Winery Suites

Traffic Impact and Mitigation Analysis

Southwest Corner of Goldwater Boulevard and 1st Street in Scottsdale, Arizona

October 2018
Project No. 18-1290

Prepared For:
Horizon Pediatric Therapy, Inc.
551 South Higley Road
Mesa, Arizona 85206

For Submittal to:
City of Scottsdale

Prepared By:

CivTech

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52-DR-2018
11/14/18

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EXECUTIVE SUMMARY

The Winery Suites development is located on the southwest corner of Goldwater Boulevard and 1st Street in Scottsdale, Arizona. The proposed site currently consists of the LDV Wine Gallery and Tasting Room and Studio B Interior Design. These tenants have since moved to new locations and the current parcels are now occupied by three dwelling units with flexible leasing terms. The redevelopment will consist of approximately 1,500 square-feet of ground-floor retail space and 31 dwelling units with flexible leasing terms in a mid-rise building. The vicinity of the site is provided in **Figure 1**.

CivTech, Inc. was retained by Horizon Pediatric Therapy, Inc. to perform a traffic impact and mitigation analysis (TIMA) for the proposed redevelopment. The purpose of this assessment is to address the traffic and transportation impacts of the proposed development on the surrounding streets and intersections. The following conclusions have been documented in this study:

- The results of the existing conditions analysis indicates that all study intersections operate with acceptable levels of service (LOS D or better), with the exception of the intersections of 69th Street & Indian School Rd, Goldwater Boulevard & Indian School Road and Goldwater Blvd & Main Street.
    - Currently, the unsignalized intersection of **69th Street and Indian School Road** operates poorly during both the AM and PM peak hours on the northbound and southbound approaches. This delay is due to the high wait times of vehicles making northbound left turns and southbound left turns because of the high volume of through traffic on Indian School Road during both peak hours. Extensive delay during either peak hour at minor roads or driveways that intersect major roads is expected.
    - The signalized intersection of **Goldwater Boulevard and Indian School Road** currently operates adequately in the AM peak hour, but has an overall intersection delay of 54 seconds in the PM peak hour. The threshold for an adequate level of service is 55 seconds, so it is very near to operating at a poor level of service.
    - The signalized intersection of **Goldwater Boulevard and Main Street** experiences delay on the eastbound and westbound approaches of the intersection during both the AM and PM peak hours. This delay is present because the signal operates under actuated-coordinated phasing, meaning that the eastbound and westbound green phases are only triggered when a vehicle approaches. Since Main Street is a minor road, very few vehicles approach the intersection from the east or west, so when they do, there is substantial delay. As more traffic uses this road in the future, the eastbound and westbound delay is likely to decrease.
- The number of crashes reported at the intersection of Goldwater Boulevard and 1st Street does not rise to the level of warranting consideration of a traffic signal based solely on crash experience. CivTech estimates that the existing development could potentially generate 142 external weekday daily trips, 3 trips during the AM peak hour, and 14 trips during the PM peak hour.

- The proposed redevelopment is anticipated to generate 734 external weekday daily trips, 62 trips during the AM peak hour, and 61 trips during the PM peak hour.
    - As compared to the existing uses, the proposed redevelopment could generate an additional 592 external daily trips with 59 additional trips in the AM peak hour and an additional 47 trips in the PM peak hour.

- The results of the 2020 peak hour analysis shows that all intersections operate at a level of service LOS D or better with the exception of the following intersections.

    - The unsignalized intersection of **69th Street and Indian School Road** is expected to continue to operate poorly during both the AM and PM peak hour on the northbound and southbound approaches. Intersections with minor approaches perpendicular to major approaches are expected to operate with delay during certain times of the day when the major road is busy, usually during the peak hour. Due to the location of this intersection to surrounding major intersections and the offset of the driveway from 69th Street, a signal will not be installed at this intersection. If there is significant delay during either peak hour, vehicles will use another route. Mitigation for this intersection is not recommended at this time.

    - The signalized intersection of **Goldwater Boulevard and Indian School Road** is expected to continue to operate poorly during the PM peak hour during both the no-build and build scenarios. The overall intersection delay during both scenarios is expected to be approximately 56 seconds. The threshold for an acceptable level of service is 55 seconds. Since the overall delay is very close to an acceptable level of service, no mitigation measures are recommended at this time, however, they could become necessary in the future.

    - The signalized intersection of **Goldwater Boulevard and Main Street** is expected to experience delay on the eastbound and westbound approaches of the intersection during both the AM and PM peak hours. This delay is present because the signal operates under actuated-coordinated phasing, meaning that the eastbound and westbound green phases are only triggered when a vehicle approaches. Since Main Street is a very small road, very few vehicles approach the intersection from the east or west, so when they do, there is significant delay. If more traffic uses this road in the future, the eastbound and westbound delay is likely to decrease.

- The existing storage lengths at the existing intersections are anticipated to accommodate the additional traffic generated by the proposed development with the exception of the northbound left turn lane at the intersection of Goldwater Boulevard and Indian School Road. No additional northbound left-turns are expected to be added from site generated traffic, meaning that the number of northbound left-turns is the same for the AM and PM peak hours for the no-build and build scenarios. Additional storage length calculations should be completed

prior to traffic signal installation, a change in intersection stop control or installation of raised medians.

- The contractor should ensure that adequate sight distance is provided at all site access points to allow safe left and right turning movements from the development. It is recommended that sight triangles be designed at all site access driveways to provide the required sight distance shown in *Appendix 5-3B* within the *City of Scottsdale Design Standards and Policies Manual*.

INTRODUCTION

The Winery Suites development is located on the southwest corner of Goldwater Boulevard and 1st Street in Scottsdale, Arizona. The development is proposed for two parcels of land, formerly zoned for residential use, totaling 0.62 gross acres. The two parcels are proposed for a mixed-use development with 34 dwelling units with flexible lease terms and approximately 1,500 square feet (SF) of retail space on the ground floor. Parking will be provided underground, with the entrance located in the alley bordering the site to the south, and there will be on-street parking provided in the alley as well. The vicinity of the site is provided in **Figure 1**.

Study Requirements

This study analyzes the traffic impact due to the proposed development on the surrounding street network. The study will be prepared in conformance with the City of Scottsdale *Design Standards and Policies Manual*, Chapter 5, Transportation Impact Studies, 2018. The specific objectives of the study are:

- To determine the existing site generated trips through trip generation rate calculations
- To determine whether the planned street system in the vicinity of the site is adequate to accommodate the increased traffic that results from the proposed development.
- To recommend additional street improvements or traffic control devices, where necessary, to mitigate the additional site-generated traffic; and,
- Evaluate the internal site circulation and provide recommendations if necessary.

Study Area

The study area has been defined as including the following intersections:

- Goldwater Blvd & Alley
- Goldwater Blvd & 2nd St
- Goldwater Blvd & Indian School Rd
- Goldwater Blvd & Main St
- Goldwater Blvd & 1st St
- 69th St & Indian School Rd
- 69th St & Alley
- 69th St & 1st St
- 69th St & 2nd St

Horizon Years

This study has been conducted to conform to the *Design Standards and Policies Manual (DS&PM), Chapter 5*, Transportation Impact Studies, prepared by the City of Scottsdale in 2018. Since the owner is applying for a change in zoning, per the *DS&PM*, a Category 2 TIMA is required. For a Category 2 TIMA, the existing year and the opening year will be analyzed. The existing year is 2018 and the opening horizon year for this development will be 2020.

The study intersections and the site accesses will be analyzed for AM and PM peak hours to determine the recommended intersection lane configuration, intersection stop control, turn lane storage requirements, and roadway typical sections for the development.

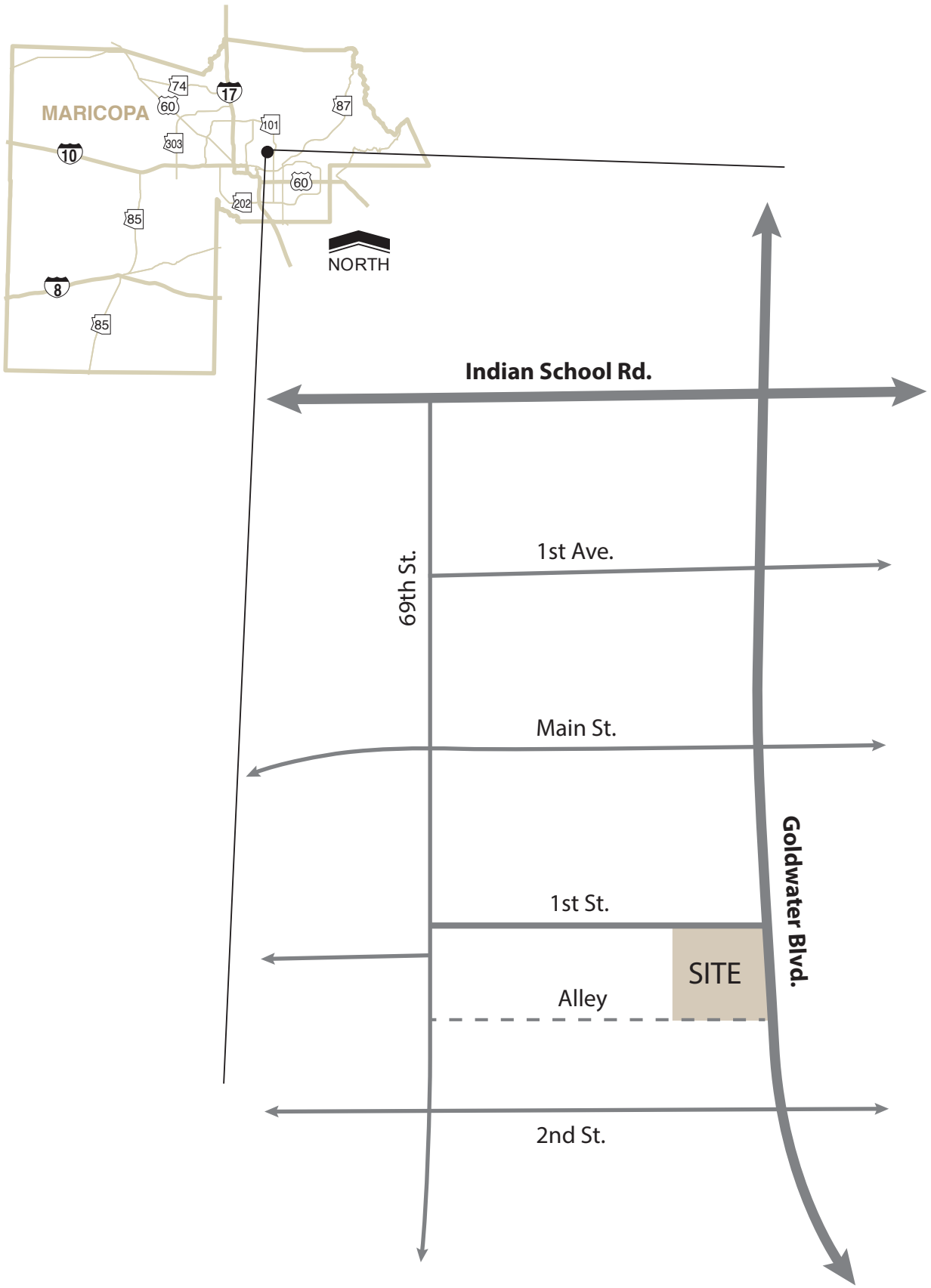


Figure 1: Vicinity Map

EXISTING CONDITIONS

LAND USE

The site of the proposed Winery Suites, according to the Maricopa County Assessor, was previously occupied by the LDV wine tasting room and Studio B Interior Design. Both of these businesses have since moved and the parcels are now occupied by a three dwelling units with flexible leasing terms.

SURROUNDING LAND USE

Surrounding the site on all sides are multi-family residential units and some small businesses. Northwest of the site is the Hotel Valley Ho. Directly east of the site is the La Loma bus station, a major hub for the Valley Metro Bus system. The site can be accessed by bus route 72. Indian School Road, north of the site, allows direct access to Pima Freeway (Loop 101).

ROADWAY NETWORK

The existing roadway network within the study area includes the following:

Goldwater Boulevard is a north-south five-lane road within the vicinity of the site classified as a major arterial by the City of Scottsdale. There are three (3) lanes in the southbound direction, two (2) lanes in the northbound and raised medians along portions of the road. This road begins just south of Chaparral, breaking off from Scottsdale Road to the west, and rejoins Scottsdale Road at the intersection with Osborn Road. This road allows traffic to bypass Old Town Scottsdale and provides access to major and minor arterials to the west of the site. The posted speed limit is 35 mph.

69th Street is a north-south two-lane road bordering the proposed site to the west. There is one (1) lane in each travelling direction. 69th Street begins at the intersection with Indian School Road and continues south for approximately 0.35 miles before terminating at the intersection with 4th Street in a residential community south of the proposed site. There is no posted speed limit.

Indian School Road is an east-west four-lane road classified as a minor arterial by the City of Scottsdale. There are two (2) lanes in each travelling direction as well as a bicycle lane. Along portions of the road, within the vicinity of the site, there is either a two-way-left-turn lane or a raised median. Indian School Road begins in the Town of Goodyear and continues west until terminating just west of Mesa Drive, before intersection with SR 87. Indian School Road provides direct access to Pima Freeway (Loop 101). The posted speed limit is 35 mph within the vicinity of the site.

Main Street is an east-west two-lane road north of the proposed site. There is one (1) lane in each travelling direction and on-street parking alone both sides of the road for the entire length of roadway. Main Street begins at the Hotel Valley Ho, just west of the site, and continues east for approximately 0.5 miles before terminating at Brown Avenue. There is no posted speed limit.

1st Street is an east-west two-lane road north of the proposed site. There is one (1) lane in each travelling direction and on-street parking along both sides of the road for the entire length of roadway. 1st Street begins at the intersection with 68th Street and continues east until terminating at the bus station east of the site. There is no posted speed limit.

2nd Street is an east-west two-lane road within the vicinity of the site. There is one (1) lane in each travelling direction and on-street parking along both sides of the road for the entire length of roadway. This portion of 2nd Street begins east of the intersection with 68th Street in a residential neighborhood and continues east until terminating at the City of Scottsdale Civic Center. The posted speed limit is 25 mph.

Alley is an east-west road that connects 69th Street to Goldwater Boulevard. Currently, it provides access to the businesses and residential units on the site, and in the future it will provide access to the underground parking garage for residents of the proposed development.

INTERSECTION CONFIGURATION

The intersection of ***Goldwater Boulevard and Indian School Road*** is a signalized four-legged intersection with protected phasing on all approaches of the intersection. The northbound approach consists of one (1) dedicated left-turn lane, one (1) through lane and one (1) shared through/right-turn lane. The westbound approach consists of dual left-turn lanes, one (1) through lane, one (1) shared through/right-turn lane and one (1) bicycle lane. The southbound approach consists of one (1) dedicated left-turn lane, two (2) through lanes and one (1) shared through/right-turn lane. The eastbound approach consists of dual left-turn lanes, two (2) through lanes, a bicycle lane and a dedicated right-turn lane. There are pedestrian cross walks across all legs of the intersection.

The intersection of ***Goldwater Boulevard and Main Street*** is a signalized four-legged intersection with permissive phasing on all approaches and no right-turn-on-red on the eastbound and westbound approaches. The northbound approach consists of one (1) dedicated left-turn, one (1) through lane and one (1) shared through/right-turn lane. The eastbound and westbound approaches consist of one (1) shared left-turn/through/right-turn lane. The southbound approach consists of one (1) dedicated left-turn lane, two (2) through lanes and one (1) shared through/right-turn lane. There are pedestrian cross walks across all legs of the intersection.

The intersection of ***Goldwater Boulevard and 1st Street*** is a two-way stop controlled intersection with stop signs on the eastbound and westbound approaches. The northbound approach consists of one (1) dedicated left-turn lane, one (1) through lane and one (1) shared through/right-turn lane. The westbound approach consists of one (1) shared left-turn/through lane and one (1) dedicated right-turn lane. The southbound approach consists of one (1) dedicated left-turn lane, two (2) through lanes and one (1) shared through/right-turn lane. The eastbound approach consists of one (1) shared left-turn/through/right-turn lane. There are pedestrian cross walks across the east and west legs of the intersection.

The intersection of ***Goldwater Boulevard and Alley*** is a three-legged unsignalized intersection with a stop sign on the eastbound approach. This access only allows right-turns into and out of the alley because of a raised median separating the northbound and southbound approaches. The northbound approach consists of two (2) through lanes. The southbound approach consists of two (2) through lanes and one (1) shared through/right-turn lane. The eastbound approach consists of one (1) right-turn lane.

The intersection of ***Goldwater Boulevard and 2nd Street*** is a two-way stop controlled intersection with stop signs on the eastbound and westbound approaches. The northbound approach consists of one (1) dedicated left-turn lane, one (1) through lane and one (1) shared through/right-turn lane. The westbound approach consists of one (1) shared left-turn/through/right-turn lane and a bicycle lane. The southbound approach consists of one (1) dedicated left-turn lane, two (2) through lanes and one (1) shared through/right-turn lane. The eastbound approach consists of one (1) shared left-turn/through/right-turn lane. There are pedestrian cross walks across the east and west legs of the intersection.

The intersection of ***69th Street and Indian School Road*** is a four-legged unsignalized intersection with stop signs on the northbound and southbound approaches. The southbound approach is an existing driveway that is approximately 50 feet offset from 69th Street to the west. The northbound approach consists of one (1) shared left-turn/through/right-turn lane. The westbound approach consists of one (1) dedicated left-turn lane, two (2) through lanes, one (1) shared through/right-turn lane and a bicycle lane. The southbound approach consists of one (1) shared left-turn/through/right-turn lane. The eastbound approach consists of one (1) dedicated left turn lane, one (1) lane that is indicated to turn into a left-turn lane at the intersection of Goldwater Boulevard and Indian School Road, one (1) through lane, one (1) shared through/right-turn lane and a bicycle lane. There are pedestrian cross walks across the north and south legs of the intersection.

The intersection of ***69th Street and 1st Street*** is a four-legged unsignalized intersection with stop signs on the eastbound and westbound approaches. The eastbound approach connects through to 68th Street, but is offset approximately 55 feet south of the westbound approach. The westbound approach is aligned with an existing driveway to the Hotel Valley Ho, however, this is not considered to be the eastbound approach. All approaches consist of one (1) shared left-turn/through/right-turn lane. There is a pedestrian cross walk across the east and west legs of the intersection.

The intersection of ***69th Street and Alley*** is a three-legged unsignalized intersection with a stop sign on the westbound approach. The northbound approach consists of one (1) shared through/right-turn lane. The westbound approach consists of one (1) shared left-turn/right-turn lane. The southbound approach consists of one (1) shared left-turn/through lane.

The intersection of ***69th Street and 2nd Street*** is a four-legged unsignalized intersection with stop signs on the northbound and southbound approaches. All approaches consist of one (1) shared left-turn/through/right-turn lane. There are pedestrian cross walks across the north and south legs of the intersection.

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

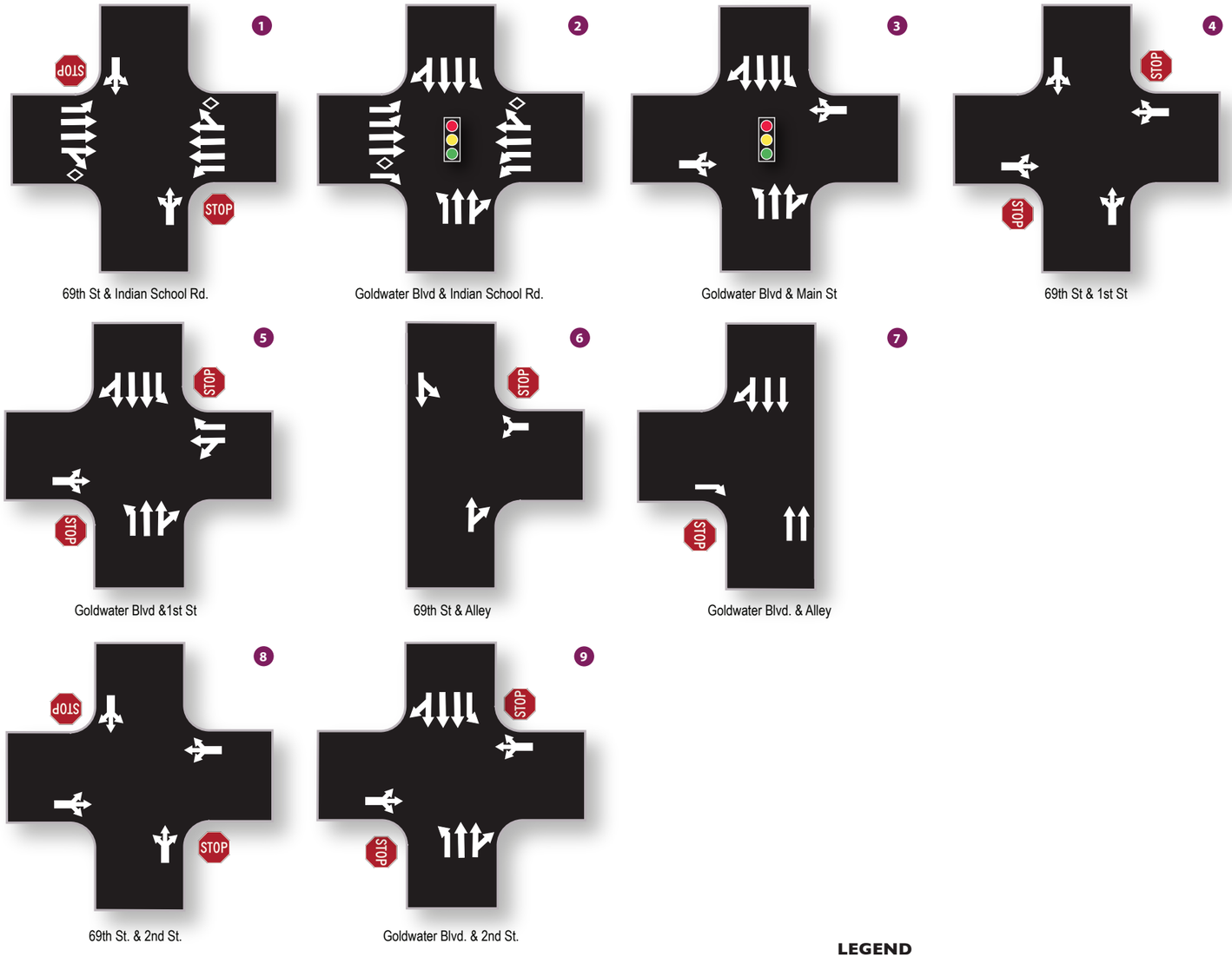
TRAFFIC VOLUMES

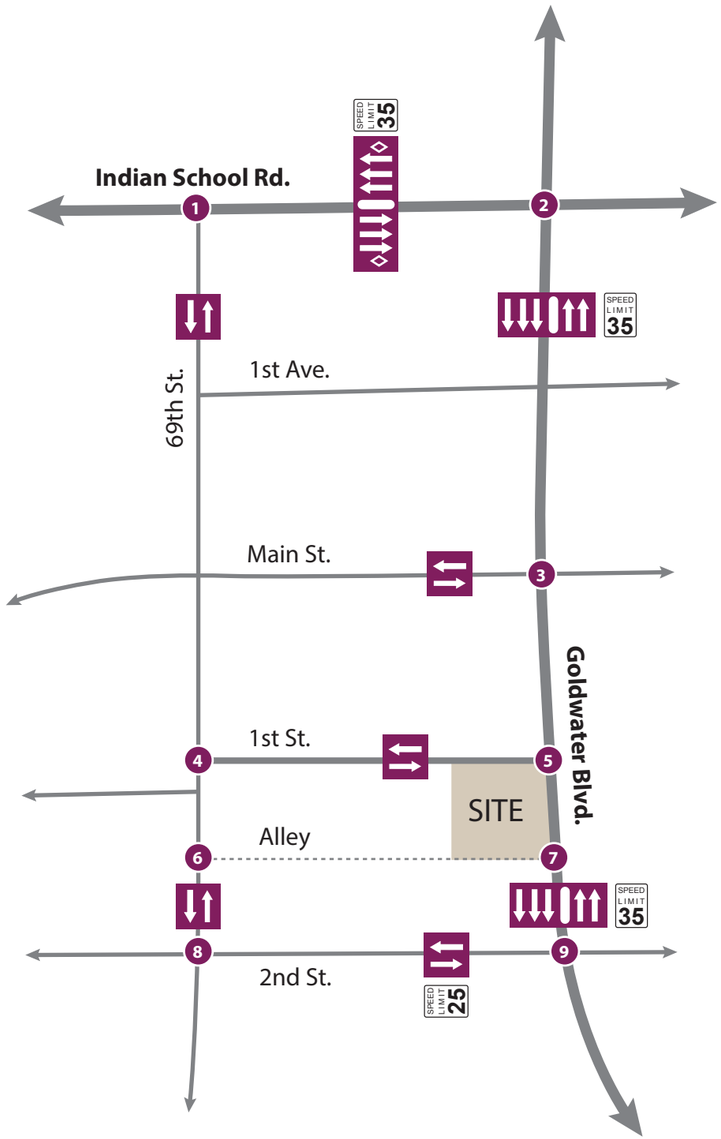
CivTech engaged Field Data Services of Arizona, Inc. to record traffic volumes at the proposed study intersections within the project vicinity. Peak hour volume turning movement counts were performed from 7:00-9:00 AM and 4:00-6:00 PM on Tuesday, August 28, 2018 at the following intersections:

- Goldwater Blvd & Alley
- Goldwater Blvd & 2nd St
- Goldwater Blvd & Indian School Rd
- Goldwater Blvd & Main St
- Goldwater Blvd & 1st St
- 69th St & Indian School Rd
- 69th St & Alley
- 69th St & 1st St
- 69th St & 2nd St

The City of Scottsdale recommends a seasonal adjustment factor based on the month the counts were taken in order to get a more accurate representation of traffic in the area. Scottsdale is a popular area for tourism and traffic volumes are considerably lower during summer months. In order to get a better look at typical traffic, a seasonal adjustment factor is applied. For example, if counts were conducted in June, a 3% increase in traffic is added. Counts for this study were conducted on August 28, 2018. For the month of August, a 5% increase in traffic, or a factor of 1.05 is applied to the existing traffic counts.

The observed existing traffic volumes for this study are presented in **Figure 3** for the weekday AM and PM peak hours and the seasonally adjusted volumes are presented in **Figure 4**. Traffic volume data obtained for this study have been included in the **Appendix B**.



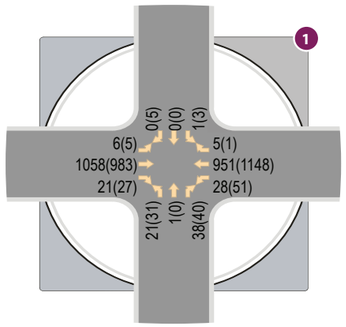


LEGEND

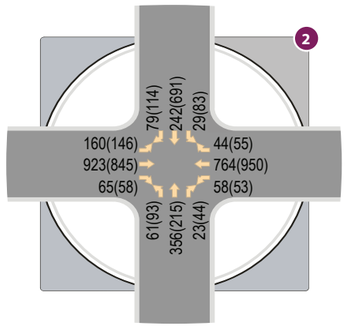
- Thru or Turning Movement
- Two-Way Left Turn-Lane
- Raised Median
- Bike Lane
- Traffic Signal
- Stop Sign
- Speed Limit

NORTH

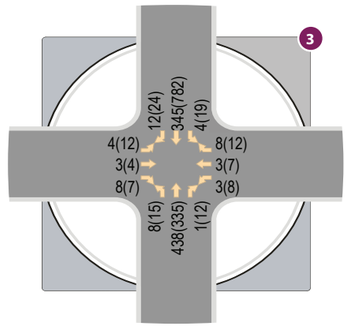
Figure 2: Existing Lane Configurations and Traffic Controls



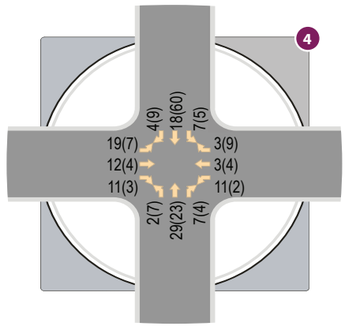
69th St & Indian School Rd.



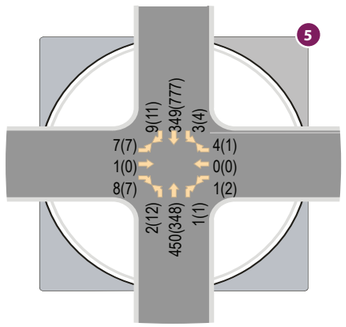
Goldwater Blvd & Indian School Rd.



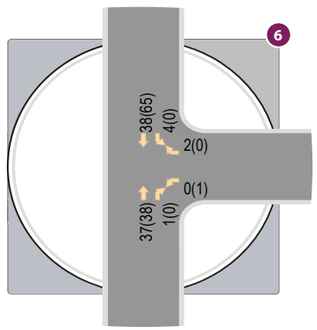
Goldwater Blvd & Main St



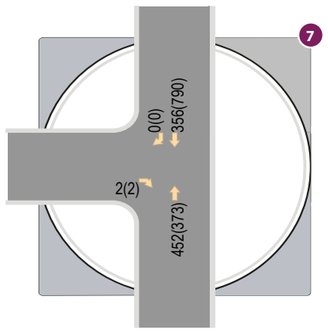
69th St & 1st St



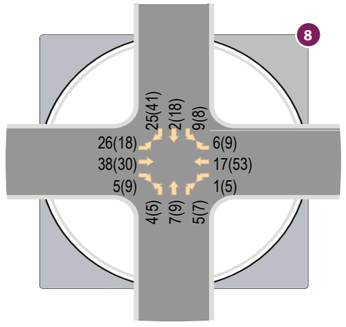
Goldwater Blvd &1st St



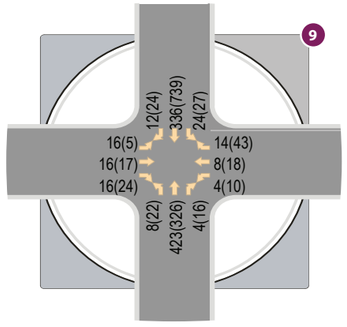
69th St & Alley



Goldwater Blvd. & Alley



69th St. & 2nd St.



Goldwater Blvd. & 2nd St.

Legend

NORTH

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

X,XXX - Average Daily Traffic Volumes

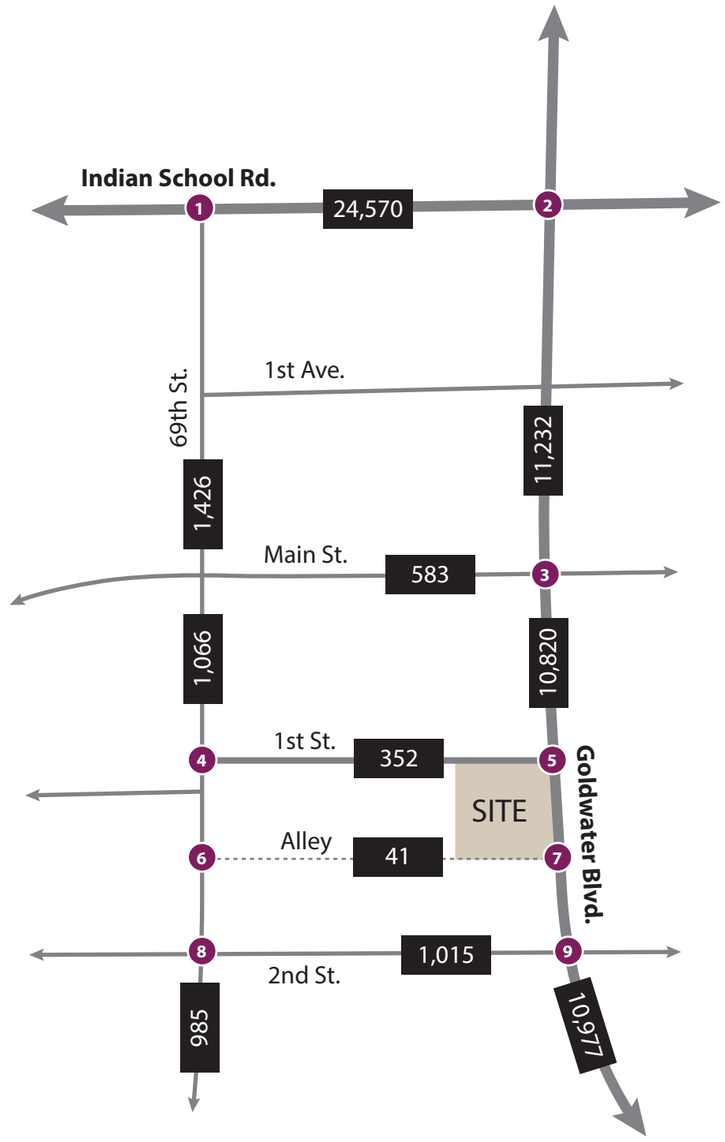
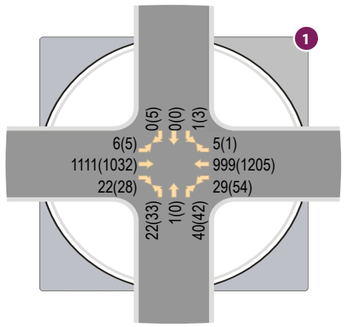
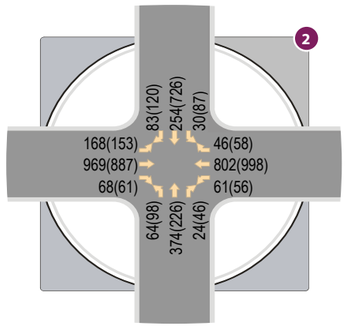


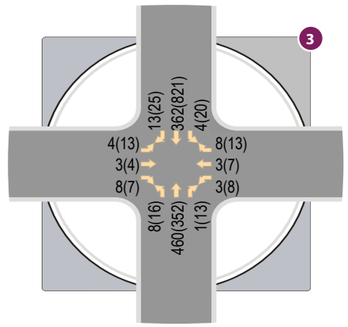
Figure 3: Observed Existing Traffic Volumes



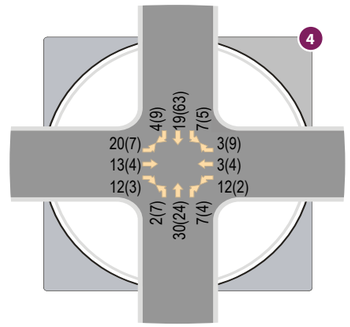
69th St & Indian School Rd.



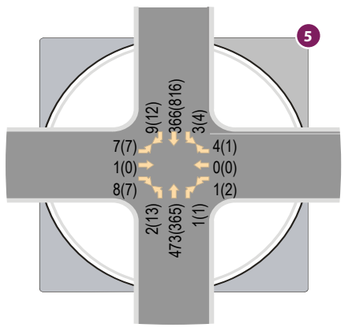
Goldwater Blvd & Indiand School Rd.



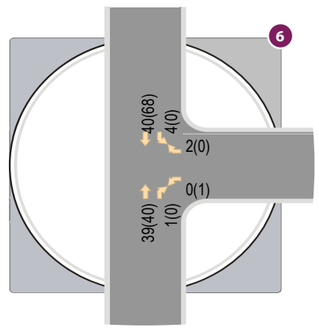
Goldwater Blvd & Main St



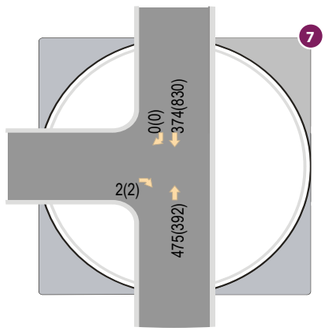
69th St & 1st St



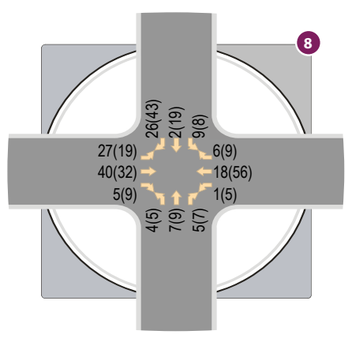
Goldwater Blvd &1st St



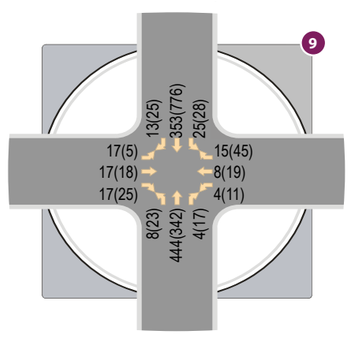
69th St & Alley



Goldwater Blvd. & Alley



69th St. & 2nd St.



Goldwater Blvd. & 2nd St.

Legend

NORTH

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

X,XXX - Average Daily Traffic Volumes

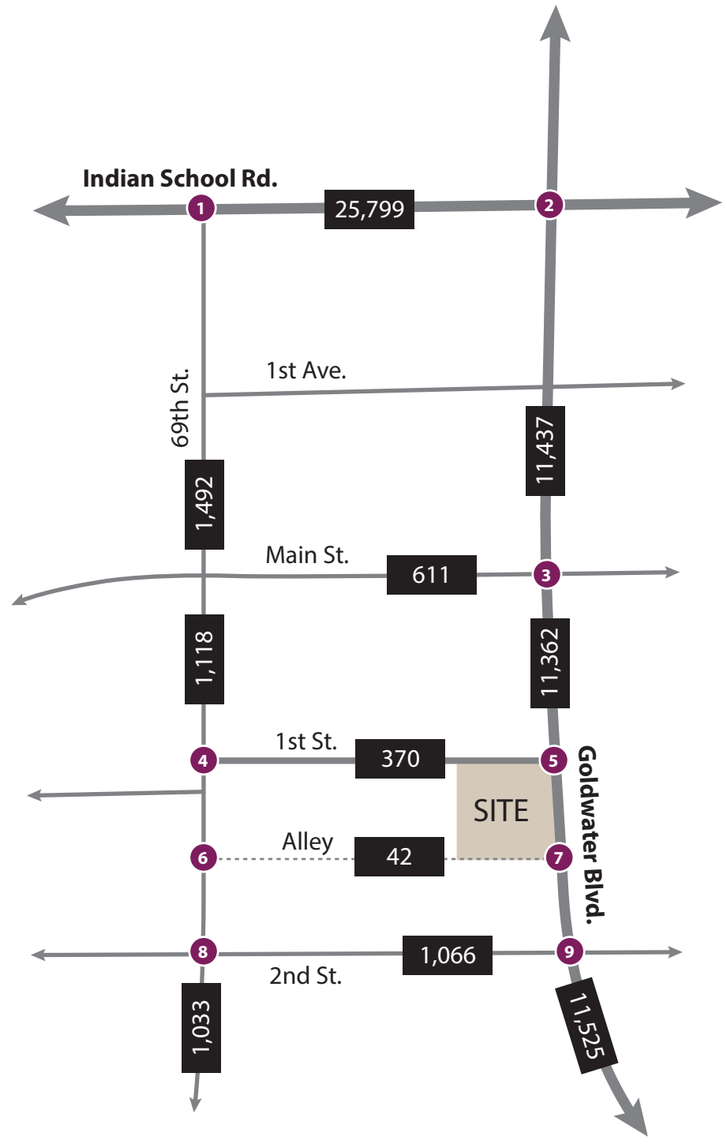


Figure 4: Seasonally Adjusted Traffic Volumes

CAPACITY ANALYSIS

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

Table 1 – Intersection Level of Service Criteria

Level of Service	Control Delay (sec/veh)	
	Signalized	Unsignalized
A	≤ 10	≤ 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F*	> 80 (or v/c>1)	> 50 (or v/c>1)

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

Peak hour capacity analyses were conducted for the study intersections based on existing conditions and traffic volumes. All intersections have been analyzed using the methodologies presented in the *Highway Capacity Manual (HCM) 6th Edition* and using Synchro traffic analysis software. Signal timing during both the AM and PM peak hour for the intersection of Goldwater Boulevard and Indian School Road was provided by the City of Scottsdale via Synchro models. Signal timing for the intersection of Goldwater Boulevard and Main Street was provided by the City of Scottsdale. Existing signal timing sheets for the intersection of Goldwater Boulevard and Main Street are provided in **Appendix C**.

Results of the existing level-of-service analyses are shown in **Table 2** for both peak hours. The analysis worksheets for the existing conditions have been included in the **Appendix D**.

Table 2: Existing Peak Hour Levels of Service

ID	Intersection	Control	Approach	AM	PM
1	69th St & Indian School Rd	2-way stop (NB/SB)	NB Shared SB Shared EB Left WB Left	E F C C	F E C C
2	Goldwater Blvd & Indian School Rd	Signal	NB SB EB WB	D E C D	E D D E
			Overall	**D**	**D**
3	Goldwater Blvd & Main St	Signal	NB SB EB WB	A A E E	A A E E
			Overall	**A**	**A**
4	69th St & 1st St	2-way stop (EB/WB)	NB Shared SB Shared EB Shared WB Shared	A A A A	A A A A
5	Goldwater Blvd & 1st St	2-way stop (EB/WB)	NB Left SB Left EB Shared WB left/thru	A A B C	B A C C
6	69th St & Alley	1-way stop (WB)	WB Shared SB Left	A A	A A
7	Goldwater Blvd & Alley	1-way stop (EB)	EB Right	B	B
8	69th St & 2nd St	2-way stop (NB/SB)	NB Shared SB Shared EB Shared WB Shared	A A A A	A A A A
9	Goldwater Blvd & 2nd St	2-way stop (EB/WB)	NB Left SB Left EB Shared WB Shared	A A C B	B A D C

The results of the existing conditions analysis summarized in **Table 2** indicates that all study intersections operate with acceptable levels of service (LOS D or better), with the exception of the intersections of 69th Street & Indian School Rd, Goldwater Boulevard & Indian School Road and Goldwater Blvd & Main Street.

The unsignalized intersection of **69th Street and Indian School Road** operates poorly during both the AM and PM peak hours on the northbound and southbound approaches. This delay is due to the high wait times of vehicles making northbound left turns and southbound left turns because of the high volume of through traffic on Indian School Road during both peak hours. Extensive delay during either peak hour at minor roads or driveways that intersect major roads is expected. This delay likely does not occur at all times throughout the day.

The signalized intersection of **Goldwater Boulevard and Indian School Road** operates adequately in the AM peak hour, but has an overall intersection delay of 54 seconds in the PM peak hour. The threshold for an adequate level of service is 55 seconds. So it is very near to operating at a poor level of service.

The signalized intersection of **Goldwater Boulevard and Main Street** experiences delay on the eastbound and westbound approaches of the intersection during both the AM and PM peak hours. This delay is present because the signal operates under actuated-coordinated phasing, meaning that the eastbound and westbound green phases are only triggered when a vehicle approaches. Since Main Street is a minor road, very few vehicles approach the intersection from the east or west, so when they do, there is substantial delay. As more traffic uses this road in the future, the eastbound and westbound delay is likely to decrease.

CRASH ANALYSIS

Crash data for the intersection of Goldwater Boulevard and 1st Street was obtained from the City of Scottsdale. Crashes were documented for the past three (3) years from 2015 to 2017. Only five (5) accidents were reported at this intersection over the analysis period. Of all the incidents reported, none resulted in a fatal injury and only one (1) resulted in incapacitating injury for one (1) of the drivers. The crash listings can be found in **Appendix E**. A summary of the crash data is provided in **Table 3**.

Table 3: Crash Data Summary

Intersection	Total	2017	2016	2015	Injury	Fatality	Angle	Sideswipe	Angle percentage	Sideswipe percentage	Pedestrian	Bicycle
Goldwater Blvd & 1st St	5	2	2	1	3	0	3	2	60%	40%	0	1

A review of the results summarized in **Table 3** reveals that the number of crashes reported at the intersection of Goldwater Boulevard and 1st Street does not rise to the level of warranting consideration of a traffic signal based solely on crash experience.

PROPOSED DEVELOPMENT

SITE LOCATION

The proposed Winery Suites development will be located on the southwest corner of Goldwater Boulevard and 1st Street. The site will encompass 0.62 gross acres of land. Currently, the site consists of a professional office and the LDV wine tasting room, the redevelopment is proposed for a mixed-use development with 31 dwelling units and retail space.

SITE DENSITY

Winery Suites redevelopment will consist of a single mixed-use development with ground floor retail and 31 dwelling units with flexible leasing terms. The site will consist of approximately 1,500 square feet of retail on the ground level.

SITE ACCESS

Resident access to the site will be via an underground parking garage with the entrance located in the alley directly south of the site. There will also be on-street parking available in the alley and public parking in the surrounding area available to visitors.

Access A – is located on the south side of the site in the alley directly south of the proposed development. This will be a full movement access and the only access directly onto the site.

The proposed site plan with access is provided in **Figure 5**.

TRIP GENERATION

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

The proposed development will consist of approximately 1,500 square feet of ground floor retail space and 26 multi-family dwelling units in a mid-rise building. Since this site is a redevelopment, the existing trips generated were compared to the estimated generated trips. The existing site consists of approximately 1,463 square feet of professional office space and a 1,533 square foot wine tasting room, according to the Maricopa County Assessor. The land use code (LUC) used for the existing office is 710 and the LUC used for the wine tasting room is 931 for a quality restaurant. Although the wine tasting room is not explicitly a quality restaurant, the amount of time that people stay at the establishment and the activities that occur are very similar, meaning that this LUC is an adequate representation of the wine tasting room. For the proposed development,

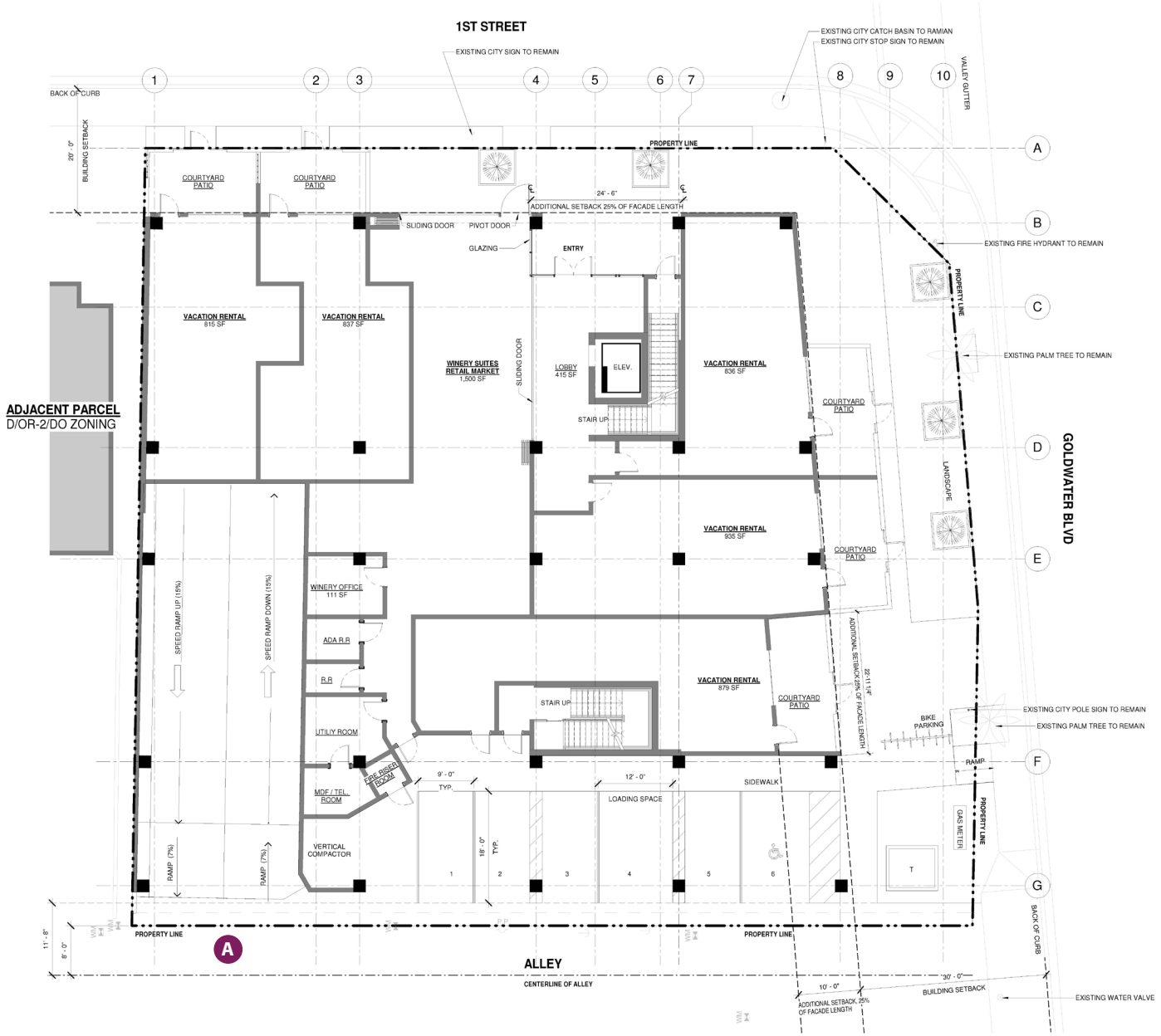


Figure 5: Site Plan and Access

there is a LUC for a mid-rise residential with first-floor commercial, however, since there are very few data points for this LUC and the retail space does not occupy the entire ground floor, it will not be used to analyze this development. The LUC used for the apartments is 221 for mid-rise multi-family and for the retail the LUC 820 was used.

The existing trip generation, using land uses and sizes from the Maricopa County Assessor website, is summarized in **Table 4**. The anticipated trip generation for the Winery Suites development is summarized in **Table 5**. Detailed trip generation calculations are provided in **Appendix F**.

Table 4: Existing Trip Generation

Proposed Use	ITE LUC	Size	Units	Weekday Trips						
				Daily	AM			PM		
				Total	In	Out	Total	In	Out	Total
General Office Building	710	1.463	1,000 square feet	14	2	0	2	0	2	2
Quality Restaurant	931	1.533	1,000 square feet	128	0	1	1	8	4	12
			Subtotals	142	2	1	3	8	6	14

The existing development generates 142 external weekday daily trips, 3 trips during the AM peak hour, and 14 trips during the PM peak hour.

Table 5: Proposed Trip Generation Summary

Proposed Use	ITE LUC	Size	Units	Weekday Trips						
				Daily	AM			PM		
				Total	In	Out	Total	In	Out	Total
Vacation Rental with Flexible Lease Terms	221	34	Rental Units	184	3	9	12	10	6	16
Shopping Center	820	1.500	1,000 square feet	56	1	0	1	3	3	6
			Subtotals	240	4	9	13	13	9	22
Difference From Existing to Proposed				***(98)***	***(2)***	***(8)***	***(10)***	***(5)***	***(3)***	***(8)***

The proposed redevelopment is anticipated to generate 734 external weekday daily trips, 62 trips during the AM peak hour, and 61 trips during the PM peak hour.

The proposed redevelopment is anticipated to generate an additional 592 external daily trips with 59 additional trips in the AM peak hour and an additional 47 trips in the PM peak hour when compared to the trips already generated by existing development.

TRIP DISTRIBUTION AND ASSIGNMENT

A single trip distribution pattern was assumed for the proposed development. It is expected that the proposed development will generate trips based on future employment within a 10-mile radius of the site. Future total employment and population within a 10-mile radius of the site, as predicted by the 2020/2030 socio-economic data compiled by the Maricopa Association of Governments (MAG), was used as a basis to estimate trip distribution. The resulting trip distribution percentages for the study area are shown in **Table 6**. The trip distribution calculations are included in **Appendix G**.

Figure 6 illustrates the trip distribution percentages noted in **Table 6** on the roadway network within the study area. The percentages presented in **Figure 6** were applied to the site trips generated to determine the AM and PM peak hour site traffic at the intersections within the study area.

Table 6: Site Trip Distribution

Direction (To/From)	Percentage
North on Goldwater Blvd (north of Indian School Rd)	9%
East on Indian School Rd (east of Goldwater Blvd)	14%
West on Indian School Rd (west of 69th St)	25%
East on Main St (east of Goldwater Blvd)	2%
East on 2nd St (east of Goldwater Blvd)	3%
West on 2nd St (west of 69th St)	12%
South on Goldwater Blvd (south of 2nd St)	35%
Total	100%

Figure 7 presents the resulting site generated traffic for the proposed development.

FUTURE BACKGROUND TRAFFIC

Per the *City of Scottsdale Design Standards & Policies Manual 2018*, for a redevelopment project, such as Winery Suites, the existing site generated volumes need to be subtracted from the existing adjusted traffic volumes to obtain the base traffic that would be present if the existing site were undeveloped. Peak hour site generated traffic volumes for the existing development are presented in **Figure 8**. These volumes were then subtracted from the existing adjusted volumes and the total is presented in **Figure 9**. The volumes presented in this figure represents the base volumes that are present with no development on the site.

CivTech then applied a growth rate to the base volumes to obtain the future background traffic volumes along the adjacent roadway network. In reviewing the City of Scottsdale Traffic Counts Map, a 1.7% average growth rate was found within the proposed study area. **Table 7** shows the expansion factor used for the proposed opening year 2020.

Table 7: Growth Rate Expansion Factors

Horizon Year	Expansion Factor
2020	1.034

Applying the growth rate to the 2018 base traffic volumes predicts the volume of traffic anticipated on the surrounding area roads without the addition of proposed site generated traffic or existing site generated traffic. This growth rate also assumes that the same percentage of overall traffic will remain pedestrians. This calculation assumes that no new

roadway improvements are provided on the study area roadways and that the regional road network remains the same. Calculated background traffic for opening year 2020 is presented in **Figure 10**. Background and site traffic calculations worksheets are included in **Appendix H**.

TOTAL TRAFFIC

Total traffic was determined by adding the proposed site generated traffic to the estimated projected background traffic. Total peak hour traffic volumes for the horizon year 2020 are shown in **Figure 11**.

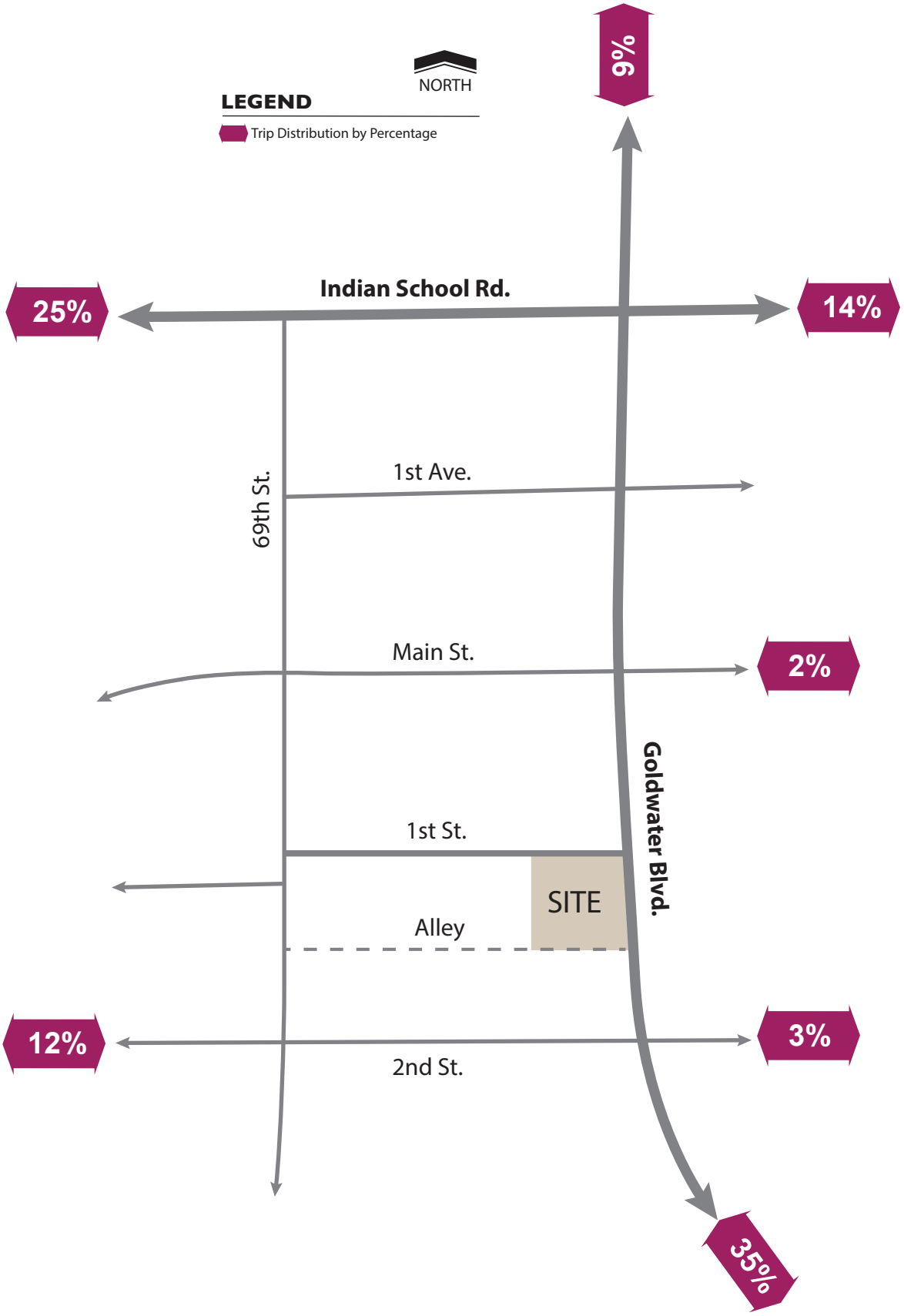
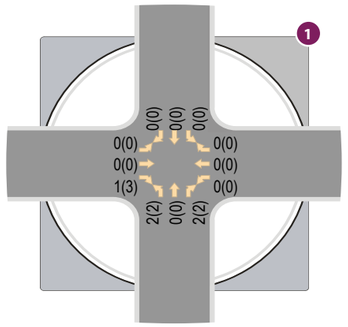
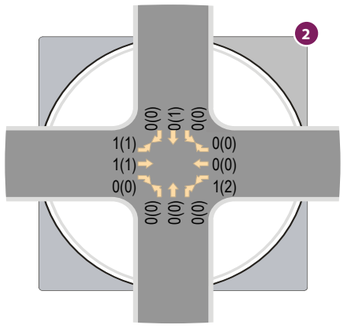


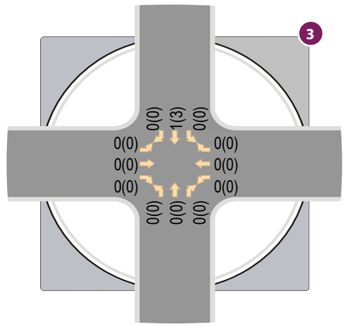
Figure 6: Trip Distribution



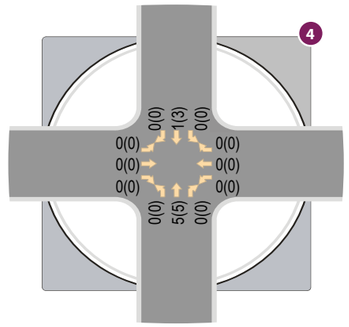
69th St & Indian School Rd.



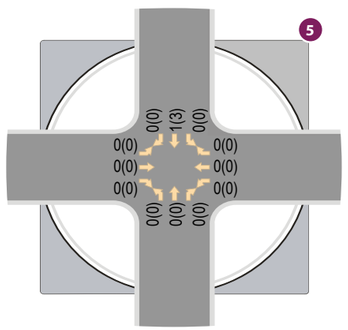
Goldwater Blvd & Indiand School Rd.



Goldwater Blvd & Main St



69th St & 1st St



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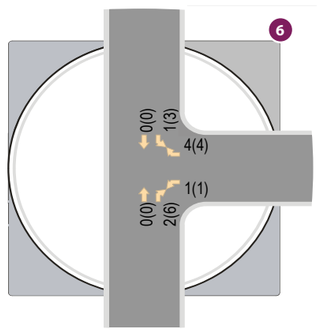
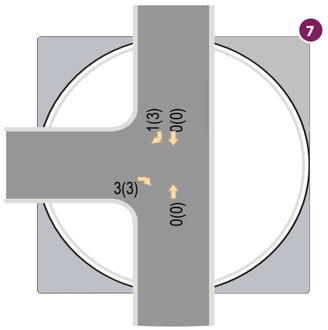
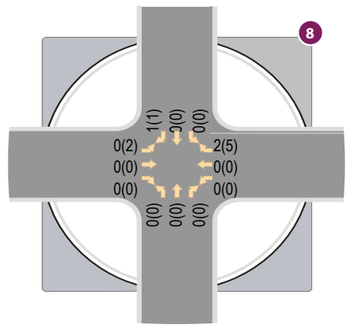


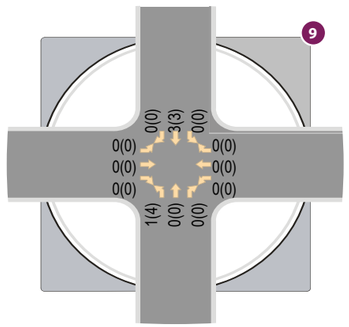
69th St & Alley



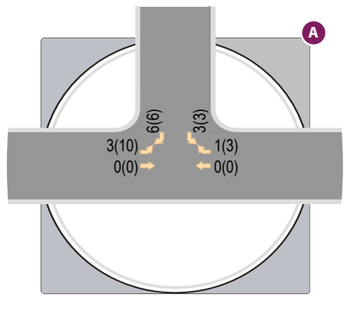
Goldwater Blvd. & Alley



69th St. & 2nd St.



Goldwater Blvd. & 2nd St.



Access A & Alley

Legend

NORTH

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

X,XXX - Average Daily Traffic Volumes

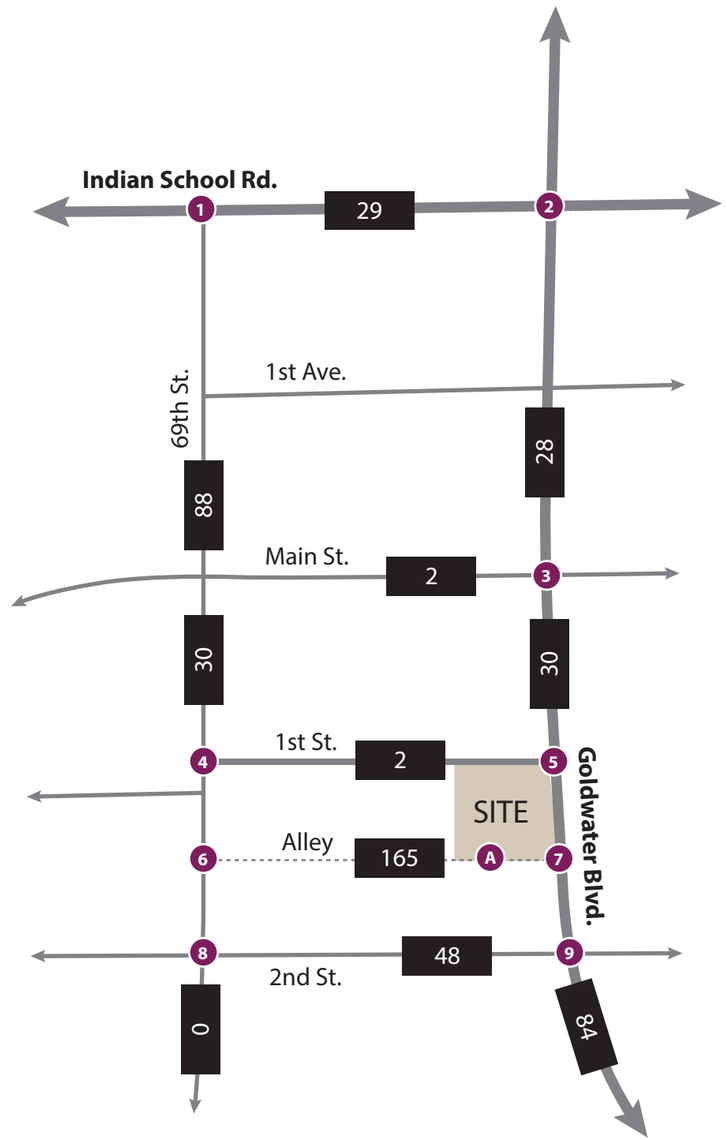
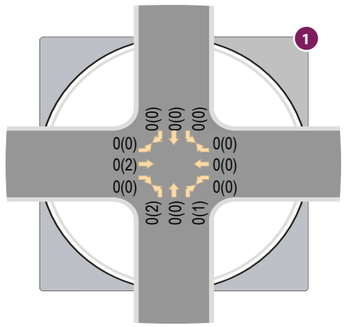
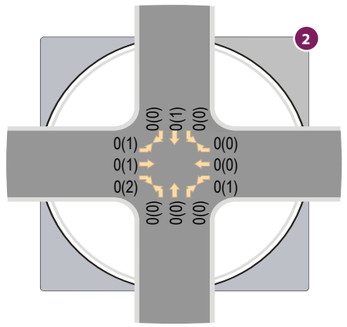


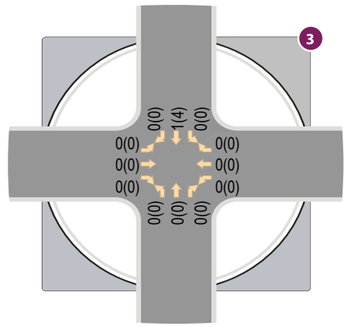
Figure 7: Site Traffic Volumes



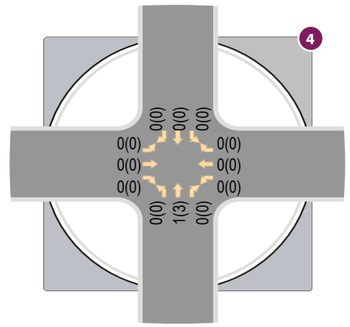
69th St & Indian School Rd.



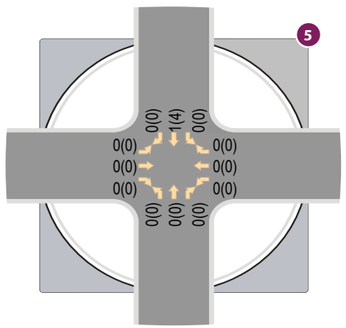
Goldwater Blvd & Indiand School Rd.



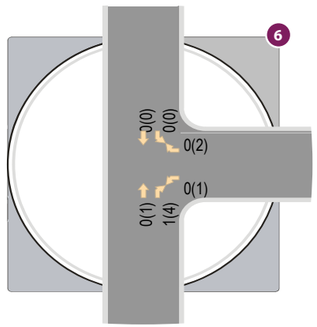
Goldwater Blvd & Main St



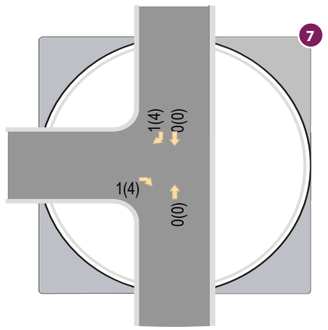
69th St & 1st St



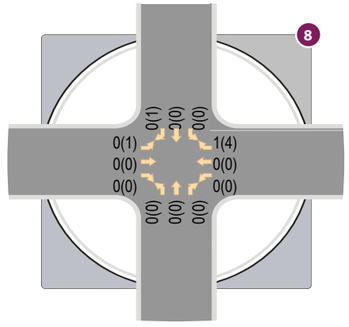
Goldwater Blvd &1st St



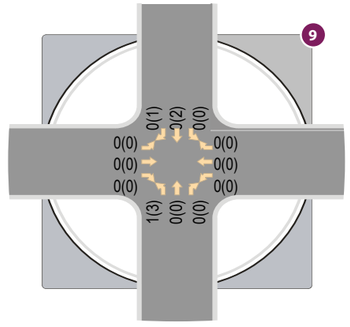
69th St & Alley



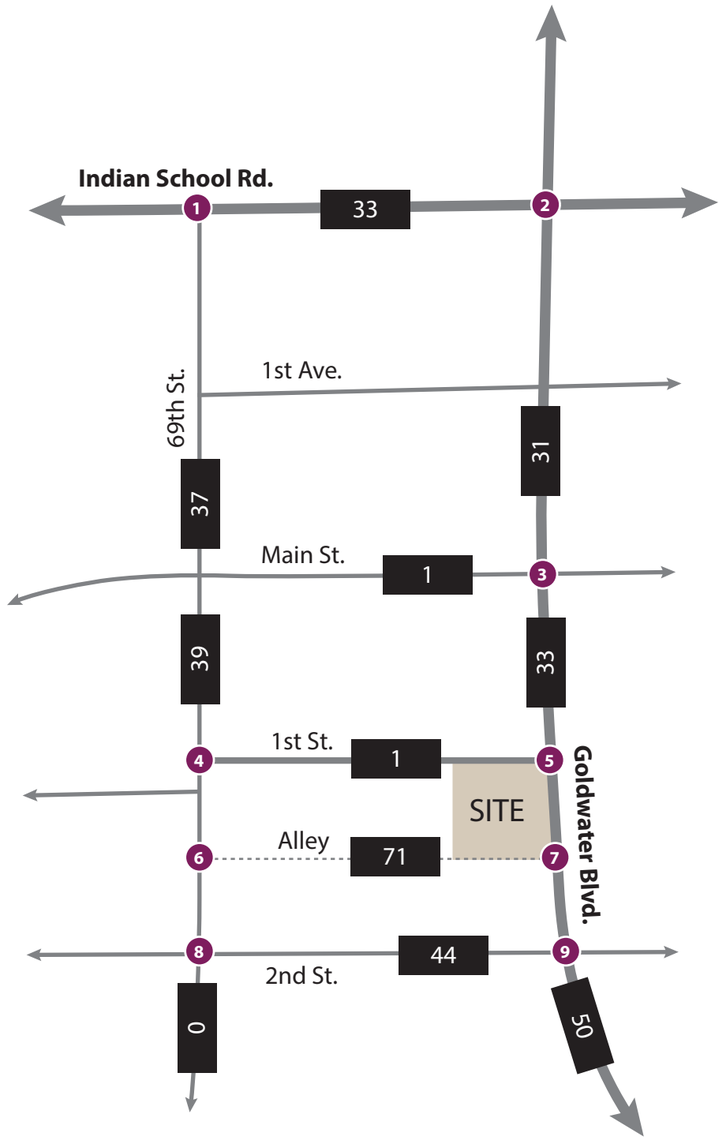
Goldwater Blvd. & Alley



69th St. & 2nd St.



Goldwater Blvd. & 2nd St.



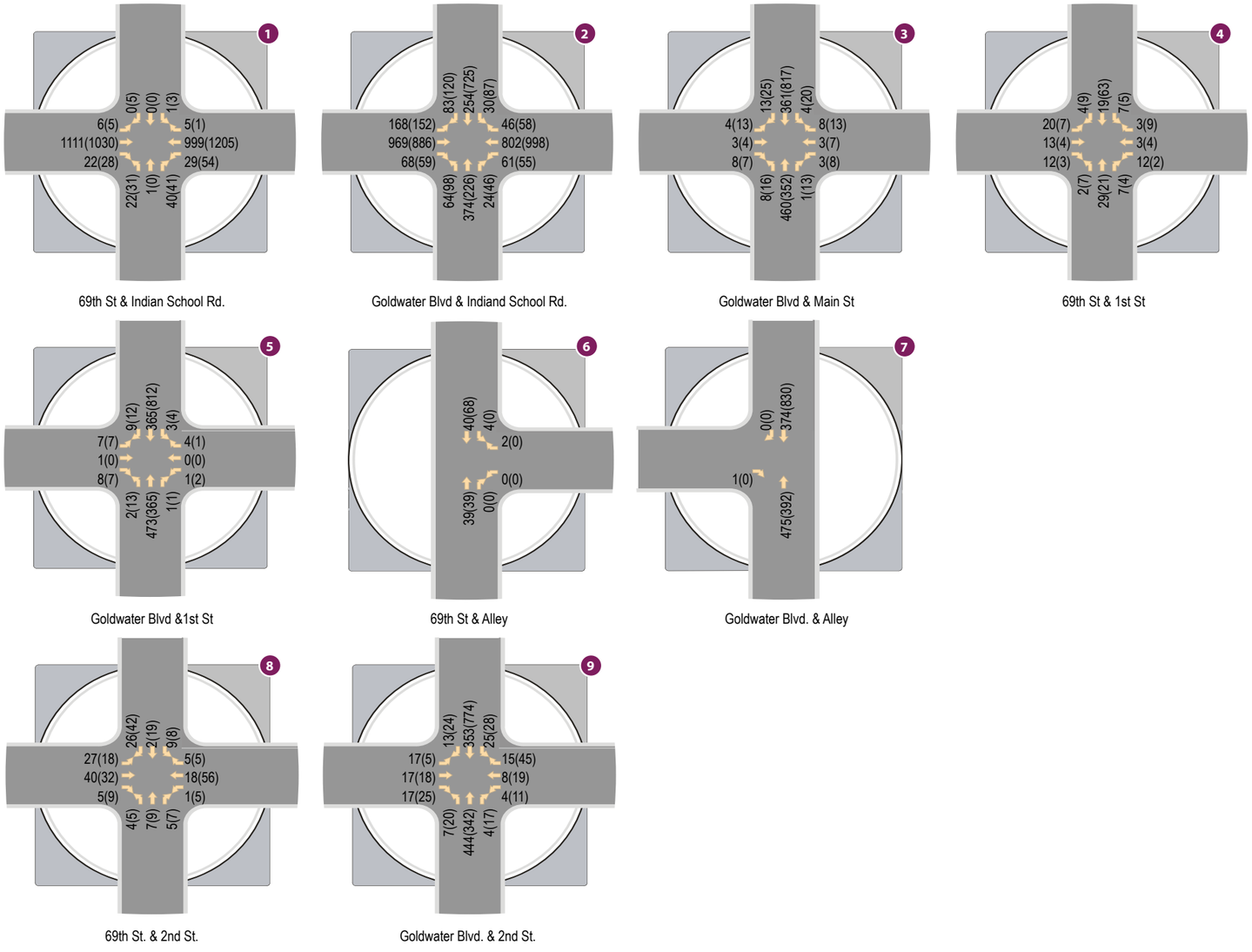
Legend

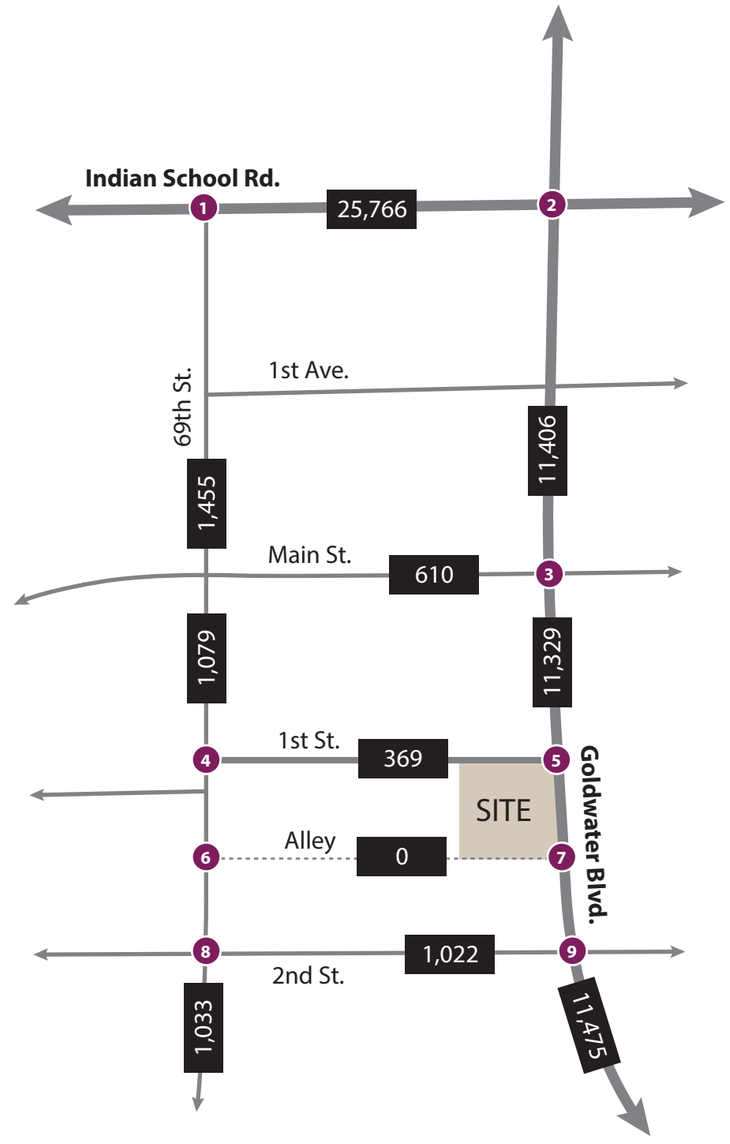
NORTH

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

X,XXX - Average Daily Traffic Volumes

Figure 8: Existing Site Traffic Volumes





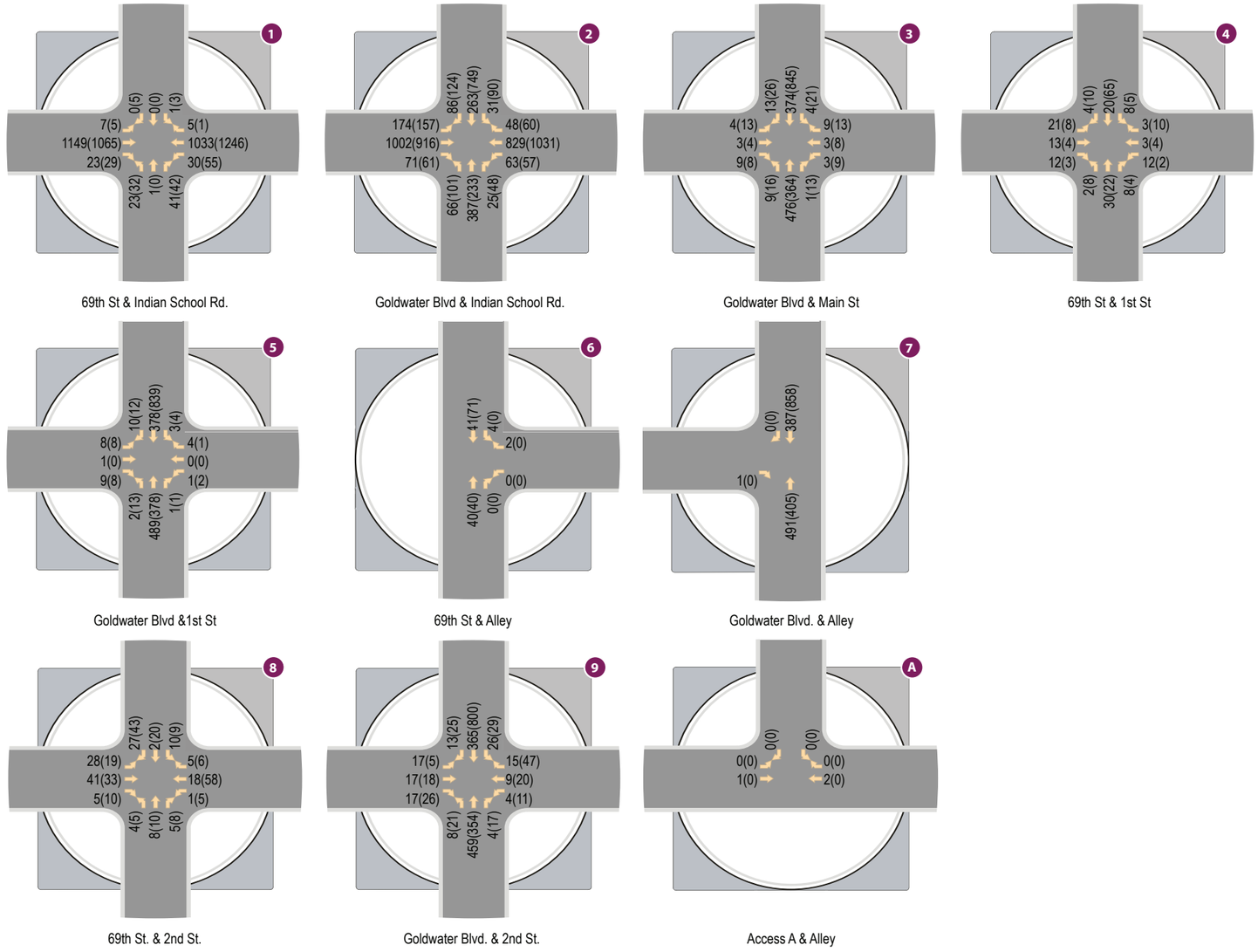
Legend

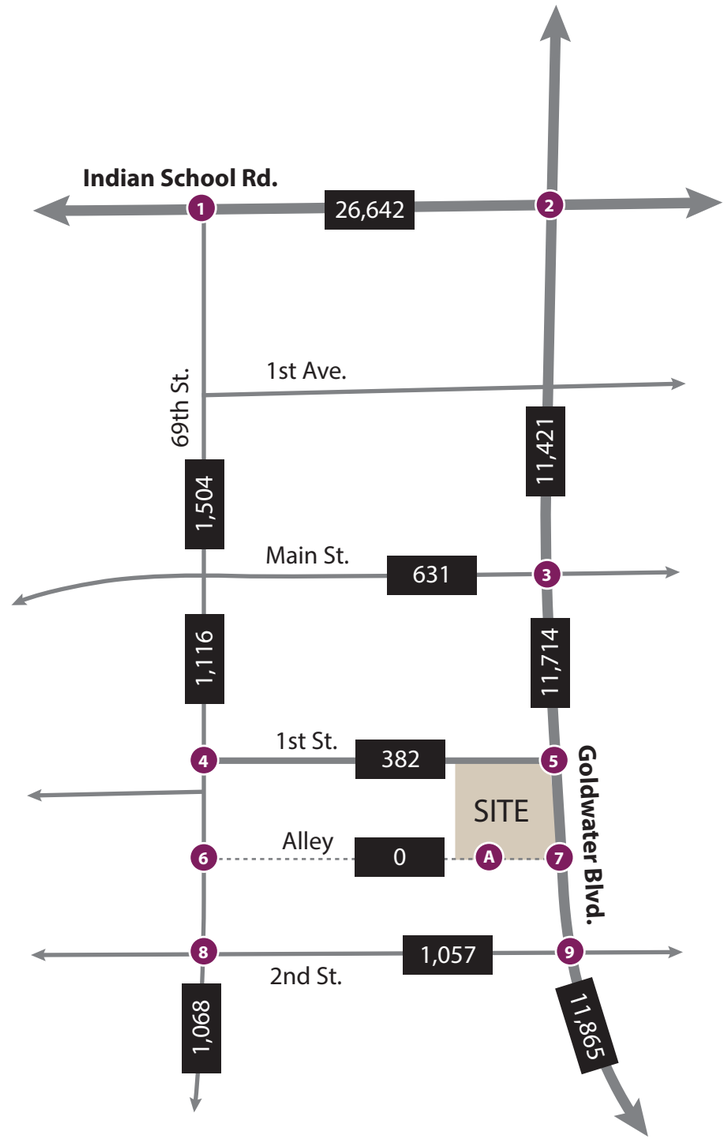
NORTH

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

X,XXX - Average Daily Traffic Volumes

Figure 9: Base Traffic Volumes





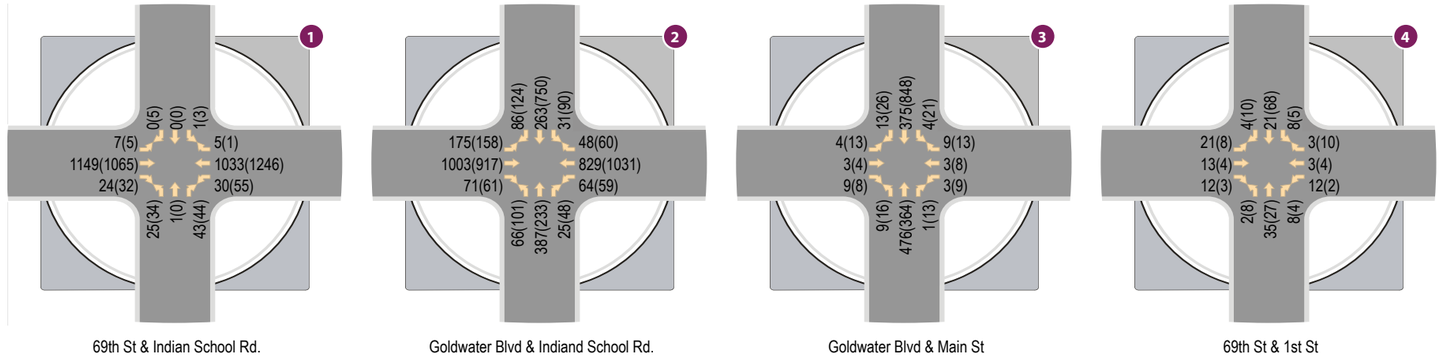
Legend

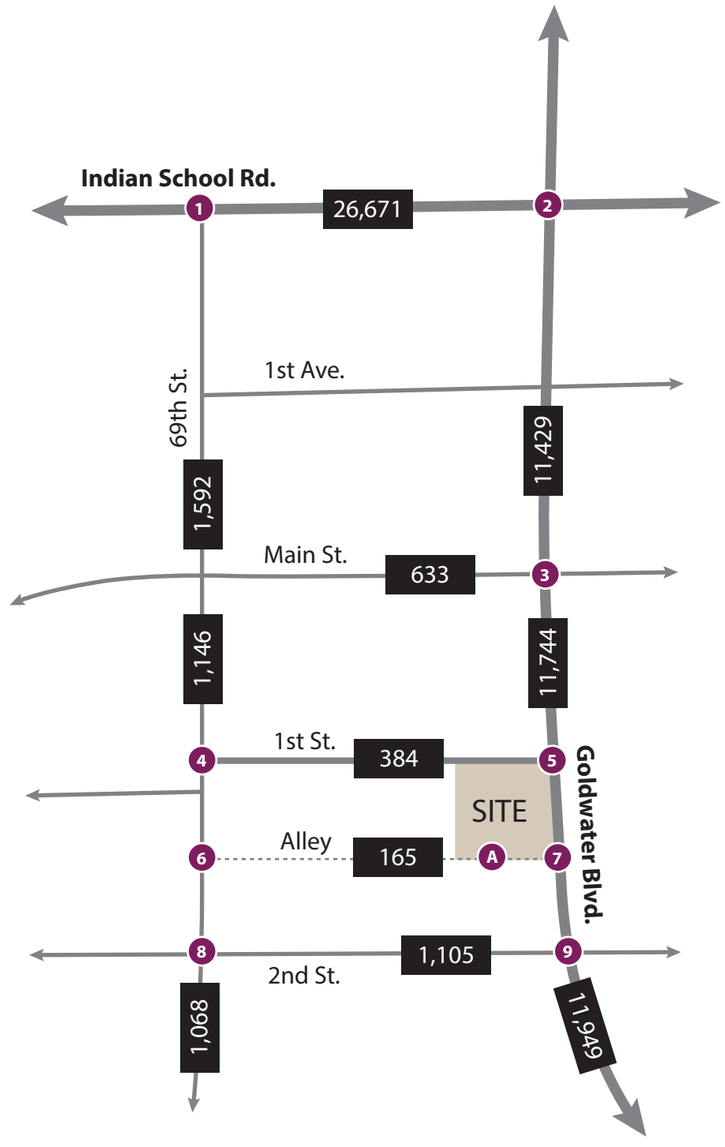
NORTH

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

X,XXX - Average Daily Traffic Volumes

Figure 10: Background Traffic Volumes





Legend

NORTH

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

X,XXX - Average Daily Traffic Volumes

Figure 11: Total Traffic Volumes

TRAFFIC AND IMPROVEMENT ANALYSIS

INTERSECTION CAPACITY ANALYSIS

Future peak hour capacity analyses have been conducted for the study intersections. All intersections have been analyzed using the methodologies presented in the *Highway Capacity Manual (HCM),* and Synchro 10 as previously described.

Results of the peak hour level-of-service are summarized in **Table 8** for the 2020 opening year. Worksheets for both AM and PM peak hour analyses have been included within **Appendix I** for the 2020 opening year.

Table 8: 2020 Peak Hour Levels of Service

ID	Intersection	Control	Approach	No Build AM(PM)	Build AM(PM)
1	69th St & Indian School Rd	2-way stop (NB/SB)	NB Shared SB Shared EB Left WB Left	F (F) F (E) C (C) C (C)	F (F) F (E) C (C) C (C)
2	Goldwater Blvd & Indian School Rd	Signal	NB SB EB WB	D (E) E (D) C (D) D (E)	D (E) E (D) C (D) D (E)
			Overall	**D (E)**	**D (E)**
3	Goldwater Blvd & Main St	Signal	NB SB EB WB	A (A) A (A) E (E) E (E)	A (A) A (A) E (E) E (E)
			Overall	**A (A)**	**A (A)**
4	69th St & 1st St	2-way stop (EB/WB)	NB Shared SB Shared EB Shared WB Shared	A (A) A (A) A (A) A (A)	A (A) A (A) A (A) A (A)
5	Goldwater Blvd & 1st St	2-way stop (EB/WB)	NB Left SB Left EB Shared WB left/thru	A (B) A (A) B (C) C (C)	A (B) A (A) B (C) C (C)
6	69th St & Alley	1-way stop (WB)	WB Shared SB Left	A (A) A (A)	A (A) A (A)
7	Goldwater Blvd & Alley	1-way stop (EB)	EB Right	B (A)	B (B)
8	69th St & 2nd St	2-way stop (NB/SB)	NB Shared SB Shared EB Shared WB Shared	A (A) A (A) A (A) A (A)	A (A) A (A) A (A) A (A)
9	Goldwater Blvd & 2nd St	2-way stop (EB/WB)	NB Left SB Left EB Shared WB Shared	A (B) A (A) C (D) C (C)	A (B) A (A) C (D) C (C)
A	Access A & Alley	1-way stop (SB)	SB Shared EB Left	- (-) - (-)	A (A) A (A)

The results of the 2020 peak hour analysis shows that all intersections operate at a level of service LOS D or better with the exception of the following intersections.

The unsignalized intersection of **69th Street and Indian School Road** is expected to continue to operate poorly during both the AM and PM peak hour on the northbound and southbound approaches. Intersections with minor approaches perpendicular to major approaches are expected to operate with delay during certain times of the day when the major road is busy, usually during the peak hour. Due to the location of this intersection to surrounding major intersections and the offset of the driveway from 69th Street, a signal will not be installed at this intersection. If there is significant delay during either peak hour, vehicles will use another route. Mitigation for this intersection is not recommended at this time.

The signalized intersection of **Goldwater Boulevard and Indian School Road** is expected to continue to operate poorly during the PM peak hour during both the no-build and build scenarios. The overall intersection delay during both scenarios is expected to be approximately 56 seconds. The threshold for an acceptable level of service is 55 seconds. Since the overall delay is very close to an acceptable level of service, no mitigation measures are recommended at this time, however, they could become necessary in the future.

The signalized intersection of **Goldwater Boulevard and Main Street** is expected to experience delay on the eastbound and westbound approaches of the intersection during both the AM and PM peak hours. This delay is present because the signal operates under actuated-coordinated phasing, meaning that the eastbound and westbound green phases are only triggered when a vehicle approaches. Since Main Street is a minor road, very few vehicles approach the intersection from the east or west, so when they do, there is significant delay. If more traffic uses this road in the future, the eastbound and westbound delay is likely to decrease.

The proposed lane configurations and stop controls are presented in **Figure 12**.

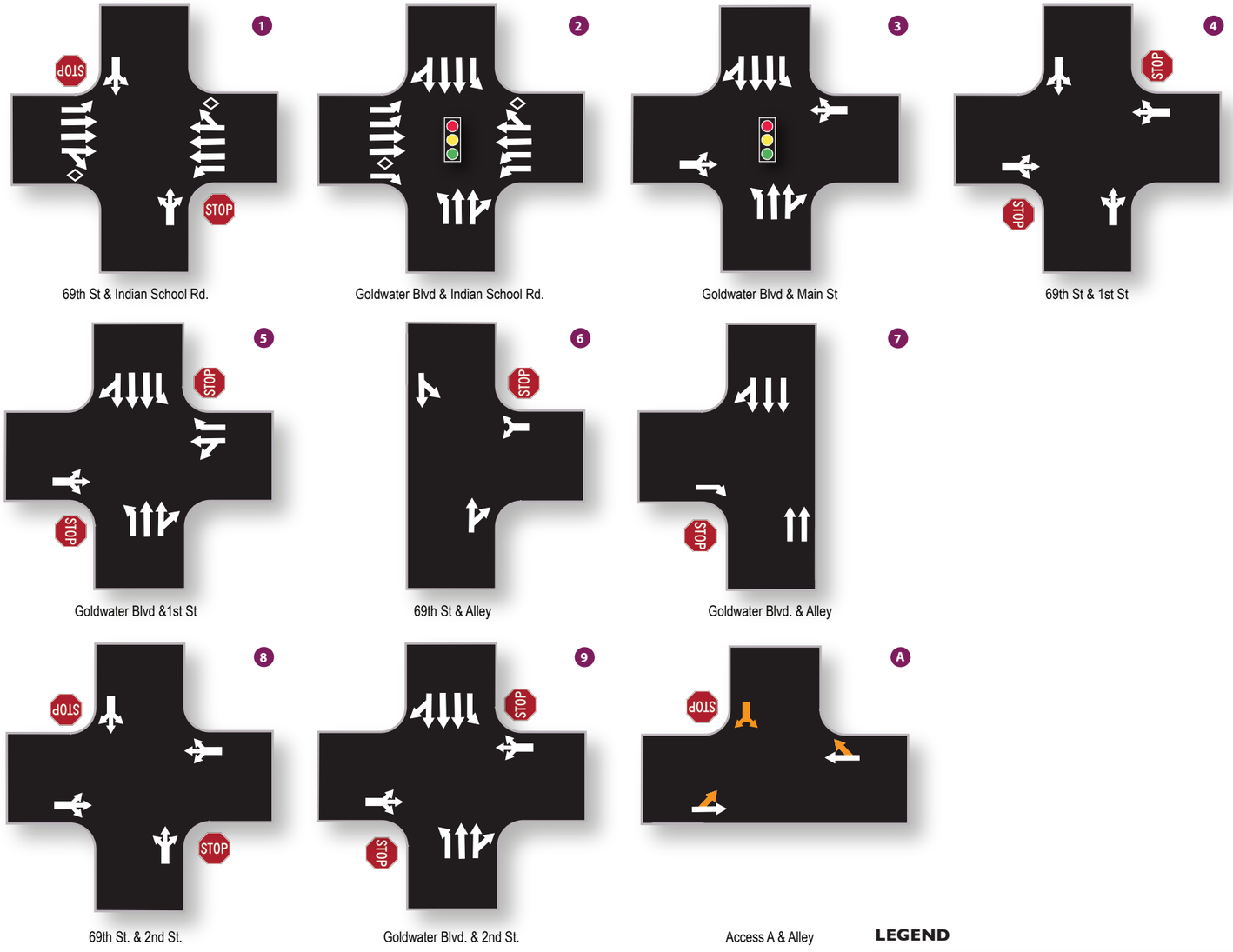
QUEUING ANALYSIS

The site access points were analyzed to determine the storage needed to accommodate the expected traffic volumes for the horizon year 2020 at the left and right turn lanes.

LEFT TURN STORAGE ANALYSIS

Left-turn lanes are required at all street intersections on major collectors and arterials per the City of Scottsdale *Design Standards and Policy Manual* (*DS&PM*). Dual left turn lanes should be considered at intersections in which the peak hour turning volume exceeds 300 vehicles, the opposing volume exceeds 1,000 vehicles per hour or the delay of the left-turns exceeds 45 seconds per section 5-3.123 of the *DS&PM*.

A queuing analysis for left turns was performed for all intersection turn lanes within the study area. The intersections were analyzed to determine the left turn storage needed to accommodate the expected traffic volumes for the horizon year 2020. The formulas used for the calculations are stated below. The resulting left turn lane storage requirements for the 2020 horizon year are summarized in **Table 9**.



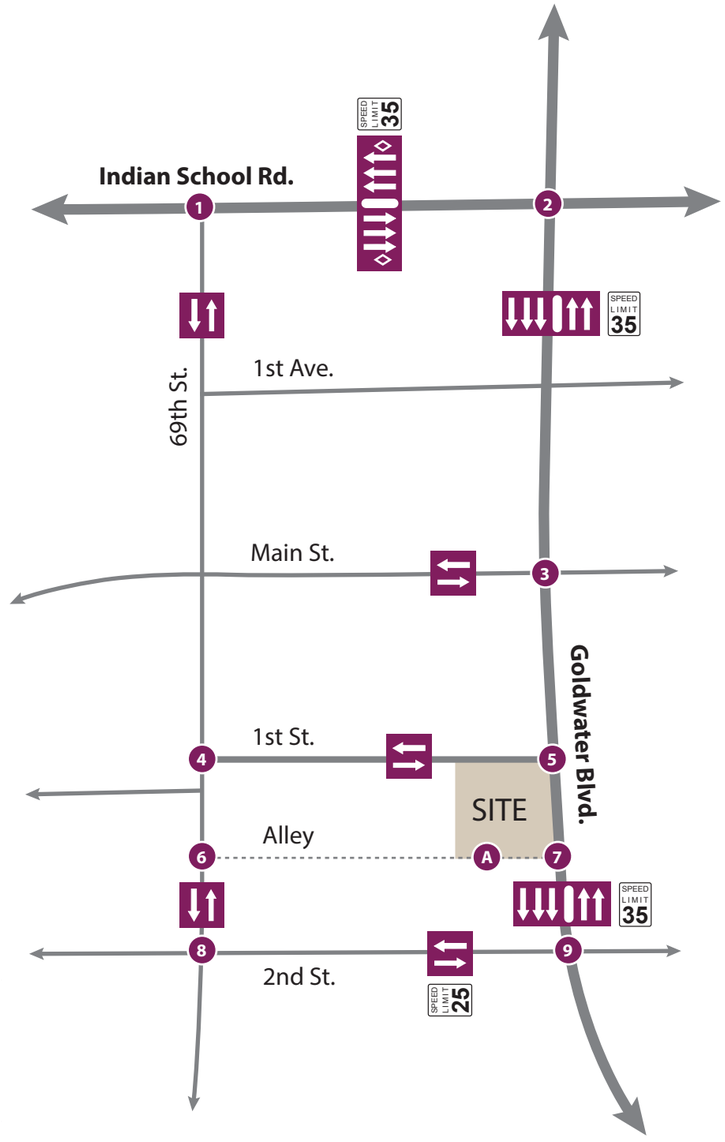


Figure 12: Proposed Lane Configurations and Traffic Controls

Two (2) methods were utilized to calculate the likely queue storage needed at the intersections for the 2032 horizon year. Synchro analysis software provided values for the 50th and 95th percentile queue storage. The 95th percentile has been reported herein. AASHTO also provides the following guidance:

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

Storage Length = [2 x (veh/hr)/(cycles/hr)] x 25 feet

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

Storage Length = [(veh/hr)/(30 periods/hr)] x 25 feet

Queue storage length recommendations at all study intersections herein are based on the 2020 projected traffic volumes.

RIGHT TURN AUXILIARY LANES

Right turn auxiliary lanes are required at all street intersections on major arterials per the City of Scottsdale *DS&PM* section 5-3.206. The standard storage length for a deceleration lane is 150 feet, with a 100-foot minimum length.

DECELERATION LANES

Per the City of Scottsdale *DS&PM*, section 5-3.206, right turn deceleration lanes are generally deemed warranted at a driveway when the following three conditions are satisfied:

- *At least 5,000 vehicles per day are expected to use the adjacent street;*
- *The 85th percentile traffic speed on the adjacent street is 35 MPH or higher, or 45 MPH or higher for a one (1) lane per direction roadway;*
- *At least 30 vehicles will make right turns into a driveway during a peak hour.*

The main access to the site does not meet the requirements listed, meaning that a right turn deceleration lane at the access point to the site is not required, and according to the Synchro analysis performed, it operates at an acceptable level of service under the proposed lane configurations.

Table 9: Queue Length Analysis

ID	Intersection	Intersection Control	Approach	Existing Storage	Synchro 95th %-ile Q	Calculated Storage	Rec. Storage
1	69th St & Indian School Rd.	2-Way Stop (NB/SB)	EB Left	45'	<25'	25'	(1)45'
			WB Left	70'	<25'	50'	(1)70'
2	Goldwater Blvd & Indian School Rd.	Signalized	NB Left	105'	139'	175'	140'
			SB Left	180'	107'	150'	(1)180'
			EB Left	275'	67'	300'	(1) (2)275'
			WB Left	160'	25'	125'	(1) (2)160'
			EB Right	165'	<25'	125'	(1)165'
3	Goldwater Blvd & Main St	Signalized	NB Left	115'	<25'	50'	(1)115'
			SB Left	115'	<25'	50'	(1)115'
9	Goldwater Blvd. & 2nd St.	2-Way Stop (EB/WB)	NB Left	135'	<25'	50'	(1)135'
			SB Left	85'	<25'	25'	(1)85'

(1) Existing turn storage is adequate
(2) Dual left-turn lanes
(3) 50th percentile synchro recommended

As shown in **Table 9**, the existing storage lengths at the existing intersections are anticipated to accommodate the additional traffic generated by the proposed development with the exception of the northbound left turn lane at the intersection of Goldwater Boulevard and Indian School Road. No additional northbound left-turns are expected to be added from site generated traffic, meaning that the number of northbound left-turns is the same for the AM and PM peak hours for the no-build and build scenarios. Additional storage length calculations should be completed prior to traffic signal installation, a change in intersection stop control or installation of raised medians. Turn queue storage length calculations can be found in the **Appendix J**.

SIGHT DISTANCE ANALYSIS

Adequate sight distance must be provided at the intersections to allow safe turning movements into and out of the development. A sight triangle is the area encompassed by the line of sight from a stopped vehicle on the minor roadway to the approaching vehicle on the major roadway: there must be sufficient unobstructed sight distance along both approaches of a street or driveway intersection and across their included corners to allow operators of vehicles to see each other in time to prevent a collision. There must also be sufficient sight distance along the major street to allow a driver intending to turn left into the site to see an oncoming vehicle in the opposing direction.

Sight distance is largely based on the design speed of the roadway. Per the *City of Scottsdale Design Standards and Policies Manual, dated 2018* intersection sight distance should adhere to *Appendix 5-3B. Sight Distance tables in Appendix 5-3B* presents the required sight distance for varying roadway widths and design speeds for passenger cars, single unit trucks and combination trucks. Typically, the posted speed limit is less than the design speed of a roadway. There is no posted speed limit in the Alley. For the purpose of this study, a design speed of 30 mph was used for this road.

The contractor should ensure that adequate sight distance is provided at all site access points to allow safe left and right turning movements from the development. Fixed objects

within the safety triangle cannot be taller than 2.5-feet measured from the adjacent roadway surface (edge of pavement); vegetation should be trimmed to 2.5-feet tall measured form the adjacent roadway surface. Trees placed within the sight triangle shall have canopies no lower than eight (8) feet. It is recommended that sight triangles be designed at all site access driveways to provide the required sight distance shown in *Appendix 5-3B* within the *City of Scottsdale Design Standards and Policies Manual*. Excerpts from the *City of Scottsdale Design Standards and Policies Manual* and tables have been included in **Appendix K**.

CONCLUSIONS

The following conclusions have been documented in this study.

- The results of the existing conditions analysis indicates that all study intersections operate with acceptable levels of service (LOS D or better), with the exception of the intersections of 69th Street & Indian School Rd, Goldwater Boulevard & Indian School Road and Goldwater Blvd & Main Street.
    - Currently, the unsignalized intersection of **69th Street and Indian School Road** operates poorly during both the AM and PM peak hours on the northbound and southbound approaches. This delay is due to the high wait times of vehicles making northbound left turns and southbound left turns because of the high volume of through traffic on Indian School Road during both peak hours. Extensive delay during either peak hour at minor roads or driveways that intersect major roads is expected.
    - The signalized intersection of **Goldwater Boulevard and Indian School Road** currently operates adequately in the AM peak hour, but has an overall intersection delay of 54 seconds in the PM peak hour. The threshold for an adequate level of service is 55 seconds, so it is very near to operating at a poor level of service.
    - The signalized intersection of **Goldwater Boulevard and Main Street** experiences delay on the eastbound and westbound approaches of the intersection during both the AM and PM peak hours. This delay is present because the signal operates under actuated-coordinated phasing, meaning that the eastbound and westbound green phases are only triggered when a vehicle approaches. Since Main Street is a minor road, very few vehicles approach the intersection from the east or west, so when they do, there is substantial delay. As more traffic uses this road in the future, the eastbound and westbound delay is likely to decrease.
- The number of crashes reported at the intersection of Goldwater Boulevard and 1st Street does not rise to the level of warranting consideration of a traffic signal based solely on crash experience. CivTech estimates that the existing development could potentially generate 142 external weekday daily trips, 3 trips during the AM peak hour, and 14 trips during the PM peak hour.
- The proposed redevelopment is anticipated to generate 734 external weekday daily trips, 62 trips during the AM peak hour, and 61 trips during the PM peak hour.
    - As compared to the existing uses, the proposed redevelopment could generate an additional 592 external daily trips with 59 additional trips in the AM peak hour and an additional 47 trips in the PM peak hour.
- The results of the 2020 peak hour analysis shows that all intersections operate at a level of service LOS D or better with the exception of the following intersections.

- The unsignalized intersection of **69th Street and Indian School Road** is expected to continue to operate poorly during both the AM and PM peak hour on the northbound and southbound approaches. Intersections with minor approaches perpendicular to major approaches are expected to operate with delay during certain times of the day when the major road is busy, usually during the peak hour. Due to the location of this intersection to surrounding major intersections and the offset of the driveway from 69th Street, a signal will not be installed at this intersection. If there is significant delay during either peak hour, vehicles will use another route. Mitigation for this intersection is not recommended at this time.

- The signalized intersection of **Goldwater Boulevard and Indian School Road** is expected to continue to operate poorly during the PM peak hour during both the no-build and build scenarios. The overall intersection delay during both scenarios is expected to be approximately 56 seconds. The threshold for an acceptable level of service is 55 seconds. Since the overall delay is very close to an acceptable level of service, no mitigation measures are recommended at this time, however, they could become necessary in the future.

- The signalized intersection of **Goldwater Boulevard and Main Street** is expected to experience delay on the eastbound and westbound approaches of the intersection during both the AM and PM peak hours. This delay is present because the signal operates under actuated-coordinated phasing, meaning that the eastbound and westbound green phases are only triggered when a vehicle approaches. Since Main Street is a very small road, very few vehicles approach the intersection from the east or west, so when they do, there is significant delay. If more traffic uses this road in the future, the eastbound and westbound delay is likely to decrease.

- The existing storage lengths at the existing intersections are anticipated to accommodate the additional traffic generated by the proposed development with the exception of the northbound left turn lane at the intersection of Goldwater Boulevard and Indian School Road. No additional northbound left-turns are expected to be added from site generated traffic, meaning that the number of northbound left-turns is the same for the AM and PM peak hours for the no-build and build scenarios. Additional storage length calculations should be completed prior to traffic signal installation, a change in intersection stop control or installation of raised medians.

- The contractor should ensure that adequate sight distance is provided at all site access points to allow safe left and right turning movements from the development. It is recommended that sight triangles be designed at all site access driveways to provide the required sight distance shown in *Appendix 5-3B* within the *City of Scottsdale Design Standards and Policies Manual*.

LIST OF REFERENCES

A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials, Washington, D.C., 2011.

ADOT Traffic Engineering Guidelines and Processes, Arizona Department of Transportation, 2015.

Highway Capacity Manual. Transportation Research Board, National Research Council, Washington, D.C., 2016.

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

Roadway Design Manual, Maricopa County Department of Transportation, Phoenix, Arizona, 2017.

Design Standards & Policies Manual, City of Scottsdale, Arizona, January 2018.

Trip Generation 10th Edition, Institute of Transportation Engineers, Washington, D.C., 2016.

Trip Generation Handbook, 3rd Edition, Institute of Transportation Engineers, Washington, D.C., 2012.

TECHNICAL APPENDICES

APPENDIX A:	**REVIEW COMMENTS (RESERVED)**
APPENDIX B:	**EXISTING TRAFFIC COUNTS**
APPENDIX C:	**EXISTING SIGNAL TIMING SHEETS**
APPENDIX D:	**EXISTING PEAK HOUR ANALYSIS**
APPENDIX E:	**CRASH DATA**
APPENDIX F:	**TRIP GENERATION**
APPENDIX G:	**TRIP DISTRIBUTION**
APPENDIX H:	**BACKGROUND TRAFFIC CALCULATIONS**
APPENDIX I:	**2020 PEAK HOUR TRAFFIC ANALYSIS**
APPENDIX J:	**QUEUE LENGTH ANALYSIS**
APPENDIX K:	**SIGHT DISTANCE ANALYSIS**

APPENDIX A

REVIEW COMMENTS AND RESPONSES

APPENDIX B

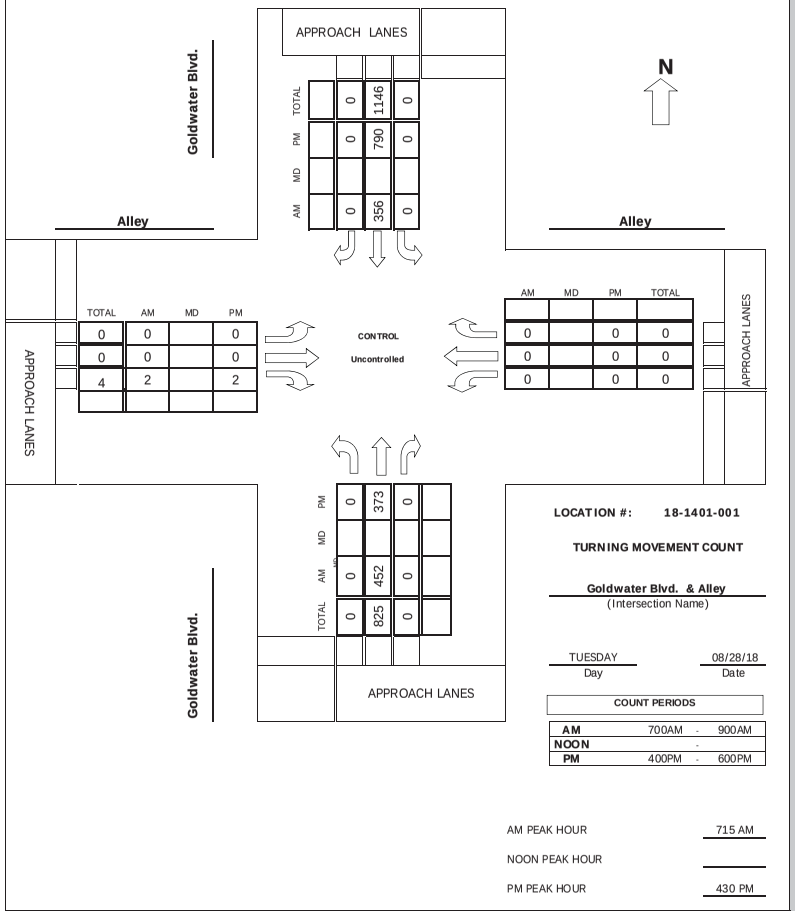
EXISTING TRAFFIC COUNTS

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 18-1401-001

TMC SUMMARY OF Goldwater Blvd. & Alley



LOCATION #: 18-1401-001

TURNING MOVEMENT COUNT

Goldwater Blvd. & Alley
(Intersection Name)

TUESDAY (Day) 08/28/18 (Date)

COUNT PERIODS			
AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 715 AM

NOON PEAK HOUR

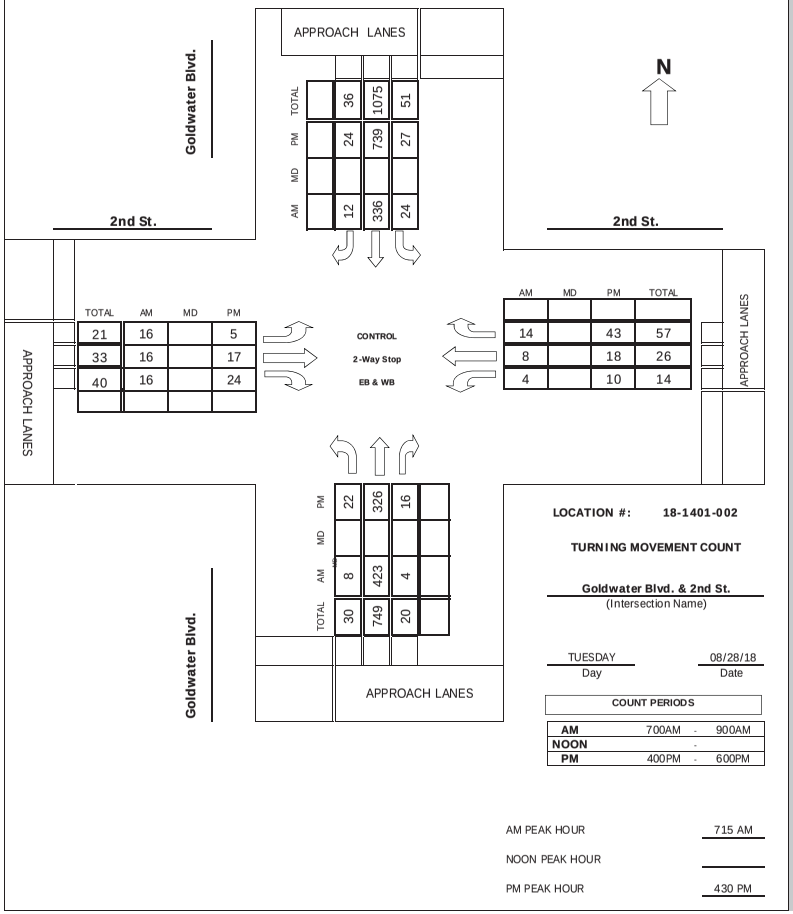
PM PEAK HOUR 430 PM

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 18-1401-002

TMC SUMMARY OF Goldwater Blvd. & 2nd St.



LOCATION #: 18-1401-002

TURNING MOVEMENT COUNT

Goldwater Blvd. & 2nd St.
(Intersection Name)

TUESDAY (Day) 08/28/18 (Date)

COUNT PERIODS			
AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 715 AM

NOON PEAK HOUR

PM PEAK HOUR 430 PM

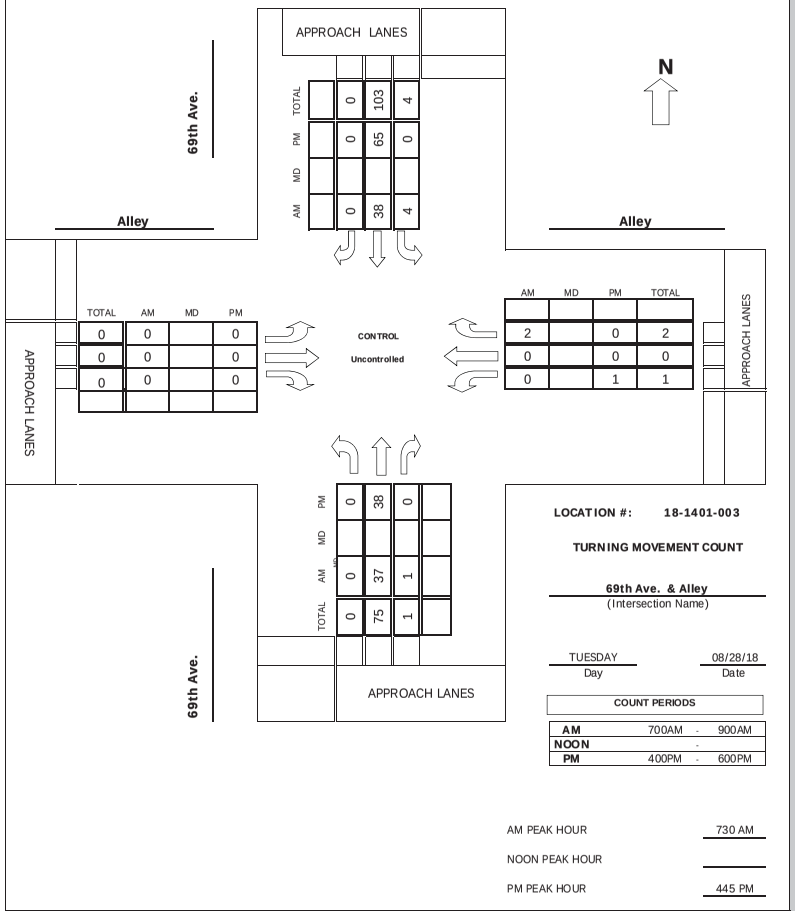
52-DR-2018
11/14/18

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 18-1401-003

TMC SUMMARY OF 69th Ave. & Alley



LOCATION #: 18-1401-003

TURNING MOVEMENT COUNT

69th Ave. & Alley
(Intersection Name)

TUESDAY (Day) 08/28/18 (Date)

COUNT PERIODS			
AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 730 AM

NOON PEAK HOUR

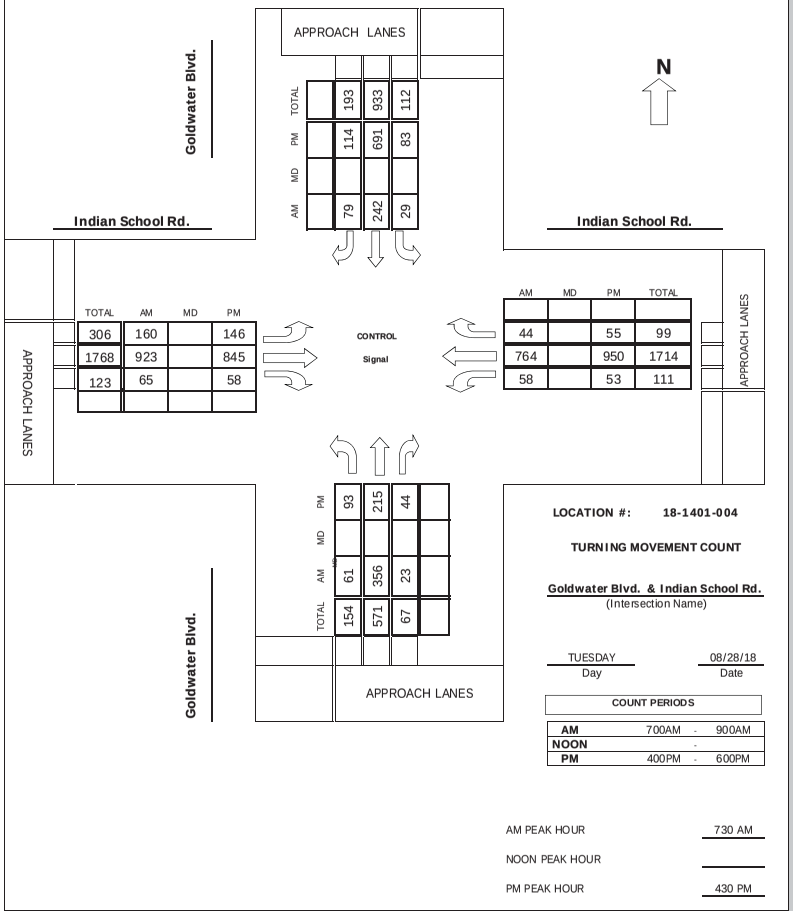
PM PEAK HOUR 445 PM

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 18-1401-004

TMC SUMMARY OF Goldwater Blvd. & Indian School Rd.



LOCATION #: 18-1401-004

TURNING MOVEMENT COUNT

Goldwater Blvd. & Indian School Rd.
(Intersection Name)

TUESDAY (Day) 08/28/18 (Date)

COUNT PERIODS			
AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 730 AM

NOON PEAK HOUR

PM PEAK HOUR 430 PM

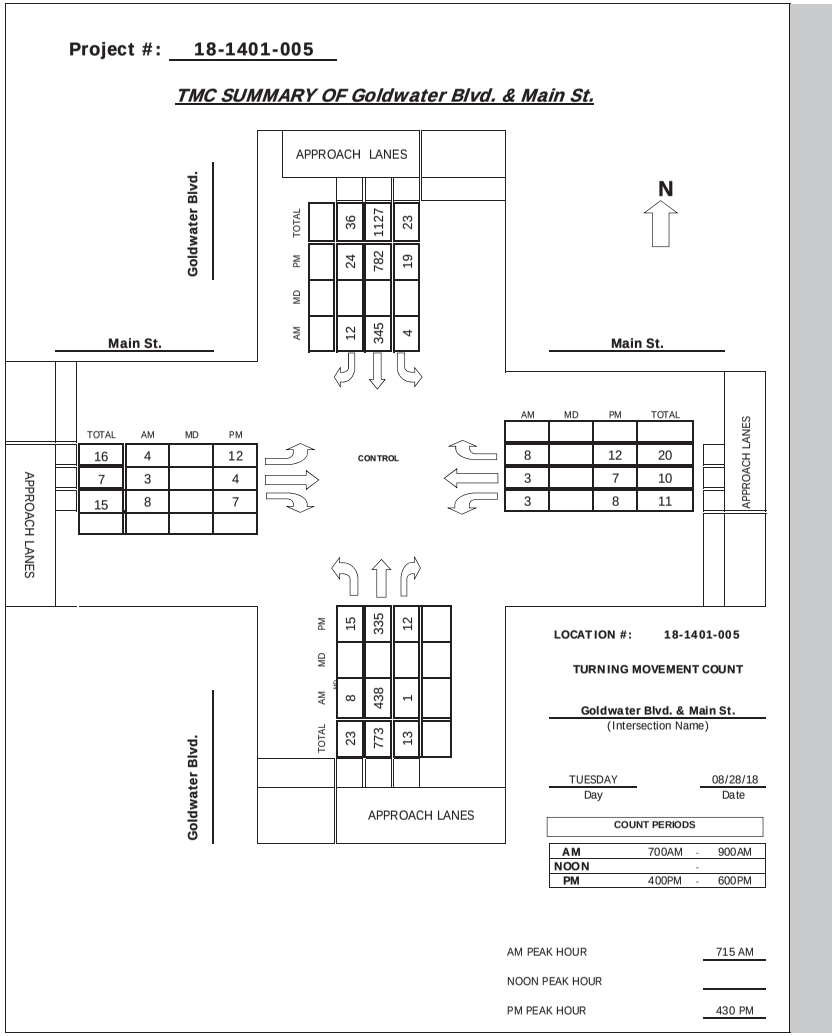
52-DR-2018
11/14/18

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 18-1401-005

TMC SUMMARY OF Goldwater Blvd. & Main St.



LOCATION #: 18-1401-005

TURNING MOVEMENT COUNT

Goldwater Blvd. & Main St.
(Intersection Name)

TUESDAY (Day) 08/28/18 (Date)

COUNT PERIODS			
AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 715 AM

NOON PEAK HOUR

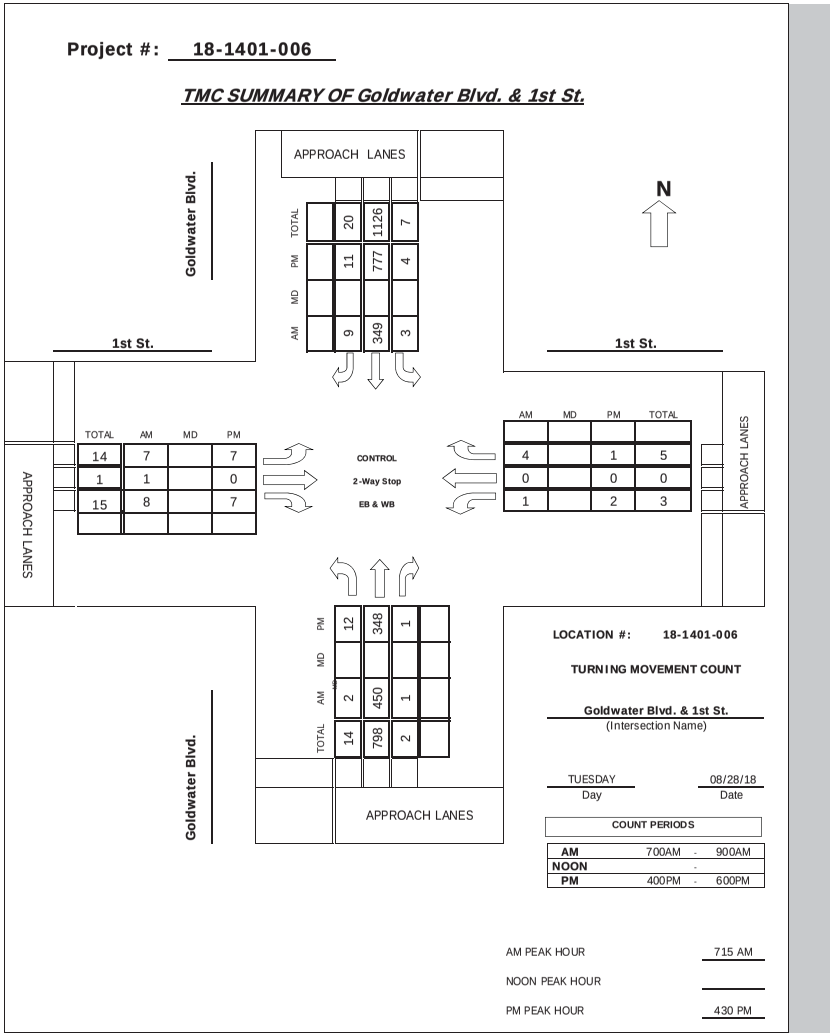
PM PEAK HOUR 430 PM

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 18-1401-006

TMC SUMMARY OF Goldwater Blvd. & 1st St.



LOCATION #: 18-1401-006

TURNING MOVEMENT COUNT

Goldwater Blvd. & 1st St.
(Intersection Name)

TUESDAY (Day) 08/28/18 (Date)

COUNT PERIODS			
AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 715 AM

NOON PEAK HOUR

PM PEAK HOUR 430 PM

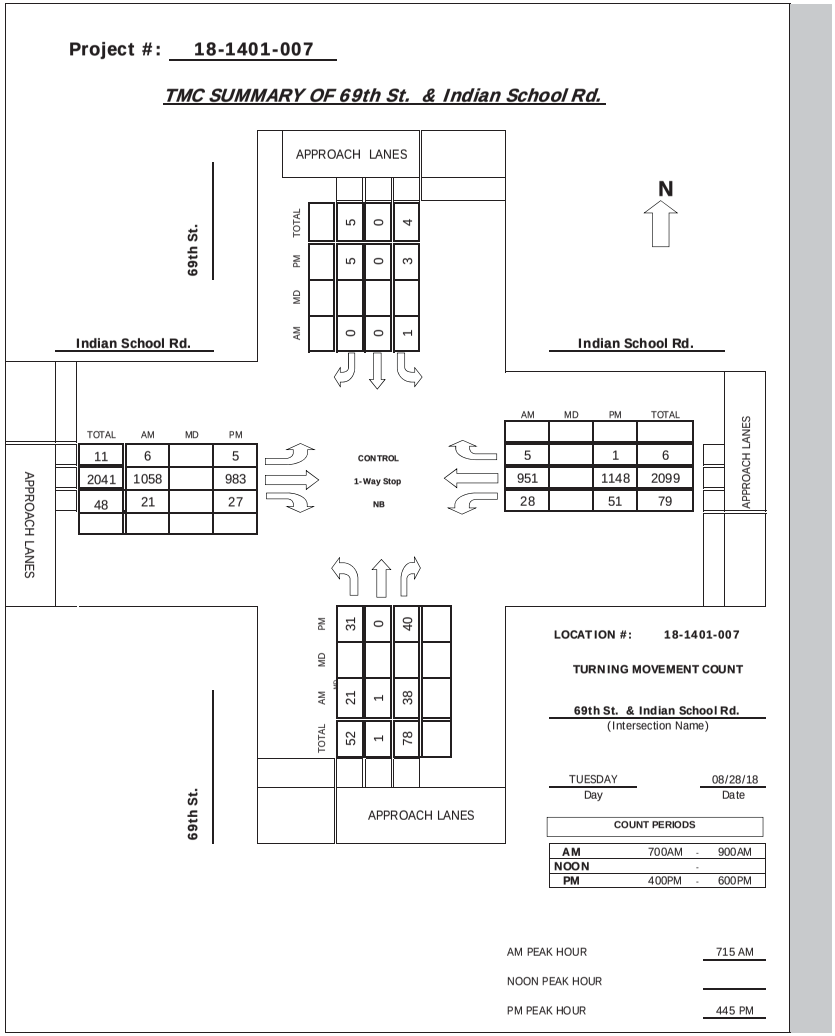
52-DR-2018
11/14/18

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 18-1401-007

TMC SUMMARY OF 69th St. & Indian School Rd.



LOCATION #: 18-1401-007

TURNING MOVEMENT COUNT

69th St. & Indian School Rd.
(Intersection Name)

TUESDAY (Day) 08/28/18 (Date)

COUNT PERIODS			
AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

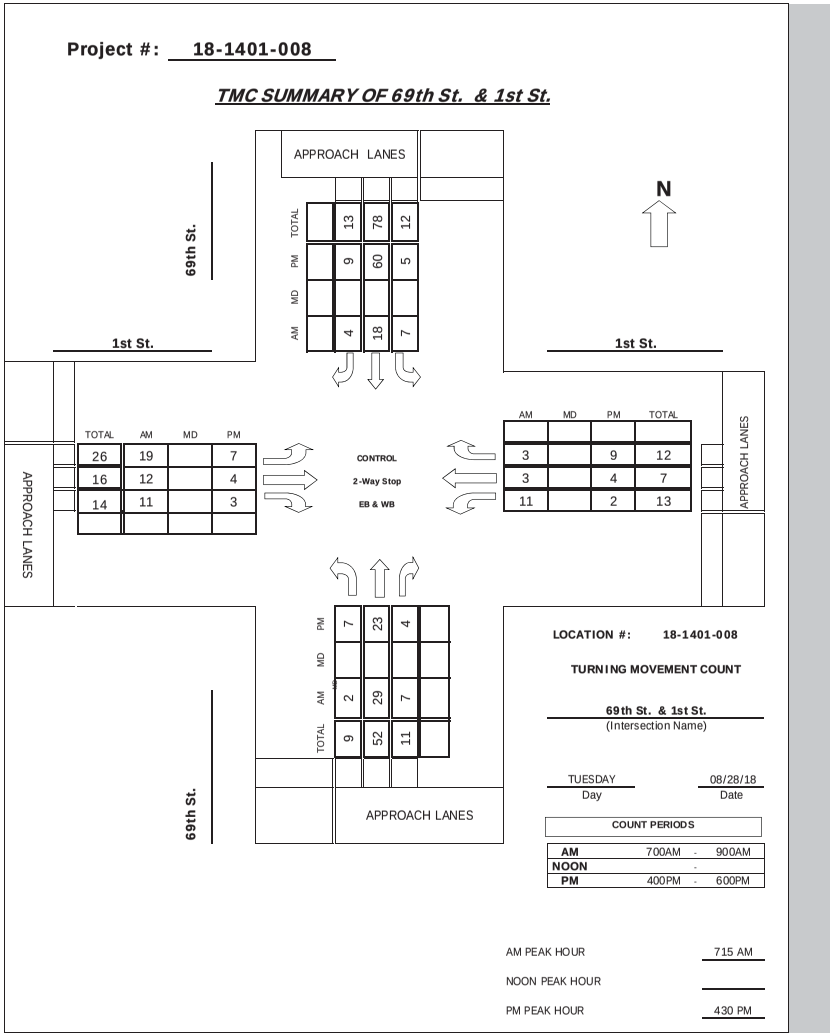
AM PEAK HOUR	715 AM
NOON PEAK HOUR	
PM PEAK HOUR	445 PM

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 18-1401-008

TMC SUMMARY OF 69th St. & 1st St.



LOCATION #: 18-1401-008

TURNING MOVEMENT COUNT

69th St. & 1st St.
(Intersection Name)

TUESDAY (Day) 08/28/18 (Date)

COUNT PERIODS			
AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR	715 AM
NOON PEAK HOUR	
PM PEAK HOUR	430 PM

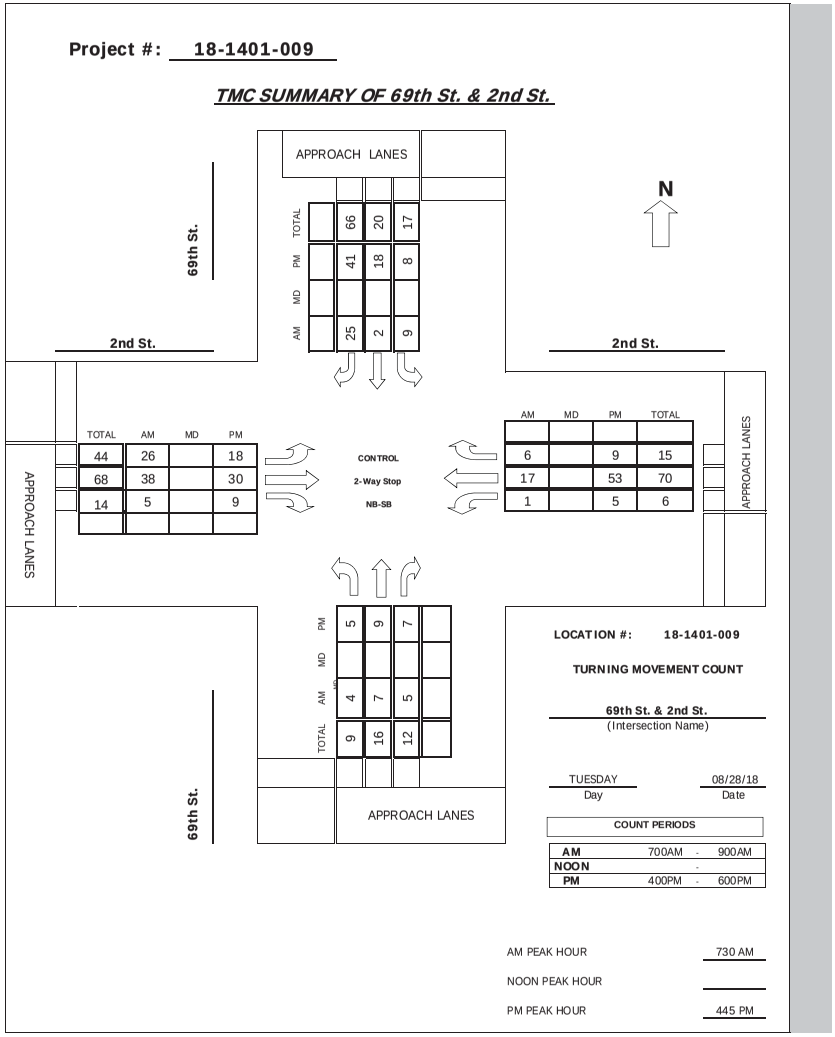
52-DR-2018
11/14/18

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 18-1401-009

TMC SUMMARY OF 69th St. & 2nd St.



LOCATION #: 18-1401-009

TURNING MOVEMENT COUNT

69th St. & 2nd St.
(Intersection Name)

TUESDAY (Day) 08/28/18 (Date)

COUNT PERIODS			
AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 730 AM

NOON PEAK HOUR

PM PEAK HOUR 445 PM

52-DR-2018
11/14/18

APPENDIX C

EXISTING SIGNAL TIMING SHEETS

GOLDWATER & MAIN

System # 195

BASIC TIMING PLAN

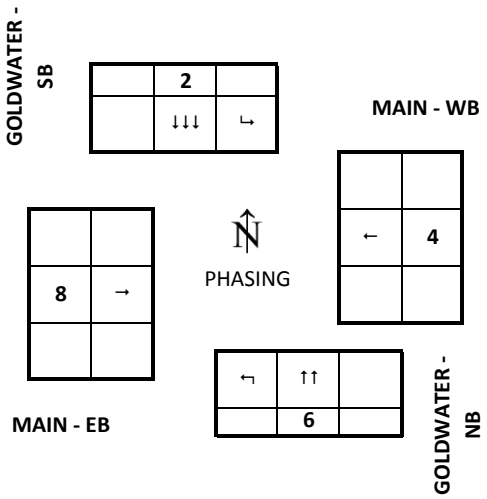
Section #	I.P. Address	Date Designed
	MM1-5-1	
	172.17.11.95	12/12/2016

TIMING PLAN - MM-2-1

Phase		2		4		6		8
Movement		SBT		WBT		NBT		EBT
NOTES								
MIN GRN		10		7		10		7
BK MGRN								
CS MGRN								
DLY GRN								
WALK		7		8		7		8
WALK2								
WLK MAX								
PED CLR/FDW		12		21		9		21
PD CLR2								
PC MAX								
PED CO								
VEH EXT				2				2
VH EXT2								
MAX 1		70		35		70		35
MAX 2		90		50		90		50
MAX 3								
DYM MAX								
DYM STP								
YELLOW		4.0		3.3		4		3.3
RED CLR		1.2		1.5		1.2		1.5
RED MAX								
RED RVT		2		2		2		2
ACT B4								
SEC/ACT								
MAX INT								
TIME B4								
CARS WT								
STPTDUC								
TTREDUC								
MIN GAP								

RECALLS - MM-2-8

LOCK DET								
VEH RECALL		X				X		
PED RECALL								
MAX RECALL								
SOFT RECALL								
NO REST								
ADD INIT CAL								



PHASING SEQUENCES				
TOD: MORNING				
R1	2		4	
R2	6		8	
		B		B
Use Timing plan:				
TOD: MIDDAY				
R1	2		4	
R2	6		8	
		B		B
Use Timing plan:				
TOD: EVENING				
R1	2		4	
R2	6		8	
		B		B
Use Timing plan:				
TOD: WEEKEND				
R1	2		4	
R2	6		8	
		B		B
Use Timing plan:				
FREE				
R1	2		4	
R2	6		8	
		B		B
Use Timing plan: 254				

NOTES

EXPIRES XX/XX/XXXX

52-DR-2018
11/14/18

APPENDIX D

EXISTING PEAK HOUR ANALYSIS

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	1111	22	29	999	5	22	1	40	1	0	0
Future Vol, veh/h	6	1111	22	29	999	5	22	1	40	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	1208	24	32	1086	5	24	1	43	1	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1091	0	0	1232	0	0	1732	2389	616	1651	2399	546
Stage 1	-	-	-	-	-	-	1234	1234	-	1153	1153	-
Stage 2	-	-	-	-	-	-	498	1155	-	498	1246	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	354	-	-	302	-	-	93	33	372	104	33	413
Stage 1	-	-	-	-	-	-	137	247	-	156	270	-
Stage 2	-	-	-	-	-	-	478	269	-	478	244	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	354	-	-	302	-	-	84	29	372	81	29	413
Mov Cap-2 Maneuver	-	-	-	-	-	-	84	29	-	81	29	-
Stage 1	-	-	-	-	-	-	134	242	-	153	241	-
Stage 2	-	-	-	-	-	-	427	240	-	412	239	-

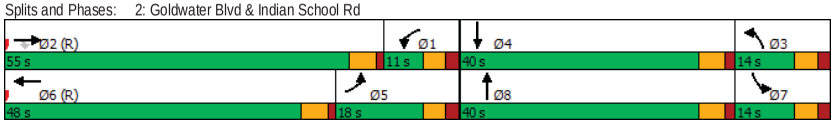
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.5	45	50
HCM LOS			E	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	156	354	-	-	302	-	-	81
HCM Lane V/C Ratio	0.439	0.018	-	-	0.104	-	-	0.013
HCM Control Delay (s)	45	15.4	-	-	18.3	-	-	50
HCM Lane LOS	E	C	-	-	C	-	-	F
HCM 95th %tile Q(veh)	2	0.1	-	-	0.3	-	-	0

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	168	969	68	61	802	64	374	30	254
Future Volume (vph)	168	969	68	61	802	64	374	30	254
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2		1	6	3	8	7	4
Permitted Phases			2						
Detector Phase	5	2	2	1	6	3	8	7	4
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	7.0	5.0	7.0
Minimum Split (s)	11.0	16.0	16.0	11.0	16.0	11.0	16.0	11.0	16.0
Total Split (s)	18.0	55.0	55.0	11.0	48.0	14.0	40.0	14.0	40.0
Total Split (%)	15.0%	45.8%	45.8%	9.2%	40.0%	11.7%	33.3%	11.7%	33.3%
Yellow Time (s)	3.3	4.0	4.0	3.3	4.0	3.3	4.0	3.3	4.0
All-Red Time (s)	2.0	1.0	1.0	2.0	1.0	2.0	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.0	5.0	5.3	5.0	5.3	5.3	5.3	5.3
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?									
Recall Mode	None	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	11.7	73.9	73.9	5.6	65.7	12.2	18.9	7.0	11.6
Actuated g/C Ratio	0.10	0.62	0.62	0.05	0.55	0.10	0.16	0.06	0.10
v/c Ratio	0.58	0.46	0.08	0.44	0.45	0.41	0.74	0.34	0.65
Control Delay	59.2	15.2	0.8	65.0	18.9	55.8	55.5	63.0	48.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.2	15.2	0.8	65.0	18.9	55.8	55.5	63.0	48.2
LOS	E	B	A	E	B	E	E	E	D
Approach Delay		20.5			22.0		55.6		49.4
Approach LOS		C			C		E		D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 30.1	Intersection LOS: C
Intersection Capacity Utilization 61.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Goldwater Blvd & Indian School Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	168	969	68	61	802	46	64	374	24	30	254	83
Future Volume (veh/h)	168	969	68	61	802	46	64	374	24	30	254	83
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	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	1772
Adj Flow Rate, veh/h	183	1053	74	66	872	50	70	407	26	33	276	90
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	996	1559	626	805	1289	74	117	484	31	47	384	118
Arrive On Green	0.30	0.42	0.42	0.25	0.36	0.36	0.07	0.14	0.14	0.03	0.09	0.09
Sat Flow, veh/h	3274	3741	1502	3274	3596	206	1688	3571	227	1688	4073	1253
Grp Volume(v), veh/h	183	1053	74	66	454	468	70	213	220	33	241	125
Grp Sat Flow(s),veh/h/ln	1637	1870	1502	1637	1870	1932	1688	1870	1928	1688	1792	1743
Q Serve(g_s), s	4.9	27.4	3.6	1.9	24.6	24.7	4.8	13.3	13.4	2.3	7.8	8.4
Cycle Q Clear(g_c), s	4.9	27.4	3.6	1.9	24.6	24.7	4.8	13.3	13.4	2.3	7.8	8.4
Prop In Lane	1.00		1.00	1.00		0.11	1.00		0.12	1.00		0.72
Lane Grp Cap(c), veh/h	996	1559	626	805	670	692	117	253	261	47	337	164
V/C Ratio(X)	0.18	0.68	0.12	0.08	0.68	0.68	0.60	0.84	0.84	0.70	0.71	0.76
Avail Cap(c_a), veh/h	996	1559	626	805	670	692	122	541	557	122	1036	504
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.8	28.4	21.5	34.8	32.6	32.6	54.2	50.6	50.6	57.8	52.8	53.0
Incr Delay (d2), s/veh	0.0	2.4	0.4	0.0	5.4	5.3	4.8	2.8	2.9	6.9	1.1	2.7
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	2.0	12.6	1.4	0.8	12.1	12.4	2.2	6.4	6.7	1.1	3.6	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.8	30.8	21.9	34.8	38.0	37.9	59.1	53.4	53.5	64.8	53.8	55.8
LnGrp LOS	C	C	C	C	D	D	E	D	D	E	D	E
Approach Vol, veh/h		1310			988			503			399	
Approach Delay, s/veh		30.3			37.7			54.3			55.4	
Approach LOS		C			D			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	34.8	55.0	13.6	16.6	41.8	48.0	8.6	21.6
Change Period (Y+Rc), s	5.3	* 5	* 5.3	* 5.3	5.3	* 5	* 5.3	* 5.3
Max Green Setting (Gmax), s	5.7	* 50	* 8.7	* 35	12.7	* 43	* 8.7	* 35
Max Q Clear Time (g_c+I1), s	3.9	29.4	6.8	10.4	6.9	26.7	4.3	15.4
Green Ext Time (p_c), s	0.0	3.1	0.0	0.9	0.2	2.0	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	39.5
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	4	3	3	3	8	460	4	362
Future Volume (vph)	4	3	3	3	8	460	4	362
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		8		4		6		2
Permitted Phases	8		4		6		2	
Detector Phase	8	8	4	4	6	6	2	2
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	10.0	10.0	10.0	10.0
Minimum Split (s)	35.0	35.0	35.0	35.0	70.0	70.0	70.0	70.0
Total Split (s)	50.0	50.0	50.0	50.0	90.0	90.0	90.0	90.0
Total Split (%)	35.7%	35.7%	35.7%	35.7%	64.3%	64.3%	64.3%	64.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	4.0	4.0	4.0	4.0
All-Red Time (s)	1.5	1.5	1.5	1.5	1.2	1.2	1.2	1.2
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.8		4.8	5.2	5.2	5.2	5.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)		7.2		7.2	133.0	133.0	133.0	133.0
Actuated g/C Ratio		0.05		0.05	0.95	0.95	0.95	0.95
v/c Ratio		0.19		0.18	0.01	0.14	0.01	0.08
Control Delay		69.0		68.4	1.0	0.7	1.0	0.6
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		69.0		68.4	1.0	0.7	1.0	0.6
LOS		E		E	A	A	A	A
Approach Delay		69.0		68.4		0.7		0.6
Approach LOS		E		E		A		A

Intersection Summary		
Cycle Length: 140		
Actuated Cycle Length: 140		
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green		
Natural Cycle: 105		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.19		
Intersection Signal Delay: 2.9	Intersection LOS: A	
Intersection Capacity Utilization 26.3%	ICU Level of Service A	
Analysis Period (min) 15		

Splits and Phases: 3: Main St & Goldwater Blvd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	3	8	3	3	8	8	460	1	4	362	13
Future Volume (veh/h)	4	3	8	3	3	8	8	460	1	4	362	13
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	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	1772
Adj Flow Rate, veh/h	4	3	9	3	3	9	9	500	1	4	393	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	41	17	34	38	17	36	872	3422	7	797	4762	169
Arrive On Green	0.04	0.04	0.04	0.04	0.04	0.04	0.89	0.89	0.89	0.89	0.89	0.89
Sat Flow, veh/h	267	480	960	204	483	1029	927	3830	8	850	5329	189
Grp Volume(v), veh/h	16	0	0	15	0	0	9	244	257	4	263	144
Grp Sat Flow(s),veh/h/ln	1707	0	0	1716	0	0	927	1870	1967	850	1792	1935
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.2	2.2	0.1	1.2	1.2
Cycle Q Clear(g_c), s	1.2	0.0	0.0	1.2	0.0	0.0	1.4	2.2	2.2	2.3	1.2	1.2
Prop In Lane	0.25		0.56	0.20		0.60	1.00		0.00	1.00		0.10
Lane Grp Cap(c), veh/h	92	0	0	91	0	0	872	1671	1758	797	3202	1729
V/C Ratio(X)	0.17	0.00	0.00	0.16	0.00	0.00	0.01	0.15	0.15	0.01	0.08	0.08
Avail Cap(c_a), veh/h	570	0	0	573	0	0	872	1671	1758	797	3202	1729
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	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.82	0.82	0.82
Uniform Delay (d), s/veh	65.8	0.0	0.0	65.7	0.0	0.0	0.9	0.9	0.9	1.1	0.9	0.9
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.1
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	0.6	0.0	0.0	0.5	0.0	0.0	0.0	0.4	0.5	0.0	0.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.1	0.0	0.0	66.1	0.0	0.0	1.0	1.1	1.1	1.1	0.9	0.9
LnGrp LOS	E	A	A	E	A	A	A	A	A	A	A	A
Approach Vol, veh/h		16			15			510			411	
Approach Delay, s/veh		66.1			66.1			1.1			0.9	
Approach LOS		E			E			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		130.3		9.7		130.3		9.7				
Change Period (Y+Rc), s		* 5.2		* 4.8		* 5.2		* 4.8				
Max Green Setting (Gmax), s		* 85		* 45		* 85		* 45				
Max Q Clear Time (g_c+I1), s		4.3		3.2		4.2		3.2				
Green Ext Time (p_c), s		0.5		0.0		0.5		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		3.1
HCM 6th LOS		A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	13	12	12	3	3	2	30	7	7	19	4
Future Vol, veh/h	20	13	12	12	3	3	2	30	7	7	19	4
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	14	13	13	3	3	2	33	8	8	21	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	83	84	23	94	82	37	25	0	0	41	0	0
Stage 1	39	39	-	41	41	-	-	-	-	-	-	-
Stage 2	44	45	-	53	41	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	904	806	1054	889	808	1035	1589	-	-	1568	-	-
Stage 1	976	862	-	974	861	-	-	-	-	-	-	-
Stage 2	970	857	-	960	861	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	894	801	1054	862	803	1035	1589	-	-	1568	-	-
Mov Cap-2 Maneuver	894	801	-	862	803	-	-	-	-	-	-	-
Stage 1	975	858	-	973	860	-	-	-	-	-	-	-
Stage 2	962	856	-	928	857	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.2	9.2	0.4	1.7
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1589	-	-	900	876	1568	-	-
HCM Lane V/C Ratio	0.001	-	-	0.054	0.022	0.005	-	-
HCM Control Delay (s)	7.3	0	-	9.2	9.2	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	1	8	1	0	4	2	473	1	3	366	9
Future Vol, veh/h	7	1	8	1	0	4	2	473	1	3	366	9
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	70	-	-	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	1	9	1	0	4	2	514	1	3	398	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	670	928	204	685	933	258	408	0	0	515	0	0
Stage 1	409	409	-	519	519	-	-	-	-	-	-	-
Stage 2	261	519	-	166	414	-	-	-	-	-	-	-
Critical Hdwy	6.99	6.54	7.14	6.99	6.54	6.94	5.34	-	-	4.14	-	-
Critical Hdwy Stg 1	7.34	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.67	4.02	3.92	3.67	4.02	3.32	3.12	-	-	2.22	-	-
Pot Cap-1 Maneuver	369	266	683	360	265	741	748	-	-	1047	-	-
Stage 1	521	594	-	492	531	-	-	-	-	-	-	-
Stage 2	695	531	-	781	591	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	365	264	683	353	263	741	748	-	-	1047	-	-
Mov Cap-2 Maneuver	365	264	-	353	263	-	-	-	-	-	-	-
Stage 1	519	592	-	491	529	-	-	-	-	-	-	-
Stage 2	689	529	-	767	589	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.1	11	0	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	748	-	-	461	353	741	1047	-	-
HCM Lane V/C Ratio	0.003	-	-	0.038	0.003	0.006	0.003	-	-
HCM Control Delay (s)	9.8	-	-	13.1	15.2	9.9	8.4	-	-
HCM Lane LOS	A	-	-	B	C	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	2	39	1	4	40
Future Vol, veh/h	0	2	39	1	4	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2	42	1	4	43

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	94	43	0	0	43	0
Stage 1	43	-	-	-	-	-
Stage 2	51	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	906	1027	-	-	1566	-
Stage 1	979	-	-	-	-	-
Stage 2	971	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	903	1027	-	-	1566	-
Mov Cap-2 Maneuver	903	-	-	-	-	-
Stage 1	976	-	-	-	-	-
Stage 2	971	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.5	0	0.7
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	1027	1566	-
HCM Lane V/C Ratio	-	-	0.002	0.003	-
HCM Control Delay (s)	-	-	8.5	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	2	0	475	374	0
Future Vol, veh/h	0	2	0	475	374	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2	0	516	407	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	204	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	683	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	-	683	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	683	-	-
HCM Lane V/C Ratio	-	0.003	-	-
HCM Control Delay (s)	-	10.3	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0	-	-

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	40	5	1	18	6	4	7	5	9	2	26
Future Vol, veh/h	27	40	5	1	18	6	4	7	5	9	2	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	43	5	1	20	7	4	8	5	10	2	28

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	27	0	0	48	0	0	145	133	46	136	132	24
Stage 1	-	-	-	-	-	-	104	104	-	26	26	-
Stage 2	-	-	-	-	-	-	41	29	-	110	106	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1587	-	-	1559	-	-	824	758	1023	835	759	1052
Stage 1	-	-	-	-	-	-	902	809	-	992	874	-
Stage 2	-	-	-	-	-	-	974	871	-	895	807	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1587	-	-	1559	-	-	788	743	1023	812	744	1052
Mov Cap-2 Maneuver	-	-	-	-	-	-	788	743	-	812	744	-
Stage 1	-	-	-	-	-	-	885	794	-	973	873	-
Stage 2	-	-	-	-	-	-	945	870	-	865	792	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.7	0.3	9.5	8.9
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	825	1587	-	-	1559	-	-	961
HCM Lane V/C Ratio	0.021	0.018	-	-	0.001	-	-	0.042
HCM Control Delay (s)	9.5	7.3	0	-	7.3	0	-	8.9
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	17	17	4	8	15	8	444	4	25	353	13
Future Vol, veh/h	17	17	17	4	8	15	8	444	4	25	353	13
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	-	-	-	-	-	-	130	-	-	82	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	18	18	4	9	16	9	483	4	27	384	14

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	709	950	199	720	955	244	398	0	0	487	0	0
Stage 1	445	445	-	503	503	-	-	-	-	-	-	-
Stage 2	264	505	-	217	452	-	-	-	-	-	-	-
Critical Hdwy	6.99	6.54	7.14	6.99	6.54	6.94	5.34	-	-	4.14	-	-
Critical Hdwy Stg 1	7.34	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.67	4.02	3.92	3.67	4.02	3.32	3.12	-	-	2.22	-	-
Pot Cap-1 Maneuver	348	259	688	342	257	757	756	-	-	1072	-	-
Stage 1	492	573	-	503	540	-	-	-	-	-	-	-
Stage 2	693	539	-	728	569	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	322	249	688	305	247	757	756	-	-	1072	-	-
Mov Cap-2 Maneuver	322	249	-	305	247	-	-	-	-	-	-	-
Stage 1	486	559	-	497	534	-	-	-	-	-	-	-
Stage 2	659	533	-	668	555	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.2	14.4	0.2	0.5
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	756	-	-	350	413	1072	-	-
HCM Lane V/C Ratio	0.012	-	-	0.158	0.071	0.025	-	-
HCM Control Delay (s)	9.8	-	-	17.2	14.4	8.4	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1032	28	54	1205	1	33	0	42	3	0	5
Future Vol, veh/h	5	1032	28	54	1205	1	33	0	42	3	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1122	30	59	1310	1	36	0	46	3	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1311	0	0	1152	0	0	1789	2576	576	1888	2591	656
Stage 1	-	-	-	-	-	-	1147	1147	-	1429	1429	-
Stage 2	-	-	-	-	-	-	642	1429	-	459	1162	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	276	-	-	330	-	-	86	25	394	74	25	350
Stage 1	-	-	-	-	-	-	157	272	-	99	199	-
Stage 2	-	-	-	-	-	-	391	199	-	504	267	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	276	-	-	330	-	-	72	20	394	56	20	350
Mov Cap-2 Maneuver	-	-	-	-	-	-	72	20	-	56	20	-
Stage 1	-	-	-	-	-	-	154	267	-	97	163	-
Stage 2	-	-	-	-	-	-	316	163	-	438	262	-

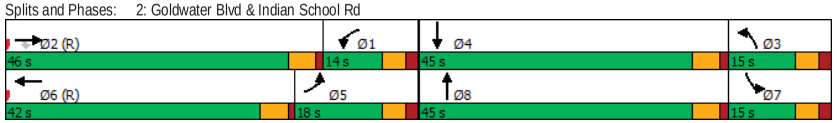
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.8	67.7	37.9
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	133	276	-	-	330	-	-	118
HCM Lane V/C Ratio	0.613	0.02	-	-	0.178	-	-	0.074
HCM Control Delay (s)	67.7	18.3	-	-	18.3	-	-	37.9
HCM Lane LOS	F	C	-	-	C	-	-	E
HCM 95th %tile Q(veh)	3.2	0.1	-	-	0.6	-	-	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	153	887	61	56	998	98	226	87	726
Future Volume (vph)	153	887	61	56	998	98	226	87	726
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2		1	6	3	8	7	4
Permitted Phases			2						
Detector Phase	5	2	2	1	6	3	8	7	4
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	11.0	16.0	16.0	11.0	16.0	11.0	16.0	11.0	16.0
Total Split (s)	18.0	46.0	46.0	14.0	42.0	15.0	45.0	15.0	45.0
Total Split (%)	15.0%	38.3%	38.3%	11.7%	35.0%	12.5%	37.5%	12.5%	37.5%
Yellow Time (s)	3.3	4.0	4.0	3.3	4.0	3.3	4.0	3.3	4.0
All-Red Time (s)	2.0	1.0	1.0	2.0	1.0	2.0	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.0	5.0	5.3	5.0	5.3	5.3	5.3	5.3
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?									
Recall Mode	None	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	10.5	56.3	56.3	6.8	50.6	12.8	13.0	25.0	25.2
Actuated g/C Ratio	0.09	0.47	0.47	0.06	0.42	0.11	0.11	0.21	0.21
v/c Ratio	0.59	0.55	0.09	0.33	0.74	0.60	0.72	0.27	0.82
Control Delay	61.0	26.7	0.7	58.8	34.2	64.6	58.0	40.5	50.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.0	26.7	0.7	58.8	34.2	64.6	58.0	40.5	50.1
LOS	E	C	A	E	C	E	E	D	D
Approach Delay		30.0			35.5		59.7		49.2
Approach LOS		C			D		E		D

Intersection Summary		
Cycle Length: 120		
Actuated Cycle Length: 120		
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green		
Natural Cycle: 70		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.82		
Intersection Signal Delay: 40.0	Intersection LOS: D	
Intersection Capacity Utilization 71.6%	ICU Level of Service C	
Analysis Period (min) 15		

Splits and Phases: 2: Goldwater Blvd & Indian School Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	153	887	61	56	998	58	98	226	46	87	726	120
Future Volume (veh/h)	153	887	61	56	998	58	98	226	46	87	726	120
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	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	1772
Adj Flow Rate, veh/h	166	964	66	61	1085	63	107	246	50	95	789	130
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	785	1278	513	676	1108	64	130	312	62	299	934	153
Arrive On Green	0.24	0.34	0.34	0.21	0.31	0.31	0.08	0.10	0.10	0.18	0.20	0.20
Sat Flow, veh/h	3274	3741	1502	3274	3593	209	1688	3106	621	1688	4654	761
Grp Volume(v), veh/h	166	964	66	61	565	583	107	146	150	95	606	313
Grp Sat Flow(s),veh/h/ln	1637	1870	1502	1637	1870	1931	1688	1870	1857	1688	1792	1832
Q Serve(g_s), s	4.9	27.4	3.6	1.8	35.9	35.9	7.5	9.2	9.5	5.9	19.5	19.8
Cycle Q Clear(g_c), s	4.9	27.4	3.6	1.8	35.9	35.9	7.5	9.2	9.5	5.9	19.5	19.8
Prop In Lane	1.00		1.00	1.00		0.11	1.00		0.33	1.00		0.42
Lane Grp Cap(c), veh/h	785	1278	513	676	577	595	130	188	187	299	719	368
V/C Ratio(X)	0.21	0.75	0.13	0.09	0.98	0.98	0.82	0.78	0.80	0.32	0.84	0.85
Avail Cap(c_a), veh/h	785	1278	513	676	577	595	136	619	614	299	1185	606
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.5	35.0	27.2	38.5	41.1	41.1	54.6	52.7	52.8	43.0	46.1	46.2
Incr Delay (d2), s/veh	0.0	4.2	0.5	0.0	32.7	32.2	28.7	2.6	3.0	0.2	1.3	2.9
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	2.0	13.1	1.4	0.7	21.5	22.2	4.2	4.4	4.6	2.5	8.8	9.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.6	39.2	27.7	38.5	73.8	73.3	83.3	55.3	55.8	43.3	47.5	49.2
LnGrp LOS	D	D	C	D	E	E	F	E	E	D	D	D
Approach Vol, veh/h		1196			1209			403			1014	
Approach Delay, s/veh		38.2			71.8			62.9			47.6	
Approach LOS		D			E			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	30.1	46.0	14.5	29.4	34.1	42.0	26.6	17.4
Change Period (Y+Rc), s	5.3	* 5	* 5.3	* 5.3	5.3	* 5	* 5.3	* 5.3
Max Green Setting (Gmax), s	8.7	* 41	* 9.7	* 40	12.7	* 37	* 9.7	* 40
Max Q Clear Time (g_c+I1), s	3.8	29.4	9.5	21.8	6.9	37.9	7.9	11.5
Green Ext Time (p_c), s	0.0	2.4	0.0	2.3	0.1	0.0	0.0	0.6

Intersection Summary		
HCM 6th Ctrl Delay		53.9
HCM 6th LOS		D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	13	4	8	7	16	352	20	821
Future Volume (vph)	13	4	8	7	16	352	20	821
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		8		4		6		2
Permitted Phases	8		4		6		2	
Detector Phase	8	8	4	4	6	6	2	2
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	10.0	10.0	10.0	10.0
Minimum Split (s)	35.0	35.0	35.0	35.0	70.0	70.0	70.0	70.0
Total Split (s)	50.0	50.0	50.0	50.0	90.0	90.0	90.0	90.0
Total Split (%)	35.7%	35.7%	35.7%	35.7%	64.3%	64.3%	64.3%	64.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	4.0	4.0	4.0	4.0
All-Red Time (s)	1.5	1.5	1.5	1.5	1.2	1.2	1.2	1.2
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.8		4.8	5.2	5.2	5.2	5.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)		7.4		7.4	129.4	129.4	129.4	129.4
Actuated g/C Ratio		0.05		0.05	0.92	0.92	0.92	0.92
v/c Ratio		0.27		0.31	0.03	0.12	0.03	0.19
Control Delay		55.4		49.6	1.3	0.9	1.1	1.0
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		55.4		49.6	1.3	0.9	1.1	1.0
LOS		E		D	A	A	A	A
Approach Delay		55.4		49.6		1.0		1.0
Approach LOS		E		D		A		A

Intersection Summary			
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.31			
Intersection Signal Delay: 3.1		Intersection LOS: A	
Intersection Capacity Utilization 31.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Main St & Goldwater Blvd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	4	7	8	7	13	16	352	13	20	821	25
Future Volume (veh/h)	13	4	7	8	7	13	16	352	13	20	821	25
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	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	1772
Adj Flow Rate, veh/h	14	4	8	9	8	14	17	383	14	22	892	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	70	22	23	48	27	35	547	3254	119	866	4739	143
Arrive On Green	0.04	0.04	0.04	0.04	0.04	0.04	0.88	0.88	0.88	0.88	0.88	0.88
Sat Flow, veh/h	678	498	523	330	613	776	576	3681	134	935	5361	162
Grp Volume(v), veh/h	26	0	0	31	0	0	17	194	203	22	596	323
Grp Sat Flow(s),veh/h/ln	1698	0	0	1719	0	0	576	1870	1945	935	1792	1940
Q Serve(g_s), s	0.0	0.0	0.0	0.3	0.0	0.0	0.6	1.9	1.9	0.4	3.2	3.2
Cycle Q Clear(g_c), s	1.9	0.0	0.0	2.3	0.0	0.0	3.8	1.9	1.9	2.3	3.2	3.2
Prop In Lane	0.54		0.31	0.29		0.45	1.00		0.07	1.00		0.08
Lane Grp Cap(c), veh/h	115	0	0	110	0	0	547	1653	1719	866	3168	1715
V/C Ratio(X)	0.23	0.00	0.00	0.28	0.00	0.00	0.03	0.12	0.12	0.03	0.19	0.19
Avail Cap(c_a), veh/h	557	0	0	575	0	0	547	1653	1719	866	3168	1715
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	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.59	0.59	0.59
Uniform Delay (d), s/veh	64.8	0.0	0.0	65.0	0.0	0.0	1.4	1.1	1.1	1.2	1.1	1.1
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.5	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1
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	0.9	0.0	0.0	1.1	0.0	0.0	0.1	0.4	0.4	0.1	0.6	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.2	0.0	0.0	65.5	0.0	0.0	1.5	1.2	1.2	1.2	1.2	1.3
LnGrp LOS	E	A	A	E	A	A	A	A	A	A	A	A
Approach Vol, veh/h		26			31			414			941	
Approach Delay, s/veh		65.2			65.5			1.2			1.2	
Approach LOS		E			E			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		129.0		11.0		129.0		11.0				
Change Period (Y+Rc), s		* 5.2		* 4.8		* 5.2		* 4.8				
Max Green Setting (Gmax), s		* 85		* 45		* 85		* 45				
Max Q Clear Time (g_c+I1), s		5.2		4.3		5.8		3.9				
Green Ext Time (p_c), s		1.2		0.1		0.5		0.1				

Intersection Summary			
HCM 6th Ctrl Delay		3.8	
HCM 6th LOS		A	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	7	4	3	2	4	9	7	24	4	5	63	9
Future Vol, veh/h	7	4	3	2	4	9	7	24	4	5	63	9
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	4	3	2	4	10	8	26	4	5	68	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	134	129	73	131	132	28	78	0	0	30	0	0
Stage 1	83	83	-	44	44	-	-	-	-	-	-	-
Stage 2	51	46	-	87	88	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	838	762	989	841	759	1047	1520	-	-	1583	-	-
Stage 1	925	826	-	970	858	-	-	-	-	-	-	-
Stage 2	962	857	-	921	822	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	821	756	989	829	753	1047	1520	-	-	1583	-	-
Mov Cap-2 Maneuver	821	756	-	829	753	-	-	-	-	-	-	-
Stage 1	920	824	-	965	854	-	-	-	-	-	-	-
Stage 2	943	853	-	910	820	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.4	9	1.5	0.5
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1520	-	-	831	919	1583	-	-
HCM Lane V/C Ratio	0.005	-	-	0.018	0.018	0.003	-	-
HCM Control Delay (s)	7.4	0	-	9.4	9	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

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	7	0	7	2	0	1	13	365	1	4	816	12
Future Vol, veh/h	7	0	7	2	0	1	13	365	1	4	816	12
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	70	-	-	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	0	8	2	0	1	14	397	1	4	887	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1129	1328	450	789	1334	199	900	0	0	398	0	0
Stage 1	902	902	-	426	426	-	-	-	-	-	-	-
Stage 2	227	426	-	363	908	-	-	-	-	-	-	-
Critical Hdwy	6.99	6.54	7.14	6.99	6.54	6.94	5.34	-	-	4.14	-	-
Critical Hdwy Stg 1	7.34	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.67	4.02	3.92	3.67	4.02	3.32	3.12	-	-	2.22	-	-
Pot Cap-1 Maneuver	184	154	476	309	153	809	437	-	-	1157	-	-
Stage 1	238	355	-	558	584	-	-	-	-	-	-	-
Stage 2	727	584	-	595	352	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	179	149	476	296	148	809	437	-	-	1157	-	-
Mov Cap-2 Maneuver	179	149	-	296	148	-	-	-	-	-	-	-
Stage 1	230	354	-	540	565	-	-	-	-	-	-	-
Stage 2	703	565	-	583	351	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.7	14.7	0.5	0
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	437	-	-	260	296	809	1157	-	-
HCM Lane V/C Ratio	0.032	-	-	0.059	0.007	0.001	0.004	-	-
HCM Control Delay (s)	13.5	-	-	19.7	17.3	9.5	8.1	-	-
HCM Lane LOS	B	-	-	C	C	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0	0	0	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	0	40	0	0	68
Future Vol, veh/h	1	0	40	0	0	68
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	0	43	0	0	74

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	117	43	0	0	43	0
Stage 1	43	-	-	-	-	-
Stage 2	74	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	879	1027	-	-	1566	-
Stage 1	979	-	-	-	-	-
Stage 2	949	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	879	1027	-	-	1566	-
Mov Cap-2 Maneuver	879	-	-	-	-	-
Stage 1	979	-	-	-	-	-
Stage 2	949	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	879	1566	-
HCM Lane V/C Ratio	-	-	0.001	-	-
HCM Control Delay (s)	-	-	9.1	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	2	0	392	830	0
Future Vol, veh/h	0	2	0	392	830	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2	0	426	902	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	451	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	475	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	475	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.6	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	475	-	-
HCM Lane V/C Ratio	-	0.005	-	-
HCM Control Delay (s)	-	12.6	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0	-	-

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	19	32	9	5	56	9	5	9	7	8	19	43
Future Vol, veh/h	19	32	9	5	56	9	5	9	7	8	19	43
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	35	10	5	61	10	5	10	8	9	21	47

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	71	0	0	45	0	0	192	163	40	167	163	66
Stage 1	-	-	-	-	-	-	82	82	-	76	76	-
Stage 2	-	-	-	-	-	-	110	81	-	91	87	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1529	-	-	1563	-	-	768	729	1031	797	729	998
Stage 1	-	-	-	-	-	-	926	827	-	933	832	-
Stage 2	-	-	-	-	-	-	895	828	-	916	823	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1529	-	-	1563	-	-	707	717	1031	773	717	998
Mov Cap-2 Maneuver	-	-	-	-	-	-	707	717	-	773	717	-
Stage 1	-	-	-	-	-	-	913	815	-	920	830	-
Stage 2	-	-	-	-	-	-	829	826	-	886	811	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.3	0.5	9.7	9.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	795	1529	-	-	1563	-	-	876
HCM Lane V/C Ratio	0.029	0.014	-	-	0.003	-	-	0.087
HCM Control Delay (s)	9.7	7.4	0	-	7.3	0	-	9.5
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.3

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↑↑↕		↰	↑↑↕	
Traffic Vol, veh/h	5	18	25	11	19	45	23	342	17	28	776	25
Future Vol, veh/h	5	18	25	11	19	45	23	342	17	28	776	25
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	-	-	-	-	-	-	130	-	-	82	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	20	27	12	21	49	25	372	18	30	843	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1164	1357	435	838	1361	195	870	0	0	390	0	0
Stage 1	917	917	-	431	431	-	-	-	-	-	-	-
Stage 2	247	440	-	407	930	-	-	-	-	-	-	-
Critical Hdwy	6.99	6.54	7.14	6.99	6.54	6.94	5.34	-	-	4.14	-	-
Critical Hdwy Stg 1	7.34	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.67	4.02	3.92	3.67	4.02	3.32	3.12	-	-	2.22	-	-
Pot Cap-1 Maneuver	175	148	487	287	147	814	452	-	-	1165	-	-
Stage 1	233	349	-	554	581	-	-	-	-	-	-	-
Stage 2	708	576	-	559	344	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	137	136	487	227	135	814	452	-	-	1165	-	-
Mov Cap-2 Maneuver	137	136	-	227	135	-	-	-	-	-	-	-
Stage 1	220	340	-	524	549	-	-	-	-	-	-	-
Stage 2	605	544	-	485	335	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26.6	20.9	0.8	0.3
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	452	-	-	218	307	1165	-	-
HCM Lane V/C Ratio	0.055	-	-	0.239	0.266	0.026	-	-
HCM Control Delay (s)	13.4	-	-	26.6	20.9	8.2	-	-
HCM Lane LOS	B	-	-	D	C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.9	1	0.1	-	-

APPENDIX E

CRASH DATA

REPORT #	YYMMDD	HHMM	NS ST	NS SF	EW ST	EW SF	DIR FROM	DIST FROM	AUX REF ST	DIR FROM AUX	DOB 1	DOB 2	INJ SEV 1	INJ SEV 2	PHYSICAL COND 1
17-15863	170717	1005	GOLDWATER	BL	1	ST	AT				2/7/1943	10/19/1965	4	1	0
17-22604	171012	1000	GOLDWATER	BL	1	ST	AT					3/17/1953	99	1	99
15-08797	150416	1254	GOLDWATER	BL	1	ST	W	126	INDIAN SCHOOL	S	4/16/1957	7/28/1981	1	1	0
16-02919	160205	2043	GOLDWATER	BL	1	ST	AT					6/29/1983	99	1	99
16-23376	161020	0901	GOLDWATER	BL	1	ST	W	101			2/2/1990	8/6/1984	1	1	0

KEY

INJURY SEVERITY:
1=NO INJURY, 2=POSSIBLE INJURY, 3=NON-INCAPACITATING INJURY, 4=INCAPACITATING INJURY, 5=FATAL INJURY, 99=NOT REPORTED / UNKNOWN

PHYSICAL CONDITION:
0=NO APPARENT INFLUENCE, 1=ILLNESS, 2=PHYSICAL IMPAIRMENT, 3=FELL ASLEEP / FATIGUED 4=ALCOHOL, 5=DRUGS, 6=MEDICATIONS, A=NO TEST GIVEN, B=TEST GIVEN, C=TEST REFUSED, D=TESTING UNKNOWN, 97=OTHER, 99=UNKNOWN

VIOLATION:
1=NO IMPROPER ACTION, 2=SPEED TOO FAST FOR CONDITIONS, 3=EXCEEDED LAWFUL SPEED 4=FOLLOWED TOO CLOSELY. 5=RAN STOP SIGN, 6=DISREGAREDED TRAFFIC SIGNAL7=MADE IMPROPER TURN, 8=DROVE/RODE IN OPPOSING TRAFFIC LANE, 9=KNOWINGLY OPERATED WITH FAULTY / MISSING EQUIPMENT, 10=REQUIRED MOTORCYCLE SAFETY EQUIPMENT NOT USED, 11=PASSED IN NO PASSING ZONE, 12=UNSAFE LANE CHANGE, 13=FAILED TO KEEP IN PROPER LANE, 14=DISREGARDED PAVEMENT MARKINGS, 15=OTHER UNSAFE PASSING, 16=INATTENTION/DISTRACTION, 17=DID NOT USE CROSSWALK, 18=WALKED ON WRONG SIDE OF ROAD, 19=ELECTRONIC COMMUNICATIONS DEVICE, 20=FAILED TO YIELD RIGHT OF WAY (added August 2014), 97=OTHER, 99 UNKNOWN

ACTION:
1=GOING STRAIGHT AHEAD, 2= SLOWING IN TRAFFICWAY, 3=STOPPED IN TRAFFICWAY, 4=MAKING LEFT TURN, 5=MAKING RIGHT TURN, 6=MAKING U-TURN, 7=OVERTAKING/PASSING, 8=CHANGING LANES, 9=NEGOTIATING A CURVE, 10=BACKING, 11=AVOIDING VEH/OBJ/PED/CYCLIST/ANIMAL, 12=ENTERING PARKING POSITION, 13=LEAVING PARKING POSITION, 14=PROPERLY PARKED, 15=IMPROPERLY PARKED, 16=DRIVERLESS MOVING VEHICLE, 17=CROSING ROAD, 18=WALKING WITH TRAFFIC, 19=WALKING AGAINST TRAFFIC, 20= STANDING, 21=LYING, 22=GETTING ON OR OFF VEHICLE, 23=WORKING ON/PUSHING VEHICLE, 24=WORKING ON ROAD, 97=OTHER, 99=UKNOWN

MANNER OF COLLISION:
1=SINGLE VEHICLE, 2=ANGLE (front to side, other than left turn), 3=LEFT TURN, 4=REAR END (front to rear), 5=HEAD-ON (front to front, other than left turn), 6=SIDE SWIPE (same direction), 7=SIDE SWIPE (opposite direction), 8=REAR-TO-SIDE, 9=REAR TO REAR, 97=OTHER, 99=UNKNOWN

PHYSICAL COND 2	VIOL 1	VIOL 2	ACTION 1	ACTION 2	TRAVEL DIR 1	TRAVEL DIR 2	MANNER	COMMENTS	DATE ENTERED	
0	13	1	17	1	NB	EB	2	CAR/BICYCLE	8/1/2017	
0	7	1	5	1	SB	SB	6	HIT AND RUN	10/24/2017	
0		1	13	1	EB	EB	2		42122	KAY
0	97	1	10	5	WB	WB	7	HIT AND RUN	42422	KAY
0	97	97	10	10	SB	NB	2		42676	KAY

APPENDIX F

TRIP GENERATION

Winery Suites - Existing

Proposed

Trip Generation

September 2018

Appendix D

Methodology Overview

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

Box 1 - Define Study Site Land Use Type & Site Characteristics

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

Land Use Types and Size

Proposed Use	Amount	Units	ITE LUC	ITE Land Use Name
General Office Building	1.463	1,000 square feet	710	General Office Building
Quality Restaurant	1.533	1,000 square feet	931	Quality Restaurant

Box 2 - Define Site Context

Context assessment is to "simply determine whether the study sites is in a multimodal setting" and "could have persons accessing the site by walking, bicycling, or riding transit."
This assessment is used in Box 4. The *Manual* separates data into 4 setting categories - **Rural, General Urban/Suburban**, **Dense Multi-Urban Use** and **Center City Core**.
This worksheet uses the following abbreviations, respectively: ***R***, ***G***, ***D***, and ***C***. The *Manual* does not have data for all settings of all land use codes. See the table on the next page titled "Site Context and Time Periods" - if this table is not provided, the "General Urban/Suburban" setting is used by default.

Box 3 - Define Analysis Objectives Types of Trips & Time Period

This tool will focus on vehicular trips for a 24-hour period on a typical weekday as well as its AM peak hour and PM peak hour. Other time period(s) may be of interest.

Box 4 - Is Study Site Multimodal?

Per the Handbook, "if the objective is to establish a local trip generation rate for a particular land use or study site, the simplified approach (Box 9) may be acceptable but the *Box 5 through 8* approach is required if the study site is located in an infill setting, contains a mix of uses on-site, or is near significant transit service."

Box 5/Box 9 - Estimate Baseline Trips/Estimate Vehicular Trips (Determine Equation)

Vehicle trips are estimated using rates/equations applicable to each LUC. When the appropriate graph has a fitted curve, the *Handbook* has a process (Figure 4.2) to determine when to use it versus using the weighted average rate or collecting local data. The methodology requires for engineering judgement in some circumstances and permits engineering judgement to override or make adjustments when appropriate to best project (example 1: study site is expected to operate differently than data in the applicable land use code - such as restaurant that is closed in the morning or in the evening; example 2: LUC data in a localized area fails to be represented by the typically selected fitted curve/weighted average rate - a small shop/LUC 820, AM peak hour is skewed by the high y-intercept).

Weighted Average Rate ("WA"), Fitted Curve ("FC"), or Custom ("C") Used in Analysis?

Proposed Use	ADT Equation [Equated Rate]	AM Equation [Equated Rate]	PM Equation [Equated Rate]	(not used)
General Office Building	WA: T=X*9.74 [9.74]	WA: T=X*1.16 [1.16]	FC: LN(T)=0.95*LN(X)+0.36 [1.41]	
Quality Restaurant	WA: T=X*83.84 [83.84]	WA: T=X*0.73 [0.73]	WA: T=X*7.8 [7.80]	

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

Baseline Vehicular Trips

	ADT				AM				PM				(not used)
Proposed Use	% In	In	Out	Total	% In	In	Out	Total	% In	In	Out	Total	
General Office Building	50%	7	7	14	86%	2	0	2	16%	0	2	2	
Quality Restaurant	50%	64	64	128	0%	0	1	1	67%	8	4	12	
Totals		**71**	**71**	**142**		**2**	**1**	**3**		**8**	**6**	**14**	

Winery Suites - Proposed

Proposed

Trip Generation

October 2018

Appendix E

Methodology Overview

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

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

Land Use Types and Size

Proposed Use	Amount Units	ITE LUC	ITE Land Use Name
Vacation Rentals	34 Rental Units	221	Multifamily Housing (Mid-Rise)
Shopping Center	1.500 1,000 square feet	820	Shopping Center

Box 2 - Define Site Context

Context assessment is to "simply determine whether the study sites is in a multimodal setting" and "could have persons accessing the site by walking, bicycling, or riding transit."
This assessment is used in Box 4. The *Manual* separates data into 4 setting categories - **Rural, General Urban/Suburban**, **Dense Multi-Urban Use** and **Center City Core**.
This worksheet uses the following abbreviations, respectively: ***R***, ***G***, ***D***, and ***C***. The *Manual* does not have data for all settings of all land use codes. See the table on the next page titled "Site Context and Time Periods" - if this table is not provided, the "General Urban/Suburban" setting is used by default.

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Box 5/Box 9 - Estimate Baseline Trips/Estimate Vehicular Trips (Determine Equation)

Vehicle trips are estimated using rates/equations applicable to each LUC. When the appropriate graph has a fitted curve, the *Handbook* has a process (Figure 4.2) to determine when to use it versus using the weighted average rate or collecting local data. The methodology requires for engineering judgement in some circumstances and permits engineering judgement to override or make adjustments when appropriate to best project (example 1: study site is expected to operate differently than data in the applicable land use code - such as restaurant that is closed in the morning or in the evening; example 2: LUC data in a localized area fails to be represented by the typically selected fitted curve/weighted average rate - a small shop/LUC 820, AM peak hour is skewed by the high y-intercept).

Weighted Average Rate ("WA"), Fitted Curve ("FC"), or Custom ("C") Used in Analysis?

Proposed Use	ADT Equation [Equated Rate]	AM Equation [Equated Rate]	PM Equation [Equated Rate]	(not used)
Vacation Rentals	FC: T=5.45*X-1.75 [5.40]	FC: LN(T)=0.98*LN(X)-0.98 [0.35]	FC: LN(T)=0.96*LN(X)-0.63 [0.46]	
Shopping Center	WA: T=X*37.75 [37.75]	WA: T=X*0.94 [0.94]	WA: T=X*3.81 [3.81]	

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

Baseline Vehicular Trips

	ADT				AM				PM				(not used)
Proposed Use	% In	In	Out	Total	% In	In	Out	Total	% In	In	Out	Total	
Vacation Rentals	50%	92	92	184	26%	3	9	12	61%	10	6	16	
Shopping Center	50%	28	28	56	62%	1	0	1	48%	3	3	6	
Totals		**120**	**120**	**240**		**4**	**9**	**13**		**13**	**9**	**22**	

APPENDIX G

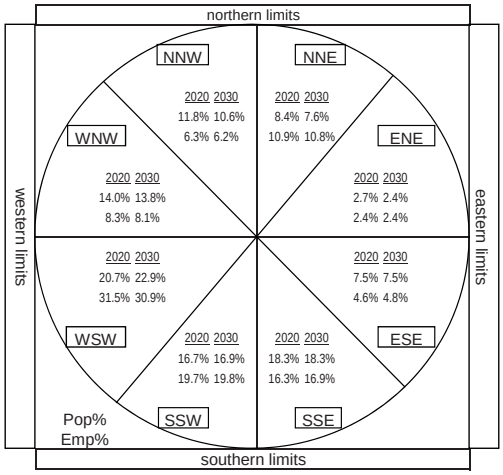
TRIP DISTRIBUTION

	2020				2030			
Quadrant	**Population**	**Percent**	**Employment**	**Percent**	**Population**	**Percent**	**Employment**	**Percent**
North Northwest	125,511	11.8%	54,849	6.3%	133,044	10.6%	58,720	6.2%
North Northeast	89,222	8.4%	94,597	10.9%	94,959	7.6%	102,246	10.8%
North	214,733	20.2%	149,445	17.2%	228,003	**18.2%**	160,965	**17.0%**
East Northeast	28,802	2.7%	20,511	2.4%	29,957	2.4%	22,801	2.4%
East Southeast	79,985	7.5%	40,289	4.6%	93,560	7.5%	45,589	4.8%
East	108,787	10.2%	60,800	7.0%	123,517	**9.9%**	68,390	**7.2%**
South Southeast	195,077	18.3%	142,336	16.3%	229,032	18.3%	159,816	16.9%
South Southwest	178,396	16.7%	171,737	19.7%	212,134	16.9%	187,563	19.8%
South	373,473	35.0%	314,074	36.0%	441,166	**35.2%**	347,379	**36.7%**
West Southwest	221,344	20.7%	274,556	31.5%	286,902	22.9%	292,250	30.9%
West Northwest	149,627	14.0%	72,692	8.3%	172,388	13.8%	76,869	8.1%
West	370,972	34.7%	347,247	39.8%	459,290	**36.7%**	369,119	**39.0%**
Totals	1,067,965	100.1%	871,566	100.0%	1,251,976	100.0%	945,853	99.9%

Radii

Population radius:	10	miles
Employment radius:	10	miles

Select Analysis Year (2020, 2030, 2040,2050)
2020



10-mile radius

		2020	2030	% of	2020	2030			2020	2030	% of	2020	2030
RAZ	**MPA**	Employment	Employment	**TAZ**	**Adjusted**	**Adjusted**	**RAZ**	**MPA**	Employment	Employment	**TAZ**	**Adjusted**	**Adjusted**
NNW							**NNE**						
246	PH	35,168	36,720	90%	31,651	33,048	228	PH	22,158	26,143	5%	1,108	1,307
228	PH	22,158	26,143	10%	2,216	2,614	246	PH	35,168	36,720	10%	3,517	3,672
227	PH	14,922	17,233	5%	746	862	247	SC	43,547	45,939	95%	41,370	43,642
245	PH	14,622	16,015	85%	12,429	13,613	262	PV	5,433	6,241	20%	1,087	1,248
244	PH	14,653	15,798	10%	1,465	1,580	263	SC	24,741	25,695	60%	14,845	15,417
242	PH	8,942	9,504	10%	894	950	264	SR	20,282	26,738	5%	1,014	1,337
349	MC	51	56	20%	10	11	248	SC	27,396	28,489	90%	24,656	25,640
262	PV	5,433	6,241	60%	3,260	3,745	249	SC	7,011	7,474	10%	701	747
247	SC	43,547	45,939	5%	2,177	2,297	230	SC	25,198	36,939	25%	6,300	9,235
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
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		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
From NNW					**54,849**	**58,720**	**From NNE**					**94,597**	**102,246**
From North												**149,445**	**160,965**

10-mile radius

RAZ	MPA	2020 Employment	2030 Employment	% of TAZ	2020 Adjusted	2030 Adjusted	RAZ	MPA	2020 Employment	2030 Employment	% of TAZ	2020 Adjusted	2030 Adjusted
ENE							ESE						
264	SR	20,282	26,738	25%	5,071	6,685	264	SR	20,282	26,738	25%	5,071	6,685
263	SC	24,741	25,695	40%	9,896	10,278	272	SC	55,578	62,010	25%	13,895	15,503
248	SC	27,396	28,489	10%	2,740	2,849	289	ME	22,892	25,176	20%	4,578	5,035
249	SC	7,011	7,474	40%	2,804	2,990	290	ME	32,071	34,902	40%	12,828	13,961
		-	-		-	-	291	ME	13,056	14,688	30%	3,917	4,406
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
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		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
From ENE					20,511	22,801	From ESE					40,289	45,589
From East												60,800	68,390

CivTech

Winery Suites Traffic Impact (and Mitigation) Analysis/Study

10-mile radius

RAZ	MPA	2020 Employment	2030 Employment	% of TAZ	2020 Adjusted	2030 Adjusted	RAZ	MPA	2020 Employment	2030 Employment	% of TAZ	2020 Adjusted	2030 Adjusted
SSE							SSW						
272	SC	55,578	62,010	60%	33,347	37,206	271	PH	47,178	49,236	5%	2,359	2,462
288	TE	91,219	108,636	50%	45,610	54,318	272	SC	55,578	62,010	10%	5,558	6,201
297	TE	48,900	51,510	50%	24,450	25,755	276	PH	21,332	22,600	60%	12,799	13,560
208	CF	1,962	2,320	10%	196	232	288	TE	91,219	108,636	50%	45,610	54,318
309	ME	38,666	41,186	30%	11,600	12,356	287	PH	70,682	74,070	50%	35,341	37,035
289	ME	22,892	25,176	80%	18,314	20,141	297	TE	48,900	51,510	50%	24,450	25,755
290	ME	32,071	34,902	20%	6,414	6,980	296	PH	43,174	45,538	90%	38,857	40,984
298	ME	13,922	14,909	10%	1,392	1,491	306	PH	16,212	17,305	40%	6,485	6,922
264	SR	20,282	26,738	5%	1,014	1,337	313	PH	6,917	7,924	1%	69	79
		-	-		-	-	208	CF	1,962	2,320	10%	196	232
		-	-		-	-	307	GU	1,393	1,473	1%	14	15
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
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		-	-		-	-			-	-		-	-
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		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
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		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
From SSE					142,336	159,816	From SSW					171,737	187,563
From South												314,074	347,379

CivTech

52-DR-2018
11/14/18

10-mile radius

RAZ	MPA	2020 Employment	2030 Employment	% of TAZ	2020 Adjusted	2030 Adjusted	RAZ	MPA	2020 Employment	2030 Employment	% of TAZ	2020 Adjusted	2030 Adjusted
WSW							**WNW**						
271	PH	47,178	49,236	85%	40,101	41,851	349	MC	51	56	80%	41	45
270	PH	88,544	95,588	100%	88,544	95,588	261	PH	32,143	33,195	100%	32,143	33,195
276	PH	21,332	22,600	40%	8,533	9,040	262	PV	5,433	6,241	20%	1,087	1,248
275	PH	99,166	105,347	90%	89,249	94,812	271	PH	47,178	49,236	10%	4,718	4,924
286	PH	16,332	17,637	80%	13,066	14,110	260	PH	24,724	26,675	90%	22,252	24,008
287	PH	70,682	74,070	40%	28,273	29,628	244	PH	14,653	15,798	75%	10,990	11,849
296	PH	43,174	45,538	10%	4,317	4,554	245	PH	14,622	16,015	10%	1,462	1,602
260	PH	24,724	26,675	10%	2,472	2,668			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
From WSW					**274,556**	**292,250**	**From WNW**					**72,692**	**76,869**
From West												**347,247**	**369,119**

APPENDIX H

BACKGROUND TRAFFIC CALCULATIONS

Location of counts: Goldwater Blvd btw Camelback and Indian School
Source(s): https://www.scottsdaleaz.gov/transportation/studies-reports/traffic-volume

	Year	Volume	Avg Growth Rate to 2014	Expansion Factor to 2014
Beginning	2014	17,800		
End	2016	18,400	1.7%	0.967

Growth Rate Used	1.7%
Per-Year Multiplier	1.017

Year	Expansion Factor(s)	
2018	1.000	
2019	1.017	
2020	1.034	<- Expansion factor to opening
2021	1.052	
2022	1.070	
2023	1.088	
2024	1.106	
2025	1.125	
2026	1.144	
2027	1.164	
2028	1.184	
2029	1.204	
2030	1.224	
2031	1.245	
2032	1.266	
2033	1.288	
2034	1.310	
2035	1.332	
2036	1.354	
2037	1.378	
2038	1.401	

APPENDIX I

2020 PEAK HOUR TRAFFIC ANALYSIS

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	1149	24	30	1033	5	25	1	43	1	0	0
Future Vol, veh/h	7	1149	24	30	1033	5	25	1	43	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	1249	26	33	1123	5	27	1	47	1	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1128	0	0	1275	0	0	1793	2472	638	1708	2483	564
Stage 1	-	-	-	-	-	-	1278	1278	-	1192	1192	-
Stage 2	-	-	-	-	-	-	515	1194	-	516	1291	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	339	-	-	288	-	-	85	30	359	96	29	402
Stage 1	-	-	-	-	-	-	127	235	-	146	259	-
Stage 2	-	-	-	-	-	-	466	258	-	466	232	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	339	-	-	288	-	-	76	26	359	72	25	402
Mov Cap-2 Maneuver	-	-	-	-	-	-	76	26	-	72	25	-
Stage 1	-	-	-	-	-	-	124	229	-	142	229	-
Stage 2	-	-	-	-	-	-	413	228	-	394	226	-

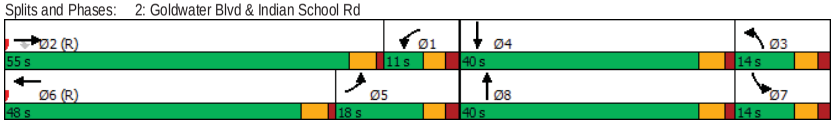
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.5	55.7	55.8
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	142	339	-	-	288	-	-	72
HCM Lane V/C Ratio	0.528	0.022	-	-	0.113	-	-	0.015
HCM Control Delay (s)	55.7	15.9	-	-	19.1	-	-	55.8
HCM Lane LOS	F	C	-	-	C	-	-	F
HCM 95th %tile Q(veh)	2.6	0.1	-	-	0.4	-	-	0

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	175	1003	71	64	829	66	387	31	263
Future Volume (vph)	175	1003	71	64	829	66	387	31	263
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2		1	6	3	8	7	4
Permitted Phases			2						
Detector Phase	5	2	2	1	6	3	8	7	4
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	7.0	5.0	7.0
Minimum Split (s)	11.0	16.0	16.0	11.0	16.0	11.0	16.0	11.0	16.0
Total Split (s)	18.0	55.0	55.0	11.0	48.0	14.0	40.0	14.0	40.0
Total Split (%)	15.0%	45.8%	45.8%	9.2%	40.0%	11.7%	33.3%	11.7%	33.3%
Yellow Time (s)	3.3	4.0	4.0	3.3	4.0	3.3	4.0	3.3	4.0
All-Red Time (s)	2.0	1.0	1.0	2.0	1.0	2.0	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.0	5.0	5.3	5.0	5.3	5.3	5.3	5.3
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?									
Recall Mode	None	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	11.7	73.4	73.4	5.6	65.2	12.4	19.4	7.0	11.9
Actuated g/C Ratio	0.10	0.61	0.61	0.05	0.54	0.10	0.16	0.06	0.10
v/c Ratio	0.60	0.48	0.08	0.47	0.47	0.42	0.75	0.35	0.66
Control Delay	59.9	15.8	1.0	66.1	19.6	55.8	55.3	63.4	48.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.9	15.8	1.0	66.1	19.6	55.8	55.3	63.4	48.3
LOS	E	B	A	E	B	E	E	E	D
Approach Delay		21.1			22.8		55.4		49.6
Approach LOS		C			C		E		D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 30.6	Intersection LOS: C
Intersection Capacity Utilization 63.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Goldwater Blvd & Indian School Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	1003	71	64	829	48	66	387	25	31	263	86
Future Volume (veh/h)	175	1003	71	64	829	48	66	387	25	31	263	86
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	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	1772
Adj Flow Rate, veh/h	190	1090	77	70	901	52	72	421	27	34	286	93
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	981	1559	626	790	1288	74	120	498	32	48	395	121
Arrive On Green	0.30	0.42	0.42	0.24	0.36	0.36	0.07	0.14	0.14	0.03	0.10	0.10
Sat Flow, veh/h	3274	3741	1502	3274	3594	207	1688	3570	228	1688	4075	1252
Grp Volume(v), veh/h	190	1090	77	70	469	484	72	220	228	34	249	130
Grp Sat Flow(s),veh/h/ln	1637	1870	1502	1637	1870	1931	1688	1870	1928	1688	1792	1743
Q Serve(g_s), s	5.2	28.8	3.8	2.0	25.8	25.8	5.0	13.8	13.9	2.4	8.1	8.7
Cycle Q Clear(g_c), s	5.2	28.8	3.8	2.0	25.8	25.8	5.0	13.8	13.9	2.4	8.1	8.7
Prop In Lane	1.00		1.00	1.00		0.11	1.00		0.12	1.00		0.72
Lane Grp Cap(c), veh/h	981	1559	626	790	670	692	120	261	269	48	347	169
V/C Ratio(X)	0.19	0.70	0.12	0.09	0.70	0.70	0.60	0.84	0.85	0.71	0.72	0.77
Avail Cap(c_a), veh/h	981	1559	626	790	670	692	122	541	557	122	1036	504
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	0.99	0.99	0.99	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.2	28.8	21.5	35.3	33.0	33.0	54.1	50.3	50.4	57.8	52.6	52.9
Incr Delay (d2), s/veh	0.0	2.6	0.4	0.0	6.0	5.8	5.3	2.8	2.8	7.1	1.1	2.7
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	2.1	13.3	1.4	0.8	12.7	13.1	2.3	6.6	6.9	1.1	3.7	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.3	31.4	21.9	35.3	39.0	38.8	59.4	53.2	53.2	65.0	53.7	55.6
LnGrp LOS	C	C	C	D	D	D	E	D	D	E	D	E
Approach Vol, veh/h		1357			1023			520			413	
Approach Delay, s/veh		30.9			38.6			54.0			55.2	
Approach LOS		C			D			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	34.3	55.0	13.8	16.9	41.3	48.0	8.7	22.0
Change Period (Y+Rc), s	5.3	* 5	* 5.3	* 5.3	5.3	* 5	* 5.3	* 5.3
Max Green Setting (Gmax), s	5.7	* 50	* 8.7	* 35	12.7	* 43	* 8.7	* 35
Max Q Clear Time (g_c+I1), s	4.0	30.8	7.0	10.7	7.2	27.8	4.4	15.9
Green Ext Time (p_c), s	0.0	3.2	0.0	0.9	0.2	2.1	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	39.9
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	4	3	3	3	9	476	4	375
Future Volume (vph)	4	3	3	3	9	476	4	375
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		8		4		6		2
Permitted Phases	8		4		6		2	
Detector Phase	8	8	4	4	6	6	2	2
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	10.0	10.0	10.0	10.0
Minimum Split (s)	35.0	35.0	35.0	35.0	70.0	70.0	70.0	70.0
Total Split (s)	50.0	50.0	50.0	50.0	90.0	90.0	90.0	90.0
Total Split (%)	35.7%	35.7%	35.7%	35.7%	64.3%	64.3%	64.3%	64.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	4.0	4.0	4.0	4.0
All-Red Time (s)	1.5	1.5	1.5	1.5	1.2	1.2	1.2	1.2
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.8		4.8	5.2	5.2	5.2	5.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)		7.2		7.2	133.0	133.0	133.0	133.0
Actuated g/C Ratio		0.05		0.05	0.95	0.95	0.95	0.95
v/c Ratio		0.20		0.19	0.01	0.15	0.01	0.08
Control Delay		69.3		68.7	0.9	0.7	1.0	0.6
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		69.3		68.7	0.9	0.7	1.0	0.6
LOS		E		E	A	A	A	A
Approach Delay		69.3		68.7		0.7		0.6
Approach LOS		E		E		A		A

Intersection Summary		
Cycle Length: 140		
Actuated Cycle Length: 140		
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green		
Natural Cycle: 105		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.20		
Intersection Signal Delay: 3.0	Intersection LOS: A	
Intersection Capacity Utilization 26.7%	ICU Level of Service A	
Analysis Period (min) 15		

Splits and Phases: 3: Main St & Goldwater Blvd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	3	9	3	3	9	9	476	1	4	375	13
Future Volume (veh/h)	4	3	9	3	3	9	9	476	1	4	375	13
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	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	1772
Adj Flow Rate, veh/h	4	3	10	3	3	10	10	517	1	4	408	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	41	16	36	37	16	39	859	3418	7	784	4763	163
Arrive On Green	0.04	0.04	0.04	0.04	0.04	0.04	0.89	0.89	0.89	0.89	0.89	0.89
Sat Flow, veh/h	246	456	1003	187	456	1071	914	3830	7	837	5337	182
Grp Volume(v), veh/h	17	0	0	16	0	0	10	252	266	4	273	149
Grp Sat Flow(s),veh/h/ln	1706	0	0	1713	0	0	914	1870	1967	837	1792	1936
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.3	2.4	0.1	1.2	1.3
Cycle Q Clear(g_c), s	1.3	0.0	0.0	1.2	0.0	0.0	1.4	2.3	2.4	2.4	1.2	1.3
Prop In Lane	0.24		0.59	0.19		0.62	1.00		0.00	1.00		0.09
Lane Grp Cap(c), veh/h	93	0	0	92	0	0	859	1669	1756	784	3198	1728
V/C Ratio(X)	0.18	0.00	0.00	0.17	0.00	0.00	0.01	0.15	0.15	0.01	0.09	0.09
Avail Cap(c_a), veh/h	570	0	0	573	0	0	859	1669	1756	784	3198	1728
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	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.82	0.82	0.82
Uniform Delay (d), s/veh	65.7	0.0	0.0	65.6	0.0	0.0	1.0	0.9	0.9	1.1	0.9	0.9
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.1
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	0.6	0.0	0.0	0.6	0.0	0.0	0.0	0.5	0.5	0.0	0.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.0	0.0	0.0	66.0	0.0	0.0	1.0	1.1	1.1	1.1	0.9	1.0
LnGrp LOS	E	A	A	E	A	A	A	A	A	A	A	A
Approach Vol, veh/h		17			16			528			426	
Approach Delay, s/veh		66.0			66.0			1.1			0.9	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	130.1	9.9	130.1	9.9
Change Period (Y+Rc), s	* 5.2	* 4.8	* 5.2	* 4.8
Max Green Setting (Gmax), s	* 85	* 45	* 85	* 45
Max Q Clear Time (g_c+I1), s	4.4	3.2	4.4	3.3
Green Ext Time (p_c), s	0.5	0.0	0.5	0.0

Intersection Summary	
HCM 6th Ctrl Delay	3.2
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	21	13	12	12	3	3	2	35	8	8	21	4
Future Vol, veh/h	21	13	12	12	3	3	2	35	8	8	21	4
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	23	14	13	13	3	3	2	38	9	9	23	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	93	94	25	104	92	43	27	0	0	47	0	0
Stage 1	43	43	-	47	47	-	-	-	-	-	-	-
Stage 2	50	51	-	57	45	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	891	796	1051	876	798	1027	1587	-	-	1560	-	-
Stage 1	971	859	-	967	856	-	-	-	-	-	-	-
Stage 2	963	852	-	955	857	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	880	790	1051	849	792	1027	1587	-	-	1560	-	-
Mov Cap-2 Maneuver	880	790	-	849	792	-	-	-	-	-	-	-
Stage 1	970	854	-	966	855	-	-	-	-	-	-	-
Stage 2	955	851	-	922	852	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	9.3	0.3	1.8
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1587	-	-	889	864	1560	-	-
HCM Lane V/C Ratio	0.001	-	-	0.056	0.023	0.006	-	-
HCM Control Delay (s)	7.3	0	-	9.3	9.3	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

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	8	1	9	1	0	4	2	489	1	3	379	10
Future Vol, veh/h	8	1	9	1	0	4	2	489	1	3	379	10
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	70	-	-	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	1	10	1	0	4	2	532	1	3	412	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	694	961	212	708	966	267	423	0	0	533	0	0
Stage 1	424	424	-	537	537	-	-	-	-	-	-	-
Stage 2	270	537	-	171	429	-	-	-	-	-	-	-
Critical Hdwy	6.99	6.54	7.14	6.99	6.54	6.94	5.34	-	-	4.14	-	-
Critical Hdwy Stg 1	7.34	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.67	4.02	3.92	3.67	4.02	3.32	3.12	-	-	2.22	-	-
Pot Cap-1 Maneuver	356	255	675	348	253	731	736	-	-	1031	-	-
Stage 1	509	585	-	480	521	-	-	-	-	-	-	-
Stage 2	687	521	-	776	582	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	352	253	675	340	251	731	736	-	-	1031	-	-
Mov Cap-2 Maneuver	352	253	-	340	251	-	-	-	-	-	-	-
Stage 1	507	583	-	479	519	-	-	-	-	-	-	-
Stage 2	681	519	-	761	580	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.4	11.1	0	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	736	-	-	450	340	731	1031	-	-
HCM Lane V/C Ratio	0.003	-	-	0.043	0.003	0.006	0.003	-	-
HCM Control Delay (s)	9.9	-	-	13.4	15.6	10	8.5	-	-
HCM Lane LOS	A	-	-	B	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	0	-	-

Intersection	
Int Delay, s/veh	1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	6	40	2	5	41
Future Vol, veh/h	1	6	40	2	5	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	7	43	2	5	45

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	99	44	0	0	45	0
Stage 1	44	-	-	-	-	-
Stage 2	55	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	900	1026	-	-	1563	-
Stage 1	978	-	-	-	-	-
Stage 2	968	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	897	1026	-	-	1563	-
Mov Cap-2 Maneuver	897	-	-	-	-	-
Stage 1	975	-	-	-	-	-
Stage 2	968	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.6	0	0.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	1005	1563	-
HCM Lane V/C Ratio	-	-	0.008	0.003	-
HCM Control Delay (s)	-	-	8.6	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	0	491	387	1
Future Vol, veh/h	0	4	0	491	387	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	4	0	534	421	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	211	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	676	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	-	676	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	676	-	-
HCM Lane V/C Ratio	-	0.006	-	-
HCM Control Delay (s)	-	10.4	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0	-	-

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	41	5	1	18	7	4	8	5	10	2	28
Future Vol, veh/h	28	41	5	1	18	7	4	8	5	10	2	28
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	30	45	5	1	20	8	4	9	5	11	2	30

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	28	0	0	50	0	0	150	138	48	141	136	24
Stage 1	-	-	-	-	-	-	108	108	-	26	26	-
Stage 2	-	-	-	-	-	-	42	30	-	115	110	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1585	-	-	1557	-	-	818	753	1021	829	755	1052
Stage 1	-	-	-	-	-	-	897	806	-	992	874	-
Stage 2	-	-	-	-	-	-	972	870	-	890	804	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1585	-	-	1557	-	-	780	738	1021	805	740	1052
Mov Cap-2 Maneuver	-	-	-	-	-	-	780	738	-	805	740	-
Stage 1	-	-	-	-	-	-	880	791	-	973	873	-
Stage 2	-	-	-	-	-	-	941	869	-	859	789	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.8	0.3	9.5	8.9
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	815	1585	-	-	1557	-	-	958
HCM Lane V/C Ratio	0.023	0.019	-	-	0.001	-	-	0.045
HCM Control Delay (s)	9.5	7.3	0	-	7.3	0	-	8.9
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	17	17	4	9	15	9	459	4	26	368	13
Future Vol, veh/h	17	17	17	4	9	15	9	459	4	26	368	13
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	-	-	-	-	-	-	130	-	-	82	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	18	18	4	10	16	10	499	4	28	400	14

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	738	986	207	746	991	252	414	0	0	503	0	0
Stage 1	463	463	-	521	521	-	-	-	-	-	-	-
Stage 2	275	523	-	225	470	-	-	-	-	-	-	-
Critical Hdwy	6.99	6.54	7.14	6.99	6.54	6.94	5.34	-	-	4.14	-	-
Critical Hdwy Stg 1	7.34	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.67	4.02	3.92	3.67	4.02	3.32	3.12	-	-	2.22	-	-
Pot Cap-1 Maneuver	333	246	680	329	245	748	743	-	-	1058	-	-
Stage 1	479	562	-	491	530	-	-	-	-	-	-	-
Stage 2	683	529	-	720	558	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	306	236	680	292	235	748	743	-	-	1058	-	-
Mov Cap-2 Maneuver	306	236	-	292	235	-	-	-	-	-	-	-
Stage 1	473	547	-	485	523	-	-	-	-	-	-	-
Stage 2	647	522	-	659	543	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.9	15	0.2	0.5
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	743	-	-	334	389	1058	-	-
HCM Lane V/C Ratio	0.013	-	-	0.166	0.078	0.027	-	-
HCM Control Delay (s)	9.9	-	-	17.9	15	8.5	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.3	0.1	-	-

Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	1	2	1	3	6
Future Vol, veh/h	3	1	2	1	3	6
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	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	1	2	1	3	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	3	0	-	0	10	3
Stage 1	-	-	-	-	3	-
Stage 2	-	-	-	-	7	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1619	-	-	-	1010	1081
Stage 1	-	-	-	-	1020	-
Stage 2	-	-	-	-	1016	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1619	-	-	-	1008	1081
Mov Cap-2 Maneuver	-	-	-	-	1008	-
Stage 1	-	-	-	-	1018	-
Stage 2	-	-	-	-	1016	-

Approach	EB	WB	SB
HCM Control Delay, s	5.4	0	8.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1619	-	-	-	1056
HCM Lane V/C Ratio	0.002	-	-	-	0.009
HCM Control Delay (s)	7.2	0	-	-	8.4
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1065	32	55	1246	1	34	0	44	3	0	5
Future Vol, veh/h	5	1065	32	55	1246	1	34	0	44	3	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1158	35	60	1354	1	37	0	48	3	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1355	0	0	1193	0	0	1848	2661	597	1948	2678	678
Stage 1	-	-	-	-	-	-	1186	1186	-	1475	1475	-
Stage 2	-	-	-	-	-	-	662	1475	-	473	1203	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	263	-	-	315	-	-	79	22	382	68	22	338
Stage 1	-	-	-	-	-	-	148	260	-	92	189	-
Stage 2	-	-	-	-	-	-	380	189	-	494	256	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	263	-	-	315	-	-	65	17	382	50	17	338
Mov Cap-2 Maneuver	-	-	-	-	-	-	65	17	-	50	17	-
Stage 1	-	-	-	-	-	-	145	255	-	90	153	-
Stage 2	-	-	-	-	-	-	303	153	-	424	251	-

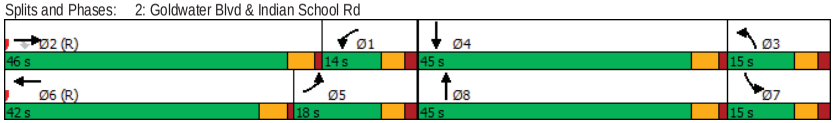
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.8	83.9	41.6
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	122	263	-	-	315	-	-	107
HCM Lane V/C Ratio	0.695	0.021	-	-	0.19	-	-	0.081
HCM Control Delay (s)	83.9	19	-	-	19.1	-	-	41.6
HCM Lane LOS	F	C	-	-	C	-	-	E
HCM 95th %tile Q(veh)	3.8	0.1	-	-	0.7	-	-	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	158	917	61	59	1031	101	233	90	750
Future Volume (vph)	158	917	61	59	1031	101	233	90	750
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2		1	6	3	8	7	4
Permitted Phases			2						
Detector Phase	5	2	2	1	6	3	8	7	4
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	11.0	16.0	16.0	11.0	16.0	11.0	16.0	11.0	16.0
Total Split (s)	18.0	46.0	46.0	14.0	42.0	15.0	45.0	15.0	45.0
Total Split (%)	15.0%	38.3%	38.3%	11.7%	35.0%	12.5%	37.5%	12.5%	37.5%
Yellow Time (s)	3.3	4.0	4.0	3.3	4.0	3.3	4.0	3.3	4.0
All-Red Time (s)	2.0	1.0	1.0	2.0	1.0	2.0	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.0	5.0	5.3	5.0	5.3	5.3	5.3	5.3
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?									
Recall Mode	None	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	10.6	55.2	55.2	6.9	49.4	13.1	13.2	25.8	26.0
Actuated g/C Ratio	0.09	0.46	0.46	0.06	0.41	0.11	0.11	0.22	0.22
v/c Ratio	0.60	0.58	0.09	0.34	0.78	0.60	0.73	0.27	0.82
Control Delay	61.4	28.1	0.7	58.9	36.5	64.2	58.3	39.9	49.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.4	28.1	0.7	58.9	36.5	64.2	58.3	39.9	49.7
LOS	E	C	A	E	D	E	E	D	D
Approach Delay		31.3			37.6		59.9		48.8
Approach LOS		C			D		E		D

Intersection Summary		
Cycle Length: 120		
Actuated Cycle Length: 120		
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green		
Natural Cycle: 75		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.82		
Intersection Signal Delay: 40.9	Intersection LOS: D	
Intersection Capacity Utilization 73.4%	ICU Level of Service D	
Analysis Period (min) 15		

Splits and Phases: 2: Goldwater Blvd & Indian School Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	158	917	61	59	1031	60	101	233	48	90	750	124
Future Volume (veh/h)	158	917	61	59	1031	60	101	233	48	90	750	124
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	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	1772
Adj Flow Rate, veh/h	172	997	66	64	1121	65	110	253	52	98	815	135
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	759	1278	513	650	1108	64	133	319	65	308	961	158
Arrive On Green	0.23	0.34	0.34	0.20	0.31	0.31	0.08	0.10	0.10	0.18	0.21	0.21
Sat Flow, veh/h	3274	3741	1502	3274	3593	208	1688	3100	627	1688	4649	765
Grp Volume(v), veh/h	172	997	66	64	583	603	110	151	154	98	627	323
Grp Sat Flow(s),veh/h/ln	1637	1870	1502	1637	1870	1931	1688	1870	1856	1688	1792	1831
Q Serve(g_s), s	5.1	28.7	3.6	1.9	37.0	37.0	7.7	9.5	9.7	6.0	20.2	20.4
Cycle Q Clear(g_c), s	5.1	28.7	3.6	1.9	37.0	37.0	7.7	9.5	9.7	6.0	20.2	20.4
Prop In Lane	1.00		1.00	1.00		0.11	1.00		0.34	1.00		0.42
Lane Grp Cap(c), veh/h	759	1278	513	650	577	595	133	193	191	308	741	379
V/C Ratio(X)	0.23	0.78	0.13	0.10	1.01	1.01	0.83	0.78	0.81	0.32	0.85	0.85
Avail Cap(c_a), veh/h	759	1278	513	650	577	595	136	619	614	308	1185	606
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.4	35.5	27.2	39.3	41.5	41.5	54.5	52.5	52.6	42.6	45.8	45.8
Incr Delay (d2), s/veh	0.1	4.8	0.5	0.0	40.3	40.0	30.0	2.6	3.0	0.2	1.7	3.7
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	2.1	13.8	1.4	0.8	23.3	24.0	4.4	4.6	4.7	2.6	9.1	9.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.4	40.2	27.7	39.3	81.8	81.5	84.5	55.1	55.6	42.8	47.5	49.5
LnGrp LOS	D	D	C	D	F	F	F	E	E	D	D	D
Approach Vol, veh/h		1235			1250			415			1048	
Approach Delay, s/veh		39.2			79.5			63.1			47.7	
Approach LOS		D			E			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	29.1	46.0	14.8	30.1	33.1	42.0	27.2	17.7
Change Period (Y+Rc), s	5.3	* 5	* 5.3	* 5.3	5.3	* 5	* 5.3	* 5.3
Max Green Setting (Gmax), s	8.7	* 41	* 9.7	* 40	12.7	* 37	* 9.7	* 40
Max Q Clear Time (g_c+I1), s	3.9	30.7	9.7	22.4	7.1	39.0	8.0	11.7
Green Ext Time (p_c), s	0.0	2.4	0.0	2.4	0.1	0.0	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	56.7
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	13	4	9	8	16	364	21	848
Future Volume (vph)	13	4	9	8	16	364	21	848
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		8		4		6		2
Permitted Phases	8		4		6		2	
Detector Phase	8	8	4	4	6	6	2	2
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	10.0	10.0	10.0	10.0
Minimum Split (s)	35.0	35.0	35.0	35.0	70.0	70.0	70.0	70.0
Total Split (s)	50.0	50.0	50.0	50.0	90.0	90.0	90.0	90.0
Total Split (%)	35.7%	35.7%	35.7%	35.7%	64.3%	64.3%	64.3%	64.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	4.0	4.0	4.0	4.0
All-Red Time (s)	1.5	1.5	1.5	1.5	1.2	1.2	1.2	1.2
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.8		4.8	5.2	5.2	5.2	5.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)		7.4		7.4	129.4	129.4	129.4	129.4
Actuated g/C Ratio		0.05		0.05	0.92	0.92	0.92	0.92
v/c Ratio		0.27		0.33	0.04	0.12	0.03	0.19
Control Delay		54.0		51.0	1.3	1.0	1.2	1.0
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		54.0		51.0	1.3	1.0	1.2	1.0
LOS		D		D	A	A	A	A
Approach Delay		54.0		51.0		1.0		1.0
Approach LOS		D		D		A		A

Intersection Summary		
Cycle Length: 140		
Actuated Cycle Length: 140		
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green		
Natural Cycle: 105		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.33		
Intersection Signal Delay: 3.1	Intersection LOS: A	
Intersection Capacity Utilization 32.6%	ICU Level of Service A	
Analysis Period (min) 15		

Splits and Phases: 3: Main St & Goldwater Blvd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	4	8	9	8	13	16	364	13	21	848	26
Future Volume (veh/h)	13	4	8	9	8	13	16	364	13	21	848	26
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	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	1772
Adj Flow Rate, veh/h	14	4	9	10	9	14	17	396	14	23	922	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	69	22	26	49	29	33	532	3256	115	855	4735	144
Arrive On Green	0.05	0.05	0.05	0.05	0.05	0.05	0.88	0.88	0.88	0.88	0.88	0.88
Sat Flow, veh/h	653	483	568	352	639	730	559	3686	130	924	5360	163
Grp Volume(v), veh/h	27	0	0	33	0	0	17	201	209	23	616	334
Grp Sat Flow(s),veh/h/ln	1704	0	0	1721	0	0	559	1870	1945	924	1792	1940
Q Serve(g_s), s	0.0	0.0	0.0	0.5	0.0	0.0	0.6	2.0	2.0	0.5	3.4	3.4
Cycle Q Clear(g_c), s	2.0	0.0	0.0	2.5	0.0	0.0	4.0	2.0	2.0	2.4	3.4	3.4
Prop In Lane	0.52		0.33	0.30		0.42	1.00		0.07	1.00		0.08
Lane Grp Cap(c), veh/h	116	0	0	111	0	0	532	1652	1719	855	3165	1713
V/C Ratio(X)	0.23	0.00	0.00	0.30	0.00	0.00	0.03	0.12	0.12	0.03	0.19	0.19
Avail Cap(c_a), veh/h	557	0	0	575	0	0	532	1652	1719	855	3165	1713
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	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.58	0.58	0.58
Uniform Delay (d), s/veh	64.8	0.0	0.0	65.0	0.0	0.0	1.4	1.1	1.1	1.2	1.1	1.1
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.5	0.0	0.0	0.1	0.2	0.1	0.0	0.1	0.1
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	1.0	0.0	0.0	1.2	0.0	0.0	0.1	0.4	0.5	0.1	0.7	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.1	0.0	0.0	65.5	0.0	0.0	1.5	1.2	1.2	1.3	1.2	1.3
LnGrp LOS	E	A	A	E	A	A	A	A	A	A	A	A
Approach Vol, veh/h		27			33			427			973	
Approach Delay, s/veh		65.1			65.5			1.2			1.3	
Approach LOS		E			E			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		128.9		11.1		128.9		11.1				
Change Period (Y+Rc), s		* 5.2		* 4.8		* 5.2		* 4.8				
Max Green Setting (Gmax), s		* 85		* 45		* 85		* 45				
Max Q Clear Time (g_c+I1), s		5.4		4.5		6.0		4.0				
Green Ext Time (p_c), s		1.3		0.1		0.5		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	3.9
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	4	3	2	4	10	8	27	4	5	68	10
Future Vol, veh/h	8	4	3	2	4	10	8	27	4	5	68	10
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	4	3	2	4	11	9	29	4	5	74	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	147	141	80	142	144	31	85	0	0	33	0	0
Stage 1	90	90	-	49	49	-	-	-	-	-	-	-
Stage 2	57	51	-	93	95	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	821	750	980	828	747	1043	1512	-	-	1579	-	-
Stage 1	917	820	-	964	854	-	-	-	-	-	-	-
Stage 2	955	852	-	914	816	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	803	743	980	816	740	1043	1512	-	-	1579	-	-
Mov Cap-2 Maneuver	803	743	-	816	740	-	-	-	-	-	-	-
Stage 1	911	818	-	958	849	-	-	-	-	-	-	-
Stage 2	935	847	-	903	814	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.5	9	1.5	0.4
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1512	-	-	815	917	1579	-	-
HCM Lane V/C Ratio	0.006	-	-	0.02	0.019	0.003	-	-
HCM Control Delay (s)	7.4	0	-	9.5	9	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

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	8	0	8	2	0	1	13	378	1	4	842	12
Future Vol, veh/h	8	0	8	2	0	1	13	378	1	4	842	12
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	70	-	-	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	0	9	2	0	1	14	411	1	4	915	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1164	1370	464	814	1376	206	928	0	0	412	0	0
Stage 1	930	930	-	440	440	-	-	-	-	-	-	-
Stage 2	234	440	-	374	936	-	-	-	-	-	-	-
Critical Hdwy	6.99	6.54	7.14	6.99	6.54	6.94	5.34	-	-	4.14	-	-
Critical Hdwy Stg 1	7.34	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.67	4.02	3.92	3.67	4.02	3.32	3.12	-	-	2.22	-	-
Pot Cap-1 Maneuver	175	145	466	297	144	800	424	-	-	1143	-	-
Stage 1	228	344	-	547	576	-	-	-	-	-	-	-
Stage 2	721	576	-	586	342	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	170	140	466	283	139	800	424	-	-	1143	-	-
Mov Cap-2 Maneuver	170	140	-	283	139	-	-	-	-	-	-	-
Stage 1	220	343	-	529	557	-	-	-	-	-	-	-
Stage 2	696	557	-	573	341	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.5	15	0.5	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	424	-	-	249	283	800	1143	-	-
HCM Lane V/C Ratio	0.033	-	-	0.07	0.008	0.001	0.004	-	-
HCM Control Delay (s)	13.8	-	-	20.5	17.8	9.5	8.2	-	-
HCM Lane LOS	B	-	-	C	C	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0	0	0	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	4	40	6	3	71
Future Vol, veh/h	1	4	40	6	3	71
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	4	43	7	3	77

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	130	47	0	0	50	0
Stage 1	47	-	-	-	-	-
Stage 2	83	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	864	1022	-	-	1557	-
Stage 1	975	-	-	-	-	-
Stage 2	940	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	862	1022	-	-	1557	-
Mov Cap-2 Maneuver	862	-	-	-	-	-
Stage 1	973	-	-	-	-	-
Stage 2	940	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	985	1557	-
HCM Lane V/C Ratio	-	-	0.006	0.002	-
HCM Control Delay (s)	-	-	8.7	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	3	0	405	858	3
Future Vol, veh/h	0	3	0	405	858	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	3	0	440	933	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	468	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	463	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	-	463	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	463	-	-
HCM Lane V/C Ratio	-	0.007	-	-
HCM Control Delay (s)	-	12.8	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0	-	-

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	21	33	10	5	58	11	5	10	8	9	20	44
Future Vol, veh/h	21	33	10	5	58	11	5	10	8	9	20	44
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	23	36	11	5	63	12	5	11	9	10	22	48

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	75	0	0	47	0	0	202	173	42	177	172	69
Stage 1	-	-	-	-	-	-	88	88	-	79	79	-
Stage 2	-	-	-	-	-	-	114	85	-	98	93	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1524	-	-	1560	-	-	756	720	1029	785	721	994
Stage 1	-	-	-	-	-	-	920	822	-	930	829	-
Stage 2	-	-	-	-	-	-	891	824	-	908	818	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1524	-	-	1560	-	-	692	706	1029	758	707	994
Mov Cap-2 Maneuver	-	-	-	-	-	-	692	706	-	758	707	-
Stage 1	-	-	-	-	-	-	905	809	-	915	827	-
Stage 2	-	-	-	-	-	-	823	822	-	874	805	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.4	0.5	9.7	9.6
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	789	1524	-	-	1560	-	-	865
HCM Lane V/C Ratio	0.032	0.015	-	-	0.003	-	-	0.092
HCM Control Delay (s)	9.7	7.4	0	-	7.3	0	-	9.6
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.3

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	18	26	11	20	47	25	354	17	29	803	25
Future Vol, veh/h	5	18	26	11	20	47	25	354	17	29	803	25
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	-	-	-	-	-	-	130	-	-	82	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	20	28	12	22	51	27	385	18	32	873	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1209	1408	450	871	1412	202	900	0	0	403	0	0
Stage 1	951	951	-	448	448	-	-	-	-	-	-	-
Stage 2	258	457	-	423	964	-	-	-	-	-	-	-
Critical Hdwy	6.99	6.54	7.14	6.99	6.54	6.94	5.34	-	-	4.14	-	-
Critical Hdwy Stg 1	7.34	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.67	4.02	3.92	3.67	4.02	3.32	3.12	-	-	2.22	-	-
Pot Cap-1 Maneuver	163	138	476	273	137	805	437	-	-	1152	-	-
Stage 1	220	336	-	541	571	-	-	-	-	-	-	-
Stage 2	698	566	-	547	332	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	124	126	476	211	125	805	437	-	-	1152	-	-
Mov Cap-2 Maneuver	124	126	-	211	125	-	-	-	-	-	-	-
Stage 1	206	327	-	507	536	-	-	-	-	-	-	-
Stage 2	588	531	-	470	323	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	28.5	22.6	0.9	0.3
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	437	-	-	206	288	1152	-	-
HCM Lane V/C Ratio	0.062	-	-	0.259	0.294	0.027	-	-
HCM Control Delay (s)	13.8	-	-	28.5	22.6	8.2	-	-
HCM Lane LOS	B	-	-	D	C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	1	1.2	0.1	-	-

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	0	0	3	3	6
Future Vol, veh/h	10	0	0	3	3	6
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	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	0	0	3	3	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	3	0	-	0	24	2
Stage 1	-	-	-	-	2	-
Stage 2	-	-	-	-	22	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1619	-	-	-	992	1082
Stage 1	-	-	-	-	1021	-
Stage 2	-	-	-	-	1001	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1619	-	-	-	985	1082
Mov Cap-2 Maneuver	-	-	-	-	985	-
Stage 1	-	-	-	-	1014	-
Stage 2	-	-	-	-	1001	-

Approach	EB	WB	SB
HCM Control Delay, s	7.2	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1619	-	-	-	1048
HCM Lane V/C Ratio	0.007	-	-	-	0.009
HCM Control Delay (s)	7.2	0	-	-	8.5
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

APPENDIX J

QUEUE STORAGE ANALYSIS

Winery Suites **Queue Length Analysis**

Signalized Intersection
2020

Average Vehicle Length (ft): 25 Cycles: 2
Intersection Cycle Length (sec): 120
Equation Used: storage length = 2 x (vehicles/hour)/(cycles/hour) x average vehicle length

Intersection	Approach	AM Peak (veh/hr)	Midday Peak	PM Peak (veh/hr)	Max vehs per 2 cycles	Max trucks per 2 cycles	Storage Length
Goldwater Blvd & Indiand School Rd.	NB Left	66	0	101	7	0	175'
	SB Left	31	0	90	6	0	150'
	EB Left	177	0	159	12	0	300'
	WB Left	67	0	62	5	0	125'
Goldwater Blvd & Main St	EB Right	71	0	61	5	0	125'
	NB Left	9	0	16	2	0	50'
	SB Left	4	0	21	2	0	50'

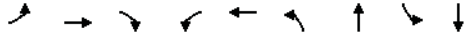
Winery Suites **Queue Length Analysis**

Unsignalized Intersection
2020

Average Vehicle Length (ft): 25

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

Intersection	Approach	AM Peak (veh/hr)	Midday Peak	PM Peak (veh/hr)	Veh per 2 minutes	Trucks per 2 minutes	Storage Length
69th St & Indian School Rd.	EB Left	7	0	5	1	0	25'
	WB Left	30	0	55	2	0	50'
Goldwater Blvd. & 2nd St.	NB Left	19	0	33	2	0	50'
	SB Left	27	0	30	1	0	25'



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	172	997	66	64	1186	110	305	98	950
v/c Ratio	0.60	0.58	0.09	0.34	0.78	0.60	0.73	0.27	0.82
Control Delay	61.4	28.1	0.7	58.9	36.5	64.2	58.3	39.9	49.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.4	28.1	0.7	58.9	36.5	64.2	58.3	39.9	49.7
Queue Length 50th (ft)	67	304	0	25	414	82	114	63	251
Queue Length 95th (ft)	103	443	4	47	#653	139	157	107	284
Internal Link Dist (ft)		548			753		580		255
Turn Bay Length (ft)	275		165	155		105		180	
Base Capacity (vph)	344	1713	752	235	1525	187	1214	361	1752
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.58	0.09	0.27	0.78	0.59	0.25	0.27	0.54

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	27	33	17	410	23	950
v/c Ratio	0.27	0.33	0.04	0.12	0.03	0.19
Control Delay	54.0	51.0	1.3	1.0	1.2	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	51.0	1.3	1.0	1.2	1.0
Queue Length 50th (ft)	16	17	1	18	2	32
Queue Length 95th (ft)	48	53	5	28	5	44
Internal Link Dist (ft)	234	426		251		580
Turn Bay Length (ft)			120		115	
Base Capacity (vph)	565	549	471	3426	833	4928
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.06	0.04	0.12	0.03	0.19

Intersection Summary

APPENDIX K

SIGHT DISTANCE ANALYSIS

SITE DISTANCE

SIX LANE ROADWAY[1]

DESIGN SPEED	SIGHT DISTANCE					
	PASSENGER CAR		SINGLE-UNIT TRUCK		COMBINATION TRUCK	
	TH	LT	TH	LT	TH	LT
25	304	340	403	440	476	513
30	364	408	483	527	572	616
35	425	476	564	615	667	718
40	486	544	644	703	762	821
45	546	612	725	791	857	923
50	607	680	805	879	952	1026
55	668	748	886	967	1048	1128

FOUR LANE ROADWAY[1]

DESIGN SPEED	SIGHT DISTANCE					
	PASSENGER CAR		SINGLE-UNIT TRUCK		COMBINATION TRUCK	
	TH	LT	TH	LT	TH	LT
25	285	322	377	414	451	487
30	342	386	453	497	541	585
35	399	451	528	579	631	682
40	456	515	603	662	721	780
45	513	579	679	745	811	877
50	570	644	754	827	901	974
55	627	708	829	910	991	1072

THREE LANE ROADWAY[1]

DESIGN SPEED	SIGHT DISTANCE					
	PASSENGER CAR		SINGLE-UNIT TRUCK		COMBINATION TRUCK	
	TH	LT	TH	LT	TH	LT
25	267	304	351	388	425	462
30	320	364	422	466	510	554
35	374	425	492	543	595	646
40	427	486	562	621	680	738
45	480	546	632	698	765	831
50	267	304	351	388	425	462
55	320	364	422	466	510	554

SITE DISTANCE

TWO LANE ROADWAY[1]

SIGHT DISTANCE						
DESIGN SPEED	PASSENGER CAR		SINGLE-UNIT TRUCK		COMBINATION TRUCK	
	TH	LT	TH	LT	TH	LT
25	239	276	313	350	386	423
30	287	331	375	419	464	508
35	335	386	438	489	541	592
40	383	441	500	559	618	677
45	430	497	563	629	695	761
50	478	552	625	699	772	846
55	526	607	688	769	849	930

Notes: [1]
Cross section assumed to include a 12' median/center lane and 6' bike lane
TH = Through Movement, LT = Turn Movement
All distances given in feet
Design speed by roadway classification is shown in Appendix 5-3A
For cross sections deviating from the tabulated configurations, refer to the AASHTO Geometric Design of Highways and Streets (current editions) for additional information

52-DR-2018
11/14/18