Megerdichian
Assisted Senior Center

Traffic Impact Analysis
2nd Submittal

East of Loop 101 South of Cholla Street
in Scottsdale, Arizona

September 2020
Project No. 18-0100

Prepared For:

AAK Architecture & Interiors, Inc.
7585 E. Redfield Rd. Suite 106
Scottsdale, Arizona 85260

For Submittal to:
City of Scottsdale

Prepared By:

CivTech

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

25-ZN-2018
25_ZN_2018_V3
10/8/2020
12/15/2020

MEGERDICHIAN SENIOR CENTER
TRAFFIC IMPACT AND MITIGATION ANALYSIS
2ND SUBMITTAL

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EXECUTIVE SUMMARY

The proposed Megerdichian Senior Center development includes a 48-dwelling unit minimal residential health care facility, and a 30-room, 38-bed specialized residential health care facility. The site is located east of the Loop 101 south of Cholla Street in Scottsdale, Arizona. There is one (1) existing access located on the north side of the site. A request is being made by the property owner to for a Conditional Use Permit and a rezoning from R1-35 (a large-lot residential zoning) to R-4, a residential zoning that would allow the construction of a residential senior center.

The following conclusions and recommendations have been documented in this study:

- The proposed development by the opening/buildout year 2020, is expected to generate 284 external daily trips with 15 total trips (7 in/8 out) occurring during the AM peak hour and 22 trips (11 in/11 out) occurring during the PM peak hour.
- These trips represent increases of 48 trips daily and 2 and 3 trips during the AM and PM peak hours, respectively, over those reported in the original submittal of this report, which was finalized on May 23, 2018 and on which the City made minor comments.
- From the review of crash data at the intersections of 90th Street and Cactus Road and 92nd Street and Cholla Street, it can be concluded that there are no obvious crash patterns that stand out and could be treated with any type of low-cost mitigation measures that could be implemented by the City.
- All study intersections currently operate at overall LOS D or better during the peak hours.
- No new left-turn or right-turn deceleration lanes are required by City of Scottsdale's *Design Standards and Polices Manual* Section 5-3.206 on 88th Place and Cholla Street approaching the site driveways.
- The results of the opening year 2020 HCM 6th Edition analyses indicate that all study intersections should operate with acceptable levels of service of LOS D or better. Based on these levels of service, no mitigation measures are recommended.
- Sight distance should be provided at the proposed access based on the standards provided in the *City of Scottsdale Design Standards and Policies Manual, 2018 Update*.

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INTRODUCTION

The proposed Megerdichian Senior Center development includes a 48-dwelling unit minimal residential health care facility, and a 30-room, 38-bed specialized residential health care facility. The site is located east of the Loop 101 south of Cholla Street in Scottsdale, Arizona. There is one (1) existing access located on the north side of the site. The vicinity is shown in **Figure 1**.

CivTech Inc. was retained by AAK Architecture & Interiors, Inc. to perform a Traffic Impact and Mitigation Analysis (TIMA) as required by the City of Scottsdale for the proposed development. A request is being made by the property owner to for a Conditional Use Permit and a rezoning from R1-35 (a large-lot residential zoning) to R-4, a residential zoning that would allow the construction of a residential senior center.

Purpose of Report and Study Objectives

The purpose of this study is to address the traffic and transportation impacts of the proposed development on the surrounding streets and intersections. This TIMA was prepared for submittal to the City of Scottsdale in conformance to City guidelines. The specific objectives of the TIMA are:

1. To evaluate lane requirements on all existing roadways and at all existing intersections within the study area.
2. To determine future level of service for all proposed major intersections within the study area and recommend any capacity related improvements.
3. To determine necessary lane configurations at all major intersections within the proposed development to provide acceptable future levels of service.
4. To evaluate the need for future traffic control changes within the proposed development and at the major entry points.
5. To evaluate the need for auxiliary lanes at stop and signal controlled intersections.

This version of the TIMA represents a 2nd Submittal of CivTech's version finalized on May 23, 2018. Two staff review comments were received via email, a copy of which has been included in **Appendix A**. It has been revised to correct the switching of two appendices (F and G) and to include as new **Appendix I** CivTech's November 30, 2018 letter to the owner addressing concerns expressed by neighbors at an October 11, 2018 on-site open house. In addition, the floor plan and numbers and types of units have recently changed, impacting very slightly the number of trips generated by the project, changes documented herein.

Study Requirements

With the concurrence of City of Scottsdale staff, the study area for this TIMA will include the following intersections:

- Existing Drive and 88th Place/Cholla Street
- 89th Street and Cholla Street
- 92nd Street and Cholla Street
- 90th Street and Cactus Road

Weekday AM and PM peak hour levels of service for these study intersections will be analyzed under current conditions and under two opening year scenarios: without and with the proposed development. It is anticipated that the development will open in 2020. For purposes of this analysis, the development will be considered to be built-out upon opening.

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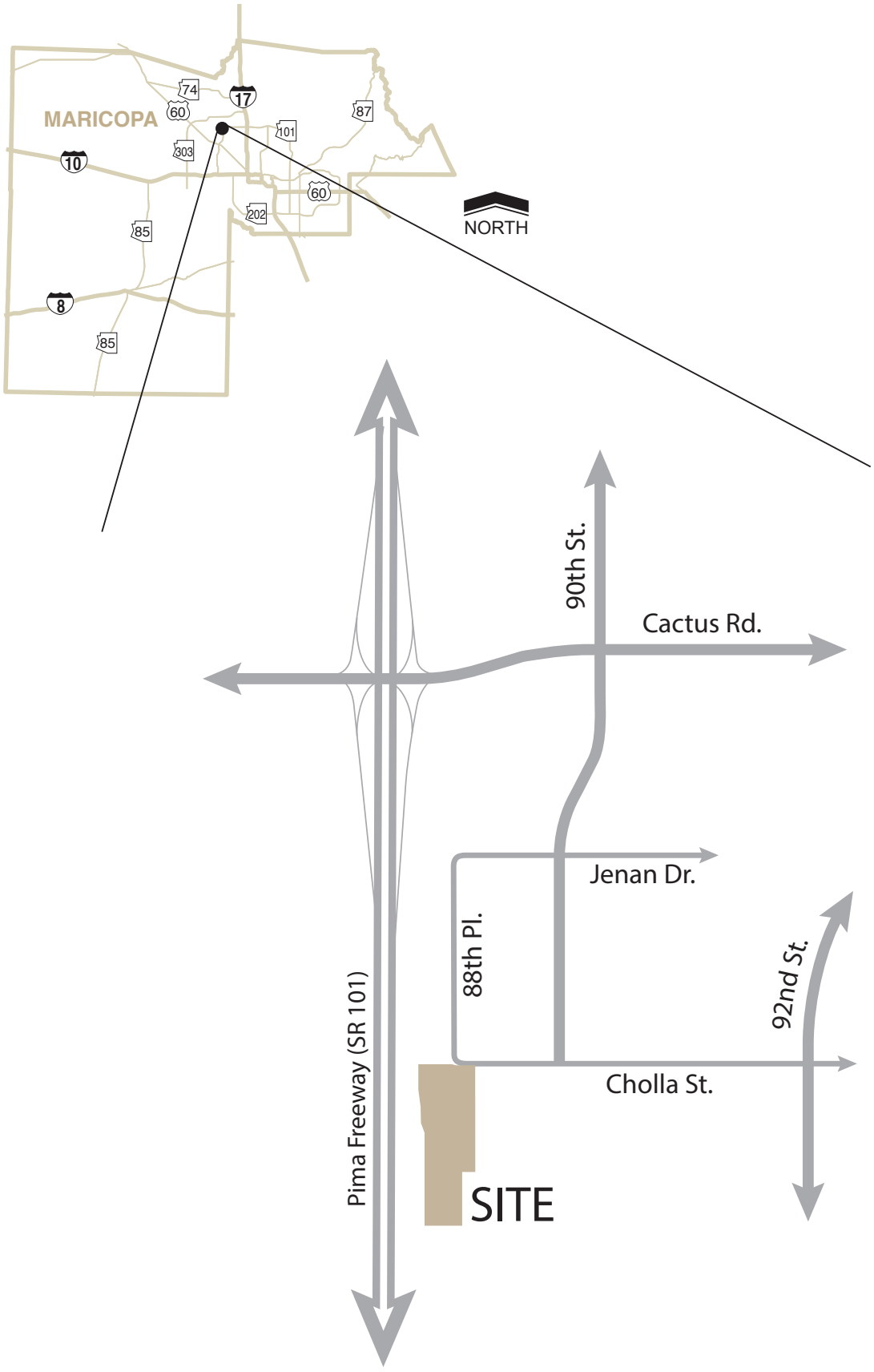

Figure 1: Vicinity Map

EXISTING CONDITIONS

LAND USE

The existing land is vacant where the proposed site is located.

SURROUNDING LAND USE

There are three (3) existing buildings immediately surrounding the proposed site, including St. Apkar Armenian Apostolic Church, Melikian Community Center, and Megerdichian Senior Group Home. These surrounding buildings share the same single access as the proposed site. Directly west of the site, the Loop 101 runs parallel bordering the site. Bordering the site to the north, east, and west are single and multifamily developments. Further south and south east of the site are medical facilities, hotel, public storage, business/office park, retail, and gas stations.

ROADWAY NETWORK

The existing roadway network within the study area includes 88th Place, 89th Street, 90th Street, 92nd Street, Cholla Street, Jenan Drive, and Cactus Road.

88th Place is a north-south roadway that is discontinuous through developments. Within the vicinity of the site, the roadway consists of one lane in each travel direction. Within the vicinity of the proposed site, 88th Place has a 25 miles per hour (mph) speed limit with speed tables posted with 20 mph warning signs.

89th Street is the north-south curvilinear roadway that transitions into 90th street within the vicinity of the site. The roadway is discontinuous through developments consisting of one lane in each travel direction. Within the vicinity of the proposed site, 89th Place has a 25 miles per hour (mph) speed limit with speed tables posted with 20 mph warning signs.

90th Street is the north-south curvilinear roadway that transitions from 89th street within the vicinity of the site. The roadway is discontinuous through developments consisting of one lane in each travel direction. Within the vicinity of the proposed site, 90th Place has a 25 miles per hour (mph) speed limit with speed tables posted with 20 mph warning signs.

92nd Street is the north-south curvilinear roadway within the vicinity of the site. The roadway is discontinuous through developments, within the vicinity of the site it consists of two lanes in each travel direction with a center median. 92nd Street has a posted speed limit of 40 mph within the vicinity of the site.

Cholla Street is the east-west curvilinear roadway that, east of Loop 101, is discontinuous through developments. The roadway consisting of one lane in each travel direction within the vicinity of the site. Cholla Street has a posted speed limit of 25 mph and dips that are posted with 15 mph warning signs within the vicinity of the site.

Jenan Drive is the east-west curvilinear roadway that is discontinuous through developments. The roadway consisting of one lane in each travel direction within the vicinity of the site. Within the vicinity of the proposed site, Jenan Drive has a 25 miles per hour (mph) speed limit with speed tables posted with 20 mph warning signs.

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Cactus Road is an east-west major collector roadway that transitions from Thunderbird Road into Cactus Road at Cave Creek Road and terminates east at Frank Lloyd Wright Boulevard. Within the vicinity of the site the roadway consists of two through lanes in each travel direction and a center median. Cactus Road has a posted speed limit of 40 mph.

INTERSECTION CONFIGURATIONS

The intersection of ***90th Street and Cactus Road*** is a signalized four-legged intersection with permitted left-turns northbound/southbound and permitted/protected left-turns eastbound/westbound. The northbound approach consists of an exclusive left-turn lane, a shared through/right-turn lane, and a bike lane. The southbound approach consists of an exclusive left-turn lane

The intersection of the **Existing Driveway and Cholla Street** is a three-legged, stop controlled intersection with free movements in the east and westbound directions. The northbound approach has one dedicated left turn lane and one dedicated right turn lane. The westbound approach has one shared left turn and through lane. The eastbound approach has one shared through and right turn lane.

The intersection of **89th Street and Cholla Street** is a three-legged, stop controlled intersection with free movements in the east and westbound directions. The southbound approach has one shared left and right turn lane. The westbound approach has one shared through and right turn lane. The eastbound approach has one shared left turn and through lane.

The intersection of **92nd Street and Cholla Street** is a signalized four-legged intersection with permitted left turns at all approaches. The northbound and southbound approaches consist of one dedicated left turn lane, one through lane and one shared through and right turn lane. The eastbound and westbound approaches consist of one dedicated left turn lane and one shared through and right turn lane.

Figure 2 depicts existing lane configurations and traffic controls of the study intersections.

TRAFFIC VOLUMES

Field Data Services (FDS) conducted intersection turning movement counts at the study intersections on Thursday, April 26, 2018. The existing hourly traffic counts used for the time periods in this study are shown on **Figure 3**. The intersection turning movement counts for the recorded volumes are provided in **Appendix B**.

LEVEL OF SERVICE 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 in terms of delay ranges. **Table 1** lists the level of service criteria for signalized and unsignalized intersections.

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Peak hour capacity analyses were conducted for the study intersections based on existing intersection configurations and traffic volumes. All intersections have been analyzed using the methodologies presented in the *Highway Capacity Manual* (HCM), using Traffix software. The overall and approach levels of service are reported for signalized intersections. The resulting levels of service for the existing conditions are summarized in **Table 2**. The existing conditions analyses have been included in **Appendix C**.

Table 1 – Intersection LOS Criteria

Level of Service	Control Delay (seconds/vehicle)	
	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	> 50

Source: Exhibit 18-4 and Exhibit 19-1, Highway Capacity Manual 2010

*In addition, any movement that operates with a volume-to-capacity ratio greater than 1 (V:C.1), is considered to be operating at LOS F, no matter the control delay.

Table 2 – Existing (2018) Level-of-Service Summary

ID	Intersection	Stop Control	Approach	AM(PM) LOS Existing
1	90th Street and Cactus Road	Signal	NB SB EB WB	C(C) C(C) C(C) C(C)
			Overall	**C(C)**
2	Existing Drive and Cholla Street	1-Way Stop (NB)	NB Left NB Right WB Left	A(A) A(A) A(A)
3	Cholla Street and 89th Street	1-Way Stop (SB)	SB Left SB Right EB Left	A(A) A(A) A(A)
4	Cholla Street and 92nd Street	Signal	NB SB EB WB	A(A) A(A) D(D) D(D)
			Overall	**B(A)**

A review of the results of the Level of Service analysis of existing conditions summarized in **Table 2** reveals that all study intersections currently operate at overall LOS D or better during both peak hours.

CRASH ANALYSIS

CivTech excerpted from its statewide crash databases crash listings for the existing signalized study intersections for the three-year period 2014 through 2016. The listing shows that a total of 11 incidents were reported. None of the incidents resulted in fatal injuries. Eight (8) of the incidents were reported at the intersection of 90th Street and Cactus Road while three (3) of the incidents were reported at the intersection of 92nd Street and Cholla Street. The report listed the cross road as Cholla Drive, but a check of the included coordinates indicate that the cross road was actually Cholla St. The crash listings can be found in **Appendix D**. A summary of the crash data for each intersection is provided in **Table 3**.

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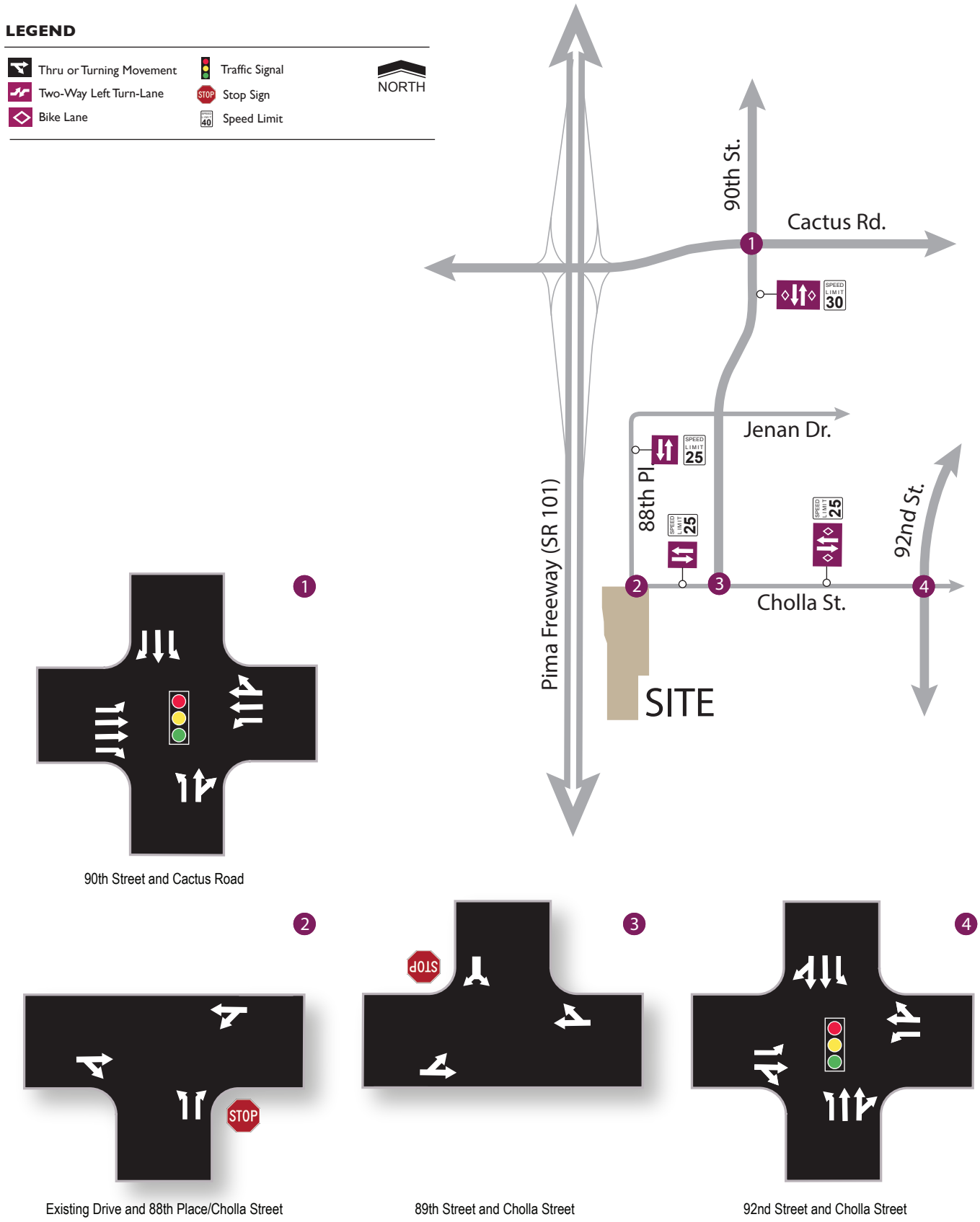

Figure 2: Existing Lane Configurations and Traffic Controls

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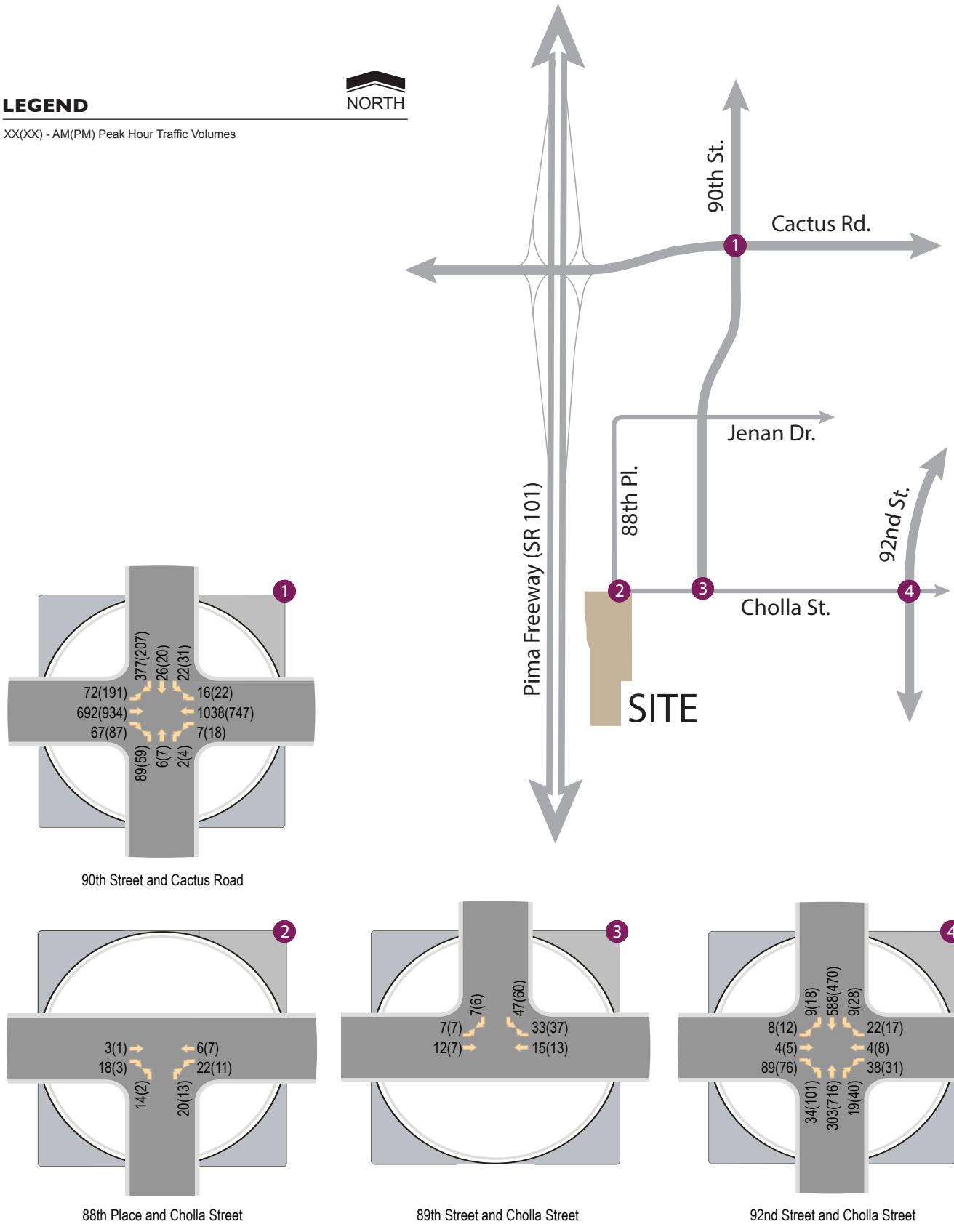

Figure 3: Existing Traffic

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Table 3 – 2014-16 Crash Summary

90th Street and Cactus Road	2014	2015	2016	Total
Type of Crash/Incident				
Single-Vehicle	0	0	1	1
Angle	0	1	1	2
Left Turn	0	0	1	1
Rear-End	2	0	0	2
Head On	1	0	0	1
Sideswipe, Same Direction	0	0	0	0
Sideswipe, Opposite Direction	0	0	0	0
Rear to Side	0	0	0	0
Rear to Rear	0	0	0	0
Other/Unknown	0	1	0	1
Crash/Incident Severity*				
Property Damage Only (PDO)	2	1	1	4
Injury	1	1	2	4
Fatality	0	0	0	0
Total by Year	**3**	**2**	**3**	**8**
92nd Street and Cholla Street	**2014**	**2015**	**2016**	**Total**
Type of Crash/Incident				
Single-Vehicle	0	1	0	1
Angle	0	0	0	0
Left Turn	0	0	1	1
Rear-End	0	0	1	1
Head On	0	0	0	0
Sideswipe, Same Direction	0	0	0	0
Sideswipe, Opposite Direction	0	0	0	0
Rear to Side	0	0	0	0
Rear to Rear	0	0	0	0
Other/Unknown	0	0	0	0
Crash/Incident Severity*				
Property Damage Only (PDO)	0	1	2	3
Injury	0	0	0	0
Fatality	0	0	0	0
Total by Year	**0**	**1**	**2**	**3**

*Numbers represent crashes, not the numbers of vehicles involved or persons injured.

A review of the data presented in **Table 3** reveals that at the intersection of 90th Street and Cactus Road, rear end and angle collisions were the most common. At the intersection of 92nd Street and Cholla Street, the collisions were divided evenly between single-vehicle, left-turn, and rear end.

Half of the incidents (4 of 8) at the intersection of 90th Street and Cactus Road resulted in no reported injuries and property damage only. The other half of the incidents reported injuries and the rate is constant over time. None of the incidents at the intersection of 92nd Street and Cholla Street reported injuries, all reported property damage only. The trend is constant over time.

From the above review of crash data at these intersections, it can be concluded that there are no obvious crash patterns that stand out and could be treated with any type of low-cost mitigation measures that could be implemented by the City.

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PROPOSED DEVELOPMENT

SITE DESCRIPTION

The proposed Megerdichian Senior Center development includes a 48-dwelling unit minimal residential health care facility, and a 30-room, 38-bed specialized residential health care facility. The site is located east of the Loop 101 south of Cholla Street in Scottsdale, Arizona. The layout of the proposed development is illustrated in **Figure 4**. It is expected to be opened and built out by the year 2020. Please note that 51 dwellings and 18 beds were studied by CivTech in May 2018.

SITE ACCESS

As shown in **Figure 4**, there is one existing site access approaching from the south where 88th Place and Cholla Street intersect. For the purpose of this analysis, 88th Place and Cholla Street were analyzed as a continuous east-west roadway and the existing driveway was analyzed as a north-south roadway at this intersection; therefore, it is analyzed as a one-way stop controlled "T" intersection with stop control northbound. The eastbound approach is a shared through/right-turn and the westbound approach is a shared left/through lane.

TRIP GENERATION ESTIMATION AND COMPARISON

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.

Table 4 – Proposed Development Trip Generation

Land Use	ITE LUC	Setting/ Location	ITE Land Use Name	Quantity Units*	AM Distribution		PM Distribution	
					In	Out	In	Out
Assisted Senior Center	252	General	Senior Adult Housing--Attached	48 Dwelling Units	35%	65%	55%	45%
Specialized Residential Health Care Facility	620	General	Nursing Home	38 Beds	72%	28%	33%	67%

Land Use	ADT		AM Peak Hour				PM Peak Hour			
	Avg Rate	Total	Avg Rate	In	Out	Total	Avg Rate	In	Out	Total
Minimal Residential Health Care Facility	*3.49	168	*0.20	3	6	9	*0.29	8	6	14
Specialized Residential Health Care Facility	3.06	116	0.17	4	2	6	0.22	3	5	8
Totals		**284**		**7**	**8**	**15**		**11**	**11**	**22**

DUs=Dwelling Units

+Note: Average rates were calculated by generating trips using equations for and dividing by total number of dwelling units. (See below.)

CALCULATIONS (Equations shown only where available)			
Land Use	***Daily***	***AM Peak Hour***	***PM Peak Hour***
Minimal Residential Health Care Facility	T= 4.02(48)-25.37= 168	T= 0.20(48)-0.18= 9	T= 0.24(48)+2.26= 14
Specialized Residential Health Care Facility	Weighted Average	Weighted Average	Weighted Average

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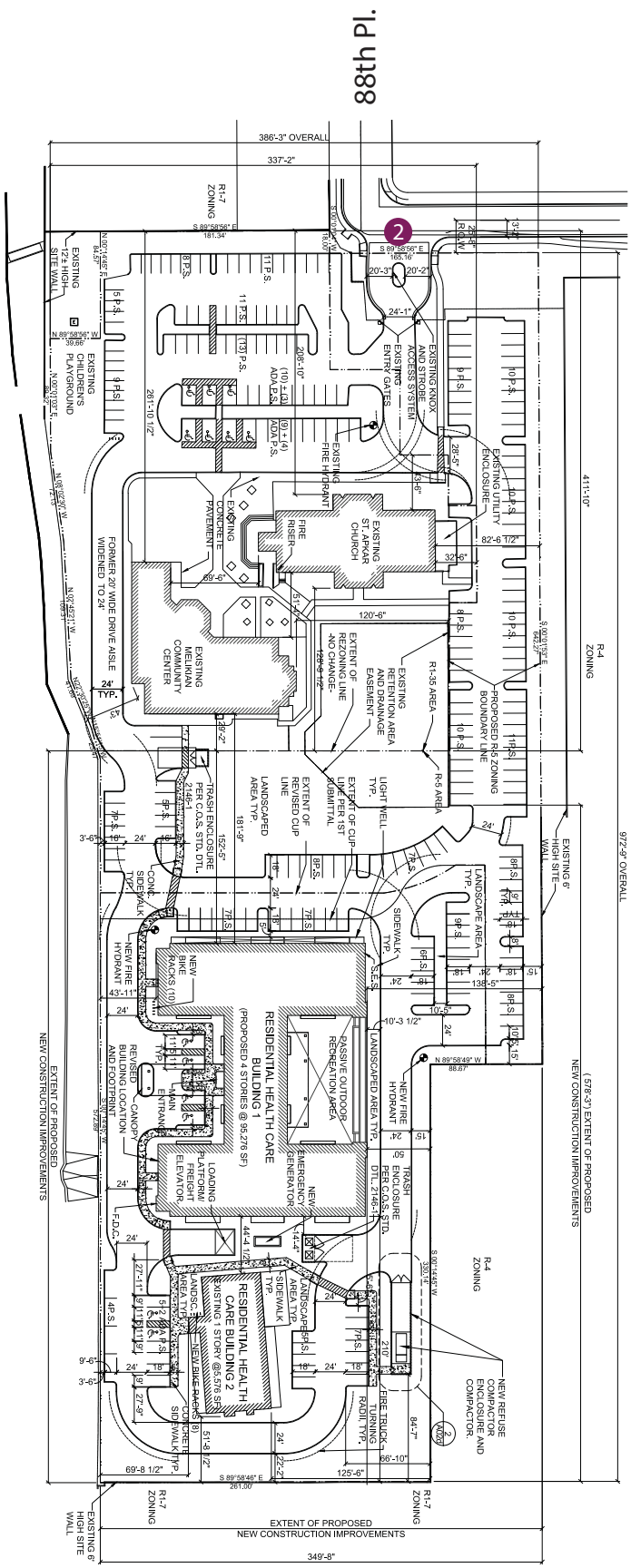

Figure 4: Site Plan and Access

The proposed development by the opening/buildout year 2020, is expected to generate 284 external daily trips with 15 total trips (7 in/8 out) occurring during the AM peak hour and 22 trips (11 in/11 out) occurring during the PM peak hour.

Under the prior mix of 51 dwelling units and 18 beds studied in May 2018, the project was expected to generate 236 external daily trips with 13 total trips (6 in/7 out) generated during the AM peak hour and 19 trips (9 in/10 out) generated during the PM peak hour when calculated using the same applicable formulae or average rates. Therefore, these trips represent increases of 48 trips daily and 2 and 3 trips during the AM and PM peak hours, respectively, over those reported in the original submittal of this report.

TRIP DISTRIBUTION AND ASSIGNMENT

A single trip distribution pattern was assumed for the proposed development. It is expected that the residential development will generate trips based on future population within a 7-mile radius of the site. Future total population within a 7-mile radius of the site, as predicted by the 2020 socio-economic data compiled by the Maricopa Association of Governments (MAG), was used as a basis to estimate trip distribution for the residential development. The resulting trip distribution percentages for the study area are shown in **Table 4**. The trip distribution calculations are included in **Appendix E**.

Figure 5 illustrates the trip distribution percentages shown in **Table 5** on the roadway network within the study area expected in 2020. The percentages presented in **Table 5** were applied to the site trips generated to determine the AM and PM peak hour site traffic at the intersections within the study area for 2020. The resulting site generated trip assignments for the proposed development in 2020 are presented in **Figure 6**.

Table 5 – Trip Distribution

Roadway	Trip Distribution
North on 90th Street (north of Cactus Road)	3%
North on 92nd Street (north of Cholla Street)	5%
South on 92nd Street (south of Cholla Street)	36%
East on Cactus Road (east of 90th Street)	5%
East on Cholla Street (east of 92nd Street)	5%
West on Cactus (west of 90th Street)	46%
Total	**100%**

FUTURE BACKGROUND TRAFFIC

Historical daily traffic volumes were taken from the City of Scottsdale traffic count website to estimate an average annual growth rate. Average daily traffic volumes on 92nd Street between Cholla Street and Cactus Road, were considered. This location experienced an average annual increase of daily traffic of 2.0 percent from 2014 to 2016. Therefore, a 2.0 percent annual growth rate was applied to the volumes at the study intersections to obtain the future background traffic volumes. Growth rate calculations can be found in **Appendix F**. The opening/buildout year background traffic volumes are illustrated in **Figure 7**.

TOTAL TRAFFIC

Total traffic was determined by adding the site generated traffic to the projected background traffic for opening/buildout year 2020. Total AM and PM peak hour traffic for horizon year 2020 is shown in **Figure 8**.

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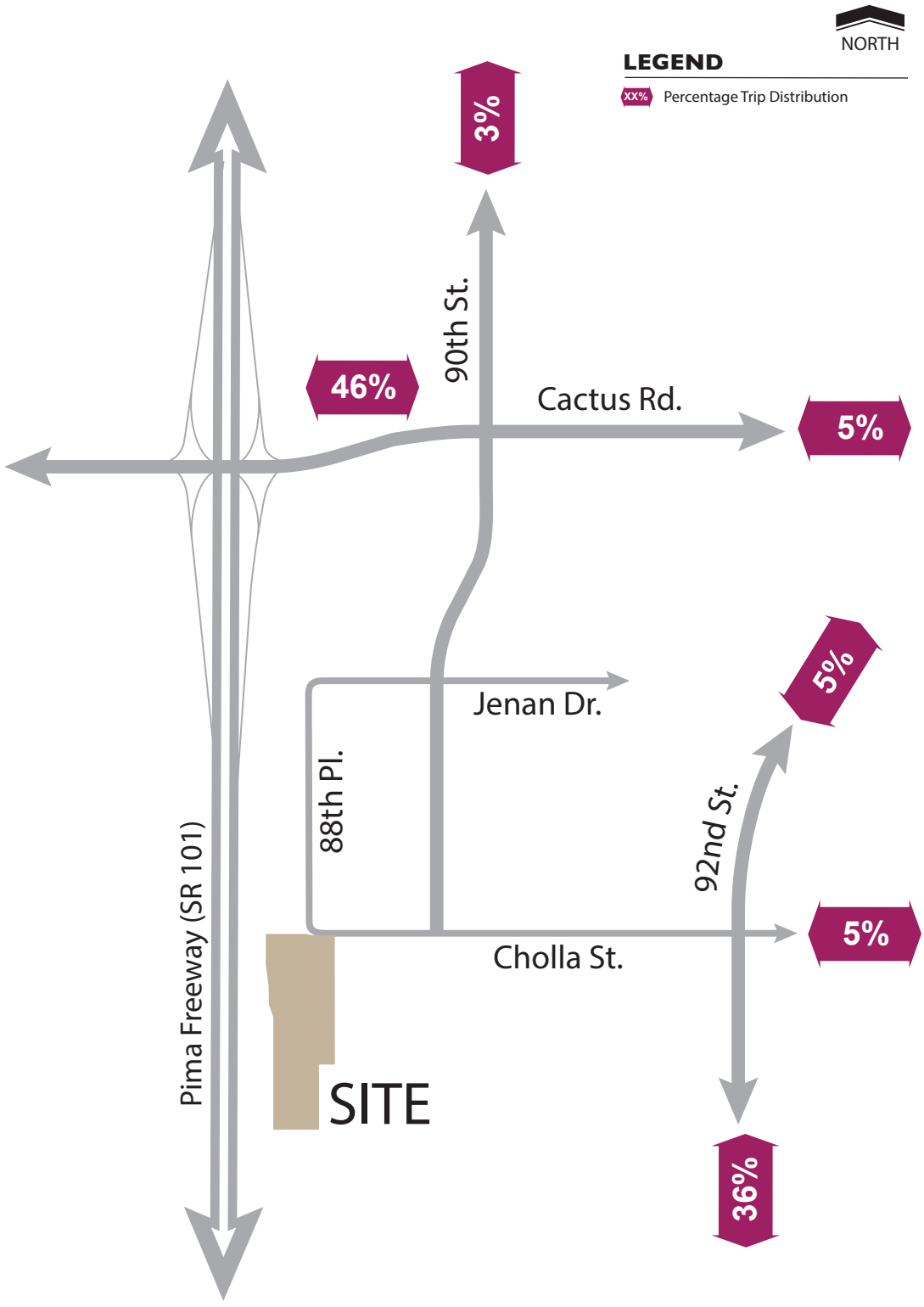

Figure 5: Trip Distribution

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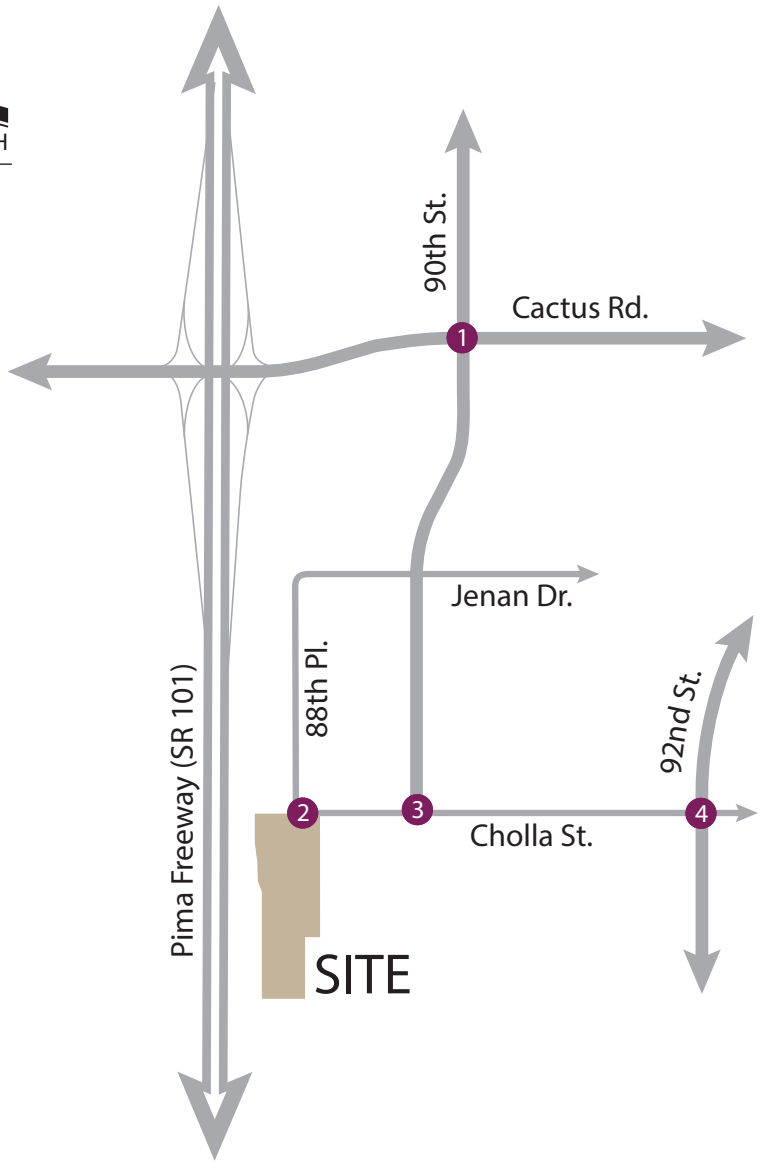
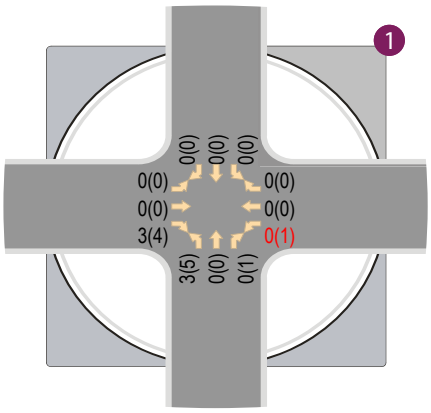
LEGEND

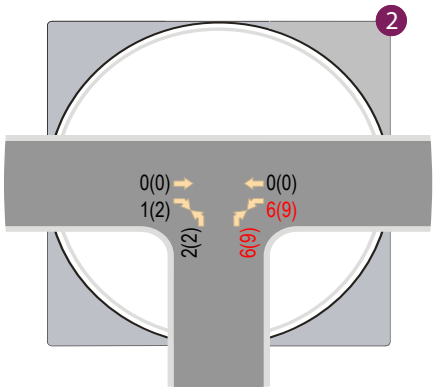
NORTH

XX(XX) - AM(PM) Peak Hour Traffic Volumes
(numbers in red revised per current trip generation)

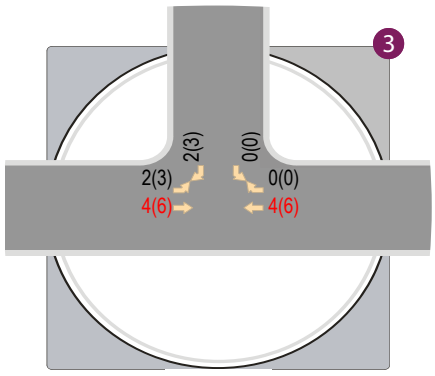




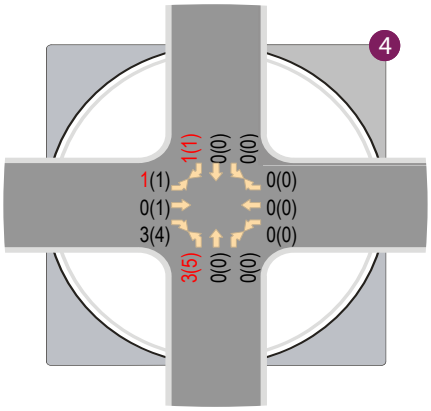
90th Street and Cactus Road



Existing Drive and 88th Place/Cholla Street



89th Street and Cholla Street



92nd Street and Cholla Street

Figure 6: Site Traffic

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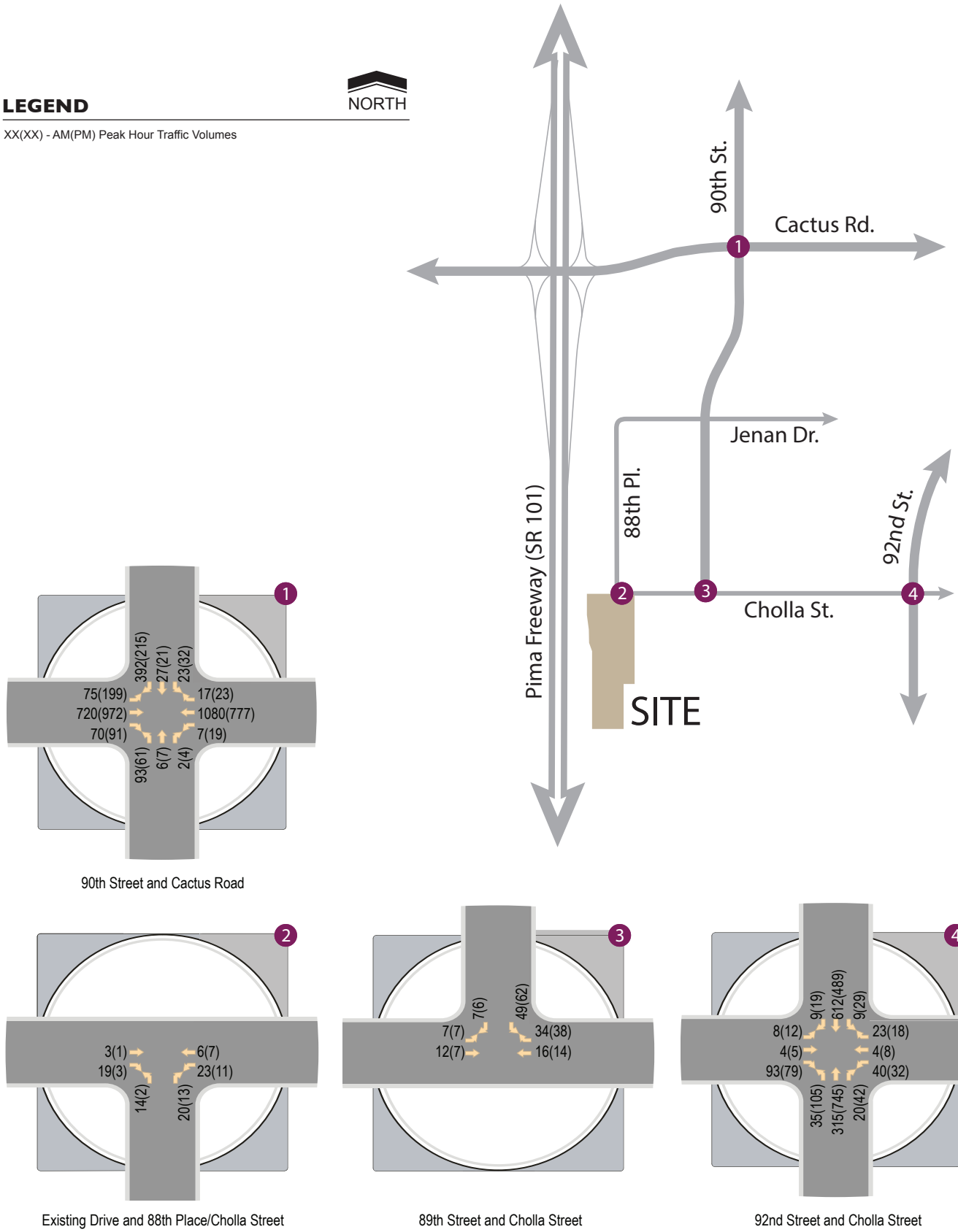

Figure 7: 2020 Background Traffic

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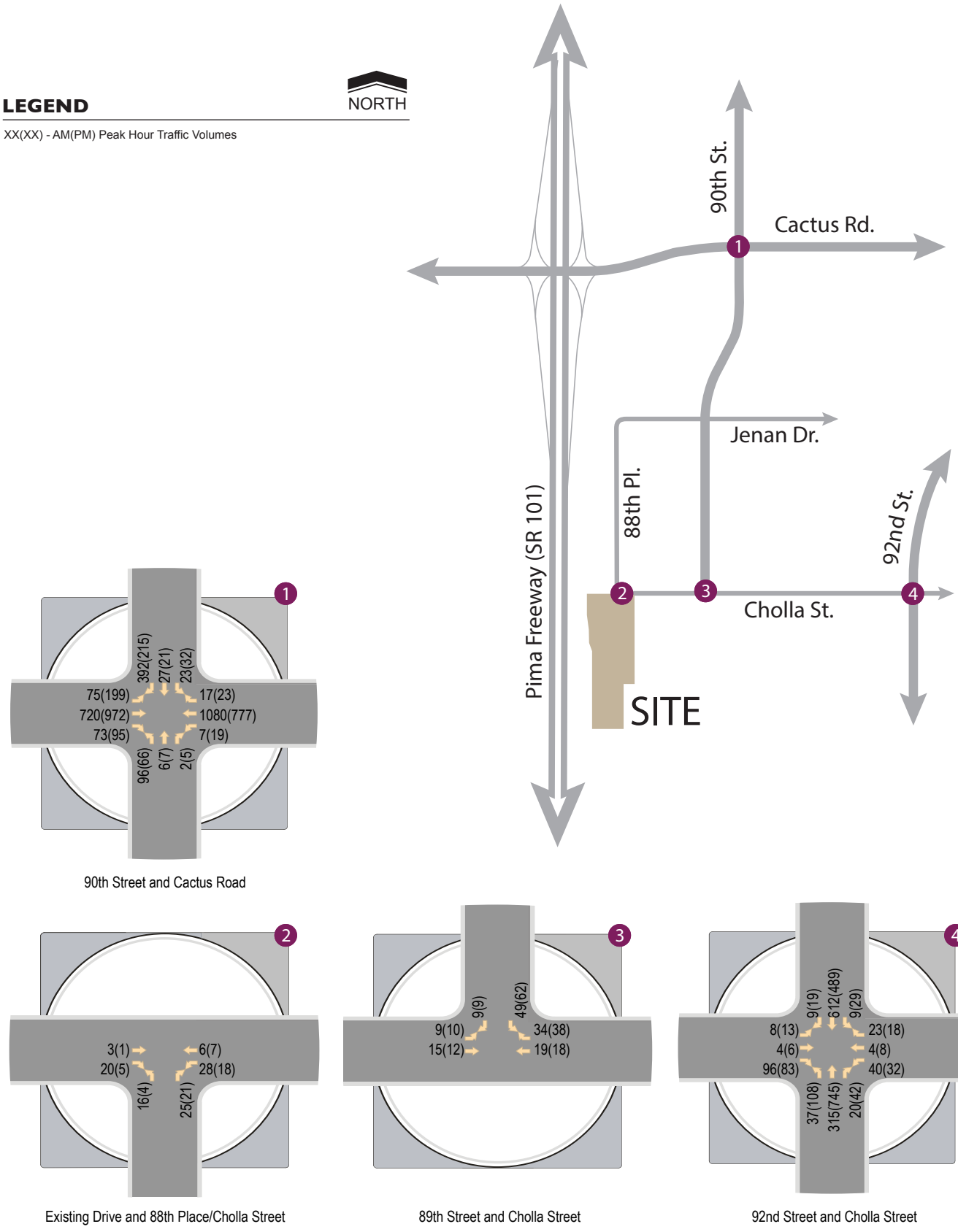

Figure 8: 2020 Total Traffic

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TRAFFIC IMPROVEMENT AND MITIGATION ANALYSIS

As documented above, the new mix of 48 dwelling units and 38 beds is expected to generate not more than 3 additional trips during either peak hour. CivTech reviewed the difference in trips and the level of service analysis below, with all of the intersections operating at overall levels of service of C or better and no movements operating at less than LOS D and did not judge these few (1 inbound/1 outbound AM; 2 inbound/1 outbound PM) additional trips enough to change the impacts on the surrounding roadway network or the recommendations within the TIA. Since the site is in an established neighborhood, the only two study intersections at which it is likely that there would have been noticeable increase in traffic since 2018—increased through volumes due to growth in regional traffic and not due to any significant site traffic—would be the intersections on 90th Street at Cactus Road and on 92nd Street at Cholla Street. Therefore, CivTech did not consider it necessary at this time to burden the church with the cost of redoing the several analyses with slightly revised numbers that would not likely change the previous reported results.

LEVEL OF SERVICE ANALYSIS

Peak hour capacity analyses were conducted for all the intersections within the study area. All intersections were analyzed using Synchro 10.0 analysis software and the methodologies previously presented. The overall intersection and approach levels of service are summarized in **Table 6** for the analysis year 2020. Detailed analysis worksheets can be found in **Appendix G** for 2020. No changes are required in lane configurations or stop control at any of the study intersections.

Table 6 – 2020 Opening Year Peak Hour Levels of Service

ID	Intersection	Stop Control/ Mitigated	Approach/ Movement	2020 LOS	
				No Build AM (PM)	Build AM (PM)
1	90th Street and Cactus Road	Signal	NB	C(C)	C(C)
			SB	C(C)	C(C)
			EB	C(C)	C(C)
			WB	C(C)	C(C)
			Overall	**C(C)**	**C(C)**
2	Existing Drive and Cholla Street	1-Way Stop (NB)	NB Left	A(A)	A(A)
			NB Right	A(A)	A(A)
			WB Left	A(A)	A(A)
3	Cholla Street and 89th Street	1-Way Stop (SB)	SB Left	A(A)	A(A)
			SB Right	A(A)	A(A)
			EB Left	A(A)	A(A)
4	Cholla Street and 92nd Street	Signal	NB	A(A)	A(A)
			SB	A(A)	A(A)
			EB	D(D)	D(D)
			WB	D(D)	D(D)
			Overall	**B(A)**	**B(A)**

The results of the opening year 2020 HCM 6th Edition analyses summarized in **Table 6** indicate that all study intersections should operate with acceptable levels of service of LOS D or better. Based on these levels of service, no mitigation measures are recommended.

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LEFT TURN DECELERATION LANES

Currently, there is no left turn deceleration lane from Cholla Street to the existing driveway. Upon completion of the development, approximately 28 vehicles will be making left turns into the site in the AM peak hour and 18 in the PM peak hour, these volumes are shown in **Figure 8**. The opposing street volume is predicted to be very minor, approximately 1 vehicle in the AM peak hour and 3 in the PM peak hour, meaning that there should be very little conflict between vehicles turning left into the site and opposing street traffic. A left turn deceleration lane is not warranted at this intersection.

RIGHT TURN DECELERATION LANES

Cholla Street is currently classified as a minor collector road by the City of Scottsdale. In order to determine the need for a deceleration lane, the following criteria must be met

- At least 5,000 vehicles per day are expected to use the street.
- The 85th percentile traffic speed on the street is at least 35 mph.
- At least 30 vehicles will be making right turns into the driveway during a 1-hour period.

Based on the total traffic volumes, shown in **Figure 8**, there will be fewer than 5,000 vehicles per day using Cholla Street. The posted speed limit for Cholla Street is 25 mph and there will be approximately 20 right turns into the site in the AM peak hour and 5 right turns in the peak hour. Since none of the three criteria has been met, a right turn deceleration lane will not be required at the driveway.

QUEUE STORAGE ANALYSIS

Since no new deceleration lanes are being proposed for the site, a queue storage analysis is not required.

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 should be provided at the proposed access based on the standards provided in the *City of Scottsdale Design Standards and Policies Manual, 2018 Update*.

Adjacent to the site, 88th Place/Cholla Street was constructed with horizontal curvature at a relatively flat grade; therefore, the only impediments to the site distance would be existing structures and landscaping. The developer should ensure that adequate sight distance is provided at the intersections to allow safe left and right turning movements from the development and left turns into the development from Cholla Street.

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Landscaping should be maintained at a maximum of three feet in height. To maintain sight distance, tree branches should be trimmed lower than seven feet and maintained to meet current acceptable landscape requirements.

Figures depicting the method and sight distance requirements are provided in the City of Scottsdale's *Design Standards and Policies Manual, 2018 Update*. Copies of the applicable standards are provided in **Appendix H** for reference.

NEIGHBOR CONCERNS

The Owner of Saint Apkar hosted a neighborhood meeting on October 11, 2018. The neighbors raised some concerns. In response, CivTech collected additional traffic data and responded to the owner in a letter dated November 30, 2018. A copy of this letter has been included as **Appendix I**.

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CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations have been documented in this study:

- The proposed development by the opening/buildout year 2020, is expected to generate 284 external daily trips with 15 total trips (7 in/8 out) occurring during the AM peak hour and 22 trips (11 in/11 out) occurring during the PM peak hour.
- These trips represent increases of 48 trips daily and 2 and 3 trips during the AM and PM peak hours, respectively, over those reported in the original submittal of this report, which was finalized on May 23, 2018 and on which the City made minor comments.
- From the review of crash data at the intersections of 90th Street and Cactus Road and 92nd Street and Cholla Street, it can be concluded that there are no obvious crash patterns that stand out and could be treated with any type of low-cost mitigation measures that could be implemented by the City.
- All study intersections currently operate at overall LOS D or better during the peak hours.
- No new left-turn or right-turn deceleration lanes are required by City of Scottsdale's *Design Standards and Polices Manual* Section 5-3.206 on 88th Place and Cholla Street approaching the site driveways.
- The results of the opening year 2020 HCM 6th Edition analyses indicate that all study intersections should operate with acceptable levels of service of LOS D or better. Based on these levels of service, no mitigation measures are recommended.
- Sight distance should be provided at the proposed access based on the standards provided in the *City of Scottsdale Design Standards and Policies Manual, 2018 Update*.

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LIST OF REFERENCES

A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials, Washington, D.C., 2009.

Design and Safety of Pedestrian Facilities, Institute of Transportation Engineers, Washington, D.C., March 1998.

Design Standards and Policies Manual, 2006 Update, City of Scottsdale

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.

Street Classification Map, City of Scottsdale website.

Transportation and Land Development, Stover, V.G. and Koepke, F.J., Institute of Transportation Engineers, Washington, D.C, 1988.

Trip Generation Manual, 10th Edition, Institute of Transportation Engineers, Washington, D.C, 2017.

Design Standards & Policies Manual – Section 5: Transportation Impact Studies, City of Scottsdale, Arizona, January 2010.

TECHNICAL APPENDICES

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APPENDIX A

REVIEW COMMENTS

25-ZN-2018
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From: Ricki Horowitz
To: Ed Bull
Subject: FW: 25-ZN-18/19-UP-18
Date: Wednesday, January 30, 2019 9:45:51 AM
Attachments: image002.jpg

Art and Ed –

Below are the Traffic Reviewer's comments. Thanks. Ricki

Ricki L. Horowitz
Paralegal

From: Bloemberg, Greg
Sent: Wednesday, January 30, 2019 9:39 AM
To: Ricki Horowitz
Cc: Ed Bull
Subject: 25-ZN-18/19-UP-18

Ricki,

Must've just missed you this morning. Just received the following comments from Transportation. Please note for the resubmittal. Thanks.

1. Traffic Report Review Comments:
   a. Additional information contained within a letter dated November 30, 2018 from CivTech to AAK Architecture & Interiors, Inc., is useful in evaluating the anticipated impacts of the project. The letter addresses trip generation comparisons, speed reduction options, an all-way stop warrant and traffic safety. Please add a copy of the letter as an appendix to the traffic report.
   b. Reviewer notes that Appendices F & G are mislabeled.

Greg Bloemberg
Senior Planner
Current Planning
City of Scottsdale

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APPENDIX B

TURNING MOVEMENT COUNTS

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Megerdichican Senior Center TIMA **TRAFFIC COUNT DATA SHEET** **Counts Conducted**

Thursday 4/26/18

AM Peak Hour

Time		Northbound				Southbound				Eastbound				Westbound				TOTAL
Start	Finish	left	through	right	peds	left	through	right	peds	left	through	right	peds	left	through	right	peds	
7:00 AM	7:15 AM	18	1	2	-	5	2	43	-	24	138	12	-	-	205	1	-	451
7:15 AM	7:30 AM	24	1	1	-	3	3	84	-	8	146	15	-	-	251	4	-	540
7:30 AM	7:45 AM	17	2	-	-	9	6	186	-	13	213	11	-	4	311	1	-	773
7:45 AM	8:00 AM	21	2	1	-	7	4	60	-	16	143	24	-	2	264	8	-	552
8:00 AM	8:15 AM	27	1	-	-	3	2	47	-	35	190	17	-	1	212	3	-	538
8:15 AM	8:30 AM	25	5	1	-	4	4	54	-	21	153	15	-	6	235	6	-	529
8:30 AM	8:45 AM	19	1	-	-	2	2	53	-	24	142	17	-	1	241	2	-	504
8:45 AM	9:00 AM	12	3	1	-	4	3	72	-	7	199	17	-	2	254	5	-	579
7:00 AM	**9:00 AM**	**163**	**16**	**6**	**-**	**37**	**26**	**599**	**-**	**148**	**1,324**	**128**	**-**	**16**	**1,973**	**30**	**-**	**4,466**
7:15 AM	**8:15 AM**	**89**	**6**	**2**	**-**	**22**	**15**	**377**	**-**	**72**	**692**	**67**	**-**	**7**	**1,038**	**16**	**-**	**2,403**

Peak Hour Factor (PHF) **0.7772**

PM Peak Hour

Time		Northbound				Southbound				Eastbound				Westbound				TOTAL
Start	Finish	left	through	right	peds	left	through	right	peds	left	through	right	peds	left	through	right	peds	
4:00 PM	4:15 PM	26	1	2	-	8	8	44	-	34	212	26	-	4	177	10	-	552
4:15 PM	4:30 PM	13	1	1	-	11	6	44	-	54	26	23	-	3	223	8	-	413
4:30 PM	4:45 PM	31	2	-	-	6	9	30	-	44	212	16	-	2	188	2	-	542
4:45 PM	5:00 PM	21	2	-	-	5	5	36	-	26	251	27	-	5	192	5	-	575
5:00 PM	5:15 PM	6	2	1	-	11	4	52	-	48	216	19	-	3	181	8	-	551
5:15 PM	5:30 PM	16	1	2	-	9	8	45	-	60	237	20	-	4	199	1	-	602
5:30 PM	5:45 PM	16	2	1	-	6	3	74	-	57	230	21	-	6	175	8	-	599
5:45 PM	6:00 PM	22	2	1	-	4	6	25	-	35	187	12	-	1	177	5	-	477
4:00 PM	**6:00 PM**	**151**	**13**	**8**	**-**	**60**	**49**	**350**	**-**	**358**	**1,571**	**164**	**-**	**28**	**1,512**	**47**	**-**	**4,311**
4:45 PM	**5:45 PM**	**59**	**7**	**4**	**-**	**31**	**20**	**207**	**-**	**191**	**934**	**87**	**-**	**18**	**747**	**22**	**-**	**2,327**

Peak Hour Factor (PHF) **0.9664**

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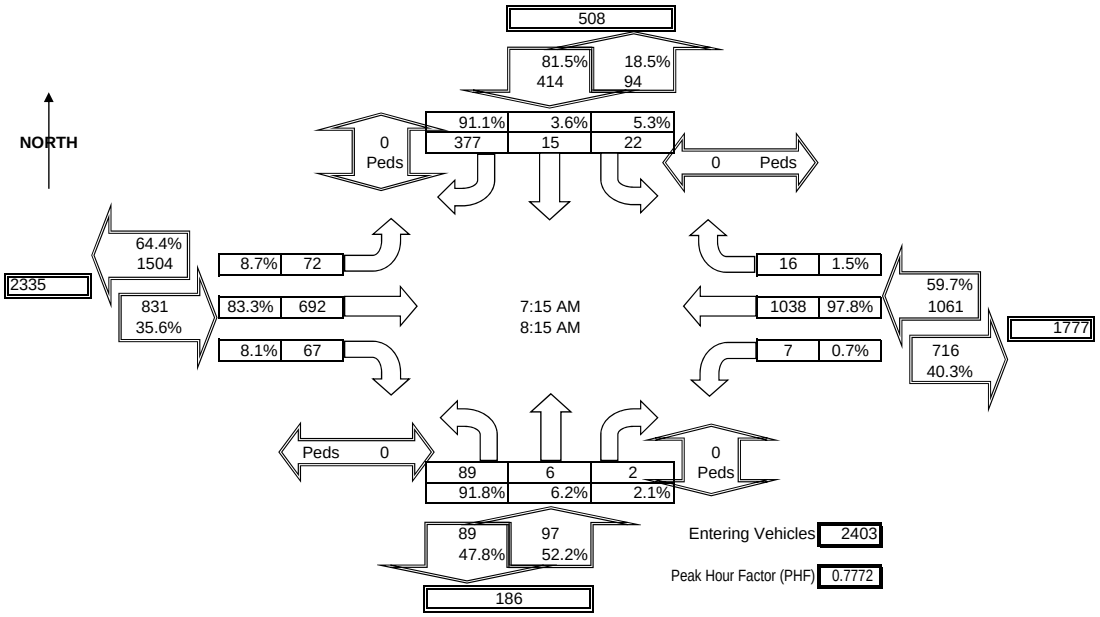
90th St. and Cactus Rd.

Megerdichican Senior Center TIMA **AM PEAK HOUR DIAGRAM** **Counts Conducted Thursday 4/26/18**



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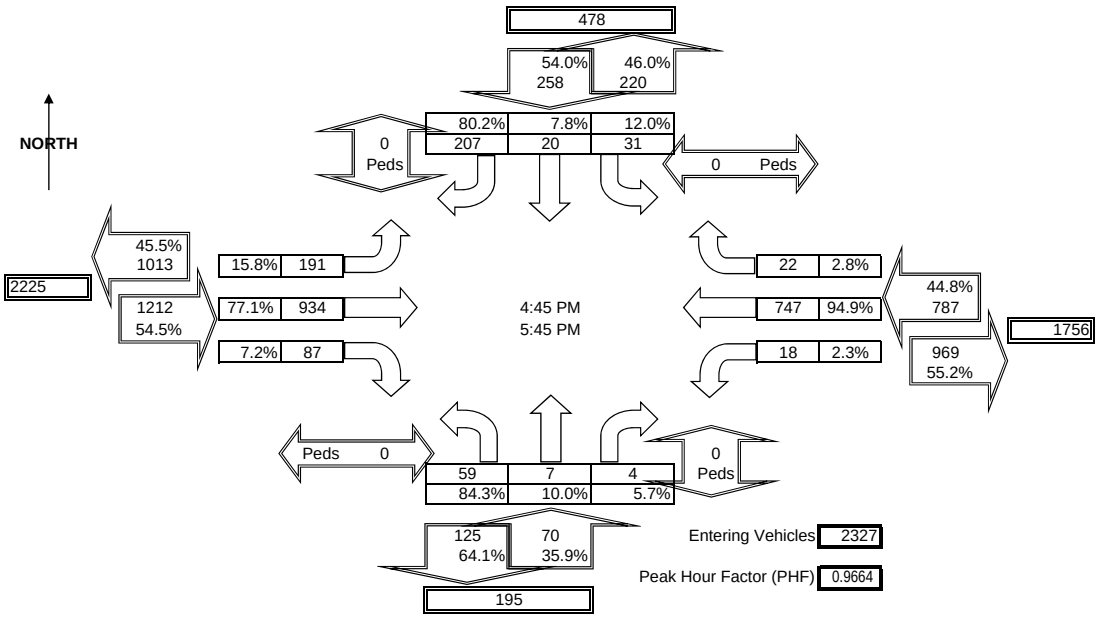
90th St. and Cactus Rd.

Megerdichican Senior Center TIMA **PM PEAK HOUR DIAGRAM** **Counts Conducted Thursday 4/26/18**



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90th St. and Cactus Rd.

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Megerdichican Senior Center TIMA **TRAFFIC COUNT DATA SHEET** **Counts Conducted**

Thursday 4/26/18

AM Peak Hour

Time		Northbound				Southbound				Eastbound				Westbound				TOTAL
Start	Finish	left	through	right	peds	left	through	right	peds	left	through	right	peds	left	through	right	peds	
7:00 AM	7:15 AM	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
7:15 AM	7:30 AM	-	-	-	-	-	-	-	-	-	2	3	-	4	-	-	-	9
7:30 AM	7:45 AM	2	-	6	-	-	-	-	-	-	2	2	-	3	-	-	-	15
7:45 AM	8:00 AM	3	-	3	-	-	-	-	-	-	1	3	-	7	4	-	-	21
8:00 AM	8:15 AM	3	-	2	-	-	-	-	-	-	-	5	-	4	-	-	-	14
8:15 AM	8:30 AM	6	-	9	-	-	-	-	-	-	-	8	-	8	2	-	-	33
8:30 AM	8:45 AM	-	-	1	-	-	-	-	-	-	1	-	-	2	-	-	-	4
8:45 AM	9:00 AM	-	-	4	-	-	-	-	-	-	-	-	-	2	-	-	-	6
7:00 AM	**9:00 AM**	**14**	**-**	**25**	**-**	**-**	**-**	**-**	**-**	**-**	**6**	**21**	**-**	**31**	**6**	**-**	**-**	**103**
7:30 AM	**8:30 AM**	**14**	**-**	**20**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**18**	**-**	**22**	**6**	**-**	**-**	**83**

Peak Hour Factor (PHF) **0.6288**

PM Peak Hour

Time		Northbound				Southbound				Eastbound				Westbound				TOTAL
Start	Finish	left	through	right	peds	left	through	right	peds	left	through	right	peds	left	through	right	peds	
4:00 PM	4:15 PM	2	-	2	-	-	-	-	-	-	-	-	-	3	3	-	-	10
4:15 PM	4:30 PM	-	-	5	-	-	-	-	-	-	-	-	-	2	2	-	-	9
4:30 PM	4:45 PM	-	-	2	-	-	-	-	-	-	1	1	-	4	2	-	-	10
4:45 PM	5:00 PM	-	-	4	-	-	-	-	-	-	-	2	-	2	-	-	-	8
5:00 PM	5:15 PM	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	3
5:15 PM	5:30 PM	-	-	2	-	-	-	-	-	-	-	-	-	5	1	-	-	8
5:30 PM	5:45 PM	1	-	4	-	-	-	-	-	-	-	2	-	-	-	-	-	7
5:45 PM	6:00 PM	3	-	-	-	-	-	-	-	-	1	-	-	2	-	-	-	6
4:00 PM	**6:00 PM**	**6**	**-**	**22**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**5**	**-**	**18**	**8**	**-**	**-**	**61**
4:00 PM	**5:00 PM**	**2**	**-**	**13**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**-**	**11**	**7**	**-**	**-**	**37**

Peak Hour Factor (PHF) **0.9250**

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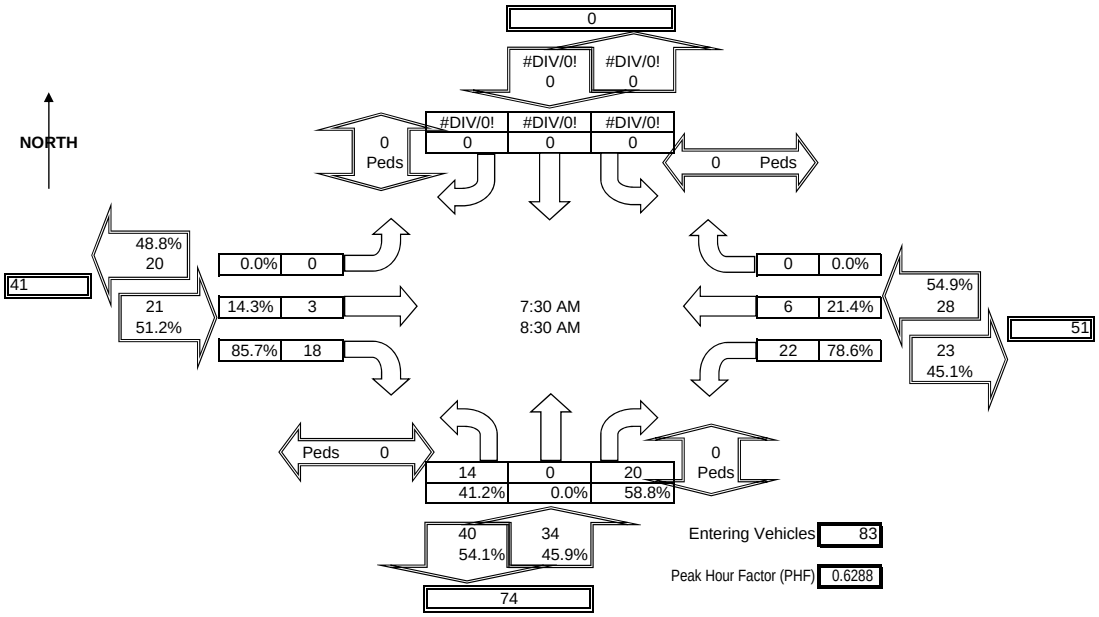
88th Pl. and Cholla St.

Megerdichican Senior Center TIMA **AM PEAK HOUR DIAGRAM** **Counts Conducted Thursday 4/26/18**



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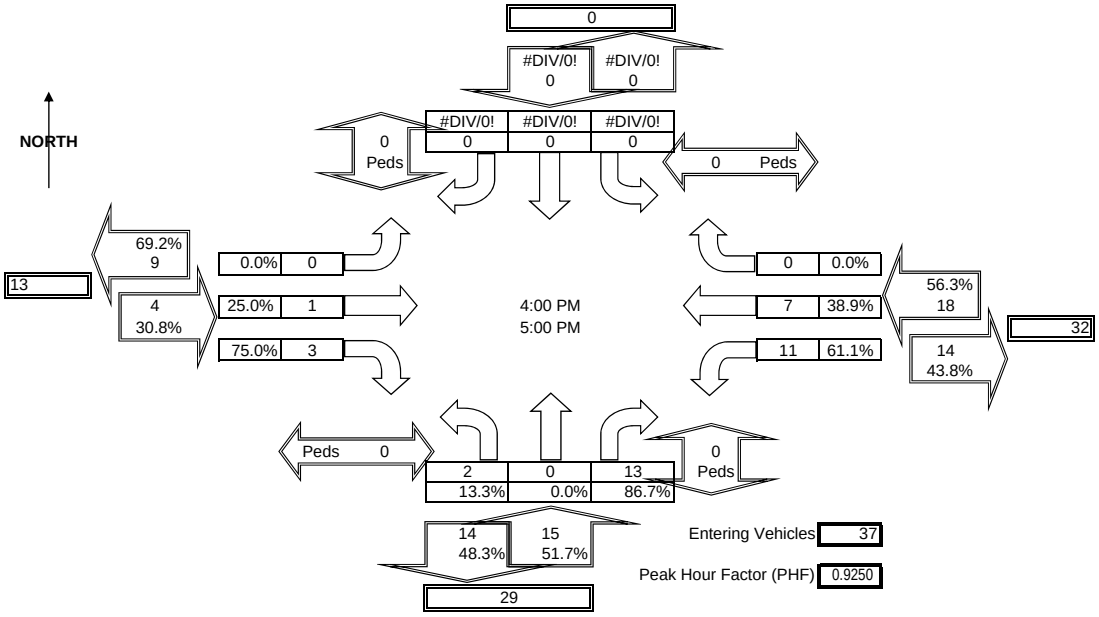
88th Pl. and Cholla St.

Megerdichican Senior Center TIMA **PM PEAK HOUR DIAGRAM** **Counts Conducted Thursday 4/26/18**



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88th Pl. and Cholla St.

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25_ZN_2018_V3
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Megerdichican Senior Center TIMA **TRAFFIC COUNT DATA SHEET** **Counts Conducted**

Thursday 4/26/18

AM Peak Hour

Time		Northbound				Southbound				Eastbound				Westbound				TOTAL
Start	Finish	left	through	right	peds	left	through	right	peds	left	through	right	peds	left	through	right	peds	
7:00 AM	7:15 AM	-	-	-	-	7	-	1	-	2	-	-	-	-	-	4	-	14
7:15 AM	7:30 AM	-	-	-	-	5	-	3	-	-	2	-	-	-	3	12	-	25
7:30 AM	7:45 AM	-	-	-	-	13	-	1	-	4	4	-	-	-	3	6	-	31
7:45 AM	8:00 AM	-	-	-	-	14	-	4	-	1	3	-	-	-	6	9	-	37
8:00 AM	8:15 AM	-	-	-	-	8	-	1	-	1	1	-	-	-	2	9	-	22
8:15 AM	8:30 AM	-	-	-	-	12	-	1	-	1	4	-	-	-	4	9	-	31
8:30 AM	8:45 AM	-	-	-	-	8	-	2	-	2	5	-	-	-	4	10	-	31
8:45 AM	9:00 AM	-	-	-	-	8	-	2	-	2	5	-	-	-	2	10	-	29
7:00 AM	**9:00 AM**	**-**	**-**	**-**	**-**	**75**	**-**	**15**	**-**	**13**	**24**	**-**	**-**	**-**	**24**	**69**	**-**	**220**
7:30 AM	**8:30 AM**	**-**	**-**	**-**	**-**	**47**	**-**	**7**	**-**	**7**	**12**	**-**	**-**	**-**	**15**	**33**	**-**	**121**

Peak Hour Factor (PHF) **0.8176**

PM Peak Hour

Time		Northbound				Southbound				Eastbound				Westbound				TOTAL
Start	Finish	left	through	right	peds	left	through	right	peds	left	through	right	peds	left	through	right	peds	
4:00 PM	4:15 PM	-	-	-	-	20	-	3	-	1	1	-	-	-	3	13	-	41
4:15 PM	4:30 PM	-	-	-	-	14	-	-	-	1	3	-	-	-	5	7	-	30
4:30 PM	4:45 PM	-	-	-	-	13	-	2	-	2	2	-	-	-	4	4	-	27
4:45 PM	5:00 PM	-	-	-	-	13	-	1	-	3	1	-	-	-	1	13	-	32
5:00 PM	5:15 PM	-	-	-	-	8	-	-	-	3	1	-	-	-	2	13	-	27
5:15 PM	5:30 PM	-	-	-	-	14	-	3	-	1	1	-	-	-	2	11	-	32
5:30 PM	5:45 PM	-	-	-	-	17	-	-	-	2	2	-	-	-	-	7	-	28
5:45 PM	6:00 PM	-	-	-	-	7	-	-	-	-	2	-	-	-	3	11	-	23
4:00 PM	**6:00 PM**	**-**	**-**	**-**	**-**	**106**	**-**	**9**	**-**	**13**	**13**	**-**	**-**	**-**	**20**	**79**	**-**	**240**
4:00 PM	**5:00 PM**	**-**	**-**	**-**	**-**	**60**	**-**	**6**	**-**	**7**	**7**	**-**	**-**	**-**	**13**	**37**	**-**	**130**

Peak Hour Factor (PHF) **0.7927**

89th St. and Cholla St.

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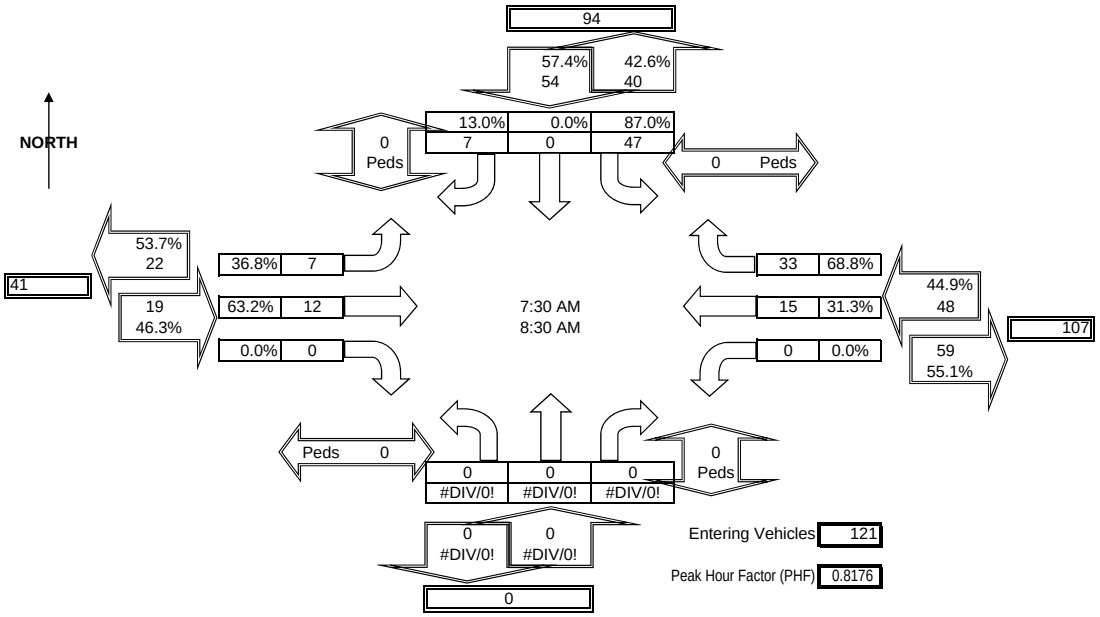
Megerdichican Senior Center TIMA **AM PEAK HOUR DIAGRAM** **Counts Conducted Thursday 4/26/18**



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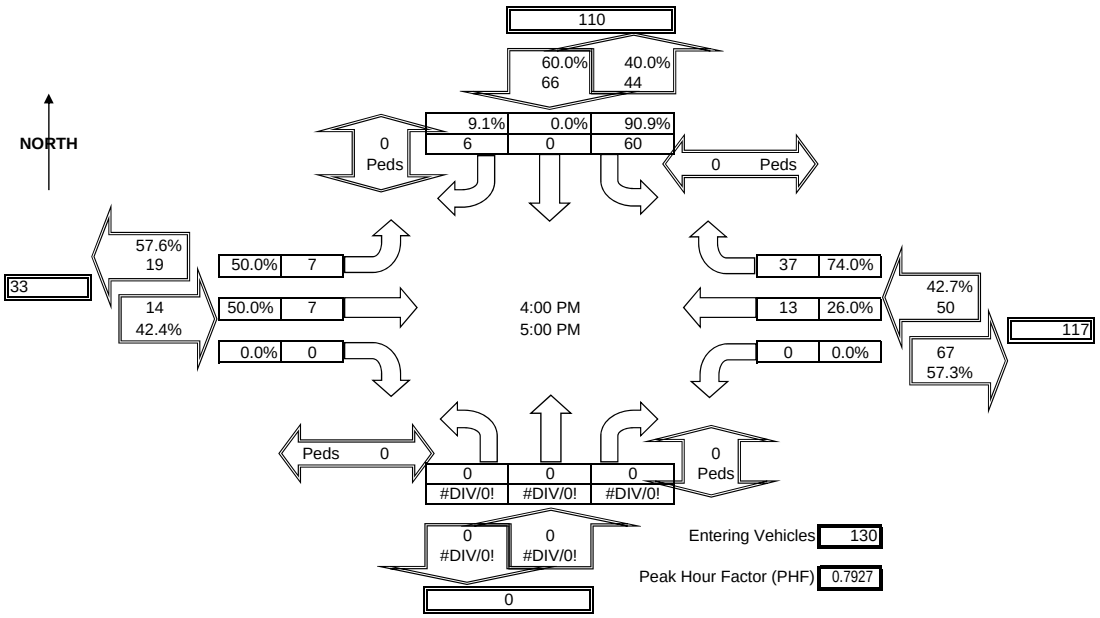
89th St. and Cholla St.

Megerdichican Senior Center TIMA **PM PEAK HOUR DIAGRAM** **Counts Conducted Thursday 4/26/18**



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89th St. and Cholla St.

25-ZN-2018
25_ZN_2018_V3
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Megerdichican Senior Center TIMA — TRAFFIC COUNT DATA SHEET

Counts Conducted
Thursday 4/26/18

AM Peak Hour

Time		Northbound				Southbound				Eastbound				Westbound				TOTAL
Start	Finish	left	through	right	peds	left	through	right	peds	left	through	right	peds	left	through	right	peds	
7:00 AM	7:15 AM	5	36	2	-	1	83	2	-	-	2	16	-	5	2	3	-	157
7:15 AM	7:30 AM	6	44	2	-	4	116	2	-	1	1	16	-	6	-	4	-	202
7:30 AM	7:45 AM	8	65	1	-	1	157	1	-	3	2	29	-	9	-	3	-	279
7:45 AM	8:00 AM	7	75	5	-	3	190	4	-	1	-	23	-	8	3	5	-	324
8:00 AM	8:15 AM	5	81	6	-	3	119	1	-	3	2	19	-	9	-	2	-	250
8:15 AM	8:30 AM	7	56	6	-	-	143	3	-	1	1	27	-	10	-	10	-	264
8:30 AM	8:45 AM	15	91	2	-	3	136	1	-	3	1	20	-	11	1	5	-	289
8:45 AM	9:00 AM	8	66	2	-	4	163	2	-	3	4	18	-	9	-	3	-	282
7:00 AM	**9:00 AM**	**61**	**514**	**26**	**-**	**19**	**1,107**	**16**	**-**	**15**	**13**	**168**	**-**	**67**	**6**	**35**	**-**	**2,047**
7:45 AM	**8:45 AM**	**34**	**303**	**19**	**-**	**9**	**588**	**9**	**-**	**8**	**4**	**89**	**-**	**38**	**4**	**22**	**-**	**1,127**

Peak Hour Factor (PHF) **0.8696**

PM Peak Hour

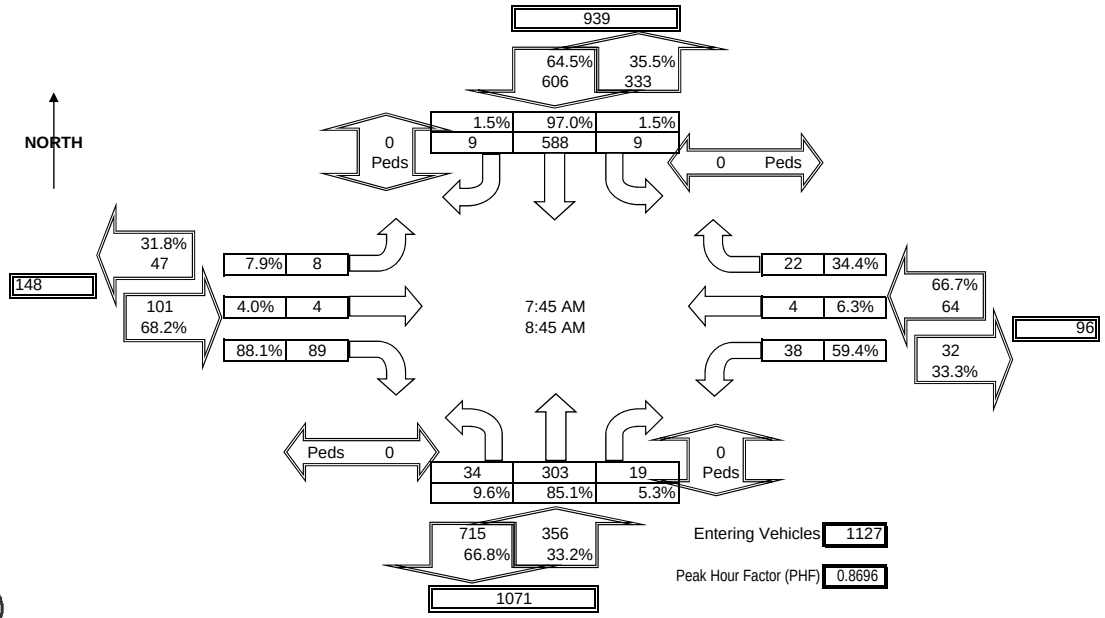
Time		Northbound				Southbound				Eastbound				Westbound				TOTAL
Start	Finish	left	through	right	peds	left	through	right	peds	left	through	right	peds	left	through	right	peds	
4:00 PM	4:15 PM	19	171	7	-	1	108	9	-	6	3	15	-	1	2	1	-	343
4:15 PM	4:30 PM	20	189	6	-	6	123	4	-	6	1	17	-	10	-	7	-	389
4:30 PM	4:45 PM	17	180	10	-	5	115	3	-	2	3	18	-	12	3	3	-	371
4:45 PM	5:00 PM	32	170	9	-	9	90	5	-	1	1	24	-	6	2	5	-	354
5:00 PM	5:15 PM	20	193	8	-	4	125	5	-	4	1	9	-	8	2	1	-	380
5:15 PM	5:30 PM	32	173	13	-	10	140	5	-	5	-	25	-	5	1	8	-	417
5:30 PM	5:45 PM	25	160	7	-	4	107	3	-	2	4	25	-	11	-	11	-	359
5:45 PM	6:00 PM	15	139	7	-	5	73	1	-	4	1	9	-	4	1	3	-	262
4:00 PM	**6:00 PM**	**180**	**1,375**	**67**	**-**	**44**	**881**	**35**	**-**	**30**	**14**	**142**	**-**	**57**	**11**	**39**	**-**	**2,875**
4:30 PM	**5:30 PM**	**101**	**716**	**40**	**-**	**28**	**470**	**18**	**-**	**12**	**5**	**76**	**-**	**31**	**8**	**17**	**-**	**1,522**

Peak Hour Factor (PHF) **0.9125**

92nd St. and Cholla St.

CivTech
Appendix B
25-ZN-2018
25_ZN_2018_V3
12/15/2020
10/8/2020

Megerdichican Senior Center TIMA **AM PEAK HOUR DIAGRAM** **Counts Conducted Thursday 4/26/18**



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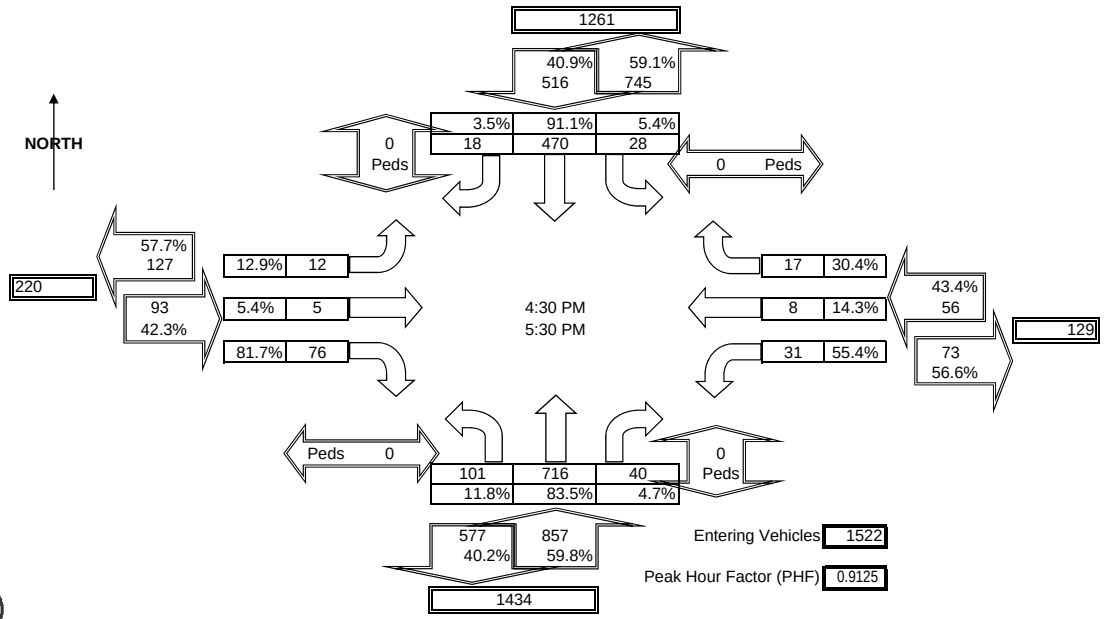
Appendix B

92nd St. and Cholla St.

Megerdichican Senior Center TIMA **PM PEAK HOUR DIAGRAM** **Counts Conducted Thursday 4/26/18**



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Appendix B

92nd St. and Cholla St.

25-ZN-2018
25_ZN_2018_V3
10/8/2020
12/15/2020

Prepared by: Field Data Services of Arizona/Veracity Traffic Group (520) 316-6745

Volumes for: Thursday, April 26, 2018 City: Scottsdale Project #: 18-1226-001

Location: Cholla St. East of 90th St.

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			0		1			12:00			12		5		
00:15			0		0			12:15			17		8		
00:30			0		0			12:30			10		3		
00:45			0	0	0	1	1	12:45			13	52	10	26	78
01:00			1		0			13:00			10		9		
01:15			0		0			13:15			12		11		
01:30			0		0			13:30			12		5		
01:45			0	1	0	0	1	13:45			14	48	5	30	78
02:00			0		0			14:00			4		4		
02:15			1		0			14:15			9		4		
02:30			0		0			14:30			12		10		
02:45			0	1	0	0	1	14:45			14	39	14	32	71
03:00			0		0			15:00			7		14		
03:15			0		0			15:15			19		11		
03:30			0		0			15:30			6		9		
03:45			0	0	0	0		15:45			9	41	9	43	84
04:00			1		0			16:00			12		15		
04:15			0		0			16:15			16		8		
04:30			1		0			16:30			11		8		
04:45			1	3	0	0	3	16:45			13	52	12	43	95
05:00			0		0			17:00			5		11		
05:15			1		1			17:15			13		14		
05:30			1		0			17:30			17		6		
05:45			0	2	3	4	6	17:45			7	42	9	40	82
06:00			5		1			18:00			12		9		
06:15			2		2			18:15			3		9		
06:30			6		2			18:30			5		4		
06:45			8	21	0	5	26	18:45			8	28	12	34	62
07:00			6		2			19:00			8		3		
07:15			8		6			19:15			8		4		
07:30			16		6			19:30			6		4		
07:45			16	46	13	27	73	19:45			10	32	4	15	47
08:00			10		7			20:00			6		5		
08:15			11		7			20:15			1		5		
08:30			14		17			20:30			5		7		
08:45			13	48	8	39	87	20:45			1	13	3	20	33
09:00			12		10			21:00			5		5		
09:15			9		5			21:15			2		2		
09:30			11		9			21:30			2		5		
09:45			11	43	6	30	73	21:45			3	12	1	13	25
10:00			10		3			22:00			0		5		
10:15			6		13			22:15			2		2		
10:30			12		9			22:30			2		4		
10:45			16	44	7	32	76	22:45			0	4	3	14	18
11:00			6		8			23:00			3		4		
11:15			9		10			23:15			1		1		
11:30			12		9			23:30			0		2		
11:45			6	33	8	35	68	23:45			1	5	0	7	12
Total Vol.				242		173	**415**					368		317	**685**

GPS Coordinates: 33.589823,-111.885606

Daily Totals

	NB	SB	EB	WB	Combined
			610	490	**1100**

	AM			PM		
Split %	58.3%	41.7%	**37.7%**	53.7%	46.3%	**62.3%**
Peak Hour	07:30	07:45	**07:45**	12:00	14:30	**14:30**
Volume	53	44	**95**	52	49	**101**
P.H.F.	0.83	0.65	**0.77**	0.76	0.88	**0.84**

Prepared by: Field Data Services of Arizona/Veracity Traffic Group (520) 316-6745

Volumes for: Thursday, April 26, 2018 City: Scottsdale Project #: 18-1226-002

Location: 89th St. Btwn Cortez St. & Kalil Dr.

AM Period	NB	SB	EB	WB		PM Period	NB	SB	EB	WB	
00:00	0		1			12:00	3		9		
00:15	0		1			12:15	12		15		
00:30	0		2			12:30	6		19		
00:45	0	0	0	4	4	12:45	7	28	13	56	84
01:00	0		1			13:00	7		13		
01:15	0		1			13:15	11		10		
01:30	0		0			13:30	7		13		
01:45	0	0	1	3	3	13:45	8	33	12	48	81
02:00	1		0			14:00	7		8		
02:15	0		1			14:15	4		13		
02:30	0		0			14:30	11		13		
02:45	0	1	2	3	4	14:45	13	35	14	48	83
03:00	0		0			15:00	9		5		
03:15	0		0			15:15	10		17		
03:30	0		0			15:30	10		14		
03:45	0	0	0	0		15:45	9	38	14	50	88
04:00	0		1			16:00	15		21		
04:15	1		0			16:15	9		18		
04:30	0		0			16:30	7		14		
04:45	2	3	1	2	5	16:45	16	47	16	69	116
05:00	1		2			17:00	13		10		
05:15	2		2			17:15	11		17		
05:30	1		1			17:30	11		19		
05:45	2	6	0	5	11	17:45	7	42	8	54	96
06:00	5		1			18:00	9		16		
06:15	5		6			18:15	10		13		
06:30	4		5			18:30	3		8		
06:45	6	20	8	20	40	18:45	7	29	8	45	74
07:00	7		7			19:00	4		7		
07:15	14		7			19:15	5		12		
07:30	11		11			19:30	1		7		
07:45	10	42	16	41	83	19:45	1	11	6	32	43
08:00	11		9			20:00	3		6		
08:15	13		15			20:15	4		5		
08:30	13		9			20:30	5		11		
08:45	11	48	10	43	91	20:45	5	17	4	26	43
09:00	11		8			21:00	5		7		
09:15	13		8			21:15	4		4		
09:30	9		8			21:30	5		8		
09:45	15	48	13	37	85	21:45	0	14	3	22	36
10:00	9		11			22:00	3		2		
10:15	13		14			22:15	1		4		
10:30	13		12			22:30	0		3		
10:45	13	48	13	50	98	22:45	3	7	2	11	18
11:00	10		9			23:00	3		2		
11:15	12		13			23:15	2		1		
11:30	7		10			23:30	0		0		
11:45	6	35	10	42	77	23:45	1	6	1	4	10
Total Vol.	251		250		**501**			307		465	**772**

GPS Coordinates: 33.591651,-111.887934

Daily Totals

NB	SB	EB	WB	Combined
558	715			**1273**

	AM			PM		
Split %	50.1%	49.9%	**39.4%**	39.8%	60.2%	**60.6%**
Peak Hour	09:45	11:45	**09:45**	16:45	16:00	**16:00**
Volume	50	53	**100**	51	69	**116**
P.H.F.	0.83	0.70	**0.89**	0.80	0.82	**0.81**

25-ZN-2018
12/15/2020
25_ZN_2018_V3
10/8/2020

Prepared by: Field Data Services of Arizona/Veracity Traffic Group (520) 316-6745

Volumes for: Thursday, April 26, 2018 City: Scottsdale Project #: 18-1226-003

Location: Jenan Dr. East of 89th St.

AM Period	NB	SB	EB		WB		PM Period	NB	SB	EB		WB		
00:00			0		0		12:00			0		2		
00:15			0		0		12:15			3		0		
00:30			0		0		12:30			1		1		
00:45			0	0	0	0	12:45			0	4	0	3	7
01:00			0		0		13:00			1		3		
01:15			0		0		13:15			0		1		
01:30			0		0		13:30			0		0		
01:45			0	0	0	0	13:45			2	3	2	6	9
02:00			0		0		14:00			1		2		
02:15			0		0		14:15			2		0		
02:30			0		0		14:30			3		3		
02:45			0	0	0	0	14:45			1	7	2	7	14
03:00			0		0		15:00			0		1		
03:15			0		0		15:15			2		0		
03:30			0		0		15:30			1		1		
03:45			0	0	0	0	15:45			2	5	0	2	7
04:00			0		0		16:00			0		0		
04:15			0		0		16:15			0		1		
04:30			0		0		16:30			0		3		
04:45			0	0	0	0	16:45			1	1	1	5	6
05:00			0		0		17:00			2		1		
05:15			0		0		17:15			1		1		
05:30			0		0		17:30			1		2		
05:45			1	1	1	1	2	17:45			4	8	2	6	14
06:00			1		1		18:00			1		3		
06:15			0		2		18:15			2		1		
06:30			0		0		18:30			3		1		
06:45			0	1	2	5	6	18:45			1	7	2	7	14
07:00			1		4		19:00			1		2		
07:15			3		3		19:15			1		1		
07:30			2		3		19:30			0		0		
07:45			2	8	1	11	19	19:45			0	2	0	3	5
08:00			1		1		20:00			0		0		
08:15			0		2		20:15			0		0		
08:30			1		1		20:30			1		1		
08:45			1	3	2	6	9	20:45			4	5	0	1	6
09:00			0		2		21:00			0		0		
09:15			1		1		21:15			0		0		
09:30			1		1		21:30			2		1		
09:45			4	6	1	5	11	21:45			1	3	1	2	5
10:00			2		2		22:00			0		0		
10:15			0		1		22:15			0		0		
10:30			1		1		22:30			0		1		
10:45			2	5	1	5	10	22:45			1	1	0	1	2
11:00			1		1		23:00			1		0		
11:15			1		0		23:15			0		0		
11:30			0		0		23:30			1		0		
11:45			1	3	0	1	4	23:45			0	2	0	0	2
Total Vol.			27		34		**61**			48		43		**91**

GPS Coordinates: 33.593447,-111.887424

Daily Totals

NB	SB	EB	WB	Combined
		75	77	**152**

	AM			PM		
Split %	44.3%	55.7%	**40.1%**	52.7%	47.3%	**59.9%**
Peak Hour	07:00	06:45	**07:00**	17:45	17:15	**17:45**
Volume	8	12	**19**	10	8	**17**
P.H.F.	0.67	0.75	**0.79**	0.63	0.67	**0.71**

Prepared by: Field Data Services of Arizona/Veracity Traffic Group (520) 316-6745

Volumes for: Thursday, April 26, 2018 City: Scottsdale Project #: 18-1226-004

Location: Jenan Dr. East of 88th Pl.

AM Period	NB	SB	EB		WB		PM Period	NB	SB	EB		WB		
00:00			0		0		12:00			2		0		
00:15			0		0		12:15			1		4		
00:30			0		0		12:30			3		1		
00:45			0	0	0	0	12:45			5	11	2	7	18
01:00			0		1		13:00			2		0		
01:15			0		0		13:15			2		2		
01:30			0		1		13:30			1		3		
01:45			0	0	0	2	2	13:45			4	9	2	7	16
02:00			0		1		14:00			4		1		
02:15			0		0		14:15			2		4		
02:30			0		0		14:30			5		2		
02:45			0	0	0	1	1	14:45			4	15	6	13	28
03:00			0		0		15:00			6		3		
03:15			0		0		15:15			2		4		
03:30			0		0		15:30			3		0		
03:45			0	0	0	0	15:45			2	13	1	8	21
04:00			0		0		16:00			3		1		
04:15			0		0		16:15			1		1		
04:30			0		0		16:30			3		3		
04:45			0	0	0	0	16:45			4	11	2	7	18
05:00			0		0		17:00			2		1		
05:15			1		0		17:15			1		2		
05:30			1		0		17:30			6		2		
05:45			1	3	0	0	3	17:45			4	13	0	5	18
06:00			0		0		18:00			0		6		
06:15			1		0		18:15			1		2		
06:30			1		1		18:30			1		0		
06:45			3	5	1	2	7	18:45			2	4	2	10	14
07:00			2		0		19:00			0		0		
07:15			1		3		19:15			0		0		
07:30			3		2		19:30			1		1		
07:45			4	10	4	9	19	19:45			1	2	0	1	3
08:00			6		6		20:00			1		1		
08:15			5		6		20:15			0		1		
08:30			8		1		20:30			0		0		
08:45			1	20	0	13	33	20:45			1	2	0	2	4
09:00			0		4		21:00			0		0		
09:15			3		1		21:15			0		0		
09:30			1		1		21:30			0		0		
09:45			2	6	1	7	13	21:45			1	1	1	1	2
10:00			2		2		22:00			0		1		
10:15			3		2		22:15			3		2		
10:30			6		1		22:30			0		0		
10:45			1	12	0	5	17	22:45			1	4	1	4	8
11:00			4		2		23:00			0		0		
11:15			5		3		23:15			0		0		
11:30			3		2		23:30			0		0		
11:45			1	13	3	10	23	23:45			0	0	0	0	
Total Vol.			69		49		**118**			85		65		**150**

GPS Coordinates: 33.593456,-111.888690

Daily Totals

NB	SB	EB	WB	Combined
		154	114	**268**

	AM			PM		
Split %	58.5%	41.5%	**44.0%**	56.7%	43.3%	**56.0%**
Peak Hour	07:45	07:30	**07:45**	14:15	14:15	**14:15**
Volume	23	18	**40**	17	15	**32**
P.H.F.	0.72	0.75	**0.83**	0.71	0.63	**0.80**

25-ZN-2018
12/15/2020
25_ZN_2018_V3
10/8/2020

APPENDIX C

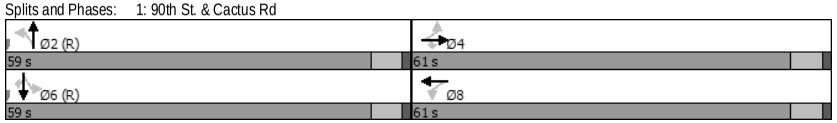
EXISTING PEAK HOUR ANALYSIS

25-ZN-2018
25_ZN_2018_V3
10/8/2020
12/15/2020

Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	59	61	59	61
Maximum Split (%)	49.2%	50.8%	49.2%	50.8%
Minimum Split (s)	22	22	22	22
Yellow Time (s)	4.5	4.5	4.5	4.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	5	5	5
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	5	5	5
Flash Dont Walk (s)	11	11	11	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	0	59	0	59
End Time (s)	59	0	59	0
Yield/Force Off (s)	53	114	53	114
Yield/Force Off 170(s)	42	103	42	103
Local Start Time (s)	0	59	0	59
Local Yield (s)	53	114	53	114
Local Yield 170(s)	42	103	42	103

Intersection Summary	
Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	55
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	

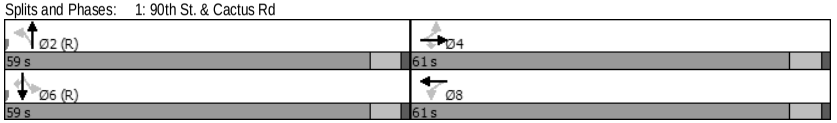
Splits and Phases: 1: 90th St. & Cactus Rd



Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	59	61	59	61
Maximum Split (%)	49.2%	50.8%	49.2%	50.8%
Minimum Split (s)	22	22	22	22
Yellow Time (s)	4.5	4.5	4.5	4.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	5	5	5
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	5	5	5
Flash Dont Walk (s)	11	11	11	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	0	59	0	59
End Time (s)	59	0	59	0
Yield/Force Off (s)	53	114	53	114
Yield/Force Off 170(s)	42	103	42	103
Local Start Time (s)	0	59	0	59
Local Yield (s)	53	114	53	114
Local Yield 170(s)	42	103	42	103

Intersection Summary	
Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	

Splits and Phases: 1: 90th St. & Cactus Rd



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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	692	67	7	1038	16	89	6	2	22	26	377
Future Volume (veh/h)	72	692	67	7	1038	16	89	6	2	22	26	377
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	80	769	74	8	1153	18	99	7	2	24	29	419
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	151	1602	715	255	1615	25	475	628	180	688	840	712
Arrive On Green	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Sat Flow, veh/h	479	3554	1585	653	3581	56	942	1399	400	1406	1870	1585
Grp Volume(v), veh/h	80	769	74	8	572	599	99	0	9	24	29	419
Grp Sat Flow(s),veh/h/ln	479	1777	1585	653	1777	1860	942	0	1798	1406	1870	1585
Q Serve(g_s), s	19.5	18.2	3.2	1.0	31.3	31.3	7.9	0.0	0.3	1.2	1.0	23.8
Cycle Q Clear(g_c), s	50.8	18.2	3.2	19.2	31.3	31.3	8.9	0.0	0.3	1.5	1.0	23.8
Prop In Lane	1.00		1.00	1.00		0.03	1.00		0.22	1.00		1.00
Lane Grp Cap(c), veh/h	151	1602	715	255	801	839	475	0	808	688	840	712
V/C Ratio(X)	0.53	0.48	0.10	0.03	0.71	0.71	0.21	0.00	0.01	0.03	0.03	0.59
Avail Cap(c_a), veh/h	155	1629	726	260	814	853	475	0	808	688	840	712
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.3	23.1	19.0	29.8	26.7	26.7	21.0	0.0	18.3	18.7	18.5	24.7
Incr Delay (d2), s/veh	3.2	0.2	0.1	0.0	2.9	2.8	1.0	0.0	0.0	0.1	0.1	3.5
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	2.4	7.6	1.2	0.2	13.6	14.3	1.9	0.0	0.1	0.4	0.5	9.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.5	23.3	19.0	29.9	29.6	29.5	22.0	0.0	18.3	18.8	18.6	28.3
LnGrp LOS	D	C	B	C	C	C	C	A	B	B	B	C
Approach Vol, veh/h		923			1179			108			472	
Approach Delay, s/veh		25.3			29.6			21.7			27.2	
Approach LOS		C			C			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		59.9		60.1		59.9		60.1				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		53.0		55.0		53.0		55.0				
Max Q Clear Time (g_c+I1), s		10.9		52.8		25.8		33.3				
Green Ext Time (p_c), s		0.6		1.3		1.8		8.5				
Intersection Summary												
HCM 6th Ctrl Delay			27.4									
HCM 6th LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	191	934	87	18	747	22	59	7	4	31	20	207
Future Volume (veh/h)	191	934	87	18	747	22	59	7	4	31	20	207
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	212	1038	97	20	830	24	66	8	4	34	22	230
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	248	1629	726	176	1616	47	551	520	260	674	826	700
Arrive On Green	0.46	0.46	0.46	0.46	0.46	0.46	0.44	0.44	0.44	0.44	0.44	0.44
Sat Flow, veh/h	646	3554	1585	496	3527	102	1128	1176	588	1402	1870	1585
Grp Volume(v), veh/h	212	1038	97	20	418	436	66	0	12	34	22	230
Grp Sat Flow(s),veh/h/ln	646	1777	1585	496	1777	1852	1128	0	1764	1402	1870	1585
Q Serve(g_s), s	35.0	26.8	4.2	3.9	20.0	20.0	4.2	0.0	0.5	1.7	0.8	11.4
Cycle Q Clear(g_c), s	55.0	26.8	4.2	30.7	20.0	20.0	5.0	0.0	0.5	2.1	0.8	11.4
Prop In Lane	1.00		1.00	1.00		0.06	1.00		0.33	1.00		1.00
Lane Grp Cap(c), veh/h	248	1629	726	176	814	849	551	0	779	674	826	700
V/C Ratio(X)	0.85	0.64	0.13	0.11	0.51	0.51	0.12	0.00	0.02	0.05	0.03	0.33
Avail Cap(c_a), veh/h	248	1629	726	176	814	849	551	0	779	674	826	700
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.4	24.9	18.8	36.6	23.0	23.0	20.3	0.0	18.8	19.4	18.9	21.9
Incr Delay (d2), s/veh	23.8	0.8	0.1	0.3	0.6	0.5	0.4	0.0	0.0	0.1	0.1	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.1	11.3	1.6	0.5	8.4	8.8	1.2	0.0	0.2	0.6	0.4	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.3	25.7	18.8	36.9	23.6	23.6	20.8	0.0	18.9	19.6	19.0	23.1
LnGrp LOS	E	C	B	D	C	C	C	A	B	B	B	C
Approach Vol, veh/h		1347			874			78			286	
Approach Delay, s/veh		31.9			23.9			20.5			22.4	
Approach LOS		C			C			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		59.0		61.0		59.0		61.0				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		53.0		55.0		53.0		55.0				
Max Q Clear Time (g_c+I1), s		7.0		57.0		13.4		32.7				
Green Ext Time (p_c), s		0.3		0.0		1.0		6.0				
Intersection Summary												
HCM 6th Ctrl Delay			27.8									
HCM 6th LOS			C									

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Intersection	
Int Delay, s/veh	5.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	3	18	22	6	14	20
Future Vol, veh/h	3	18	22	6	14	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	20	24	7	16	22

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	23	0	68	13
Stage 1	-	-	-	-	13	-
Stage 2	-	-	-	-	55	-
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	-	-	1592	-	937	1067
Stage 1	-	-	-	-	1010	-
Stage 2	-	-	-	-	968	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1592	-	923	1067
Mov Cap-2 Maneuver	-	-	-	-	923	-
Stage 1	-	-	-	-	995	-
Stage 2	-	-	-	-	968	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.7	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	923	1067	-	-	1592	-
HCM Lane V/C Ratio	0.017	0.021	-	-	0.015	-
HCM Control Delay (s)	9	8.4	-	-	7.3	0
HCM Lane LOS	A	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	5.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1	3	11	7	2	13
Future Vol, veh/h	1	3	11	7	2	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	3	12	8	2	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	4	0	35	3
Stage 1	-	-	-	-	3	-
Stage 2	-	-	-	-	32	-
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	-	-	1618	-	978	1081
Stage 1	-	-	-	-	1020	-
Stage 2	-	-	-	-	991	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1618	-	971	1081
Mov Cap-2 Maneuver	-	-	-	-	971	-
Stage 1	-	-	-	-	1013	-
Stage 2	-	-	-	-	991	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.4	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	971	1081	-	-	1618	-
HCM Lane V/C Ratio	0.002	0.013	-	-	0.008	-
HCM Control Delay (s)	8.7	8.4	-	-	7.2	0
HCM Lane LOS	A	A	-	-	A	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-

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Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	12	15	33	47	7
Future Vol, veh/h	7	12	15	33	47	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	13	17	37	52	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	54	0	-	0	65	36
Stage 1	-	-	-	-	36	-
Stage 2	-	-	-	-	29	-
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	1551	-	-	-	941	1037
Stage 1	-	-	-	-	986	-
Stage 2	-	-	-	-	994	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1551	-	-	-	936	1037
Mov Cap-2 Maneuver	-	-	-	-	876	-
Stage 1	-	-	-	-	981	-
Stage 2	-	-	-	-	994	-

Approach	EB	WB	SB
HCM Control Delay, s	2.7	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1551	-	-	-	894
HCM Lane V/C Ratio	0.005	-	-	-	0.067
HCM Control Delay (s)	7.3	0	-	-	9.3
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	7	13	37	60	6
Future Vol, veh/h	7	7	13	37	60	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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	8	14	41	67	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	55	0	-	0	59	35
Stage 1	-	-	-	-	35	-
Stage 2	-	-	-	-	24	-
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	1550	-	-	-	948	1038
Stage 1	-	-	-	-	987	-
Stage 2	-	-	-	-	999	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1550	-	-	-	943	1038
Mov Cap-2 Maneuver	-	-	-	-	881	-
Stage 1	-	-	-	-	982	-
Stage 2	-	-	-	-	999	-

Approach	EB	WB	SB
HCM Control Delay, s	3.7	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1550	-	-	-	893
HCM Lane V/C Ratio	0.005	-	-	-	0.082
HCM Control Delay (s)	7.3	0	-	-	9.4
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.3

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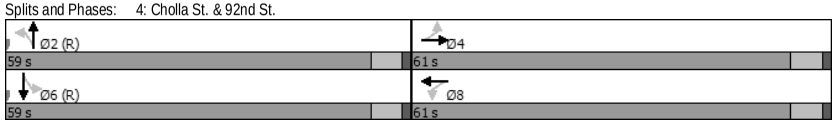
Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	59	61	59	61
Maximum Split (%)	49.2%	50.8%	49.2%	50.8%
Minimum Split (s)	22	22	22	22
Yellow Time (s)	4.5	4.5	4.5	4.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	5	5	5
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	5	5	5
Flash Dont Walk (s)	11	11	11	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	0	59	0	59
End Time (s)	59	0	59	0
Yield/Force Off (s)	53	114	53	114
Yield/Force Off 170(s)	42	103	42	103
Local Start Time (s)	0	59	0	59
Local Yield (s)	53	114	53	114
Local Yield 170(s)	42	103	42	103

Intersection Summary		
Cycle Length		120
Control Type	Actuated-Coordinated	
Natural Cycle		45
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		

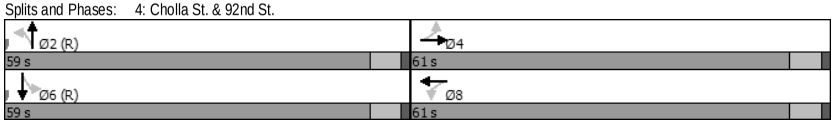
Splits and Phases: 4: Cholla St. & 92nd St.



Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	59	61	59	61
Maximum Split (%)	49.2%	50.8%	49.2%	50.8%
Minimum Split (s)	22	22	22	22
Yellow Time (s)	4.5	4.5	4.5	4.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	5	5	5
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	5	5	5
Flash Dont Walk (s)	11	11	11	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	0	59	0	59
End Time (s)	59	0	59	0
Yield/Force Off (s)	53	114	53	114
Yield/Force Off 170(s)	42	103	42	103
Local Start Time (s)	0	59	0	59
Local Yield (s)	53	114	53	114
Local Yield 170(s)	42	103	42	103

Intersection Summary		
Cycle Length		120
Control Type	Actuated-Coordinated	
Natural Cycle		45
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		

Splits and Phases: 4: Cholla St. & 92nd St.



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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	4	89	38	4	22	34	303	19	9	588	9
Future Volume (veh/h)	8	4	89	38	4	22	34	303	19	9	588	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	9	4	99	42	4	24	38	337	21	10	653	10
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	193	7	172	125	26	156	632	2678	166	843	2823	43
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.79	0.79	0.79	0.79	0.79	0.79
Sat Flow, veh/h	1382	62	1533	1291	231	1389	772	3398	211	1023	3582	55
Grp Volume(v), veh/h	9	0	103	42	0	28	38	176	182	10	324	339
Grp Sat Flow(s),veh/h/ln	1382	0	1594	1291	0	1620	772	1777	1832	1023	1777	1860
Q Serve(g_s), s	0.7	0.0	7.4	3.8	0.0	1.9	1.6	2.8	2.8	0.3	5.7	5.7
Cycle Q Clear(g_c), s	2.6	0.0	7.4	11.2	0.0	1.9	7.3	2.8	2.8	3.1	5.7	5.7
Prop In Lane	1.00		0.96	1.00		0.86	1.00		0.12	1.00		0.03
Lane Grp Cap(c), veh/h	193	0	179	125	0	181	632	1400	1444	843	1400	1466
V/C Ratio(X)	0.05	0.00	0.58	0.33	0.00	0.15	0.06	0.13	0.13	0.01	0.23	0.23
Avail Cap(c_a), veh/h	672	0	731	573	0	743	632	1400	1444	843	1400	1466
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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.3	0.0	50.6	55.9	0.0	48.1	4.2	3.0	3.0	3.4	3.3	3.3
Incr Delay (d2), s/veh	0.1	0.0	2.9	1.6	0.0	0.4	0.2	0.2	0.2	0.0	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	3.1	1.3	0.0	0.8	0.3	0.9	0.9	0.1	1.8	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.4	0.0	53.5	57.4	0.0	48.5	4.4	3.2	3.2	3.4	3.7	3.7
LnGrp LOS	D	A	D	E	A	D	A	A	A	A	A	A
Approach Vol, veh/h		112			70			396			673	
Approach Delay, s/veh		53.2			53.9			3.3			3.7	
Approach LOS		D			D			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		100.6		19.4		100.6		19.4				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		53.0		55.0		53.0		55.0				
Max Q Clear Time (g_c+I1), s		9.3		9.4		7.7		13.2				
Green Ext Time (p_c), s		2.6		0.7		4.7		0.3				
Intersection Summary												
HCM 6th Ctrl Delay			10.8									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	5	76	31	8	17	101	716	40	28	470	18
Future Volume (veh/h)	12	5	76	31	8	17	101	716	40	28	470	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	13	6	84	34	9	19	112	796	44	31	522	20
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	174	10	146	117	52	110	723	2747	152	546	2800	107
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.80	0.80	0.80	0.80	0.80	0.80
Sat Flow, veh/h	1382	107	1495	1307	536	1131	864	3424	189	655	3490	134
Grp Volume(v), veh/h	13	0	90	34	0	28	112	413	427	31	265	277
Grp Sat Flow(s),veh/h/ln	1382	0	1601	1307	0	1667	864	1777	1836	655	1777	1846
Q Serve(g_s), s	1.0	0.0	6.4	3.1	0.0	1.9	4.2	7.2	7.2	1.5	4.2	4.2
Cycle Q Clear(g_c), s	2.9	0.0	6.4	9.5	0.0	1.9	8.3	7.2	7.2	8.7	4.2	4.2
Prop In Lane	1.00		0.93	1.00		0.68	1.00		0.10	1.00		0.07
Lane Grp Cap(c), veh/h	174	0	156	117	0	163	723	1426	1473	546	1426	1481
V/C Ratio(X)	0.07	0.00	0.58	0.29	0.00	0.17	0.15	0.29	0.29	0.06	0.19	0.19
Avail Cap(c_a), veh/h	672	0	734	589	0	764	723	1426	1473	546	1426	1481
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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.0	0.0	51.8	56.3	0.0	49.7	3.7	3.1	3.1	4.2	2.8	2.8
Incr Delay (d2), s/veh	0.2	0.0	3.3	1.3	0.0	0.5	0.5	0.5	0.5	0.2	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	2.8	1.1	0.0	0.8	0.7	2.2	2.3	0.2	1.3	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.2	0.0	55.1	57.7	0.0	50.2	4.2	3.6	3.6	4.4	3.0	3.0
LnGrp LOS	D	A	E	E	A	D	A	A	A	A	A	A
Approach Vol, veh/h		103			62			952			573	
Approach Delay, s/veh		54.6			54.3			3.6			3.1	
Approach LOS		D			D			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		102.3		17.7		102.3		17.7				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		53.0		55.0		53.0		55.0				
Max Q Clear Time (g_c+I1), s		10.3		8.4		10.7		11.5				
Green Ext Time (p_c), s		7.4		0.6		4.0		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			8.4									
HCM 6th LOS			A									

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APPENDIX D

COLLISION DATA

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CRASH STATISTICS

2014-2016

90th St & Cactus Rd, Scottsdale

Involvement

	# Incidents	Totals		# Motorists	# Non-Motorists
Incidents	8	15	Veh	22	0
Fatal	0	0	Ppl	0	0
Injury	4	6	Ppl	6	0
PDO	4	7	Veh		

Peds/Bikes Summary

	Incidents	Persons	Injuries Fatal	Injuries Non-Fatal
Pedestrian:	0	0	0	0
Bicycle:	0	0	0	0

Circumstances

Hit & Run?	1
Intersection Related?	3

LightCondition	Code	No.
DAYLIGHT	1	5
DAWN	2	0
DUSK	3	1
DARK_LIGHTED	4	2
DARK_NOT_LIGHTED	5	0
DARK_UNKNOWN_LIGHTING	6	0
UNKNOWN	99	0
Check Total		8

Weather	Code	No.
CLEAR	1	7
CLOUDY	2	0
SLEET_HAIL_FREEZING_RAIN_OR_DRIZZLE	3	0
RAIN	4	1
SNOW	5	0
SEVERE_CROSSWINDS	6	0
BLOWING_SAND_SOIL_DIRT	7	0
FOG_SMOG_SMOKE	8	0
BLOWING_SNOW	9	0
OTHER	97	0
UNKNOWN	99	0
Check Total		8

TrafficWayType	Code	No.
ONE_WAY_TRAFFICWAY	1	0
TWO_WAY_NOT_DIVIDED	2	2
TWO_WAY_NOT_DIVIDED_WITH_CONTINUOUS_LEFT_TURN_LANE	3	0
TWO_WAY_DIVIDED_UNPROTECTED_PAINTED_4_FEET_MEDIAN	4	5
TWO_WAY_DIVIDED_POSITIVE_MEDIAN_BARRIER	5	1
UNKNOWN	99	0
Check Total		8

Weekday	Code	No.
Sunday	1	1
Monday	2	0
Tuesday	3	1
Wednesday	4	2
Thursday	5	0
Friday	6	3
Saturday	7	1
Check Total		8

JunctionRelation	Code	No.
NOT_JUNCTION_RELATED	0	5
INTERSECTION_NON_INTERCHANGE	1	2
INTERSECTION_RELATED_NON_INTERCHANGE	2	0
ENTRANCE_EXIT_RAMP_NON_INTERCHANGE	3	0
RAILWAY_GRADE_CROSSING	4	0
CROSSOVER_RELATED	5	0
FRONTAGE_ROAD_NON_INTERCHANGE	6	0
DRIVEWAY	7	0
ALLEY_ACCESS_RELATED	8	0
UNKNOWN_NON_INTERCHANGE	9	0
THRU_ROADWAY	10	0
INTERSECTION_INTERCHANGE	11	0
INTERSECTION_RELATED_INTERCHANGE	12	1
ENTRANCE_EXIT_RAMP_INTERCHANGE	13	0
FRONTAGE_ROAD_INTERCHANGE	14	0
OTHER_PART_OF_INTERCHANGE	15	0
<not defined>	16	0
UNKNOWN_INTERCHANGE	17	0
UNKNOWN_JUNCTION	18	0
UNKNOWN	99	0
OTHER_NON_INTERCHANGE	109	0
Check Total		8

CollisionManner	Code	No.
SINGLE_VEHICLE	1	1
ANGLE (front to side)(other than left turn)	2	2
LEFT_TURN	3	1
REAR_END	4	2
HEAD_ON	5	1
SIDESWIPE_SAME_DIRECTION	6	0
SIDESWIPE_OPPOSITE_DIRECTION	7	0
REAR_TO_SIDE	8	0
REAR_TO_REAR	9	0
OTHER	97	1
UNKNOWN	99	0
Check Total		8

TravelDirection		
1	NORTH	N
2	SOUTH	S
3	EAST	E
4	WEST	W
5	NORTHWEST	NW
6	NORTHEAST	NE
7	SOUTHWEST	SW
8	SOUTHEAST	SE
99	UNKNOWN	99

First Harmful Event	Code	No.
OVERTURN_ROLLOVER	1	0
FIRE_EXPLOSION	2	0
IMMERSION	3	0
JACKKNIFE	4	0
CARGO_EQUIPMENT_LOSS_SHIFT	5	0
FELL_JUMPED_FROM_VEHICLE	6	0
THROWN_OR_FALLING_OBJECT	7	0
OTHER_NON_COLLISION	8	0
EQUIPMENT_FAILURE~~_TIRES_BRAKES~~	9	0
SEPARATION_OF_UNITS	10	0
RAN_OFF_ROAD_RIGHT	11	0
RAN_OFF_ROAD_LEFT	12	0
CROSS_MEDIAN	13	0
CROSS_CENTERLINE	14	0
DOWNHILL_RUNAWAY	15	0
MOTOR_VEHICLE_IN_TRANSPORT	16	7
PEDESTRIAN	17	0
PEDALCYCLE	18	0
RAILWAY_VEHICLE_TRAIN_ENGINE	19	0
LIGHT_RAILWAY_RAILCAR_VEHICLE	20	0
ANIMAL_WILD_NON_GAME	21	0
ANIMAL_WILD_GAME	22	0
ANIMAL_PET	23	0
ANIMAL_LIVESTOCK	24	0
PARKED_MOTOR_VEHICLE	25	0
WORK_ZONE_MAINTENANCE_EQUIPMENT	26	0
STRUCK_BY_FALLING_SHIFTING_CARGO_OR_OBJECT	27	0
OTHER_NON_FIXED_OBJECT	28	0
IMPACT_ATTENUATOR_CRASH_CUSHION	29	0
BRIDGE_OVERHEAD_STRUCTURE	30	0
BRIDGE_RAIL	31	0
CULVERT	32	0
CURB	33	0
DITCH	34	0
EMBANKMENT	35	0
GUARDRAIL_FACE	36	0
GUARDRAIL_END	37	0
CONCRETE_TRAFFIC_BARRIER	38	0
CABLE_TRAFFIC_BARRIER	39	0
OTHER_TRAFFIC_BARRIER	40	0
TREE_BUSH_STUMP_STANDING	41	1
TRAFFIC_SIGN_SUPPORT	42	0
TRAFFIC_SIGNAL_SUPPORT	43	0
UTILITY_POLE_LIGHT_SUPPORT	44	0
OTHER_POST_POLE_OR_SUPPORT	45	0
FENCE	46	0
MAILBOX	47	0
BUILDING	48	0
OTHER_FIXED_OBJECT	49	0
UNKNOWN	99	0
Not Reported	255	0
Check Total		8

Month	Code	No.
January	1	1
February	2	0
March	3	0
April	4	0
May	5	3
June	6	0
July	7	0
August	8	0
September	9	0
October	10	1
November	11	2
December	12	1
Total		8

(Unit) SurfaceCondition	Code	No.
DRY	1	13
WET	2	2
SNOW	3	0
SLUSH	4	0
ICE_FROST	5	0
WATER_STANDING_MOVING	6	0
SAND	7	0
MUD_DIRT_GRAVEL	8	0
OIL	9	0
OTHER	97	0
UNKNOWN	99	0
Total		15

Additional Useful Information

Vehicle Action Codes

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_Vehicle_Object_Pedestrian
12	ENTERING_PARKING_POSITION
13	LEAVING_PARKING_POSITION
14	PROPERLY_PARKED
15	IMPROPERLY_PARKED
16	DRIVERLESS_MOVING_VEHICLE
17	CROSSING_ROAD
18	WALKING_WITH_TRAFFIC
19	WALKING_AGAINST_TRAFFIC
20	STANDING
21	LYING
22	GETTING_ON_OR_OFF_VEHICLE
23	WORKING_ON_OR_PUSHING_VEHICLE
24	WORKING_ON_ROAD
97	OTHER
99	UNKNOWN

Body Styles

-1	NOT_REPORTED
1	\Passenger Vehicles, including RVs
53	/
54	\TRUCKS
88	/
89	\MOBILEHOME (NOT RVS)
92	/
93	\TRAILERS
120	/
121	\MOTORCYCLES
128	/
254	UNKNOWN
255	NOT REPORTED

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INCIDNT	ON STREET	MP	OFF-SET	DR	DIS-TANCE	INTERSECT STREET	NCIC	OFCR NCIC	YYMMDD	HH:MM	DW	TO-TAL	SRFCND U1	SRFCND U2	ALGMT 1	ALGMT 2	GRADE 1	GRADE 2	DFCTS U1	DFCTS U2	BSTYLE U1	BSTYLE U2	TRDR 1	TRDR 2	UACT U1	UACT U2	TTL MOT	TTL NON	TYP 1	TYP 2	INJR 1	INJR 2	VLTN D1	VLTN D2	PHSCND D1	PHSCND D2	NON LOC	INCIDENTS PDO	INCIDENTS INJ	INCIDENTS FAT	INJURIES TTL	INJURIES MOT	INJURIES NON	FATALITIES TTL	FATALITIES MOT	FATALITIES NON	HR	LT CN	WE CN	JCT REL	TRF CWY	HE CD	MC
2823783	Cactus Rd			P	57	90th St	725	725	140122	15:01	4	2	1	1	1	1	1	1	0	0	47	47	E	E	1	3	2	0	1	1	1	1	1	2	0	0	255	1			0			0			N	1	1	0	4	16	4
2853743	Cactus Rd			P	165	90th St	725	725	140523	14:34	6	2	1	1	1	1	1	1	0	0	41	47	W	W	1	3	2	0	1	1	1	1	2	1	0	0	255	1			0			0			N	1	1	0	5	16	4
2915335	Cactus Rd			M	125	90th St	725	725	141126	14:57	4	2	1	1	1	1	1	1	99	99	44	44	E	W	8	1	2	0	1	1	3	3	1	8	0	0	255		1		2	2	0	0			N	1	1	0	4	16	5
2965388	Cactus Rd			M	80	90th St	725	725	150526	09:34	3	2	1	1	1	1	1	1	0	0	44	76	E	W	3	10	3	0	1	4	1	1	1	-1	0	0	255	1			0			0			N	1	1	12	4	16	97
																													1		1		97		0																		
3024255	Cactus Rd			M	215	90th St	725	725	151113	17:04	6	2	1	1	1	1	1	1	0	0	44	126	W	E	1	1	2	0	1	1	3	1	2	1	0	0	255		1		1	1	0	0			N	3	1	0	4	16	2
3099952	90th St			P	223	Cactus Rd	725	725	160521	21:38	7	1	1		1		1		99		255		E		99		1	0	1		99		99		0			1			0			0			Y	4	1	0	2	41	1
3142989	90th St			P	0	Cactus Rd	725	725	161002	08:40	1	2	2	2	1	1	1	1	0	0	47	47	E	N	1	4	6	0	1	4	3	1	6	-1	0	0	255		1		2	2	0	0			N	1	4	1	2	16	2
																													4	4	1	1	-1	-1	0	0	255																
																													1	4	3	1	1	-1	0	0	255																
3175311	90th St			P	0	Cactus Rd	725	725	161216	19:49	6	2	1	1	1	1	1	1	0	0	44	50	E	W	1	4	4	0	1	4	1	1	20	-1	0	0	255		1		1	1	0	0			N	4	1	1	4	16	3
																													4	1	99	3	-1	1	0	0	255																

CRASH STATISTICS

2015-2016

92nd St & Cholla St, Scottsdale

Involvement

	# Incidents	Totals		# Motorists	# Non-Motorists
Incidents	3	5	Veh	9	0
Fatal	0	0	Ppl	0	0
Injury	0	0	Ppl	0	0
PDO	3	5	Veh		

Peds/Bikes Summary

	Incidents	Persons	Injuries Fatal	Injuries Non-Fatal
Pedestrian:	0	0	0	0
Bicycle:	0	0	0	0

LightCondition	Code	No.
DAYLIGHT	1	2
DAWN	2	0
DUSK	3	0
DARK_LIGHTED	4	1
DARK_NOT_LIGHTED	5	0
DARK_UNKNOWN_LIGHTING	6	0
UNKNOWN	99	0
Check Total		3

Weather	Code	No.
CLEAR	1	3
CLOUDY	2	0
SLEET_HAIL_FREEZING_RAIN_OR_DRIZZLE	3	0
RAIN	4	0
SNOW	5	0
SEVERE_CROSSWINDS	6	0
BLOWING_SAND_SOIL_DIRT	7	0
FOG_SMOG_SMOKE	8	0
BLOWING_SNOW	9	0
OTHER	97	0
UNKNOWN	99	0
Check Total		3

TrafficWayType	Code	No.
ONE_WAY_TRAFFICWAY	1	0
TWO_WAY_NOT_DIVIDED	2	0
TWO_WAY_NOT_DIVIDED_WITH_CONTINUOUS_LEFT_TURN_LANE	3	0
TWO_WAY_DIVIDED_UNPROTECTED_PAINTED_4_FEET_MEDIAN	4	0
TWO_WAY_DIVIDED_POSITIVE_MEDIAN_BARRIER	5	3
UNKNOWN	99	0
Check Total		3

Weekday	Code	No.
Sunday	1	0
Monday	2	0
Tuesday	3	1
Wednesday	4	0
Thursday	5	1
Friday	6	1
Saturday	7	0
Check Total		3

Circumstances

Hit & Run?	2
Intersection Related?	2

JunctionRelation	Code	No.
NOT_JUNCTION_RELATED	0	1
INTERSECTION_NON_INTERCHANGE	1	1
INTERSECTION_RELATED_NON_INTERCHANGE	2	1
ENTRANCE_EXIT_RAMP_NON_INTERCHANGE	3	0
RAILWAY_GRADE_CROSSING	4	0
CROSSOVER_RELATED	5	0
FRONTAGE_ROAD_NON_INTERCHANGE	6	0
DRIVEWAY	7	0
ALLEY_ACCESS_RELATED	8	0
UNKNOWN_NON_INTERCHANGE	9	0
THRU_ROADWAY	10	0
INTERSECTION_INTERCHANGE	11	0
INTERSECTION_RELATED_INTERCHANGE	12	0
ENTRANCE_EXIT_RAMP_INTERCHANGE	13	0
FRONTAGE_ROAD_INTERCHANGE	14	0
OTHER_PART_OF_INTERCHANGE	15	0
<not defined>	16	0
UNKNOWN_INTERCHANGE	17	0
UNKNOWN_JUNCTION	18	0
UNKNOWN	99	0
OTHER_NON_INTERCHANGE	109	0
Check Total		3

CollisionManner	Code	No.
SINGLE_VEHICLE	1	1
ANGLE (front to side)(other than left turn)	2	0
LEFT_TURN	3	1
REAR_END	4	1
HEAD_ON	5	0
SIDESWIPE_SAME_DIRECTION	6	0
SIDESWIPE_OPPOSITE_DIRECTION	7	0
REAR_TO_SIDE	8	0
REAR_TO_REAR	9	0
OTHER	97	0
UNKNOWN	99	0
Check Total		3

TravelDirection		
1	NORTH	N
2	SOUTH	S
3	EAST	E
4	WEST	W
5	NORTHWEST	NW
6	NORTHEAST	NE
7	SOUTHWEST	SW
8	SOUTHEAST	SE
99	UNKNOWN	99

First Harmful Event	Code	No.
OVERTURN_ROLLOVER	1	0
FIRE_EXPLOSION	2	0
IMMERSION	3	0
JACKKNIFE	4	0
CARGO_EQUIPMENT_LOSS_SHIFT	5	0
FELL_JUMPED_FROM_VEHICLE	6	0
THROWN_OR_FALLING_OBJECT	7	0
OTHER_NON_COLLISION	8	0
EQUIPMENT_FAILURE~~_TIRES_BRAKES~~	9	0
SEPARATION_OF_UNITS	10	0
RAN_OFF_ROAD_RIGHT	11	0
RAN_OFF_ROAD_LEFT	12	0
CROSS_MEDIAN	13	0
CROSS_CENTERLINE	14	0
DOWNHILL_RUNAWAY	15	0
MOTOR_VEHICLE_IN_TRANSPORT	16	2
PEDESTRIAN	17	0
PEDALCYCLE	18	0
RAILWAY_VEHICLE_TRAIN_ENGINE	19	0
LIGHT_RAILWAY_RAILCAR_VEHICLE	20	0
ANIMAL_WILD_NON_GAME	21	0
ANIMAL_WILD_GAME	22	0
ANIMAL_PET	23	0
ANIMAL_LIVESTOCK	24	0
PARKED_MOTOR_VEHICLE	25	0
WORK_ZONE_MAINTENANCE_EQUIPMENT	26	0
STRUCK_BY_FALLING_SHIFTING_CARGO_OR_OBJECT	27	0
OTHER_NON_FIXED_OBJECT	28	0
IMPACT_ATTENUATOR_CRASH_CUSHION	29	0
BRIDGE_OVERHEAD_STRUCTURE	30	0
BRIDGE_RAIL	31	0
CULVERT	32	0
CURB	33	1
DITCH	34	0
EMBANKMENT	35	0
GUARDRAIL_FACE	36	0
GUARDRAIL_END	37	0
CONCRETE_TRAFFIC_BARRIER	38	0
CABLE_TRAFFIC_BARRIER	39	0
OTHER_TRAFFIC_BARRIER	40	0
TREE_BUSH_STUMP_STANDING	41	0
TRAFFIC_SIGN_SUPPORT	42	0
TRAFFIC_SIGNAL_SUPPORT	43	0
UTILITY_POLE_LIGHT_SUPPORT	44	0
OTHER_POST_POLE_OR_SUPPORT	45	0
FENCE	46	0
MAILBOX	47	0
BUILDING	48	0
OTHER_FIXED_OBJECT	49	0
UNKNOWN	99	0
Not Reported	255	0
Check Total		3

Month	Code	No.
January	1	0
February	2	0
March	3	1
April	4	0
May	5	0
June	6	1
July	7	0
August	8	0
September	9	0
October	10	0
November	11	1
December	12	0
Total		3

(Unit) SurfaceCondition	Code	No.
DRY	1	5
WET	2	0
SNOW	3	0
SLUSH	4	0
ICE_FROST	5	0
WATER_STANDING_MOVING	6	0
SAND	7	0
MUD_DIRT_GRAVEL	8	0
OIL	9	0
OTHER	97	0
UNKNOWN	99	0
Total		5

Additional Useful Information

Vehicle Action Codes

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_Vehicle_Object_Pedestrian
12	ENTERING_PARKING_POSITION
13	LEAVING_PARKING_POSITION
14	PROPERLY_PARKED
15	IMPROPERLY_PARKED
16	DRIVERLESS_MOVING_VEHICLE
17	CROSSING_ROAD
18	WALKING_WITH_TRAFFIC
19	WALKING_AGAINST_TRAFFIC
20	STANDING
21	LYING
22	GETTING_ON_OR_OFF_VEHICLE
23	WORKING_ON_OR_PUSHING_VEHICLE
24	WORKING_ON_ROAD
97	OTHER
99	UNKNOWN

Body Styles

-1	NOT_REPORTED
1	\Passenger Vehicles, including RVs
53	/
54	\TRUCKS
88	/
89	\MOBILEHOME (NOT RVS)
92	/
93	\TRAILERS
120	/
121	\MOTORCYCLES
128	/
254	UNKNOWN
255	NOT REPORTED

25-ZN-2018
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<-------------------- LOCATION ---------------------->						<-DATE & TIME->	<------------------ UNITS ------------------->																				<---------- PERSON ---------->								<------- SEVERITY ------->				<----- GENERAL ---->						
INCIDNT	ON STREET	MP	OFF-SET	D R	DIS-TANCE	INTERSECT STREET	NCIC	OFCR NCIC	YYMMDD	HH:MM	D W	TO-TAL	SRFCND U1	SRFCND U2	ALGMT 1	ALGMT 2	GRADE 1	GRADE 2	DFCTS U1	DFCTS U2	BSTYLE U1	BSTYLE U2	TRDR 1	TRDR 2	UACT U1	UACT U2	TTL MOT	TTL NON	TYP 1	TYP 2	INJR 1	INJR 2	VLTN D1	VLTN D2	PHSCND D1	PHSCND D2	NON LOC	INCIDENTS PDO	INJFAT	INJURIES TTL	FATALITIES MOT	FATALITIES NON	H R	LT CN	WE CN	JCT REL	TRF CWY	HE CD	M C
3033201	92nd St			P	50	Cholla Dr	725	725	151126	04:37	5	1	1		2		1		99		44		S		1		2	0	4	1	99	99	-1	13	0	0	255	1		0	0		Y	4	1	0	5	33	1
3061849	92nd St			P	0	Cholla Dr	725	725	160301	14:48	3	2	1	1	1	1	1	1	0	0	84	44	S	N	1	4	4	0	1	4	1	1	20	-1	0	0	255	1		0	0		N	1	1	1	5	16	3
																												4	1	1	1	-1	1	0	0	255												
3105672	92nd St			M	20	Cholla Dr	725	725	160617	15:11	6	2	1	1	1	1	1	1	99	0	255	50	N	N	1	3	3	0	1	1	1	99	1	99	0	0	255	1		0	0		Y	1	1	2	5	16	4
																												4		1		-1		0														

APPENDIX E

TRIP DISTRIBUTION CALCULATIONS

25-ZN-2018
25_ZN_2018_V3
10/8/2020
12/15/2020

Quadrant	2020 Population	2020 Percent	2030 Population	2030 Percent
North Northwest	23,106	7.9%	31,318	9.8%
North Northeast	39,400	13.5%	44,108	13.8%
North	62,506	21.4%	75,427	**23.6%**
East Northeast	29,846	10.2%	32,605	10.2%
East Southeast	15,327	5.3%	16,045	5.0%
East	45,172	15.5%	48,650	**15.2%**
South Southeast	2,898	1.0%	3,016	0.9%
South Southwest	70,481	24.2%	75,901	23.8%
South	73,379	25.2%	78,918	**24.7%**
West Southwest	36,969	12.7%	38,713	12.1%
West Northwest	73,288	25.2%	77,479	24.3%
West	110,258	37.9%	116,192	**36.4%**
Totals	291,315	100.0%	319,186	99.9%

Radius

Population radius: 10 miles

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

2020

25-ZN-2018
25_ZN_2018_V3
10/8/2020
12/15/2020

10-mile radius

RAZ	MPA	2020 Population	2030 Population	% of TAZ	2020 Adjusted	2030 Adjusted	RAZ	MPA	2020 Population	2030 Population	% of TAZ	2020 Adjusted	2030 Adjusted
ENE							ESE						
248	SC	37,661	39,019	20%	7,532	7,804	248	SC	37,661	39,019	15%	5,649	5,853
230	SC	33,607	41,394	20%	6,721	8,279	249	SC	21,657	22,818	40%	8,663	9,127
249	SC	21,657	22,818	60%	12,994	13,691	264	SR	6,766	7,102	15%	1,015	1,065
250	FH	25,977	28,315	10%	2,598	2,832			-	-		-	-
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From ENE					29,846	32,605	From ESE					15,327	16,045
From East												45,172	48,650

Megerdichian Assisted Senior Center Traffic Impact (and Mitigation) Analysis/Study

Appendix E
April 2018

10-mile radius

RAZ	MPA	2020 Population	2030 Population	% of TAZ	2020 Adjusted	2030 Adjusted	RAZ	MPA	2020 Population	2030 Population	% of TAZ	2020 Adjusted	2030 Adjusted
NNW							NNE						
228	PH	17,962	39,116	30%	5,389	11,735	230	SC	33,607	41,394	50%	16,804	20,697
246	PH	60,062	62,330	5%	3,003	3,117	248	SC	37,661	39,019	60%	22,597	23,411
247	SC	13,321	13,647	60%	7,993	8,188			-	-		-	-
230	SC	33,607	41,394	20%	6,721	8,279			-	-		-	-
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From NNW					23,106	31,318	From NNE					39,400	44,108
From North												62,506	75,427

10-mile radius

RAZ	MPA	2020 Population	2030 Population	% of TAZ	2020 Adjusted	2030 Adjusted	RAZ	MPA	2020 Population	2030 Population	% of TAZ	2020 Adjusted	2030 Adjusted
WSW							WNW						
245	PH	57,570	59,845	20%	11,514	11,969	227	PH	56,483	67,265	5%	2,824	3,363
246	PH	60,062	62,330	5%	3,003	3,117	228	PH	17,962	39,116	5%	898	1,956
247	SC	13,321	13,647	10%	1,332	1,365	245	PH	57,570	59,845	20%	11,514	11,969
261	PH	35,232	38,363	15%	5,285	5,754	246	PH	60,062	62,330	90%	54,056	56,097
262	PV	14,198	14,871	70%	9,939	10,410	247	SC	13,321	13,647	30%	3,996	4,094
263	SC	36,704	37,882	15%	5,506	5,682			-	-		-	-
349	MC	391	416	100%	391	416			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
		-	-		-	-			-	-		-	-
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		-	-		-	-			-	-		-	-
From WSW					36,969	38,713	From WNW					73,288	77,479
From West												110,258	116,192

CivTech

Megerdichian Assisted Senior Center Traffic Impact (and Mitigation) Analysis/Study

Appendix E

April 2018

10-mile radius

RAZ	MPA	2020 Population	2030 Population	% of TAZ	2020 Adjusted	2030 Adjusted	RAZ	MPA	2020 Population	2030 Population	% of TAZ	2020 Adjusted	2030 Adjusted
SSE							SSW						
248	SC	37,661	39,019	5%	1,883	1,951	263	SC	36,704	37,882	85%	31,198	32,200
264	SR	6,766	7,102	15%	1,015	1,065	262	PV	14,198	14,871	25%	3,550	3,718
		-	-		-	-	271	PH	67,978	72,784	10%	6,798	7,278
		-	-		-	-	272	SC	72,339	81,764	40%	28,936	32,706
		-	-		-	-			-	-		-	-
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From SSE					2,898	3,016	From SSW					70,481	75,901
From South												73,379	78,918

CivTech

APPENDIX F

BACKGROUND GROWTH RATE CALCULATIONS

25-ZN-2018
25_ZN_2018_V3
10/8/2020
12/15/2020

Location of counts: 92nd St btwn Cholla St & Cactus Rd

Source(s): City of Scottsdale 2014 and 2016 Average Daily Traffic Volumes Segment

	Year	Volume
Start	2014	12,100
End	2016	12,600
AAGR		2.0%
Exp Factor		1.041

Growth Rate Used	2.0%
Per-Year Multiplier	1.020

Year	**Expansion Factor(s)**	
2018	1.000	
2019	1.020	
2020	**1.040**	**Opening**
2021	1.061	
2022	1.082	
2023	1.104	
2024	1.126	
2025	1.149	
2026	1.172	
2027	1.195	
2028	1.219	
2029	1.243	
2030	1.268	
2031	1.294	
2032	1.319	
2033	1.346	
2034	1.373	
2035	1.400	
2036	1.428	
2037	1.457	
2038	1.486	
2039	1.516	
2040	1.546	
2041	1.577	
2042	1.608	
2043	1.641	
2044	1.673	
2045	1.707	
2046	1.741	
2047	1.776	
2048	1.811	
2049	1.848	
2050	1.885	

APPENDIX G

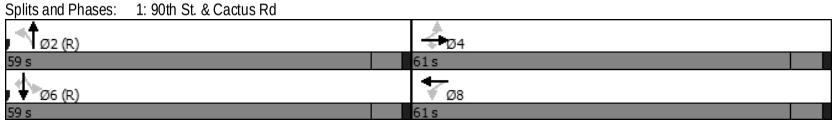
2020 PEAK HOUR ANALYSIS

25-ZN-2018
25_ZN_2018_V3
10/8/2020
12/15/2020

Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	59	61	59	61
Maximum Split (%)	49.2%	50.8%	49.2%	50.8%
Minimum Split (s)	22	22	22	22
Yellow Time (s)	4.5	4.5	4.5	4.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	5	5	5
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	5	5	5
Flash Dont Walk (s)	11	11	11	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	0	59	0	59
End Time (s)	59	0	59	0
Yield/Force Off (s)	53	114	53	114
Yield/Force Off 170(s)	42	103	42	103
Local Start Time (s)	0	59	0	59
Local Yield (s)	53	114	53	114
Local Yield 170(s)	42	103	42	103

Intersection Summary	
Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	55
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	

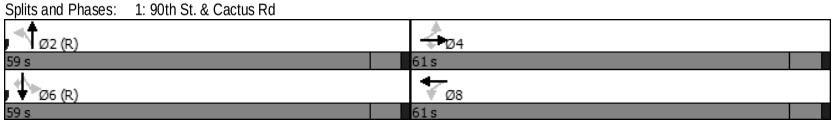
Splits and Phases: 1: 90th St. & Cactus Rd



Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	59	61	59	61
Maximum Split (%)	49.2%	50.8%	49.2%	50.8%
Minimum Split (s)	22	22	22	22
Yellow Time (s)	4.5	4.5	4.5	4.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	5	5	5
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	5	5	5
Flash Dont Walk (s)	11	11	11	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	0	59	0	59
End Time (s)	59	0	59	0
Yield/Force Off (s)	53	114	53	114
Yield/Force Off 170(s)	42	103	42	103
Local Start Time (s)	0	59	0	59
Local Yield (s)	53	114	53	114
Local Yield 170(s)	42	103	42	103

Intersection Summary	
Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	

Splits and Phases: 1: 90th St. & Cactus Rd



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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	720	70	7	1080	17	93	6	2	23	27	392
Future Volume (veh/h)	75	720	70	7	1080	17	93	6	2	23	27	392
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	83	800	78	8	1200	19	103	7	2	26	30	436
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	145	1629	726	250	1641	26	461	618	177	677	826	700
Arrive On Green	0.46	0.46	0.46	0.46	0.46	0.46	0.44	0.44	0.44	0.44	0.44	0.44
Sat Flow, veh/h	458	3554	1585	632	3580	57	927	1399	400	1406	1870	1585
Grp Volume(v), veh/h	83	800	78	8	595	624	103	0	9	26	30	436
Grp Sat Flow(s),veh/h/ln	458	1777	1585	632	1777	1860	927	0	1798	1406	1870	1585
Q Serve(g_s), s	21.7	18.9	3.4	1.1	32.8	32.8	8.5	0.0	0.3	1.3	1.1	25.4
Cycle Q Clear(g_c), s	54.4	18.9	3.4	20.0	32.8	32.8	9.6	0.0	0.3	1.6	1.1	25.4
Prop In Lane	1.00		1.00	1.00		0.03	1.00		0.22	1.00		1.00
Lane Grp Cap(c), veh/h	145	1629	726	250	814	853	461	0	794	677	826	700
V/C Ratio(X)	0.57	0.49	0.11	0.03	0.73	0.73	0.22	0.00	0.01	0.04	0.04	0.62
Avail Cap(c_a), veh/h	145	1629	726	250	814	853	461	0	794	677	826	700
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.7	22.7	18.5	29.7	26.5	26.5	21.7	0.0	18.8	19.2	19.0	25.8
Incr Delay (d2), s/veh	5.4	0.2	0.1	0.1	3.4	3.2	1.1	0.0	0.0	0.1	0.1	4.1
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	2.7	7.9	1.3	0.2	14.3	15.0	2.0	0.0	0.1	0.4	0.5	10.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.0	22.9	18.6	29.7	29.9	29.7	22.9	0.0	18.8	19.4	19.1	29.9
LnGrp LOS	D	C	B	C	C	C	C	A	B	B	B	C
Approach Vol, veh/h		961			1227			112			492	
Approach Delay, s/veh		25.3			29.8			22.5			28.7	
Approach LOS		C			C			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		59.0		61.0		59.0		61.0				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		53.0		55.0		53.0		55.0				
Max Q Clear Time (g_c+I1), s		11.6		56.4		27.4		34.8				
Green Ext Time (p_c), s		0.6		0.0		1.9		8.6				
Intersection Summary												
HCM 6th Ctrl Delay			27.8									
HCM 6th LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	199	972	91	19	777	23	61	7	4	32	21	215
Future Volume (veh/h)	199	972	91	19	777	23	61	7	4	32	21	215
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	221	1080	101	21	863	26	68	8	4	36	23	239
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	237	1629	726	165	1614	49	546	520	260	674	826	700
Arrive On Green	0.46	0.46	0.46	0.46	0.46	0.46	0.44	0.44	0.44	0.44	0.44	0.44
Sat Flow, veh/h	625	3554	1585	475	3522	106	1117	1176	588	1402	1870	1585
Grp Volume(v), veh/h	221	1080	101	21	435	454	68	0	12	36	23	239
Grp Sat Flow(s),veh/h/ln	625	1777	1585	475	1777	1851	1117	0	1764	1402	1870	1585
Q Serve(g_s), s	33.9	28.4	4.4	4.3	21.1	21.1	4.4	0.0	0.5	1.8	0.8	11.9
Cycle Q Clear(g_c), s	55.0	28.4	4.4	32.7	21.1	21.1	5.2	0.0	0.5	2.2	0.8	11.9
Prop In Lane	1.00		1.00	1.00		0.06	1.00		0.33	1.00		1.00
Lane Grp Cap(c), veh/h	237	1629	726	165	814	848	546	0	779	674	826	700
V/C Ratio(X)	0.93	0.66	0.14	0.13	0.53	0.53	0.12	0.00	0.02	0.05	0.03	0.34
Avail Cap(c_a), veh/h	237	1629	726	165	814	848	546	0	779	674	826	700
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.4	25.3	18.8	38.0	23.3	23.3	20.4	0.0	18.8	19.5	18.9	22.0
Incr Delay (d2), s/veh	40.7	1.0	0.1	0.3	0.7	0.7	0.5	0.0	0.0	0.2	0.1	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.4	12.0	1.7	0.5	8.9	9.3	1.2	0.0	0.2	0.6	0.4	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	87.1	26.3	18.9	38.4	24.0	24.0	20.9	0.0	18.9	19.6	19.0	23.4
LnGrp LOS	F	C	B	D	C	C	C	A	B	B	B	C
Approach Vol, veh/h		1402			910			80			298	
Approach Delay, s/veh		35.4			24.3			20.6			22.6	
Approach LOS		D			C			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		59.0		61.0		59.0		61.0				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		53.0		55.0		53.0		55.0				
Max Q Clear Time (g_c+I1), s		7.2		57.0		13.9		34.7				
Green Ext Time (p_c), s		0.3		0.0		1.1		6.1				
Intersection Summary												
HCM 6th Ctrl Delay			29.8									
HCM 6th LOS			C									

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Intersection	
Int Delay, s/veh	5.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	3	19	23	6	14	20
Future Vol, veh/h	3	19	23	6	14	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	21	26	7	16	22

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	24	0	73	14
Stage 1	-	-	-	-	14	-
Stage 2	-	-	-	-	59	-
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	-	-	1591	-	931	1066
Stage 1	-	-	-	-	1009	-
Stage 2	-	-	-	-	964	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1591	-	916	1066
Mov Cap-2 Maneuver	-	-	-	-	916	-
Stage 1	-	-	-	-	993	-
Stage 2	-	-	-	-	964	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.8	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	916	1066	-	-	1591	-
HCM Lane V/C Ratio	0.017	0.021	-	-	0.016	-
HCM Control Delay (s)	9	8.4	-	-	7.3	0
HCM Lane LOS	A	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	5.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1	3	11	7	2	13
Future Vol, veh/h	1	3	11	7	2	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	3	12	8	2	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	4	0	35	3
Stage 1	-	-	-	-	3	-
Stage 2	-	-	-	-	32	-
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	-	-	1618	-	978	1081
Stage 1	-	-	-	-	1020	-
Stage 2	-	-	-	-	991	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1618	-	971	1081
Mov Cap-2 Maneuver	-	-	-	-	971	-
Stage 1	-	-	-	-	1013	-
Stage 2	-	-	-	-	991	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.4	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	971	1081	-	-	1618	-
HCM Lane V/C Ratio	0.002	0.013	-	-	0.008	-
HCM Control Delay (s)	8.7	8.4	-	-	7.2	0
HCM Lane LOS	A	A	-	-	A	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-

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Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	12	16	34	49	7
Future Vol, veh/h	7	12	16	34	49	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	13	18	38	54	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	56	0	-	0	66	37
Stage 1	-	-	-	-	37	-
Stage 2	-	-	-	-	29	-
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	1549	-	-	-	939	1035
Stage 1	-	-	-	-	985	-
Stage 2	-	-	-	-	994	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1549	-	-	-	934	1035
Mov Cap-2 Maneuver	-	-	-	-	875	-
Stage 1	-	-	-	-	980	-
Stage 2	-	-	-	-	994	-

Approach	EB	WB	SB
HCM Control Delay, s	2.7	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1549	-	-	-	892
HCM Lane V/C Ratio	0.005	-	-	-	0.07
HCM Control Delay (s)	7.3	0	-	-	9.3
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	7	14	38	62	6
Future Vol, veh/h	7	7	14	38	62	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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	8	16	42	69	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	58	0	-	0	61	37
Stage 1	-	-	-	-	37	-
Stage 2	-	-	-	-	24	-
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	1546	-	-	-	945	1035
Stage 1	-	-	-	-	985	-
Stage 2	-	-	-	-	999	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1546	-	-	-	940	1035
Mov Cap-2 Maneuver	-	-	-	-	879	-
Stage 1	-	-	-	-	980	-
Stage 2	-	-	-	-	999	-

Approach	EB	WB	SB
HCM Control Delay, s	3.7	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1546	-	-	-	891
HCM Lane V/C Ratio	0.005	-	-	-	0.085
HCM Control Delay (s)	7.3	0	-	-	9.4
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.3

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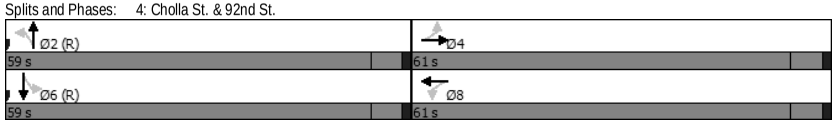
Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	59	61	59	61
Maximum Split (%)	49.2%	50.8%	49.2%	50.8%
Minimum Split (s)	22	22	22	22
Yellow Time (s)	4.5	4.5	4.5	4.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	5	5	5
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	5	5	5
Flash Dont Walk (s)	11	11	11	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	0	59	0	59
End Time (s)	59	0	59	0
Yield/Force Off (s)	53	114	53	114
Yield/Force Off 170(s)	42	103	42	103
Local Start Time (s)	0	59	0	59
Local Yield (s)	53	114	53	114
Local Yield 170(s)	42	103	42	103

Intersection Summary	
Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	45
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	

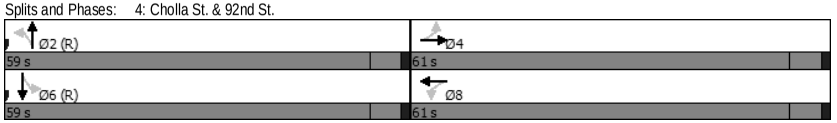
Splits and Phases: 4: Cholla St. & 92nd St.



Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	59	61	59	61
Maximum Split (%)	49.2%	50.8%	49.2%	50.8%
Minimum Split (s)	22	22	22	22
Yellow Time (s)	4.5	4.5	4.5	4.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	5	5	5
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	5	5	5
Flash Dont Walk (s)	11	11	11	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	0	59	0	59
End Time (s)	59	0	59	0
Yield/Force Off (s)	53	114	53	114
Yield/Force Off 170(s)	42	103	42	103
Local Start Time (s)	0	59	0	59
Local Yield (s)	53	114	53	114
Local Yield 170(s)	42	103	42	103

Intersection Summary	
Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	45
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	

Splits and Phases: 4: Cholla St. & 92nd St.



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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	4	93	40	4	23	35	315	20	9	612	9
Future Volume (veh/h)	8	4	93	40	4	23	35	315	20	9	612	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	9	4	103	44	4	26	39	350	22	10	680	10
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	197	7	178	128	25	163	612	2662	167	827	2810	41
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.78	0.78	0.78	0.78	0.78	0.78
Sat Flow, veh/h	1380	60	1535	1287	216	1402	753	3396	213	1010	3585	53
Grp Volume(v), veh/h	9	0	107	44	0	30	39	182	190	10	337	353
Grp Sat Flow(s),veh/h/ln	1380	0	1594	1287	0	1618	753	1777	1832	1010	1777	1861
Q Serve(g_s), s	0.7	0.0	7.6	4.0	0.0	2.0	1.7	3.0	3.0	0.3	6.1	6.1
Cycle Q Clear(g_c), s	2.7	0.0	7.6	11.7	0.0	2.0	7.8	3.0	3.0	3.3	6.1	6.1
Prop In Lane	1.00		0.96	1.00		0.87	1.00		0.12	1.00		0.03
Lane Grp Cap(c), veh/h	197	0	185	128	0	188	612	1393	1436	827	1393	1459
V/C Ratio(X)	0.05	0.00	0.58	0.34	0.00	0.16	0.06	0.13	0.13	0.01	0.24	0.24
Avail Cap(c_a), veh/h	669	0	731	568	0	742	612	1393	1436	827	1393	1459
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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.0	0.0	50.3	55.8	0.0	47.8	4.5	3.1	3.1	3.5	3.5	3.5
Incr Delay (d2), s/veh	0.1	0.0	2.8	1.6	0.0	0.4	0.2	0.2	0.2	0.0	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	3.2	1.4	0.0	0.8	0.3	1.0	1.0	0.1	2.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.1	0.0	53.1	57.4	0.0	48.2	4.7	3.3	3.3	3.5	3.9	3.9
LnGrp LOS	D	A	D	E	A	D	A	A	A	A	A	A
Approach Vol, veh/h		116			74			411			700	
Approach Delay, s/veh		52.8			53.6			3.4			3.9	
Approach LOS		D			D			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		100.1		19.9		100.1		19.9				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		53.0		55.0		53.0		55.0				
Max Q Clear Time (g_c+I1), s		9.8		9.6		8.1		13.7				
Green Ext Time (p_c), s		2.7		0.8		5.0		0.3				
Intersection Summary												
HCM 6th Ctrl Delay			10.9									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	5	79	32	8	18	105	745	42	29	489	19
Future Volume (veh/h)	12	5	79	32	8	18	105	745	42	29	489	19
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	13	6	88	36	9	20	117	828	47	32	543	21
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	178	10	152	119	53	117	704	2729	155	525	2785	108
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.80	0.80	0.80	0.80	0.80	0.80
Sat Flow, veh/h	1381	102	1498	1302	516	1147	847	3418	194	634	3488	135
Grp Volume(v), veh/h	13	0	94	36	0	29	117	430	445	32	276	288
Grp Sat Flow(s),veh/h/ln	1381	0	1601	1302	0	1664	847	1777	1835	634	1777	1846
Q Serve(g_s), s	1.0	0.0	6.7	3.3	0.0	1.9	4.6	7.7	7.7	1.7	4.5	4.5
Cycle Q Clear(g_c), s	3.0	0.0	6.7	10.0	0.0	1.9	9.1	7.7	7.7	9.4	4.5	4.5
Prop In Lane	1.00		0.94	1.00		0.69	1.00		0.11	1.00		0.07
Lane Grp Cap(c), veh/h	178	0	163	119	0	169	704	1418	1465	525	1418	1474
V/C Ratio(X)	0.07	0.00	0.58	0.30	0.00	0.17	0.17	0.30	0.30	0.06	0.19	0.20
Avail Cap(c_a), veh/h	671	0	734	584	0	763	704	1418	1465	525	1418	1474
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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.6	0.0	51.4	56.2	0.0	49.3	4.0	3.2	3.2	4.5	2.9	2.9
Incr Delay (d2), s/veh	0.2	0.0	3.2	1.4	0.0	0.5	0.5	0.6	0.5	0.2	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	2.9	1.1	0.0	0.8	0.8	2.4	2.5	0.2	1.4	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.8	0.0	54.7	57.6	0.0	49.8	4.5	3.8	3.8	4.7	3.2	3.2
LnGrp LOS	D	A	D	E	A	D	A	A	A	A	A	A
Approach Vol, veh/h		107			65			992			596	
Approach Delay, s/veh		54.2			54.1			3.8			3.3	
Approach LOS		D			D			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		101.8		18.2		101.8		18.2				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		53.0		55.0		53.0		55.0				
Max Q Clear Time (g_c+I1), s		11.1		8.7		11.4		12.0				
Green Ext Time (p_c), s		7.8		0.7		4.2		0.3				
Intersection Summary												
HCM 6th Ctrl Delay			8.6									
HCM 6th LOS			A									

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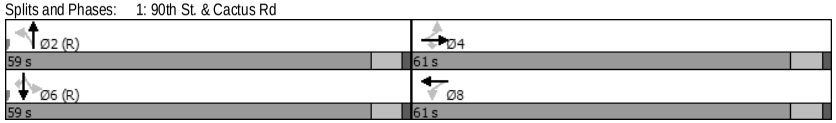
Total AM
1: 90th St. & Cactus Rd

18-100 - MASC
Timing Report, Sorted By Phase

Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	59	61	59	61
Maximum Split (%)	49.2%	50.8%	49.2%	50.8%
Minimum Split (s)	22	22	22	22
Yellow Time (s)	4.5	4.5	4.5	4.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	5	5	5
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	5	5	5
Flash Dont Walk (s)	11	11	11	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	0	59	0	59
End Time (s)	59	0	59	0
Yield/Force Off (s)	53	114	53	114
Yield/Force Off 170(s)	42	103	42	103
Local Start Time (s)	0	59	0	59
Local Yield (s)	53	114	53	114
Local Yield 170(s)	42	103	42	103

Intersection Summary		
Cycle Length		120
Control Type	Actuated-Coordinated	
Natural Cycle		55
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		

Splits and Phases: 1: 90th St. & Cactus Rd



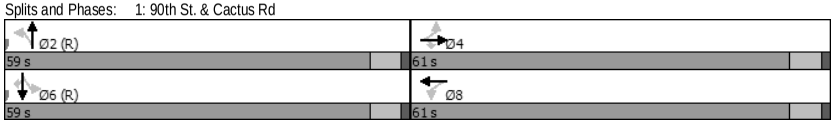
Total PM
1: 90th St. & Cactus Rd

18-100 - MASC
Timing Report, Sorted By Phase

Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	59	61	59	61
Maximum Split (%)	49.2%	50.8%	49.2%	50.8%
Minimum Split (s)	22	22	22	22
Yellow Time (s)	4.5	4.5	4.5	4.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	5	5	5
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	5	5	5
Flash Dont Walk (s)	11	11	11	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	0	59	0	59
End Time (s)	59	0	59	0
Yield/Force Off (s)	53	114	53	114
Yield/Force Off 170(s)	42	103	42	103
Local Start Time (s)	0	59	0	59
Local Yield (s)	53	114	53	114
Local Yield 170(s)	42	103	42	103

Intersection Summary		
Cycle Length		120
Control Type	Actuated-Coordinated	
Natural Cycle		60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		

Splits and Phases: 1: 90th St. & Cactus Rd



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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	720	73	7	1080	17	96	6	2	23	27	392
Future Volume (veh/h)	75	720	73	7	1080	17	96	6	2	23	27	392
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	83	800	81	8	1200	19	107	7	2	26	30	436
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	145	1629	726	250	1641	26	461	618	177	677	826	700
Arrive On Green	0.46	0.46	0.46	0.46	0.46	0.46	0.44	0.44	0.44	0.44	0.44	0.44
Sat Flow, veh/h	458	3554	1585	630	3580	57	927	1399	400	1406	1870	1585
Grp Volume(v), veh/h	83	800	81	8	595	624	107	0	9	26	30	436
Grp Sat Flow(s),veh/h/ln	458	1777	1585	630	1777	1860	927	0	1798	1406	1870	1585
Q Serve(g_s), s	21.7	18.9	3.5	1.1	32.8	32.8	8.9	0.0	0.3	1.3	1.1	25.4
Cycle Q Clear(g_c), s	54.4	18.9	3.5	20.0	32.8	32.8	10.0	0.0	0.3	1.6	1.1	25.4
Prop In Lane	1.00		1.00	1.00		0.03	1.00		0.22	1.00		1.00
Lane Grp Cap(c), veh/h	145	1629	726	250	814	853	461	0	794	677	826	700
V/C Ratio(X)	0.57	0.49	0.11	0.03	0.73	0.73	0.23	0.00	0.01	0.04	0.04	0.62
Avail Cap(c_a), veh/h	145	1629	726	250	814	853	461	0	794	677	826	700
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.7	22.7	18.6	29.7	26.5	26.5	21.8	0.0	18.8	19.2	19.0	25.8
Incr Delay (d2), s/veh	5.4	0.2	0.1	0.1	3.4	3.2	1.2	0.0	0.0	0.1	0.1	4.1
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	2.7	7.9	1.3	0.2	14.3	15.0	2.1	0.0	0.1	0.4	0.5	10.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.0	22.9	18.6	29.7	29.9	29.7	23.0	0.0	18.8	19.4	19.1	29.9
LnGrp LOS	D	C	B	C	C	C	C	A	B	B	B	C
Approach Vol, veh/h		964			1227			116			492	
Approach Delay, s/veh		25.3			29.8			22.7			28.7	
Approach LOS		C			C			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		59.0		61.0		59.0		61.0				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		53.0		55.0		53.0		55.0				
Max Q Clear Time (g_c+I1), s		12.0		56.4		27.4		34.8				
Green Ext Time (p_c), s		0.6		0.0		1.9		8.6				
Intersection Summary												
HCM 6th Ctrl Delay			27.7									
HCM 6th LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	199	972	95	19	777	23	66	7	5	32	21	215
Future Volume (veh/h)	199	972	95	19	777	23	66	7	5	32	21	215
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	221	1080	106	21	863	26	73	8	6	36	23	239
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	237	1629	726	165	1614	49	546	438	329	672	826	700
Arrive On Green	0.46	0.46	0.46	0.46	0.46	0.46	0.44	0.44	0.44	0.44	0.44	0.44
Sat Flow, veh/h	625	3554	1585	472	3522	106	1117	992	744	1400	1870	1585
Grp Volume(v), veh/h	221	1080	106	21	435	454	73	0	14	36	23	239
Grp Sat Flow(s),veh/h/ln	625	1777	1585	472	1777	1851	1117	0	1736	1400	1870	1585
Q Serve(g_s), s	33.9	28.4	4.7	4.3	21.1	21.1	4.7	0.0	0.5	1.8	0.8	11.9
Cycle Q Clear(g_c), s	55.0	28.4	4.7	32.7	21.1	21.1	5.6	0.0	0.5	2.3	0.8	11.9
Prop In Lane	1.00		1.00	1.00		0.06	1.00		0.43	1.00		1.00
Lane Grp Cap(c), veh/h	237	1629	726	165	814	848	546	0	767	672	826	700
V/C Ratio(X)	0.93	0.66	0.15	0.13	0.53	0.53	0.13	0.00	0.02	0.05	0.03	0.34
Avail Cap(c_a), veh/h	237	1629	726	165	814	848	546	0	767	672	826	700
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.4	25.3	18.9	38.0	23.3	23.3	20.5	0.0	18.9	19.5	18.9	22.0
Incr Delay (d2), s/veh	40.7	1.0	0.1	0.3	0.7	0.7	0.5	0.0	0.0	0.2	0.1	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.4	12.0	1.7	0.5	8.9	9.3	1.3	0.0	0.2	0.6	0.4	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	87.1	26.3	19.0	38.4	24.0	24.0	21.0	0.0	18.9	19.7	19.0	23.4
LnGrp LOS	F	C	B	D	C	C	C	A	B	B	B	C
Approach Vol, veh/h		1407			910			87			298	
Approach Delay, s/veh		35.3			24.3			20.7			22.6	
Approach LOS		D			C			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		59.0		61.0		59.0		61.0				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		53.0		55.0		53.0		55.0				
Max Q Clear Time (g_c+I1), s		7.6		57.0		13.9		34.7				
Green Ext Time (p_c), s		0.4		0.0		1.1		6.1				
Intersection Summary												
HCM 6th Ctrl Delay			29.7									
HCM 6th LOS			C									

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Intersection	
Int Delay, s/veh	5.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	3	20	28	6	16	25
Future Vol, veh/h	3	20	28	6	16	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	22	31	7	18	28

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	25	0	83	14
Stage 1	-	-	-	-	14	-
Stage 2	-	-	-	-	69	-
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	-	-	1589	-	919	1066
Stage 1	-	-	-	-	1009	-
Stage 2	-	-	-	-	954	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1589	-	901	1066
Mov Cap-2 Maneuver	-	-	-	-	901	-
Stage 1	-	-	-	-	989	-
Stage 2	-	-	-	-	954	-

Approach	EB	WB	NB
HCM Control Delay, s	0	6	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	901	1066	-	-	1589	-
HCM Lane V/C Ratio	0.02	0.026	-	-	0.02	-
HCM Control Delay (s)	9.1	8.5	-	-	7.3	0
HCM Lane LOS	A	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	6.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1	5	18	7	4	21
Future Vol, veh/h	1	5	18	7	4	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	6	20	8	4	23

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	7	0	52	4
Stage 1	-	-	-	-	4	-
Stage 2	-	-	-	-	48	-
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	-	-	1614	-	957	1080
Stage 1	-	-	-	-	1019	-
Stage 2	-	-	-	-	974	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1614	-	946	1080
Mov Cap-2 Maneuver	-	-	-	-	946	-
Stage 1	-	-	-	-	1007	-
Stage 2	-	-	-	-	974	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.2	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	946	1080	-	-	1614	-
HCM Lane V/C Ratio	0.005	0.022	-	-	0.012	-
HCM Control Delay (s)	8.8	8.4	-	-	7.3	0
HCM Lane LOS	A	A	-	-	A	A
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-

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Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	9	15	19	34	49	9
Future Vol, veh/h	9	15	19	34	49	9
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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	17	21	38	54	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	59	0	-	0	77	40
Stage 1	-	-	-	-	40	-
Stage 2	-	-	-	-	37	-
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	1545	-	-	-	926	1031
Stage 1	-	-	-	-	982	-
Stage 2	-	-	-	-	985	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1545	-	-	-	920	1031
Mov Cap-2 Maneuver	-	-	-	-	865	-
Stage 1	-	-	-	-	975	-
Stage 2	-	-	-	-	985	-

Approach	EB	WB	SB
HCM Control Delay, s	2.8	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1545	-	-	-	887
HCM Lane V/C Ratio	0.006	-	-	-	0.073
HCM Control Delay (s)	7.3	0	-	-	9.4
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	12	18	38	62	9
Future Vol, veh/h	10	12	18	38	62	9
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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	13	20	42	69	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	62	0	-	0	76	41
Stage 1	-	-	-	-	41	-
Stage 2	-	-	-	-	35	-
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	1541	-	-	-	927	1030
Stage 1	-	-	-	-	981	-
Stage 2	-	-	-	-	987	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1541	-	-	-	921	1030
Mov Cap-2 Maneuver	-	-	-	-	866	-
Stage 1	-	-	-	-	974	-
Stage 2	-	-	-	-	987	-

Approach	EB	WB	SB
HCM Control Delay, s	3.3	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1541	-	-	-	884
HCM Lane V/C Ratio	0.007	-	-	-	0.089
HCM Control Delay (s)	7.4	0	-	-	9.5
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.3

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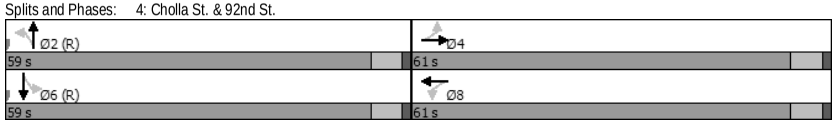
Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	59	61	59	61
Maximum Split (%)	49.2%	50.8%	49.2%	50.8%
Minimum Split (s)	22	22	22	22
Yellow Time (s)	4.5	4.5	4.5	4.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	5	5	5
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	5	5	5
Flash Dont Walk (s)	11	11	11	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	0	59	0	59
End Time (s)	59	0	59	0
Yield/Force Off (s)	53	114	53	114
Yield/Force Off 170(s)	42	103	42	103
Local Start Time (s)	0	59	0	59
Local Yield (s)	53	114	53	114
Local Yield 170(s)	42	103	42	103

Intersection Summary		
Cycle Length		120
Control Type	Actuated-Coordinated	
Natural Cycle		45
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		

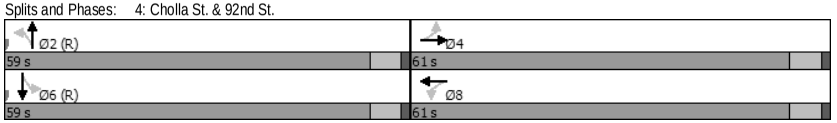
Splits and Phases: 4: Cholla St. & 92nd St.



Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	59	61	59	61
Maximum Split (%)	49.2%	50.8%	49.2%	50.8%
Minimum Split (s)	22	22	22	22
Yellow Time (s)	4.5	4.5	4.5	4.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	5	5	5
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	5	5	5
Flash Dont Walk (s)	11	11	11	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	0	59	0	59
End Time (s)	59	0	59	0
Yield/Force Off (s)	53	114	53	114
Yield/Force Off 170(s)	42	103	42	103
Local Start Time (s)	0	59	0	59
Local Yield (s)	53	114	53	114
Local Yield 170(s)	42	103	42	103

Intersection Summary		
Cycle Length		120
Control Type	Actuated-Coordinated	
Natural Cycle		45
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		

Splits and Phases: 4: Cholla St. & 92nd St.



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Total AM
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18-100 - MASC
HCM 6th Signalized Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	4	96	40	4	23	37	315	20	9	612	9
Future Volume (veh/h)	8	4	96	40	4	23	37	315	20	9	612	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	9	4	107	44	4	26	41	350	22	10	680	10
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	201	7	182	127	26	166	610	2654	166	824	2801	41
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.78	0.78	0.78	0.78	0.78	0.78
Sat Flow, veh/h	1380	57	1536	1282	216	1402	753	3396	213	1010	3585	53
Grp Volume(v), veh/h	9	0	111	44	0	30	41	182	190	10	337	353
Grp Sat Flow(s),veh/h/ln	1380	0	1594	1282	0	1618	753	1777	1832	1010	1777	1861
Q Serve(g_s), s	0.7	0.0	7.9	4.0	0.0	2.0	1.9	3.0	3.0	0.3	6.1	6.1
Cycle Q Clear(g_c), s	2.7	0.0	7.9	12.0	0.0	2.0	8.0	3.0	3.0	3.3	6.1	6.1
Prop In Lane	1.00		0.96	1.00		0.87	1.00		0.12	1.00		0.03
Lane Grp Cap(c), veh/h	201	0	189	127	0	192	610	1388	1432	824	1388	1454
V/C Ratio(X)	0.04	0.00	0.59	0.35	0.00	0.16	0.07	0.13	0.13	0.01	0.24	0.24
Avail Cap(c_a), veh/h	669	0	730	563	0	742	610	1388	1432	824	1388	1454
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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.7	0.0	50.1	55.8	0.0	47.5	4.6	3.2	3.2	3.6	3.5	3.5
Incr Delay (d2), s/veh	0.1	0.0	2.9	1.6	0.0	0.4	0.2	0.2	0.2	0.0	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	3.3	1.4	0.0	0.8	0.3	1.0	1.0	0.1	2.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.8	0.0	53.0	57.4	0.0	47.9	4.8	3.4	3.4	3.6	4.0	3.9
LnGrp LOS	D	A	D	E	A	D	A	A	A	A	A	A
Approach Vol, veh/h		120			74			413			700	
Approach Delay, s/veh		52.7			53.5			3.5			3.9	
Approach LOS		D			D			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		99.8		20.2		99.8		20.2				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		53.0		55.0		53.0		55.0				
Max Q Clear Time (g_c+I1), s		10.0		9.9		8.1		14.0				
Green Ext Time (p_c), s		2.7		0.8		5.0		0.3				
Intersection Summary												
HCM 6th Ctrl Delay			11.1									
HCM 6th LOS			B									

Total PM
4: Cholla St. & 92nd St.

18-100 - MASC
HCM 6th Signalized Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	6	83	32	8	18	108	745	42	29	489	19
Future Volume (veh/h)	13	6	83	32	8	18	108	745	42	29	489	19
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	14	7	92	36	9	20	120	828	47	32	543	21
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	183	12	156	119	54	120	701	2718	154	522	2774	107
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.80	0.80	0.80	0.80	0.80	0.80
Sat Flow, veh/h	1381	113	1489	1296	516	1147	847	3418	194	634	3488	135
Grp Volume(v), veh/h	14	0	99	36	0	29	120	430	445	32	276	288
Grp Sat Flow(s),veh/h/ln	1381	0	1602	1296	0	1664	847	1777	1835	634	1777	1846
Q Serve(g_s), s	1.1	0.0	7.1	3.3	0.0	1.9	4.8	7.9	7.9	1.7	4.5	4.5
Cycle Q Clear(g_c), s	3.0	0.0	7.1	10.3	0.0	1.9	9.3	7.9	7.9	9.6	4.5	4.5
Prop In Lane	1.00		0.93	1.00		0.69	1.00		0.11	1.00		0.07
Lane Grp Cap(c), veh/h	183	0	168	119	0	174	701	1413	1460	522	1413	1468
V/C Ratio(X)	0.08	0.00	0.59	0.30	0.00	0.17	0.17	0.30	0.30	0.06	0.20	0.20
Avail Cap(c_a), veh/h	671	0	734	578	0	763	701	1413	1460	522	1413	1468
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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.3	0.0	51.3	56.2	0.0	48.9	4.1	3.3	3.3	4.6	3.0	3.0
Incr Delay (d2), s/veh	0.2	0.0	3.3	1.4	0.0	0.4	0.5	0.6	0.5	0.2	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	3.0	1.1	0.0	0.8	0.8	2.5	2.5	0.2	1.4	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.5	0.0	54.5	57.6	0.0	49.4	4.6	3.9	3.9	4.8	3.3	3.3
LnGrp LOS	D	A	D	E	A	D	A	A	A	A	A	A
Approach Vol, veh/h		113			65			995			596	
Approach Delay, s/veh		54.0			53.9			4.0			3.4	
Approach LOS		D			D			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		101.4		18.6		101.4		18.6				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		53.0		55.0		53.0		55.0				
Max Q Clear Time (g_c+I1), s		11.3		9.1		11.6		12.3				
Green Ext Time (p_c), s		7.8		0.7		4.2		0.3				
Intersection Summary												
HCM 6th Ctrl Delay			8.8									
HCM 6th LOS			A									

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APPENDIX H

DESIGN STANDARDS AND POLICIES

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B. Angle of Intersection

A right-angle intersection provides the shortest crossing distance for intersecting traffic streams. It also provides the most favorable condition for drivers to judge the relative position and speed of intersecting vehicles. Where special conditions exist, intersection angles may diverge from a right-angle by a maximum of 2 degrees (up to 4 degrees with approval of the Transportation Department) on arterial streets and major collector streets; and by a maximum of 4 degrees (up to 15 degrees with approval of the Transportation Department) on minor and local collector streets, couplets and local streets.

C. Alignment and Profile

Intersections occurring on horizontal or crest vertical curves are undesirable. When there is latitude in the selection of intersection locations, vertical or horizontal curvature should be avoided. A line or grade change is frequently warranted when major intersections are involved. If a curve is unavoidable, it should be as flat as site conditions permit. Where the grade of the through roadway is steep, flattening through the intersection is desirable as a safety measure.

The maximum profile grade through an intersection is 6 percent for arterials and collector streets and 8 percent for local streets. The intersecting streets' profiles and cross slopes need to be coordinated with one another to ensure a safe and comfortable driving surface. Typically this may mean extending grades through the intersection for approximately 75 feet to 150 feet. Short vertical curves may be necessary in lieu of grade breaks.

D. Intersection and Driveway Sight Distance

In order to provide the opportunity for vehicles at an intersection to safely cross or make left or right turns onto a through street, **adequate sight distance must be provided**. Sight distance must also be provided for left turning traffic turning from the main street as described in AASHTO Intersection Sight Distance Case F. If opposing left turn lanes are present, the opposing left turns must be off-set in a positive way to allow for sight distance when opposing vehicles are present. See Figure 5.3-28 and Figure 5.3-29 for options. Sight distance should be based on the design speed for the roadway. Design speeds for new roadways should conform to those identified in Section 5-3.100 and Appendix 5-3A and Appendix 5-3B. Typically design speeds are 10 m.p.h. higher than the anticipated posted speed limit. The sight distance requirements outlined below are required for all private and public street intersections and at all intersections of driveways onto public or private streets. Internal driveway intersections on private property are excluded from these requirements.

Figure 5.3-26 depicts the technique used to determine the driver's eye location and an approaching vehicle; a line is then drawn to connect these 2 points. Continuous unobstructed line of sight must be provided along this line and throughout the approach to the intersection, providing an unobstructed sight triangle to the side street driver. Sight lines are to be drawn on roadway and landscaping plans to represent the areas that must be free of all objects and topography in excess of 18 inches above the roadway surface, however, certain vegetation will be allowed. Vegetation placed within the sight triangle will be of a low variety that remains below 18 inches when mature. Trees can be considered within the triangle as long as the canopies are above 8 feet, they are a single trunk variety, and they are not spaced in a configuration that creates a "picket fence" effect.

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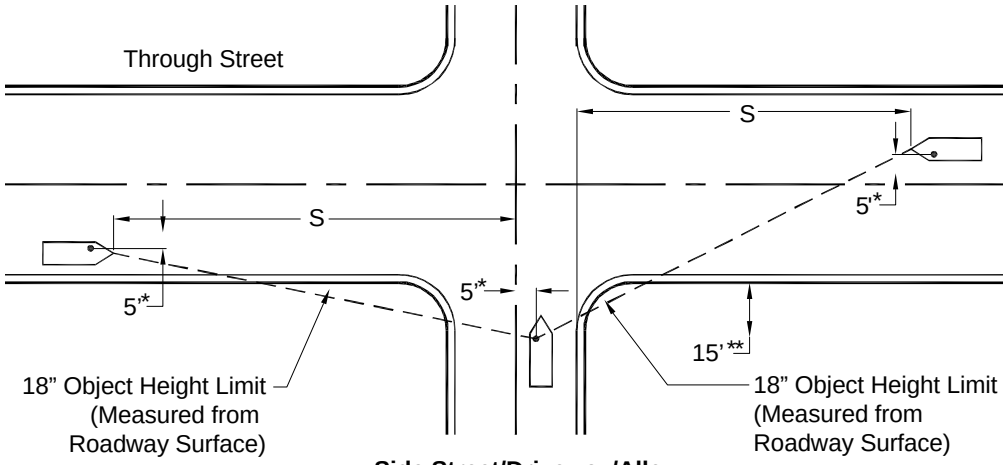

Side Street/Driveway/Alley
(Applies to stop controlled side street or all approaches to a signalized intersection for right-on-red traffic.

* 5 feet measured to nearest lane line or centerline.

**15 feet measured from face-of-curb or edge-of-travelway.

S = Intersection sight distance in feet on drivers left and right for right turns, left turns and through traffic. (See *2004 AASHTO Geometric Design of Highways and Streets* for additional sight distance requirements.)

(See Appendix 5-3A, Appendix 5-3B and Appendix 5-3C for distance S.)

FIGURE 5.3-26 INTERSECTION & DRIVEWAY DEPARTURE SIGHT DISTANCE REQUIREMENTS

1. Right-Angle Intersections

Right-angle intersections are those whose legs meet at an angle of 88 to 90 degrees. For these right-angle intersections the sight distances shown in Appendix 5-3A, Appendix 5-3B and Appendix 5-3C are to be used with Figure 5.3-26 to calculate the sight triangle. Appendices 5-3A and 5-3B present the intersection sight distances for all street classifications which were determined assuming passenger car traffic. Appendix 5-3C presents the sight distance requirements for varying roadway widths and design speeds for passenger cars, single unit trucks and combination trucks. If high volumes of truck traffic are anticipated, sight distances given in Appendix 5-3C will be used. Sight distances for vehicles turning left from the main street should also be considered and calculated based on the *AASHTO Geometric Design of Highways and Streets.*

2. Skewed Intersections

For skewed intersections where the intersection angles are less than 88 degrees, sight distances must be calculated in accordance with the procedures described in *AASHTO's Geometric Design of Highways and Streets.* Skewed intersection design must include appropriate design for pedestrian crossings and the location of curb ramps.

3. Intersections Within or Near a Curve

Sight distance measurements, identified as S in Figure 5.3-26, need to follow the curved street alignment when the intersection is within or near a horizontal curve.

4. Traffic Safety Triangles

Traffic Safety Triangles should be used as a means to limit the height of structures, vegetation and other improvements on corner properties immediately adjacent to intersections. **Safety triangles are not to be used as a substitute for intersection sight distance!** Safety triangles provide additional visibility around corners for all intersection approaches and should be applied to the design of perimeter walls and

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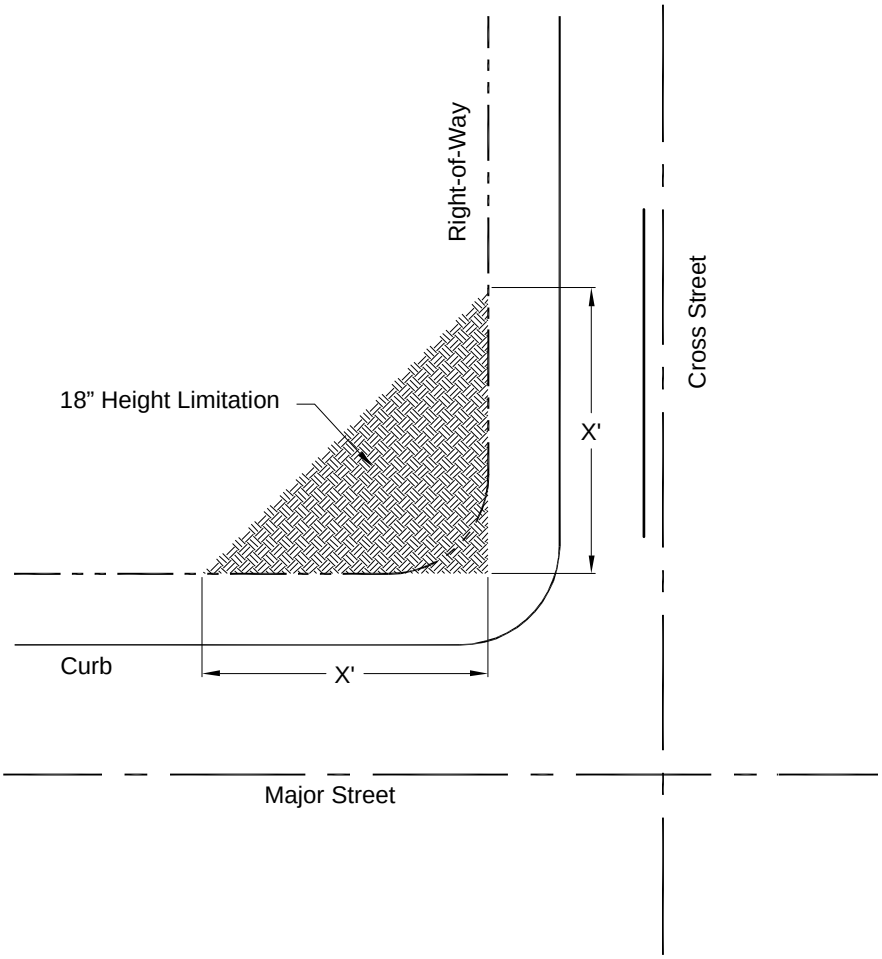
landscape features. Items within the safety triangle cannot be higher than 18" measured from the roadway surface. Figure 5.3-27 depicts the method used to determine the safety triangle location. The sight distance requirements contained in both Figure 5.3-26 and Figure 5.3-27 are applied at all corner lots.

5. Right-of-Way at Corners

A minimum of 25-foot radius rights-of-way shall be dedicated at street intersections to provide room for traffic control and sight distance.



Major Street Classification	**X** (in feet)
Parkway, Expressway, Arterials, Major Collector	25
Minor Collector	35
* Local Streets	35 / 60 / 70

* If the standard right-of-way (46 ft. local residential, 60 ft. local collector) is not available, the safety triangle (X) shall measure 60 ft. on local residential streets and 70 ft. on local collector streets from the centerlines of the streets.

FIGURE 5.3-27 TRAFFIC SAFETY TRIANGLE ON CORNER PROPERTY

E. Auxiliary Lanes

An exclusive turning lane permits separation of conflicting traffic movements and removes turning vehicles from the flow of through traffic. Figure 5.3-28 and Figure 5.3-29 depict the

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APPENDIX I

CIVTECH RESPONSES TO NEIGHBOR CONCERNS

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CivTech

November 30, 2018

Mr. Artin Knadjian, AIA, LEED AP
AAK Architecture & Interiors, Inc.
7585 East Redfield Rd, Suite 106
Scottsdale, Arizona 85260-6937

RE: Response to Neighborhood Meeting Questions: Megerdichian Senior Center – Scottsdale

Dear Mr. Knadjian:

This memorandum has been prepared to address four (4) topics requested of the administration of Saint Apkar Armenian Apostolic Church of Arizona. The first topic is a comparison of trips generated by different land uses. The second topic is a discussion of the different speed reduction/ mitigation and enforcement options allowed by the City. The third topic is a request for 90th Street and Cholla Street to be converted into an all-way stop controlled intersection. The fourth topic is a request to research and document information on senior housing relating to traffic safety. This memorandum will discuss the requested topics in detail and the recommendations for each.

TOPIC 1 – TRIP GENERATION COMPARISON

Neighbors were concerned about the number of trips that would be added to the roadway network within their residential development. A trip generation comparison was requested to determine how many trips would be generated if another potential land use allowed under neighboring R1-7 zoning (S-F homes) or under existing zoning (public charter school) were provided instead of the current proposed senior center.

To estimate the trips generated by each land use, CivTech used information found in the latest (10th) edition of the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*. The proposed Megerdichian Senior Center development is composed of a 51-dwelling unit minimal residential health care facility, and an 18-bed specialized residential health care facility.[1] The descriptions of the age ranges that will be residents at this location are described below:

- The minimal residential health care facility was categorized under the ITE land use 252 Attached Senior Adult Housing. This land use is described as an independent living active senior community for individuals with limited amenities such as social, recreational, centralized dinning, or medical amenities. These individuals may or may not own vehicles or operate vehicles.
- The residential health care facility was categorized under the ITE land use 620 Nursing Home. This land use is described as providing care to individuals who are unable to care for themselves. These individuals will not own or operate a vehicle.

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[1] The concept is for residents to "age in place." That is, residents will not have to move to another room or elsewhere in the facility as their need for medical attention increases. Thus, by assuming that more than seventy percent of the residents require minimal supervision and live almost independently, the trip generation may be somewhat conservative in that it may overestimate the number of trips that will actually be generated.

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Table 1 is a trip generation that shows the trips expected from the proposed Megerdichian Senior Center and two other land uses: a 24-dwelling unit R1-7 Single Family Homes and a 170-student Charter Elementary School.

Table 1 – Trip Generation Comparison Summary

Land Use	ITE Code	Size Quantity Units	Weekday Generated Trips						
			Daily Total	AM Peak Hour			PM Peak Hour		
				Enter	Exit	Total	Enter	Exit	Total
Proposed Megerdichian Senior Center									
Senior Adult Housing – Attached	252	51 Dwelling Units	180	4	6	10	8	7	15
Specialized Residential Health Care Facility	620	18 Beds	56	2	1	3	1	3	4
Total Proposed Trips			**236**	**6**	**7**	**13**	**9**	**10**	**19**
Comparison									
R1-7 Single Family Homes	210	24 Dwelling Units	280	6	16	22	16	10	26
Additional Trips When Compared to Total Proposed Trips			**44**	**0**	**9**	**9**	**7**	**0**	**7**
Charter Elementary School	537	170 Students	314	87	77	164	8	16	24
Additional Trips When Compared to Total Proposed Trips			**78**	**81**	**70**	**151**	**-1**	**6**	**5**

The trip generation summarized in **Table 1** also compares the differences in trips between the Megerdichian Senior Center and the 24-dwelling unit R1-7 Single Family Homes and 170-student Charter Elementary School. A review of the results of the trip generation comparison reveals that:

- A 24-dwelling unit R1-7 Single Family Home development could generate 44 more daily trips, with 9 more trips during the AM peak hour and 7 more trips during the PM peak hour compared to the Megerdichian Senior Center.
- A 170 student Charter Elementary School could generate 78 more daily trips, with 151 more trips during the AM peak hour and 5 more trips during the PM peak hour compared to the Megerdichian Senior Center.

From these results, it could be concluded that the Megerdichian Senior Center would generate fewer trips than a 24-dwelling unit R1-7 Single Family Homes development or a 170-student Charter Elementary School.

TOPIC 2 – SPEED REDUCTION/MITIGATION AND ENFORCEMENT OPTIONS

Neighbors also requested that research be conducted for speed reduction/mitigation and enforcement options that would be acceptable to the City of Scottsdale. The research included a review of the City of Scottsdale's Speed Awareness Program and Neighborhood Traffic Management Program.

Speed Awareness Program

The Speed Awareness Program is a three-step program designed to reduce speed of traffic within a neighborhood by increasing awareness. The program may be initiated when vehicles are traveling faster than the speed limit through a neighborhood, there are a high number of vehicle-related crashes within the neighborhood, or if there are pedestrian safety concerns. The Speed Awareness Program is for two-lane residential streets only and is deployed in three steps.

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Step 1 – Education

The first step is education, to raise motorist awareness of their speeds and speeding concerns in the neighborhood.

- Neighborhood speed-awareness trailers will be placed in neighborhoods where there is a speeding concern.
- If speed-awareness trailers fail to reduce or prevent speeding, residents from the neighborhood may obtain a hand-held radar unit to monitor traffic and record vehicle information. Speeding vehicles will then be sent a letter (not a ticket) from the city, informing them of the violation and requesting they obey neighborhood posted speed limits.
- Signs provided by the city can be placed by the residents in their yard outside the city right-of-way (typically 10' back from the edge of the pavement) for up to 30 days. This notifies drivers that the speeding concerns are those of the residents, not just the city.

Step 2 – Enforcement

While heightened awareness may be all that is needed for most Scottsdale neighborhoods, some areas may require police to monitor traffic and issue tickets to traffic speeding.

Step 3 – Engineering

After completing the Speed Awareness education and enforcement steps, if residents still feel their quality of life is impacted by traffic, they can request that their street be evaluated for engineering solutions based on the City of Scottsdale's Neighborhood Traffic Management Program.

- The Neighborhood Traffic Management Interest Form must be completed and signed by at least ten different residents along the same street.
- Once the request is placed on a list for traffic evaluation, speed and volume data is collected by the Transportation Department and compared to the city's approved criteria for traffic calming. Provided that there is support in the neighborhood.
- If the data collected meets the city's criteria and the street qualifies for possible installation of traffic calming devices, neighborhood support for the project must be established. In most cases, the city pays for the devices.
- A public meeting will be held to provide information about the projects to residents of the surrounding area. The public meeting will then be followed by a petition process requiring 70 percent of the residents, within the affected area of the project, to sign in favor of the project. Once these signatures have been received and verified, the project will be presented to the City of Scottsdale Transportation Commission for funding approval.

Speed Data and Recommendation

CivTech recorded traffic volumes, speeds, and vehicle classifications from Thursday, November 8 through Sunday, November 11 at two locations on Cholla Street: between 88th Place and 90th Street (i.e., immediately east of the project site) and between 90th and 91st Streets. North- and eastbound approach counts to the intersection of 90th and Cholla Streets were recorded on Thursday, November 15. **Table 2** summarizes the data recorded. Since they total 55 sheets, the summary data sheets on which **Table 2** is based are attached. CivTech can provide the other sheets electronically upon request.

Table 2 – Summary of Volume and Speed Data

Count Location	Travel Direction	Count Date	Day of Week	Volume			Speeds				Vehicle Classifications (#)			
				Daily	High Hour	Hi Hour Starts	85th %ile Speed	%>25 mph	%>30mph	%>35mph	Bikes	Cars	Other 2 axles	>2 axles
Cholla Street from 88th Place to 89th Street	East-bound	11/08/18	Thursday	150	29	7:45 AM		12.6%	1.3%	0.0%	0	129	21	0
		11/09/18	Friday	123	16	7:45 AM		21.9%	2.4%	0.0%	0	108	14	1
		11/10/18	Saturday	66	9	11:15 AM		21.2%	3.0%	0.0%	0	58	8	0
		11/11/18	Sunday	68	12	10:15 AM		19.1%	2.9%	0.0%	0	62	6	0
		Averages/Totals		102			25 mph	17.9%	2.2%	0.0%	0	357	49	1
	West-bound	11/08/18	Thursday	168	34	7:45 AM		27.4%	5.4%	1.2%	0	139	29	0
		11/09/18	Friday	146	17	3:15 PM		28.7%	3.4%	0.0%	1	115	29	1
		11/10/18	Saturday	86	11	9:30 AM		18.6%	0.0%	0.0%	0	72	14	0
		11/11/18	Sunday	64	12	10:00 AM		25.1%	6.3%	1.6%	0	55	9	0
		Averages/Totals		116			27 mph	25.8%	3.8%	0.6%	1	381	81	1
	EB+WB	11/08/18	Thursday	318				20.4%	3.4%	0.6%	0	268	50	0
		11/09/18	Friday	269				25.7%	3.0%	0.0%	1	223	43	2
		11/10/18	Saturday	152				19.7%	1.3%	0.0%	0	130	22	0
		11/11/18	Sunday	132				22.0%	4.6%	0.8%	0	117	15	0
		Averages/Totals		218	25	7:45 AM	26 mph	22.2%	2.8%	0.3%	1	738	130	2
Cholla Street from 90th Street to 91st Street	East-bound	11/08/18	Thursday	633	67	7:30 AM		79.7%	37.8%	7.2%	1	542	88	2
		11/09/18	Friday	656	61	7:30 AM		82.7%	37.3%	6.5%	0	573	83	0
		11/10/18	Saturday	510	58	10:00 AM		82.6%	34.0%	8.1%	1	443	65	1
		11/11/18	Sunday	381	44	10:00 AM		80.8%	37.8%	8.4%	0	344	37	0
		Averages/Totals		545			33 mph	81.5%	36.8%	7.4%	2	1,902	273	3
	West-bound	11/08/18	Thursday	477	50	7:45 AM		88.1%	57.3%	14.3%	1	412	63	1
		11/09/18	Friday	497	47	3:15 PM		90.5%	54.7%	16.9%	1	434	61	1
		11/10/18	Saturday	404	43	9:30 AM		90.2%	56.3%	15.5%	1	360	42	1
		11/11/18	Sunday	325	35	2:15 PM		88.0%	54.2%	12.0%	0	290	35	0
		Averages/Totals		426			34 mph	89.3%	55.7%	14.9%	3	1,496	201	3
	EB+WB	11/08/18	Thursday	1,110				83.3%	46.2%	10.3%	2	954	151	3
		11/09/18	Friday	1,153				75.1%	44.9%	11.1%	1	1,007	144	1
		11/10/18	Saturday	914				85.9%	43.8%	11.3%	2	803	107	2
		11/11/18	Sunday	706				84.1%	45.3%	10.0%	0	634	72	0
		Averages/Totals		971	80	12:15 PM	34 mph	85.0%	45.2%	10.8%	5	3,398	474	6
90th St @ Cholla St	NB	11/15/18	Thursday	758	86	4:45 PM								
	EB	11/15/18	Thursday	478	50	11:45 AM								

A review of the traffic volumes and speed data summarized in **Table 2** reveals that the segment of Cholla Street east of the project site, that is, west of 89th Street, experiences much lighter traffic volumes and much slower speeds that the segment east of 90th Street. While approximately one-fourth of drivers exceed the posted speed of 25 mph west of 89th Street, that percentage is between 80% and 90% east of 90th Street, with eastbound speeds lower than westbound speeds on both segments. The 85th percentile speed averages 26 mph west of 89th Street, just 1 mph over the speed limit (which indicates the speed limit is appropriate for prevailing traffic conditions), the 85th percentile speed east of 90th Street is 34 mph. As a residential street, the posted speed limit is appropriate; however, the majority of drivers seem to be ignoring it. Over the course of the four days on which data was recorded, a total of 27 vehicles exceeded 30 mph west of 89th Street while 1,752 vehicles exceeded 30 mph east of 90th Street, with 45 vehicles exceeding 45 mph, including 1 recorded at between 55 and 60 mph. A final point regarding **Table 2** is that Cholla Street carries few vehicles with more than two axles. The overwhelming majority of trips are by personal vehicles.

The data suggests that, while neighbors' concerns about speeding on Cholla Street are valid, the speeding is not occurring along the segment west of 89th Street near the Church. It is occurring farther east, east of 90th Street.

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With respect to the additional traffic added to Cholla Street from 88th Place east to 92nd Street, the maximum daily volume recorded was approximately 1,150 vehicles per day (vpd) on Friday, November 9. If all[2] of the nearly 240 trips expected from the subject development were added to this, the total would be approximately 1,400 vpd. Scottsdale's *Design Standards & Policies Manual* indicates that a residential street with a suburban character, such as Cholla Street, would have a maximum capacity of 1,500 vpd. Therefore, the trips generated by the proposed development in this conservative scenario are not expected to create capacity issues on Cholla Street.

TOPIC 3 – ALL-WAY STOP WARRANT

A request for 90th Street and Cholla Street to be converted to an all-way stop controlled intersection is considered here. The existing intersection lane configuration and control, an all-way stop control warrant analysis, and the results of that warrant analysis are discussed below.

Existing Lane Configuration and Control

The intersection of 90th Street and Cholla Street operates as a three-legged intersection with a single stop control in the northbound approach. The northbound approach consists of a single, shared left-turn/right-turn lane. The eastbound approach consists of a single, shared through/ right-turn lane. The westbound approach consists of a single, shared left-turn/through lane.

All-Way Stop Control Warrant

A methodology described in the Federal Highway Administration's *Manual on Uniform Traffic Control Devices 2009* (MUTCD) was used to evaluate if all-way stop control is warranted at 90th Street and Cholla Street. The criteria that should be considered when evaluating an all-way stop control warrant and the *results* are provided below:

A. Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.

   There are no traffic control signals planned to be installed at this intersection, therefore this criterion is not met for the all-way stop control warrant.

B. Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.

   CivTech reviewed the Statewide crash data for 2015 through 2017 purchased from the Arizona Department of Transportation. There were no crashes reported as having occurred either on 90th Street at Cholla Street or on Cholla Street at 90th Street. Thus, this criterion is not met for the all-way stop control warrant.

[2] The majority, but not all, of the site trips were assigned to Cholla Street. Church attendees will be encouraged to use 88th Place so traffic is distributed more evenly between Cholla Street and 88th Place. Therefore, the scenario described is a conservative, "worst-case" scenario.

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C. Minimum volumes:
   1. The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour (vph) for any 8 hours of an average day; and
   2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but
   3. If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.

      The volumes used to determine if these criteria are met were recorded by Field Data Services of Arizona, Inc. for CivTech the purposes of this analysis. The projected peak hour total volumes in the Megerdichian Senior Center TIA were used to perform this warrant analysis.

      Regarding Item 1, the maximum number of vehicles recorded approaching the "Tee" intersection of 90th and Cholla Streets from three directions (eastbound, westbound, and northbound) was 152 vehicles in an hour, calculated by combining the highest single-day recorded on Cholla Street westbound (Day 2, Friday November 9) east of 90th Street with the north- and eastbound daily approach counts recorded on November 15. Therefore, since this is substantially below the criterion of 300 vehicles per hour for eight hours, this item would not be satisfied. Since this item is inextricably linked by the word "and" with the second item regarding the units of traffic approaching from the minor street and the delays to these units, an analysis of the intersection under this second item is not required since the first is not satisfied. However, just to make this assessment more complete, as noted above, the 85th percentile speed on Cholla Street was found to be a maximum of 34 mph, less than the 40 mph in Item 3 that could have allowed the criteria in Items 1 and 2 to be reduced to 70% of the original values (to 210 vph and 140 units per hour, respectively).

D. Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.

   Criteria D is not met due to Criteria B, C.1, and C.2 not being met.

Based on the above, an all-way stop warrant is not satisfied for the intersection of 90th Street and Cholla Street.

TOPIC 4 – SENIOR HOUSING RELATING TO TRAFFIC SAFETY

Finally, neighbors requested that research be conducted on how senior housing impacts traffic safety questions from the neighborhood meeting. There were three major questions of concern that will be addressed through public documentation online. The questions of concern and *results* are provided below:

- Whether seniors are likely to drive in excess of the speed limit on Cholla Street?
- Whether seniors are likely (or more likely than other age drivers) to run over kids playing in the road on Cholla Street?
- Whether seniors are typically better, worse or the same "quality" driver as compared to "young" and "middle-aged" drivers.

These questions cannot be answered definitively. All are dependent on individual drivers. A search of the internet reveals opinions and studies that fall on both sides of the issue. And there is a limit to how much effort can be spent here in conducting research into these issues.

Here are some quotes that may shed some light on the subject posted in January 2009 on Insurance.com:

> *Less than one percent of people over 65 die as a result of motor vehicle accidents. On the other hand, car crashes are the major cause of death for the age group 15–20. Males in this group are twice as likely as females to die in a car crash.*
>
> *The young and the lead-footed are truly scary. Their risk of crash per mile is 4 times higher than in older age groups. As the Insurance Institute for Highway Safety puts it, "teenage drivers represent a major hazard." Although young drivers make up about 6 percent of the total licensed driving population, almost 13 percent (6,982) of all drivers involved in fatal crashes in 2007 were young drivers 15 to 20 years old, according to [a] National Highway Traffic Safety Administration report.*
>
> *And while older drivers do have problems that can sometimes affect their ability to be the drivers they once were, studies show they also tend to be aware of their limitations and restrict their driving as their abilities diminish. As a result, car accidents involving drivers who are seniors are generally not serious. The spike in per mile fatality with older drivers is due to the fact that a driver over 65 is twice as likely to die from the same accident as a driver over 55, and a driver above 75 has four times the risk.*

Older, retired drivers drive fewer miles each year than younger drivers if only for the fact that they do not commute to work each day. (Therefore, most of the facility residents will not be on Cholla Street at the same time as local residents.) Thus, seniors have less overall exposure to other traffic than younger drivers, so they have less chance of being involved in a crash. In addition, most tend to avoid travel during the morning and afternoon rush hours. At the same time, older drivers are frailer; therefore, their survivability decreases as they age, which explains the last sentence quoted above.

CONCLUSIONS AND RECOMMENDATIONS

From the above, the following can be concluded:

- The Megerdichian Senior Center would generate fewer trips than a 24-dwelling unit R1-7 Single Family Homes development or a 170-student Charter Elementary School.
- The data recorded for CivTech suggests that, while neighbors' concerns about speeding on Cholla Street is valid, the speeding is not occurring along the segment west of 89th Street near the Church. It is occurring farther east, east of 90th Street.
- The trips generated by the proposed development are not expected to create capacity issues on Cholla Street.
- An all-way stop warrant is not satisfied for the intersection of 90th Street and Cholla Street.
- Older, retired drivers drive fewer miles each year than younger drivers if only for the fact that they do not commute to work each day. Thus, seniors have less overall exposure to other traffic than younger drivers, so they have less chance of being involved in a crash. In addition, most tend to avoid travel during the morning and afternoon rush hours. At the same time, older drivers are frailer; therefore, their survivability decreases as they age.

Thank you for allowing CivTech to assist you on this project. Please contact me with any questions you may have on these responses.

Sincerely,

CivTech

Joseph F. Spadafino, P.E., PTOE, PTP
Project Manager/Senior Traffic Engineer

Attachment (1, 6 sheets)