

**SOUTHWEST TRAFFIC  
ENGINEERING, LLC**

## TRAFFIC IMPACT ANALYSIS

# CREATION TBIRD SCOTTSDALE

73<sup>RD</sup> STREET/THUNDERBIRD ROAD

REVISED 6 OCTOBER 2022

23 JUNE 2022

27 APRIL 2022



PREPARED FOR

**CREATION RE LLC**

**1200 NORTH 52<sup>ND</sup> STREET**

**PHOENIX, ARIZONA 85008**

SOUTHWEST TRAFFIC ENGINEERING, LLC  
3838 NORTH CENTRAL AVENUE, SUITE 1810  
PHOENIX, AZ 85012  
T 602.266.SWTE (7983) F 602.266.1115



## Table of Contents

<b>Executive Summary</b>	<b>4</b>
<b>Project Description</b>	<b>6</b>
<b>Study Methodology</b>	<b>6</b>
<b>Existing Conditions</b>	<b>9</b>
<b>Existing Traffic Data</b>	<b>9</b>
<b>Access</b>	<b>12</b>
<b>Trip Generation</b>	<b>12</b>
<b>Trip Distribution &amp; Assignment</b>	<b>14</b>
<b>Existing Traffic Operations</b>	<b>14</b>
<b>Future Traffic Operations Without Project</b>	<b>17</b>
<b>Future Traffic Operations With Project</b>	<b>21</b>
<b>Turn Lane Analysis</b>	<b>24</b>
<b>Crash Analysis</b>	<b>26</b>
<b>Mitigation</b>	<b>26</b>
<b>Conclusion</b>	<b>27</b>

## Table of Figures

<b>Figure 1 – Vicinity Map</b>	<b>7</b>
<b>Figure 2 – Site Plan</b>	<b>8</b>
<b>Figure 3 – Existing Lane Configurations and Traffic Control</b>	<b>10</b>
<b>Figure 4 – Existing Weekday Peak Hour Traffic Volumes</b>	<b>11</b>
<b>Figure 5 – Baseline Access Point and Intersection Configuration Assumptions</b>	<b>13</b>
<b>Figure 6 – Weekday Peak Hour Trip Distribution</b>	<b>15</b>
<b>Figure 7 – Weekday Peak Hour Trip Assignment</b>	<b>16</b>
<b>Figure 8 – 2023 Weekday Peak Hour Traffic Volumes Without Project</b>	<b>18</b>
<b>Figure 9 – 2028 Weekday Peak Hour Traffic Volumes Without Project</b>	<b>19</b>
<b>Figure 10 – 2023 Weekday Peak Hour Traffic Volumes With Project</b>	<b>21</b>
<b>Figure 11 – 2028 Weekday Peak Hour Traffic Volumes With Project</b>	<b>23</b>
<b>Figure 12 – Proposed Lane Configurations and Traffic Control</b>	<b>29</b>



## List of Tables

<b>Table 1 – Project Site Generated Trips</b>	<b>12</b>
<b>Table 2 – Level of Service Criteria – Un-signalized Intersections</b>	<b>14</b>
<b>Table 3 – Existing Weekday Peak Hour Levels of Service</b>	<b>17</b>
<b>Table 4 – 2023 Weekday Peak Hour Levels of Service Without Project</b>	<b>20</b>
<b>Table 5 – 2028 Weekday Peak Hour Levels of Service Without Project</b>	<b>20</b>
<b>Table 6 – 2023 Weekday Peak Hour Levels of Service With Project</b>	<b>21</b>
<b>Table 7 – 2028 Weekday Peak Hour Levels of Service With Project</b>	<b>24</b>
<b>Table 8 – Calculated Queue Lengths</b>	<b>25</b>
<b>Table 9 – Crash Analysis at 73<sup>rd</sup> Street/Thunderbird Road</b>	<b>26</b>

## Appendix

Traffic Counts  
Trip Generation Calculations  
Capacity Calculations  
Turn Lane Calculations  
Crash Summary  
Comment Resolution

### Prepared By:

Andrew Smigielski, PE, PTOE, PTP  
Amy Forsythe, EIT



## CREATION TBIRD SCOTTSDALE 73<sup>RD</sup> STREET/THUNDERBIRD ROAD TRAFFIC IMPACT ANALYSIS

### **Executive Summary**

The purpose of this traffic study is to evaluate the current and future transportation system within the project study area surrounding the site without and with the proposed project.

### **Existing Traffic Data**

All of the study intersections currently operate at an adequate levels of service (LOS) during the weekday peak hours.

### **Future Traffic Data Without Project**

The eastbound right turning movement at Park n Ride Driveway/Scottsdale Road is expected to begin experiencing inadequate delays during the weekday PM peak hour in 2028 without traffic from the project. This delay is due to the relatively large number of through traffic volumes on Scottsdale Road not providing adequate gaps for vehicles turning from the minor approaches.

The remaining study intersections are expected to continue to operate at an adequate LOS during the weekday peak hours in 2023 and 2028 without traffic from the project.

### **Future Traffic Data With Project**

The eastbound right turning movement at Park n Ride Driveway/Scottsdale Road is expected to experience inadequate delays during the weekday PM peak hour in 2028 without and with traffic from the project. This delay is due to the relatively large number of through traffic volumes on Scottsdale Road not providing adequate gaps for vehicles turning from the minor approaches.

The remaining study intersections are expected to continue to operate at an adequate LOS during the weekday peak hours in 2023 and 2028 without and with traffic from the project.

### **Turn Lane Analysis**

The northbound right turn lane at Park n Ride Driveway/Scottsdale Road, the westbound left turn lane and northbound left and right turn lanes at 73<sup>rd</sup> Street/Thunderbird Road, and the westbound left turn lane and eastbound right turn lane at Redfield Road/Thunderbird Road are each expected to require 25 feet or less of storage. The existing turn lanes at the study intersections are expected to adequately serve the future queuing vehicles with the project.

### **Crash Analysis**

Crash history at the two existing study intersections was obtained from ADOT from 1 January 2018 to 31 December 2020.

Three crashes were reported at the intersection of 73<sup>rd</sup> Street/Thunderbird Road during the three-year study period. Two of the collisions were sideswipes and one was rear-end.



No crashes were reported at the remaining study intersections during this three-year period. This limited crash data provides no observable crash pattern for the area.

### **Mitigation**

The eastbound right turning movement at Park n Ride Driveway/Scottsdale Road is expected to experience inadequate delays during the weekday PM peak hour in 2028 without and with traffic from the project. This delay is due to the relatively large number of through traffic volumes on Scottsdale Road not providing adequate gaps for vehicles turning from the minor approaches. Un-signalized, minor approaches to intersections with four or more lane major streets such as Scottsdale Road tend to operate at a LOS E or F during the weekday peak hours. Mitigation measures are limited at this intersection. A traffic signal would not be appropriate due to the proximity of the signalized intersection of Thunderbird Road/Scottsdale Road.

It should be noted that this delay is only expected to occur for the right-in/right-out only movement on the west side of Scottsdale Road and will not be utilized or significantly impacted by this project.



## CREATION TBIRD SCOTTSDALE 73<sup>RD</sup> STREET/THUNDERBIRD ROAD TRAFFIC IMPACT ANALYSIS

### Project Description

Creation RE LLC is proposing a new light industrial development on the southeast corner of 73<sup>rd</sup> Street/Thunderbird Road in Scottsdale, Arizona. The vicinity of the project is shown in **Figure 1**. The site will be located as shown in **Figure 2**. The project will consist of 243,360 square feet of general light industrial park. Two access points will serve the project site.

The purpose of this traffic impact analysis is to:

- Evaluate the current and future operational characteristics of the adjacent roadway network surrounding the project site.
- Estimate the traffic generation associated with the project and assign that traffic to the existing roadway system.
- Analyze future traffic operations at three existing intersections and two proposed driveways serving the project area.
- Verify the queue storage lengths needed at the existing auxiliary (left and right turn) lanes at the intersections that will serve the project site.
- Perform a crash analysis to identify any specific crash trends within the study area.

The author of this report is a registered professional engineer (civil) in the State of Arizona having specific expertise and experience in the preparation of traffic impact analyses.

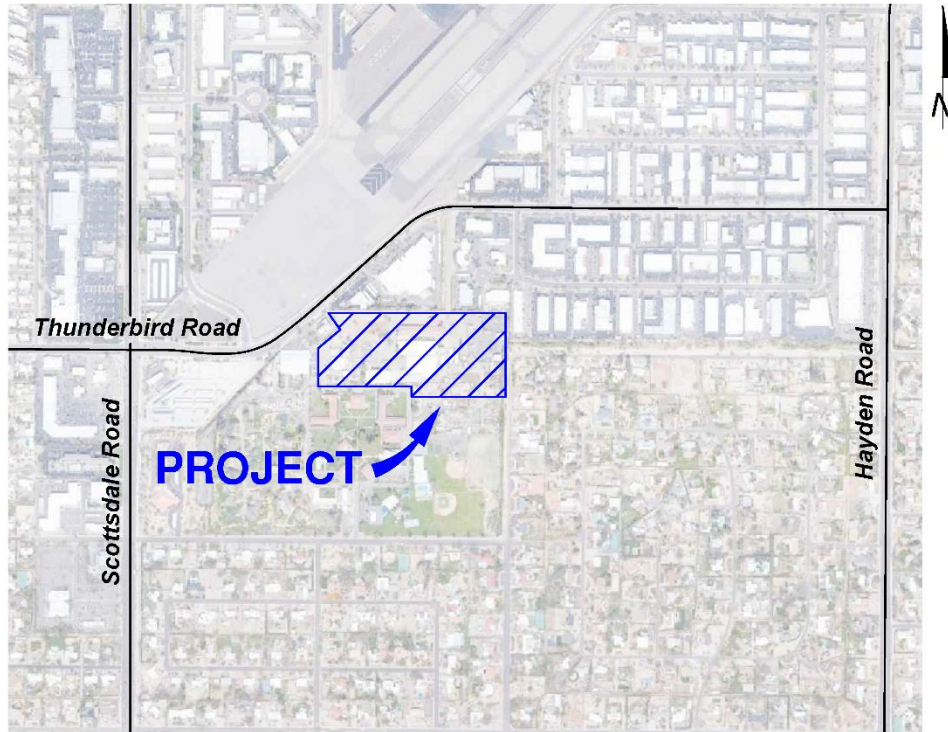
### Study Methodology

In order to analyze and evaluate the potential traffic impacts of the proposed development, the following tasks were undertaken:

- Field observation of the proposed site and surrounding area was conducted to evaluate the existing physical and operational characteristics of the adjacent roadway network.
- Site traffic volumes generated by the proposed site were calculated using the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 11<sup>th</sup> Edition, 2021*.
- Capacity analyses were performed for the existing conditions and future conditions without and with the project based on an opening year of 2023 and horizon year of 2028 using methodology presented in the *2016 Highway Capacity Manual (HCM 6)*.
- Crash records were obtained from the Arizona Department of Transportation (ADOT) database to identify any specific crash trends within the study area.



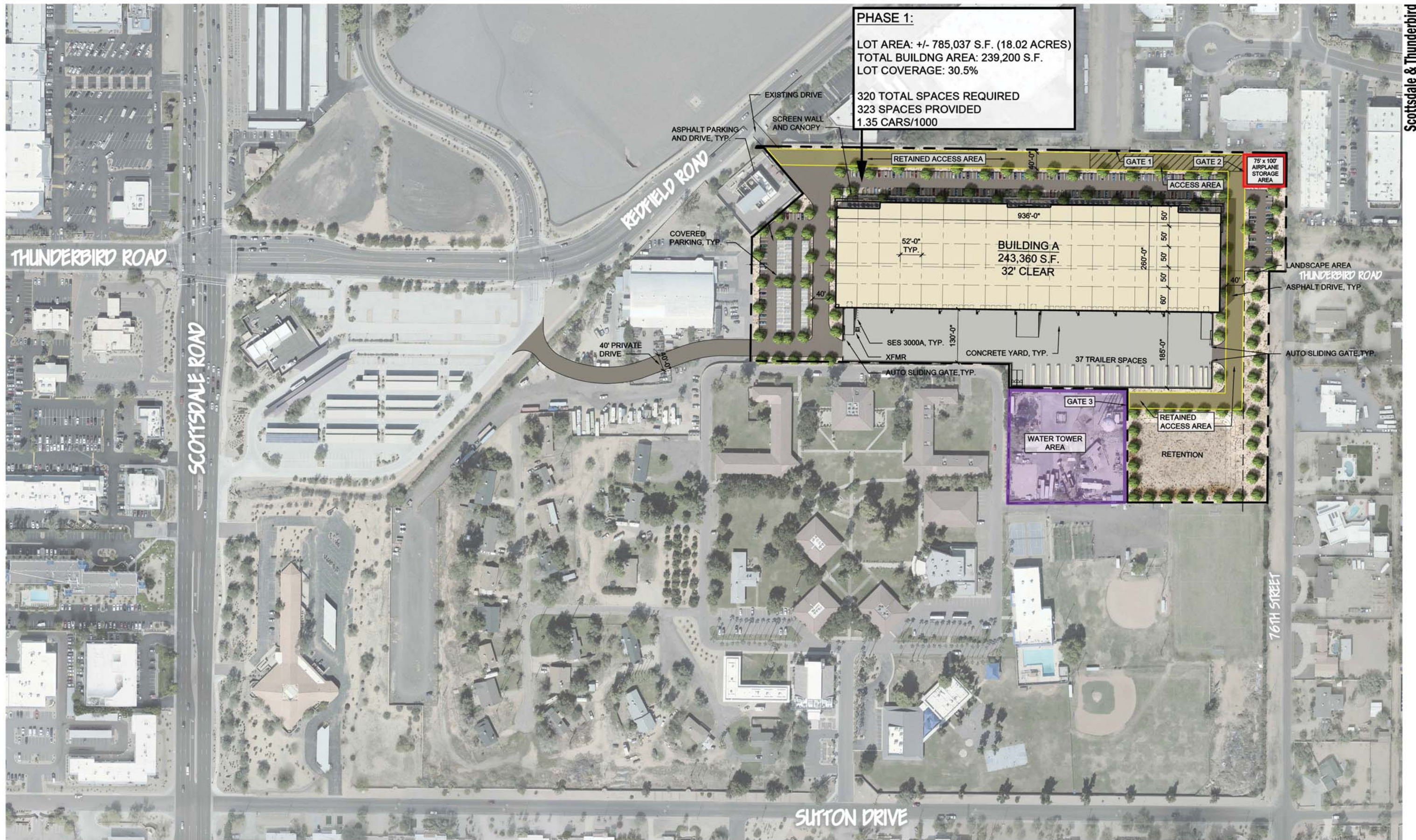
Figure 1 – Vicinity Map



**LEGEND:**

— = Existing Road

 = Project Site



**PHASE 1:**  
 LOT AREA: +/- 785,037 S.F. (18.02 ACRES)  
 TOTAL BUILDING AREA: 239,200 S.F.  
 LOT COVERAGE: 30.5%  
 320 TOTAL SPACES REQUIRED  
 323 SPACES PROVIDED  
 1.35 CARS/1000

**BUILDING A**  
 243,360 S.F.  
 32' CLEAR

**WATER TOWER AREA**





## **Existing Conditions**

The project will be located on the southeast corner of 73<sup>rd</sup> Street/Thunderbird Road and will replace existing warehouse land uses.

Scottsdale Road is aligned north/south roadway with three through lanes for each direction of travel, separated by a raised median, in the vicinity of the project site. Approximately three miles north of Thunderbird Road, Scottsdale Road offers access to the Loop 101. There is a posted speed limit of 45 mph on the roadway.

Thunderbird Road is an east/west aligned roadway that offers two through lanes in each direction. East of 73<sup>rd</sup> Street, Thunderbird Road narrows to provide only one eastbound through lane. Approximately 450 feet east of 73<sup>rd</sup> Street, Thunderbird Road transitions into Redfield Road. Redfield Road continues east for less than one mile, ending at Hayden Road. A two-way center left turn lane is present on the roadway to the west of Scottsdale Road and to the east of Redfield Road. Thunderbird Road has a posted speed limit of 40 miles per hour (mph) and the posted speed limit lowers to 35 mph after the roadway transitions into Redfield Road.

Approximately 600 feet east of 73<sup>rd</sup> Street, Redfield Road extends south from Thunderbird Road as a driveway that serves several developments.

A Park n Ride is located on the southeast corner of Thunderbird Road/Scottsdale Road.

The study intersection locations, lane configurations, and intersection control are shown in **Figure 3**.

## **Existing Traffic Data**

In order to form a basis for analysis of the project impacts, weekday AM and PM peak hour turning movement counts were conducted at the following intersections:

- Park n Ride Driveway/Scottsdale Road
- Park n Ride Driveway (aka 73<sup>rd</sup> Street)/Thunderbird Road
- Redfield Road/Thunderbird Road

The weekday turning movement counts were conducted from 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM. All of the traffic data was collected in March 2022 while school was in session.

The existing weekday AM/PM peak hour traffic volumes are shown in **Figure 4**. Complete traffic count data can be found in the Appendix.



Figure 3 – Existing Lane Configurations and Traffic Control

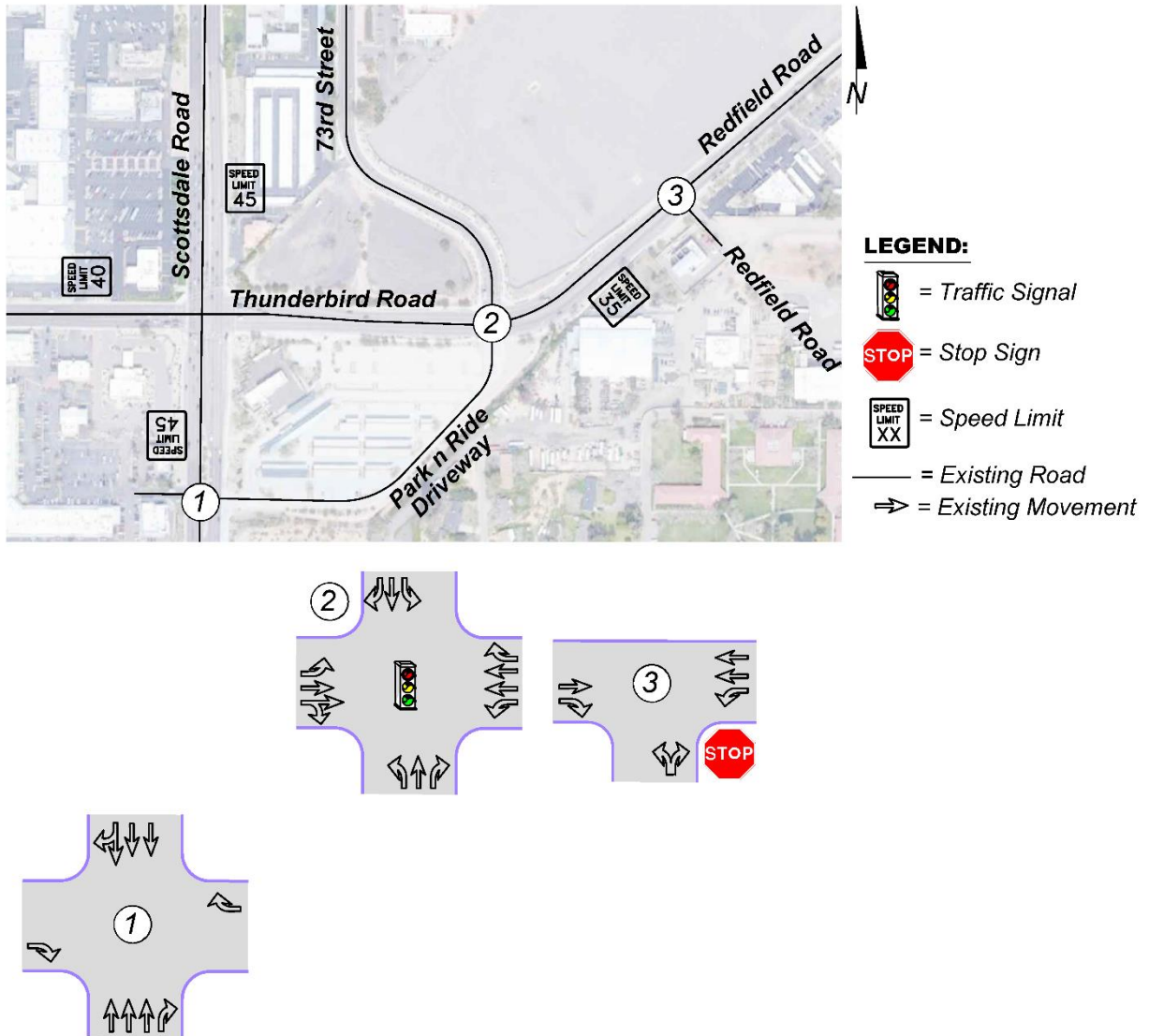
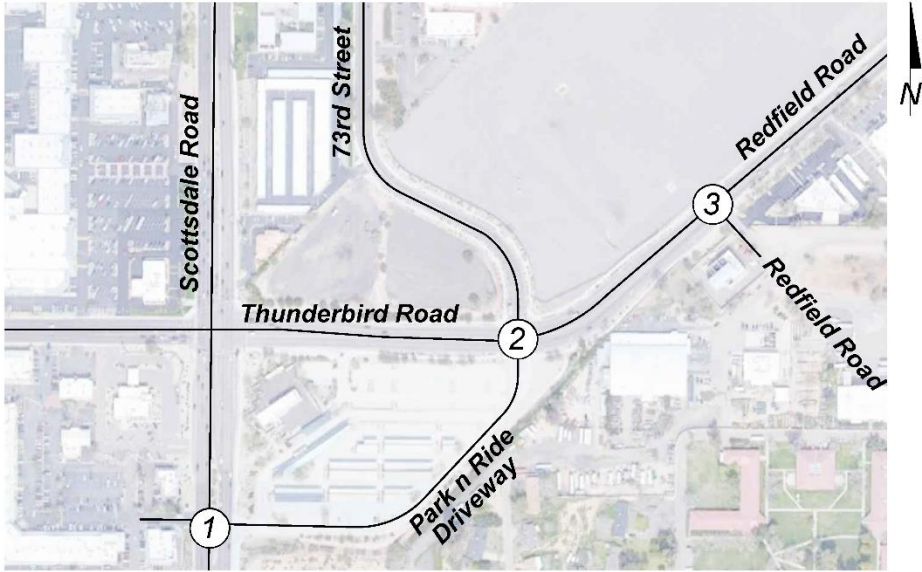


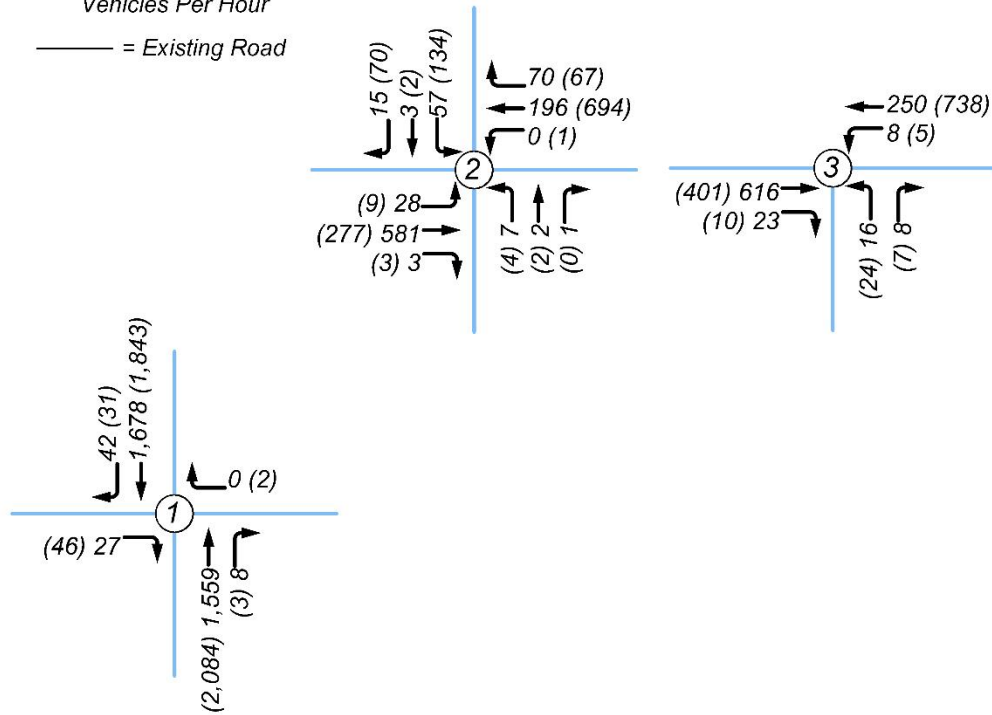


Figure 4 – Existing Weekday Peak Hour Traffic Volumes



**LEGEND:**

XX = Weekday AM Peak Hour  
 (XX) = Weekday PM Peak Hour  
 Vehicles Per Hour  
 — = Existing Road





## Access

Two access points are proposed to serve the project site, East Access and West Access.

The Redfield Road driveway is proposed as the East Access for the project.

West Access is proposed on the east side of Park n Ride Driveway, approximately 75 feet south of Thunderbird Road. Two existing intersections that serve the Park n Ride are expected to provide access to this driveway, Park n Ride Driveway/Scottsdale Road and Park n Ride Driveway/Thunderbird Road.

**Figure 5** shows the locations, geometry and spacing for the proposed driveways serving the project site that will serve as a baseline of analysis in the report.

## Trip Generation

Trip generation was developed utilizing nationally agreed upon data contained in the Institute of Transportation Engineers (ITE) publication *Trip Generation, 11th Edition*, 2021. Trip generation for the project was based on 243,360 square feet of general light industrial space based on ITE Land Use Code (LUC) 110, General Light Industrial. The resulting weekday AM and PM peak hour trip generation for the proposed site is shown in **Table 1**. The complete trip generation calculations can be found in the Appendix.

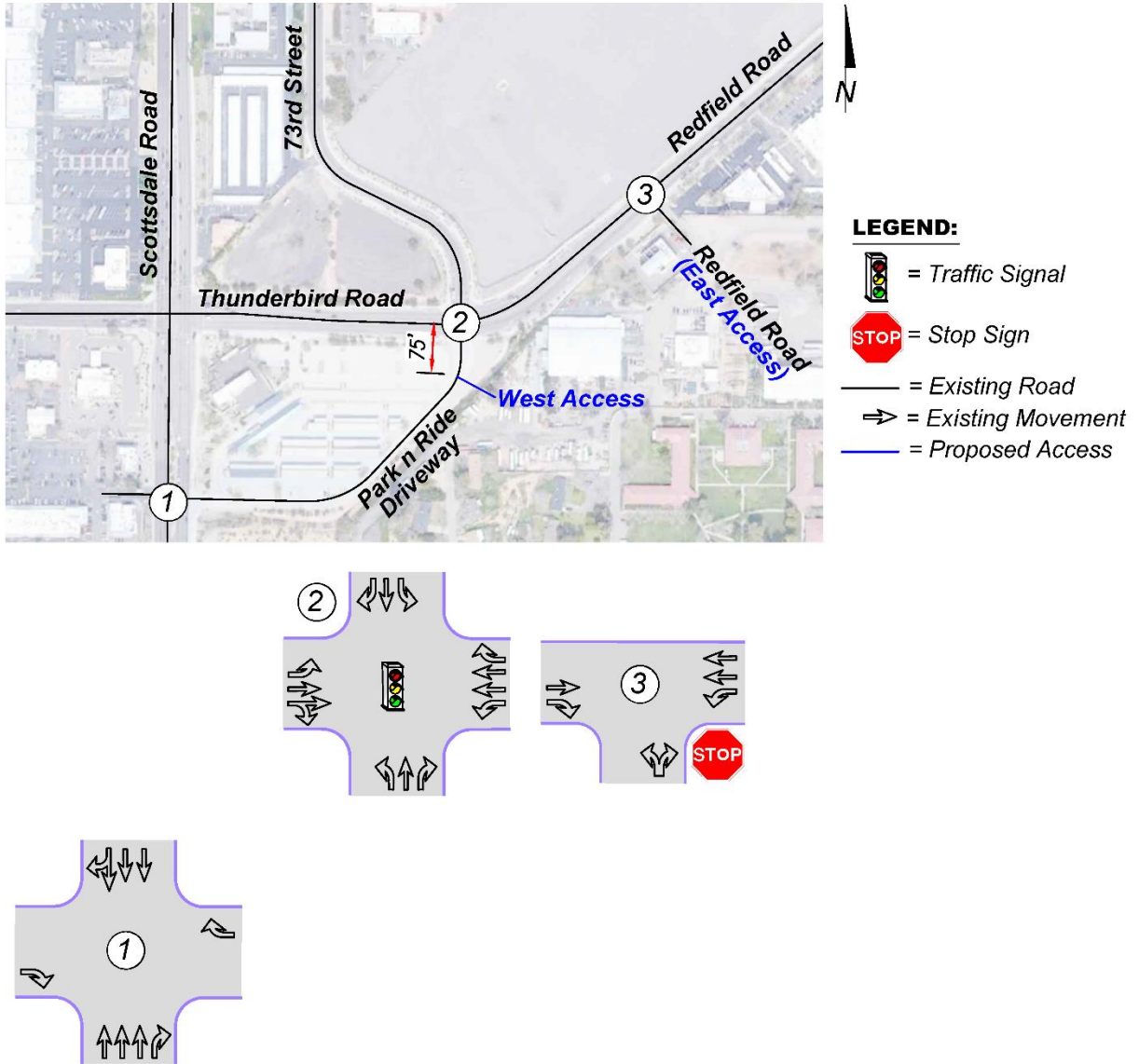
**Table 1 – Project Site Generated Trips**

Time Period	243,360 sqft General Light Industrial (LUC 110)
Average Daily, Inbound (vtpd)	483
Average Daily, Outbound (vtpd)	483
<b>Total Daily</b>	<b>966</b>
AM Peak Hour, Inbound (vtph)	149
AM Peak Hour, Outbound (vtph)	20
<b>Total AM Peak</b>	<b>169</b>
PM Peak Hour, Inbound (vtph)	11
PM Peak Hour, Outbound (vtph)	65
<b>Total PM Peak</b>	<b>76</b>

vtpd - vehicle trips per day, vtph - vehicle trips per hour



Figure 5 – Baseline Access Point and Intersection Configuration Assumptions





## Trip Distribution & Assignment

Trip distribution for the project was based on existing traffic volume patterns near the proposed site. **Figure 6** shows the weekday trip distribution for the project as a percentage of net new primary trips. **Figure 7** shows the assignment of the new site generated trips to the project intersections within the study area.

Per direction from the City of Scottsdale, it was assumed that 27% of the overall trips generated by the site would be trucks. These truck trips were only assigned to the intersection of Redfield Road/Thunderbird Road.

## Existing Traffic Operations

Analysis of current intersection operations was conducted for the weekday AM and PM peak hours using the nationally accepted methodology set forth in the *Highway Capacity Manual*, Transportation Research Board, 2016 (HCM 6). The computer software Synchro 11 was utilized to calculate the levels of service for individual movements and approaches.

LOS is a qualitative measure of the traffic operations at an intersection or on a roadway segment. Level of service is ranked from LOS A, which signifies little or no congestion and is the highest rank, to LOS F, which signifies congestion and jam conditions. LOS D is typically considered adequate operation at signalized and un-signalized intersections in developed areas.

At un-signalized intersections, level of service is predicted/calculated for those movements, which must either stop for or yield to oncoming traffic and is based on average control delay for the particular movement. Control delay is the portion of total delay attributed to traffic control measures such as stop signs and traffic signals. The criteria for level of service at un-signalized intersections are shown in **Table 2**.

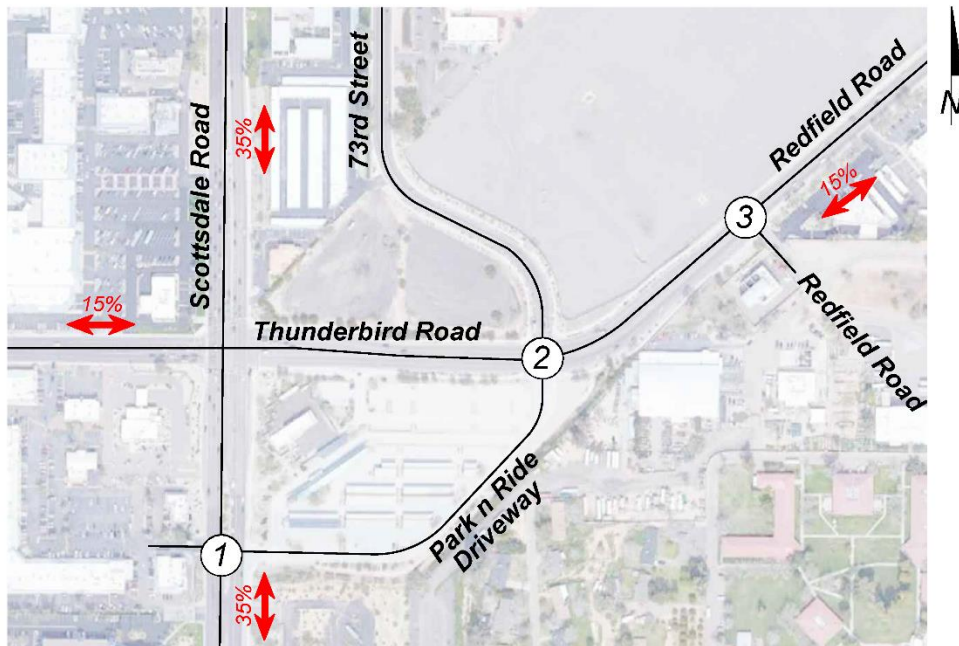
**Table 2 – Level of Service Criteria – Un-signalized Intersections**

Level-of-Service	Delay
A	< 10 seconds/vehicle
B	> 10 and < 15 seconds/vehicle
C	> 15 and < 25 seconds/vehicle
D	> 25 and < 35 seconds/vehicle
E	> 35 and < 50 seconds/vehicle
F	> 50 seconds/vehicle

**Table 3** shows the existing levels of service that were calculated for the study intersections. Complete capacity calculations are included in the Appendix.



Figure 6 – Weekday Peak Hour Trip Distribution



**LEGEND:**

- = Existing Road
- ↔<sup>XX%</sup> = Distribution of Vehicle Trips

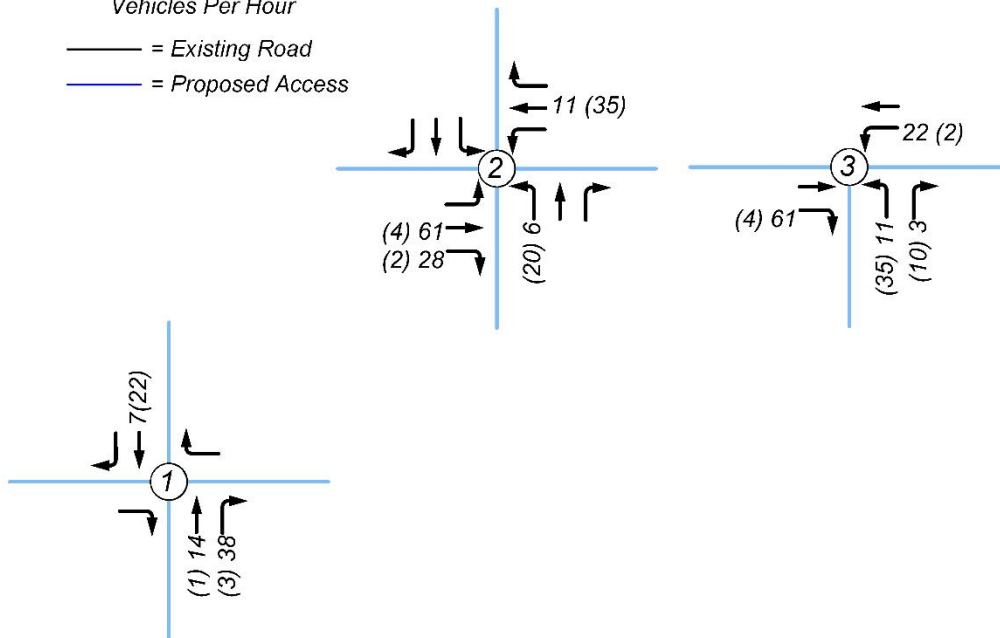


Figure 7 – Weekday Peak Hour Trip Assignment



**LEGEND:**

- XX = Weekday AM Peak Hour
- (XX) = Weekday PM Peak Hour
- Vehicles Per Hour
- = Existing Road
- = Proposed Access





**Table 3 – Existing Weekday Peak Hour Levels of Service**

Intersection	AM Peak		PM Peak	
	LOS	Delay	LOS	Delay
<b>Signalized Intersections</b>				
73rd Street/Thunderbird Road				
Overall Intersection	C	20.4	B	18.5
Eastbound Left	C	20.8	C	28.1
Eastbound Through	C	23.4	B	18.2
Eastbound Through/Right	C	23.3	B	18.2
Westbound Left	A	0.0	B	19.7
Westbound Through	B	18.8	C	22.0
Westbound Right	B	18.8	B	17.3
Northbound Left	A	5.6	A	7.2
Northbound Through	A	5.5	A	7.2
Northbound Right	A	5.5	A	0.0
Southbound Left	A	6.0	A	8.6
Southbound Through	A	5.5	A	7.2
Southbound Right	A	5.6	A	7.8
<b>Un-Signalized Intersections</b>				
Park n Ride Driveway/Scottsdale Road				
Eastbound Right	C	24.1	D	31.0
Westbound Right	A	0.0	D	27.4
Redfield Road/Thunderbird Road				
Westbound Left	A	9.1	A	8.3
Northbound Left/Right	C	16.4	C	16.8

Delay - seconds per vehicle

As shown in **Table 3**, all of the study intersections currently operate at an adequate LOS during the weekday peak hours.

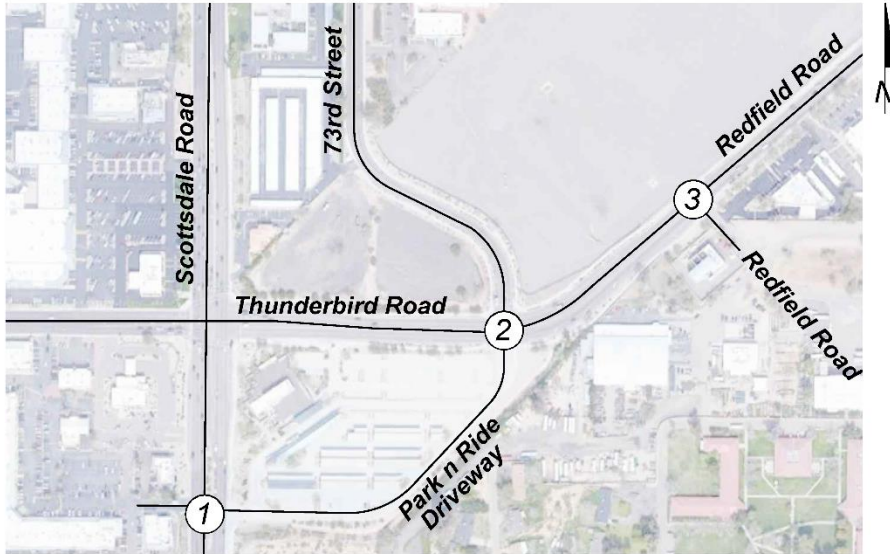
### **Future Traffic Operations Without Project**

In order to assess the impacts of the project on future traffic operations, traffic projections were made for the opening year of 2023 and horizon year 2028. City of Scottsdale historical traffic counts at the intersection of Thunderbird Road/Scottsdale Road showed an annual growth rate of approximately 2% for traffic volumes in recent years. Using a conservative 2% annual compounded growth rate, 2023 and 2028 weekday peak hour traffic volumes without the project were estimated as shown in **Figures 8 and 9**.

As with the current volumes, levels of service were calculated for each of the intersections in the study area for 2023 and 2028 without the project. Intersection levels of service for 2023 and 2028 without the project are shown in **Tables 4 and 5**. Complete capacity calculations are included in the Appendix.



Figure 8 – 2023 Weekday Peak Hour Traffic Volumes Without Project



**LEGEND:**

XX = Weekday AM Peak Hour  
 (XX) = Weekday PM Peak Hour  
 Vehicles Per Hour  
 — = Existing Road

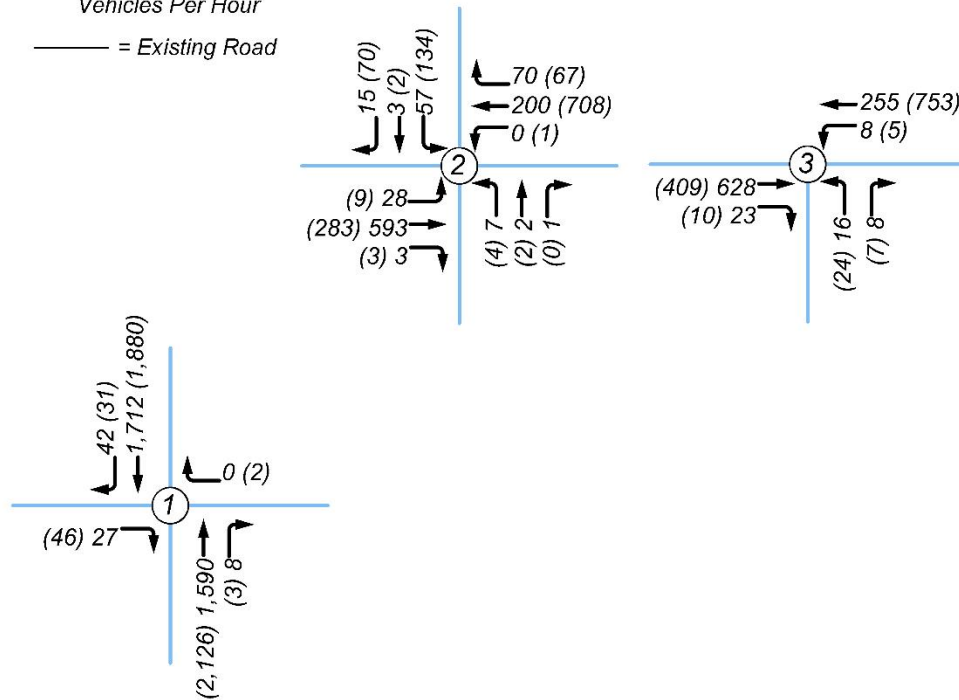
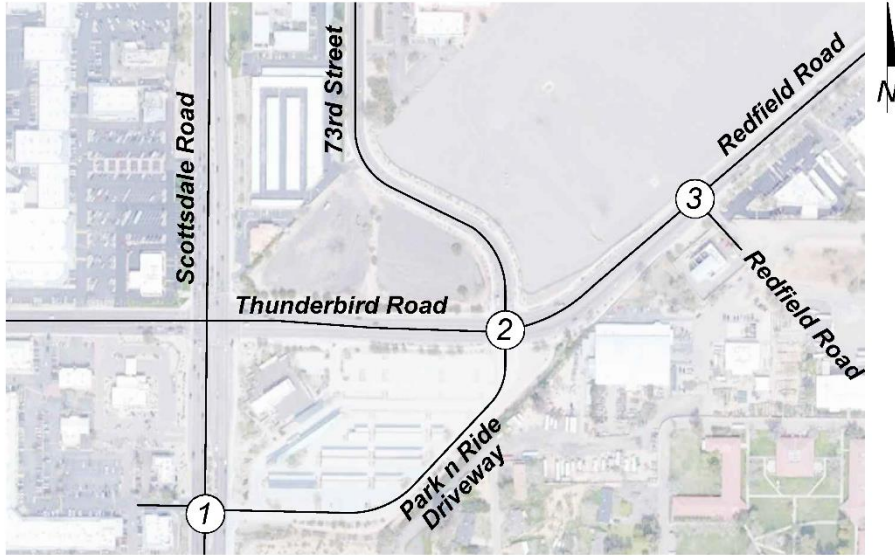


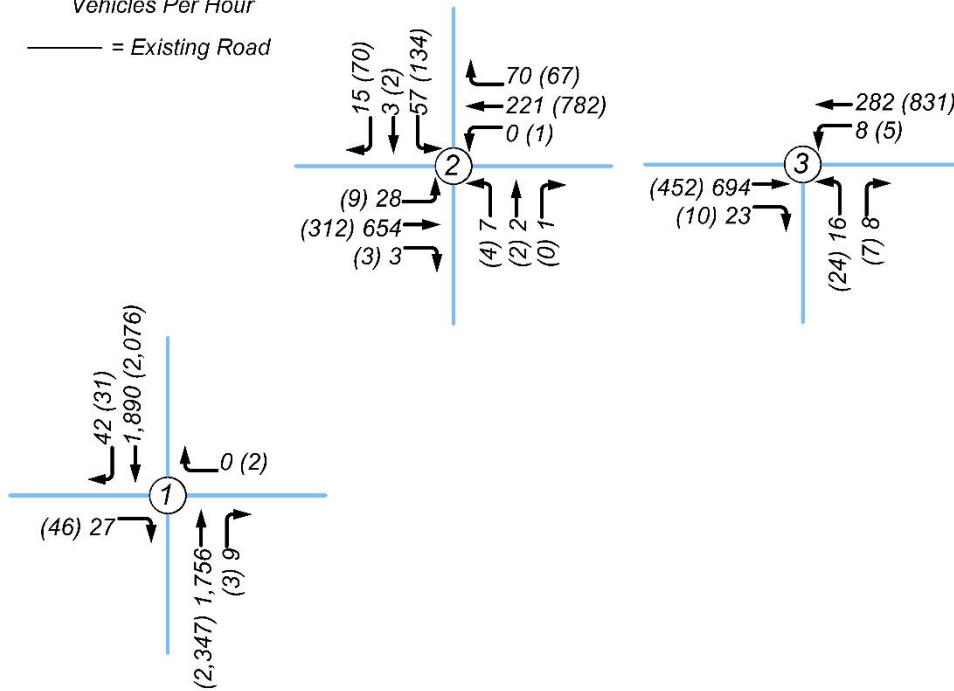


Figure 9 – 2028 Weekday Peak Hour Traffic Volumes Without Project



**LEGEND:**

XX = Weekday AM Peak Hour  
 (XX) = Weekday PM Peak Hour  
 Vehicles Per Hour  
 — = Existing Road





**Table 4 – 2023 Weekday Peak Hour Levels of Service Without Project**

Intersection	AM Peak		PM Peak	
	LOS	Delay	LOS	Delay
<b>Signalized Intersections</b>				
73rd Street/Thunderbird Road				
Overall Intersection	C	20.4	B	18.5
Eastbound Left	C	20.8	C	27.8
Eastbound Through	C	23.3	B	18.5
Eastbound Through/Right	C	23.3	B	18.5
Westbound Left	A	0.0	C	20.1
Westbound Through	B	18.8	C	22.0
Westbound Right	B	18.6	B	17.6
Northbound Left	A	5.7	A	6.9
Northbound Through	A	5.7	A	6.9
Northbound Right	A	5.6	A	0.0
Southbound Left	A	6.1	A	8.2
Southbound Through	A	5.7	A	6.9
Southbound Right	A	5.8	A	7.5
<b>Un-Signalized Intersections</b>				
Park n Ride Driveway/Scottsdale Road				
Eastbound Right	C	24.7	D	32.2
Westbound Right	A	0.0	D	28.3
Redfield Road/Thunderbird Road				
Westbound Left	A	9.2	A	8.3
Northbound Left/Right	C	16.6	C	17.0

Delay - seconds per vehicle

**Table 5 – 2028 Weekday Peak Hour Levels of Service Without Project**

Intersection	AM Peak		PM Peak	
	LOS	Delay	LOS	Delay
<b>Signalized Intersections</b>				
73rd Street/Thunderbird Road				
Overall Intersection	C	20.4	B	18.7
Eastbound Left	C	20.8	C	28.6
Eastbound Through	C	23.3	B	18.0
Eastbound Through/Right	C	23.2	B	18.0
Westbound Left	A	0.0	B	19.8
Westbound Through	B	18.7	C	21.9
Westbound Right	B	18.3	B	16.9
Northbound Left	A	6.0	A	7.8
Northbound Through	A	5.9	A	7.8
Northbound Right	A	5.9	A	0.0
Southbound Left	A	6.4	A	9.2
Southbound Through	A	5.9	A	7.8
Southbound Right	A	6.0	A	8.5
<b>Un-Signalized Intersections</b>				
Park n Ride Driveway/Scottsdale Road				
Eastbound Right	D	28.8	E	39.9
Westbound Right	A	0.0	D	33.5
Redfield Road/Thunderbird Road				
Westbound Left	A	9.4	A	8.5
Northbound Left/Right	C	18.3	C	18.9

Delay - seconds per vehicle



As shown in **Tables 4** and **5**, the eastbound right turning movement at Park n Ride Driveway/Scottsdale Road is expected to begin experiencing inadequate delays during the weekday PM peak hour in 2028 without traffic from the project. This delay is due to the relatively large number of through traffic volumes on Scottsdale Road not providing adequate gaps for vehicles turning from the minor approaches.

The remaining study intersections are expected to continue to operate at an adequate LOS during the weekday peak hours in 2023 and 2028 without traffic from the project.

### **Future Traffic Operations With Project**

In order to assess the impacts of the project on future traffic operations, levels of service were calculated for each project intersection in 2023 and 2028 with the project. Weekday peak hour traffic volumes for 2023 and 2028 without the project (**Figures 8** and **9**) were combined with the estimated trips generated by the project (**Figure 7**) to yield weekday peak hour traffic volumes with the project as shown in **Figures 10** and **11**.

Weekday intersection levels of service for 2023 and 2028 with the project, were then calculated as shown in **Tables 6** and **7**. Complete capacity calculations are included in the Appendix.

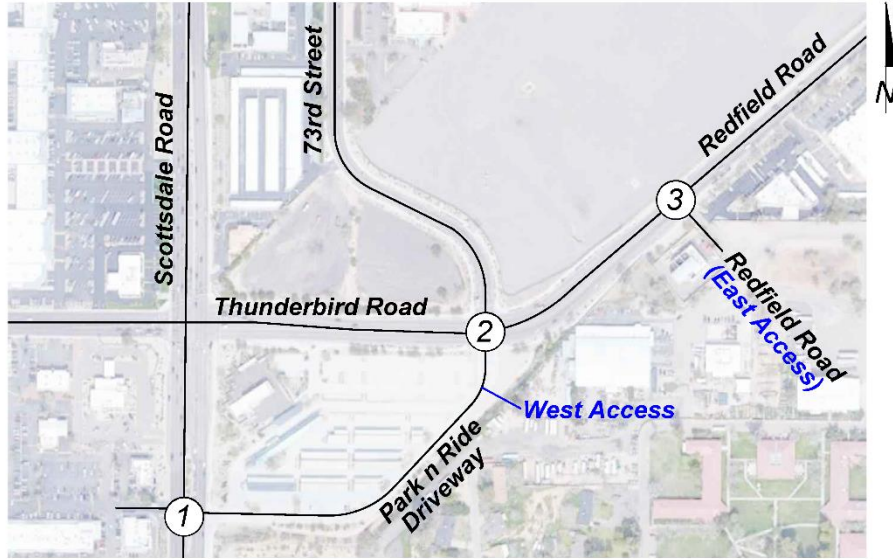
**Table 6 – 2023 Weekday Peak Hour Levels of Service With Project**

Intersection	2023 Without Project				2023 With Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
<b>Signalized Intersections</b>								
73rd Street/Thunderbird Road								
Overall Intersection	C	20.4	B	18.5	C	20.3	B	18.4
Eastbound Left	C	20.8	C	27.8	C	20.4	C	28.2
Eastbound Through	C	23.3	B	18.5	C	23.2	B	18.2
Eastbound Through/Right	C	23.3	B	18.5	C	23.2	B	18.2
Westbound Left	B	0.0	C	20.1	A	0.0	B	19.8
Westbound Through	B	18.8	C	22.0	B	18.3	C	22.0
Westbound Right	B	18.7	B	17.6	B	18.1	B	17.3
Northbound Left	A	5.7	A	6.9	A	6.4	A	7.6
Northbound Through	A	5.7	A	6.9	A	6.3	A	7.3
Northbound Right	A	5.7	A	0.0	A	6.3	A	0.0
Southbound Left	A	6.1	A	8.2	A	6.8	A	8.7
Southbound Through	A	5.7	A	6.9	A	6.3	A	7.3
Southbound Right	A	5.8	A	7.5	A	6.4	A	7.9
<b>Un-Signalized Intersections</b>								
Park n Ride Driveway/Scottsdale Road								
Eastbound Right	C	24.7	D	32.2	C	24.9	D	33.0
Westbound Right	A	0.0	D	28.3	A	0.0	D	28.3
Redfield Road/Thunderbird Road								
Westbound Left	A	9.2	A	8.3	A	9.6	A	8.3
Northbound Left/Right	C	16.6	C	17.0	C	19.0	C	19.7

Delay - seconds per vehicle



Figure 10 – 2023 Weekday Peak Hour Traffic Volumes With Project



**LEGEND:**

XX = Weekday AM Peak Hour  
 (XX) = Weekday PM Peak Hour  
 Vehicles Per Hour

— = Existing Road  
 — = Proposed Access

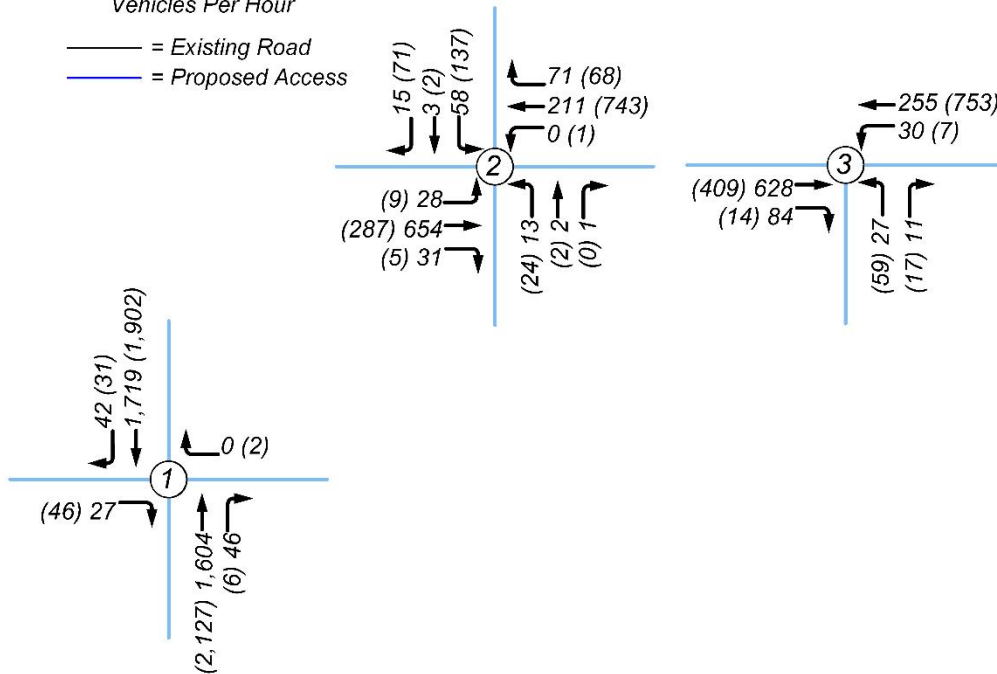




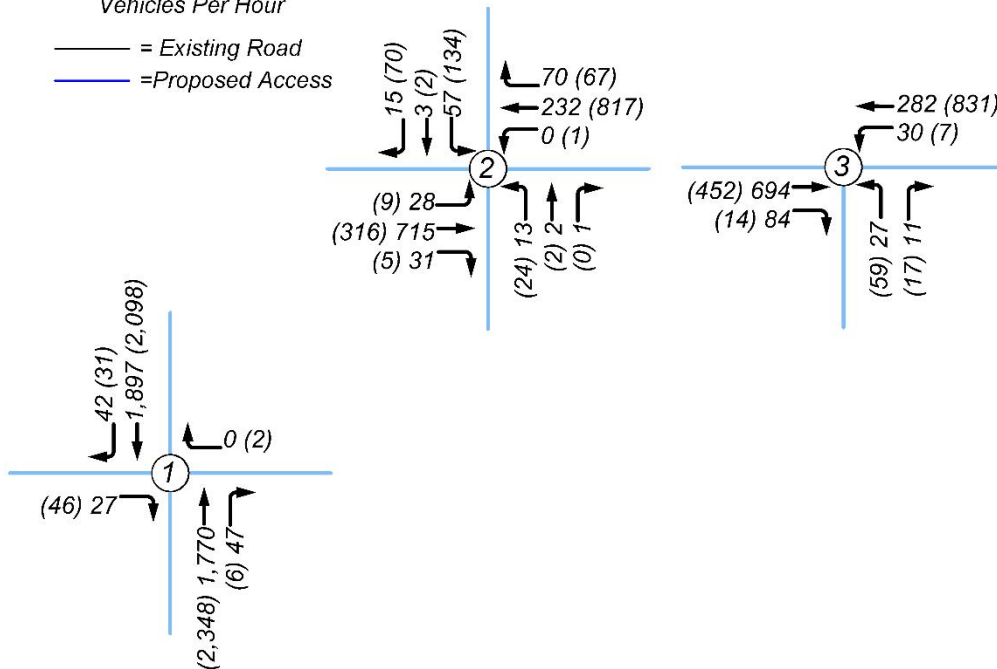
Figure 11 – 2028 Weekday Peak Hour Traffic Volumes With Project



**LEGEND:**

XX = Weekday AM Peak Hour  
 (XX) = Weekday PM Peak Hour  
 Vehicles Per Hour

— = Existing Road  
 — = Proposed Access





**Table 7 – 2028 Weekday Peak Hour Levels of Service With Project**

Intersection	2028 Without Project				2028 With Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
<b>Signalized Intersections</b>								
73rd Street/Thunderbird Road								
Overall Intersection	C	20.2	B	18.6	C	20.3	B	18.6
Eastbound Left	C	21.0	C	28.6	C	20.1	C	29.0
Eastbound Through	C	23.3	B	18.0	C	23.1	B	17.7
Eastbound Through/Right	C	23.2	B	18.0	C	23.1	B	17.7
Westbound Left	B	0.0	B	19.8	A	0.0	B	19.5
Westbound Through	B	18.7	C	21.9	B	17.9	C	21.9
Westbound Right	B	18.5	B	17.0	B	17.6	B	16.6
Northbound Left	A	6.0	A	7.8	A	7.1	A	8.5
Northbound Through	A	5.9	A	7.8	A	6.9	A	8.2
Northbound Right	A	5.9	A	0.0	A	6.9	A	0.0
Southbound Left	A	6.5	A	9.4	A	7.5	A	9.7
Southbound Through	A	5.9	A	7.8	A	6.9	A	8.2
Southbound Right	A	6.0	A	8.5	A	7.0	A	8.9
<b>Un-Signalized Intersections</b>								
Park n Ride Driveway/Scottsdale Road								
Eastbound Right	D	28.8	E	39.9	D	28.9	E	38.9
Westbound Right	A	0.0	D	33.5	A	0.0	C	33.5
Redfield Road/Thunderbird Road								
Westbound Left	A	9.5	A	8.5	A	9.9	A	8.5
Northbound Left/Right	C	18.6	C	19.2	C	21.2	C	22.4

Delay - seconds per vehicle

As shown in **Tables 6 and 7**, the eastbound right turning movement at Park n Ride Driveway/Scottsdale Road is expected to experience inadequate delays during the weekday PM peak hour in 2028 without and with traffic from the project. This delay is due to the relatively large number of through traffic volumes on Scottsdale Road not providing adequate gaps for vehicles turning from the minor approaches.

The remaining study intersections are expected to continue to operate at an adequate LOS during the weekday peak hours in 2023 and 2028 without and with traffic from the project.

**Turn Lane Analysis**

A key element of this traffic statement is to ensure adequate space is provided within the existing turn lanes at the intersections providing direct access to the project site. Queue storage requirements for the existing left and right turn lanes were calculated using Synchro 95<sup>th</sup> percentile (Synchro 95<sup>th</sup>) methodology. Typically, an average vehicle length of 25 feet is assumed.



For signalized intersections, the average number of vehicles that would queue at an intersection per cycle was based on the Synchro 95<sup>th</sup> percentile queue length.

$$\text{Storage length} = \text{Synchro } 95^{\text{th}} \% \text{ queue (ft)}$$

For un-signalized intersections, storage for vehicles likely to arrive in an average two-minute period within the peak hour should be provided, similarly based on Synchro 95<sup>th</sup> percentile queue lengths.

$$\text{Storage length} = \text{Synchro } 95^{\text{th}} \% \text{ queue (vehicles)} \times \text{vehicle length (ft)}$$

A vehicle length of 25 feet was assumed at Park n Ride Driveway/Scottsdale Road and 73<sup>rd</sup> Street/Thunderbird Road. However, due to the expected truck traffic at Redfield Road/Thunderbird Road, the average vehicle length formula for this intersection is shown below.

$$\begin{aligned} \text{Average vehicle length} &= (\%_T \times L_T) + (\%_{PV} \times L_{PV}) \\ &= (27\% \times 55 \text{ feet}) + (63\% \times 25 \text{ feet}) \\ &= \sim \underline{\underline{31 \text{ feet}}} \end{aligned}$$

- %<sub>T</sub> = Percentage Trucks
- %<sub>PV</sub> = Percentage Passenger Vehicles
- L<sub>T</sub> = Truck Length
- L<sub>PV</sub> = Passenger Vehicle Length

**Table 8** shows the calculated queue lengths for the turn lanes at the study intersections based on 2028 weekday peak hour traffic volumes with traffic from the project. The computed values are typically rounded to the nearest 25 feet. Complete queue length calculations are available in the Appendix. It should be noted that queue lengths are not calculable using synchro for free-flow movements, as these turning movements are not expected to generate a queue.

**Table 8 – Calculated Queue Lengths**

Intersection	Left Turn Storage				Right Turn Storage			
	NB	SB	EB	WB	NB	SB	EB	WB
Park n Ride Driveway/Scottsdale Road								
Turning Volume (vph)					47			
S <sub>calculated</sub> =					0			
S <sub>rounded</sub> (ft)					0			
73rd Street/Thunderbird Road								
Turning Volume (vph)	24			1	1			
S <sub>calculated</sub> =	22			3	0			
S <sub>rounded</sub> (ft)	25			25	0			
Redfield Road/Thunderbird Road								
Turning Volume (vph)				30			31	
S <sub>calculated</sub> =				6			0	
S <sub>rounded</sub> (ft)				25			0	

S - storage in feet, vph - vehicles per hour



As shown in **Table 8**, the northbound right turn lane at Park n Ride Driveway/Scottsdale Road, the westbound left turn lane and northbound left and right turn lanes at 73<sup>rd</sup> Street/Thunderbird Road, and the westbound left turn lane and eastbound right turn lane at Redfield Road/Thunderbird Road are each expected to require 25 feet or less of storage. The existing turn lanes at the study intersections are expected to adequately serve the future queueing vehicles with the project.

**Crash Analysis**

Crash history at the two existing study intersections was obtained from ADOT from 1 January 2018 to 31 December 2020.

**Table 9 – Crash Analysis at 73<sup>rd</sup> Street/Thunderbird Road**

Year	Crash Type							Fatal	Injury	Crash Totals
	Angle	Left Turn	Rear-End	Sideswipe	Single Vehicle	Head On	Other			
2018				1						1
2019			1							1
2020				1						1
<b>3-Year Total</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>

**Table 9** shows that three crashes were reported at the intersection of 73<sup>rd</sup> Street/Thunderbird Road during the three-year study period. Two of the collisions were sideswipes and one was rear-end.

No crashes were reported at the remaining study intersections during this three-year period. This limited crash data provides no observable crash pattern for the area.

It is possible that other minor crashes occurred in the area where the Police Department was not contacted, and no official record of these crashes exists.

**Mitigation**

The eastbound right turning movement at Park n Ride Driveway/Scottsdale Road is expected to experience inadequate delays during the weekday PM peak hour in 2028 without and with traffic from the project. This delay is due to the relatively large number of through traffic volumes on Scottsdale Road not providing adequate gaps for vehicles turning from the minor approaches. Un-signalized, minor approaches to intersections with four or more lane major streets such as Scottsdale Road tend to operate at a LOS E or F during the weekday peak hours. Mitigation measures are limited at this intersection. A traffic signal would not be appropriate due to the proximity of the signalized intersection of Thunderbird Road/Scottsdale Road.



It should be noted that this delay is only expected to occur for the right-in/right-out only movement on the west side of Scottsdale Road and will not be utilized or significantly impacted by this project.

## **Conclusion**

When fully completed, the proposed project is predicted to generate an additional 966 vehicle trips per day (vtpd) on weekdays to the adjacent street system from the new project site. Fifty percent of these new trips (483 vehicle trips) will be into the project and fifty percent will be out of the project.

All of the study intersections currently operate at an adequate LOS during the weekday peak hours.

The eastbound right turning movement at Park n Ride Driveway/Scottsdale Road is expected to experience inadequate delays during the weekday PM peak hour in 2028 without and with traffic from the project. This delay is due to the relatively large number of through traffic volumes on Scottsdale Road not providing adequate gaps for vehicles turning from the minor approaches.

The remaining study intersections are expected to continue to operate at an adequate LOS during the weekday peak hours in 2023 and 2028 without and with traffic from the project.

The northbound right turn lane at Park n Ride Driveway/Scottsdale Road, the westbound left turn lane and northbound left and right turn lanes at 73<sup>rd</sup> Street/Thunderbird Road, and the westbound left turn lane and eastbound right turn lane at Redfield Road/Thunderbird Road are each expected to require 25 feet or less of storage. The existing turn lanes at the study intersections are expected to adequately serve the future queuing vehicles with the project.

Three crashes were reported at the intersection of 73<sup>rd</sup> Street/Thunderbird Road during the three-year study period. Two of the collisions were sideswipes and one was rear-end. No crashes were reported at the remaining study intersections during this three-year period. This limited crash data provides no observable crash pattern for the area.

The eastbound right turning movement at Park n Ride Driveway/Scottsdale Road is expected to experience inadequate delays during the weekday PM peak hour in 2028 without and with traffic from the project. This delay is due to the relatively large number of through traffic volumes on Scottsdale Road not providing adequate gaps for vehicles turning from the minor approaches. Un-signalized, minor approaches to intersections with four or more lane major streets such as Scottsdale Road tend to operate at a LOS E or F during the weekday peak hours. Mitigation measures are limited at this intersection. A traffic signal would not be appropriate due to the proximity of the signalized intersection of Thunderbird Road/Scottsdale Road.

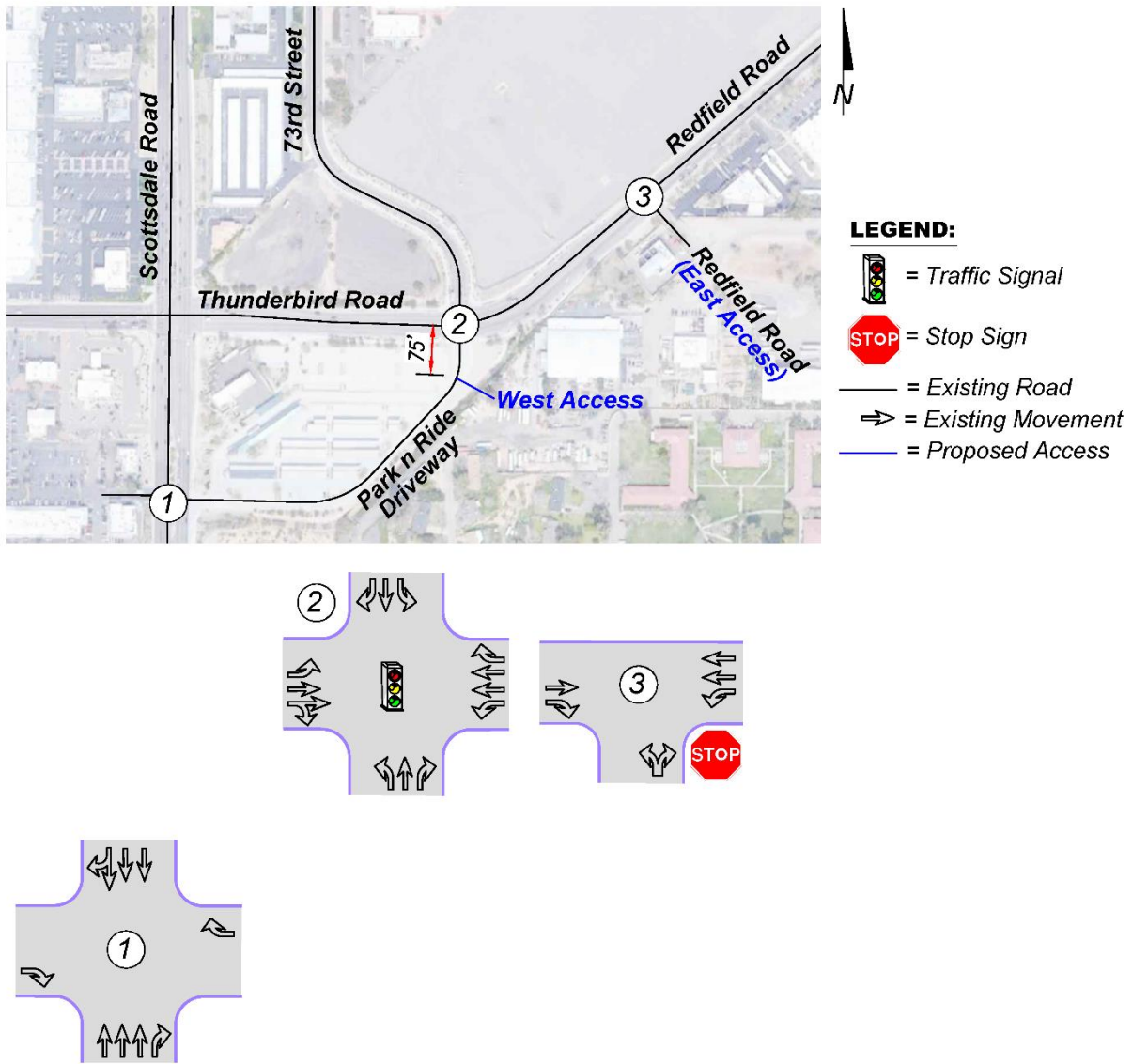


It should be noted that this delay is only expected to occur for the right-in/right-out only movement on the west side of Scottsdale Road and will not be utilized or significantly impacted by this project.

Proposed lane configurations and traffic control are shown in **Figure 12**.



Figure 12 – Proposed Lane Configurations and Traffic Control





**CREATION TBIRD SCOTTSDALE  
73<sup>RD</sup> STREET/THUNDERBIRD ROAD  
TRAFFIC IMPACT ANALYSIS**

**APPENDIX**

**Traffic Counts**

**Trip Generation Calculations**

**Capacity Calculations**

**Turn Lane Calculations**

**Crash Summary**

**Comment Resolution**



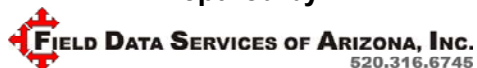
**CREATION TBIRD SCOTTSDALE  
73<sup>RD</sup> STREET/THUNDERBIRD ROAD  
TRAFFIC IMPACT ANALYSIS**

**APPENDIX**

**Traffic Counts**

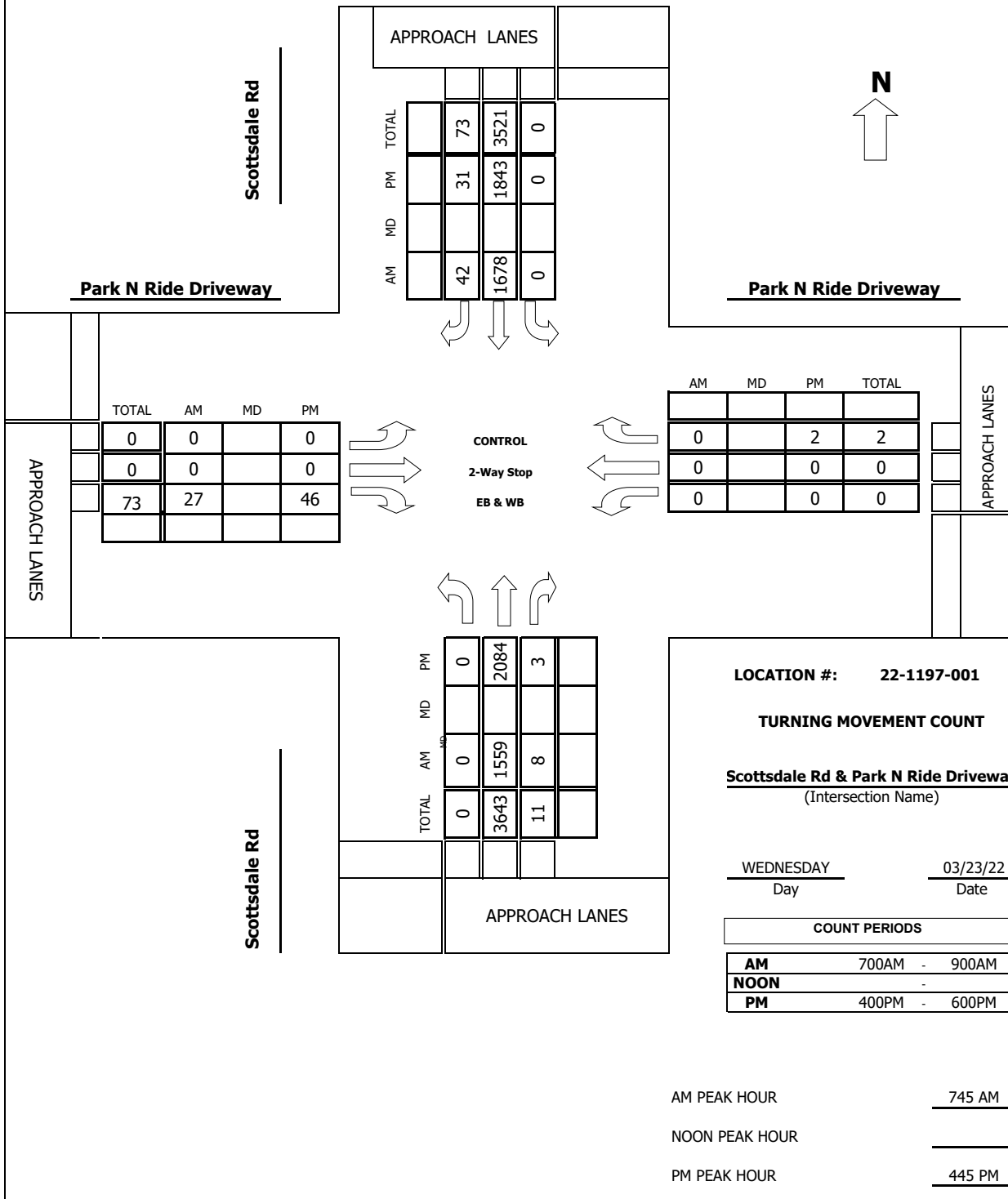
# Intersection Turning Movement

Prepared by:



Project #: 22-1197-001

## TMC SUMMARY OF Scottsdale Rd & Park N Ride Driveway



## Intersection Turning Movement Prepared by:



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



N-S STREET: **Scottsdale Rd**      DATE: **03/23/22**      LOCATION: **Scottsdale**  
 E-W STREET: **Park N Ride Driveway**      DAY: **WEDNESDAY**      PROJECT#: **22-1197-001**

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	3	1	0	3	0	0	0	1	0	0	1	

6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	0	225	2	0	240	5	0	0	6	0	0	0	478
7:15 AM	0	256	1	0	383	4	0	0	2	0	0	0	646
7:30 AM	0	354	0	0	428	9	0	0	5	0	0	0	796
7:45 AM	0	401	2	0	489	7	0	0	7	0	0	0	906
8:00 AM	0	367	1	0	381	3	0	0	6	0	0	0	758
8:15 AM	0	394	2	0	409	17	0	0	6	0	0	0	828
8:30 AM	0	397	3	0	399	15	0	0	8	0	0	0	822
8:45 AM	0	357	0	0	335	14	0	0	12	0	0	0	718
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	2751	11	0	3064	74	0	0	52	0	0	0	5952
Approach %	0.00	99.60	0.40	0.00	97.64	2.36	0.00	0.00	100.00	####	####	####	
App/Depart	2762 /		2751	3138 /		3116	52 /		11	0 /		74	

AM Peak Hr Begins at: 745 AM

**PEAK**

Volumes	0	1559	8	0	1678	42	0	0	27	0	0	0	3314
Approach %	0.00	99.49	0.51	0.00	97.56	2.44	0.00	0.00	100.00	####	####	####	

**PEAK HR.**

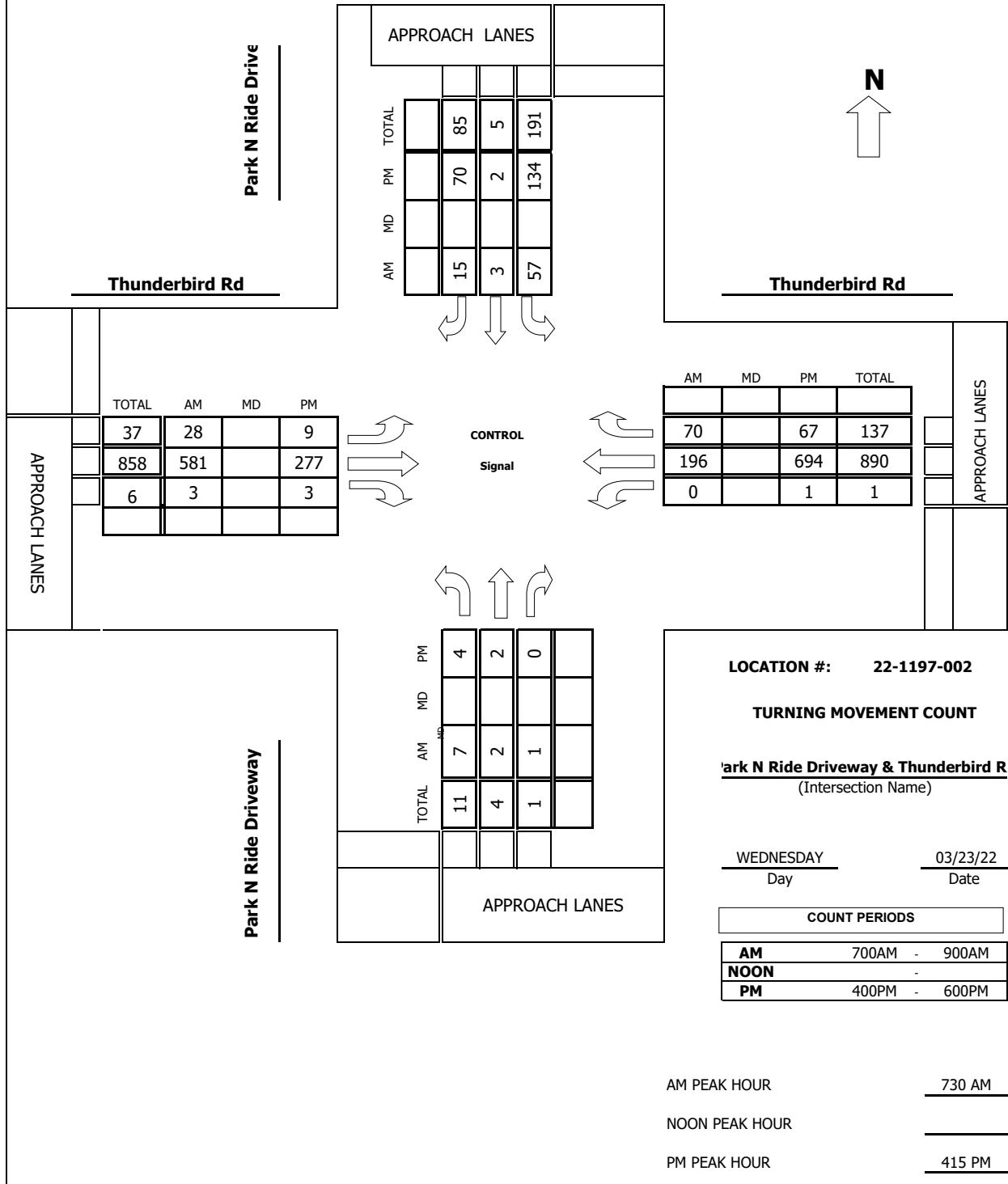
FACTOR:	0.972	0.867	0.844	0.000	0.914
---------	-------	-------	-------	-------	-------

CONTROL: **2-Way Stop (EB & WB)**  
 COMMENT 1:  
 GPS: **33.609861, -111.925810**



**Project #:** 22-1197-002

**TMC SUMMARY OF Park N Ride Driveway & Thunderbird Rd**



## Intersection Turning Movement Prepared by:



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



N-S STREET: **Park N Ride Driveway**      DATE: **03/23/22**      LOCATION: **Scottsdale**  
 E-W STREET: **Thunderbird Rd**      DAY: **WEDNESDAY**      PROJECT# **22-1197-002**

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	1	1	1	1	1	1	1	2	0	1	2	1	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	2	0	1	9	0	3	3	75	1	0	33	9	136
7:15 AM	2	1	0	20	0	8	2	109	1	0	37	17	197
7:30 AM	0	0	0	16	0	3	7	146	0	0	42	17	231
7:45 AM	2	1	1	16	1	5	8	160	1	0	48	21	264
8:00 AM	2	0	0	13	1	3	7	132	1	0	44	12	215
8:15 AM	3	1	0	12	1	4	6	143	1	0	62	20	253
8:30 AM	1	1	0	15	0	9	3	120	0	0	53	19	221
8:45 AM	1	0	0	12	3	7	4	102	1	0	53	23	206
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	13	4	2	113	6	42	40	987	6	0	372	138	1723
Approach %	68.42	21.05	10.53	70.19	3.73	26.09	3.87	95.55	0.58	0.00	72.94	27.06	
App/Depart	19	/	182	161	/	12	1033	/	1102	510	/	427	

AM Peak Hr Begins at: 730 AM

**PEAK**

Volumes	7	2	1	57	3	15	28	581	3	0	196	70	963
Approach %	70.00	20.00	10.00	76.00	4.00	20.00	4.58	94.93	0.49	0.00	73.68	26.32	

**PEAK HR.**

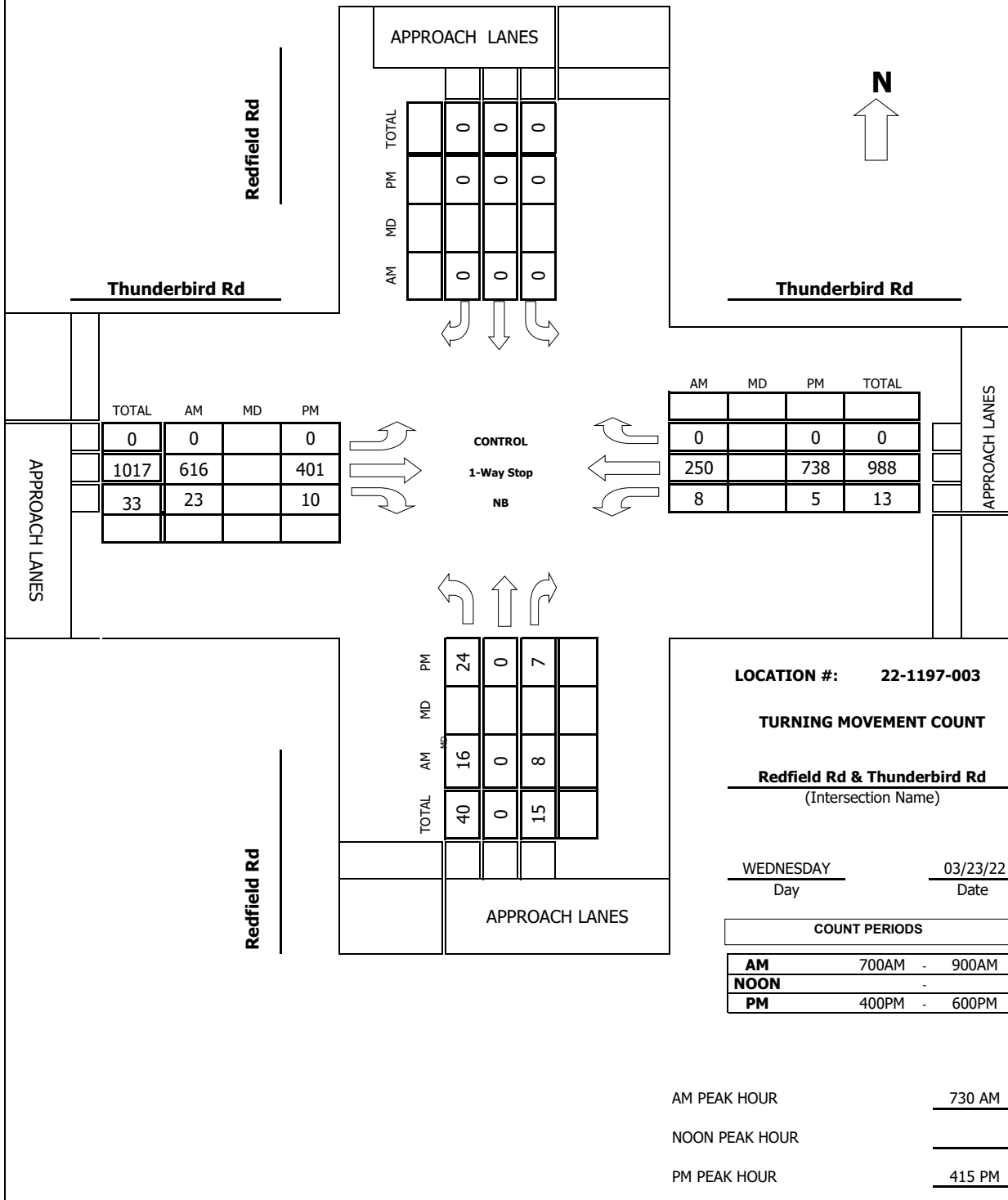
FACTOR:	0.625	0.852	0.905	0.811	0.912
---------	-------	-------	-------	-------	-------

CONTROL: **Signal**  
 COMMENT 1:  
 GPS: **33.611213, -111.923169**



Project #: 22-1197-003

**TMC SUMMARY OF Redfield Rd & Thunderbird Rd**



## Intersection Turning Movement Prepared by:



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



N-S STREET: **Redfield Rd**      DATE: **03/23/22**      LOCATION: **Scottsdale**  
 E-W STREET: **Thunderbird Rd**      DAY: **WEDNESDAY**      PROJECT# **22-1197-003**

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	1	1	0	2	0	

6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	1	0	2	0	0	0	0	81	4	0	41	0	129
7:15 AM	5	0	2	0	0	0	0	127	2	1	49	0	186
7:30 AM	3	0	3	0	0	0	0	160	2	3	56	0	227
7:45 AM	5	0	2	0	0	0	0	166	11	1	64	0	249
8:00 AM	2	0	2	0	0	0	0	138	7	1	54	0	204
8:15 AM	6	0	1	0	0	0	0	152	3	3	76	0	241
8:30 AM	0	0	0	0	0	0	0	130	5	1	72	0	208
8:45 AM	4	0	2	0	0	0	0	114	0	0	72	0	192
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	26	0	14	0	0	0	0	1068	34	10	484	0	1636
Approach %	65.00	0.00	35.00	####	####	####	0.00	96.91	3.09	2.02	97.98	0.00	
App/Depart	40	/	0	0	/	44	1102	/	1082	494	/	510	

AM Peak Hr Begins at: 730 AM

**PEAK**

Volumes	16	0	8	0	0	0	0	616	23	8	250	0	921
Approach %	66.67	0.00	33.33	####	####	####	0.00	96.40	3.60	3.10	96.90	0.00	

**PEAK HR.**

FACTOR:	0.857	0.000	0.903	0.816	0.925
---------	-------	-------	-------	-------	-------

CONTROL: **1-Way Stop (NB)**  
 COMMENT 1:  
 GPS: **33.612178, -111.921440**

# Intersection Turning Movement



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



N-S STREET: **Redfield Rd**      DATE: **03/23/22**      LOCATION: **Scottsdale**  
 E-W STREET: **Thunderbird Rd**      DAY: **WEDNESDAY**      PROJECT#: **22-1197-003**

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	1	1	0	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	6	0	1	0	0	0	0	125	1	1	205	0	339
4:15 PM	6	0	1	0	0	0	0	108	3	1	171	0	290
4:30 PM	13	0	2	0	0	0	0	90	5	0	159	0	269
4:45 PM	2	0	1	0	0	0	0	101	0	1	175	0	280
5:00 PM	3	0	3	0	0	0	0	102	2	3	233	0	346
5:15 PM	4	0	1	0	0	0	0	74	0	1	176	0	256
5:30 PM	5	0	1	0	0	0	0	69	1	0	107	0	183
5:45 PM	4	0	0	0	0	0	0	70	1	0	110	0	185
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	43	0	10	0	0	0	0	739	13	7	1336	0	2148
Approach %	81.13	0.00	18.87	####	####	####	0.00	98.27	1.73	0.52	99.48	0.00	
App/Depart	53	/	0	0	/	20	752	/	749	1343	/	1379	

PM Peak Hr Begins at: 415 PM

**PEAK**

Volumes	24	0	7	0	0	0	0	401	10	5	738	0	1185
Approach %	77.42	0.00	22.58	####	####	####	0.00	97.57	2.43	0.67	99.33	0.00	

**PEAK HR.**

FACTOR:	0.517	0.000	0.926	0.787	0.856
---------	-------	-------	-------	-------	-------

CONTROL: **1-Way Stop (NB)**  
 COMMENT 1: **0**  
 GPS: **33.612178, -111.921440**



**CREATION TBIRD SCOTTSDALE  
73<sup>RD</sup> STREET/THUNDERBIRD ROAD  
TRAFFIC IMPACT ANALYSIS**

**APPENDIX**

**Trip Generation Calculations**

## General Light Industrial (LUC 110)

TRIP GENERATION CALCULATIONS ARE BASED ON THE INSTITUTE OF TRANSPORTATION ENGINEERS' TRIP GENERATION, 11TH EDITION.

THE ITE LAND USE CODE IS

General Light Industrial (110), General Urban/Suburban

### Weekday

Fitted Curve  $T = 3.76(X) + 50.47$

Where X = 243360 Square Feet

**T = 966 VTPD**

ENTER:  $(0.5) * (965.5036) = 483 \text{ VTPD}$

EXIT:  $(0.5) * (965.5036) = 483 \text{ VTPD}$

### AM PEAK HOUR (ONE HOUR BETWEEN 7 AND 9 AM)

Fitted Curve  $T = 0.68(X) + 3.81$

Where X = 243360 Square Feet

**T = 169 VPH**

ENTER:  $(0.88) * (169.2948) = 149 \text{ VPH}$

EXIT:  $(0.12) * (169.2948) = 20 \text{ VPH}$

### PM PEAK HOUR (ONE HOUR BETWEEN 4 AND 6 PM)

Fitted Curve  $\ln(T) = 0.72 \ln(X) + 0.38$

Where X = 243360 Square Feet

**T = 76 VPH**

ENTER:  $(0.14) * (76) = 11 \text{ VPH}$

EXIT:  $(0.86) * (76) = 65 \text{ VPH}$

\*where, T = trip ends

### TRIP GENERATION SUMMARY

WEEKDAY

**966 VTPD**

AM PEAK HOUR (ONE HOUR BETWEEN 7 AND 9 AM)

**169 VPH**

PM PEAK HOUR (ONE HOUR BETWEEN 4 AND 6 PM)

**76 VPH**



**CREATION TBIRD SCOTTSDALE  
73<sup>RD</sup> STREET/THUNDERBIRD ROAD  
TRAFFIC IMPACT ANALYSIS**

**APPENDIX**

**Capacity Calculations**

HCM 6th TWSC  
1: Park n Ride Driveway & Scottsdale Road

06/22/2022

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↑↑↑	↗		↑↑↑	
Traffic Vol, veh/h	0	0	27	0	0	0	0	1559	8	0	1678	42
Future Vol, veh/h	0	0	27	0	0	0	0	1559	8	0	1678	42
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	80	92	92	80	92	90	80	92	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	34	0	0	0	0	1732	10	0	1864	47
























Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	-	-	956	-	-	866	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	222	0	0	255	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	-	-	222	-	-	255	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	24.1		0		0		0	
HCM LOS	C		A					

Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1	SBT	SBR
Capacity (veh/h)	-	-	222	-	-
HCM Lane V/C Ratio	-	-	0.152	-	-
HCM Control Delay (s)	-	-	24.1	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.5	-	-

HCM 6th Signalized Intersection Summary  
2: Thunderbird Road & 73rd Street

06/22/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	581	3	0	196	70	7	2	1	57	3	15
Future Volume (veh/h)	28	581	3	0	196	70	7	2	1	57	3	15
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			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	35	684	4	0	231	88	9	2	1	71	4	19
Peak Hour Factor	0.80	0.85	0.85	0.80	0.85	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	344	987	6	109	968	432	929	1106	938	944	1106	938
Arrive On Green	0.27	0.27	0.27	0.00	0.27	0.27	0.59	0.59	0.59	0.59	0.59	0.59
Sat Flow, veh/h	1061	3622	21	755	3554	1585	1388	1870	1585	1414	1870	1585
Grp Volume(v), veh/h	35	336	352	0	231	88	9	2	1	71	4	19
Grp Sat Flow(s),veh/h/ln	1061	1777	1867	755	1777	1585	1388	1870	1585	1414	1870	1585
Q Serve(g_s), s	1.8	11.2	11.2	0.0	3.3	2.8	0.2	0.0	0.0	1.4	0.1	0.3
Cycle Q Clear(g_c), s	5.1	11.2	11.2	0.0	3.3	2.8	0.2	0.0	0.0	1.5	0.1	0.3
Prop In Lane	1.00		0.01	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	344	484	508	109	968	432	929	1106	938	944	1106	938
V/C Ratio(X)	0.10	0.69	0.69	0.00	0.24	0.20	0.01	0.00	0.00	0.08	0.00	0.02
Avail Cap(c_a), veh/h	728	1126	1183	382	2252	1005	929	1106	938	944	1106	938
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.7	21.6	21.6	0.0	18.7	18.5	5.6	5.5	5.5	5.8	5.5	5.6
Incr Delay (d2), s/veh	0.1	1.8	1.7	0.0	0.1	0.2	0.0	0.0	0.0	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	0.4	4.6	4.8	0.0	1.3	1.0	0.0	0.0	0.0	0.4	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.8	23.4	23.3	0.0	18.8	18.8	5.6	5.5	5.5	6.0	5.5	5.6
LnGrp LOS	C	C	C	A	B	B	A	A	A	A	A	A
Approach Vol, veh/h		723			319			12			94	
Approach Delay, s/veh		23.2			18.8			5.6			5.9	
Approach LOS		C			B			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		43.6		22.5		43.6		22.5				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		39.1		41.9		39.1		41.9				
Max Q Clear Time (g_c+I1), s		2.2		13.2		3.5		5.3				
Green Ext Time (p_c), s		0.0		4.8		0.3		1.9				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				20.4								
HCM 6th LOS				C								

HCM 6th TWSC  
11: Redfield Road & Thunderbird Road

06/22/2022

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑↑	↘	
Traffic Vol, veh/h	616	23	8	250	16	8
Future Vol, veh/h	616	23	8	250	16	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	80	80	85	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	684	29	10	294	20	10

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	713	0	851 684
Stage 1	-	-	-	-	684 -
Stage 2	-	-	-	-	167 -
Critical Hdwy	-	-	4.13	-	6.63 6.23
Critical Hdwy Stg 1	-	-	-	-	5.43 -
Critical Hdwy Stg 2	-	-	-	-	5.83 -
Follow-up Hdwy	-	-	2.219	-	3.519 3.319
Pot Cap-1 Maneuver	-	-	885	-	314 448
Stage 1	-	-	-	-	500 -
Stage 2	-	-	-	-	846 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	885	-	311 448
Mov Cap-2 Maneuver	-	-	-	-	311 -
Stage 1	-	-	-	-	500 -
Stage 2	-	-	-	-	837 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	16.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	346	-	-	885	-
HCM Lane V/C Ratio	0.087	-	-	0.011	-
HCM Control Delay (s)	16.4	-	-	9.1	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0	-

HCM 6th TWSC  
 1: Park n Ride Driveway & Scottsdale Road

06/22/2022

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↑↑↑	↗		↑↑↑	
Traffic Vol, veh/h	0	0	46	0	0	2	0	2084	3	0	1843	31
Future Vol, veh/h	0	0	46	0	0	2	0	2084	3	0	1843	31
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	80	92	92	80	92	90	80	92	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	58	0	0	3	0	2316	4	0	2048	34

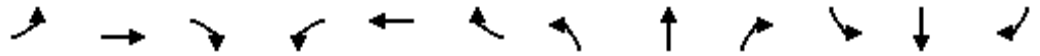
Major/Minor	Minor2		Minor1		Major1		Major2	
Conflicting Flow All	-	-	1041	-	-	1158	-	0
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-
Pot Cap-1 Maneuver	0	0	195	0	0	163	0	-
Stage 1	0	0	-	0	0	-	0	-
Stage 2	0	0	-	0	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	195	-	-	163	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31	27.4	0	0
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1	SBT	SBR
Capacity (veh/h)	-	-	195	163	-
HCM Lane V/C Ratio	-	-	0.295	0.015	-
HCM Control Delay (s)	-	-	31	27.4	-
HCM Lane LOS	-	-	D	D	-
HCM 95th %tile Q(veh)	-	-	1.2	0	-

HCM 6th Signalized Intersection Summary  
 2: Thunderbird Road & 73rd Street

06/22/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↗	↖	↗	↗	↖	↗	↗
Traffic Volume (veh/h)	9	277	3	1	694	67	4	2	0	134	2	70
Future Volume (veh/h)	9	277	3	1	694	67	4	2	0	134	2	70
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			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	11	326	4	1	816	84	5	2	0	168	2	88
Peak Hour Factor	0.80	0.85	0.85	0.80	0.85	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	176	1161	14	369	1147	512	820	1029	872	880	1029	872
Arrive On Green	0.32	0.32	0.32	0.32	0.32	0.32	0.55	0.55	0.00	0.55	0.55	0.55
Sat Flow, veh/h	619	3595	44	1050	3554	1585	1307	1870	1585	1415	1870	1585
Grp Volume(v), veh/h	11	161	169	1	816	84	5	2	0	168	2	88
Grp Sat Flow(s),veh/h/ln	619	1777	1862	1050	1777	1585	1307	1870	1585	1415	1870	1585
Q Serve(g_s), s	1.1	4.8	4.8	0.1	14.3	2.7	0.1	0.0	0.0	4.3	0.0	1.9
Cycle Q Clear(g_c), s	15.5	4.8	4.8	4.9	14.3	2.7	0.2	0.0	0.0	4.3	0.0	1.9
Prop In Lane	1.00		0.02	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	176	574	601	369	1147	512	820	1029	872	880	1029	872
V/C Ratio(X)	0.06	0.28	0.28	0.00	0.71	0.16	0.01	0.00	0.00	0.19	0.00	0.10
Avail Cap(c_a), veh/h	342	1048	1099	650	2096	935	820	1029	872	880	1029	872
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	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.9	17.9	17.9	19.7	21.1	17.2	7.2	7.2	0.0	8.2	7.2	7.6
Incr Delay (d2), s/veh	0.1	0.3	0.3	0.0	0.8	0.1	0.0	0.0	0.0	0.5	0.0	0.2
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	1.9	2.0	0.0	5.7	1.0	0.0	0.0	0.0	1.3	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.1	18.2	18.2	19.7	22.0	17.3	7.2	7.2	0.0	8.6	7.2	7.8
LnGrp LOS	C	B	B	B	C	B	A	A	A	A	A	A
Approach Vol, veh/h		341			901			7			258	
Approach Delay, s/veh		18.5			21.5			7.2			8.4	
Approach LOS		B			C			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		43.6		27.4		43.6		27.4				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		39.1		41.9		39.1		41.9				
Max Q Clear Time (g_c+I1), s		2.2		17.5		6.3		16.3				
Green Ext Time (p_c), s		0.0		2.0		0.8		6.6				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				18.5								
HCM 6th LOS				B								

HCM 6th TWSC  
11: Redfield Road & Thunderbird Road

06/22/2022

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑↑	↘	
Traffic Vol, veh/h	401	10	5	738	24	7
Future Vol, veh/h	401	10	5	738	24	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	80	80	90	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	446	13	6	820	30	9

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	459	0	868 446
Stage 1	-	-	-	-	446 -
Stage 2	-	-	-	-	422 -
Critical Hdwy	-	-	4.13	-	6.63 6.23
Critical Hdwy Stg 1	-	-	-	-	5.43 -
Critical Hdwy Stg 2	-	-	-	-	5.83 -
Follow-up Hdwy	-	-	2.219	-	3.519 3.319
Pot Cap-1 Maneuver	-	-	1100	-	307 611
Stage 1	-	-	-	-	644 -
Stage 2	-	-	-	-	630 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1100	-	305 611
Mov Cap-2 Maneuver	-	-	-	-	305 -
Stage 1	-	-	-	-	644 -
Stage 2	-	-	-	-	627 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	16.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	344	-	-	1100	-
HCM Lane V/C Ratio	0.113	-	-	0.006	-
HCM Control Delay (s)	16.8	-	-	8.3	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.4	-	-	0	-

HCM 6th TWSC  
1: Park n Ride Driveway & Scottsdale Road

06/22/2022

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↑↑↑	↗		↑↑↑	
Traffic Vol, veh/h	0	0	27	0	0	0	0	1590	8	0	1712	42
Future Vol, veh/h	0	0	27	0	0	0	0	1590	8	0	1712	42
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	80	92	92	80	92	90	80	92	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	34	0	0	0	0	1767	10	0	1902	47
























Major/Minor	Minor2		Minor1		Major1		Major2	
Conflicting Flow All	-	-	975	-	-	884	-	0
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-
Pot Cap-1 Maneuver	0	0	216	0	0	248	0	-
Stage 1	0	0	-	0	0	-	0	-
Stage 2	0	0	-	0	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	216	-	-	248	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.7	0	0	0
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1	SBT	SBR
Capacity (veh/h)	-	-	216	-	-
HCM Lane V/C Ratio	-	-	0.156	-	-
HCM Control Delay (s)	-	-	24.7	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.5	-	-

HCM 6th Signalized Intersection Summary  
 2: Thunderbird Road & 73rd Street

06/22/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	593	3	0	200	70	7	2	1	57	3	15
Future Volume (veh/h)	28	593	3	0	200	70	7	2	1	57	3	15
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			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	35	698	4	0	235	88	9	2	1	71	4	19
Peak Hour Factor	0.80	0.85	0.85	0.80	0.85	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	347	1002	6	108	983	439	923	1100	932	939	1100	932
Arrive On Green	0.28	0.28	0.28	0.00	0.28	0.28	0.59	0.59	0.59	0.59	0.59	0.59
Sat Flow, veh/h	1057	3623	21	745	3554	1585	1388	1870	1585	1414	1870	1585
Grp Volume(v), veh/h	35	342	360	0	235	88	9	2	1	71	4	19
Grp Sat Flow(s),veh/h/ln	1057	1777	1867	745	1777	1585	1388	1870	1585	1414	1870	1585
Q Serve(g_s), s	1.8	11.5	11.5	0.0	3.4	2.8	0.2	0.0	0.0	1.5	0.1	0.3
Cycle Q Clear(g_c), s	5.2	11.5	11.5	0.0	3.4	2.8	0.2	0.0	0.0	1.5	0.1	0.3
Prop In Lane	1.00		0.01	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	347	492	516	108	983	439	923	1100	932	939	1100	932
V/C Ratio(X)	0.10	0.70	0.70	0.00	0.24	0.20	0.01	0.00	0.00	0.08	0.00	0.02
Avail Cap(c_a), veh/h	720	1120	1176	372	2239	999	923	1100	932	939	1100	932
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.6	21.5	21.5	0.0	18.6	18.4	5.7	5.6	5.6	6.0	5.7	5.7
Incr Delay (d2), s/veh	0.1	1.8	1.7	0.0	0.1	0.2	0.0	0.0	0.0	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	0.4	4.7	4.9	0.0	1.3	1.0	0.0	0.0	0.0	0.4	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.8	23.3	23.3	0.0	18.8	18.6	5.7	5.7	5.6	6.1	5.7	5.8
LnGrp LOS	C	C	C	A	B	B	A	A	A	A	A	A
Approach Vol, veh/h		737			323			12			94	
Approach Delay, s/veh		23.2			18.7			5.7			6.0	
Approach LOS		C			B			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		43.6		22.9		43.6		22.9				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		39.1		41.9		39.1		41.9				
Max Q Clear Time (g_c+I1), s		2.2		13.5		3.5		5.4				
Green Ext Time (p_c), s		0.0		4.9		0.3		1.9				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				20.4								
HCM 6th LOS				C								

HCM 6th TWSC  
 11: Redfield Road & Thunderbird Road

06/22/2022

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑↑	↘	
Traffic Vol, veh/h	628	23	8	255	16	8
Future Vol, veh/h	628	23	8	255	16	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	80	80	85	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	698	29	10	300	20	10

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	727	0	868 698
Stage 1	-	-	-	-	698 -
Stage 2	-	-	-	-	170 -
Critical Hdwy	-	-	4.13	-	6.63 6.23
Critical Hdwy Stg 1	-	-	-	-	5.43 -
Critical Hdwy Stg 2	-	-	-	-	5.83 -
Follow-up Hdwy	-	-	2.219	-	3.519 3.319
Pot Cap-1 Maneuver	-	-	874	-	307 440
Stage 1	-	-	-	-	493 -
Stage 2	-	-	-	-	843 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	874	-	304 440
Mov Cap-2 Maneuver	-	-	-	-	304 -
Stage 1	-	-	-	-	493 -
Stage 2	-	-	-	-	834 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	16.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	339	-	-	874	-
HCM Lane V/C Ratio	0.088	-	-	0.011	-
HCM Control Delay (s)	16.6	-	-	9.2	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0	-

HCM 6th TWSC  
 1: Park n Ride Driveway & Scottsdale Road

06/22/2022

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↑↑↑	↗		↑↑↑	
Traffic Vol, veh/h	0	0	46	0	0	2	0	2126	3	0	1880	31
Future Vol, veh/h	0	0	46	0	0	2	0	2126	3	0	1880	31
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	80	92	92	80	92	90	80	92	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	58	0	0	3	0	2362	4	0	2089	34

Major/Minor	Minor2		Minor1		Major1		Major2	
Conflicting Flow All	-	-	1062	-	-	1181	-	0
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-
Pot Cap-1 Maneuver	0	0	189	0	0	157	0	-
Stage 1	0	0	-	0	0	-	0	-
Stage 2	0	0	-	0	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	189	-	-	157	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-
























Approach	EB		WB		NB		SB	
HCM Control Delay, s	32.2		28.3		0		0	
HCM LOS	D		D					

Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1	SBT	SBR
Capacity (veh/h)	-	-	189	157	-
HCM Lane V/C Ratio	-	-	0.304	0.016	-
HCM Control Delay (s)	-	-	32.2	28.3	-
HCM Lane LOS	-	-	D	D	-
HCM 95th %tile Q(veh)	-	-	1.2	0	-

# HCM 6th Signalized Intersection Summary

## 2: Thunderbird Road & 73rd Street

06/22/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	283	3	1	708	67	4	2	0	134	2	70
Future Volume (veh/h)	9	283	3	1	708	67	4	2	0	134	2	70
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			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	11	333	4	1	787	84	5	2	0	158	2	88
Peak Hour Factor	0.80	0.85	0.85	0.80	0.90	0.80	0.80	0.80	0.80	0.85	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	179	1130	14	358	1117	498	830	1042	883	891	1042	883
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.56	0.56	0.00	0.56	0.56	0.56
Sat Flow, veh/h	636	3596	43	1043	3554	1585	1307	1870	1585	1415	1870	1585
Grp Volume(v), veh/h	11	164	173	1	787	84	5	2	0	158	2	88
Grp Sat Flow(s),veh/h/ln	636	1777	1863	1043	1777	1585	1307	1870	1585	1415	1870	1585
Q Serve(g_s), s	1.1	4.9	4.9	0.1	13.7	2.7	0.1	0.0	0.0	3.9	0.0	1.8
Cycle Q Clear(g_c), s	14.8	4.9	4.9	5.0	13.7	2.7	0.2	0.0	0.0	3.9	0.0	1.8
Prop In Lane	1.00		0.02	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	179	559	586	358	1117	498	830	1042	883	891	1042	883
V/C Ratio(X)	0.06	0.29	0.29	0.00	0.70	0.17	0.01	0.00	0.00	0.18	0.00	0.10
Avail Cap(c_a), veh/h	358	1061	1112	653	2123	947	830	1042	883	891	1042	883
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	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.7	18.2	18.2	20.0	21.2	17.4	6.9	6.9	0.0	7.8	6.9	7.3
Incr Delay (d2), s/veh	0.1	0.3	0.3	0.0	0.8	0.2	0.0	0.0	0.0	0.4	0.0	0.2
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	1.9	2.0	0.0	5.4	1.0	0.0	0.0	0.0	1.1	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.8	18.5	18.5	20.1	22.0	17.6	6.9	6.9	0.0	8.2	6.9	7.5
LnGrp LOS	C	B	B	C	C	B	A	A	A	A	A	A
Approach Vol, veh/h		348			872			7			248	
Approach Delay, s/veh		18.8			21.6			6.9			7.9	
Approach LOS		B			C			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		43.6		26.6		43.6		26.6				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		39.1		41.9		39.1		41.9				
Max Q Clear Time (g_c+I1), s		2.2		16.8		5.9		15.7				
Green Ext Time (p_c), s		0.0		2.1		0.7		6.4				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				18.5								
HCM 6th LOS				B								

HCM 6th TWSC  
 11: Redfield Road & Thunderbird Road

06/22/2022

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑↑	↘	
Traffic Vol, veh/h	409	10	5	753	24	7
Future Vol, veh/h	409	10	5	753	24	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	80	80	90	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	454	13	6	837	30	9

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	467	0	885 454
Stage 1	-	-	-	-	454 -
Stage 2	-	-	-	-	431 -
Critical Hdwy	-	-	4.13	-	6.63 6.23
Critical Hdwy Stg 1	-	-	-	-	5.43 -
Critical Hdwy Stg 2	-	-	-	-	5.83 -
Follow-up Hdwy	-	-	2.219	-	3.519 3.319
Pot Cap-1 Maneuver	-	-	1093	-	300 605
Stage 1	-	-	-	-	639 -
Stage 2	-	-	-	-	624 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1093	-	299 605
Mov Cap-2 Maneuver	-	-	-	-	299 -
Stage 1	-	-	-	-	639 -
Stage 2	-	-	-	-	621 -

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)	338	-	-	1093	-
HCM Lane V/C Ratio	0.115	-	-	0.006	-
HCM Control Delay (s)	17	-	-	8.3	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.4	-	-	0	-

HCM 6th TWSC  
 1: Park n Ride Driveway & Scottsdale Road

06/22/2022

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↑↑↑	↗		↑↑↑	
Traffic Vol, veh/h	0	0	27	0	0	0	0	1756	9	0	1890	42
Future Vol, veh/h	0	0	27	0	0	0	0	1756	9	0	1890	42
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	80	92	92	80	92	90	80	92	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	34	0	0	0	0	1951	11	0	2100	47

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	-	-	1074	-	-	976	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	185	0	0	215	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	-	-	185	-	-	215	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
























Approach	EB		WB		NB		SB	
HCM Control Delay, s	28.8		0		0		0	
HCM LOS	D		A					

Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1	SBT	SBR
Capacity (veh/h)	-	-	185	-	-
HCM Lane V/C Ratio	-	-	0.182	-	-
HCM Control Delay (s)	-	-	28.8	0	-
HCM Lane LOS	-	-	D	A	-
HCM 95th %tile Q(veh)	-	-	0.6	-	-

# HCM 6th Signalized Intersection Summary

## 2: Thunderbird Road & 73rd Street

06/22/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	654	3	0	221	70	7	2	1	57	3	15
Future Volume (veh/h)	28	654	3	0	221	70	7	2	1	57	3	15
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			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	35	727	3	0	260	82	9	2	1	71	4	19
Peak Hour Factor	0.80	0.90	0.90	0.80	0.85	0.85	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	345	1035	4	107	1013	452	913	1087	921	928	1087	921
Arrive On Green	0.29	0.29	0.29	0.00	0.29	0.29	0.58	0.58	0.58	0.58	0.58	0.58
Sat Flow, veh/h	1039	3630	15	726	3554	1585	1388	1870	1585	1414	1870	1585
Grp Volume(v), veh/h	35	356	374	0	260	82	9	2	1	71	4	19
Grp Sat Flow(s),veh/h/ln	1039	1777	1868	726	1777	1585	1388	1870	1585	1414	1870	1585
Q Serve(g_s), s	1.8	12.0	12.0	0.0	3.8	2.6	0.2	0.0	0.0	1.5	0.1	0.3
Cycle Q Clear(g_c), s	5.6	12.0	12.0	0.0	3.8	2.6	0.2	0.0	0.0	1.5	0.1	0.3
Prop In Lane	1.00		0.01	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	345	507	533	107	1013	452	913	1087	921	928	1087	921
V/C Ratio(X)	0.10	0.70	0.70	0.00	0.26	0.18	0.01	0.00	0.00	0.08	0.00	0.02
Avail Cap(c_a), veh/h	695	1106	1163	352	2213	987	913	1087	921	928	1087	921
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.7	21.5	21.5	0.0	18.5	18.1	6.0	5.9	5.9	6.2	5.9	6.0
Incr Delay (d2), s/veh	0.1	1.8	1.7	0.0	0.1	0.2	0.0	0.0	0.0	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	0.4	4.9	5.1	0.0	1.5	0.9	0.0	0.0	0.0	0.4	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.8	23.3	23.2	0.0	18.7	18.3	6.0	5.9	5.9	6.4	5.9	6.0
LnGrp LOS	C	C	C	A	B	B	A	A	A	A	A	A
Approach Vol, veh/h		765			342			12			94	
Approach Delay, s/veh		23.1			18.6			6.0			6.3	
Approach LOS		C			B			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		43.6		23.7		43.6		23.7				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		39.1		41.9		39.1		41.9				
Max Q Clear Time (g_c+I1), s		2.2		14.0		3.5		5.8				
Green Ext Time (p_c), s		0.0		5.1		0.3		2.1				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				20.4								
HCM 6th LOS				C								

HCM 6th TWSC  
 11: Redfield Road & Thunderbird Road

06/22/2022

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑↑	↘	
Traffic Vol, veh/h	694	23	8	282	16	8
Future Vol, veh/h	694	23	8	282	16	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	80	80	85	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	771	29	10	332	20	10

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	800	0	957
Stage 1	-	-	-	-	771
Stage 2	-	-	-	-	186
Critical Hdwy	-	-	4.13	-	6.63
Critical Hdwy Stg 1	-	-	-	-	5.43
Critical Hdwy Stg 2	-	-	-	-	5.83
Follow-up Hdwy	-	-	2.219	-	3.519
Pot Cap-1 Maneuver	-	-	821	-	270
Stage 1	-	-	-	-	455
Stage 2	-	-	-	-	828
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	821	-	267
Mov Cap-2 Maneuver	-	-	-	-	267
Stage 1	-	-	-	-	455
Stage 2	-	-	-	-	818

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	18.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	300	-	-	821	-
HCM Lane V/C Ratio	0.1	-	-	0.012	-
HCM Control Delay (s)	18.3	-	-	9.4	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0	-

HCM 6th TWSC  
 1: Park n Ride Driveway & Scottsdale Road

06/22/2022

Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↑↑↑	↗		↑↑↑	
Traffic Vol, veh/h	0	0	46	0	0	2	0	2347	3	0	2076	31
Future Vol, veh/h	0	0	46	0	0	2	0	2347	3	0	2076	31
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	80	92	92	80	92	90	80	92	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	58	0	0	3	0	2608	4	0	2307	34

Major/Minor	Minor2		Minor1		Major1		Major2	
Conflicting Flow All	-	-	1171	-	-	1304	-	0
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-
Pot Cap-1 Maneuver	0	0	159	0	0	129	0	-
Stage 1	0	0	-	0	0	-	0	-
Stage 2	0	0	-	0	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	159	-	-	129	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-
























Approach	EB		WB		NB		SB	
HCM Control Delay, s	39.9		33.5		0		0	
HCM LOS	E		D					

Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1	SBT	SBR
Capacity (veh/h)	-	-	159	129	-
HCM Lane V/C Ratio	-	-	0.362	0.019	-
HCM Control Delay (s)	-	-	39.9	33.5	-
HCM Lane LOS	-	-	E	D	-
HCM 95th %tile Q(veh)	-	-	1.5	0.1	-

# HCM 6th Signalized Intersection Summary

## 2: Thunderbird Road & 73rd Street

06/22/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	312	3	1	782	67	4	2	0	134	2	70
Future Volume (veh/h)	9	312	3	1	782	67	4	2	0	134	2	70
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			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	11	367	4	1	869	84	5	2	0	158	2	88
Peak Hour Factor	0.80	0.85	0.85	0.80	0.90	0.80	0.80	0.80	0.80	0.85	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	172	1217	13	365	1201	536	802	1006	853	860	1006	853
Arrive On Green	0.34	0.34	0.34	0.34	0.34	0.34	0.54	0.54	0.00	0.54	0.54	0.54
Sat Flow, veh/h	589	3601	39	1011	3554	1585	1307	1870	1585	1415	1870	1585
Grp Volume(v), veh/h	11	181	190	1	869	84	5	2	0	158	2	88
Grp Sat Flow(s),veh/h/ln	589	1777	1863	1011	1777	1585	1307	1870	1585	1415	1870	1585
Q Serve(g_s), s	1.2	5.5	5.5	0.1	15.6	2.7	0.1	0.0	0.0	4.2	0.0	2.0
Cycle Q Clear(g_c), s	16.8	5.5	5.5	5.5	15.6	2.7	0.2	0.0	0.0	4.3	0.0	2.0
Prop In Lane	1.00		0.02	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	172	601	630	365	1201	536	802	1006	853	860	1006	853
V/C Ratio(X)	0.06	0.30	0.30	0.00	0.72	0.16	0.01	0.00	0.00	0.18	0.00	0.10
Avail Cap(c_a), veh/h	312	1025	1074	606	2049	914	802	1006	853	860	1006	853
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	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	17.7	17.7	19.8	21.1	16.8	7.8	7.8	0.0	8.7	7.8	8.2
Incr Delay (d2), s/veh	0.2	0.3	0.3	0.0	0.8	0.1	0.0	0.0	0.0	0.5	0.0	0.2
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	2.2	2.3	0.0	6.2	0.9	0.0	0.0	0.0	1.3	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.6	18.0	18.0	19.8	21.9	16.9	7.8	7.8	0.0	9.2	7.8	8.5
LnGrp LOS	C	B	B	B	C	B	A	A	A	A	A	A
Approach Vol, veh/h		382			954			7			248	
Approach Delay, s/veh		18.3			21.5			7.8			8.9	
Approach LOS		B			C			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		43.6		29.1		43.6		29.1				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		39.1		41.9		39.1		41.9				
Max Q Clear Time (g_c+I1), s		2.2		18.8		6.3		17.6				
Green Ext Time (p_c), s		0.0		2.3		0.7		7.0				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				18.7								
HCM 6th LOS				B								

HCM 6th TWSC  
 11: Redfield Road & Thunderbird Road

06/22/2022

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑↑	↘	
Traffic Vol, veh/h	452	10	5	831	24	7
Future Vol, veh/h	452	10	5	831	24	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	80	80	90	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	502	13	6	923	30	9

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	515	0	976 502
Stage 1	-	-	-	-	502 -
Stage 2	-	-	-	-	474 -
Critical Hdwy	-	-	4.13	-	6.63 6.23
Critical Hdwy Stg 1	-	-	-	-	5.43 -
Critical Hdwy Stg 2	-	-	-	-	5.83 -
Follow-up Hdwy	-	-	2.219	-	3.519 3.319
Pot Cap-1 Maneuver	-	-	1049	-	263 568
Stage 1	-	-	-	-	607 -
Stage 2	-	-	-	-	593 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1049	-	261 568
Mov Cap-2 Maneuver	-	-	-	-	261 -
Stage 1	-	-	-	-	607 -
Stage 2	-	-	-	-	589 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	18.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	297	-	-	1049	-
HCM Lane V/C Ratio	0.13	-	-	0.006	-
HCM Control Delay (s)	18.9	-	-	8.5	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.4	-	-	0	-

HCM 6th TWSC  
1: Park n Ride Driveway & Scottsdale Road

10/05/2022

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↑↑↑	↗		↑↑↑	
Traffic Vol, veh/h	0	0	27	0	0	0	0	1604	46	0	1719	42
Future Vol, veh/h	0	0	27	0	0	0	0	1604	46	0	1719	42
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	80	92	92	80	92	90	80	92	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	34	0	0	0	0	1782	58	0	1910	47
























Major/Minor	Minor2		Minor1		Major1		Major2	
Conflicting Flow All	-	-	979	-	-	891	-	0
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-
Pot Cap-1 Maneuver	0	0	214	0	0	245	0	-
Stage 1	0	0	-	0	0	-	0	-
Stage 2	0	0	-	0	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	214	-	-	245	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.9	0	0	0
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1	SBT	SBR
Capacity (veh/h)	-	-	214	-	-
HCM Lane V/C Ratio	-	-	0.158	-	-
HCM Control Delay (s)	-	-	24.9	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.5	-	-

HCM 6th Signalized Intersection Summary  
 2: Thunderbird Road & 73rd Street

10/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	654	31	0	211	70	13	2	1	57	3	15
Future Volume (veh/h)	28	654	31	0	211	70	13	2	1	57	3	15
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			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	35	727	34	0	248	88	16	2	1	71	4	19
Peak Hour Factor	0.80	0.90	0.90	0.80	0.85	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	359	1023	48	105	1052	469	899	1071	907	914	1071	907
Arrive On Green	0.30	0.30	0.30	0.00	0.30	0.30	0.57	0.57	0.57	0.57	0.57	0.57
Sat Flow, veh/h	1044	3457	162	705	3554	1585	1388	1870	1585	1414	1870	1585
Grp Volume(v), veh/h	35	374	387	0	248	88	16	2	1	71	4	19
Grp Sat Flow(s),veh/h/ln	1044	1777	1841	705	1777	1585	1388	1870	1585	1414	1870	1585
Q Serve(g_s), s	1.8	12.8	12.8	0.0	3.6	2.8	0.3	0.0	0.0	1.5	0.1	0.4
Cycle Q Clear(g_c), s	5.4	12.8	12.8	0.0	3.6	2.8	0.4	0.0	0.0	1.6	0.1	0.4
Prop In Lane	1.00		0.09	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	359	526	545	105	1052	469	899	1071	907	914	1071	907
V/C Ratio(X)	0.10	0.71	0.71	0.00	0.24	0.19	0.02	0.00	0.00	0.08	0.00	0.02
Avail Cap(c_a), veh/h	691	1090	1129	329	2180	972	899	1071	907	914	1071	907
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.2	21.4	21.4	0.0	18.2	17.9	6.3	6.3	6.3	6.6	6.3	6.3
Incr Delay (d2), s/veh	0.1	1.8	1.7	0.0	0.1	0.2	0.0	0.0	0.0	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	0.4	5.2	5.4	0.0	1.4	1.0	0.1	0.0	0.0	0.4	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.4	23.2	23.2	0.0	18.3	18.1	6.4	6.3	6.3	6.8	6.3	6.4
LnGrp LOS	C	C	C	A	B	B	A	A	A	A	A	A
Approach Vol, veh/h		796			336			19			94	
Approach Delay, s/veh		23.1			18.3			6.4			6.7	
Approach LOS		C			B			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		43.6		24.7		43.6		24.7				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		39.1		41.9		39.1		41.9				
Max Q Clear Time (g_c+I1), s		2.4		14.8		3.6		5.6				
Green Ext Time (p_c), s		0.0		5.4		0.3		2.0				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				20.3								
HCM 6th LOS				C								

HCM 6th TWSC  
 11: Redfield Road & Thunderbird Road

10/05/2022

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑↑	↘	
Traffic Vol, veh/h	628	84	30	255	27	11
Future Vol, veh/h	628	84	30	255	27	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	85	80	85	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	698	99	38	300	34	14

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	797	0	924 698
Stage 1	-	-	-	-	698 -
Stage 2	-	-	-	-	226 -
Critical Hdwy	-	-	4.13	-	6.63 6.23
Critical Hdwy Stg 1	-	-	-	-	5.43 -
Critical Hdwy Stg 2	-	-	-	-	5.83 -
Follow-up Hdwy	-	-	2.219	-	3.519 3.319
Pot Cap-1 Maneuver	-	-	823	-	283 440
Stage 1	-	-	-	-	493 -
Stage 2	-	-	-	-	791 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	823	-	270 440
Mov Cap-2 Maneuver	-	-	-	-	270 -
Stage 1	-	-	-	-	493 -
Stage 2	-	-	-	-	755 -

Approach	EB	WB	NB
HCM Control Delay, s	0	1.1	19
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	304	-	-	823	-
HCM Lane V/C Ratio	0.156	-	-	0.046	-
HCM Control Delay (s)	19	-	-	9.6	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.5	-	-	0.1	-

HCM 6th TWSC  
1: Park n Ride Driveway & Scottsdale Road

10/05/2022

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗	↑↑↑	↑↑↑	↗	↑↑↑	↗	
Traffic Vol, veh/h	0	0	46	0	0	2	0	2127	6	0	1902	31
Future Vol, veh/h	0	0	46	0	0	2	0	2127	6	0	1902	31
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	80	92	92	80	92	90	80	92	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	58	0	0	3	0	2363	8	0	2113	34
























Major/Minor	Minor2		Minor1		Major1		Major2	
Conflicting Flow All	-	-	1074	-	-	1182	-	0
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-
Pot Cap-1 Maneuver	0	0	185	0	0	157	0	-
Stage 1	0	0	-	0	0	-	0	-
Stage 2	0	0	-	0	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	185	-	-	157	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	33	28.3	0	0
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1	SBT	SBR
Capacity (veh/h)	-	-	185	157	-
HCM Lane V/C Ratio	-	-	0.311	0.016	-
HCM Control Delay (s)	-	-	33	28.3	-
HCM Lane LOS	-	-	D	D	-
HCM 95th %tile Q(veh)	-	-	1.3	0	-

HCM 6th Signalized Intersection Summary  
 2: Thunderbird Road & 73rd Street

10/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	287	5	1	743	67	24	2	0	134	2	70
Future Volume (veh/h)	9	287	5	1	743	67	24	2	0	134	2	70
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			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	11	338	6	1	826	84	30	2	0	158	2	88
Peak Hour Factor	0.80	0.85	0.85	0.80	0.90	0.80	0.80	0.80	0.80	0.85	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	175	1164	21	366	1158	516	816	1025	869	876	1025	869
Arrive On Green	0.33	0.33	0.33	0.33	0.33	0.33	0.55	0.55	0.00	0.55	0.55	0.55
Sat Flow, veh/h	613	3572	63	1037	3554	1585	1307	1870	1585	1415	1870	1585
Grp Volume(v), veh/h	11	168	176	1	826	84	30	2	0	158	2	88
Grp Sat Flow(s),veh/h/ln	613	1777	1859	1037	1777	1585	1307	1870	1585	1415	1870	1585
Q Serve(g_s), s	1.1	5.0	5.0	0.1	14.6	2.7	0.8	0.0	0.0	4.1	0.0	1.9
Cycle Q Clear(g_c), s	15.7	5.0	5.0	5.1	14.6	2.7	0.8	0.0	0.0	4.1	0.0	1.9
Prop In Lane	1.00		0.03	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	175	579	606	366	1158	516	816	1025	869	876	1025	869
V/C Ratio(X)	0.06	0.29	0.29	0.00	0.71	0.16	0.04	0.00	0.00	0.18	0.00	0.10
Avail Cap(c_a), veh/h	336	1044	1092	637	2087	931	816	1025	869	876	1025	869
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	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.0	17.9	17.9	19.8	21.1	17.1	7.5	7.3	0.0	8.2	7.3	7.7
Incr Delay (d2), s/veh	0.1	0.3	0.3	0.0	0.8	0.1	0.1	0.0	0.0	0.5	0.0	0.2
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	2.0	2.1	0.0	5.8	0.9	0.2	0.0	0.0	1.2	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.2	18.2	18.2	19.8	22.0	17.3	7.6	7.3	0.0	8.7	7.3	7.9
LnGrp LOS	C	B	B	B	C	B	A	A	A	A	A	A
Approach Vol, veh/h		355			911			32				248
Approach Delay, s/veh		18.5			21.5			7.5				8.4
Approach LOS		B			C			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		43.6		27.7		43.6		27.7				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		39.1		41.9		39.1		41.9				
Max Q Clear Time (g_c+I1), s		2.8		17.7		6.1		16.6				
Green Ext Time (p_c), s		0.1		2.1		0.7		6.7				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				18.4								
HCM 6th LOS				B								

HCM 6th TWSC  
 11: Redfield Road & Thunderbird Road

10/05/2022

Intersection						
Int Delay, s/veh	1.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑↑	↘	
Traffic Vol, veh/h	409	14	7	753	59	17
Future Vol, veh/h	409	14	7	753	59	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	80	80	90	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	454	18	9	837	69	20

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	472	0	891
Stage 1	-	-	-	-	454
Stage 2	-	-	-	-	437
Critical Hdwy	-	-	4.13	-	6.63
Critical Hdwy Stg 1	-	-	-	-	5.43
Critical Hdwy Stg 2	-	-	-	-	5.83
Follow-up Hdwy	-	-	2.219	-	3.519
Pot Cap-1 Maneuver	-	-	1088	-	297
Stage 1	-	-	-	-	639
Stage 2	-	-	-	-	619
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1088	-	295
Mov Cap-2 Maneuver	-	-	-	-	295
Stage 1	-	-	-	-	639
Stage 2	-	-	-	-	614

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	19.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	333	-	-	1088	-
HCM Lane V/C Ratio	0.269	-	-	0.008	-
HCM Control Delay (s)	19.7	-	-	8.3	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	1.1	-	-	0	-

HCM 6th TWSC  
 1: Park n Ride Driveway & Scottsdale Road

10/05/2022

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↑↑↑	↗		↑↑↑	
Traffic Vol, veh/h	0	0	27	0	0	0	0	1770	47	0	1897	42
Future Vol, veh/h	0	0	27	0	0	0	0	1770	47	0	1897	42
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	80	92	92	80	92	90	80	92	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	34	0	0	0	0	1967	59	0	2108	47
























Major/Minor	Minor2		Minor1		Major1		Major2	
Conflicting Flow All	-	-	1078	-	-	984	-	0
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-
Pot Cap-1 Maneuver	0	0	184	0	0	213	0	-
Stage 1	0	0	-	0	0	-	0	-
Stage 2	0	0	-	0	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	184	-	-	213	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	28.9	0	0	0
HCM LOS	D	A		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1	SBT	SBR
Capacity (veh/h)	-	-	184	-	-
HCM Lane V/C Ratio	-	-	0.183	-	-
HCM Control Delay (s)	-	-	28.9	0	-
HCM Lane LOS	-	-	D	A	-
HCM 95th %tile Q(veh)	-	-	0.7	-	-

HCM 6th Signalized Intersection Summary  
 2: Thunderbird Road & 73rd Street

10/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	715	31	0	232	70	13	2	1	57	3	15
Future Volume (veh/h)	28	715	31	0	232	70	13	2	1	57	3	15
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			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	35	794	34	0	273	88	16	2	1	71	4	19
Peak Hour Factor	0.80	0.90	0.90	0.80	0.85	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	366	1095	47	102	1121	500	874	1041	882	888	1041	882
Arrive On Green	0.32	0.32	0.32	0.00	0.32	0.32	0.56	0.56	0.56	0.56	0.56	0.56
Sat Flow, veh/h	1021	3472	149	662	3554	1585	1388	1870	1585	1414	1870	1585
Grp Volume(v), veh/h	35	406	422	0	273	88	16	2	1	71	4	19
Grp Sat Flow(s),veh/h/ln	1021	1777	1844	662	1777	1585	1388	1870	1585	1414	1870	1585
Q Serve(g_s), s	1.9	14.3	14.3	0.0	4.0	2.8	0.4	0.0	0.0	1.7	0.1	0.4
Cycle Q Clear(g_c), s	5.9	14.3	14.3	0.0	4.0	2.8	0.4	0.0	0.0	1.7	0.1	0.4
Prop In Lane	1.00		0.08	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	366	561	582	102	1121	500	874	1041	882	888	1041	882
V/C Ratio(X)	0.10	0.72	0.72	0.00	0.24	0.18	0.02	0.00	0.00	0.08	0.00	0.02
Avail Cap(c_a), veh/h	653	1059	1099	288	2119	945	874	1041	882	888	1041	882
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.0	21.3	21.3	0.0	17.8	17.4	7.0	6.9	6.9	7.3	6.9	7.0
Incr Delay (d2), s/veh	0.1	1.8	1.7	0.0	0.1	0.2	0.0	0.0	0.0	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	0.4	5.8	6.0	0.0	1.6	1.0	0.1	0.0	0.0	0.5	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.1	23.1	23.1	0.0	17.9	17.6	7.1	6.9	6.9	7.5	6.9	7.0
LnGrp LOS	C	C	C	A	B	B	A	A	A	A	A	A
Approach Vol, veh/h		863			361			19				94
Approach Delay, s/veh		23.0			17.9			7.0				7.4
Approach LOS		C			B			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		43.6		26.7		43.6		26.7				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		39.1		41.9		39.1		41.9				
Max Q Clear Time (g_c+I1), s		2.4		16.3		3.7		6.0				
Green Ext Time (p_c), s		0.0		5.9		0.3		2.2				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				20.3								
HCM 6th LOS				C								

HCM 6th TWSC  
 11: Redfield Road & Thunderbird Road

10/05/2022

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑↑	↘	
Traffic Vol, veh/h	694	84	30	282	27	11
Future Vol, veh/h	694	84	30	282	27	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	80	80	85	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	771	105	38	332	34	14

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	876	0	1013 771
Stage 1	-	-	-	-	771 -
Stage 2	-	-	-	-	242 -
Critical Hdwy	-	-	4.13	-	6.63 6.23
Critical Hdwy Stg 1	-	-	-	-	5.43 -
Critical Hdwy Stg 2	-	-	-	-	5.83 -
Follow-up Hdwy	-	-	2.219	-	3.519 3.319
Pot Cap-1 Maneuver	-	-	769	-	250 399
Stage 1	-	-	-	-	455 -
Stage 2	-	-	-	-	776 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	769	-	238 399
Mov Cap-2 Maneuver	-	-	-	-	238 -
Stage 1	-	-	-	-	455 -
Stage 2	-	-	-	-	738 -

Approach	EB	WB	NB
HCM Control Delay, s	0	1	21.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	269	-	-	769	-
HCM Lane V/C Ratio	0.177	-	-	0.049	-
HCM Control Delay (s)	21.2	-	-	9.9	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.6	-	-	0.2	-

HCM 6th TWSC  
1: Park n Ride Driveway & Scottsdale Road

10/05/2022

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↑↑↑	↗		↑↑↑	
Traffic Vol, veh/h	0	0	46	0	0	2	0	2348	7	0	2098	31
Future Vol, veh/h	0	0	46	0	0	2	0	2348	7	0	2098	31
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	90	92	92	80	92	90	80	92	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	51	0	0	3	0	2609	9	0	2331	34
























Major/Minor	Minor2		Minor1		Major1		Major2	
Conflicting Flow All	-	-	1183	-	-	1305	-	0
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-
Pot Cap-1 Maneuver	0	0	156	0	0	129	0	-
Stage 1	0	0	-	0	0	-	0	-
Stage 2	0	0	-	0	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	156	-	-	129	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	38.9		33.5		0		0	
HCM LOS	E		D					

Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1	SBT	SBR
Capacity (veh/h)	-	-	156	129	-
HCM Lane V/C Ratio	-	-	0.328	0.019	-
HCM Control Delay (s)	-	-	38.9	33.5	-
HCM Lane LOS	-	-	E	D	-
HCM 95th %tile Q(veh)	-	-	1.3	0.1	-

HCM 6th Signalized Intersection Summary  
 2: Thunderbird Road & 73rd Street

10/05/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	316	5	1	817	67	24	2	0	134	2	70
Future Volume (veh/h)	9	316	5	1	817	67	24	2	0	134	2	70
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			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	11	372	6	1	908	79	30	2	0	158	2	88
Peak Hour Factor	0.80	0.85	0.85	0.80	0.90	0.85	0.80	0.80	0.80	0.85	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	169	1248	20	372	1239	553	789	990	839	846	990	839
Arrive On Green	0.35	0.35	0.35	0.35	0.35	0.35	0.53	0.53	0.00	0.53	0.53	0.53
Sat Flow, veh/h	570	3579	58	1005	3554	1585	1307	1870	1585	1415	1870	1585
Grp Volume(v), veh/h	11	184	194	1	908	79	30	2	0	158	2	88
Grp Sat Flow(s),veh/h/ln	570	1777	1860	1005	1777	1585	1307	1870	1585	1415	1870	1585
Q Serve(g_s), s	1.3	5.6	5.6	0.1	16.5	2.5	0.8	0.0	0.0	4.4	0.0	2.0
Cycle Q Clear(g_c), s	17.8	5.6	5.6	5.6	16.5	2.5	0.9	0.0	0.0	4.4	0.0	2.0
Prop In Lane	1.00		0.03	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	169	620	649	372	1239	553	789	990	839	846	990	839
V/C Ratio(X)	0.07	0.30	0.30	0.00	0.73	0.14	0.04	0.00	0.00	0.19	0.00	0.10
Avail Cap(c_a), veh/h	294	1008	1055	592	2016	899	789	990	839	846	990	839
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	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.8	17.5	17.5	19.5	21.0	16.5	8.4	8.2	0.0	9.2	8.2	8.7
Incr Delay (d2), s/veh	0.2	0.3	0.3	0.0	0.9	0.1	0.1	0.0	0.0	0.5	0.0	0.3
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	2.2	2.3	0.0	6.5	0.9	0.2	0.0	0.0	1.3	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.0	17.7	17.7	19.5	21.9	16.6	8.5	8.2	0.0	9.7	8.2	8.9
LnGrp LOS	C	B	B	B	C	B	A	A	A	A	A	A
Approach Vol, veh/h		389			988			32			248	
Approach Delay, s/veh		18.1			21.5			8.5			9.4	
Approach LOS		B			C			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		43.6		30.3		43.6		30.3				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		39.1		41.9		39.1		41.9				
Max Q Clear Time (g_c+I1), s		2.9		19.8		6.4		18.5				
Green Ext Time (p_c), s		0.1		2.3		0.7		7.2				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				18.6								
HCM 6th LOS				B								

HCM 6th TWSC  
 11: Redfield Road & Thunderbird Road

10/05/2022

Intersection						
Int Delay, s/veh	1.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑↑	↘	
Traffic Vol, veh/h	452	14	7	831	59	17
Future Vol, veh/h	452	14	7	831	59	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	80	80	90	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	502	18	9	923	69	20

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	520	0	982
Stage 1	-	-	-	-	502
Stage 2	-	-	-	-	480
Critical Hdwy	-	-	4.13	-	6.63
Critical Hdwy Stg 1	-	-	-	-	5.43
Critical Hdwy Stg 2	-	-	-	-	5.83
Follow-up Hdwy	-	-	2.219	-	3.519
Pot Cap-1 Maneuver	-	-	1044	-	261
Stage 1	-	-	-	-	607
Stage 2	-	-	-	-	589
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1044	-	259
Mov Cap-2 Maneuver	-	-	-	-	259
Stage 1	-	-	-	-	607
Stage 2	-	-	-	-	584

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	22.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	295	-	-	1044	-
HCM Lane V/C Ratio	0.303	-	-	0.008	-
HCM Control Delay (s)	22.4	-	-	8.5	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	1.2	-	-	0	-



**CREATION TBIRD SCOTTSDALE  
73<sup>RD</sup> STREET/THUNDERBIRD ROAD  
TRAFFIC IMPACT ANALYSIS**

**APPENDIX**

**Turn Lane Calculations**





Queues

2: Thunderbird Road & 73rd Street

10/05/2022



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	35	828	273	88	16	3	1	71	4	19
v/c Ratio	0.10	0.71	0.23	0.15	0.02	0.00	0.00	0.09	0.00	0.02
Control Delay	16.5	24.3	17.5	4.6	10.0	10.0	0.0	10.2	10.0	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.5	24.3	17.5	4.6	10.0	10.0	0.0	10.2	10.0	5.0
Queue Length 50th (ft)	11	165	45	0	3	1	0	14	1	0
Queue Length 95th (ft)	25	222	66	20	13	5	0	36	5	9
Internal Link Dist (ft)		211	546			79			109	
Turn Bay Length (ft)										
Base Capacity (vph)	633	2049	2059	958	763	1011	867	764	1011	868
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.40	0.13	0.09	0.02	0.00	0.00	0.09	0.00	0.02
Intersection Summary										

# Queues

## 2: Thunderbird Road & 73rd Street

10/05/2022



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	11	378	1	908	79	30	3	158	3	88
v/c Ratio	0.10	0.29	0.00	0.71	0.13	0.04	0.00	0.22	0.00	0.10
Control Delay	17.2	17.3	14.0	23.7	4.2	11.7	12.0	12.8	12.0	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.2	17.3	14.0	23.7	4.2	11.7	12.0	12.8	12.0	4.1
Queue Length 50th (ft)	3	64	0	187	0	6	1	37	1	2
Queue Length 95th (ft)	12	88	3	247	21	22	5	87	5	21
Internal Link Dist (ft)		211		546			79		109	
Turn Bay Length (ft)										
Base Capacity (vph)	171	1961	515	1964	913	729	964	729	964	859
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.19	0.00	0.46	0.09	0.04	0.00	0.22	0.00	0.10
Intersection Summary										



**CREATION TBIRD SCOTTSDALE  
73<sup>RD</sup> STREET/THUNDERBIRD ROAD  
TRAFFIC IMPACT ANALYSIS**

**APPENDIX**

**Crash Summary**

## 2018-2020 Crash Data

IncidentID	IncidentDate	CollisionManner	TotalInjuries	TotalFatalities	Onroad	CrossingFeature
3342290	1/15/2018	6	0	0	Thunderbird Road	73rd Street
3605756	10/28/2019	4	0	0	Thunderbird Road	73rd Street
3669160	2/19/2020	6	0	0	73rd Street	Thunderbird Road

### LEGEND

#### CollisionManner

- 1 SINGLE\_VEHICLE
- 2 ANGLE (front to side)(other than left turn)
- 3 LEFT\_TURN
- 4 REAR\_END
- 5 HEAD\_ON
- 6 SIDESWIPE\_SAME\_DIRECTION
- 7 SIDESWIPE\_OPPOSITE\_DIRECTION
- 8 REAR\_TO\_SIDE
- 9 REAR\_TO\_REAR
- 10 U\_TURN
- 97 OTHER
- 99 UNKNOWN



**CREATION TBIRD SCOTTSDALE  
73<sup>RD</sup> STREET/THUNDERBIRD ROAD  
TRAFFIC IMPACT ANALYSIS**

**APPENDIX**

**Comment Resolution**



Creation Tbird Scottsdale  
TIA Dated 27 April 2022  
Comment Resolution

6/21/2022

Item No.	Page No.	Reviewer	Code	Comment	Response
<b>City of Scottsdale</b>					
1	10	Kiran Guntupalli	A	Existing traffic data shown for Intersection 1 southbound through volumes for PM peak do not match traffic data provided in appendix. Verify existing values and future projected volumes (without and with). Revise analysis with corrected traffic volumes.	See revised report.
2	23, 24	Kiran Guntupalli	A	The text shows the storage length is the Synchro 95th %tile queue (in vehicles) multiplied by the average vehicle length (in feet). Table 8 seems to show the reported Synchro queue in feet and then rounded to the nearest 25 feet. Verify values and clarify the equation provided in text.	See revised report.
3	General	Kiran Guntupalli	A	Intersection 1 (Park n Ride Dwy/Scottsdale Road) was is Right-in/Right-out, but also has an opposing driveway that is also Right-in/Right-out. The traffic counts show it was counted as a four-leg intersection, but only the Park N Ride Dwy was evaluated in Synchro. How does the eastbound right-turn exiting the opposing driveway operate? This site is expected to add southbound through traffic at this intersection ( refer below image).	See revised report.

A - Will Comply  
B - Consultant to Evaluate  
C - Scottsdale to Evaluate  
D - See Response