CHANDLER BOULEVARD: 27TH AVENUE TO 19TH AVENUE

TRAFFIC TECHNICAL MEMORANDUM

For: City of Phoenix Street Transportation Department

Date: April 7, 2016

Subject: Chandler Boulevard: 27th Avenue to 19th Avenue, Traffic Analysis

EXECUTIVE SUMMARY

The Chandler Boulevard connection consists of two-lane roadway with a 12 foot wide travel lane and a 6 foot wide bicycle lane in each direction. The north side of the roadway will be fully developed with curb and gutter, street lighting and sidewalk.

The purpose of this analysis is to review the before and after local traffic conditions associated with the construction of the Chandler Boulevard connection and removal of Pecos Road with the constructed Loop 202 South Mountain Freeway. The analysis includes the completion of undeveloped communities as well as known planned developments within the study area to determine the capacity and safety needs for the Chandler Boulevard connection.

Conclusions

Existing Traffic Condition:

The existing conditions consist of the existing traffic volumes and current roadway geometry and network (without the Chandler Boulevard connection). This evaluation is necessary to establish the baseline and understanding of the existing volumes and capacity. Results of this analysis indicate the following:

- All roadways within the project limits operate at Level of Service (LOS) of B or better.
- Intersection of 17th Avenue and Chandler Boulevard operates at LOS of A in the AM and PM peak hours of the day.
- Pecos Road, which currently serves as the main means of access to and from the community west of 17th Avenue, operates at an existing LOS of B.

Interim Traffic Condition:

The interim conditions is defined as the period when the Chandler Boulevard connection is built, Pecos Road is removed, and consists of the traffic generated from the build out of Calabrea and Promontory at Foothills West developments. Results of this analysis indicate the following:

- All roadways within the project limits operate at LOS of B or better.

- Intersection of 17th Avenue and Chandler Boulevard operates at LOS B during the AM peak hour and LOS of C during the PM peak hour.
- Chandler Boulevard connection, which will replace the Pecos Road local access between 19th Avenue and 27th Avenue, will operate at LOS of B.

Future Years 2025 and 2035 Traffic Conditions:

The future conditions is defined as the period when the Chandler Boulevard connection is built, removal of Pecos Road, completion of the Loop 202 South Mountain Regional Freeway, and consists of planned years 2025 and 2035 traffic volume projections obtained from the MAG regional travel demand model completed for the Loop 202 South Mountain Freeway. As growth and development occurs in the study area, the City of Phoenix will require Chandler Boulevard be built to a four-lane section. As such, the Chandler Boulevard connection was evaluated as a four-lane section. Results indicate the following:

- 17th Avenue, between Pecos Road and Chandler Boulevard operates at LOS C in year 2025 and 2035.
- Chandler Boulevard, between 17th Avenue and Desert Foothills Parkway operates at LOS B in year 2025 and 2035.
- Chandler Boulevard, between South Chandler Boulevard and 19th Avenue will operate at LOS of B when developed and improved to a four lane section in year 2025 and 2035.

The intersection of 17th Avenue and Chandler Boulevard capacity and traffic control needs will be monitored by the City of Phoenix as development grows in the study area.

INTRODUCTION

This technical memorandum summarizes the process and results of the Traffic Analysis performed for the Chandler Boulevard connection, from 27th Avenue to 19th Avenue, located in the City of Phoenix. As part of the construction of the Arizona Department of Transportation (ADOT) Loop 202 South Mountain Freeway, Pecos Road will be removed west of Interstate 10 (I-10) and replaced with the Loop 202 regional freeway. The Chandler Boulevard connection will re-establish local connectivity for the communities west of 17th Avenue.

Background / History

As illustrated in ***Figure 1*** on page 4, Pecos Road was classified as a major arterial roadway by the City of Phoenix in the 1999 Street Classification Map and was built in 2000. At the time Pecos Road was being planned and built, the future life and funding of the ADOT Loop 202 South Mountain Freeway was unknown. For this reason, Pecos Road was planned and built to provide regional connectivity and to accommodate regional traffic volumes in the absence of the freeway. Evidence of the planned connectivity of Pecos Road still exists and includes the termination of Pecos Road pavement on the west end of Pecos Road with the barricading. Although Pecos Road was designed and built to accommodate regional traffic and future connectivity, today Pecos Road functions as a local access road to/from the communities west of 17th Avenue.

Project Purpose

The purpose of this analysis is to review the before and after local traffic conditions associated with the construction of the Chandler Boulevard connection and removal of Pecos Road with the constructed Loop 202 South Mountain Freeway. The analysis includes the completion of undeveloped (non-buildout) communities (Calabrea) as well as known planned development (Promontory at Foothills West) within the study area to determine the capacity and safety needs for the Chandler Boulevard connection.

The specific objectives of this study include determining:

- Typical section (number of travel lanes) needed for the Chandler Boulevard connection
- Existing and interim LOS for the 17th Avenue and Chandler Boulevard intersection and segments within the study area

Study Area

As previously discussed, the purpose of the study is to evaluate local connectivity, capacity, and safety. For this reason, the study area boundary consists of Pecos Road on the south, Chandler Boulevard on the north, 17th Avenue on the east, and termination at Shaughnessey Road on the west. ***Figure 2*** on page 5 illustrates the study area boundary.

STREET CLASSIFICATION MAP
City of Phoenix, Arizona

REVISIONS					
RESOLUTION	DATE	REVISED BY	RESOLUTION	DATE	REVISED BY
R-18980	10-01-97	DCS			
R-19057	01-07-98	DCS			
R-19319	07-01-98	DCS			

SUPPLEMENTAL LEGEND FOR AREA NORTH OF HAPPY VALLEY ROAD:

- MCDOT RURAL MINOR ARTERIAL (2-1-2 ON 110 FEET ROW)
- MCDOT RURAL MAJOR COLLECTOR (1-1-1 ON 110 FEET ROW)
- MCDOT RURAL MINOR COLLECTOR (1-0-1 ON 80 FEET ROW)

ORDINANCE NUMBER _____
ADOPTED BY THE CITY COUNCIL
CITY OF PHOENIX, ARIZONA
THIS ___ DAY OF ___, 199_

GRAPHIC SCALE IN MILES

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GENERAL NOTES

NOTE 1
See the lower left portion of this map for the design and dimensions of major arterial, arterial, collector, and minor collector streets. If frontage roads are constructed, additional right of way is required. Local streets shall have a minimum right-of-way width of 50 feet except as required in commercial and industrial areas.

NOTE 2
Where right-of-way of a major or collector street changes at an intersection, the wider right-of-way width shall extend approximately 300 feet past the intersection and then taper as determined by the Street Transportation Director.

NOTE 3
In undeveloped areas, collector streets will normally be designated during subdivision and/or development review.

NOTE 4
As development or redevelopment occurs on streets in the vicinity of existing or future freeway interchanges, the need for additional right-of-way for interchange flares will be determined.

NOTE 5
Village Cores are areas of existing and projected intense development which will require careful review to determine additional right-of-way requirements not shown on this map.

NOTE 6
Right-of-way in addition to that shown on this map may be required to accommodate through and turning lanes at intersections and other locations where traffic demand dictates, as determined by the Street Transportation Director. For flares at major intersections (denoted by colored octagons), see street cross section legend.

NOTE 7
Right-of-way, in addition to that shown on this map, may be required for transit related purposes, as determined by the Street Transportation Director. These purposes may include passenger shelters, benches, and waiting areas. See the Minimum Transit Right of Way Map for Bus Bay requirements.

NOTE 8
All Baseline Road and Jomax Road cross street offsets are to be eliminated. Refer to Geometric drawings.

NOTE 9
Land uses shown on map are for street design purposes only.

NOTE 10
The Street Classification Map combines information formerly contained on the Minimum Right-of-Way Standards Map. The independent Minimum Right-of-Way Standards Map is superseded by this map.

NOTE 11
The City reserves the option to construct an interim arterial street crossing of the CAP Canal in the Squaw Peak Freeway Corridor in the event that traffic demand warrants the crossing and freeway funds remain uncommitted.

FUNCTIONAL STREET CLASSIFICATION DEFINITIONS

1. FREEWAY, or EXPRESSWAY, provides for the expeditious movement of large volumes of through traffic between areas and/or across, around, or through the City or urban area. A freeway or an expressway is a divided roadway with control of access, and is not intended to provide access to abutting land. A freeway will have full access control and complete separation of conflicting traffic flows while an expressway may have partial access control and may have some at-grade intersections. In urban areas freeways and expressways will normally comprise a system or network of limited-access, high-capacity roadways.
2. MAJOR ARTERIAL STREET, provides for long distance traffic movement within Phoenix and between Phoenix and other cities. Service to abutting land is limited. Access is controlled through frontage roads, raised medians, and the spacing and location of driveways and intersections. Opposing traffic flows are often separated by a raised median.
2. ARTERIAL STREET, provides for moderately long distance traffic movement within Phoenix or between Phoenix and adjacent cities. Moderate service is provided to abutting land. Access is controlled through frontage roads, raised medians, and the spacing and location of driveways and intersections. Opposing traffic flows are separated by a raised median or a continuous left turn lane.
3. COLLECTOR STREET, provides for short distance (less than 3 miles) traffic movement; primarily functions to collect and distribute traffic between local streets or high volume traffic generators and arterial streets. Provides direct access to abutting land. Some access may be controlled by raised medians and the spacing and location of intersections and driveways.
3. MINOR COLLECTOR STREET, provides for short distance (less than 3 miles) traffic movement; primarily functions to collect and distribute traffic between local streets and arterial streets. Provides direct access to abutting land. Some access may be controlled by the spacing and location of intersections.
4. LOCAL STREET, provides for direct access to residential, commercial, industrial, or other abutting land, and for local traffic movements and connects to collector and/or major streets.

MAP LEGEND

- EXISTING FREEWAY
- FREEWAY-UNDER CONSTRUCTION
- FUTURE FREEWAY
- POTENTIAL FUTURE TOLL FACILITY
- CITY LIMITS
- A — CROSS SECTION
- OUTSIDE CITY LIMITS

LAND USE LEGEND		CHARACTER OF: INTERSECTION	CHARACTER OF: MIDBLOCK
URBAN CORE	EF		
SUBURBAN CORE	EL		
INDUSTRIAL PARK	IL		
INDUSTRIAL FREE ACCESS	IF		
COMMERCIAL LIMITED ACCESS	CL		
COMMERCIAL FREE ACCESS	CF		
HIGH DENSITY RESIDENTIAL	MF-ML		
LOW DENSITY RESIDENTIAL LIMITED ACCESS	RL		
LOW DENSITY RESIDENTIAL FREE ACCESS	RF		
OPEN SPACE	O		
DEVELOPED RECREATIONAL	D		
SONORAN DESERT PRESERVE (LIMITS TO BE DETERMINED)			

STREET CROSS SECTION LEGEND

CROSS SECTIONS LETTER	CROSS SECTIONS DESCRIPTION	CLASSIFICATION MAJ. ART.	ART.	COL.	MINOR COL.	FLARE/ATHWARE INTERSECTIONS	USE CODES	MEDIAN
A	104/140	X				FLARE ONE	0106F1	Yes
B	94/130	X	X			FLARE TWO	0106F2	Opt
C	74/110	X	X			FLARE THREE	0106F3	Opt
D	64/100	X	X	X		FLARE FOUR	0106F4	No
E	50/80		X	X		FLARE FIVE	0106F5	No
F	40/60		X	X	X	FLARE SIX	0106F6	No
X	Existing Special Section	Refer to the cross section and right-of-way. Additional 10-foot easements may be required for right turn lanes. Flared right of ways and roadways may be required at major intersections (denoted by colored octagons.) See above.						
Z	Proposed Special Section	Refer to supplemental right-of-way maps.						

See Recreational Trails Map. If a trail is required, add ten feet to above right of ways.
See Transit Minimum Right of Way standards Map for Bus Bay locations.
All Collector and Minor Collector Streets are Cross Section "F" unless noted.

STREET CLASSIFICATION LEGEND

SCENIC DRIVE	STREET	
		MAJOR ARTERIAL
		ARTERIAL
		COLLECTOR
		MINOR COLLECTOR

NOTES:
Detailed cross sections are shown for illustrative purposes and to designate the Minimum Right of Way Standard for each street.

Two (10) Foot Easements may be allowed in lieu of Right-of-Way on Cross Sections A, B, C, D, and E, at the discretion of the Street Transportation Department or Development Services Department.

CROSS SECTION A — 104/140
CROSS SECTION C — 74/110
CROSS SECTION E — 50/80
CROSS SECTION B — 94/130
CROSS SECTION D — 64/100
CROSS SECTION F — 40/60

CROSS SECTIONS

1999 City of Phoenix Street Classification Map

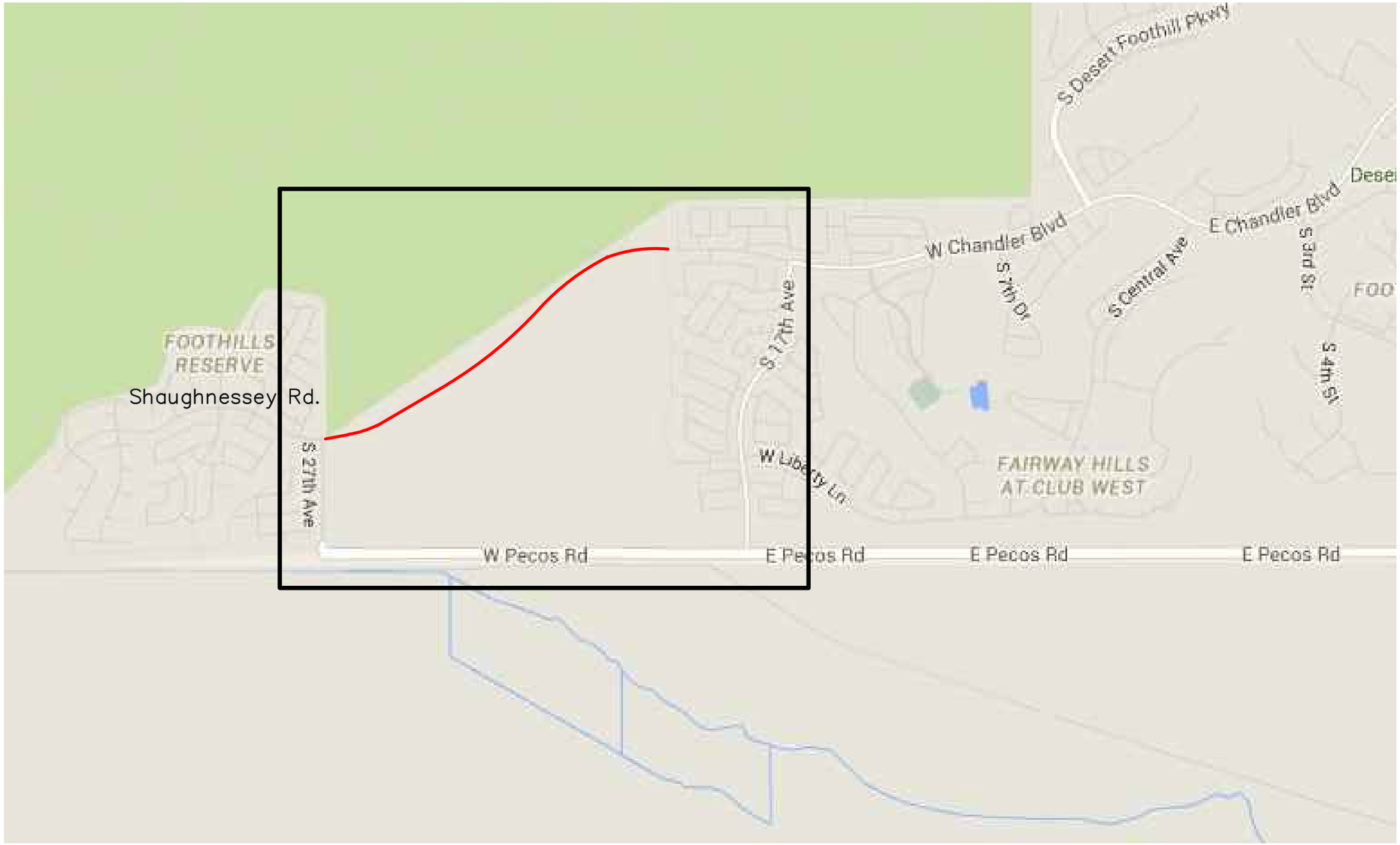
LEGEND
PECOS ROAD

Kimley»Horn

April 2016

Figure 1
Street Classification

TIA



Vicinity Map

EXISTING TRAFFIC CONDITIONS

Physical Characteristics

The existing roadway network within the study area includes West Chandler Boulevard, 17th Avenue, South Chandler Boulevard, West Shaughnessey Road, and Pecos Road.

West Chandler Boulevard exists as an east-west roadway and provides two travel lanes in each direction. The City of Phoenix classifies Chandler Boulevard as an Existing Special Section (X-D) Arterial Roadway. The West Chandler Boulevard roadway is 64 feet wide. On-street parking is currently provided between 18th Drive and 19th Avenue where Chandler Boulevard is striped for one lane in each direction and terminates just west of 19th Avenue. Eastbound and westbound travel lanes are separated by a striped center two-way left-turn lane median. There is curb, gutter, and sidewalk on both sides of the road. Currently, the posted speed limit is 45 mph east of 17th Avenue. The westbound speed limit drops to 35 mph just east of 17th Avenue. There is no posted speed limit between 19th Avenue and 17th Avenue, but the future speed limit will remain as 35 mph.

17th Avenue exists as a north-south roadway from Pecos Road to W. Chandler Boulevard. The City of Phoenix classifies 17th Avenue as an Existing Special Section (X-D) Arterial Roadway. 17th Avenue provides two travel lanes in each direction with bike lanes. Northbound and southbound travel lanes are separated by a striped two-way left-turn lane center median. The 64 feet wide roadway is fully built out with curb, gutter, and sidewalk on the east and west sides of the road. The posted speed limit is 35 mph.

South Chandler Boulevard exists as a north-south roadway from Pecos Road to Shaughnessey Road. The City of Phoenix classifies South Chandler Boulevard as Proposed Special Section (Z-D) Arterial Roadway. South Chandler Boulevard provides one travel lane in each direction with no striped biked lanes. Northbound and southbound travel lanes are separated by a solid double yellow line. The west half is built with curb, gutter, and sidewalk. The pavement width varies in width from 40 feet to 28 feet wide between Pecos Road and Cottonwood Lane and remains 28 feet wide between Cottonwood Lane and Shaughnessey Road. The posted speed limit is 35 mph.

West Shaughnessey Road exists as an east-west roadway from South Chandler Boulevard and terminates just west of South 32nd Lane. The City of Phoenix classifies Shaughnessey Road as an Existing Special Section (X-D) Arterial Roadway. Shaughnessey Road provides one travel lane in each direction with no striped bike lanes. There is curb, gutter, and sidewalk on both sides of the road. The posted speed limit is 25 mph. Currently, West Shaughnessey Road is 35 feet wide and functions as a local collector for the existing residential community.

Pecos Road exists as an east-west roadway from South Chandler Boulevard extending east of I-10. The City of Phoenix classifies Pecos Road as an Existing Special Section

(X-B) Major Arterial Roadway and future Freeway. Pecos Road provides two travel lanes in each direction. Eastbound and westbound travel lanes are separated by an unpaved median. There is no curb, gutter, or sidewalk on either side of the road. The posted speed limit is 40 mph.

The existing roadway network and lane configuration is shown in the existing conditions ***Figure 3*** on page 10.

Existing Traffic Volumes

24-hour bi-directional traffic counts were provided by the City of Phoenix and collected February 9th and 10th, 2016 at the following locations:

- On Shaughnessey Road, between 31st Lane and South Chandler Boulevard
- On Pecos Road, between South Chandler Boulevard and 17th Avenue
- On South Chandler Boulevard, between Shaughnessey Road and Pecos Road

24-hour bi-directional traffic counts were provided by the City of Phoenix and collected in 2011 and 2010 at the following locations:

- On Chandler Boulevard, between 19th Avenue and 13th Avenue
- On 17th Avenue, between Liberty Lane and Chandler Boulevard

Turning movement counts were collected at the intersection of 17th Avenue and West Chandler Boulevard on Wednesday February 24, 2016. The counts were performed between the peak hours of 6:00 AM and 9:00 AM and between 4:00 PM and 6:00 PM.

The results of these counts are shown in ***Figure 3*** on page 10.

Level of Service Methodology and Analysis

LOS is commonly used as a qualitative description of intersection operation and is based on the type of traffic control and delay experienced at the intersection. The *Highway Capacity Manual 2010 (HCM 2010)* analysis methodology for signalized intersections and unsignalized intersections is utilized to determine the operating LOS of the study intersections. The HCM 2010 analysis methodology describes the operation of an intersection using a range of LOS from LOS A (free-flow conditions) to LOS F (severely congested conditions), based on the corresponding ranges of stopped delay experienced per vehicle for signalized and unsignalized intersections shown in ***Table 1***. For an urban signalized or unsignalized intersection, a LOS "D" or better will be used as the design threshold to measure the intersection and determine if the intersection is operating at an acceptable LOS.

Table 1: Intersection LOS Delay Ranges

LOS	Control Delay per Vehicle (seconds/vehicle)	
	Signalized	Unsignalized
A	0-10	0-10
B	>10-20	>10-15
C	>20-35	>25-35
D	>35-55	>25-35
E	>55-80	>35-50
F	>80	>50

Source: *HCM 2010 Exhibits 18-4, 19-1 and 20-2, Transportation Research Board*

The LOS for the intersection of Chandler Boulevard and 17th Avenue was evaluated using the traffic counts collected and methodology presented in the HCM 2010. Traffic analysis software, HCS 2010, was used to perform the analysis for the unsignalized intersection. The current Chandler Boulevard and 17th Avenue intersection LOS results are shown in ***Table 2***. The HCS capacity results are provided in the Appendix.

Table 2: Chandler Blvd and 17th Avenue Existing LOS

Intersection	NB		WB	Intersection LOS
	L	R	L	
AM Peak	B	A	A	A
PM Peak	B	A	A	A

The Chandler Boulevard and 17th Avenue intersection operates at a LOS A during the AM and PM peak hours.

Capacity of a roadway is described as the maximum traffic flow attainable for a given number of lanes and roadway characteristics. Maricopa Association of Governments (MAG) maintains a Regional Travel Demand Model for the Maricopa County region.

Among other things, the planning model accounts for existing and planned land uses, existing and planned infrastructure improvements, economic growth, and population growth for the Maricopa County regional roadway network. The model uses the capacity of a roadway to estimate LOS. The desired LOS for urban arterial roadway is a LOS D or better.

Table 3 below illustrates the roadway capacity and LOS used to evaluate the roadway segments within the study area.

Table 3: Segment Capacity Volume and LOS Criteria

No. of Lanes	A / B	C	D	E	F
2	<10,385	14,745	18,485	20,770	>20,770
4	<20,765	29,486	36,961	41,530	>41,530

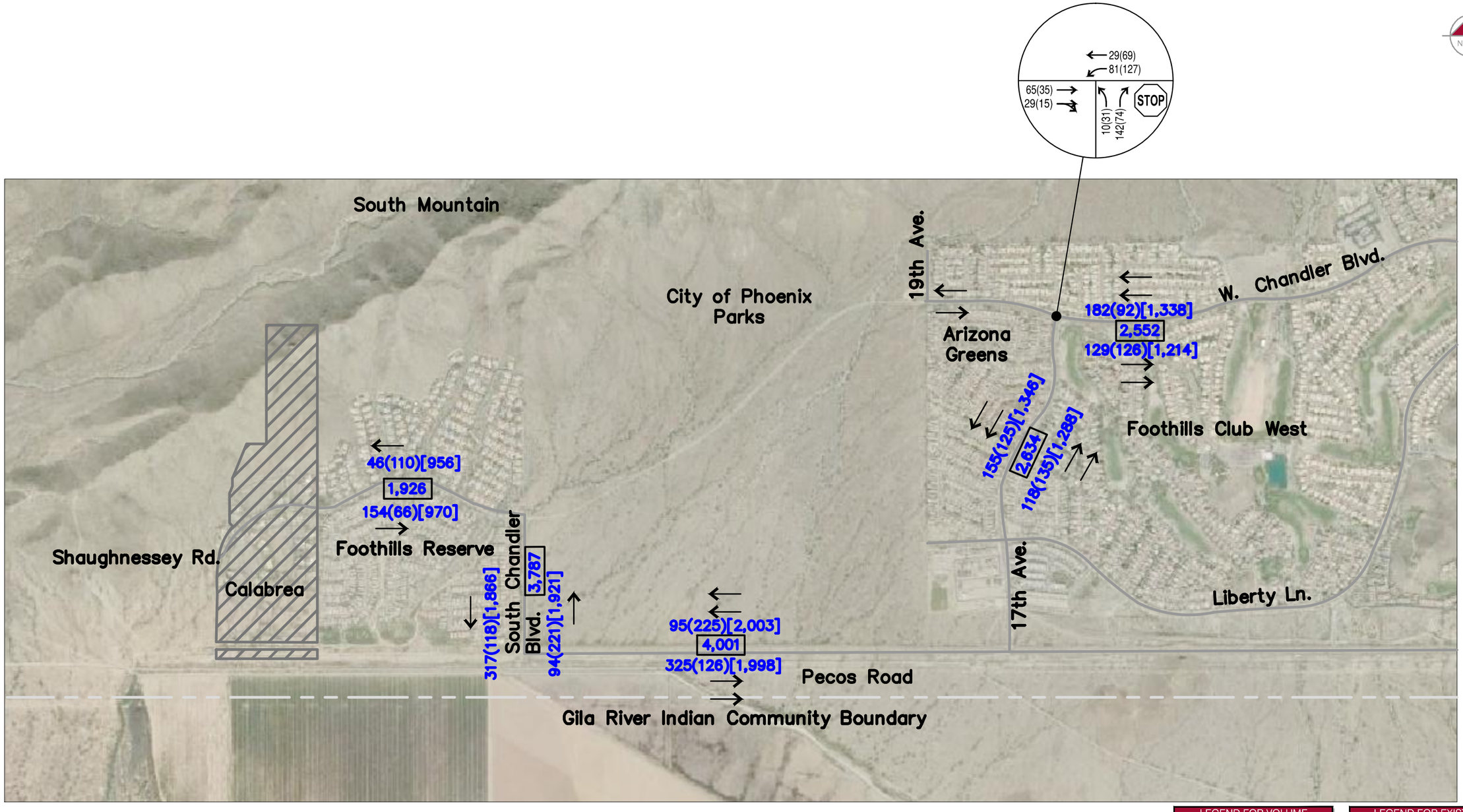
Notes:
1. *Volumes represent two-way average daily traffic volume (ADT).*
2. *Capacity service volumes established from the MAG Regional Travel Demand Model developed as part of the ADOT Loop 202 South Mountain Freeway and provided by HDR, Inc.*

The LOS for each roadway segment within the study area is presented in ***Table 4****.*

Table 4: Existing Roadway Capacity and LOS

Roadway Segment		No. of Lanes	Daily Volume	LOS
17th Ave	Between Pecos Rd and Chandler Blvd	4	2,634[2]	A / B
West Chandler Blvd	East of 17th Ave	4	2,552[3]	A / B
West Chandler Blvd	Between South Chandler Blvd and 19th Ave	Proposed Connection N/A		
Pecos Rd	Between South Chandler Blvd and 17th Ave	4	4,001[1]	A / B
South Chandler Blvd	Between Pecos Rd and Shaughnessey Rd	2	3,787[1]	A / B
Shaughnessey Rd	Between 31st Ln and South Chandler Blvd	2	1,926[1]	A / B

Notes:
1. *Collected 2016*
2. *Collected 2011*
3. *Collected 2010*



Daily Volumes Collected: February, 2016

Turning Movement Volumes Collected: February, 2016

Figure 3
Existing Roadway Network and Traffic Conditions

INTERIM BUILD-OUT TRAFFIC CONDITIONS

The City of Phoenix has started the design for the extension of West Chandler Boulevard from 27th Avenue to 19th Avenue in Ahwatukee. The proposed improvements include building the north half of Chandler Boulevard. Construction of the Chandler Boulevard extension is estimated to be complete in summer 2017.

This interim build-out traffic condition is described as the interim build-out of the north half of Chandler Boulevard, from 27th Avenue to 19th Avenue, removal of Pecos Road, from South Chandler Boulevard to 17th Avenue as part of the separate Loop 202 South Mountain Freeway project, and consists of the traffic generated from the build out of Calabrea and Promontory at Foothills West developments.

Interim Roadway Network

The interim roadway network is essentially the same network as described in the existing traffic conditions plus the extension and connection of Chandler Boulevard.

Chandler Boulevard, 27th Avenue to 19th Avenue connection consists of two-lane roadway with one travel lane and a bicycle lane in each direction. As shown in **Figure 4**, the north side of the roadway will be fully developed with curb and gutter, street lighting, and sidewalk. As shown in the figure, the Chandler Boulevard interim improvements includes building the north half street width. The south half street improvements will be constructed when the land along the south side gets developed. It is currently unknown as to when the land will be developed.

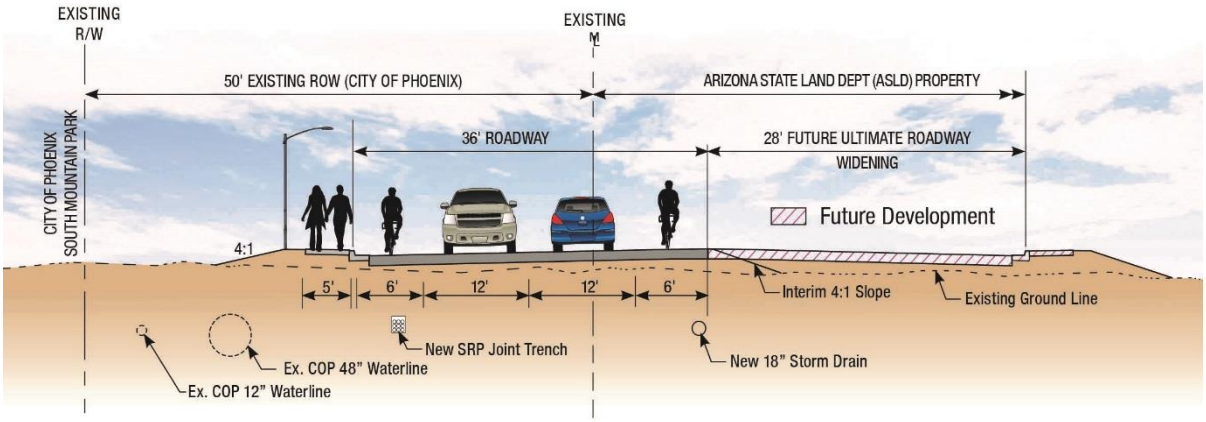


Figure 4: Future Chandler Boulevard Typical Section

Proposed Development Traffic

Two known developments within the study were also taken into consideration to determine the additional volume and capacity of the Interim Chandler Boulevard connection and roadway network within the study area.

The first development considered is the planned Taylor Morrison development called Promontory at Foothills West which consists of 110 single-family dwelling units (lots) located west of 32nd Lane.

The second development for consideration is the completion of the existing Calabrea community development. The Calabrea community development was originally planned for a total of 94 single-family dwelling units (lots). As part of the Loop 202 South Mountain Freeway right of way acquisition, 26 lots have been removed leaving a total of 68 lots *(94 lots–26 lots = 68 lots)*. Currently, Calabrea has 25 built and occupied lots. The traffic generated as part of these existing lots are included in the existing volumes collected. As such, a total of 43 new lots *(68 lots–25 lots = 43 lots)* are expected to be built and complete the development of the Calabrea community. The location of these two developments is shown on ***Figure 5*** on page 14.

No other developments are proposed in the study area except for the development of the future ASLD parcel directly to the South of Chandler Boulevard alignment. The development and timing of the ASLD parcel is unknown. When the ASLD parcel develops, it will be the developer's responsibility to build the remaining south half of Chandler Boulevard and Liberty Lane connection to accommodate the additional traffic generated by that development.

The Institute of Transportation Engineers' (ITE) *Trip Generation, 9th Edition*, was used to obtain daily and peak-hour trip generation rates and inbound-outbound percentages associated with the planned developments. The trip generation characteristics of the developments are summarized in ***Table 5****.*

Table 5: Projected Trip Generation

Land Use	ITE Code	Quantity	Units	Daily Total	AM Peak			PM Peak		
					In	Out	Total	In	Out	Total
Single-Family Detached Housing (Promontory)	210	110	DU's	1,048	21	62	83	69	41	110
Single-Family Detached Housing (Calabrea)	210	43	DU's	410	8	24	32	27	16	43
Total Trips				**1,458**	**29**	**86**	**115**	**96**	**57**	**153**

The planned developments are expected to generate 1,458 daily trips, with 115 trips occurring in the AM peak hour and 153 occurring in the PM peak hour.

Travel Patterns

Pecos Road will be removed sometime after the completion of the Chandler Boulevard connection as part of the Loop 202 South Mountain Freeway construction. The local traffic west of South Chandler Boulevard will use the Chandler Boulevard connection, from 27th Avenue to 19th Avenue, to access the existing roadway network east of 19th Avenue.

Traffic currently using Pecos Road west of 17th Avenue will be redistributed to the new Chandler Boulevard connection including traffic from the two residential developments previously discussed. The traffic volumes are shown on ***Figure 5*** on page 14.

Interim Capacity and Intersection Analysis (Chandler Connection in Place, Pecos Removed)

After estimating the trips for the two developments, re-distribution of existing traffic volumes, and assignment of development volumes, we were able to estimate the capacity of the roadway network within the study area.

Using the same analysis and methodology previously described, the interim traffic conditions were evaluated for each of the roadways within the study area. ***Table 6*** below provides a summary of the LOS for each of the roadway networks.

Table 6: Interim Roadway Segment Capacity and LOS

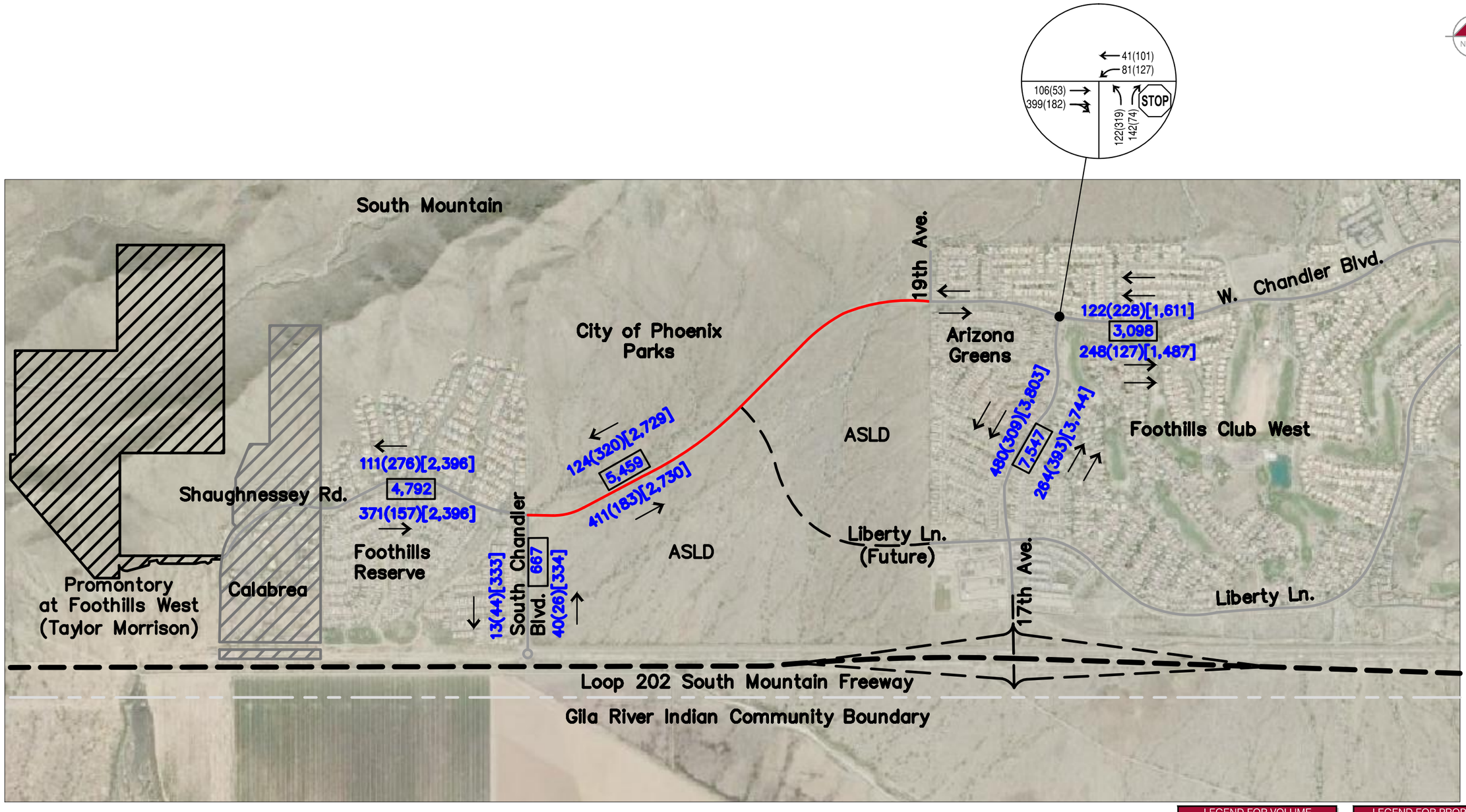
Roadway Segment		No. of Lanes	Daily Volume	LOS
17th Ave	Between Pecos Rd and Chandler Blvd	4	7,547	A / B
West Chandler Blvd	East of 17th Ave	4	3,098	A / B
West Chandler Blvd	Between 27th Ave and 19th Ave	2	5,459	A / B
Pecos Rd	Between South Chandler Blvd and 17th Ave	Removed N/A		
South Chandler Blvd	Between Cottonwood Ln and Shaughnessey Rd	2	667	A / B
Shaughnessey Rd	Between 31st Ln and South Chandler Blvd	2	4,792	A / B

All roadway segments within the study area are expected to operate at LOS B or better during the interim condition.

In addition, as shown in ***Table 7,*** the Chandler Boulevard and 17th Avenue intersection is anticipated to operate at an acceptable LOS during the AM and PM peak hours under the interim conditions.

Table 7: Chandler Boulevard and 17th Avenue Interim LOS

Intersection	NB		WB	Intersection LOS
	L	R	L	
AM Peak	B	B	A	B
PM Peak	D	A	A	C



LEGEND FOR VOLUME

XXX	AM VOLUME
(XXX)	PM VOLUME
[XXX]	DIRECTIONAL DAILY VOLUMES
XXX	TOTAL TWO-WAY DAILY VOLUMES

LEGEND FOR PROPOSED

- EXISTING ROADWAY
- PROPOSED LOOP 202 SOUTH MOUNTAIN FWY
- GILA RIVER RIGHT OF WAY
- PROPOSED DEVELOPMENT (PROMONTORY)
- CALABREA RESIDENTIAL
- FUTURE ROADWAY
- PROPOSED ROADWAY
- LANE CONFIGURATION

Figure 5
Interim Roadway Network and Total Traffic Conditions

FUTURE YEAR 2025 AND 2035 TRAFFIC CONDITIONS

The year 2025 and 2035 traffic conditions are described as the build-out of Chandler Boulevard, from 27th Avenue to 19th Avenue, removal of Pecos Road, from South Chandler Boulevard to 17th Avenue, completion of the Loop 202 South Mountain Regional Freeway, and consists of planned years 2025 and 2035 traffic volume projections obtained from the MAG regional travel demand model completed for the Loop 202 South Mountain Freeway.

The MAG regional planning model accounts for planned land uses, infrastructure improvements, economic growth and population growth for the Maricopa County region. The model evaluated Chandler Boulevard west of 19th Avenue as a two lane rather than a four lane. As development occurs, the City of Phoenix would require Chandler Boulevard to be improved to the four lane. This would provide additional capacity with the increased growth and development.

Future year traffic conditions were evaluated for each of the roadways within the project limits. ***Table 8*** provides a summary of the LOS for each of the roadway networks. The volumes were provided by the MAG Regional Travel Demand Model developed as part of the ADOT Loop 202 South Mountain freeway evaluation.

Table 8: Future Roadway Segment Capacity Analysis

Roadway Segment		No. of Lanes	2025		2035	
			Daily[1] Volume	LOS	Daily[1] Volume	LOS
17th Ave	Between Pecos Rd and Chandler Blvd	4	24,126	C	26,812	C
West Chandler Blvd	Between 17th Ave and Desert Foothills Pkwy	4	4,779	B	8,284	B
West Chandler Blvd	Between South Chandler Blvd and 19th Ave	4[2]	11,181	B	13,865	B

Note:

1. *Future year 2025 and 2035 traffic volumes and capacity provided by HDR, Inc. and completed as part of the ADOT Loop 202 South Mountain MAG Regional Travel Demand Model.*
2. *MAG model was evaluated using a 2-lane section. City of Phoenix would require the additional lanes be developed as development occurs within this area. For this reason, this section was analyzed as a four lane section.*

As shown in ***Table 8*****,** Chandler Boulevard operate at a LOS B in 2025 and 2035. The intersection of 17th Avenue and Chandler Boulevard capacity and traffic control needs will be monitored by the City of Phoenix as development grows in the study area.

SAFETY

The Chandler Boulevard connection is being designed in accordance with City of Phoenix Standard Details, the City of Phoenix Administrative Procedure No. 155 (AP-155), Project Development Requirements and Guidelines, as well as the AASHTO Policy on Geometric Design of Highways and Streets. The AASHTO Policy provides design standards and guidelines that are nationally used and accepted with the intent of balancing safety and

mobility. The criteria used in association with the design of Chandler Boulevard connection is provided in Table 9 on the following page.

Table 9: Chandler Boulevard Design Criteria and Safety Features

Design Speed	45 mph
Posted Speed	35 mph
Street Classification	Urban Arterial (AASHTO Low-Speed Urban)
City of Phoenix Typical Section	Cross Section D
Lane Widths	12' (AASHTO recommends 10'-12')
Bike Lane Widths	6' (AASHTO recommends 4'-6')
Side Slopes	4:1 (AP-155)
Minimum Longitudinal Grade	0.20% (AP-155)
Maximum Longitudinal Grade	3% Desirable, 6% Maximum (AP-155)
Maximum Grade Break	1.0% (AP-155)
Minimum Horizontal Curve Radius	1,039-ft (AASHTO Low-Speed Urban)
Additional Safety Features	• Street Lighting on north side • End treatments at bridge locations • 3-way stop at the intersection of West Chandler Blvd & South Chandler Blvd • Advance warning signs east of 19th Ave

Through coordination with the City of Phoenix Police and Fire Department they have deemed the interim typical roadway section adequate for necessary functional operations. The fire station that serves the community within the study area is located on Chandler Boulevard east of Desert Foothills Parkway. Typical response times is under five minutes. Currently, the Phoenix Fire Department travels approximately 4.6 miles to gain access to the community west of South Chandler Boulevard. With the Chandler Boulevard connection the Phoenix Fire Department will travel approximately 4.3 miles to gain access to the community on the west. This reduction in travel distance will assist with improving response times.

CONCLUSIONS

Existing Traffic Conditions:

The existing conditions consist of the existing traffic volumes and current roadway geometry and network (without the Chandler Boulevard connection). This evaluation is necessary to establish the baseline and understanding the existing volumes and capacity. Results of this analysis indicate the following:

- All roadways within the project limits currently operate at LOS of B or better.
- Intersection of 17th Avenue and Chandler Boulevard operates at LOS of A in both the AM and PM peak hours of the day.
- Pecos Road, which currently serves as the main point of access to and from the community west of 17th Avenue, operates at an existing LOS of B.

Interim Traffic Condition:

The interim conditions is defined as the period when the Chandler Boulevard connection is built, Pecos Road is removed, and consists of the traffic generated from the build out of Calabrea and Promontory at Foothills West developments. Results indicate the following:

- All roadways within the project limits will operate at LOS of B or better.
- Intersection of 17th Avenue and Chandler Boulevard will operate at LOS B during the AM peak hour and LOS of C during the PM peak hour.
- Chandler Boulevard connection, which will replace the Pecos Road local access between 27th Avenue and 19th Avenue, will operate at LOS of B.

Future Years 2025 and 2035 Traffic Condition:

The future conditions is defined as the period when the Chandler Boulevard connection is built, removal of Pecos Road, completion of the Loop 202 South Mountain Regional Freeway, and consists of planned years 2025 and 2035 traffic volume projections obtained from the MAG regional travel demand model completed for the Loop 202 South Mountain Freeway. As growth and development occurs in the study area, the City of Phoenix will require Chandler Boulevard be built to a four-lane section. As such, the Chandler Boulevard connection was evaluated as a four-lane. Results indicate the following:

- 17th Avenue, between Pecos Road and Chandler Boulevard operates at LOS C in year 2025 and 2035.
- Chandler Boulevard, between 17th Avenue and Desert Foothills Parkway operates at LOS B in year 2025 and 2035.
- Chandler Boulevard, between South Chandler Boulevard and 19th Avenue will operate at LOS of B when developed and improved to a four lane section in year 2025 and 2035.

The intersection of 17th Avenue and Chandler Boulevard capacity and traffic control needs will be monitored by the City of Phoenix as development grows in the study area.

APPENDIX

Traffic Volumes

Highway Capacity LOS Output

City of Phoenix

Posted 2016/2017 Volume Map

StudyID: 14219

* Location : **On CHANDLER BLVD Between SHAUGHNESSEY RD & PEC**
* Site Number : **U0150H51**
* Source File Name : **U0150H51.txt**
* Interval : **15 Min.**
* Config : **00**

*** Direction : Northbound**

	Date	Tue	Wed	Thu	Fri	Sat	Sun	Mon	
	Hour Period	02/09/16	02/10/16	02/11/16	02/12/16	02/13/16	02/14/16	02/15/16	Averages
AM	0000-0100	10	6						8.0
	0100-0200	2	8						5.0
	0200-0300	2	1						1.5
	0300-0400	6	2						4.0
	0400-0500	1	1						1.0
	0500-0600	9	10						9.5
	0600-0700	22	29						25.5
	0700-0800	53	74						63.5
	0800-0900	99	88						93.5
	0900-1000	48	73						60.5
	1000-1100	72	71						71.5
	1100-1200	84	74						79.0
PM	1200-1300	90	126						108.0
	1300-1400	82	89						85.5
	1400-1500	101	147						124.0
	1500-1600	181	143						162.0
	1600-1700	181	181						181.0
	1700-1800	213	228						220.5
	1800-1900	218	198						208.0
	1900-2000	140	148						144.0
	2000-2100	127	129						128.0
	2100-2200	71	84						77.5
	2200-2300	47	39						43.0
	2300-2400	18	15						16.5
	Totals	1877	1964						1920.5
	12 hour (0700-1900)	1422	1492						1457.0
	16 hour (0600-2200)	1782	1882						1832.0
	18 hour (0600-2400)	1847	1936						1891.5
	24 hour (0000-2400)	1877	1964						1920.5
	AM Peak Hour:	8-9	8-9						8-9
	AM Peak Volume:	99	88						93.5
	PM Peak Hour:	18-19	17-18						17-18
	PM Peak Volume:	218	228						220.5

City of Phoenix

Posted 2016/2017 Volume Map

StudyID: 14219

* Location : **On CHANDLER BLVD Between SHAUGHNESSEY RD & PEC**
* Site Number : **U0150H52**
* Source File Name : **U0150H52.txt**
* Interval : **15 Min.**
* Config : **00**

*** Direction : Southbound**

	Date	Tue	Wed	Thu	Fri	Sat	Sun	Mon	
	Hour Period	02/09/16	02/10/16	02/11/16	02/12/16	02/13/16	02/14/16	02/15/16	Averages
AM	0000-0100	3	3						3.0
	0100-0200	1	2						1.5
	0200-0300	4	1						2.5
	0300-0400	6	7						6.5
	0400-0500	21	23						22.0
	0500-0600	55	60						57.5
	0600-0700	126	137						131.5
	0700-0800	316	317						316.5
	0800-0900	176	196						186.0
	0900-1000	114	119						116.5
	1000-1100	91	93						92.0
	1100-1200	84	98						91.0
PM	1200-1300	84	110						97.0
	1300-1400	75	101						88.0
	1400-1500	88	95						91.5
	1500-1600	121	105						113.0
	1600-1700	125	110						117.5
	1700-1800	104	125						114.5
	1800-1900	100	97						98.5
	1900-2000	43	43						43.0
	2000-2100	38	28						33.0
	2100-2200	20	27						23.5
	2200-2300	13	15						14.0
	2300-2400	6	6						6.0
	Totals	1814	1918						1866.0
	12 hour (0700-1900)	1478	1566						1522.0
	16 hour (0600-2200)	1705	1801						1753.0
	18 hour (0600-2400)	1724	1822						1773.0
	24 hour (0000-2400)	1814	1918						1866.0
	AM Peak Hour:	7-8	7-8						7-8
	AM Peak Volume:	316	317						316.5
	PM Peak Hour:	16-17	17-18						16-17
	PM Peak Volume:	125	125						117.5

City of Phoenix

Posted 2016/2017 Volume Map

StudyID: 14218

* Location : **On PECOS RD Between 17TH AVE & CHANDLER BLVD**
* Site Number : **U0148F83**
* Source File Name : **U0148F83.txt**
* Interval : **15 Min.**
* Config : **00**

*** Direction : Eastbound**

	Date	Tue	Wed	Thu	Fri	Sat	Sun	Mon	
	Hour Period	02/09/16	02/10/16	02/11/16	02/12/16	02/13/16	02/14/16	02/15/16	Averages
AM	0000-0100	3	3						3.0
	0100-0200	1	2						1.5
	0200-0300	6	1						3.5
	0300-0400	6	7						6.5
	0400-0500	21	22						21.5
	0500-0600	59	63						61.0
	0600-0700	140	137						138.5
	0700-0800	324	325						324.5
	0800-0900	186	201						193.5
	0900-1000	123	125						124.0
	1000-1100	100	113						106.5
	1100-1200	93	104						98.5
PM	1200-1300	92	123						107.5
	1300-1400	81	105						93.0
	1400-1500	95	117						106.0
	1500-1600	132	119						125.5
	1600-1700	131	117						124.0
	1700-1800	111	131						121.0
	1800-1900	104	100						102.0
	1900-2000	51	58						54.5
	2000-2100	40	30						35.0
	2100-2200	20	32						26.0
	2200-2300	14	15						14.5
	2300-2400	6	6						6.0
	Totals	1939	2056						1997.5
	12 hour (0700-1900)	1572	1680						1626.0
	16 hour (0600-2200)	1823	1937						1880.0
	18 hour (0600-2400)	1843	1958						1900.5
	24 hour (0000-2400)	1939	2056						1997.5
	AM Peak Hour:	7-8	7-8						7-8
	AM Peak Volume:	324	325						324.5
	PM Peak Hour:	15-16	17-18						15-16
	PM Peak Volume:	132	131						125.5

City of Phoenix

Posted 2016/2017 Volume Map

StudyID: 14218

* Location : **On PECOS RD Between 17TH AVE & CHANDLER BLVD**
* Site Number : **U0149N04**
* Source File Name : **U0149N04.txt**
* Interval : **15 Min.**
* Config : **00**

*** Direction : Westbound**

	Date	Tue	Wed	Thu	Fri	Sat	Sun	Mon	
	Hour Period	02/09/16	02/10/16	02/11/16	02/12/16	02/13/16	02/14/16	02/15/16	Averages
AM	0000-0100	10	8						9.0
	0100-0200	2	7						4.5
	0200-0300	4	2						3.0
	0300-0400	5	1						3.0
	0400-0500	1	1						1.0
	0500-0600	21	12						16.5
	0600-0700	25	28						26.5
	0700-0800	54	82						68.0
	0800-0900	104	85						94.5
	0900-1000	51	83						67.0
	1000-1100	80	81						80.5
	1100-1200	87	78						82.5
PM	1200-1300	96	137						116.5
	1300-1400	88	103						95.5
	1400-1500	109	158						133.5
	1500-1600	179	145						162.0
	1600-1700	183	189						186.0
	1700-1800	216	234						225.0
	1800-1900	218	196						207.0
	1900-2000	147	164						155.5
	2000-2100	127	131						129.0
	2100-2200	72	85						78.5
	2200-2300	44	39						41.5
	2300-2400	18	15						16.5
	Totals	1941	2064						2002.5
	12 hour (0700-1900)	1465	1571						1518.0
	16 hour (0600-2200)	1836	1979						1907.5
	18 hour (0600-2400)	1898	2033						1965.5
	24 hour (0000-2400)	1941	2064						2002.5
	AM Peak Hour:	8-9	8-9						8-9
	AM Peak Volume:	104	85						94.5
	PM Peak Hour:	18-19	17-18						17-18
	PM Peak Volume:	218	234						225.0

City of Phoenix

Posted 2016/2017 Volume Map

StudyID: 14220

* Location : **On SHAUGHNESSEY RD Between CHANDLER BLVD & 31S**
* Site Number : **U0151I33**
* Source File Name : **U0151I33.txt**
* Interval : **15 Min.**
* Config : **00**

*** Direction : Eastbound**

	Date	Tue	Wed	Thu	Fri	Sat	Sun	Mon	
	Hour Period	02/09/16	02/10/16	02/11/16	02/12/16	02/13/16	02/14/16	02/15/16	Averages
AM	0000-0100	2	2						2.0
	0100-0200	0	3						1.5
	0200-0300	3	0						1.5
	0300-0400	3	3						3.0
	0400-0500	12	14						13.0
	0500-0600	24	29						26.5
	0600-0700	67	56						61.5
	0700-0800	144	163						153.5
	0800-0900	86	93						89.5
	0900-1000	55	62						58.5
	1000-1100	42	50						46.0
	1100-1200	52	53						52.5
PM	1200-1300	45	55						50.0
	1300-1400	47	57						52.0
	1400-1500	46	55						50.5
	1500-1600	57	51						54.0
	1600-1700	67	61						64.0
	1700-1800	66	66						66.0
	1800-1900	50	57						53.5
	1900-2000	24	31						27.5
	2000-2100	24	15						19.5
	2100-2200	11	14						12.5
	2200-2300	10	7						8.5
	2300-2400	2	3						2.5
	Totals	939	1000						969.5
	12 hour (0700-1900)	757	823						790.0
	16 hour (0600-2200)	883	939						911.0
	18 hour (0600-2400)	895	949						922.0
	24 hour (0000-2400)	939	1000						969.5
	AM Peak Hour:	7-8	7-8						7-8
	AM Peak Volume:	144	163						153.5
	PM Peak Hour:	16-17	17-18						17-18
	PM Peak Volume:	67	66						66.0

City of Phoenix

Posted 2016/2017 Volume Map

StudyID: 14220

* Location : **On SHAUGHNESSEY RD Between CHANDLER BLVD & 31S**
* Site Number : **U0151I34**
* Source File Name : **U0151I34.txt**
* Interval : **15 Min.**
* Config : **00**

*** Direction : Westbound**

	Date	Tue	Wed	Thu	Fri	Sat	Sun	Mon	
	Hour Period	02/09/16	02/10/16	02/11/16	02/12/16	02/13/16	02/14/16	02/15/16	Averages
AM	0000-0100	5	2						3.5
	0100-0200	1	5						3.0
	0200-0300	1	1						1.0
	0300-0400	1	2						1.5
	0400-0500	0	0						0.0
	0500-0600	5	3						4.0
	0600-0700	10	12						11.0
	0700-0800	23	39						31.0
	0800-0900	44	38						41.0
	0900-1000	29	41						35.0
	1000-1100	38	35						36.5
	1100-1200	44	48						46.0
PM	1200-1300	54	62						58.0
	1300-1400	41	49						45.0
	1400-1500	50	74						62.0
	1500-1600	93	70						81.5
	1600-1700	88	88						88.0
	1700-1800	115	104						109.5
	1800-1900	101	103						102.0
	1900-2000	63	57						60.0
	2000-2100	68	71						69.5
	2100-2200	35	45						40.0
	2200-2300	23	17						20.0
	2300-2400	8	6						7.0
	Totals	940	972						956.0
	12 hour (0700-1900)	720	751						735.5
	16 hour (0600-2200)	896	936						916.0
	18 hour (0600-2400)	927	959						943.0
	24 hour (0000-2400)	940	972						956.0
	AM Peak Hour:	11-12	11-12						11-12
	AM Peak Volume:	44	48						46.0
	PM Peak Hour:	17-18	17-18						17-18
	PM Peak Volume:	115	104						109.5

City of Phoenix

Posted 2012/2013 Volume Map

StudyID: 9833

* Location : **On 17TH AVE Between CHANDLER BLVD & LIBERTY LN**
* Site Number : **B0010I51**
* Source File Name : **B0010I51.TXT**
* Interval : **15 Min.**
* Config : **00**

*** Direction : Northbound**

	Date	Wed	Thu	Fri	Sat	Sun	Mon	Tue	
	Hour Period	10/26/11	10/27/11	10/28/11	10/29/11	10/30/11	10/31/11	11/01/11	Averages
AM	0000-0100		2	8					5.0
	0100-0200		2	3					2.5
	0200-0300		1	2					1.5
	0300-0400		4	2					3.0
	0400-0500		3	2					2.5
	0500-0600		17	8					12.5
	0600-0700		50	43					46.5
	0700-0800		115	120					117.5
	0800-0900		93	98					95.5
	0900-1000		82	78					80.0
	1000-1100		62	67					64.5
	1100-1200		77	71					74.0
PM	1200-1300		71	95					83.0
	1300-1400	84	60	63					69.0
	1400-1500	70	82	92					81.3
	1500-1600	99	119	102					106.7
	1600-1700	120	115	130					121.7
	1700-1800	116	147	142					135.0
	1800-1900	136	134	100					123.3
	1900-2000	84	73	56					71.0
	2000-2100	77	78	65					73.3
	2100-2200	43	60	54					52.3
	2200-2300	25	40	57					40.7
	2300-2400	13	22	31					22.0
	Totals	867	1509	1489					1484.3
	12 hour (0700-1900)	625	1157	1158					980.0
	16 hour (0600-2200)	829	1418	1376					1207.7
	18 hour (0600-2400)	867	1480	1464					1270.3
	24 hour (0000-2400)	867	1509	1489					1288.3
	AM Peak Hour:		7-8	7-8					7-8
	AM Peak Volume:		115	120					117.5
	PM Peak Hour:	18-19	17-18	17-18					17-18
	PM Peak Volume:	136	147	142					135.0

City of Phoenix

Posted 2012/2013 Volume Map

StudyID: 9833

* Location : **On 17TH AVE Between CHANDLER BLVD & LIBERTY LN**
* Site Number : **B0011G42**
* Source File Name : **B0011G42.TXT**
* Interval : **15 Min.**
* Config : **00**

*** Direction : Southbound**

	Date	Wed	Thu	Fri	Sat	Sun	Mon	Tue	
	Hour Period	10/26/11	10/27/11	10/28/11	10/29/11	10/30/11	10/31/11	11/01/11	Averages
AM	0000-0100		5	6					5.5
	0100-0200		0	3					1.5
	0200-0300		0	3					1.5
	0300-0400		3	4					3.5
	0400-0500		11	10					10.5
	0500-0600		42	38					40.0
	0600-0700		118	107					112.5
	0700-0800		150	159					154.5
	0800-0900		120	108					114.0
	0900-1000		97	92					94.5
	1000-1100		89	82					85.5
	1100-1200		75	75					75.0
PM	1200-1300		77	79					78.0
	1300-1400	68	60	91					73.0
	1400-1500	96	79	91					88.7
	1500-1600	87	113	107					102.3
	1600-1700	119	134	107					120.0
	1700-1800	124	131	120					125.0
	1800-1900	116	93	95					101.3
	1900-2000	65	68	67					66.7
	2000-2100	54	42	75					57.0
	2100-2200	43	40	49					44.0
	2200-2300	13	32	47					30.7
	2300-2400	13	18	27					19.3
	Totals	798	1597	1642					1604.5
	12 hour (0700-1900)	610	1218	1206					1011.3
	16 hour (0600-2200)	772	1486	1504					1254.0
	18 hour (0600-2400)	798	1536	1578					1304.0
	24 hour (0000-2400)	798	1597	1642					1345.7
	AM Peak Hour:		7-8	7-8					7-8
	AM Peak Volume:		150	159					154.5
	PM Peak Hour:	17-18	16-17	17-18					17-18
	PM Peak Volume:	124	134	120					125.0

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst:	*BS*
Agency/Co.:	*Kimley-Horn*
Date Performed:	*3/2/2016*
Analysis Time Period:	*AM Peak Hour*

Site Information

Intersection:	*Chandler Blvd and 17th Ave*
Jurisdiction:	*City of Phoenix*
Analysis Year:	*Existing*
Peak Hour Factor:	

Project Description: *191784003*

East/West Street: *Chandler Boulevard* | North/South Street: *17th Avenue*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound				Westbound			
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume (veh/h)			*65*	*29*		*81*	*29*	
Percent Heavy Vehicles		*0*	*0*	*0*		*0*	*0*	*0*
Median Type	*Two Way Left Turn Lane*							
Storage	*1*							
RT Channelized				*0*				*0*
Lanes	*0*		*2*	*0*		*1*	*1*	*0*
Configuration			*T*	*TR*		*L*	*T*	
Proportion Time Blocked								

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*10*		*142*			
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Left-Turn Lane Storage						
Percent Grade (%)	*0*			*0*		
Flared Approach			*N*			*N*
Storage			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			
Proportion Time Blocked						

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*94*	*11*		*165*			
C (m) (veh/h)		*1495*	*649*		*1019*			
v/c Ratio		*0.06*	*0.02*		*0.16*			
95% Queue Length		*0.20*	*0.05*		*0.58*			
Control Delay (s/veh)		*7.6*	*10.6*		*9.2*			
Movement LOS		*A*	*B*		*A*			
Approach Delay (s/veh)			*9.3*					
Approach LOS			*A*					

HCS+™ Version 5.6

Generated: 3/31/2016 6:11 PM

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst:	*BS*	Intersection:	*Chandler Blvd and 17th Ave*
Agency/Co.:	*Kimley-Horn*	Jurisdiction:	*City of Phoenix*
Date Performed:	*3/2/2016*	Analysis Year:	*Existing*
Analysis Time Period:	*PM Peak Hour*	Peak Hour Factor:	

Project Description: *191784003*

East/West Street: *Chandler Boulevard* | North/South Street: *17th Avenue*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound				Westbound			
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume (veh/h)			*35*	*15*		*127*	*69*	
Percent Heavy Vehicles		*0*	*0*	*0*		*0*	*0*	*0*
Median Type	*Two Way Left Turn Lane*							
Storage	*1*							
RT Channelized				*0*				*0*
Lanes	*0*		*2*	*0*		*1*	*1*	*0*
Configuration			*T*	*TR*		*L*	*T*	
Proportion Time Blocked								

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*31*		*74*			
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Left-Turn Lane Storage						
Percent Grade (%)	*0*			*0*		
Flared Approach			*N*			*N*
Storage			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			
Proportion Time Blocked						

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*135*	*32*		*78*			
C (m) (veh/h)		*1567*	*566*		*1056*			
v/c Ratio		*0.09*	*0.06*		*0.07*			
95% Queue Length		*0.28*	*0.18*		*0.24*			
Control Delay (s/veh)		*7.5*	*11.7*		*8.7*			
Movement LOS		*A*	*B*		*A*			
Approach Delay (s/veh)			*9.6*					
Approach LOS			*A*					

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Generated: 3/31/2016 6:14 PM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst:	*BS*
Agency/Co.:	*Kimley-Horn*
Date Performed:	*3/2/2016*
Analysis Time Period:	*AM Peak Hour*

Site Information

Intersection:	*Chandler Blvd and 17th Ave*
Jurisdiction:	*City of Phoenix*
Analysis Year:	*Interim*
Peak Hour Factor:	

Project Description: *191784003*

East/West Street: *Chandler Boulevard* | North/South Street: *17th Avenue*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound				Westbound			
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume (veh/h)			*106*	*399*		*81*	*41*	
Percent Heavy Vehicles		*0*	*0*	*0*		*0*	*0*	*0*
Median Type	*Two Way Left Turn Lane*							
Storage	*1*							
RT Channelized				*0*				*0*
Lanes	*0*		*2*	*0*		*1*	*1*	*0*
Configuration			*T*	*TR*		*L*	*T*	
Proportion Time Blocked								

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*122*		*142*			
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Left-Turn Lane Storage						
Percent Grade (%)	*0*			*0*		
Flared Approach			*N*			*N*
Storage			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			
Proportion Time Blocked						

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*94*	*141*		*165*			
C (m) (veh/h)		*999*	*503*		*751*			
v/c Ratio		*0.09*	*0.28*		*0.22*			
95% Queue Length		*0.31*	*1.14*		*0.84*			
Control Delay (s/veh)		*9.0*	*14.9*		*11.1*			
Movement LOS		*A*	*B*		*B*			
Approach Delay (s/veh)			*12.9*					
Approach LOS			*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst:	*BS*	Intersection:	*Chandler Blvd and 17th Ave*
Agency/Co.:	*Kimley-Horn*	Jurisdiction:	*City of Phoenix*
Date Performed:	*3/2/2016*	Analysis Year:	*Interim*
Analysis Time Period:	*PM Peak Hour*	Peak Hour Factor:	

Project Description: *191784003*

East/West Street: *Chandler Boulevard* | North/South Street: *17th Avenue*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound				Westbound			
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume (veh/h)			*53*	*182*		*127*	*101*	
Percent Heavy Vehicles		*0*	*0*	*0*		*0*	*0*	*0*
Median Type	*Two Way Left Turn Lane*							
Storage	*1*							
RT Channelized				*0*				*0*
Lanes	*0*		*2*	*0*		*1*	*1*	*0*
Configuration			*T*	*TR*		*L*	*T*	
Proportion Time Blocked								

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*319*		*74*			
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Left-Turn Lane Storage						
Percent Grade (%)	*0*			*0*		
Flared Approach			*N*			*N*
Storage			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			
Proportion Time Blocked						

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*135*	*339*		*78*			
C (m) (veh/h)		*1328*	*506*		*932*			
v/c Ratio		*0.10*	*0.67*		*0.08*			
95% Queue Length		*0.34*	*4.93*		*0.27*			
Control Delay (s/veh)		*8.0*	*25.4*		*9.2*			
Movement LOS		*A*	*D*		*A*			
Approach Delay (s/veh)			*22.4*					
Approach LOS			*C*					