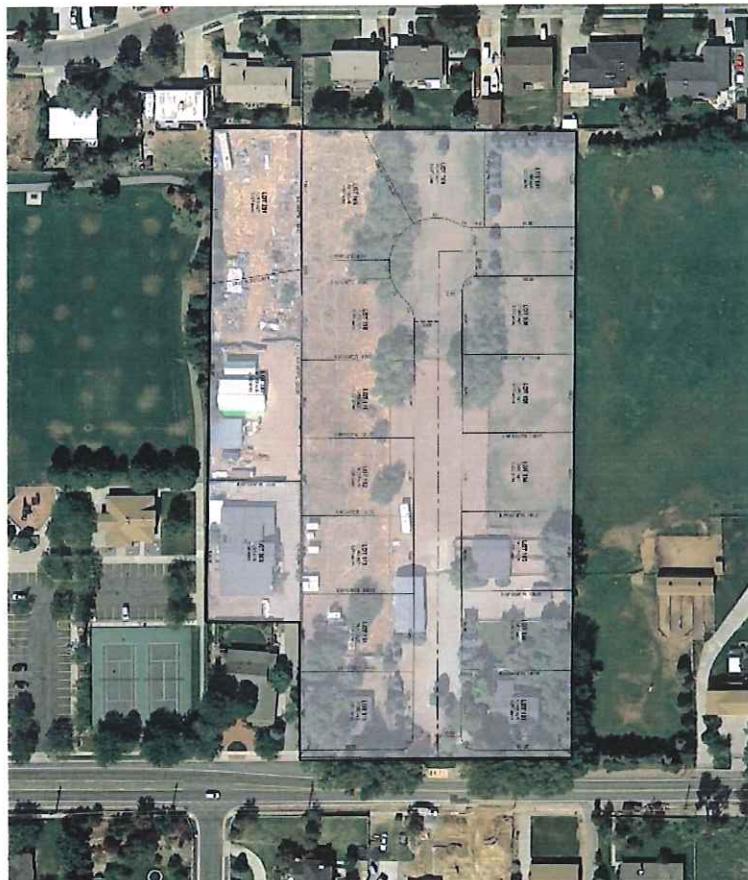


Bell Canyon Cove

Traffic Impact Study



Sandy, Utah

July 15, 2019

UT19-1506



EXECUTIVE SUMMARY

This study addresses the traffic impacts associated with the proposed Bell Canyon Cove residential development located in Sandy, Utah. The proposed project is located on the north side of 11400 South and just east of Jolley Acres Circle.

Included within the analyses for this study are the traffic operations and recommended mitigation measures for existing conditions and plus project conditions (conditions after development of the proposed project) at key intersections and roadways near the site.

The evening peak hour level of service (LOS) was computed for each study intersection. The results of this analysis are shown in Table ES-1.

TABLE ES-1 LOS Analysis - Evening Peak Hour Sandy - Bell Canyon Cove TIS		
Intersection	Level of Service (Sec/Veh) ¹	
	Existing (2019) Background	Existing (2019) Plus Project
Jolley Acres Circle / 11400 South	A (5.7) / NB	A (5.8) / NB
South Access / 11400 South ²	-	A (3.1) / SB

1. Intersection LOS and delay (seconds/vehicle) values represent the overall intersection average for roundabout, signalized, all-way stop controlled intersections and the worst approach for all other unsignalized intersections.

2. This intersection is a project access and was only analyzed in the plus project scenario.

Source: Hales Engineering, July 2019

SUMMARY OF KEY FINDINGS/RECOMMENDATIONS

The following is a summary of key findings and recommendations:

- All study intersections are currently operating at an acceptable LOS during the evening peak hour in existing (2019) background conditions.
- The development will consist of 17 new single-family units and one existing unit.
- All study intersections are anticipated to operate at an acceptable LOS during the evening peak hour with project traffic added.
- The City could consider striping a two-way left-turn lane (TWLTL) in front of the site by continuing the existing TWLTL on 11400 South to the east. However, this is not necessary.

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I. INTRODUCTION

A. Purpose

This study addresses the traffic impacts associated with the proposed Bell Canyon Cove residential development located in Sandy, Utah. The proposed project is located on the north side of 11400 South and just east of Jolley Acres Circle. Figure 1 shows a vicinity map of the proposed development.

Included within the analyses for this study are the traffic operations and recommended mitigation measures for existing conditions and plus project conditions (conditions after development of the proposed project) at key intersections and roadways near the site.

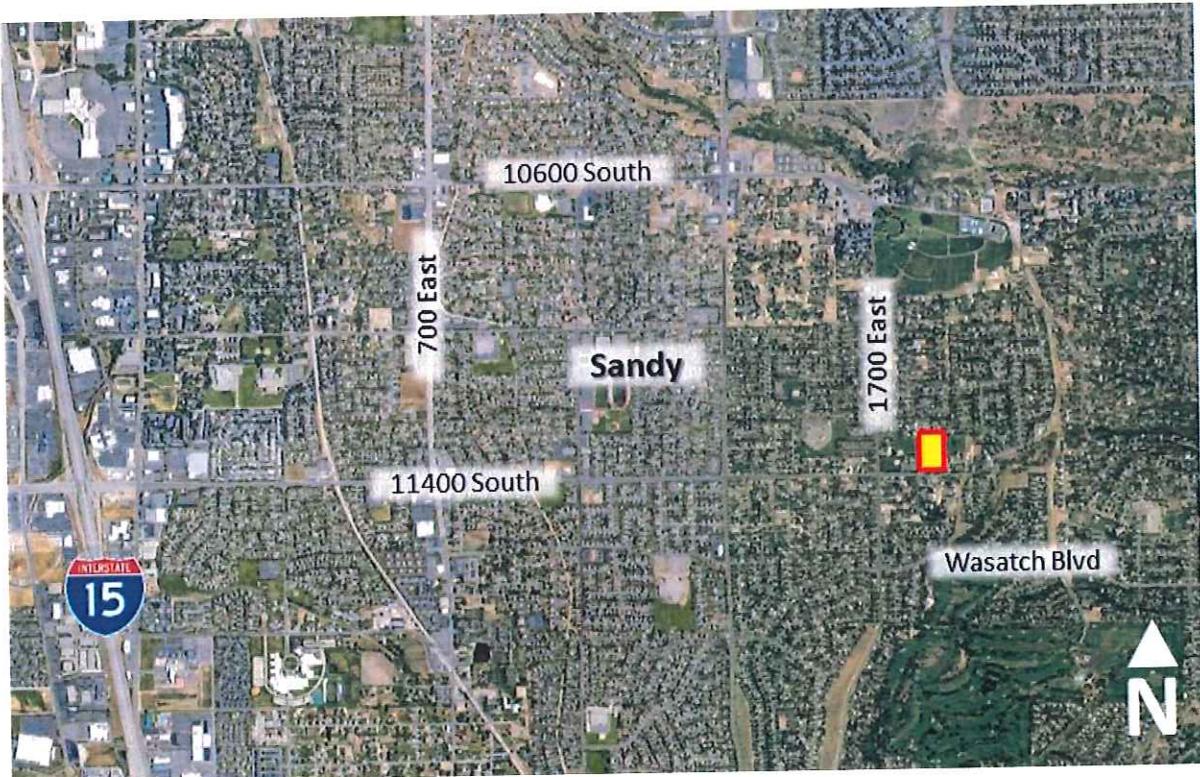


Figure 1: Vicinity map showing the project location in Sandy, Utah

B. Scope

The study area was defined based on conversations with the development team. This study was scoped to evaluate the traffic operational performance impacts of the project on the following intersections:

- Jolley Acres Circle / 11400 South
- South Access / 11400 South

C. Analysis Methodology

Level of service (LOS) is a term that describes the operating performance of an intersection or roadway. LOS is measured quantitatively and reported on a scale from A to F, with A representing the best performance and F the worst. Table 1 provides a brief description of each LOS letter designation and an accompanying average delay per vehicle for both signalized and unsignalized intersections. Figure 2 provides a visual representation of each LOS letter designation.

The *Highway Capacity Manual* (HCM), 6th Edition, 2016 methodology was used in this study to remain consistent with “state-of-the-practice” professional standards. This methodology has different quantitative evaluations for signalized and unsignalized intersections. For signalized and all-way stop intersections, the LOS is provided for the overall intersection (weighted average of all approach delays). For all other unsignalized intersections, LOS is reported based on the worst approach.

Using Synchro/SimTraffic software, which follow the HCM methodology, the peak hour LOS was computed for each study intersection. Multiple runs of SimTraffic were used to provide a statistical evaluation of the interaction between the intersections. The detailed LOS reports are provided in Appendix B. Hales Engineering also calculated the 95th percentile queue lengths for the study intersections using SimTraffic. The detailed queue length reports are provided in Appendix D.

D. Level of Service Standards

For the purposes of this study, a minimum acceptable intersection performance for each of the study intersections was set at LOS D. If levels of service E or F conditions exist, an explanation and/or mitigation measures will be presented. A LOS D threshold is consistent with “state-of-the-practice” traffic engineering principles for urbanized areas.

Table 1: Level of Service Description

Level of Service	Description of Traffic Conditions	Average Delay (seconds/vehicle)
Signalized Intersections		Overall Intersection
A	Extremely favorable progression and a very low level of control delay. Individual users are virtually unaffected by others in the traffic stream.	0 ≤ 10.0
B	Good progression and a low level of control delay. The presence of other users in the traffic stream becomes noticeable.	> 10.0 and ≤ 20.0
C	Fair progression and a moderate level of control delay. The operation of individual users becomes somewhat affected by interactions with others in the traffic stream.	>20.0 and ≤ 35.0
D	Marginal progression with relatively elevated levels of control delay. Operating conditions are noticeably more constrained.	> 35.0 and ≤ 55.0
E	Poor progression with unacceptably elevated levels of control delay. Operating conditions are at or near capacity.	> 55.0 and ≤ 80.0
F	Unacceptable progression with forced or breakdown operating conditions.	> 80.0
Unsignalized Intersections		Worst Approach
A	Free Flow / Insignificant Delay	0 ≤ 10.0
B	Stable Operations / Minimum Delays	>10.0 and ≤ 15.0
C	Stable Operations / Acceptable Delays	>15.0 and ≤ 25.0
D	Approaching Unstable Flows / Tolerable Delays	>25.0 and ≤ 35.0
E	Unstable Operations / Significant Delays Can Occur	>35.0 and ≤ 50.0
F	Forced Flows / Unpredictable Flows / Excessive Delays Occur	> 50.0

Source: Hales Engineering Descriptions, based on the *Highway Capacity Manual* (HCM), 6th Edition, 2016 Methodology (Transportation Research Board)

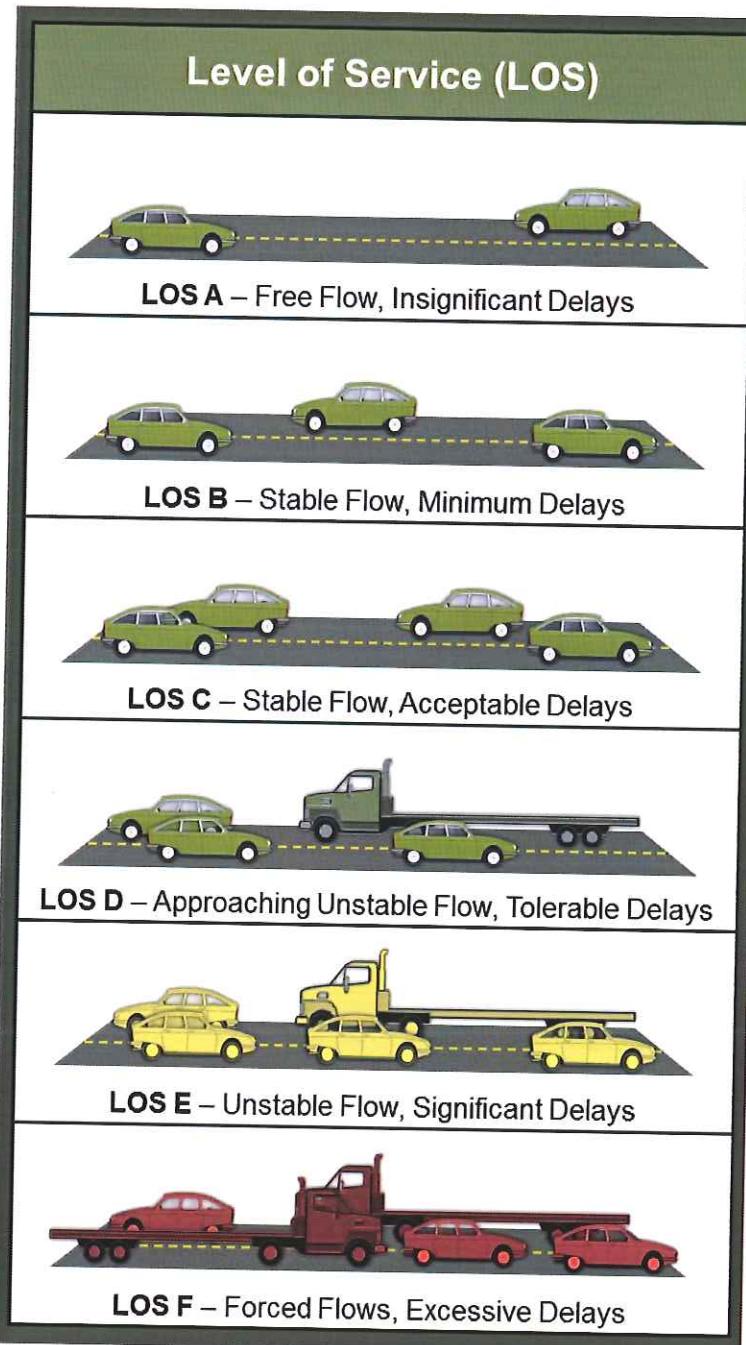


Figure 2: Visual representation of the LOS letter designations



II. EXISTING (2019) BACKGROUND CONDITIONS

A. Purpose

The purpose of the background analysis is to study the intersections and roadways during the peak travel periods of the day with background traffic and geometric conditions. Through this analysis, background traffic operational deficiencies can be identified, and potential mitigation measures recommended. This analysis provides a baseline condition that may be compared to the build conditions to identify the impacts of the development.

B. Roadway System

The primary roadways that will provide access to the project site are described below:

11400 South – is a city-maintained roadway which is classified by the Sandy City Transportation Master Plan (November 2009) as a “major collector.” The roadway has a single travel lane in each direction. There is a center two-way left-turn lane (TWLTL) west of Jolley Acres Circle but not otherwise. The posted speed limit is 30 mph in the study area.

C. Traffic Volumes

Weekday morning (7:00 to 9:00 a.m.) and evening (4:00 to 6:00 p.m.) peak period traffic counts were performed at the following intersection:

- Jolley Acres Circle / 11400 South

The counts were performed on Thursday, July 11, 2019. The morning peak hour was determined to be between 8:00 and 9:00 a.m., and the evening peak hour was determined to be between 5:00 and 6:00 p.m. The evening peak hour volumes were approximately 47% higher than the morning peak hour volumes. Therefore, the evening peak hour volumes were used in the analysis to represent the worst-case conditions. Detailed count data are included in Appendix A.

Hales Engineering made no seasonal adjustments to the observed traffic volumes as no UDOT automatic traffic recorders (ATRs) are located near the study area. Figure 3 shows the existing evening peak hour volumes as well as intersection geometry at the study intersections.

Sandy Bell Canyon Cove TIS
Existing (2019) Background

Evening Peak Hour
Figure 3



D. Level of Service Analysis

Hales Engineering determined that all study intersections are currently operating at acceptable levels of service during the evening peak hour, as shown in Table 2. These results serve as a baseline condition for the impact analysis of the proposed development during existing (2019) conditions.

Table 2: Existing (2019) Background Evening Peak Hour Level of Service

Intersection Description	Control	Worst Approach			Overall Intersection	
		Approach ^{1,3}	Aver. Delay (Sec/Veh) ¹	LOS ¹	Aver. Delay (Sec/Veh) ²	LOS ²
Jolley Acres Circle / 11400 South	NB Stop	NB	5.7	A	-	-

1. This represents the worst approach LOS and delay (seconds / vehicle) and is only reported for non-all-way stop unsignalized intersections.
 2. This represents the overall intersection LOS and delay (seconds / vehicle) and is reported for all-way stop and signal-controlled intersections.
 3. SB = Southbound approach, etc.

Source: Hales Engineering, July 2019

E. Queuing Analysis

Hales Engineering calculated the 95th percentile queue lengths for each of the study intersections. No significant queueing was observed during the evening peak hour.

F. Mitigation Measures

No mitigation measures are recommended.

III. PROJECT CONDITIONS

A. Purpose

The project conditions discussion explains the type and intensity of development. This provides the basis for trip generation, distribution, and assignment of project trips to the surrounding study intersections defined in Chapter I.

B. Project Description

This study addresses the traffic impacts associated with the proposed Bell Canyon Cove residential development located in Sandy, Utah. The proposed project is located on the north side of 11400 South and just east of Jolley Acres Circle. The development will consist of 17 new residential units. There is an existing single-family home (lot 203 on the site plan) that is included within this subdivision but that will access 11400 South from a separate existing access. A site plan for the proposed development is provided in Appendix C.

The proposed land use for the development has been identified as follows:

- Single-family homes 17 new units

C. Trip Generation

Trip generation for the development was calculated using trip generation rates published in the Institute of Transportation Engineers (ITE), *Trip Generation*, 10th Edition, 2017. Trip generation for the proposed project is included in Table 3. The total trip generation for the development is as follows:

- Daily Trips: 204
- Morning Peak Hour Trips: 18
- Evening Peak Hour Trips: 20

D. Trip Distribution and Assignment

Project traffic was assigned to the roadway network based on the proximity of the project access to major streets, high population densities, and regional trip attractions. Existing travel patterns observed during data collection also provided helpful guidance to establishing these distribution percentages. The resulting distribution of project trips during the evening peak hour is as follows:

To/From Project:

- 90% West
- 10% East

Table 3
Sandy - Bell Canyon Cove TIS
Trip Generation

Weekday Daily Land Use ¹	# of Units	Unit Type	Trip Generation	% Entering	% Exiting	Trips Entering	Trips Exiting	Total Daily Trips
Single-Family Detached Housing (210)	17	Dwelling Units	204	50%	50%	102	102	204
Morning Peak Hour Land Use ¹	# of Units	Unit Type	Trip Generation	% Entering	% Exiting	Trips Entering	Trips Exiting	Total a.m. Trips
Single-Family Detached Housing (210)	17	Dwelling Units	18	25%	75%	5	13	18
Evening Peak Hour Land Use ¹	# of Units	Unit Type	Trip Generation	% Entering	% Exiting	Trips Entering	Trips Exiting	Total p.m. Trips
Single-Family Detached Housing (210)	17	Dwelling Units	20	63%	37%	13	7	20

1. Land Use Code from the Institute of Transportation Engineers (ITE) *Trip Generation*, 10th Edition, 2017.

SOURCE: Hales Engineering, July 2019

These trip distribution assumptions were used to assign the evening peak hour generated traffic at the study intersections to create trip assignment for the proposed development. Trip assignment for the development is shown in Figure 4.

E. Access

The proposed access for the site will be gained at the following locations (see also concept plan in Appendix C):

11400 South:

- The South Access will be located approximately 225 feet east of the Jolley Acres Circle / 11400 South intersection. It is anticipated that the access will be a full-movement access and stop-controlled on the southbound approach.
 - There is an existing TWLTL on 11400 South west of Jolley Acres Circle that tapers down towards the east. The City could consider extending this TWLTL in front of the site by striping the pavement in front of the site.

**Sandy Bell Canyon Cove TIS
Trip Assignment**

**Evening Peak Hour
Figure 4**



IV. EXISTING (2019) PLUS PROJECT CONDITIONS

A. Purpose

The purpose of the existing (2019) plus project analysis is to study the intersections and roadways during the peak travel periods of the day for existing background traffic and geometric conditions plus the net trips generated by the proposed development. This scenario provides valuable insight into the potential impacts of the proposed project on background traffic conditions.

B. Traffic Volumes

Hales Engineering added the project trips discussed previously to the existing (2019) background traffic volumes to predict volumes for existing (2019) plus project conditions. Existing (2019) plus project evening peak hour turning movement volumes are shown in Figure 5.

C. Level of Service Analysis

Hales Engineering determined that all intersections are anticipated to operate at acceptable levels of service during the evening peak hour with project traffic added, as shown in Table 4.

Table 4: Existing (2019) Plus Project Evening Peak Hour Level of Service

Intersection Description	Control	Worst Approach			Overall Intersection	
		Approach ¹	Aver. Delay (Sec/Veh) ¹	LOS ¹	Aver. Delay (Sec/Veh) ²	LOS
Jolley Acres Circle / 11400 South	NB Stop	NB	5.8	A	-	-
South Access / 11400 South	SB Stop	SB	3.1	A	-	-

1. This represents the worst approach LOS and delay (seconds / vehicle) and is only reported for non-all-way stop unsignalized intersections.

Source: Hales Engineering, July 2019

D. Queuing Analysis

Hales Engineering calculated the 95th percentile queue lengths for each of the study intersections. No significant queuing is anticipated during the evening peak hour.

E. Mitigation Measures

No mitigation measures are recommended.

Sandy Bell Canyon Cove TIS
Existing (2019) Plus Project

Evening Peak Hour
Figure 5





APPENDIX A

Turning Movement Counts

 TrafficCounts

2364 North 1450 East
Lehi, UT 84043
801 636 0891

Intersection Turning Movement Summary

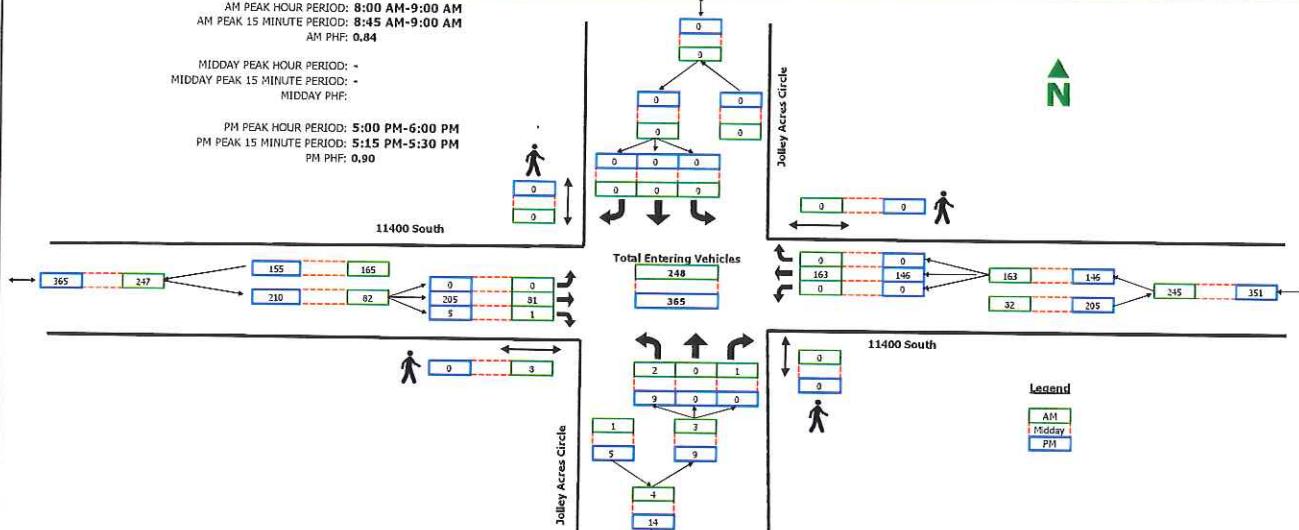
Intersection: Jolley Acres Circle / 11400 South
North/South: Jolley Acres Circle
East/West: 11400 South
Jurisdiction: Sandy
Project Title: Bell Canyon Cove TIS
Project No: UT19-1506
Weather: Clear

Client Summary
Date: 7-11-19, Thu
Day of Week Adjustment: 100,0%
Month of Year Adjustment: 100,0%
Adjustment Station #: 0
Growth Rate: 0,0%
Number of Years: 0

AM PEAK HOUR PERIOD: 8:00 AM-9:00 AM
AM PEAK 15 MINUTE PERIOD: 8:45 AM-9:00 AM
AM PHF: 0.84

MIDDAY PEAK HOUR PERIOD: -
MIDDAY PEAK 15 MINUTE PERIOD: -
MIDDAY RHE:

PM PEAK HOUR PERIOD: 5:00 PM-6:00 PM
PM PEAK 15 MINUTE PERIOD: 5:15 PM-5:30 PM
PM PHE: 0.90



Raw Count Summaries	Jolley Acres Circle Northbound				Jolley Acres Circle Southbound				11400 South Eastbound				11400 South Westbound				Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
AM PERIOD COUNTS																	
Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	
7:00 - 7:15	1	1	0	2	0	0	0	0	0	10	0	0	1	22	0	0	41
7:15 - 7:30	1	0	1	0	0	0	0	0	0	14	0	4	1	25	0	0	53
7:30 - 7:45	4	0	0	0	0	0	0	0	0	14	0	2	0	35	0	0	69
7:45 - 8:00	1	0	0	0	0	0	0	0	0	22	1	0	0	45	0	0	55
8:00 - 8:15	0	0	0	0	0	0	0	0	0	24	0	2	0	31	0	0	51
8:15 - 8:30	1	0	0	0	0	0	0	0	0	15	0	3	0	35	0	0	68
8:30 - 8:45	1	0	0	0	0	0	0	0	0	21	0	0	0	46	0	0	74
8:45 - 9:00	0	0	1	0	0	0	0	0	0	21	1	0	0	51	0	0	
MIDDAY PERIOD COUNTS																	
Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	
9:00 - 9:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9:15 - 9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9:30 - 9:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9:45 - 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:00 - 10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:15 - 10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:30 - 10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:45 - 11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:00 - 11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:15 - 11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 - 11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 - 12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:00 - 12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:15 - 12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:30 - 12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:45 - 13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13:00 - 13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13:15 - 13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13:30 - 13:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13:45 - 14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
14:00 - 14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
14:15 - 14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
14:30 - 14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
14:45 - 15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
15:00 - 15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
15:15 - 15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
15:30 - 15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
15:45 - 16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PM PERIOD COUNTS																	
Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	
16:00 - 16:15	1	0	0	0	0	0	0	0	0	38	0	0	0	29	0	0	71
16:15 - 16:30	0	0	0	0	0	0	0	0	0	52	0	0	0	31	0	0	86
16:30 - 16:45	3	3	0	0	0	0	0	0	0	37	1	0	0	30	0	0	74
16:45 - 17:00	1	0	0	0	0	0	0	0	0	51	0	1	0	28	0	0	70
17:00 - 17:15	1	0	0	0	0	0	0	0	0	57	0	0	0	30	0	0	89
17:15 - 17:30	2	0	0	0	0	0	0	0	0	49	0	0	0	50	0	0	101
17:30 - 17:45	2	0	0	0	0	0	0	0	0	46	2	0	0	40	0	0	90
17:45 - 18:00	4	0	0	0	0	0	0	0	0	53	3	0	0	26	0	0	86



APPENDIX B

LOS Results

SimTraffic LOS Report

Project:

Sandy Bell Canyon Cove TIS

Analysis Period:

Existing (2019) Background

Time Period:

Evening Peak Hour

Project #: UT19-1506

Intersection: Jolley Acres Circle & 11400 South
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
NB	L	9	8	86	5.7	A
	Subtotal	9	8	89	5.7	A
EB	T	205	204	100	0.2	A
	R	5	6	114	0.0	A
WB	Subtotal	210	210	100	0.2	A
	T	146	144	98	0.1	A
	Subtotal	146	144	99	0.1	A
Total		366	362	99	0.3	A

1: Jolley Acres Circle & 11400 South Performance by movement Interval #1 5:00

Movement	EBT	EBR	WBT	NBL	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	0.1	0.0	0.1	0.1
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.2	0.0	0.1	4.2	0.3
Vehicles Entered	48	2	34	3	87
Vehicles Exited	48	1	34	2	85
Hourly Exit Rate	192	4	136	8	340
Input Volume	197	5	141	9	352
% of Volume	97	80	96	89	97

1: Jolley Acres Circle & 11400 South Performance by movement Interval #2 5:15

Movement	EBT	EBR	WBT	NBL	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	0.3	0.0	0.1	0.1
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.3	0.0	0.1	6.3	0.3
Vehicles Entered	50	2	34	2	88
Vehicles Exited	50	2	34	2	88
Hourly Exit Rate	200	8	136	8	352
Input Volume	197	5	141	9	352
% of Volume	102	160	96	89	100

1: Jolley Acres Circle & 11400 South Performance by movement Interval #3 5:30

Movement	EBT	EBR	WBT	NBL	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	0.2	0.0	0.1	0.1
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.3	0.0	0.1	6.4	0.3
Vehicles Entered	56	1	39	2	98
Vehicles Exited	57	1	39	2	99
Hourly Exit Rate	228	4	156	8	396
Input Volume	228	6	162	10	406
% of Volume	100	67	96	80	98

1: Jolley Acres Circle & 11400 South Performance by movement Interval #4 5:45

Movement	EBT	EBR	WBT	NBL	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	0.1	0.0	0.1	0.1
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.2	0.2	0.1	4.0	0.2
Vehicles Entered	50	1	36	2	89
Vehicles Exited	49	1	36	2	88
Hourly Exit Rate	196	4	144	8	352
Input Volume	197	5	141	9	352
% of Volume	99	80	102	89	100

1: Jolley Acres Circle & 11400 South Performance by movement Entire Run

Movement	EBT	EBR	WBT	NBL	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	0.2	0.0	0.1	0.1
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.2	0.0	0.1	5.7	0.3
Vehicles Entered	205	6	144	8	363
Vehicles Exited	204	6	144	8	362
Hourly Exit Rate	204	6	144	8	362
Input Volume	205	5	146	9	366
% of Volume	100	114	98	86	99

Total Network Performance By Interval

Interval Start	5:00	5:15	5:30	5:45	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	0.2	0.2	0.2	0.2
Total Delay (hr)	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	0.7	0.8	1.0	0.7	0.8
Vehicles Entered	87	89	98	89	363
Vehicles Exited	86	88	100	88	364
Hourly Exit Rate	344	352	400	352	364
Input Volume	1380	1380	1592	1380	1433
% of Volume	25	26	25	26	25

Intersection: 1: Jolley Acres Circle & 11400 South, Interval #1

Movement	NB
Directions Served	LR
Maximum Queue (ft)	28
Average Queue (ft)	8
95th Queue (ft)	31
Link Distance (ft)	344
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 1: Jolley Acres Circle & 11400 South, Interval #2

Movement	NB
Directions Served	LR
Maximum Queue (ft)	25
Average Queue (ft)	7
95th Queue (ft)	28
Link Distance (ft)	344
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 1: Jolley Acres Circle & 11400 South, Interval #3

Movement	NB
Directions Served	LR
Maximum Queue (ft)	27
Average Queue (ft)	7
95th Queue (ft)	29
Link Distance (ft)	344
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 1: Jolley Acres Circle & 11400 South, Interval #4

Movement	NB
Directions Served	LR
Maximum Queue (ft)	28
Average Queue (ft)	6
95th Queue (ft)	26
Link Distance (ft)	344
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 1: Jolley Acres Circle & 11400 South, All Intervals

Movement	NB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	7
95th Queue (ft)	29
Link Distance (ft)	344
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty, Interval #1: 0
Network wide Queuing Penalty, Interval #2: 0
Network wide Queuing Penalty, Interval #3: 0
Network wide Queuing Penalty, Interval #4: 0
Network wide Queuing Penalty, All Intervals: 0

SimTraffic LOS Report

Project:
Analysis Period:
Time Period:

Sandy Bell Canyon Cove TIS
Existing (2019) Plus Project
Evening Peak Hour

Project #: *UT19-1506*

Intersection: Jolley Acres Circle & 11400 South
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
<i>NB</i>	L	9	9	97	5.8	A
	Subtotal	9	9	100	5.8	A
<i>EB</i>	T	217	219	101	0.2	A
	R	5	5	95	0.1	A
<i>WB</i>	Subtotal	222	224	101	0.2	A
	T	152	153	100	0.1	A
	Subtotal	152	153	101	0.1	A
Total		384	386	101	0.3	A

Intersection: 11400 South & South Access
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
<i>SB</i>	L	1	1	100	3.8	A
	R	6	6	96	3.0	A
<i>EB</i>	Subtotal	7	7	100	3.1	A
	L	12	11	90	2.1	A
<i>WB</i>	T	205	208	102	0.2	A
	Subtotal	217	219	101	0.3	A
	T	146	147	101	0.2	A
	R	1	1	100	0.1	A
	Subtotal	147	148	101	0.2	A
Total		372	374	101	0.3	A

1: Jolley Acres Circle & 11400 South Performance by movement Interval #1 5:00

Movement	EBT	EBR	WBT	NBL	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	0.1	0.0	0.1	0.1
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.2	0.0	0.1	6.0	0.3
Vehicles Entered	54	1	36	2	93
Vehicles Exited	54	1	36	2	93
Hourly Exit Rate	216	4	144	8	372
Input Volume	209	5	147	9	370
% of Volume	103	80	98	89	101

1: Jolley Acres Circle & 11400 South Performance by movement Interval #2 5:15

Movement	EBT	EBR	WBT	NBL	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	0.1	0.0	0.1	0.1
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.2	0.1	0.1	7.0	0.3
Vehicles Entered	51	1	37	2	91
Vehicles Exited	50	1	36	2	89
Hourly Exit Rate	200	4	144	8	356
Input Volume	209	5	147	9	370
% of Volume	96	80	98	89	96

1: Jolley Acres Circle & 11400 South Performance by movement Interval #3 5:30

Movement	EBT	EBR	WBT	NBL	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	0.3	0.0	0.1	0.1
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.3	0.2	0.1	4.0	0.3
Vehicles Entered	61	2	42	3	108
Vehicles Exited	60	2	42	2	106
Hourly Exit Rate	240	8	168	8	424
Input Volume	241	6	169	10	426
% of Volume	100	133	99	80	100

1: Jolley Acres Circle & 11400 South Performance by movement Interval #4 5:45

Movement	EBT	EBR	WBT	NBL	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	0.1	0.0	0.1	0.1
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.2	0.2	0.1	5.1	0.3
Vehicles Entered	55	1	39	2	97
Vehicles Exited	55	1	38	2	96
Hourly Exit Rate	220	4	152	8	384
Input Volume	209	5	147	9	370
% of Volume	105	80	103	89	104

1: Jolley Acres Circle & 11400 South Performance by movement Entire Run

Movement	EBT	EBR	WBT	NBL	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	0.2	0.0	0.1	0.1
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.2	0.1	0.1	5.3	0.3
Vehicles Entered	220	4	153	9	386
Vehicles Exited	219	5	153	9	386
Hourly Exit Rate	219	5	153	9	386
Input Volume	217	5	152	9	384
% of Volume	101	95	100	97	101

2: 11400 South & South Access Performance by movement Interval #1 5:00

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0		4.4	0.1	
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.1	0.1	0.2		3.4	0.3	
Vehicles Entered	2	52	33	0	0	2	89
Vehicles Exited	2	52	34	0	0	2	90
Hourly Exit Rate	8	208	136	0	0	8	360
Input Volume	12	197	141	1	1	6	358
% of Volume	67	106	96	0	0	133	101

2: 11400 South & South Access Performance by movement Interval #2 5:15

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0			5.9	0.1
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.2	0.2	0.2			1.9	0.3
Vehicles Entered	3	48	36	0	0	1	88
Vehicles Exited	3	48	36	0	0	1	88
Hourly Exit Rate	12	192	144	0	0	4	352
Input Volume	12	197	141	1	1	6	358
% of Volume	100	97	102	0	0	67	98

2: 11400 South & South Access Performance by movement Interval #3 5:30

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0			4.6	0.1
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.1	0.2	0.2			3.7	0.3
Vehicles Entered	3	57	40	0	2	102	
Vehicles Exited	3	57	40	0	2	102	
Hourly Exit Rate	12	228	160	0	8	408	
Input Volume	13	228	162	1	7	412	
% of Volume	92	100	99	0	114	99	

2: 11400 South & South Access Performance by movement Interval #4 5:45

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0			3.8	0.0
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.1	0.2	0.1			2.7	0.3
Vehicles Entered	3	52	38	0	0	1	94
Vehicles Exited	3	52	38	0	0	1	94
Hourly Exit Rate	12	208	152	0	0	4	376
Input Volume	12	197	141	1	1	6	358
% of Volume	100	106	108	0	0	67	105

2: 11400 South & South Access Performance by movement Entire Run

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	4.0	0.1
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.1	0.2	0.2	0.1	3.8	3.0	0.3
Vehicles Entered	11	208	147	2	1	7	376
Vehicles Exited	11	208	147	1	1	6	374
Hourly Exit Rate	11	208	147	1	1	6	374
Input Volume	12	205	146	1	1	6	372
% of Volume	90	102	101	100	100	96	101

Total Network Performance By Interval

Interval Start	5:00	5:15	5:30	5:45	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.3	0.2	0.3	0.2	0.3
Total Delay (hr)	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	1.0	1.0	1.0	0.9	1.0
Vehicles Entered	92	91	109	97	389
Vehicles Exited	94	90	107	96	387
Hourly Exit Rate	376	360	428	384	387
Input Volume	1439	1439	1658	1439	1494
% of Volume	26	25	26	27	26

Intersection: 1: Jolley Acres Circle & 11400 South, Interval #1

Movement	NB
Directions Served	LR
Maximum Queue (ft)	33
Average Queue (ft)	9
95th Queue (ft)	33
Link Distance (ft)	344
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 1: Jolley Acres Circle & 11400 South, Interval #2

Movement	NB
Directions Served	LR
Maximum Queue (ft)	28
Average Queue (ft)	9
95th Queue (ft)	33
Link Distance (ft)	344
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 1: Jolley Acres Circle & 11400 South, Interval #3

Movement	NB
Directions Served	LR
Maximum Queue (ft)	28
Average Queue (ft)	8
95th Queue (ft)	31
Link Distance (ft)	344
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 1: Jolley Acres Circle & 11400 South, Interval #4

Movement	NB
Directions Served	LR
Maximum Queue (ft)	22
Average Queue (ft)	7
95th Queue (ft)	28
Link Distance (ft)	344
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 1: Jolley Acres Circle & 11400 South, All Intervals

Movement	NB
Directions Served	LR
Maximum Queue (ft)	34
Average Queue (ft)	8
95th Queue (ft)	31
Link Distance (ft)	344
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: 11400 South & South Access, Interval #1

Movement	SB	SB
Directions Served	L	R
Maximum Queue (ft)	9	28
Average Queue (ft)	1	8
95th Queue (ft)	9	30
Link Distance (ft)	474	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	50	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 2: 11400 South & South Access, Interval #2

Movement	EB	SB	SB
Directions Served	LT	L	R
Maximum Queue (ft)	11	6	27
Average Queue (ft)	2	1	5
95th Queue (ft)	19	9	24
Link Distance (ft)	184	474	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		50	
Storage Blk Time (%)		0	
Queuing Penalty (veh)		0	

Intersection: 2: 11400 South & South Access, Interval #3

Movement	EB	SB
Directions Served	LT	R
Maximum Queue (ft)	14	31
Average Queue (ft)	2	8
95th Queue (ft)	16	29
Link Distance (ft)	184	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		50
Storage Blk Time (%)		0
Queuing Penalty (veh)		0

Intersection: 2: 11400 South & South Access, Interval #4

Movement	EB	SB	SB
Directions Served	LT	L	R
Maximum Queue (ft)	9	6	18
Average Queue (ft)	2	1	3
95th Queue (ft)	13	9	17
Link Distance (ft)	184	474	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		50	
Storage Blk Time (%)		0	
Queuing Penalty (veh)		0	

Intersection: 2: 11400 South & South Access, All Intervals

Movement	EB	SB	SB
Directions Served	LT	L	R
Maximum Queue (ft)	28	18	31
Average Queue (ft)	2	1	6
95th Queue (ft)	14	8	26
Link Distance (ft)	184	474	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		50	
Storage Blk Time (%)		0	
Queuing Penalty (veh)		0	

Network Summary

Network wide Queuing Penalty, Interval #1: 0
Network wide Queuing Penalty, Interval #2: 0
Network wide Queuing Penalty, Interval #3: 0
Network wide Queuing Penalty, Interval #4: 0
Network wide Queuing Penalty, All Intervals: 0



APPENDIX C

Site Plan

BELL CANYON COVE

**AMENDING LOT 2 OF PARK LANE SUBDIVISION
CONCERNING THE NINETEEN-FOOT QUADROES OF SECTION 21.**

LOCATED IN THE NORTHEAST QUARTER OF SECTION 21,
TOWNSHIP 2 SOUTH, RANGE 1 EAST, SALT LAKE BASE & MERIDIAN
SANDY CITY, SALT LAKE COUNTY, UTAH

FINAL FLAT

APPENDIX D

95th Percentile Queue Length Reports



SimTraffic Queueing Report

Project: Sandy Bell Canyon Cove TIS

Analysis: Existing (2019) Plus Project

Time Period: Evening Peak Hour

95th Percentile Queue Length (feet)



HALES ENGINEERING
innovative transportation solutions

Project #: UT19-1506

Intersection	NB		SB		EB	
	LR	L	R	LT	LT	
11400 South & South Access	—	8	26	14	—	
Jolley Acres Circle & 11400 South	31	—	—	—	—	