26.9	27.0	0.0	0.0
Incr Delay (d2), s/veh	1.0	1.5	1.4	0.7	2.1	2.0	0.7	0.0	0.4	0.2	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	0.1	0.5	0.5	0.2	3.1	3.2	1.2	0.0	0.3	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	3.4	1.5	1.4	3.8	6.7	6.6	28.6	0.0	27.3	27.2	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	C	C	A	A
Approach Vol, veh/h		1349			1597			96			22	
Approach Delay, s/veh		1.5			6.6			28.4			27.2	
Approach LOS		A			A			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		52.8		12.2		52.8		12.2				
Change Period (Y+Rc), s		6.5		6.0		6.5		6.0				
Max Green Setting (Gmax), s		28.5		24.0		28.5		24.0				
Max Q Clear Time (g_c+I), s		15.8		5.1		18.2		2.8				
Green Ext Time (p_c), s		8.4		0.4		6.1		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	5.2
HCM 6th LOS	A

## **APPENDIX H**

### **SCOTTSDALE DS&PM SECTION 5-3.201**

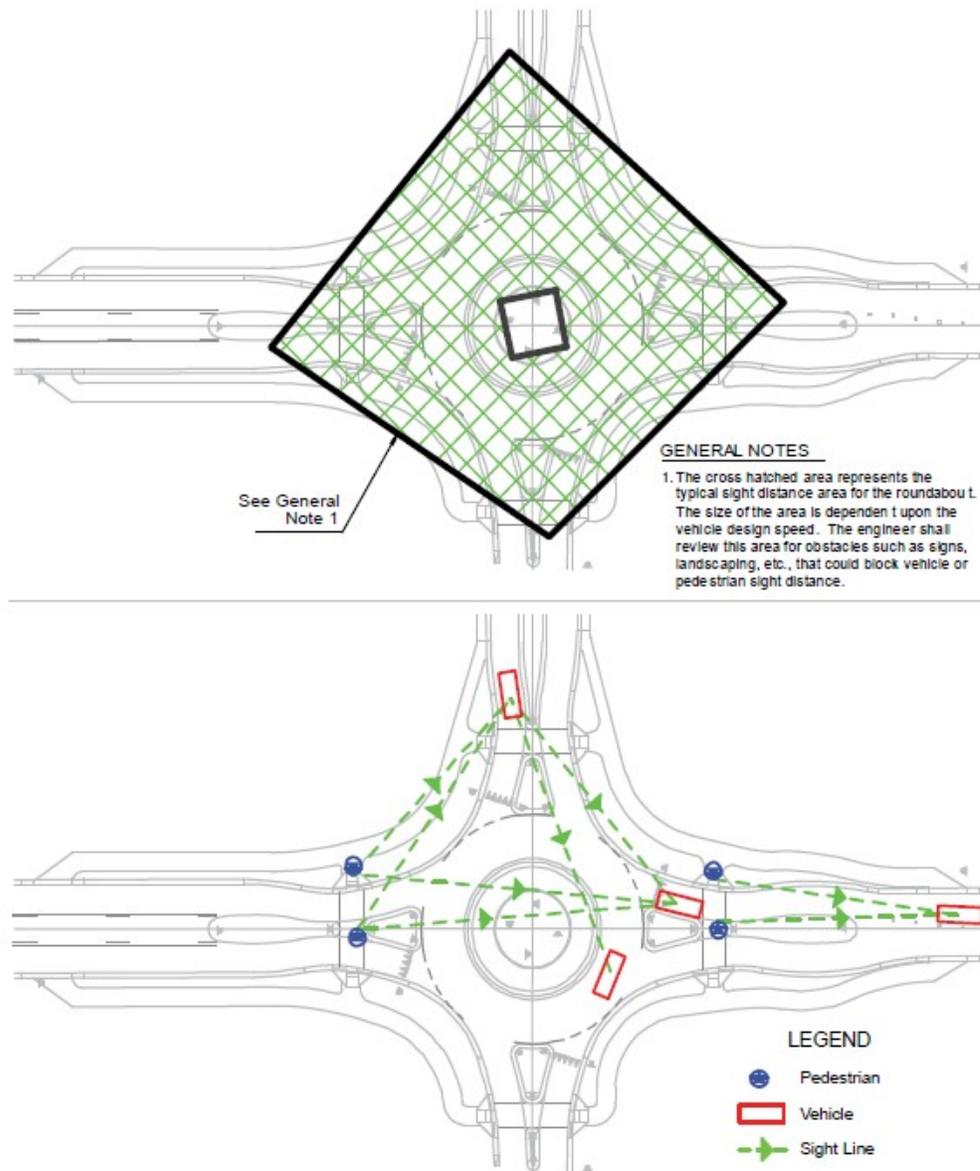


FIGURE 5-3.34 ROUNDABOUT SIGHT DISTANCE

## STREET ACCESS AND DRIVEWAYS

5-3.2000

Driveway types are determined by land use type and street classification. The standards for these driveway types are illustrated in Figure 5-3.38 through Figure 5-3.43. Refer to Figure 5-3.39 for driveway grade standards.

## DRIVEWAY SPACING

5-3.201

Standard and minimum driveway spacing will generally conform to the following standards. This minimum spacing applies to proposed site driveway separation as well

as separation from existing or planned driveways and streets on adjacent parcels. The spacing is measured to the driveway or street centerline.

<b>STREET TYPE</b>	<b>STANDARD DRIVEWAY SPACING</b>	<b>MINIMUM DRIVEWAY SPACING</b>
Local Residential / Local Collector	50 feet	50 feet
Local Industrial / Local Commercial	165 feet	125 feet
Minor Collector	165 feet	125 feet
Major Collector	250 feet	150 feet
Minor Arterial	330 feet	250 feet
Major Arterial	500 feet	300 feet

FIGURE 5-3.35 DRIVEWAY SPACING

Standard driveway spacing criteria shall apply for all new driveways where there are no conflicts with existing driveway and street intersections, site frontage is adequate, and there are no conflicts with natural features or drainage structures. The minimum driveway spacing may be allowed when approved by Transportation staff where those conflicts noted above exist or other site plan associated issues do not allow the standard driveway spacing to be implemented. In locations where the standard driveway spacing cannot be achieved, a deceleration lane may be required to mitigate the impact of the closer driveway spacing.

For sites that have frontage on two streets, primary access should be onto the minor street frontage. A maximum of two driveway openings is permitted to a site or parcel from the abutting street(s). The Transportation Department may permit additional driveway entrances when projected travel demands indicate it is in the interests of good traffic operation, and when adequate street frontage exists to maintain the above guidelines.

Where new development adjoins other similarly zoned property or compatible land uses, a cross access easement may be required to permit vehicular movement between the parcels or to reduce the number of access points required onto the adjacent public street. Combining driveways reduces the number of conflict points for pedestrians, bicyclists, and other vehicles. This may be required regardless of the development status of the adjoining property, unless the cross access is determined to be unfeasible by city staff.

New driveways on collector and arterial streets in areas that do not have raised medians shall align with existing or planned driveways and street intersections to avoid creating interlocking left turns and other conflicts. Offsets in the driveway centerlines may be allowed up to 6 feet. If the driveways cannot be aligned, the driveways should be offset a minimum distance of 125 feet along streets without a center turn lane, and a minimum 250 feet along streets with a center turn lane.

When site driveway locations are modified, any existing driveways that are not going to be utilized for access must be removed and replaced with curb, gutter, and sidewalk to match the adjacent improvements.

## DRIVEWAY LOCATIONS

5-3.202

A new access driveway will not be allowed (measured to the driveway centerline):

- A. Within 30 feet of any commercial property line, except when it is a joint-use driveway serving two abutting commercial properties and access agreements have been exchanged between, and recorded by, the two abutting property owners;
- B. When the total width of all driveways serving a property exceeds 50 percent of the curb line frontage;
- C. Within 50 feet of the rights-of-way line of an intersecting non-arterial street;
- D. Within 100 feet of the rights-of-way line of an intersecting arterial street;
- E. Within 100 feet of an approved median opening location on an arterial street;
- F. Less than the minimum spacing as established under Section 5-3.201;

## VEHICULAR NON-ACCESS EASEMENT

5-3.203

For proper control of driveway access, a vehicular non-access easement (V.N.E.) is to be granted to the city, except at approved access points, along all collector and arterial streets when abutting property develops.

## RESIDENTIAL DRIVEWAYS

5-3.204

### A. **Single-family Residential Development**

Driveways serving single-family residential units should be S-1 type driveways as shown in Figure 5-3.40. Only one driveway per lot street frontage is allowed except where the street frontage is of sufficient length to maintain a separation of 50 feet between driveways. The minimum driveway length is 18 feet, measured from the face of the garage opening to the back of sidewalk or the back of curb if no sidewalk is provided. Refer to Section 2-2.308 for additional discussion on driveways. Refer to Standard Detail Drawings (2200 Series) for access ramp design requirements.

### B. **Multi-family Residential Development**

Driveways serving multi-family residential units should be CL and CH type driveways, as shown in Figure 5-3.41 through Figure 5-3.44. Type CL-1 and CL-2 are low-volume driveways to be used on local streets. Type CH-1, -2 and -3 are high volume driveways to be used on collector and arterial streets. CL type driveways may be required along urban character collector and arterial streets with higher pedestrian traffic. The minimum driveway length is 50 feet, measured from the entrance to the off-street parking area to the back of sidewalk, or to the back of curb if no sidewalk is provided. Refer to Standard Detail Drawings (2200 Series) for access ramp design requirements.

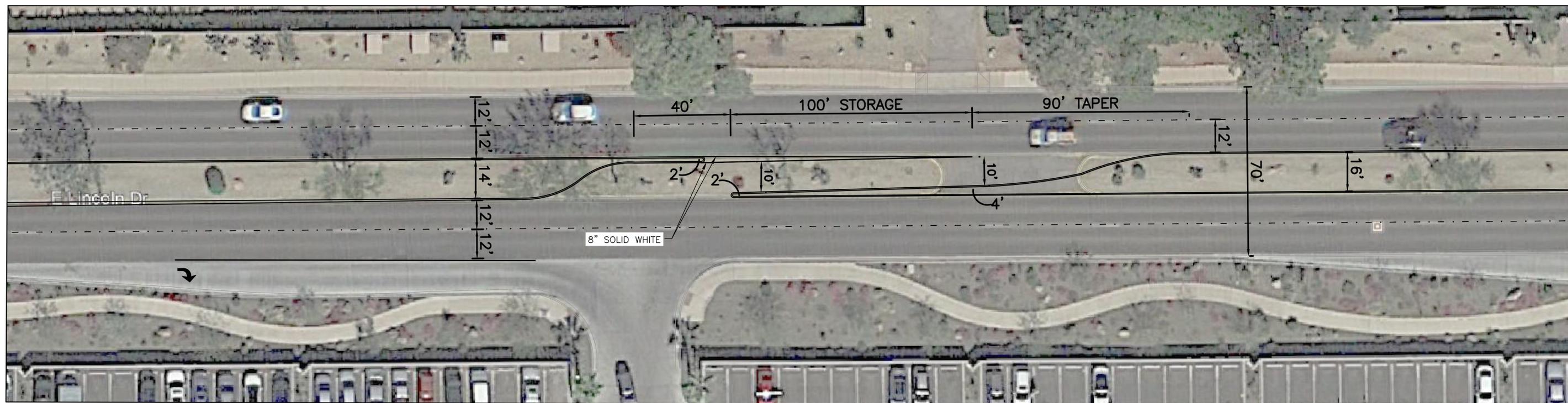
### C. **Limitations on Residential Access**

Residential properties that have frontage on a local street, an arterial, or collector street are limited to local street access.

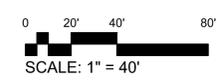
In some instances, residential parcels fronting only on arterial or collector streets may be given access if alternate public access is not available. When such access is allowed, the driveway must be circular, or it must have a turn-around area to ensure there is no need for backing onto the street.

## **APPENDIX I**

### **LEFT TURN LANE DESIGN CONCEPT**



**MOUNTAIN SHADOW** 



SHEET TITLE		Plan Sheet Title
PROJECT TITLE		MOUNTAIN SHADOW LEFT TURN
DESIGNED: XXXXX	DRAWN: XXXXX	CHECKED: XXXXX
		SHT. FIG-1

## **APPENDIX J**

### **QUEUE STORAGE ANALYSIS**

Signalized Intersection  
2020

Average Vehicle Length (ft): 25

Cycles: 2

Intersection Cycle Length (sec): 65

Equation Used: storage length = 2 x (vehicles/hour)/(cycles/hour) x average vehicle length

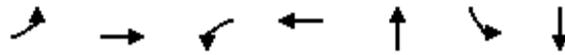
Intersection	Approach	AM Peak (veh/hr)	Midday Peak	PM Peak (veh/hr)	Max vehs per 2 cycles	Max trucks per 2 cycles	Storage Length
Desert Fairways Dr & Lincoln Dr	NB Left	2	0	4	1	0	25'
	SB Left	75	0	115	5	0	125'
	EB Left	68	0	63	3	0	75'
	WB Left	5	0	5	1	0	25'
	NB Right	5	0	6	1	0	25'
	SB Right	45	0	85	4	0	100'
	EB Right	4	0	3	1	0	25'
	WB Right	56	0	171	7	0	175'
56th St & Lincoln Dr	NB Left	34	0	68	3	0	75'
	SB Left	4	0	3	1	0	25'
	EB Left	7	0	33	2	0	50'
	WB Left	14	0	52	2	0	50'
	NB Right	15	0	26	1	0	25'
	SB Right	3	0	14	1	0	25'
	EB Right	48	0	36	2	0	50'
	WB Right	6	0	32	2	0	50'

Unsignalized Intersection  
2020

Average Vehicle Length (ft): 25

Equation Used: storage length = 2 x (vehicles/hour)/(60 minutes/hour) x average vehicle length

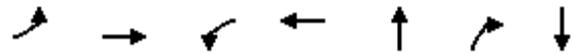
Intersection	Approach	AM Peak (veh/hr)	Midday Peak	PM Peak (veh/hr)	Veh per 2 minutes	Trucks per 2 minutes	Storage Length
Mountain Shadows West & Lincoln Dr	NB Left	0	0	0	0	0	0'
	SB Left	0	0	0	0	0	0'
	EB Left	0	0	0	0	0	0'
	WB Left	7	0	16	1	0	25'
	NB Right	13	0	29	1	0	25'
	SB Right	0	0	0	0	0	0'
	EB Right	24	0	43	2	0	50'
	WB Right	0	0	0	0	0	0'
Mountain Shadows East & Lincoln Dr	NB Left	23	0	18	1	0	25'
	SB Left	0	0	0	0	0	0'
	EB Left	0	0	0	0	0	0'
	WB Left	11	0	21	1	0	25'
	NB Right	14	0	27	1	0	25'
	SB Right	0	0	0	0	0	0'
	EB Right	28	0	25	1	0	25'
	WB Right	0	0	0	0	0	0'



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	75	1417	6	1226	21	89	55
v/c Ratio	0.22	0.55	0.03	0.55	0.08	0.43	0.19
Control Delay	5.4	7.1	8.0	11.0	15.1	30.5	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.4	7.1	8.0	11.0	15.1	30.5	9.2
Queue Length 50th (ft)	7	134	1	197	3	33	0
Queue Length 95th (ft)	22	233	m4	319	6	61	23
Internal Link Dist (ft)		606		1662	828		853
Turn Bay Length (ft)	150		50			75	
Base Capacity (vph)	334	2557	216	2217	641	511	620
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.55	0.03	0.55	0.03	0.17	0.09

**Intersection Summary**

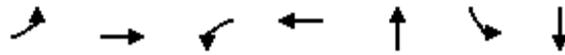
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	8	1489	15	1138	38	16	8
v/c Ratio	0.02	0.52	0.07	0.40	0.21	0.07	0.04
Control Delay	2.3	6.0	4.6	4.0	28.5	0.5	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.3	6.0	4.6	4.0	28.5	0.5	0.3
Queue Length 50th (ft)	1	224	2	83	14	0	0
Queue Length 95th (ft)	m0	331	8	135	38	0	0
Internal Link Dist (ft)		411		603	435		338
Turn Bay Length (ft)	50		80			285	
Base Capacity (vph)	358	2849	225	2859	531	598	530
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.52	0.07	0.40	0.07	0.03	0.02

**Intersection Summary**

m Volume for 95th percentile queue is metered by upstream signal.



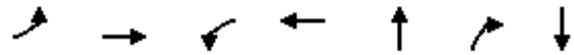
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	68	1203	5	1574	18	155	118
v/c Ratio	0.26	0.55	0.02	0.86	0.05	0.57	0.29
Control Delay	7.8	9.2	22.2	30.1	13.9	31.0	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	9.2	22.2	30.1	13.9	31.0	6.7
Queue Length 50th (ft)	8	124	2	333	3	56	1
Queue Length 95th (ft)	26	226	m3	#580	11	76	21
Internal Link Dist (ft)		606		1662	828		853
Turn Bay Length (ft)	150		50			75	
Base Capacity (vph)	266	2193	229	1839	637	513	659
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.55	0.02	0.86	0.03	0.30	0.18

**Intersection Summary**

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



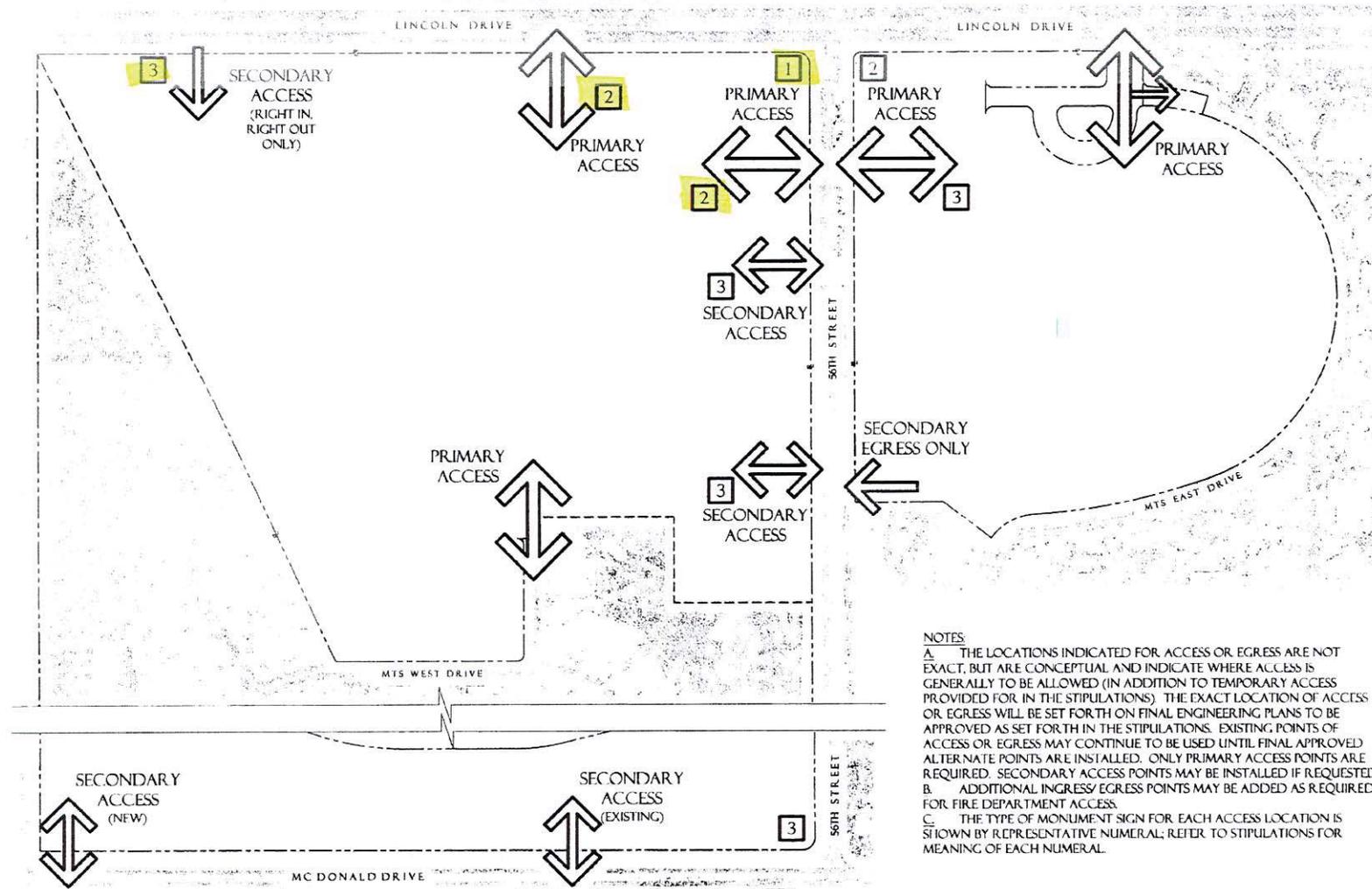
Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	36	1291	55	1615	78	29	30
v/c Ratio	0.24	0.51	0.22	0.63	0.41	0.10	0.13
Control Delay	6.7	3.5	8.1	8.1	31.1	3.4	19.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	3.5	8.1	8.1	31.1	3.4	19.7
Queue Length 50th (ft)	3	66	7	168	29	0	8
Queue Length 95th (ft)	m7	82	28	290	61	9	18
Internal Link Dist (ft)		411		603	435		338
Turn Bay Length (ft)	50		80			285	
Base Capacity (vph)	151	2548	250	2552	488	621	581
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.51	0.22	0.63	0.16	0.05	0.05

**Intersection Summary**

m Volume for 95th percentile queue is metered by upstream signal.

## **APPENDIX K**

### **SUP ACCESS DIAGRAMS**



**NOTES**  
 A. THE LOCATIONS INDICATED FOR ACCESS OR EGRESS ARE NOT EXACT, BUT ARE CONCEPTUAL AND INDICATE WHERE ACCESS IS GENERALLY TO BE ALLOWED (IN ADDITION TO TEMPORARY ACCESS PROVIDED FOR IN THE STIPULATIONS). THE EXACT LOCATION OF ACCESS OR EGRESS WILL BE SET FORTH ON FINAL ENGINEERING PLANS TO BE APPROVED AS SET FORTH IN THE STIPULATIONS. EXISTING POINTS OF ACCESS OR EGRESS MAY CONTINUE TO BE USED UNTIL FINAL APPROVED ALTERNATE POINTS ARE INSTALLED. ONLY PRIMARY ACCESS POINTS ARE REQUIRED. SECONDARY ACCESS POINTS MAY BE INSTALLED IF REQUESTED.  
 B. ADDITIONAL INGRESS/EGRESS POINTS MAY BE ADDED AS REQUIRED FOR FIRE DEPARTMENT ACCESS.  
 C. THE TYPE OF MONUMENT SIGN FOR EACH ACCESS LOCATION IS SHOWN BY REPRESENTATIVE NUMERAL; REFER TO STIPULATIONS FOR MEANING OF EACH NUMERAL.

**MOUNTAIN SHADOWS**

**INGRESS / EGRESS AND SIGN LOCATION DIAGRAM**

ALL WRITTEN DIMENSIONS TAKE PRECEDENCE OVER SCALED DIMENSIONS.

	DATE: FEBRUARY 22, 2013	<table border="1"> <tr> <td>PROJECT:</td> <td>3</td> </tr> <tr> <td>SPECIAL USE PERMIT:</td> <td></td> </tr> </table>	PROJECT:	3	SPECIAL USE PERMIT:	
	PROJECT:		3			
SPECIAL USE PERMIT:						
SCALE: 1" = 40'						

*SUP Access Diagram*