

Drainage Reports

Abbreviated Water & Sewer Need Reports

Water Study

Wastewater Study

Stormwater Waiver Application



TRAFFIC IMPACT MITIGATION ANALYSIS (TIMA)

SEC Scottsdale Road
and Chauncey Lane
Scottsdale, Arizona

Prepared for:

JLB Realty, LLC

Kimley»»Horn

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Prepared for:

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1.0 INTRODUCTON TO SUMMARY

1.1 REPORT PURPOSE AND TIMA OBJECTIVES

Kimley-Horn and Associates, Inc., has been retained by JLB Realty, LLC to perform the Traffic Impact and Mitigation Analysis (TIMA) for the proposed development.

This report documents a traffic impact and mitigation analysis performed supporting the rezoning of the project located on the southeast corner of the intersection of Scottsdale Road and Chauncey Lane in Scottsdale, Arizona. The site is currently zoned as Planned Community District (PCD) and is planned to be rezoned to incorporate residential land uses within the PCD.

The purpose of this study is to address traffic and transportation impacts of the proposed development on surrounding streets and intersections. This traffic impact and mitigation analysis was prepared based on criteria set forth by the City of Scottsdale, Category II study. The specific objectives of this study are:

- To evaluate lane requirements on all existing roadway links and at all existing intersections within the study area;
- To determine future level of service (LOS) for all existing intersections within the study area and recommend any capacity-related improvements;
- To determine necessary lane configurations at all new site driveways within the proposed development in order to provide acceptable levels of service;
- To evaluate the need for auxiliary lanes at all study area intersections; and
- To evaluate the need for future traffic signals.

1.2 PRINCIPAL FINDINGS AND RECOMMENDATIONS

The proposed development is expected to generate 5,544 daily trips, with 362 trips occurring in the AM peak hour and 436 trips occurring in the PM peak hour. To ensure that the estimate of traffic impacts is the maximum that can be expected, it is assumed that the site will be 100 percent occupied upon buildout in 2018.

Taking into consideration internal capture and pass-by trips, the proposed development is expected to add 4,828 new daily trips, 320 new AM peak hour trips, and 319 new PM peak hour trips to the roadway network.

The Scottsdale Road/Mayo Boulevard intersection currently operates at an undesirable LOS during the PM peak hour. Additionally, several eastbound and westbound movements operate at an undesirable LOS during the AM peak hour. Restriping the western most southbound through lane to a through/right-turn lane would provide a more desirable level of service.

The Scottsdale Road/Chauncey Lane intersection currently operates at an acceptable LOS during the AM and PM peak hours with the exception of the eastbound movements during the AM peak hour.

The existing Princess Boulevard/Cottage Terrace unsignalized intersection currently operates at an acceptable level of service during the AM and PM peak hours.

The unsignalized intersections in the study area are anticipated to operate at an acceptable level of service (LOS) in 2018 and 2023 with buildout of the proposed development.

The Scottsdale Road/Mayo Boulevard intersection will continue to operate at an undesirable LOS during the PM peak hour with several movements anticipated to operate at an undesirable LOS during the AM peak hour in 2018 and 2023 background conditions. To improve operations to an acceptable level of service with the exception of the eastbound left and right-turn movements and the westbound movements the following improvements are recommended due to background traffic conditions:

- Restripe the western most southbound through lane to a shared through/right lane
- Modify traffic signal timing to optimize each movement.

The Scottsdale Road/Chauncey Lane intersection is anticipated to continue to operate at an acceptable overall LOS during the AM and PM peak hours with the exception of the eastbound left and right-turn movements during the AM peak hour 2018 and 2023 background conditions.

The Scottsdale Road/Chauncey Lane intersection is anticipated to operate an unsatisfactory level of service in 2018 and 2023 with buildout of the proposed development. To improve operations to an acceptable level of service the following improvements are recommended due to 2028 and 2023 total traffic conditions:

- Provide left-turn phasing for the northbound and southbound approaches.
- Modify traffic signal timing to optimize each movement

The southbound left-turn storage at the Scottsdale Road/Chauncey Lane intersection does not currently provide the recommended storage capacity. The northbound and southbound approaches are configured for future dual left-turn lanes; therefore, it is recommended that the City of Scottsdale monitor traffic volumes at this intersection to determine the appropriate time to transition the northbound and southbound approaches to dual left-turn lanes. The westbound left-turn lane at the Scottsdale Road/Chauncey Lane intersection does not provide the recommended storage capacity for this movement. Median modifications could be considered to increase the left-turn storage.

It is recommended to construct a northbound right-turn deceleration lane at Driveway D1 to provide the standard right turn deceleration lane dimensions per City of Scottsdale Design Standards and Policies Manual Section 5-3.206.

2.0 PROPOSED DEVELOPMENT

2.1 SITE LOCATION

The proposed mixed-use development is located on the southeast corner of the intersection of Scottsdale Road and Chauncey Lane in Scottsdale, Arizona. The project location is shown in **Figure 1**.

2.2 LAND USE AND SITE PLAN

The overall development consists of 294 residential dwelling units, 33,050 square feet of retail land uses and 16,675 square feet of restaurant land uses. The total site area is on approximately 12.3 acres. **Table 1** illustrates the land use of the proposed development.

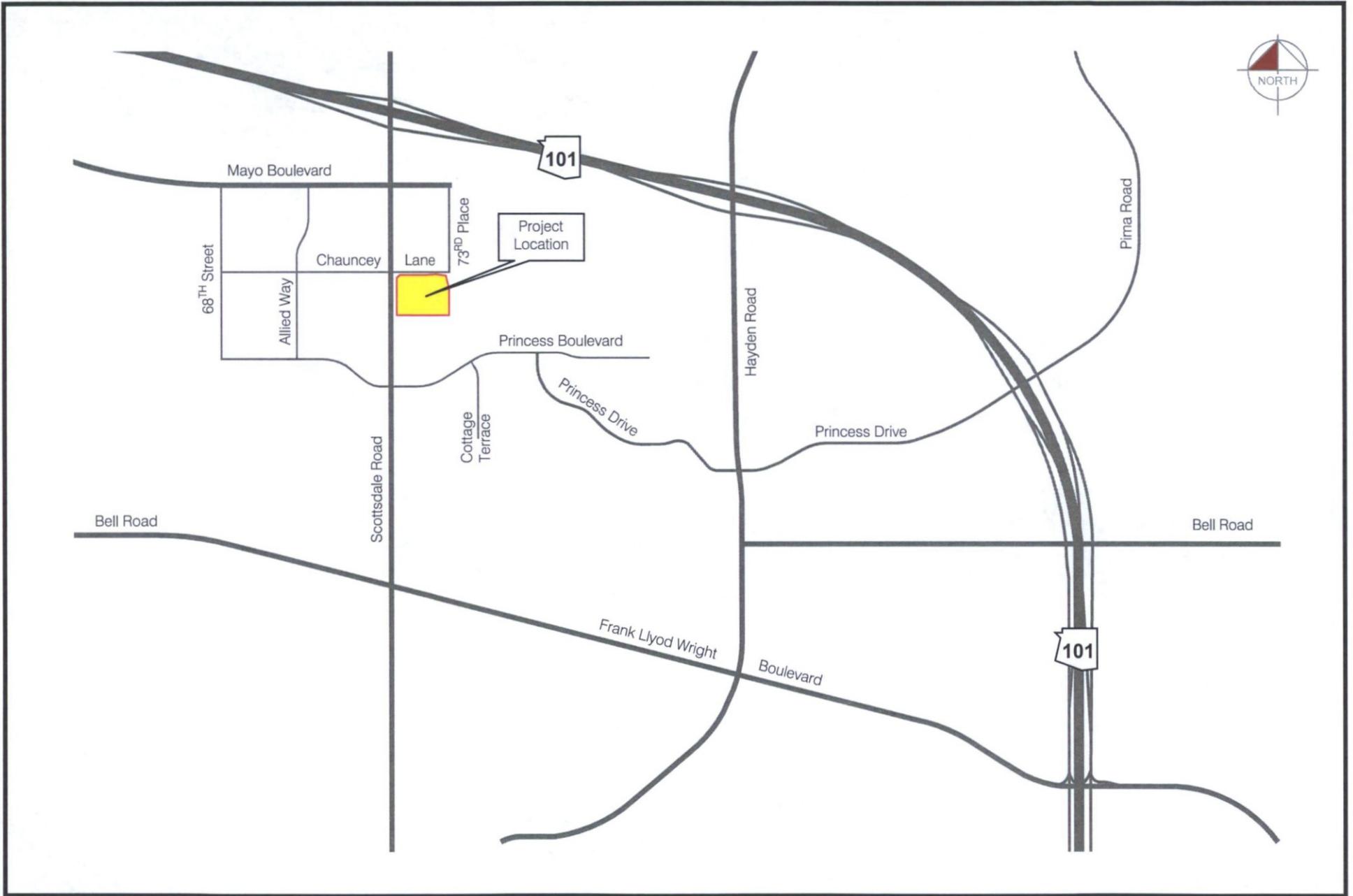
Table 1. Land Use

General Description	ITE Land Use	Size
Apartments	220	294 Dwelling Units
Specialty Retail Center	826	33,050 Square Feet
High-Turnover (Sit-Down) Restaurant	932	16,675 Square Feet

The site is located east of Scottsdale Road and south of Chauncey Lane in the City of Scottsdale, Arizona. The site is bound on the west by Scottsdale Road, to the north by Chauncey Lane, to the east and south by vacant state land. The retail and restaurant land uses are proposed to be located on the western portion of the site while the residential land use is proposed to be located on the eastern portion of the site. The layout of the site is illustrated in **Figure 2**.

2.3 SITE ACCESSIBILITY

The site is accessed locally via Scottsdale Road, Chauncey Lane, and 73rd Place. Regional access is expected to be provided by Loop 101 and by other arterial streets in the vicinity such as Mayo Boulevard and Frank Lloyd Wright Boulevard. The Loop 101 runs east-west and is located approximately ½ mile north of the site via Scottsdale Road access. Approximately two miles east of the site, the Loop 101 runs north-south with access at Frank Lloyd Wright Boulevard.





PROJECT DATA - MIXED-USE RETAIL/RESIDENTIAL

ADDRESS: SEC SCOTTSDALE ROAD & CHAUNCEY LANE
SCOTTSDALE, AZ

APN: 215-07-004G

ZONING: PCD

LAND USE: MIXED USE COMMERCIAL/RESIDENTIAL

SITE AREA: 534,045 S.F.
12.26 GROSS ACRES

MIXED COMMERCIAL USE

BUILDING AREA:	
ENTERTAINMENT	25,000 S.F.
RETAIL / RESTAURANT	24,725 S.F.
TOTAL BUILDING AREA:	49,725 S.F.

PATIO DINING: TBD S.F.

REQUIRED PARKING:
COMMERCIAL MIXED USE (1/300) 49,725 S.F. 166 SPACES

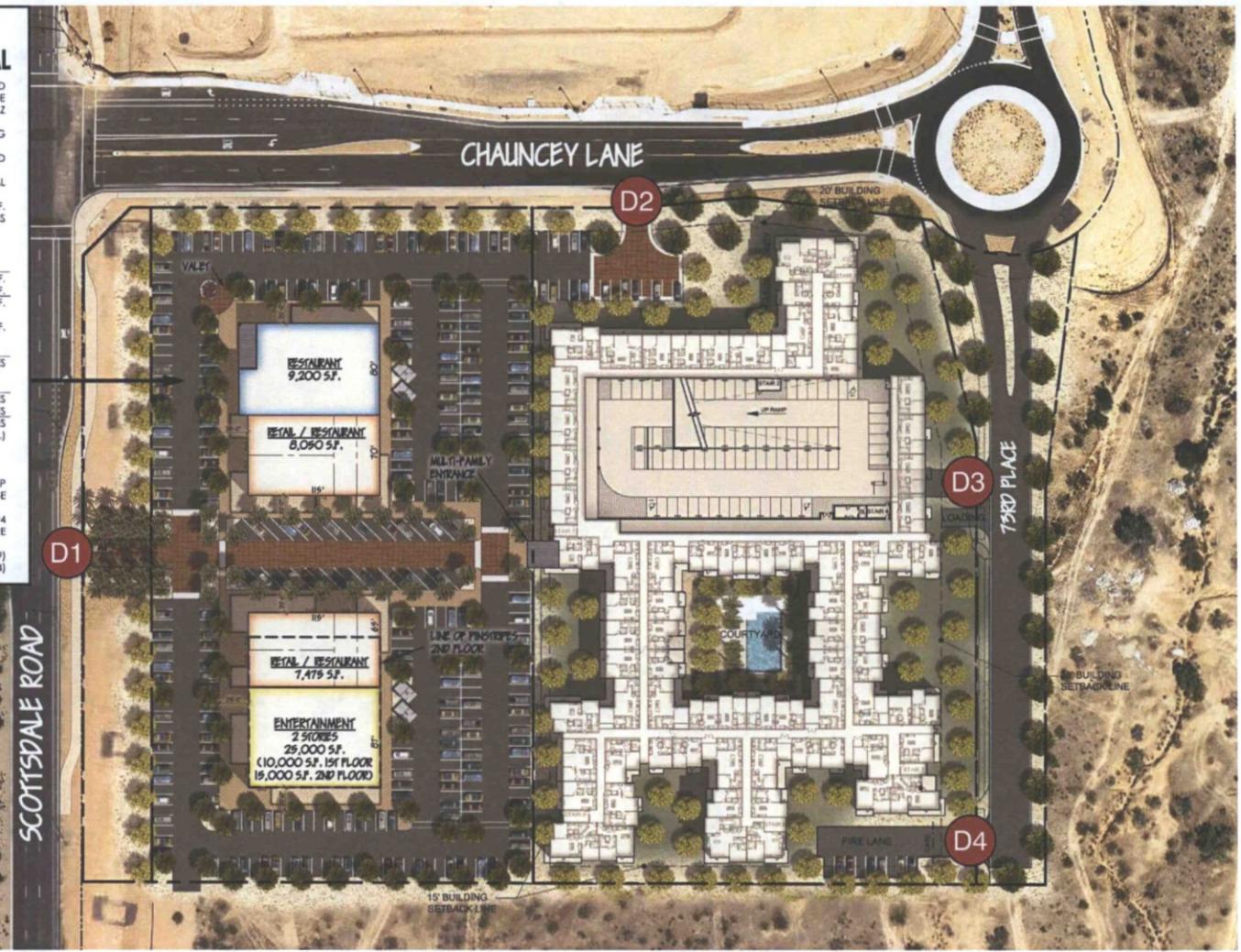
PROVIDED PARKING:
WEST PARCEL 339 SPACES
EAST PARCEL - SURFACE PARKING 19 SPACES
TOTAL PARKING PROVIDED 358 SPACES
(7.20 SPACES PER 1,000 S.F.)

MULTI-FAMILY

RESIDENTIAL: 4-STORY WRAP
5-STORY GARAGE

TOTAL UNITS: 294
PROPOSED DENSITY: 57.4 UNITS/ACRE

PARKING REQUIRED: 416 (1.49)
PARKING PROVIDED: 430 (1.54)



LEGEND	
	DRIVEWAYS

3.0 AREA CONDITIONS

3.1 STUDY AREA

The study area includes the intersections of Scottsdale Road/Mayo Boulevard, Scottsdale Road/Chauncey Lane, Chauncey Lane/73rd Place, Princess Boulevard/Cottage Terrace and the four site access driveways.

3.2 STUDY AREA LAND USE

The site is currently zoned PCD. The proposed project is a rezoning of the existing PCD zoning to include residential land uses. The eastern portion of the project is proposed to be occupied by the residential land use while the western portion of the site will be developed with retail land uses. The proposed zoning will remain PCD with amendments.

3.3 ADJACENT LAND USE

A mixed-use development consisting of residential, retail and a hotel land uses is currently under construction to the north of the site. To the east and west of the site is vacant state land. The site is bound on the west by Scottsdale Road.

3.4 EXISTING PHYSICAL CHARACTERISTICS

The existing roadway network within the study area includes Scottsdale Road, Chauncey Lane, Princess Boulevard, and 73rd Place. The existing intersection lane use and traffic control is shown in **Figure 3**.

Scottsdale Road extends north-south with three lanes in each direction. An existing raised median separates northbound and southbound traffic. Bicycle lanes exist on both sides of the roadway. Curb, gutter, and sidewalk exist on both sides of the roadway. The posted speed limit on Scottsdale Road in the vicinity of the site is 45 mph. The City of Scottsdale classifies Scottsdale Road as a Major Arterial – Urban roadway in the vicinity of the site.

Chauncey Lane extends east-west with one travel lane in each direction and bicycle lanes on the north side of the roadway. Curb, and gutter exist on both sides of the roadway while sidewalks exist on the north side of the roadway. There is no posted speed limit on Chauncey Lane in the vicinity of the site.

Princess Boulevard extends east-west with two travel lanes in each direction. An existing raised median separates eastbound and westbound traffic. Curb, and gutter exist on both sides of the roadway while sidewalks exist on the south side of the roadway. The posted speed limit on Princess Boulevard in the vicinity of the site is 30 mph. The City of Scottsdale classifies Princess Boulevard as a Major Collector –Urban roadway in the vicinity of the site.

73rd Place extends north-south with one travel lane in each direction. Curb, and gutter exist on both sides of the roadway while sidewalks exist on the west side of the roadway. There is no posted speed limit on 73rd Place in the vicinity of the site.

The existing intersections analyzed in this report are Scottsdale Road/Mayo Boulevard (signalized), Scottsdale Road/Chauncey Lane (signalized), and Princess Boulevard/Cottage Terrace (stop-controlled in the northbound direction).

3.5 TRAFFIC VOLUMES

Turning movement counts were collected at the intersections of Scottsdale Road/Mayo Boulevard, Scottsdale Road/Chauncey Lane, and Princess Boulevard/Cottage Terrace on Tuesday, March 15, 2016. The counts were performed between 7:00 AM and 9:00 AM and between 4:00 PM and 6:00 PM. The counts were then seasonally adjusted utilizing the City of Scottsdale’s monthly adjustment factors. The resulting adjusted existing traffic volume counts are shown in **Figure 3**. A copy of the counts is attached in the **Appendix**.

In addition to peak hour turning movement counts, 24-hour bidirectional counts were performed along Scottsdale Road south of Chauncey Lane. 24-hour volume counts were collected on Tuesday, March 15, 2016. 24-hour volume counts were then seasonally adjusted utilizing the City of Scottsdale’s monthly adjustment factors. A copy of the counts is attached in the **Appendix**.

3.6 LEVEL OF SERVICE

The LOS at the intersections of Scottsdale Road/Mayo Boulevard, Scottsdale Road/Chauncey Lane, and Princess Boulevard/Cottage Terrace was evaluated using the seasonally adjusted traffic counts collected on Tuesday, March 15, 2016. The LOS for the intersections was evaluated using the *2010 Highway Capacity Manual (HCM)* methodology for unsignalized and signalized intersections using *Synchro 9* analysis software and utilizing the existing signal timing data obtained from the City of Scottsdale. The existing intersection geometry and control, shown in **Figure 3**, was used to obtain the LOS. The results of this analysis are shown in **Table 2** and **Table 3**. LOS analysis worksheets are attached in the **Appendix**.

Table 2. Existing Level of Service: Unsignalized Intersections

Intersection	NB			SB			EB			WB		
	L	T	R	L	T	R	L	T	R	L	T	R
<i>Princess Boulevard and Cottage Terrace</i>												
AM Peak	B			-	-	-	-	-	-	A	-	-
PM Peak	B			-	-	-	-	-	-	A	-	-

The existing unsignalized Princess Boulevard/Cottage Terrace intersection currently operates at an acceptable level of service during the AM and PM peak hours.

Table 3. Existing Level of Service: Signalized Intersections

Intersection	NB			SB			EB			WB			Intersection LOS
	L	T	R	L	T	R	L	T	R	L	T	R	
<i>Scottsdale Road and Mayo Boulevard</i>													
AM Peak	C	B	A	D	C	D	D	D	E	E	E	E	C
PM Peak	C	C	B	D	D	F	F	D	E	E	E	C	E
<i>Scottsdale Road and Chauncey Lane</i>													
AM Peak	A	A	A	A	A	A	E	E	E	D	D	D	A
PM Peak	A	A	A	A	A	A	D	D	D	D	D	D	A

The Scottsdale Road/Mayo Boulevard intersection currently operates at an undesirable LOS during the PM peak hour. Additionally, several eastbound and westbound movements operate at an undesirable LOS during the AM peak hour. The Scottsdale Road/Chauncey Lane intersection currently operates at an acceptable LOS during the AM and PM peak hours with the exception of the eastbound movements during the AM peak hour.

Restriping the western most southbound through lane to a shared through/right lane at the Scottsdale Road/Mayo Boulevard intersection could mitigate the existing undesirable level of service; however, this would prevent a southbound bike lane from being provided in the future.

3.7 CRASH ANALYSIS

Crash data analysis pending data from the City of Scottsdale.

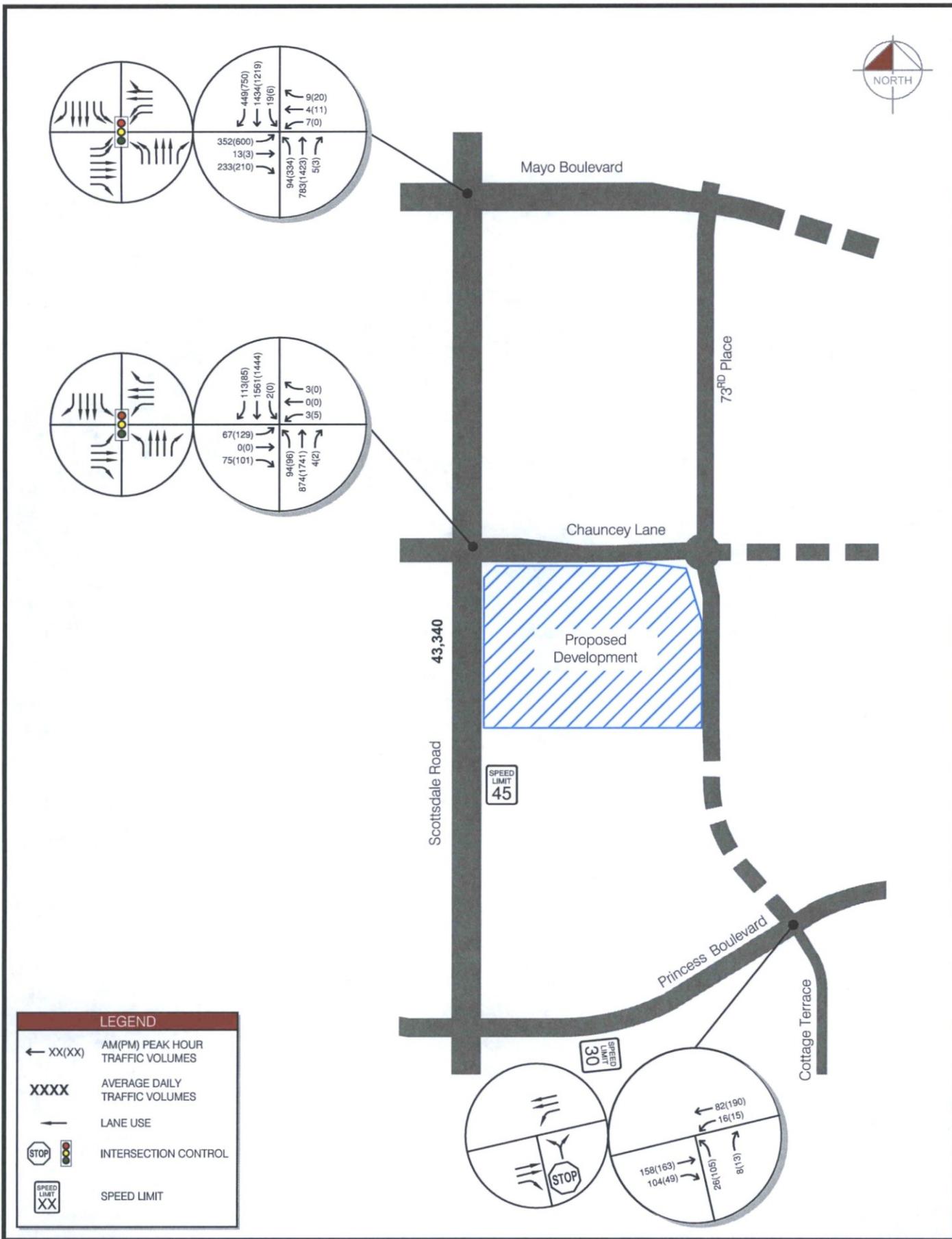


Figure 3
Existing Conditions

4.0 PROJECTED TRAFFIC

4.1 SITE TRAFFIC FORECASTS

4.1.1 TRIP GENERATION

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, which were then used to estimate the number of daily and peak hour trips that can be attributed to the proposed development. The trip generation characteristics of the site are summarized in **Table 4**. Trip generation calculations are attached in the **Appendix**.

Table 4. Project Trip Generation

Land Use	ITE Code	Quantity	Units	Daily Total	AM Peak			PM Peak		
					In	Out	Total	In	Out	Total
Apartments	220	294	DUs	1,956	30	120	150	118	64	182
Specialty Retail Center	826	33,050	SF	1,466	20	12	32	40	50	90
High-Turnover (Sit-Down) Restaurant	932	16,675	SF	2,122	99	81	180	98	66	164
Total Trips				5,544	149	213	362	256	180	436

The proposed development is expected to generate 5,544 daily trips, with 362 trips occurring in the AM peak hour and 436 trips occurring in the PM peak hour. To ensure that the estimate of traffic impacts is the maximum that can be expected, it is assumed that the site will be 100 percent occupied upon buildout in 2018. Owing to the mix of uses, trip reductions are anticipated and justified below.

4.1.3 TRIP REDUCTIONS

It is reasonable to expect that trip interaction will result considering the residential and retail uses. To account for this interaction, the methodology for estimating internally captured trips in the *ITE Trip Generation Handbook, June 2004*, Chapter 7 was used. The worksheets calculating internal capture using the ITE method and the resulting internal trip generation is located in the **Appendix**.

As documented in the ITE publication, *Trip Generation, 9th Edition*, restaurant land uses do not typically generate all new traffic on a roadway system. The total traffic generation is a combination of pass-by trips, or traffic drawn directly from the passing traffic flow on the adjacent streets, and primary trips, which represent new traffic drawn to the facility. In order to assess the pass-by trips, the data published in the *ITE Trip Generation Handbook* was used to estimate the pass-by percentages for the commercial parcels. It should be noted that pass-by trip reductions do not reduce driveway traffic volumes. Pass-by reductions are shown in the **Appendix**.

Taking into consideration internal capture and pass-by trips, the proposed development is expected to add 4,828 new daily trips, 320 new AM peak hour trips, and 319 new PM peak hour trips to the roadway network.

4.1.3 TRIP DISTRIBUTION AND TRAFFIC ASSIGNMENT

Distribution percentages for the site were developed using the existing turning movement counts at the study area intersections and a review of the anticipated 2018 and 2023 roadway network. Trips generated by the proposed development were assigned to the roadway network on the basis of the trip distribution shown in **Figure 4** and the likely travel patterns to and from the site.

Figure 5 shows the results of the traffic assignment based on the 2018 roadway network. Pass-by trips were assigned to the street system based on the anticipated use of the roadway facilities for users accessing the restaurant land uses within the site. Pass-by traffic is expected to use Scottsdale Road to access the proposed development. **Figure 6** shows the project assignment for pass-by trips. **Figure 7** shows the results of the total traffic assignment for the proposed development based on the 2018 roadway network.

Changes to the roadway network are anticipated by the 2023 horizon planning year. As a result, travel patterns to and from will reroute to utilize the future roadway network. It was assumed that the future roadway network would include connections to the east along Mayo Boulevard and Chauncey Lane. 73rd Place was also assumed to connect to Princess Boulevard and form the north leg of the Princess Boulevard/Cottage Terrace intersection. **Figure 8** shows the results of the traffic assignment utilizing the anticipated 2023 roadway network. **Figure 9** shows the project assignment for pass-by trips. **Figure 10** shows the results of the total traffic assignment for the proposed development based on the 2023 roadway network.

4.2 FUTURE TRAFFIC FORECASTING

To determine the future background traffic volumes for the buildout year 2018 and horizon year 2023 consideration was given to future adjacent development and the adjacent roadway traffic growth. A review of the surrounding area indicates that the majority of traffic growth can be attributed to future development with access along the roadway network within the study area.

A future mixed-use development located on the northeast corner of the Scottsdale Road/Chauncey Lane intersection is currently under construction. This mixed-use development consists of 187 apartment dwelling units, a 232 room hotel, approximately 11,800 square feet of general office land uses and 25,700 square feet of specialty retail land uses. At full buildout, the development on the northeast corner of the Scottsdale Road/Chauncey Lane intersection is anticipated to generate 4,410 daily trips, with 261 trips occurring in the AM peak hour and 343 trips occurring in the PM peak hour. It was assumed this development would be built out prior to 2018. Trip generation calculations for this development are included in the **Appendix**.

South of the proposed development is an Arizona State Land parcel. For purposes of this analysis it was assumed this state land parcel was bound by the proposed development to the north, 73rd Place to the east, Princess Boulevard to the south, and Scottsdale Road to the west. Currently there is no development plan in place for this parcel; however, it was assumed that it would develop with similar land uses as the proposed development. At full buildout, the state land parcel is anticipated to generate 6,034 daily trips, with 395 trips occurring in the AM peak hour and 475 trips occurring in the PM peak hour. It

was assumed this state land parcel would be built out prior to 2023. Trip generation calculations for this parcel is included in the **Appendix**.

To account for other future developments on the east side of 73rd Place and additional through traffic an additional 2,000 trips per day were assigned to 73rd Place and Chauncey Lane in the 2023 background conditions.

It is anticipated that the adjacent roadway network will experience traffic growth in addition to the future adjacent developments within the study area. To determine the additional growth in traffic, projected 2035 average daily traffic (ADT) volumes were obtained from the City of Scottsdale. Traffic generated by the proposed development and future adjacent developments previously described was subtracted from the 2035 ADT projections to determine a 2035 ADT background volume. 2016 existing 24-hour volumes were obtained from the traffic counts collected on Tuesday, March 15, 2016 and seasonally adjusted. **Table 5** shows the existing 2016 ADT, the 2035 ADT background volume, and the corresponding growth rate.

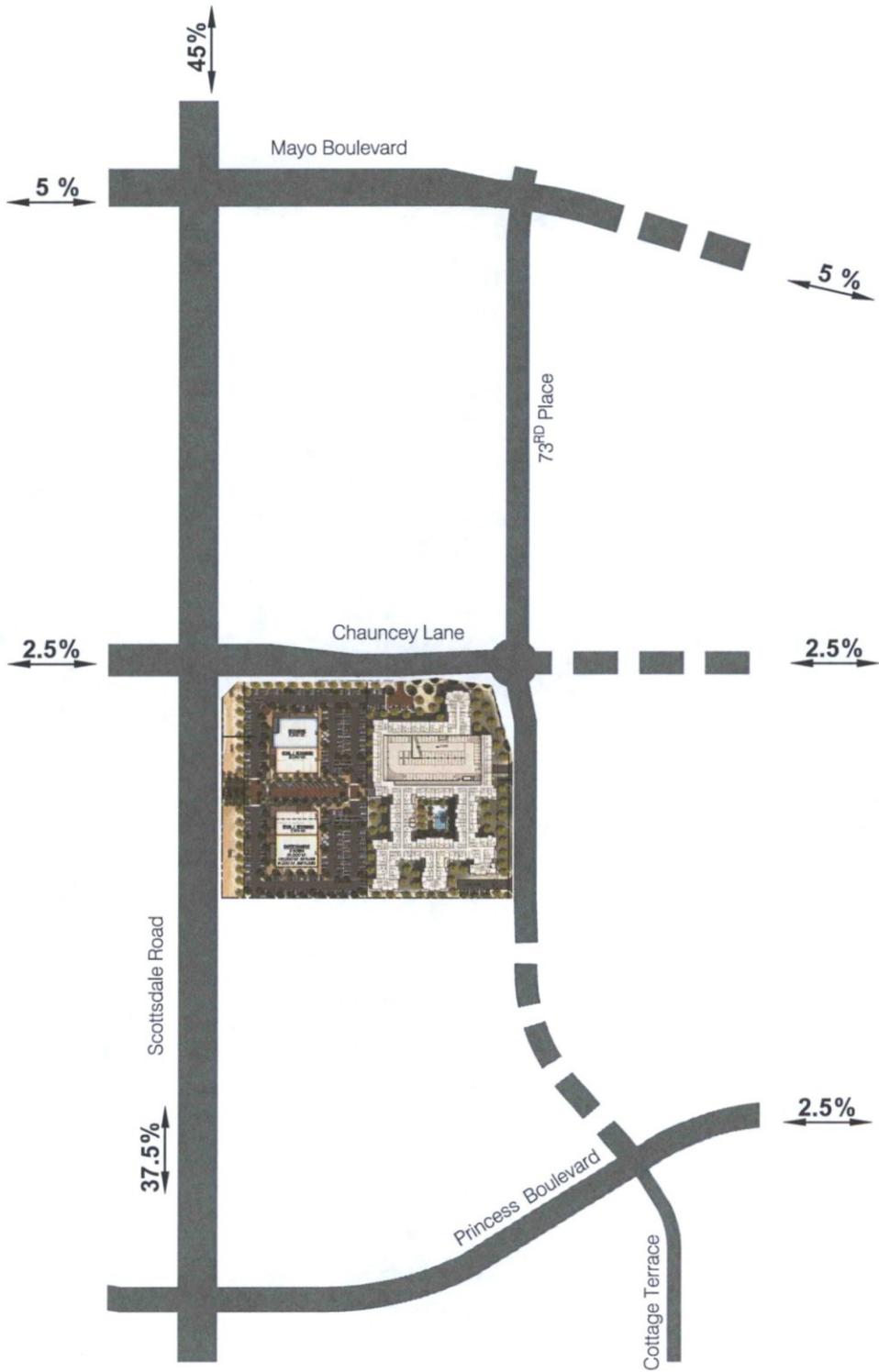
Table 5. Traffic Growth

Roadway	2016 ADT (vehicles per day, both directions)	2035 ADT (vehicles per day, both directions)	Average Annual Growth
Scottsdale Road (South of Chauncey Lane)	43,340	49,088	0.66%

On the basis of the above growth rate, an annual growth rate of 0.66 percent per year was applied to the seasonally adjusted existing turning movements to obtain the base background traffic volumes for the year 2018 and 2023. Anticipated adjacent development traffic was then added to the 2018 and 2023 base background traffic volumes to produce the 2018 and 2023 background traffic volumes. The resulting 2018 and 2023 background traffic volumes are shown in **Figure 11** and **Figure 12**, respectively.

4.3 TOTAL TRAFFIC

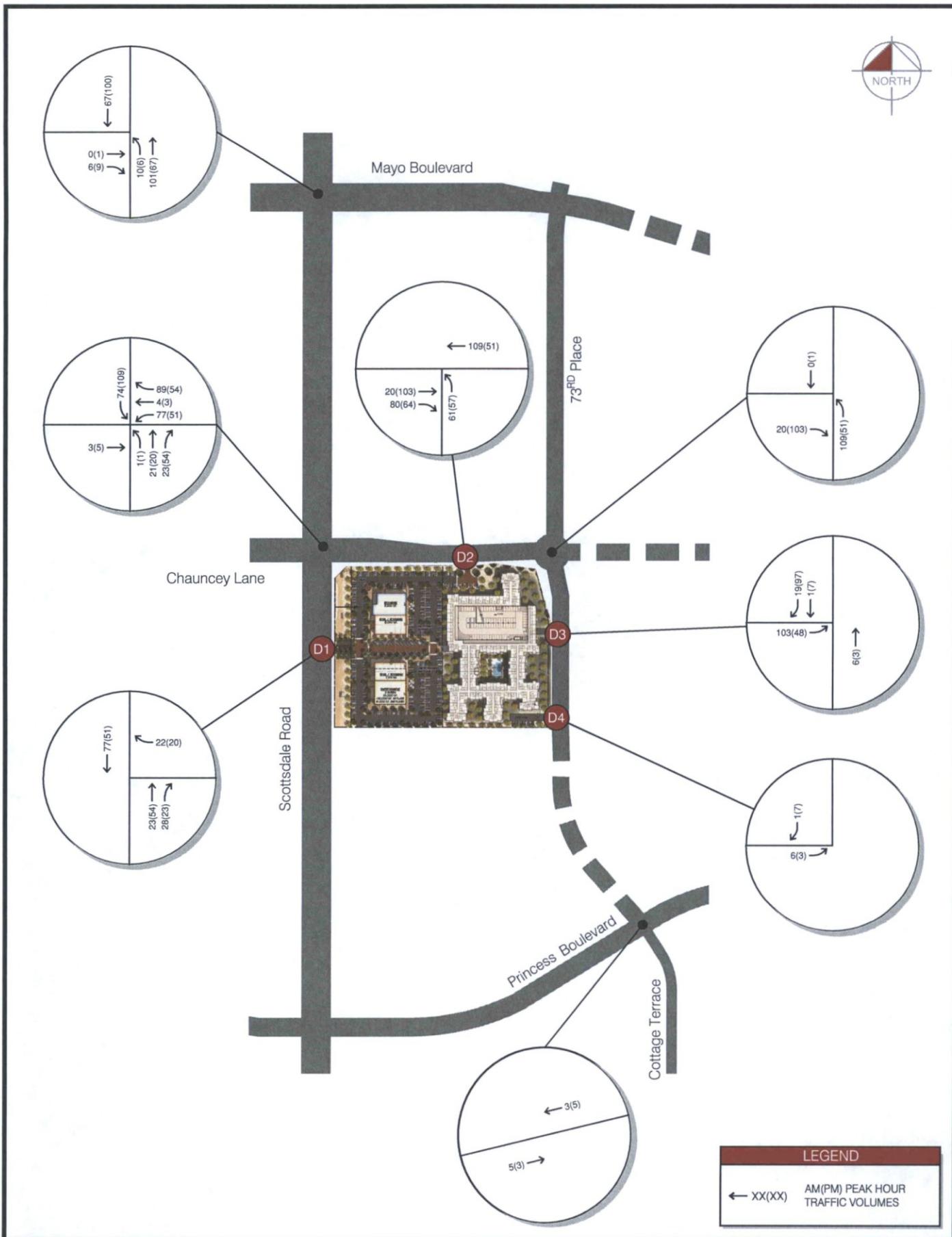
The results of the 2018 and 2023 total traffic assignment, shown in **Figure 7** and **Figure 10**, were added to the year 2018 and 2023 background traffic volumes, shown in **Figure 11** and **Figure 12**, to produce total traffic volumes for the study area. These total traffic volumes for 2018 and 2023 are shown in **Figure 13** and **Figure 14**, respectively.

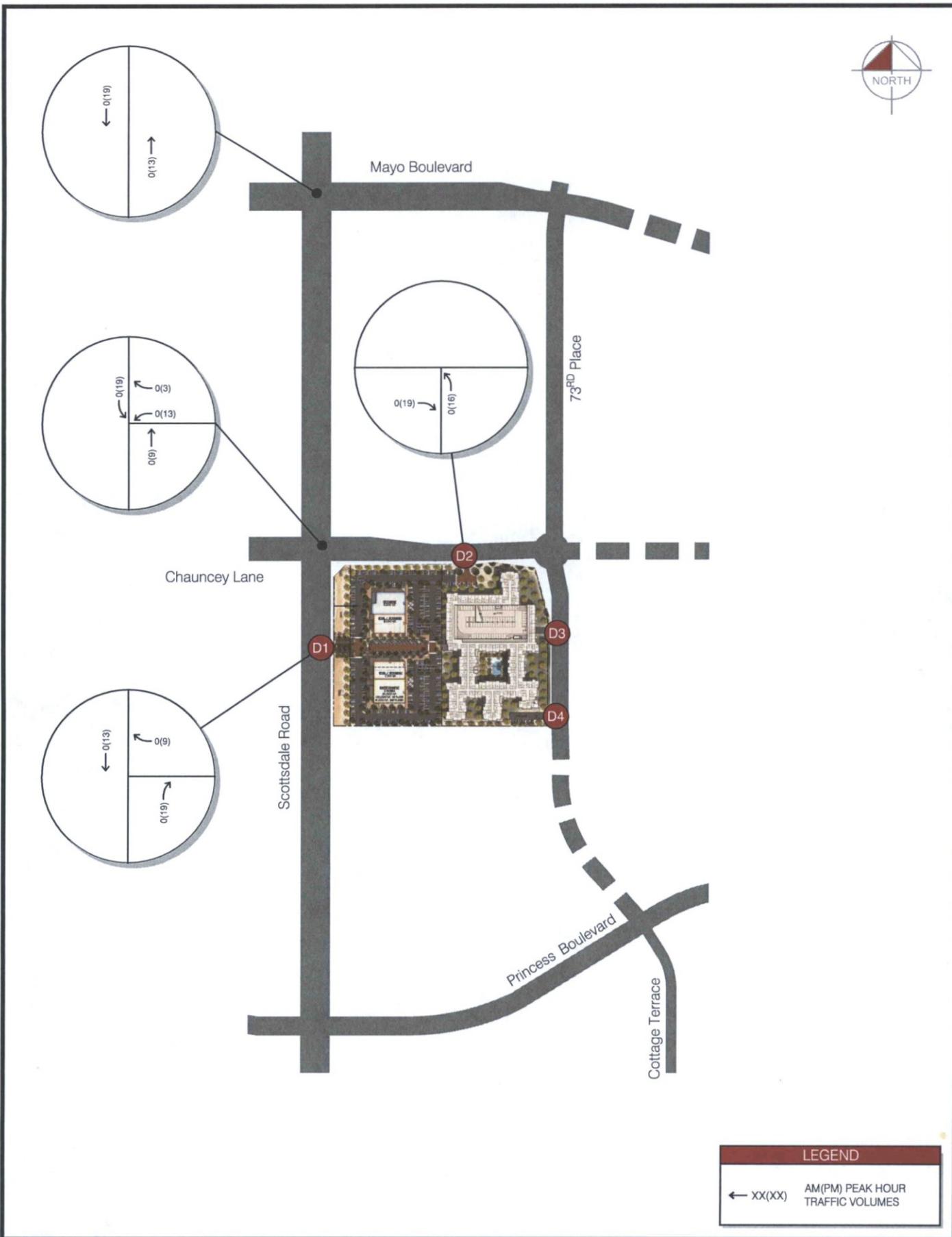


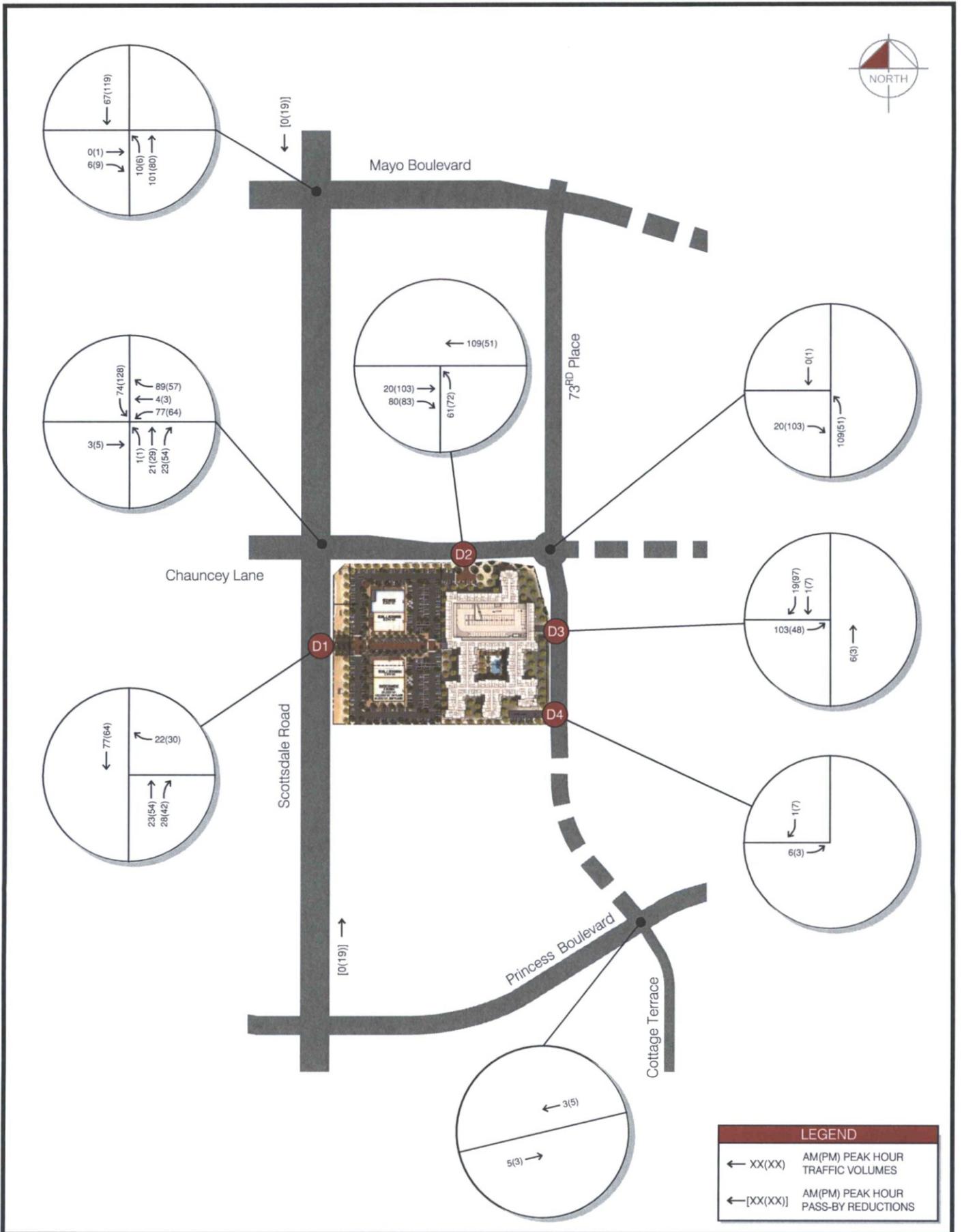
LEGEND

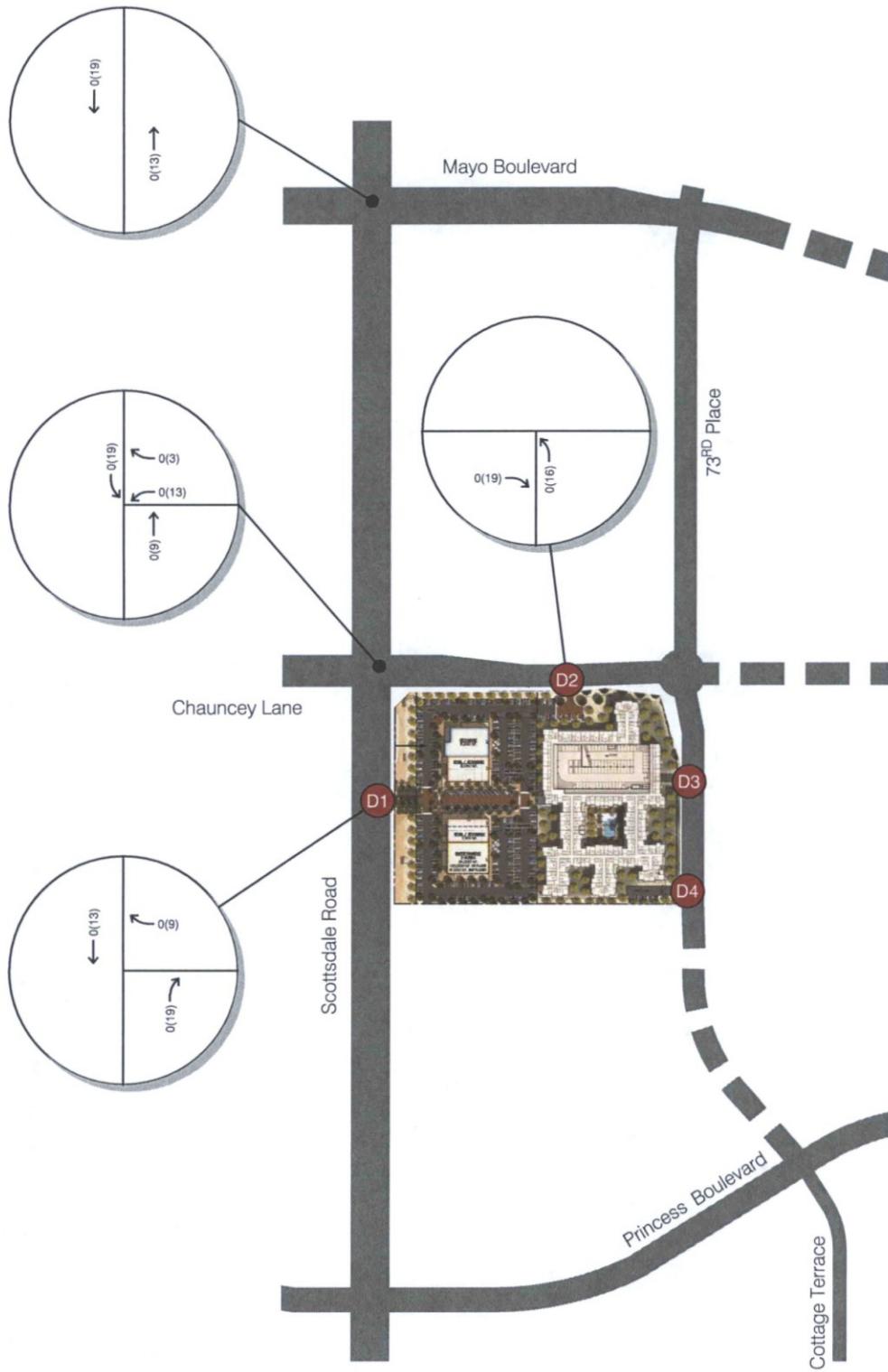
XX% DISTRIBUTION OF PROJECT TRIPS

Figure 4
Trip Distribution

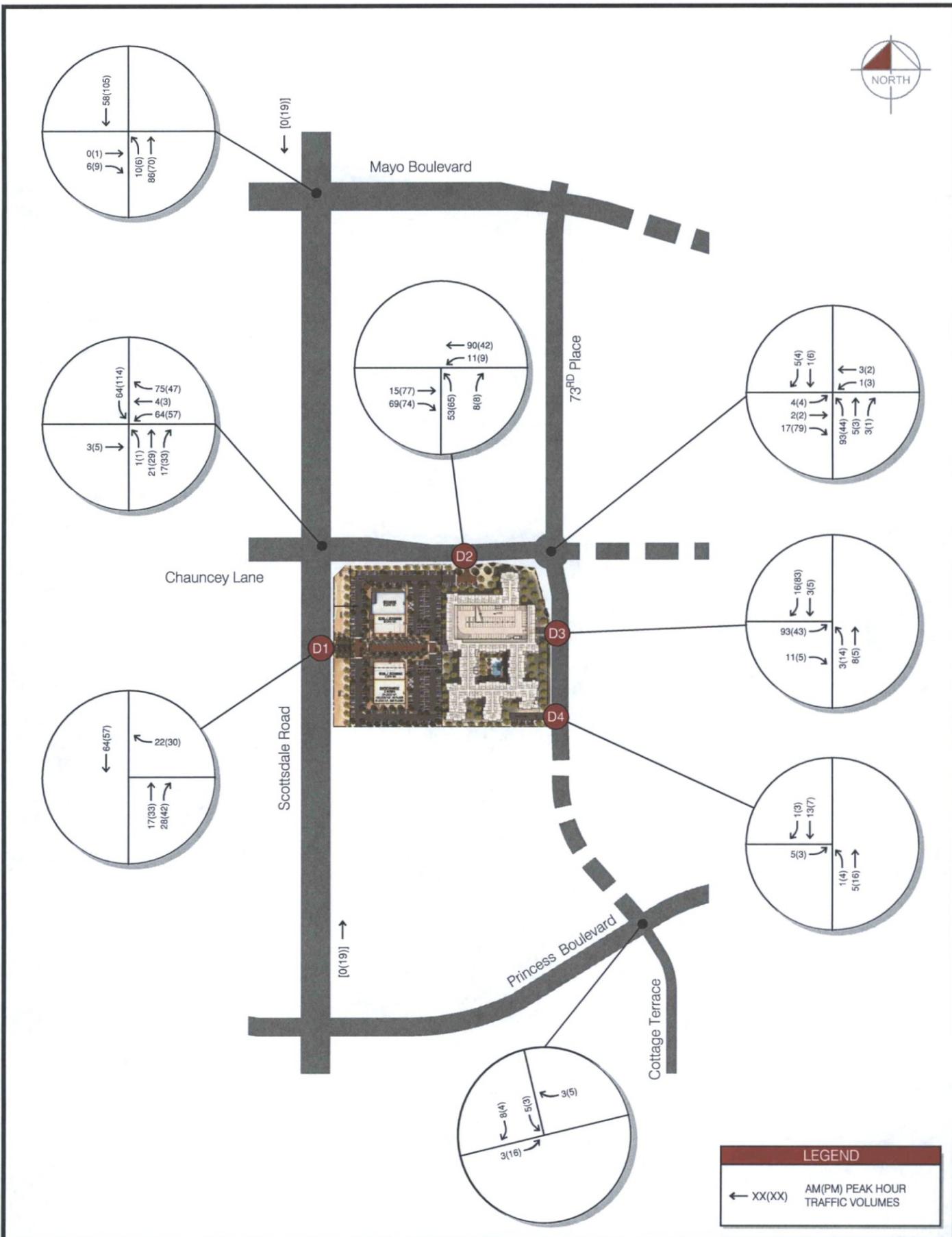








LEGEND	
← XX(XX)	AM(PM) PEAK HOUR TRAFFIC VOLUMES



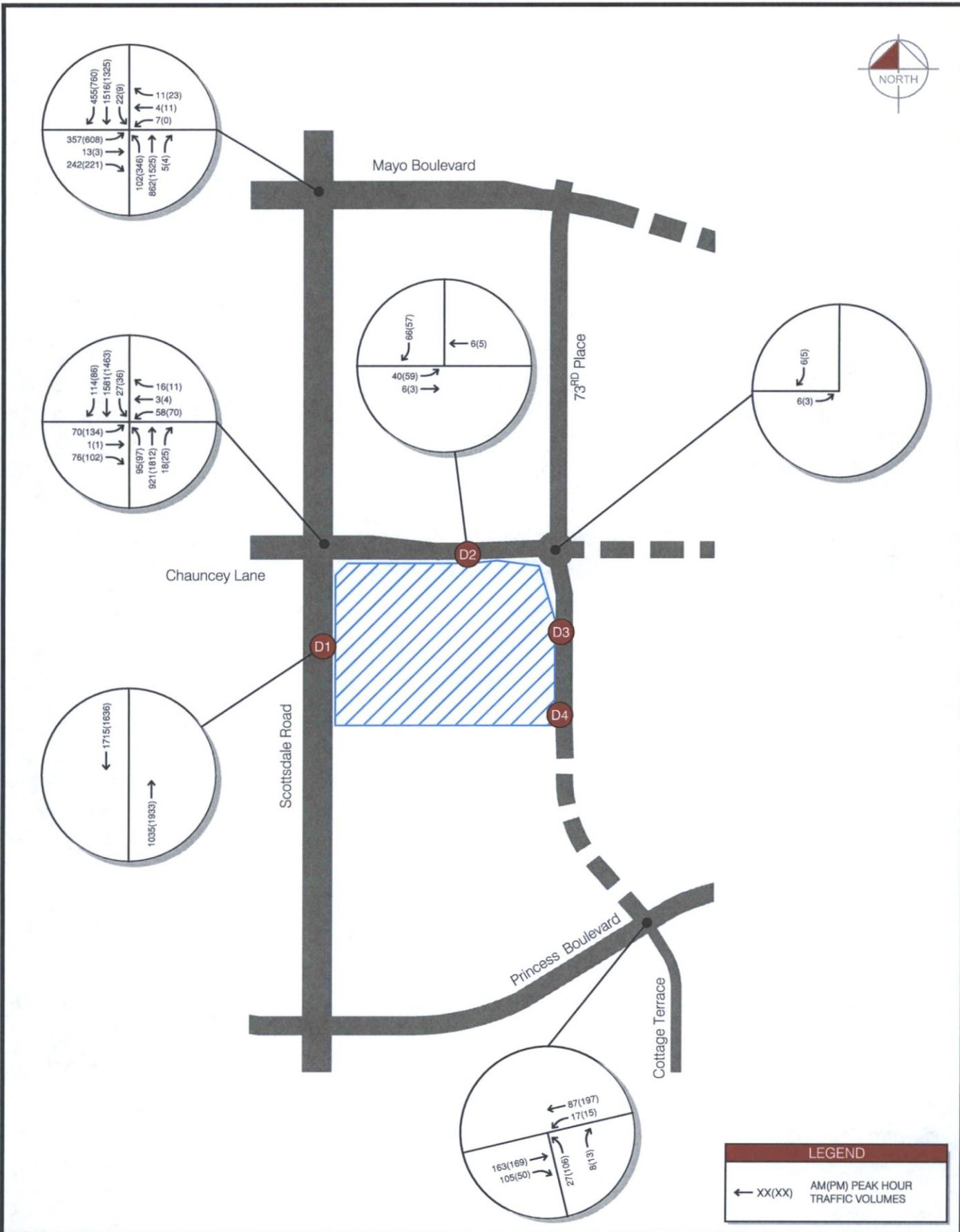


Figure 11
2018 Background Traffic

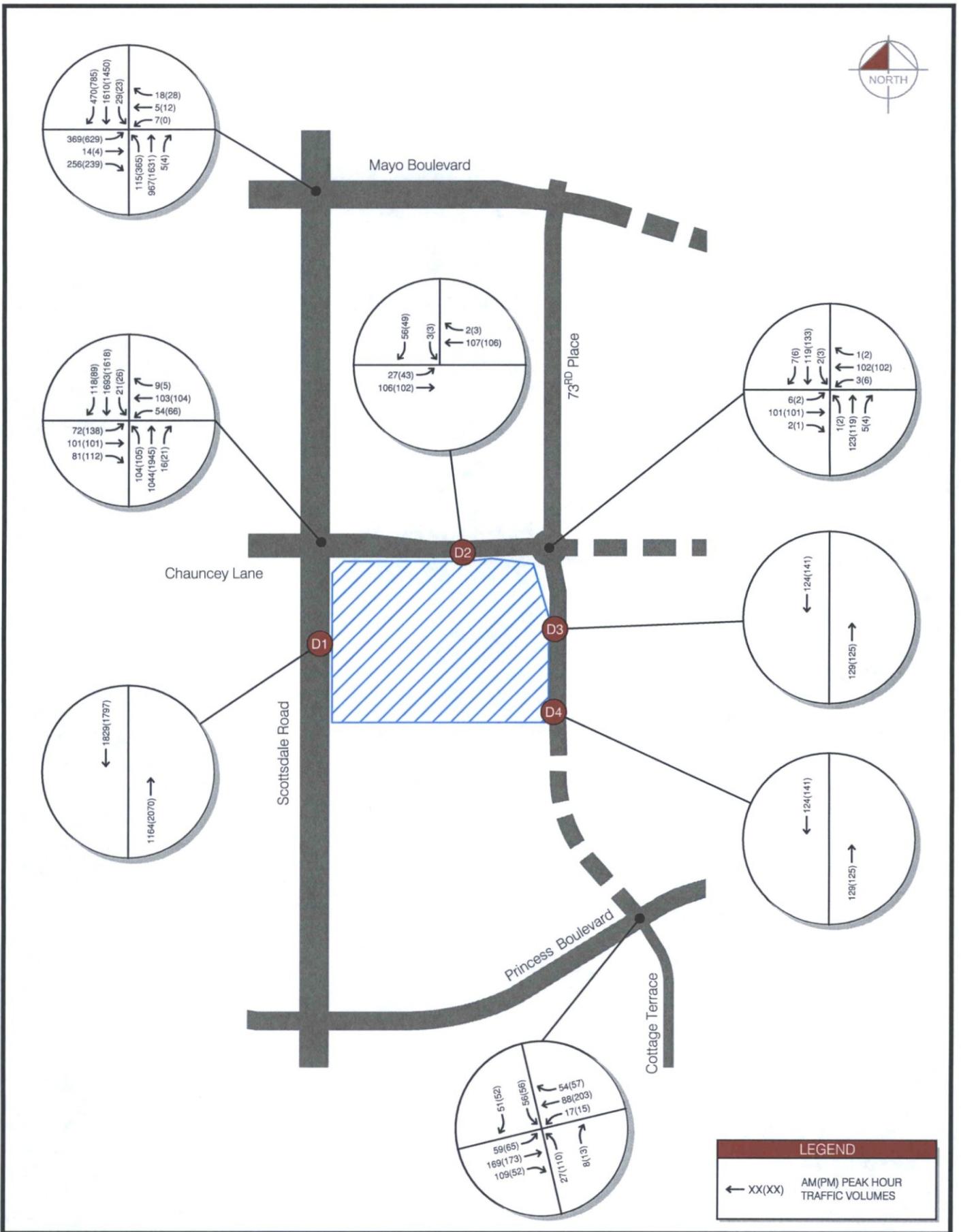


Figure 12
2023 Background Traffic

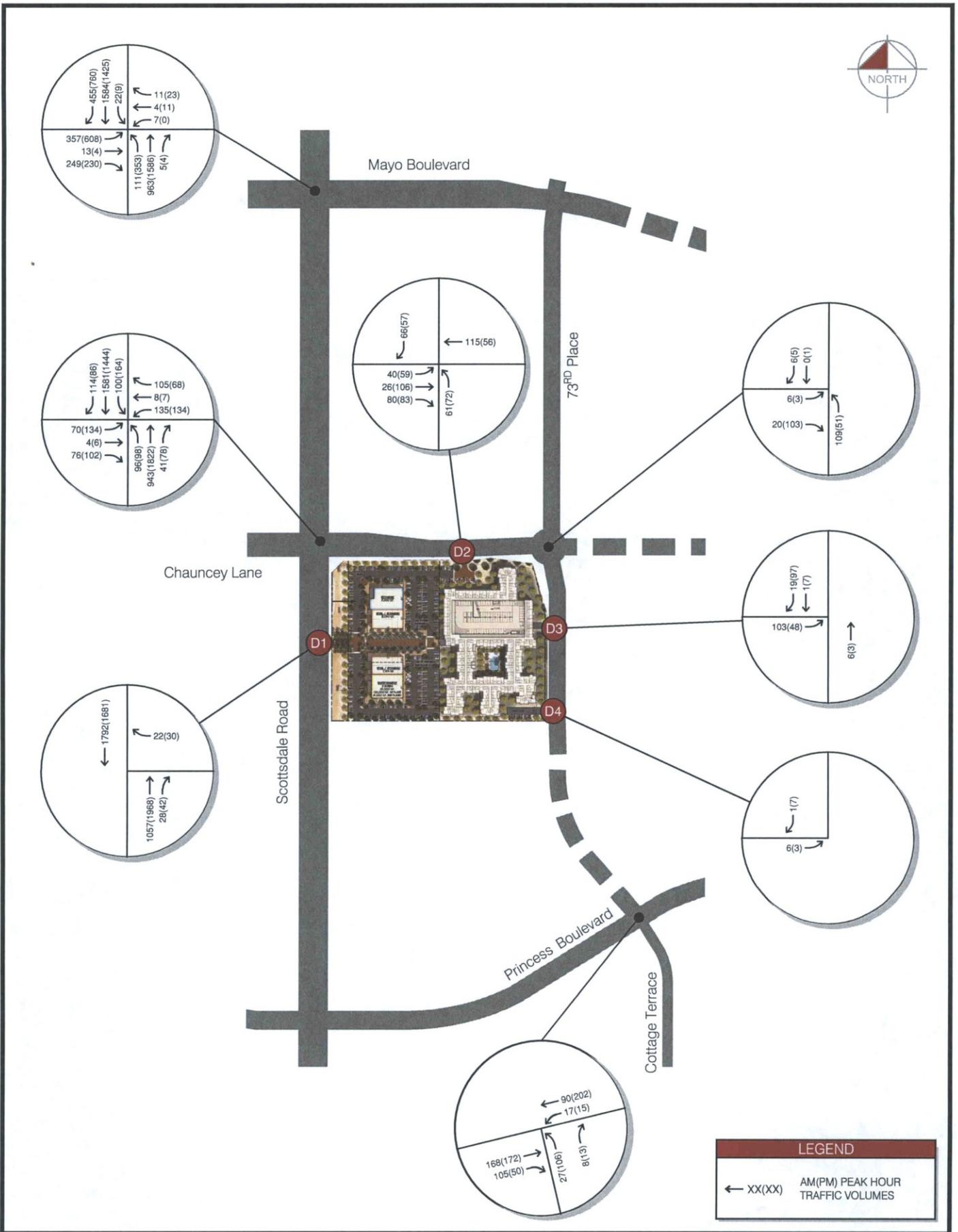


Figure 13
2018 Total Traffic

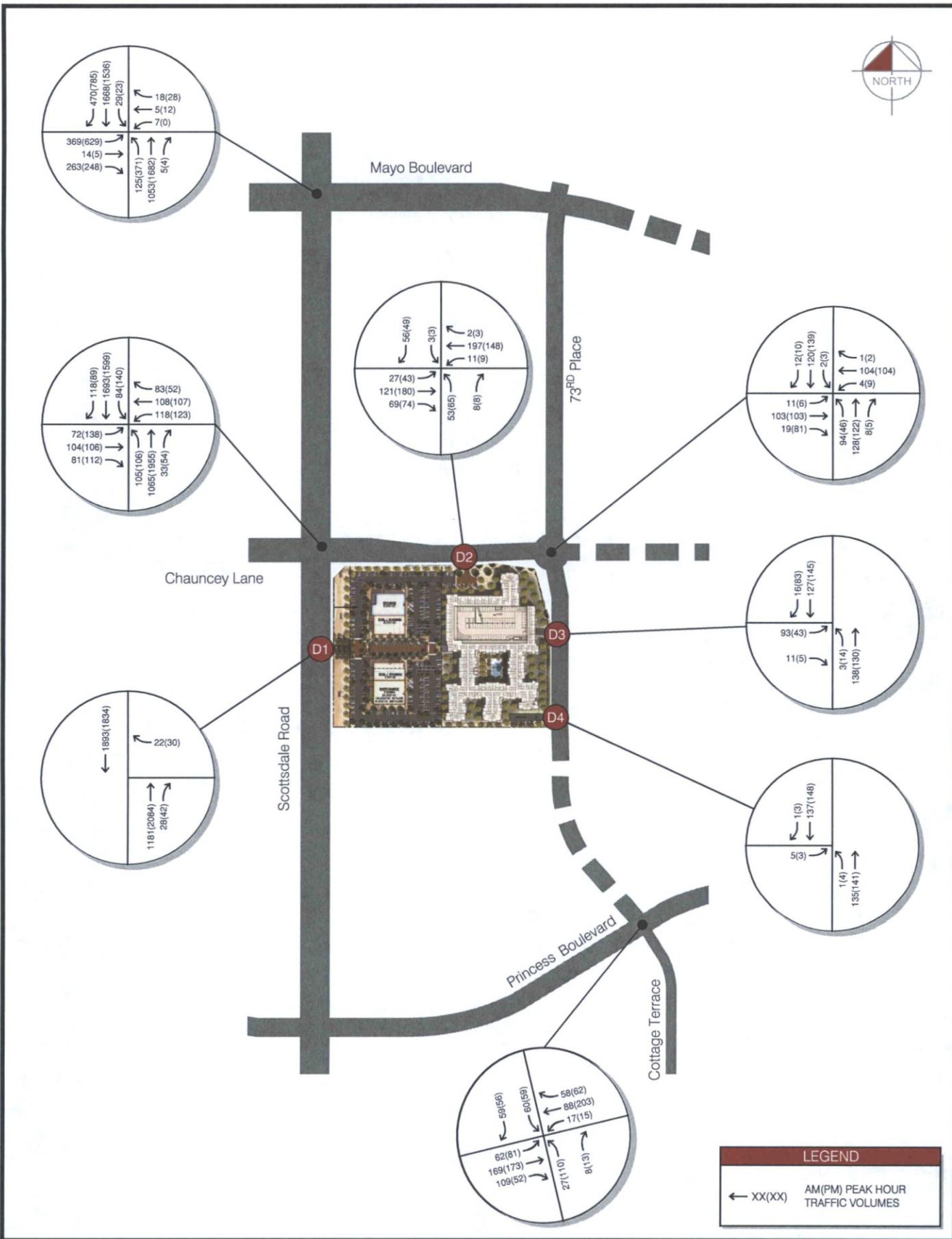


Figure 14
2023 Total Traffic

5.0 TRAFFIC ANALYSIS

5.1 SITE ACCESS

The proposed development is accessed via four access drives, Driveway D1 through D4. Driveway D1 and Driveway D2 will provide access to the restaurant and retail land uses. Driveway D1 is proposed as a right-in/right-out only access located approximately 350 feet south of Chauncey Lane. Driveway D1 is proposed to provide stop-control on the westbound approach. Driveway D2 is proposed as a full movement access and is located approximately 560 feet east of Scottsdale Road aligning with the existing driveway to the north. Driveway D2 is proposed to provide stop-control on the northbound and southbound approaches.

Driveway D3 and D4 will provide access to the residential land use. Driveway D3 is proposed as a full movement access and is located approximately 290 feet south of Chauncey Lane. Driveway D3 is the primary access to the residential land use and provides access to the parking structure. Driveway D3 is proposed to provide stop-control on the eastbound approach. Immediately south of Driveway D3 is a proposed service access driveway for the residential land use. Due to the nature of the service driveway, it is not anticipated to be used by residents or guests, additionally this service access driveway is anticipated to be used primarily during non-peak hours of operation. Driveway D4 is proposed as a full movement access and is located approximately 605 feet south of Chauncey Lane and 315 feet south of Driveway D3. It is recommended Driveway D4 to be stop-controlled on the eastbound approach.

5.2 CAPACITY AND LEVEL OF SERVICE

The LOS for the study area intersections for 2018 and 2023 were evaluated using the *2010 Highway Capacity Manual* methodology for unsignalized, signalized, and roundabout intersections using *Synchro 9* analysis software. LOS analysis worksheets are attached in the **Appendix**.

5.2.1 2018 BACKGROUND LEVEL OF SERVICE

The unsignalized and signalized intersections in the study area were evaluated on the basis of the 2018 background traffic shown in **Figure 11** and the existing geometry shown in **Figure 3**. The results of the analysis for the unsignalized intersections and site driveways are shown in **Table 6**.

Table 6. 2018 Background Level of Service: Unsignalized Intersections

Intersection	NB			SB			EB			WB		
	L	T	R	L	T	R	L	T	R	L	T	R
<i>Princess Boulevard and Cottage Terrace</i>												
AM Peak		B		-	-	-	-	-	-	A	-	-
PM Peak		B		-	-	-	-	-	-	A	-	-
<i>Chauncey Lane and Driveway D2</i>												
AM Peak	-	-	-		A		A	-	-	-	-	-
PM Peak	-	-	-		A		A	-	-	-	-	-

The unsignalized intersections in the study area are anticipated to operate at an acceptable level of service (LOS) in 2018 background conditions.

The results of this analysis for the signalized intersections are shown in **Table 7**.

Table 7. 2018 Background Level of Service: Signalized Intersections

Intersection	NB			SB			EB			WB			Intersection LOS
	L	T	R	L	T	R	L	T	R	L	T	R	
<i>Scottsdale Road and Mayo Boulevard</i>													
AM Peak	C	B	A	D	C	D	D	D	E	E	E	E	C
PM Peak	C	C	B	D	D	F	F	D	E	E	E	E	F
<i>Scottsdale Road and Chauncey Lane</i>													
AM Peak	A	A	A	A	A	A	E	D	E	D	D	D	A
PM Peak	A	A	A	A	A	A	D	D	D	D	D	D	A

The Scottsdale Road/Mayo Boulevard intersection will continue to operate at an undesirable LOS during the PM peak hour. During the AM peak hour the intersection will continue to operate at an acceptable overall LOS; however, several movements are anticipated to operate at an undesirable LOS. The Scottsdale Road/Chauncey Lane intersection is anticipated to continue to operate at an acceptable overall LOS during the AM and PM peak hours with the exception of the eastbound left and right turn movements during the AM peak hour.

Mitigating the existing conditions at the Scottsdale Road/Mayo Boulevard intersection to provide a southbound shared through/right lane along with refinements to the signal timing splits would improve the poor LOS in the 2018 background conditions. The results of this mitigation analysis for the Scottsdale Road/Mayo Boulevard signalized intersection is shown in **Table 8**.

Table 8. 2018 Background Level of Service: Signalized Intersection (Mitigated)

Intersection	NB			SB			EB			WB			Intersection LOS
	L	T	R	L	T	R	L	T	R	L	T	R	
<i>Scottsdale Road and Mayo Boulevard</i>													
AM Peak	C	B	A	D	C	D	D	D	E	E	E	E	C
PM Peak	D	C	B	D	D	D	E	D	D	E	E	E	D

5.2.2 2023 BACKGROUND LEVEL OF SERVICE

With the development of the adjacent state land parcel to the south, it is assumed that 73rd Place will connect to Princess Boulevard. Improvements to the Princess Boulevard/Cottage Terrace intersections are assumed to consist of an eastbound left-turn lane, a westbound right-turn lane, and a southbound left-turn lane and a shared through/right-lane. The Chauncey Lane/73rd Place single lane roundabout is anticipated to continue to further to the east.

The unsignalized and signalized intersections in the study area were evaluated on the basis of the 2023 background traffic shown in **Figure 7** and the anticipated 2023 roadway network with the mitigated 2018 background conditions and refinements to the signal timing splits. The results of the analysis for the unsignalized intersections are shown in **Table 9**.

Table 9. 2023 Background Level of Service: Unsignalized Intersections

Intersection	NB			SB			EB			WB			
	L	T	R	L	T	R	L	T	R	L	T	R	
Princess Boulevard and Cottage Terrace													
AM Peak	B			B	A			A	-	-	A	-	-
PM Peak	C			B	A			A	-	-	A	-	-
Chauncey Lane and Driveway D2													
AM Peak	-	-	-	A			A	-	-	-	-	-	
PM Peak	-	-	-	A			A	-	-	-	-	-	
Chauncey Lane and 73rd Place (Roundabout)													
AM Peak	A			A			A			A			
PM Peak	A			A			A			A			

The unsignalized intersections are anticipated to operate at an acceptable level of service (LOS) in 2023 background conditions.

The results of this analysis for the signalized intersections are shown in **Table 10**.

Table 10. 2023 Background Level of Service: Signalized Intersections

Intersection	NB			SB			EB			WB			Intersection LOS
	L	T	R	L	T	R	L	T	R	L	T	R	
Scottsdale Road and Mayo Boulevard													
AM Peak	C	B	A	D	C	D	D	D	E	E	E	E	C
PM Peak	D	C	B	D	D	D	E	D	D	E	E	E	D
Scottsdale Road and Chauncey Lane													
AM Peak	B	A	A	A	A	A	E	D	D	D	D	D	A
PM Peak	B	A	A	A	A	A	E	D	D	D	D	D	A

The Scottsdale Road/Mayo Boulevard intersection is anticipated to continue to operate at an acceptable LOS during the AM and PM peak hours in 2023 mitigated background conditions. However, several movements will continue to operate at an undesirable LOS. The Scottsdale Road/Chauncey Lane intersection is anticipated to continue to operate at an acceptable overall LOS during the AM and PM peak hours with the exception of the eastbound left-turn movements during the AM peak hour.

5.2.1 2018 TOTAL LEVEL OF SERVICE

The unsignalized and signalized intersections in the study area were evaluated on the basis of the 2018 total traffic shown in **Figure 13** and the recommended geometry shown in **Figure 15** which includes the previous background mitigation. The results of the analysis for the unsignalized intersections and site driveways are shown in **Table 11**.

Table 11. 2018 Total Level of Service: Unsignalized Intersections

Intersection	NB			SB			EB			WB			
	L	T	R	L	T	R	L	T	R	L	T	R	
Princess Boulevard and Cottage Terrace													
AM Peak		B		-	-	-	-	-	-	-	A	-	-
PM Peak		B		-	-	-	-	-	-	-	A	-	-
Chauncey Lane and 73rd Place (Roundabout)													
AM Peak		A			A			A			-		
PM Peak		A			A			A			-		
Scottsdale Road and Driveway D1													
AM Peak	-	-	-	-	-	-	-	-	-	-	-	-	B
PM Peak	-	-	-	-	-	-	-	-	-	-	-	-	D
Chauncey Lane and Driveway D2													
AM Peak		B			A		A	-	-	A	-	-	
PM Peak		B			A		A	-	-	A	-	-	
73rd Place and Driveway D3													
AM Peak	-	-	-	-	-	-		A		-	-	-	
PM Peak	-	-	-	-	-	-		A		-	-	-	
73rd Place and Driveway D4													
AM Peak	-	-	-	-	-	-		A		-	-	-	
PM Peak	-	-	-	-	-	-		A		-	-	-	

The unsignalized intersection are all anticipated to operate at an acceptable level of service in 2018 with buildout of the proposed development.

The results of this analysis for the signalized intersections are shown in **Table 12**.

Table 12. 2018 Total Level of Service: Signalized Intersections

Intersection	NB			SB			EB			WB			Intersection LOS
	L	T	R	L	T	R	L	T	R	L	T	R	
Scottsdale Road and Mayo Boulevard													
AM Peak	C	B	A	D	C	D	D	D	E	E	E	E	C
PM Peak	D	A	A	D	D	D	E	D	E	E	E	E	C
Scottsdale Road and Chauncey Lane													
AM Peak	A	B	A	A	A	A	D	D	D	D	D	D	B
PM Peak	C	C	B	C	B	B	D	D	D	D	D	D	C

The signalized intersections within the study area are anticipated to operate at an acceptable overall level of service in 2018 with buildout of the proposed development with the exception of several eastbound and westbound movements at the Scottsdale Road/Mayo Boulevard intersection.

5.2.2 2023 TOTAL LEVEL OF SERVICE

The unsignalized and signalized intersections in the study area were evaluated on the basis of the 2023 total traffic shown in **Figure 14** and the recommended geometry shown in **Figure 15**. The results of the analysis for the unsignalized intersections and site driveways are shown in **Table 13**.

Table 13. 2023 Total Level of Service: Unsignalized Intersections

Intersection	NB			SB			EB			WB		
	L	T	R	L	T	R	L	T	R	L	T	R
<i>Princess Boulevard and Cottage Terrace</i>												
AM Peak		B		B		A	A	-	-	A	-	-
PM Peak		C		C		A	A	-	-	A	-	-
<i>Chauncey Lane and 73rd Place (Roundabout)</i>												
AM Peak		A			A		A			A		
PM Peak		A			A		A			A		
<i>Scottsdale Road and Driveway D1</i>												
AM Peak	-	-	-	-	-	-	-	-	-	-	-	C
PM Peak	-	-	-	-	-	-	-	-	-	-	-	D
<i>Chauncey Lane and Driveway D2</i>												
AM Peak		B			A		A	-	-	A	-	-
PM Peak		B			A		A	-	-	A	-	-
<i>73rd Place and Driveway D3</i>												
AM Peak	A	-	-	-	-	-		B		-	-	-
PM Peak	A	-	-	-	-	-		B		-	-	-
<i>73rd Place and Driveway D4</i>												
AM Peak	A	-	-	-	-	-		B		-	-	-
PM Peak	A	-	-	-	-	-		B		-	-	-

The unsignalized intersection are all anticipated to operate at an acceptable level of service in 2023 with buildout of the proposed development.

The results of this analysis for the signalized intersections are shown in **Table 14**.

Table 14. 2023 Total Level of Service: Signalized Intersections

Intersection	NB			SB			EB			WB			Intersection LOS
	L	T	R	L	T	R	L	T	R	L	T	R	
<i>Scottsdale Road and Mayo Boulevard</i>													
AM Peak	C	B	A	D	C	D	D	D	E	E	E	E	C
PM Peak	D	A	A	D	C	D	E	D	E	E	E	E	C
<i>Scottsdale Road and Chauncey Lane</i>													
AM Peak	C	B	A	B	A	A	D	D	D	D	D	D	B
PM Peak	B	C	B	C	A	A	D	D	D	D	D	D	B

The signalized intersections within the study area are anticipated to continue to operate at an acceptable overall level of service in 2023 with buildout of the proposed development with the exception of several eastbound and westbound movements at the Scottsdale Road/Mayo Boulevard intersection.

6.0 IMPROVEMENT ANALYSIS

6.1 OFF-SITE INTERSECTION IMPROVEMENTS

The Scottsdale Road/Mayo Boulevard intersection is anticipated to operate an unsatisfactory level of service in 2018 and 2023 under the existing intersection geometry and traffic signal timing and phasing due to growth in background traffic volumes. To improve operations to an acceptable level of service with the exception of the eastbound left and right-turn movements and the westbound movements the following improvements are recommended due to background traffic conditions:

- Restripe the western most southbound through lane to a shared through/right lane
- Modify traffic signal timing to optimize each movement.

To improve operations to an acceptable level of service with the exception of several eastbound and westbound movements in 2018 and 2023 with buildout of the proposed development the following improvements are recommended:

- Modify traffic signal timing to optimize each movement.

The Scottsdale Road/Chauncey Lane intersection is anticipated to operate an unsatisfactory level of service in 2018 and 2023 under the existing intersection geometry and traffic signal timing and phasing with buildout of the proposed development. To improve operations to an acceptable level of service the following improvements are recommended due to 2028 and 2023 total traffic conditions:

- Provide left-turn phasing for the northbound and southbound approaches.
- Modify traffic signal timing to optimize each movement.

6.0 FINDINGS

6.1 LEFT-TURN STORAGE ANALYSIS

The signalized and unsignalized intersections in the study area were analyzed to determine the left-turn storage needed to accommodate the expected traffic volumes in the year 2023.

The left-turn storage lengths were determined for the left-turn movements at the study area intersections. The calculations associated with these conclusions are included in the **Appendix**. The recommended storage lengths are based on 2023 total traffic volumes shown in **Figure 14**.

Table 15. Left Turn Storage

Intersection and Approach	Existing	Recommended
<i>Scottsdale Road and Mayo Boulevard</i>		
- Northbound Approach	240 feet (Duals)	240 feet (Duals)*
- Southbound Approach	165 feet (Duals)	165 feet (Duals)*
- Eastbound Approach	270 feet (Duals)	350 feet (Duals)
- Westbound Approach	165 feet (Duals)	165 feet (Duals)*
<i>Scottsdale Road and Chauncey Lane</i>		
- Northbound Approach	200 feet	200 feet*
- Southbound Approach	175 feet	200 feet
- Eastbound Approach	165 feet	200 feet
- Westbound Approach	165 feet	175 feet
<i>Princess Boulevard and Cottage Terrace</i>		
- Southbound Approach	n/a	100 feet
- Eastbound Approach	n/a	100 feet
- Westbound Approach	190 feet	190 feet*
<i>Chauncey Boulevard and Driveway D2</i>		
- Eastbound Approach	TWLTL	50 feet
- Westbound Approach	TWLTL	50 feet

*Calculated value less than existing.

As shown in **Table 15**, the eastbound approach at the Scottsdale Road/Mayo Boulevard intersection does not provide the recommended storage capacity for this movement due to background traffic growth. Due to the existing median configuration no additional storage is available. The southbound left-turn storage at the Scottsdale Road/Chauncey Lane intersection does not currently provide the recommended storage capacity. The northbound and southbound approaches are configured for future dual left-turn lanes; therefore, it is recommended that the City of Scottsdale monitor traffic volumes at this intersection to determine the appropriate time to transition the northbound and southbound approaches to dual left-turn lanes. The eastbound approach at the Scottsdale Road/Chauncey Lane intersection does not provide the recommended storage capacity for this movement due to background traffic growth. The westbound left-turn at the Scottsdale Road/Chauncey Lane intersection does not provide the recommended storage capacity for this movement. Median modifications could be considered to increase the left-turn storage.

6.2 RIGHT-TURN LANES

Right-turn lanes are often recommended on roadways where right-turning vehicles create delays or safety problems for other traffic movements. The need for a right-turn lane depends on the speed of traffic on the road, the volume of traffic turning right, and the through traffic volume in the same lane as the right-turning traffic.

6.4.1 INTERSECTIONS

A right-turn deceleration lane is currently provided on the northbound approach to the Scottsdale Road/Chauncey Boulevard intersection.

6.4.2 DRIVEWAY

The Federal Highway Administration's *Access Management for Streets and Highways* provides the following minimum criteria for the provision of right-turn deceleration lanes:

- Greater than 10,000 vpd on adjacent streets;
- Highway speed at least 35 mph;
- Greater than 1,000 vpd driveway volumes; and
- At least 40 ingress right-turns during the peak period.

Review of total traffic under the 2023 total traffic condition in previously referenced **Figure 14** reveals that the site driveways meeting all the criteria for the installation of a right-turn deceleration lane is the northbound approach to Driveway D1 on Scottsdale Road. As a result, it is recommended to construct a northbound right-turn deceleration lane at Driveway D1 to provide the standard right turn deceleration lane dimensions per City of Scottsdale Design Standards and Policies Manual Section 5-3.206.

6.3 SIGHT TRIANGLES

It is recommended that sight triangles be provided at all site access points to give drivers exiting the site a clear view of oncoming traffic. The landscaping within sight triangles must not obstruct drivers' views of the adjacent travel lanes. It is recommended to provide sight triangles per City of Scottsdale Design Standards and Policies Manual Section 5.3, Figure 5.3-27.

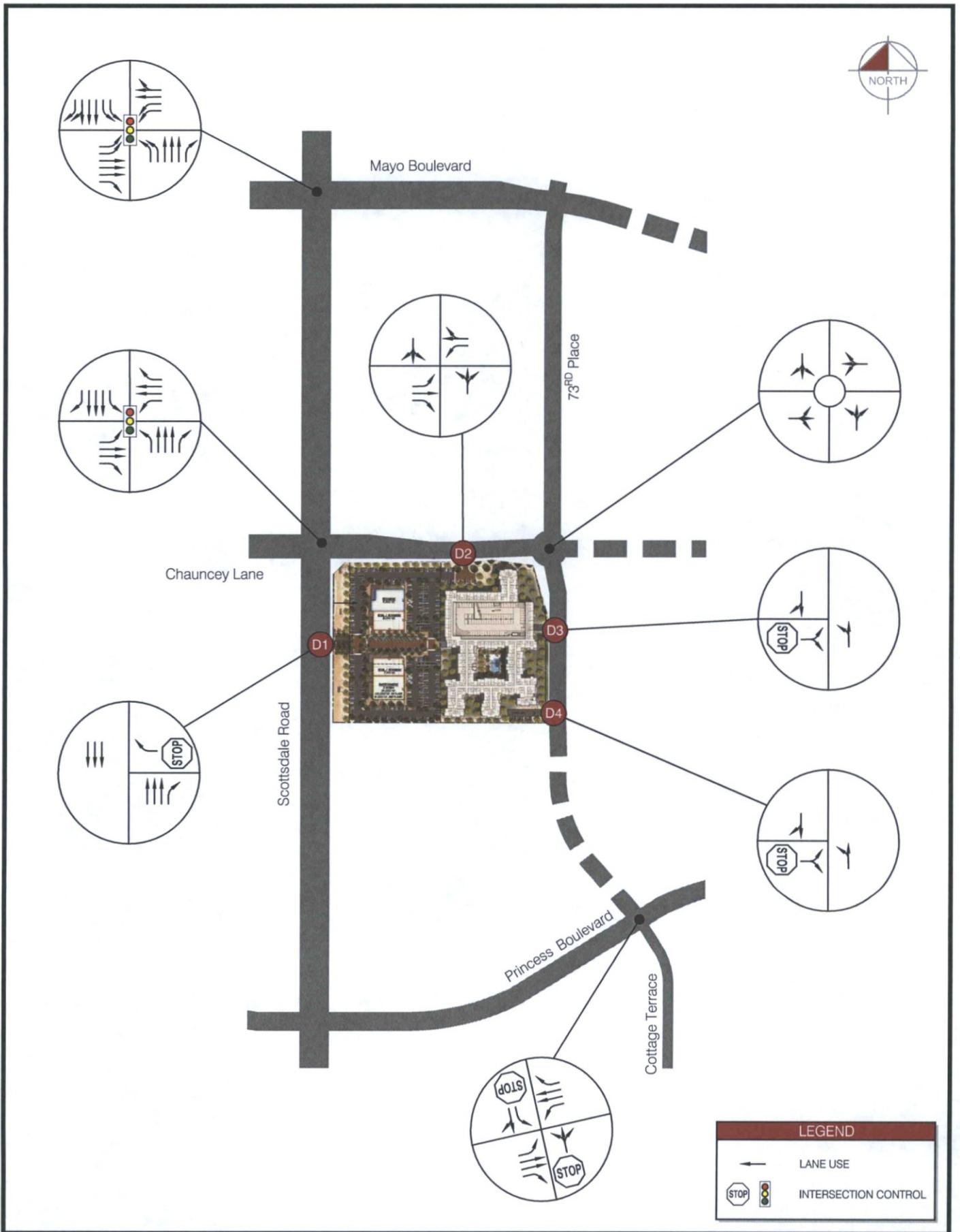


Figure 15
Recommended Geometry

7.0 CONCLUSIONS AND RECOMMENDATIONS

The proposed development is expected to generate 5,544 daily trips, with 362 trips occurring in the AM peak hour and 436 trips occurring in the PM peak hour. To ensure that the estimate of traffic impacts is the maximum that can be expected, it is assumed that the site will be 100 percent occupied upon buildout in 2018.

Taking into consideration internal capture and pass-by trips, the proposed development is expected to add 4,828 new daily trips, 320 new AM peak hour trips, and 319 new PM peak hour trips to the roadway network.

The Scottsdale Road/Mayo Boulevard intersection currently operates at an undesirable LOS during the PM peak hour. Additionally, several eastbound and westbound movements operate at an undesirable LOS during the AM peak hour. Restriping the western most southbound through lane to a through/right-turn lane would provide a more desirable level of service.

The Scottsdale Road/Chauncey Lane intersection currently operates at an acceptable LOS during the AM and PM peak hours with the exception of the eastbound movements during the AM peak hour.

The existing Princess Boulevard/Cottage Terrace unsignalized intersection currently operates at an acceptable level of service during the AM and PM peak hours.

The unsignalized intersections in the study area are anticipated to operate at an acceptable level of service (LOS) in 2018 and 2023 background conditions.

The Scottsdale Road/Mayo Boulevard intersection will continue to operate at an undesirable LOS during the PM peak hour with several movements anticipated to operate at an undesirable LOS during the AM peak hour in 2018 and 2023 background conditions. To improve operations to an acceptable level of service with the exception of the eastbound left and right-turn movements and the westbound movements the following improvements are recommended due to background traffic conditions:

- Restripe the western most southbound through lane to a shared through/right lane
- Modify traffic signal timing to optimize each movement.

The Scottsdale Road/Chauncey Lane intersection is anticipated to continue to operate at an acceptable overall LOS during the AM and PM peak hours with the exception of the eastbound left and right-turn movements during the AM peak hour 2018 and 2023 background conditions.

The signalized intersections within the study area are anticipated to operate at an acceptable overall level of service in 2018 and 2023 with buildout of the proposed development with the exception of several eastbound and westbound movements at the Scottsdale Road/Mayo Boulevard intersection. A more desirable LOS can be achieved with refinements to the signal timing splits.

The Scottsdale Road/Chauncey Lane intersection is anticipated to operate an unsatisfactory level of service in 2018 and 2023 with buildout of the proposed development. To improve operations to an acceptable level of service the following improvements are recommended due to 2028 and 2023 total traffic conditions:

- Provide left-turn phasing for the northbound and southbound approaches.
- Modify traffic signal timing to optimize each movement

The southbound left-turn storage at the Scottsdale Road/Chauncey Lane intersection does not currently provide the recommended storage capacity. The northbound and southbound approaches are configured for future dual left-turn lanes; therefore, it is recommended that the City of Scottsdale monitor traffic volumes at this intersection to determine the appropriate time to transition the northbound and southbound approaches to dual left-turn lanes. The westbound left-turn at the Scottsdale Road/Chauncey Lane intersection does not provide the recommended storage capacity for this movement. Median modifications could be considered to increase the left-turn storage.

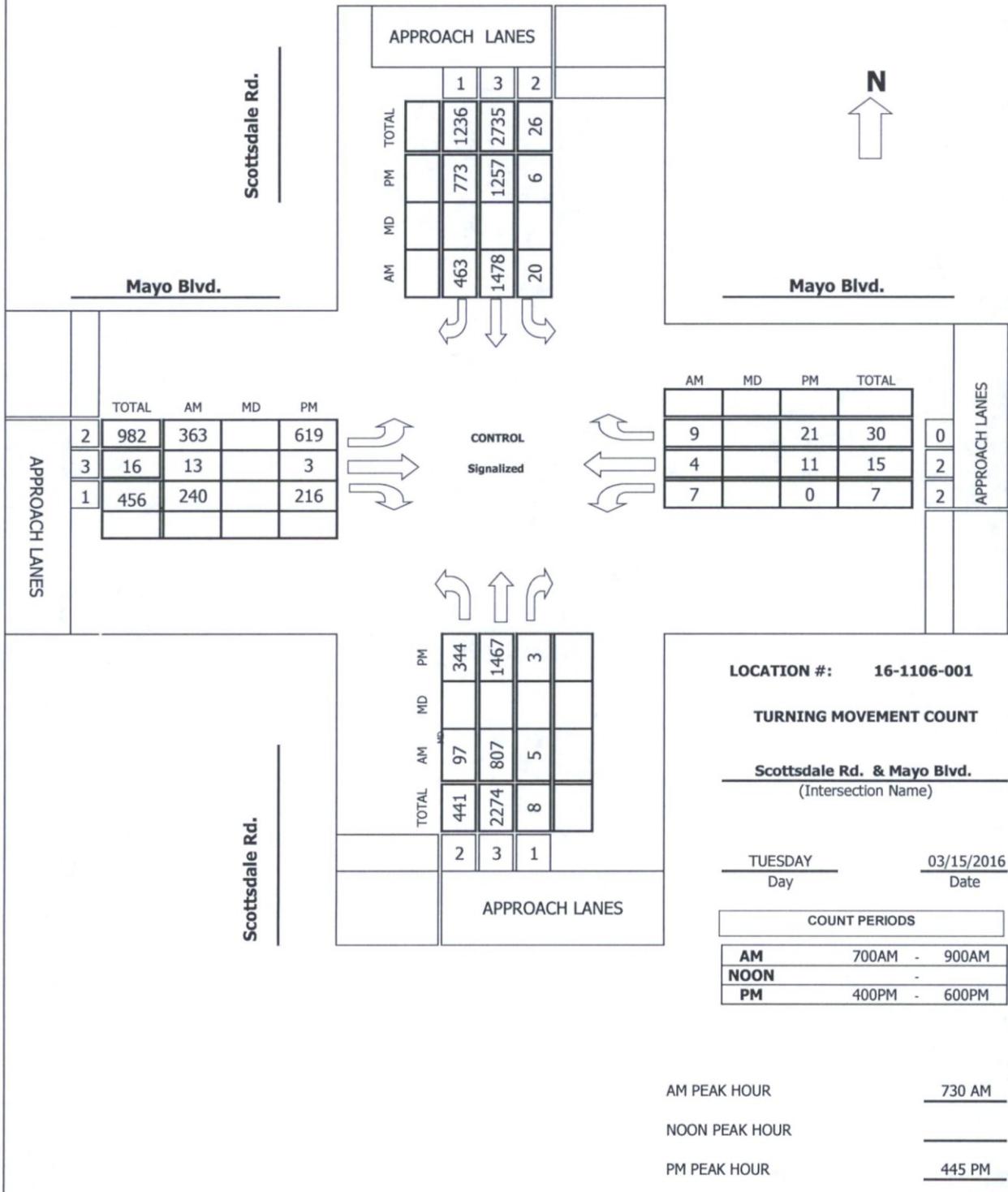
It is recommended to construct a northbound right-turn deceleration lane at Driveway D1 to provide the standard right turn deceleration lane dimensions per City of Scottsdale Design Standards and Policies Manual Section 5-3.206.

It is recommended that sight triangles be provided at all site access points to give drivers exiting the site a clear view of oncoming traffic. The landscaping within sight triangles must not obstruct drivers' views of the adjacent travel lanes. It is recommended to provide sight triangles per City of Scottsdale Design Standards and Policies Manual Section 5.3, Figure 5.3-27.

Traffic Counts

Project #: 16-1106-001

TMC SUMMARY OF Scottsdale Rd. & Mayo Blvd.



Intersection Turning Movement

Prepared by:



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



veracitytraffic group

N-S STREET: Scottsdale Rd. DATE: 03/15/2016 LOCATION: Scottsdale
 E-W STREET: Mayo Blvd. DAY: TUESDAY PROJECT# 16-1106-001

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	2	3	1	2	3	1	2	3	1	2	2	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	15	141	1	4	261	63	56	1	49	0	1	2	594
7:15 AM	19	133	1	4	323	82	89	3	43	0	0	1	698
7:30 AM	18	205	2	8	395	116	103	1	58	0	1	2	909
7:45 AM	24	183	1	5	410	121	87	5	67	2	0	0	905
8:00 AM	26	208	1	3	324	109	99	5	61	3	2	3	844
8:15 AM	29	211	1	4	349	117	74	2	54	2	1	4	848
8:30 AM	29	184	1	4	345	123	72	1	41	3	0	2	805
8:45 AM	47	179	1	3	353	139	75	1	41	1	0	2	842
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	207	1444	9	35	2760	870	655	19	414	11	5	16	6445
Approach %	12.47	86.99	0.54	0.95	75.31	23.74	60.20	1.75	38.05	34.38	15.63	50.00	
App/Depart	1660	/	2115	3665	/	3185	1088	/	63	32	/	1082	

AM Peak Hr Begins at: 730 AM

PEAK

Volumes	97	807	5	20	1478	463	363	13	240	7	4	9	3506
Approach %	10.67	88.78	0.55	1.02	75.37	23.61	58.93	2.11	38.96	35.00	20.00	45.00	

PEAK HR.

FACTOR:	0.943	0.915	0.933	0.625	0.964
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CONTROL: Signalized
 COMMENT 1:
 GPS: 33.654898, -111.925588

Intersection Turning Movement



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: **Scottsdale Rd.** DATE: **03/15/2016** LOCATION: **Scottsdale**
 E-W STREET: **Mayo Blvd.** DAY: **TUESDAY** PROJECT#: **16-1106-001**

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	2	3	1	2	3	1	2	3	1	2	2	0	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	76	346	1	3	280	159	157	3	66	0	5	2	1098
4:15 PM	76	344	2	4	306	165	127	1	47	0	2	5	1079
4:30 PM	71	372	1	5	309	160	145	2	49	2	4	5	1125
4:45 PM	87	350	0	1	281	172	160	1	49	0	2	6	1109
5:00 PM	88	371	2	4	282	175	158	0	59	0	5	8	1152
5:15 PM	75	346	1	0	353	219	167	2	61	0	2	6	1232
5:30 PM	94	400	0	1	341	207	134	0	47	0	2	1	1227
5:45 PM	84	304	1	3	261	183	125	1	38	0	5	3	1008
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	651	2833	8	21	2413	1440	1173	10	416	2	27	36	9030
Approach %	18.64	81.13	0.23	0.54	62.29	37.17	73.36	0.63	26.02	3.08	41.54	55.38	
App/Depart	3492	/	4042	3874	/	2831	1599	/	39	65	/	2118	

PM Peak Hr Begins at: 445 PM

PEAK

Volumes	344	1467	3	6	1257	773	619	3	216	0	11	21	4720
Approach %	18.96	80.87	0.17	0.29	61.74	37.97	73.87	0.36	25.78	0.00	34.38	65.63	

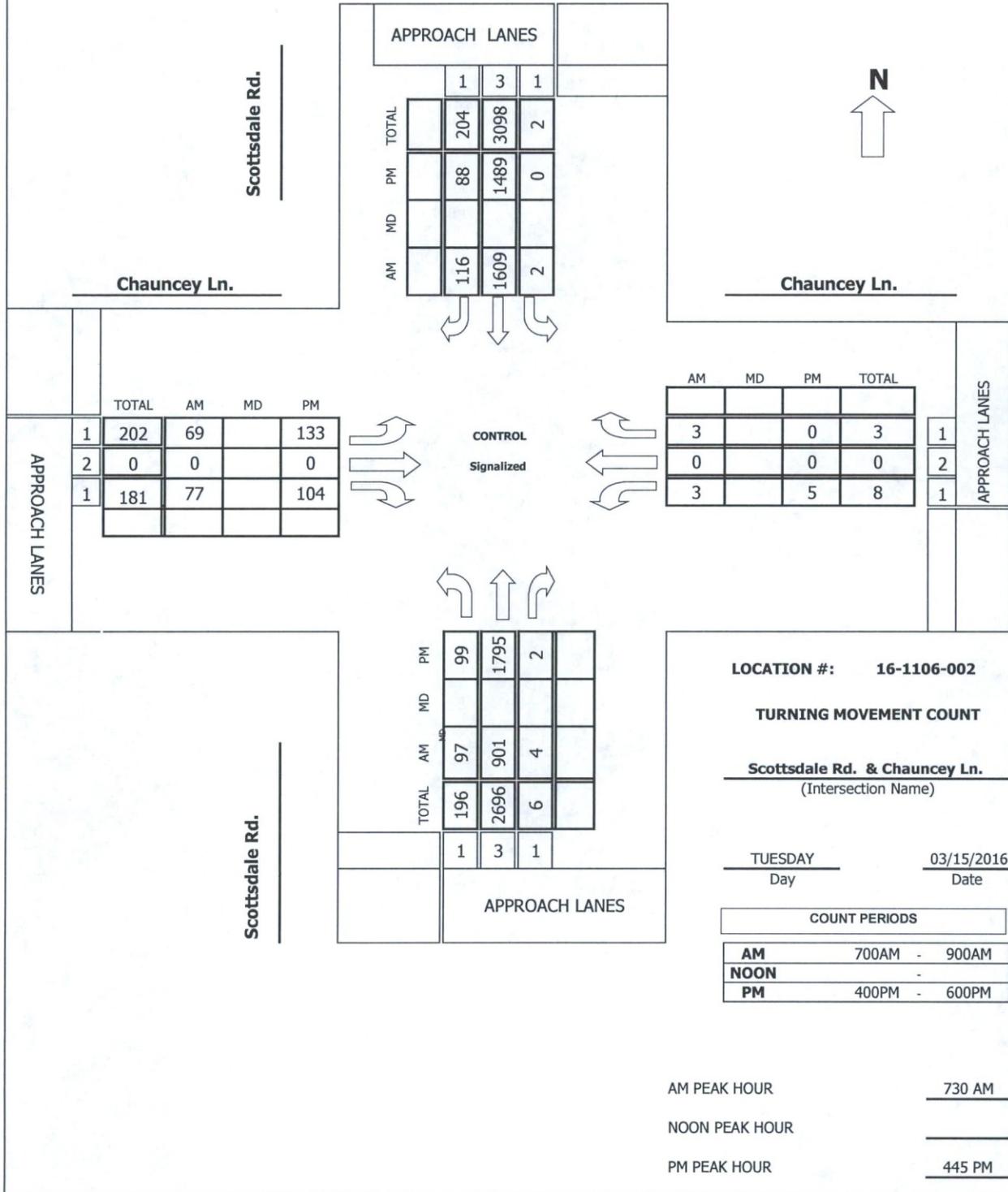
PEAK HR.

FACTOR:	0.918	0.890	0.911	0.615	0.958
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CONTROL: **Signalized**
 COMMENT 1: **0**
 GPS: **33.654898, -111.925588**

Project #: 16-1106-002

TMC SUMMARY OF Scottsdale Rd. & Chauncey Ln.



Intersection Turning Movement

Prepared by:



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



veracitytraffic group

N-S STREET: Scottsdale Rd. DATE: 03/15/2016 LOCATION: Scottsdale
 E-W STREET: Chauncey Ln. DAY: TUESDAY PROJECT# 16-1106-002

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	1	3	1	1	3	1	1	2	1	1	2	1	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	11	149	1	0	302	17	9	1	15	0	0	0	505
7:15 AM	13	146	0	0	349	25	10	0	5	0	0	1	549
7:30 AM	20	219	1	0	410	27	14	0	13	0	0	0	704
7:45 AM	25	218	1	0	428	43	16	0	21	1	0	1	754
8:00 AM	28	230	1	1	407	24	17	0	25	1	0	0	734
8:15 AM	24	234	1	1	364	22	22	0	18	1	0	2	689
8:30 AM	27	209	0	1	366	36	18	0	20	1	0	1	679
8:45 AM	23	222	1	0	344	30	24	0	17	1	0	0	662
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	171	1627	6	3	2970	224	130	1	134	5	0	5	5276
Approach %	9.48	90.19	0.33	0.09	92.90	7.01	49.06	0.38	50.57	50.00	0.00	50.00	
App/Depart	1804	/	1762	3197	/	3109	265	/	10	10	/	395	

AM Peak Hr Begins at: 730 AM

PEAK

Volumes	97	901	4	2	1609	116	69	0	77	3	0	3	2881
Approach %	9.68	89.92	0.40	0.12	93.17	6.72	47.26	0.00	52.74	50.00	0.00	50.00	

PEAK HR.

FACTOR:	0.967	0.917	0.869	0.500	0.955
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CONTROL: Signalized

COMMENT 1:

GPS: 33.651339, -111.925575

Intersection Turning Movement



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: Scottsdale Rd. DATE: 03/15/2016 LOCATION: Scottsdale
 E-W STREET: Chauncey Ln. DAY: TUESDAY PROJECT#: 16-1106-002

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	1	3	1	1	3	1	1	2	1	1	2	1	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	22	442	1	0	346	17	25	0	18	2	0	0	873
4:15 PM	16	412	1	0	326	26	31	0	30	2	0	0	844
4:30 PM	23	458	0	0	352	17	28	0	24	0	0	0	902
4:45 PM	24	390	0	0	331	20	37	0	22	1	0	0	825
5:00 PM	19	491	1	0	338	23	40	0	33	0	0	0	945
5:15 PM	31	435	1	0	428	15	30	0	25	3	0	0	968
5:30 PM	25	479	0	0	392	30	26	0	24	1	0	0	977
5:45 PM	18	386	1	0	290	17	29	0	20	0	0	1	762
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	178	3493	5	0	2803	165	246	0	196	9	0	1	7096
Approach %	4.84	95.02	0.14	0.00	94.44	5.56	55.66	0.00	44.34	90.00	0.00	10.00	
App/Depart	3676	/	3740	2968	/	3008	442	/	5	10	/	343	

PM Peak Hr Begins at: 445 PM

PEAK

Volumes	99	1795	2	0	1489	88	133	0	104	5	0	0	3715
Approach %	5.22	94.67	0.11	0.00	94.42	5.58	56.12	0.00	43.88	100.00	0.00	0.00	

PEAK HR. FACTOR:

	0.928	0.890	0.812	0.417	0.951
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CONTROL: Signalized
 COMMENT 1: 0
 GPS: 33.651339, -111.925575

Intersection Turning Movement Prepared by:



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: Cottage Terrace DATE: 03/15/2016 LOCATION: Scottsdale
E-W STREET: Princess Blvd. DAY: TUESDAY PROJECT# 16-1106-003

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	1	0	0	0	0	0	2	1	1	2	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	10	0	3	0	0	0	0	30	28	1	20	0	92
7:15 AM	6	0	5	0	0	0	0	39	24	4	21	0	99
7:30 AM	7	0	0	0	0	0	0	48	24	3	21	0	103
7:45 AM	4	0	1	0	0	0	0	40	40	4	18	0	107
8:00 AM	7	0	3	0	0	0	0	38	23	5	22	0	98
8:15 AM	9	0	4	0	0	0	0	37	20	5	24	0	99
8:30 AM	14	0	1	0	0	0	0	31	17	1	26	0	90
8:45 AM	11	0	2	0	0	0	0	27	23	2	34	0	99
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	68	0	19	0	0	0	0	290	199	25	186	0	787
Approach %	78.16	0.00	21.84	####	####	####	0.00	59.30	40.70	11.85	88.15	0.00	
App/Depart	87	/	0	0	/	224	489	/	309	211	/	254	

AM Peak Hr Begins at: 730 AM

PEAK

Volumes	27	0	8	0	0	0	0	163	107	17	85	0	407
Approach %	77.14	0.00	22.86	####	####	####	0.00	60.37	39.63	16.67	83.33	0.00	

PEAK HR.

FACTOR:	0.673	0.000	0.844	0.879	0.951
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CONTROL: 1 Way Stop (NB)
COMMENT 1:
GPS: 33.647545, -111.921319

Intersection Turning Movement



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: Cottage Terrace DATE: 03/15/2016 LOCATION: Scottsdale
 E-W STREET: Princess Blvd. DAY: TUESDAY PROJECT#: 16-1106-003

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	1	0	0	0	0	0	2	1	1	2	0	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	21	0	5	0	0	0	0	20	9	4	41	0	100
4:15 PM	26	0	2	0	0	0	0	49	20	4	40	0	141
4:30 PM	22	0	2	0	0	0	0	42	13	2	46	0	127
4:45 PM	33	0	2	0	0	0	0	35	10	4	61	0	145
5:00 PM	27	0	7	0	0	0	0	42	8	5	49	0	138
5:15 PM	24	0	3	0	0	0	0	31	13	1	64	0	136
5:30 PM	30	0	6	0	0	0	0	24	9	2	60	0	131
5:45 PM	25	0	1	0	0	0	0	17	5	2	34	0	84
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	208	0	28	0	0	0	0	260	87	24	395	0	1002
Approach %	88.14	0.00	11.86	####	####	####	0.00	74.93	25.07	5.73	94.27	0.00	
App/Depart	236	/	0	0	/	111	347	/	288	419	/	603	

PM Peak Hr Begins at: 415 PM

PEAK

Volumes	108	0	13	0	0	0	0	168	51	15	196	0	551
Approach %	89.26	0.00	10.74	####	####	####	0.00	76.71	23.29	7.11	92.89	0.00	

PEAK HR. FACTOR:

	0.864	0.000	0.793	0.812	0.950
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CONTROL: 1 Way Stop (NB)
 COMMENT 1: 0
 GPS: 33.647545, -111.921319

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

Volumes for: Tuesday, March 15, 2016

City: Scottsdale

Project #: 16-1106-002

Location: Scottsdale Rd. south of Chauncey Ln.

AM Period	NB	SB	EB	WB	PM Period	NB	SB	EB	WB
00:00	25	15			12:00	422	402		
00:15	34	21			12:15	381	440		
00:30	20	11			12:30	394	460		
00:45	20	99	10	57	12:45	407	1604	432	1734
01:00	13	9			13:00	429	401		
01:15	10	1			13:15	432	375		
01:30	9	8			13:30	432	419		
01:45	14	46	5	23	13:45	410	1703	382	1577
02:00	5	8			14:00	440	382		
02:15	14	5			14:15	444	364		
02:30	5	5			14:30	460	356		
02:45	1	25	8	26	14:45	471	1815	397	1499
03:00	3	4			15:00	540	340		
03:15	8	7			15:15	454	345		
03:30	6	17			15:30	459	401		
03:45	7	24	16	44	15:45	367	1820	365	1451
04:00	9	19			16:00	465	366		
04:15	13	39			16:15	429	358		
04:30	15	40			16:30	481	376		
04:45	19	56	59	157	16:45	414	1789	354	1454
05:00	30	54			17:00	511	371		
05:15	28	83			17:15	467	456		
05:30	55	152			17:30	504	417		
05:45	47	160	205	494	17:45	405	1887	310	1554
06:00	66	179			18:00	510	300		
06:15	76	244			18:15	396	311		
06:30	106	277			18:30	333	290		
06:45	122	370	309	1009	18:45	341	1580	270	1171
07:00	161	317			19:00	369	246		
07:15	159	354			19:15	304	220		
07:30	240	423			19:30	259	203		
07:45	244	804	450	1544	19:45	266	1198	192	861
08:00	259	433			20:00	264	154		
08:15	259	383			20:15	242	157		
08:30	236	387			20:30	221	116		
08:45	246	1000	362	1565	20:45	224	951	91	518
09:00	233	352			21:00	237	120		
09:15	267	348			21:15	212	110		
09:30	238	396			21:30	183	126		
09:45	273	1011	438	1534	21:45	160	792	103	459
10:00	246	387			22:00	133	112		
10:15	267	411			22:15	115	96		
10:30	301	404			22:30	87	86		
10:45	314	1128	434	1636	22:45	81	416	70	364
11:00	334	489			23:00	79	45		
11:15	373	464			23:15	59	25		
11:30	379	457			23:30	46	28		
11:45	359	1445	446	1856	23:45	52	236	36	134
Total Vol.	6168	9945		16113		15791	12776		28567

GPS Coordinates:

	Daily Totals				Combined				
	NB	SB	EB	WB					
	21959	22721			44680				
	AM				PM				
Split %	38.3%	61.7%			55.3%	44.7%			63.9%
Peak Hour	11:45	11:00		11:45	14:30	12:00			16:45
Volume	1556	1856		3304	1925	1734			3494
P.H.F.	0.92	0.95		0.97	0.89	0.94			0.95

**AM Existing Traffic
Capacity Analysis**

Timings
1: Scottsdale Road & Mayo Boulevard

Existing AM
3/28/2016

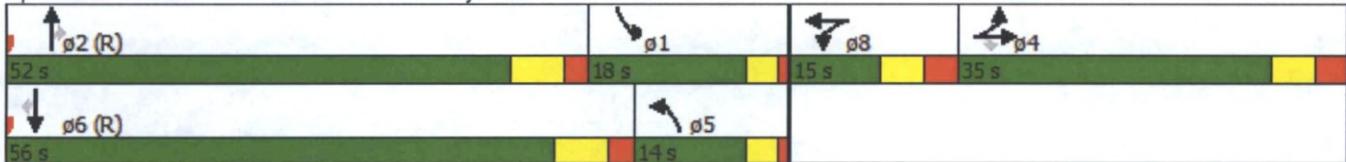


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↑↑↑	↗	↖↖	↑↑	↖↖	↑↑↑	↗	↖↖	↑↑↑	↗
Traffic Volume (vph)	352	13	233	7	4	94	783	5	19	1434	449
Future Volume (vph)	352	13	233	7	4	94	783	5	19	1434	449
Turn Type	Split	NA	Perm	Split	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8	8	5	2		1	6	
Permitted Phases			4					2			6
Detector Phase	4	4	4	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	4.0	4.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	17.0	17.0	17.0	11.0	11.0	9.5	40.0	40.0	9.5	40.0	40.0
Total Split (s)	35.0	35.0	35.0	15.0	15.0	14.0	52.0	52.0	18.0	56.0	56.0
Total Split (%)	29.2%	29.2%	29.2%	12.5%	12.5%	11.7%	43.3%	43.3%	15.0%	46.7%	46.7%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.0	4.8	4.8	3.0	4.8	4.8
All-Red Time (s)	3.1	3.1	3.1	3.1	3.1	1.0	2.2	2.2	1.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag						Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Scottsdale Road & Mayo Boulevard



HCM 2010 Signalized Intersection Summary
1: Scottsdale Road & Mayo Boulevard

Existing AM
3/28/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	352	13	233	7	4	9	94	783	5	19	1434	449
Future Volume (veh/h)	352	13	233	7	4	9	94	783	5	19	1434	449
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	367	14	243	7	4	9	98	816	5	20	1494	468
Adj No. of Lanes	2	3	1	2	2	0	2	3	1	2	3	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	599	885	276	56	29	26	665	1907	594	779	2076	647
Arrive On Green	0.17	0.17	0.17	0.02	0.02	0.02	0.39	0.75	0.75	0.23	0.41	0.41
Sat Flow, veh/h	3442	5085	1583	3442	1770	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	367	14	243	7	4	9	98	816	5	20	1494	468
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	11.8	0.3	18.0	0.2	0.3	0.7	2.2	7.1	0.1	0.5	29.5	29.8
Cycle Q Clear(g_c), s	11.8	0.3	18.0	0.2	0.3	0.7	2.2	7.1	0.1	0.5	29.5	29.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	599	885	276	56	29	26	665	1907	594	779	2076	647
V/C Ratio(X)	0.61	0.02	0.88	0.13	0.14	0.35	0.15	0.43	0.01	0.03	0.72	0.72
Avail Cap(c_a), veh/h	803	1187	369	229	118	106	665	1907	594	779	2076	647
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.98	0.98	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.8	41.0	48.4	58.2	58.2	58.4	30.4	10.3	9.4	36.1	29.7	29.8
Incr Delay (d2), s/veh	0.4	0.0	14.3	0.4	0.8	3.0	0.0	0.7	0.0	0.0	2.2	6.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	0.1	8.9	0.1	0.1	0.3	1.1	3.3	0.0	0.3	14.3	14.2
LnGrp Delay(d),s/veh	46.2	41.1	62.6	58.6	59.0	61.4	30.4	10.9	9.4	36.1	31.9	36.7
LnGrp LOS	D	D	E	E	E	E	C	B	A	D	C	D
Approach Vol, veh/h		624			20			919			1982	
Approach Delay, s/veh		52.5			59.9			13.0			33.1	
Approach LOS		D			E			B			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	31.2	52.0		27.9	27.2	56.0		8.9				
Change Period (Y+Rc), s	* 4	7.0		7.0	* 4	7.0		7.0				
Max Green Setting (Gmax), s	* 14	45.0		28.0	* 10	49.0		8.0				
Max Q Clear Time (g_c+I1), s	2.5	9.1		20.0	4.2	31.8		2.7				
Green Ext Time (p_c), s	0.1	1.3		0.9	0.1	2.4		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay				31.5								
HCM 2010 LOS				C								
Notes												

Timings
2: Scottsdale Road & Chauncey Lane

Existing AM
3/28/2016

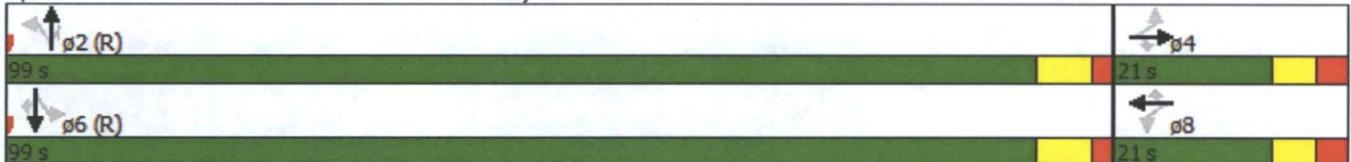


Lane Group	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	67	75	3	3	94	874	4	2	1561	113
Future Volume (vph)	67	75	3	3	94	874	4	2	1561	113
Turn Type	Perm	Perm	Perm	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases						2			6	
Permitted Phases	4	4	8	8	2		2	6		6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	13.0	13.0	13.0	13.0	37.0	37.0	37.0	37.0	37.0	37.0
Total Split (s)	21.0	21.0	21.0	21.0	99.0	99.0	99.0	99.0	99.0	99.0
Total Split (%)	17.5%	17.5%	17.5%	17.5%	82.5%	82.5%	82.5%	82.5%	82.5%	82.5%
Yellow Time (s)	3.9	3.9	3.9	3.9	4.9	4.9	4.9	4.9	4.9	4.9
All-Red Time (s)	3.1	3.1	3.1	3.1	2.1	2.1	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 25 (21%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated

Splits and Phases: 2: Scottsdale Road & Chauncey Lane



HCM 2010 Signalized Intersection Summary
 2: Scottsdale Road & Chauncey Lane

Existing AM
 3/28/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	0	75	3	0	3	94	874	4	2	1561	113
Future Volume (veh/h)	67	0	75	3	0	3	94	874	4	2	1561	113
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	70	0	78	3	0	3	98	910	4	2	1626	118
Adj No. of Lanes	1	2	1	1	2	1	1	3	1	1	3	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	153	234	105	147	234	105	285	4156	1294	533	4156	1294
Arrive On Green	0.07	0.00	0.07	0.07	0.00	0.07	0.82	0.82	0.82	1.00	1.00	1.00
Sat Flow, veh/h	1408	3539	1583	1316	3539	1583	275	5085	1583	608	5085	1583
Grp Volume(v), veh/h	70	0	78	3	0	3	98	910	4	2	1626	118
Grp Sat Flow(s),veh/h/ln	1408	1770	1583	1316	1770	1583	275	1695	1583	608	1695	1583
Q Serve(g_s), s	5.9	0.0	5.8	0.3	0.0	0.2	12.1	4.8	0.1	0.0	0.0	0.0
Cycle Q Clear(g_c), s	5.9	0.0	5.8	0.3	0.0	0.2	12.1	4.8	0.1	4.8	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	153	234	105	147	234	105	285	4156	1294	533	4156	1294
V/C Ratio(X)	0.46	0.00	0.75	0.02	0.00	0.03	0.34	0.22	0.00	0.00	0.39	0.09
Avail Cap(c_a), veh/h	224	413	185	213	413	185	285	4156	1294	533	4156	1294
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Uniform Delay (d), s/veh	55.1	0.0	55.0	52.5	0.0	52.4	3.1	2.4	2.0	0.1	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.0	3.9	0.0	0.0	0.0	3.3	0.1	0.0	0.0	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	2.6	0.1	0.0	0.1	1.2	2.2	0.0	0.0	0.1	0.0
LnGrp Delay(d),s/veh	55.9	0.0	59.0	52.5	0.0	52.5	6.4	2.6	2.0	0.1	0.2	0.1
LnGrp LOS	E		E	D		D	A	A	A	A	A	A
Approach Vol, veh/h		148			6			1012			1746	
Approach Delay, s/veh		57.5			52.5			2.9			0.2	
Approach LOS		E			D			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		105.1		14.9		105.1		14.9				
Change Period (Y+Rc), s		7.0		7.0		7.0		7.0				
Max Green Setting (Gmax), s		92.0		14.0		92.0		14.0				
Max Q Clear Time (g_c+I1), s		14.1		7.9		6.8		2.3				
Green Ext Time (p_c), s		7.8		0.1		7.8		0.2				
Intersection Summary												
HCM 2010 Ctrl Delay			4.2									
HCM 2010 LOS			A									

Intersection

Int Delay, s/veh	1.2
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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	158	104	16	82	26	8
Future Vol, veh/h	158	104	16	82	26	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	160	190	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	166	109	17	86	27	8

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	166
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	1410
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1410
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	10
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	761	-	-	1410	-
HCM Lane V/C Ratio	0.047	-	-	0.012	-
HCM Control Delay (s)	10	-	-	7.6	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

**PM Existing Traffic
Capacity Analysis**

Timings
1: Scottsdale Road & Mayo Boulevard

Existing PM
3/28/2016

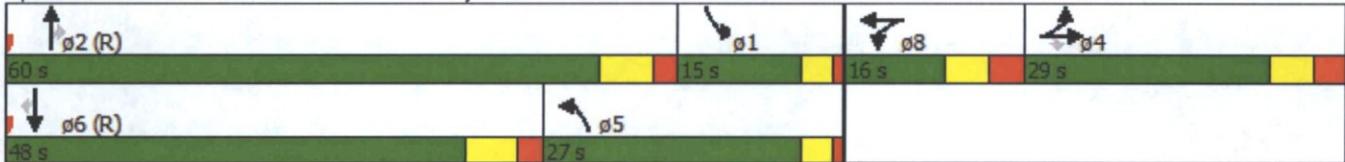


Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑↑	↗	↑↑	↖↗	↑↑↑	↗	↖↗	↑↑↑	↗
Traffic Volume (vph)	600	3	210	11	334	1423	3	6	1219	750
Future Volume (vph)	600	3	210	11	334	1423	3	6	1219	750
Turn Type	Split	NA	Perm	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8	5	2		1	6	
Permitted Phases			4				2			6
Detector Phase	4	4	4	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	4.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	17.0	17.0	17.0	11.0	9.5	40.0	40.0	9.5	40.0	40.0
Total Split (s)	29.0	29.0	29.0	16.0	27.0	60.0	60.0	15.0	48.0	48.0
Total Split (%)	24.2%	24.2%	24.2%	13.3%	22.5%	50.0%	50.0%	12.5%	40.0%	40.0%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.0	4.8	4.8	3.0	4.8	4.8
All-Red Time (s)	3.1	3.1	3.1	3.1	1.0	2.2	2.2	1.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag					Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Scottsdale Road & Mayo Boulevard



HCM 2010 Signalized Intersection Summary
 1: Scottsdale Road & Mayo Boulevard

Existing PM
 3/28/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	600	3	210	0	11	20	334	1423	3	6	1219	750
Future Volume (veh/h)	600	3	210	0	11	20	334	1423	3	6	1219	750
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	625	3	219	0	11	21	348	1482	3	6	1270	781
Adj No. of Lanes	2	3	1	2	2	0	2	3	1	2	3	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	631	932	290	75	39	35	843	2246	699	498	1737	541
Arrive On Green	0.18	0.18	0.18	0.00	0.02	0.02	0.33	0.59	0.59	0.14	0.34	0.34
Sat Flow, veh/h	3442	5085	1583	3442	1770	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	625	3	219	0	11	21	348	1482	3	6	1270	781
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	21.7	0.1	15.7	0.0	0.7	1.6	9.5	23.6	0.1	0.2	26.3	41.0
Cycle Q Clear(g_c), s	21.7	0.1	15.7	0.0	0.7	1.6	9.5	23.6	0.1	0.2	26.3	41.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	631	932	290	75	39	35	843	2246	699	498	1737	541
V/C Ratio(X)	0.99	0.00	0.75	0.00	0.28	0.61	0.41	0.66	0.00	0.01	0.73	1.44
Avail Cap(c_a), veh/h	631	932	290	258	133	119	843	2246	699	498	1737	541
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00	0.86	0.86	0.86	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.9	40.0	46.4	0.0	57.8	58.2	33.7	18.7	13.8	44.0	34.7	39.5
Incr Delay (d2), s/veh	33.3	0.0	9.6	0.0	1.5	6.2	0.1	1.3	0.0	0.0	2.8	210.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.2	0.0	7.6	0.0	0.4	0.7	4.5	11.1	0.0	0.1	12.7	49.4
LnGrp Delay(d),s/veh	82.2	40.0	56.1	0.0	59.2	64.4	33.9	20.0	13.9	44.0	37.4	249.5
LnGrp LOS	F	D	E		E	E	C	C	B	D	D	F
Approach Vol, veh/h		847			32			1833			2057	
Approach Delay, s/veh		75.3			62.6			22.6			117.9	
Approach LOS		E			E			C			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	21.4	60.0		29.0	33.4	48.0		9.6				
Change Period (Y+Rc), s	* 4	7.0		7.0	* 4	7.0		7.0				
Max Green Setting (Gmax), s	* 11	53.0		22.0	* 23	41.0		9.0				
Max Q Clear Time (g_c+1), s	2.2	25.6		23.7	11.5	43.0		3.6				
Green Ext Time (p_c), s	0.5	2.7		0.0	0.6	0.0		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			73.4									
HCM 2010 LOS			E									
Notes												

Timings

Existing PM

2: Scottsdale Road & Chauncey Lane

3/28/2016

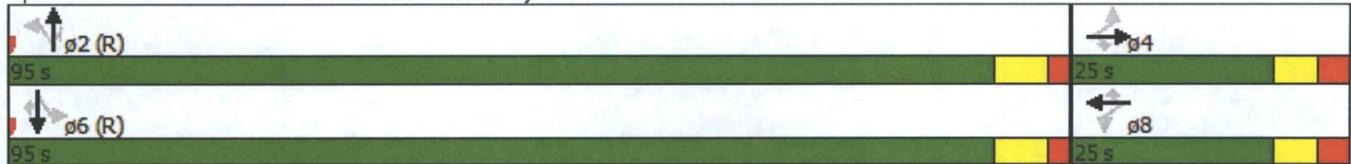


Lane Group	EBL	EBR	WBL	NBL	NBT	NBR	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	129	101	5	96	1741	2	1444	85
Future Volume (vph)	129	101	5	96	1741	2	1444	85
Turn Type	Perm	Perm	Perm	Perm	NA	Perm	NA	Perm
Protected Phases					2		6	
Permitted Phases	4	4	8	2		2		6
Detector Phase	4	4	8	2	2	2	6	6
Switch Phase								
Minimum Initial (s)	6.0	6.0	6.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	13.0	13.0	13.0	37.0	37.0	37.0	37.0	37.0
Total Split (s)	25.0	25.0	25.0	95.0	95.0	95.0	95.0	95.0
Total Split (%)	20.8%	20.8%	20.8%	79.2%	79.2%	79.2%	79.2%	79.2%
Yellow Time (s)	3.9	3.9	3.9	4.9	4.9	4.9	4.9	4.9
All-Red Time (s)	3.1	3.1	3.1	2.1	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 25 (21%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated

Splits and Phases: 2: Scottsdale Road & Chauncey Lane



HCM 2010 Signalized Intersection Summary
2: Scottsdale Road & Chauncey Lane

Existing PM
3/28/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	129	0	101	5	0	0	96	1741	2	0	1444	85
Future Volume (veh/h)	129	0	101	5	0	0	96	1741	2	0	1444	85
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	136	0	106	5	0	0	101	1833	2	0	1520	89
Adj No. of Lanes	1	2	1	1	2	1	1	3	1	1	3	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	219	399	178	204	399	178	302	3919	1220	60	3919	1220
Arrive On Green	0.11	0.00	0.11	0.11	0.00	0.00	0.77	0.77	0.77	0.00	1.00	1.00
Sat Flow, veh/h	1412	3539	1583	1283	3539	1583	314	5085	1583	252	5085	1583
Grp Volume(v), veh/h	136	0	106	5	0	0	101	1833	2	0	1520	89
Grp Sat Flow(s),veh/h/ln	1412	1770	1583	1283	1770	1583	314	1695	1583	252	1695	1583
Q Serve(g_s), s	11.4	0.0	7.6	0.4	0.0	0.0	13.1	15.5	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	11.4	0.0	7.6	0.4	0.0	0.0	13.1	15.5	0.0	0.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	219	399	178	204	399	178	302	3919	1220	60	3919	1220
V/C Ratio(X)	0.62	0.00	0.59	0.02	0.00	0.00	0.33	0.47	0.00	0.00	0.39	0.07
Avail Cap(c_a), veh/h	272	531	237	252	531	237	302	3919	1220	60	3919	1220
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	0.80	0.80
Uniform Delay (d), s/veh	52.3	0.0	50.6	47.4	0.0	0.0	4.7	4.9	3.2	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.1	0.0	1.2	0.0	0.0	0.0	3.0	0.4	0.0	0.0	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	0.0	3.4	0.1	0.0	0.0	1.4	7.3	0.0	0.0	0.1	0.0
LnGrp Delay(d),s/veh	53.4	0.0	51.8	47.4	0.0	0.0	7.6	5.3	3.2	0.0	0.2	0.1
LnGrp LOS	D		D	D			A	A	A		A	A
Approach Vol, veh/h		242			5			1936			1609	
Approach Delay, s/veh		52.7			47.4			5.5			0.2	
Approach LOS		D			D			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		99.5		20.5		99.5		20.5				
Change Period (Y+Rc), s		7.0		7.0		7.0		7.0				
Max Green Setting (Gmax), s		88.0		18.0		88.0		18.0				
Max Q Clear Time (g_c+1), s		17.5		13.4		2.0		2.4				
Green Ext Time (p_c), s		11.8		0.2		11.9		0.3				
Intersection Summary												
HCM 2010 Ctrl Delay			6.3									
HCM 2010 LOS			A									

Intersection

Int Delay, s/veh	2.8
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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	163	49	15	190	105	13
Future Vol, veh/h	163	49	15	190	105	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	-	160	190	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	172	52	16	200	111	14

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	172	0	304	86
Stage 1	-	-	-	-	172	-
Stage 2	-	-	-	-	132	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1402	-	664	956
Stage 1	-	-	-	-	841	-
Stage 2	-	-	-	-	880	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1402	-	656	956
Mov Cap-2 Maneuver	-	-	-	-	656	-
Stage 1	-	-	-	-	841	-
Stage 2	-	-	-	-	870	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	11.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	679	-	-	1402	-
HCM Lane V/C Ratio	0.183	-	-	0.011	-
HCM Control Delay (s)	11.5	-	-	7.6	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.7	-	-	0	-

Crash Data

Trip Generation and Reductions

Trip Generation Planner (ITE 9th Edition) - Summary Report



Weekday Trip Generation
Trips Based on Average Rates/Equations

Project Name SEC Scottsdale Rd & Chauncey Ln
Project Number 291005000

ITE Code	Internal Capture Land Use	Land Use Description	Independent Variable	No. of Units	Avg Rate or Eq	Rates			Total Trips				Net Trips after Internal Capture				Net Trips after Internal Capture & Pass-By												
						Daily Rate	AM Rate	PM Rate	Daily Trips	AM Trips	PM Trips	AM Trips In	AM Trips Out	PM Trips In	PM Trips Out	Daily Trips	AM Trips	PM Trips	AM Trips In	AM Trips Out	PM Trips In	PM Trips Out							
220	Residential	Apartment	Dwelling Unit(s)	294	Avg	6.65	0.51	0.62	1956	150	182	30	120	118	64	1598	129	155	20	109	104	51	1598	129	155	20	109	104	51
826	Retail	Specialty Retail Center	1,000 Sq Ft GLA	33.05	Avg	44.32	0.96	2.71	1466	32	90	20	12	40	50	1320	29	80	18	11	36	44	1320	29	80	18	11	36	44
932	Retail	High-Turnover (Sit-Down) Restaurant	1,000 Sq Ft	16.675	Avg	127.15	10.81	9.85	2122	180	164	99	81	98	66	1910	162	147	90	72	89	58	1910	162	147	90	72	89	58
	Select Use																												
Totals									5544	362	436	149	213	256	180	4828	320	382	128	192	229	153	4828	320	319	128	192	191	128

Notes:

- (1) AM and/or PM rates correspond to peak hour of generator
- A Trip Generation data from ITE Trip Generation, 9th Edition
- B AM/PM rates correspond to peak of adjacent street traffic (if data available)
- C Includes weekday rates only
- D Total trips include pass-by trips w/ no internal capture
- E Pass-by rates from ITE Trip Generation Handbook, 2nd Edition
- F Internal capture rates from ITE Trip Generation Handbook, 2nd Edition
- G Worksheet is intended as a planning tool. Verify results w/ ITE Trip Generation 9th Edition

Project SEC Scottsdale Rd & Chauncey Ln

Trip generation for Apartment

Designed by NB Date March 24, 2016 Job No. 291005000
 Checked by CRW Date March 24, 2016 Sheet No. 1 of 3

TRIP GENERATION MANUAL TECHNIQUES

ITE *Trip Generation 9th Edition*, Average Rate Equations

Land Use Code - **220** Apartment

Independent Variable - Dwelling Unit(s)

Number of Units (X) - 294

T = Trip Ends

Peak Hour Adjacent Street Traffic One Hour Between 7 and 9 AM

AM Peak			Directional Distribution:
T = (X) * 0.51	Trip Ends Per Dwelling Unit(s)	20% Entering	80% Exiting
T = 150	Trip Ends	30 Entering	120 Exiting

Peak Hour Adjacent Street Traffic One Hour Between 4 and 6 PM

PM Peak			Directional Distribution:
T = (X) * 0.62	Trip Ends Per Dwelling Unit(s)	65% Entering	35% Exiting
T = 182	Trip Ends	118 Entering	64 Exiting

Weekday

Daily Weekday			Directional Distribution:
T = (X) * 6.65	Trip Ends Per Dwelling Unit(s)	50% Entering	50% Exiting
T = 1956	Trip Ends	978 Entering	978 Exiting

Non-Pass-By Trip Percentage

AM 100%
PM 100%

Non-Pass-By Trip Volumes

AM Peak	30 Entering	120 Exiting
PM Peak	118 Entering	64 Exiting

Note: Rounding may occur in calculations

Project SEC Scottsdale Rd & Chauncey Ln

Trip generation for Specialty Retail Center

Designed by NB

Date March 24, 2016

Job No. 291005000

Checked by CRW

Date March 24, 2016

Sheet No. 2 of 3

TRIP GENERATION MANUAL TECHNIQUES

ITE *Trip Generation 9th Edition*, Average Rate Equations

Land Use Code - **826** Specialty Retail Center

Independent Variable - 1,000 Sq Ft GLA

Number of Units (X) - 33.05

T = Trip Ends

Peak Hour Adjacent Street Traffic One Hour Between 7 and 9 AM

AM Peak

T = (X) * 0.96 Trip Ends Per 1,000 Sq Ft GLA

T = 32 Trip Ends

Directional Distribution:

62% Entering 38% Exiting

20 Entering 12 Exiting

Peak Hour Adjacent Street Traffic One Hour Between 4 and 6 PM

PM Peak

T = (X) * 2.71 Trip Ends Per 1,000 Sq Ft GLA

T = 90 Trip Ends

Directional Distribution:

44% Entering 56% Exiting

40 Entering 50 Exiting

Weekday

Daily Weekday

T = (X) * 44.32 Trip Ends Per 1,000 Sq Ft GLA

T = 1466 Trip Ends

Directional Distribution:

50% Entering 50% Exiting

733 Entering 733 Exiting

Non-Pass-By Trip Percentage

AM 100%

PM 100%

Non-Pass-By Trip Volumes

AM Peak 20 Entering

12 Exiting

PM Peak 40 Entering

50 Exiting

Note: Rounding may occur in calculations

Project SEC Scottsdale Rd & Chauncey Ln
 Trip generation for High-Turnover (Sit-Down) Restaurant

Designed by NB Date March 24, 2016 Job No. 291005000
 Checked by CRW Date March 24, 2016 Sheet No. 3 of 3

TRIP GENERATION MANUAL TECHNIQUES

ITE *Trip Generation 9th Edition*, Average Rate Equations

Land Use Code - **932** High-Turnover (Sit-Down) Restaurant

Independent Variable - 1,000 Sq Ft

Number of Units (X) - 16.675

T = Trip Ends

Peak Hour Adjacent Street Traffic One Hour Between 7 and 9 AM

AM Peak			Directional Distribution:
T = (X) * 10.81	Trip Ends Per 1,000 Sq Ft		55% Entering 45% Exiting
T = 180	Trip Ends		99 Entering 81 Exiting

Peak Hour Adjacent Street Traffic One Hour Between 4 and 6 PM

PM Peak			Directional Distribution:
T = (X) * 9.85	Trip Ends Per 1,000 Sq Ft		60% Entering 40% Exiting
T = 164	Trip Ends		98 Entering 66 Exiting

Weekday

Daily Weekday			Directional Distribution:
T = (X) * 127.15	Trip Ends Per 1,000 Sq Ft		50% Entering 50% Exiting
T = 2122	Trip Ends		1061 Entering 1061 Exiting

Non-Pass-By Trip Percentage

AM 100%
 PM 57%

Non-Pass-By Trip Volumes

AM Peak	99 Entering	81 Exiting
PM Peak	56 Entering	37 Exiting

Note: Rounding may occur in calculations

ITE MULTI-USE PROJECT INTERNAL CAPTURE WORKSHEET

(Source: Chapter 7, ITE Trip Generation Handbook, June 2004)

Adjusted

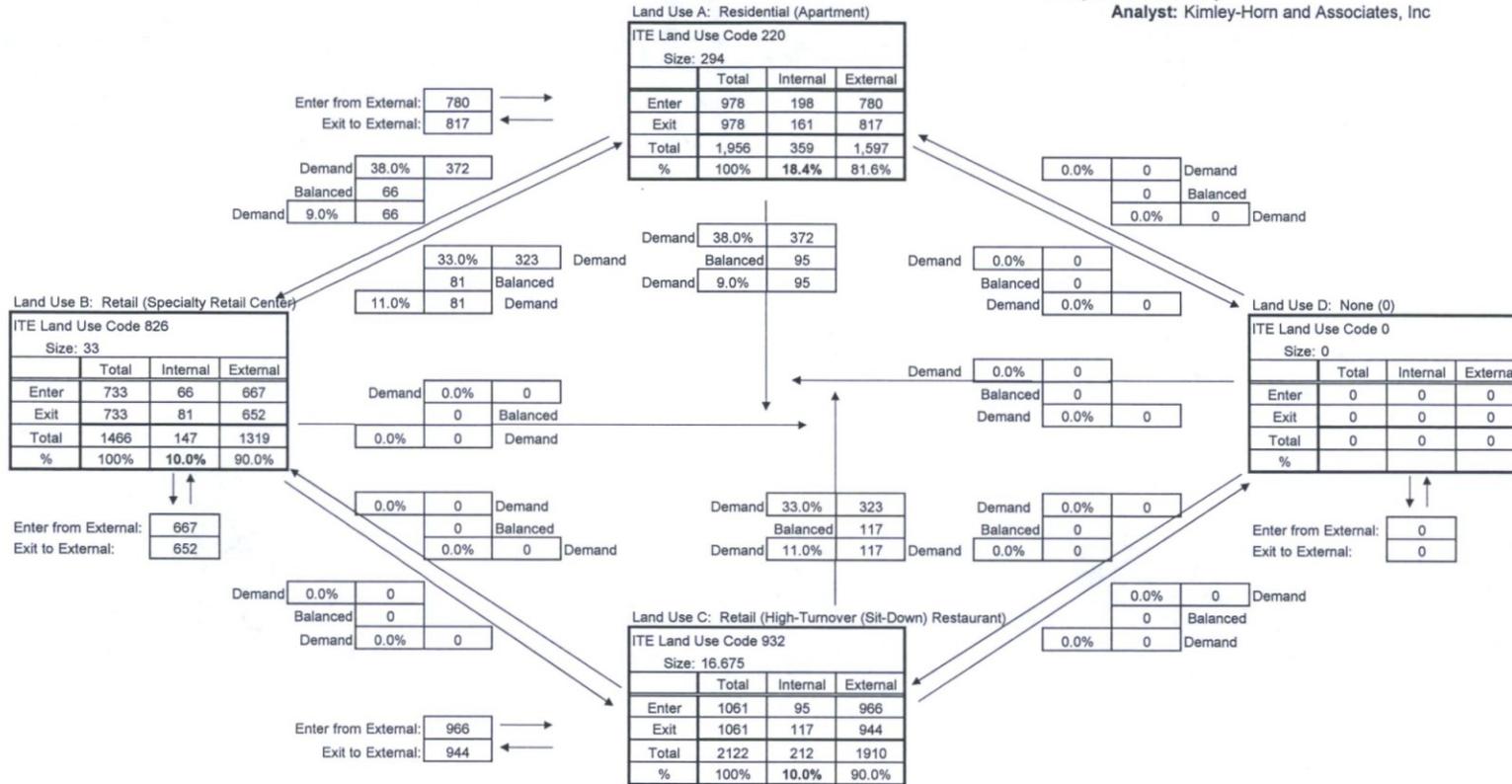
Project Number: 291005000

Project Name: SEC Scottsdale Rd & Chauncey Ln

Scenario:

Analysis Period: Daily

Analyst: Kimley-Horn and Associates, Inc



Category	Land Use				Total
	A	B	C	D	
Enter	780	667	966	0	2,413
Exit	817	652	944	0	2,413
Total	1,597	1,319	1,910	0	4,826
Single Use Trip Gen Estimate	1,956	1,466	2,122	0	5,544

Overall Internal Capture = **12.95%**

ITE MULTI-USE PROJECT INTERNAL CAPTURE WORKSHEET

(Source: Chapter 7, ITE Trip Generation Handbook, June 2004)

Adjusted

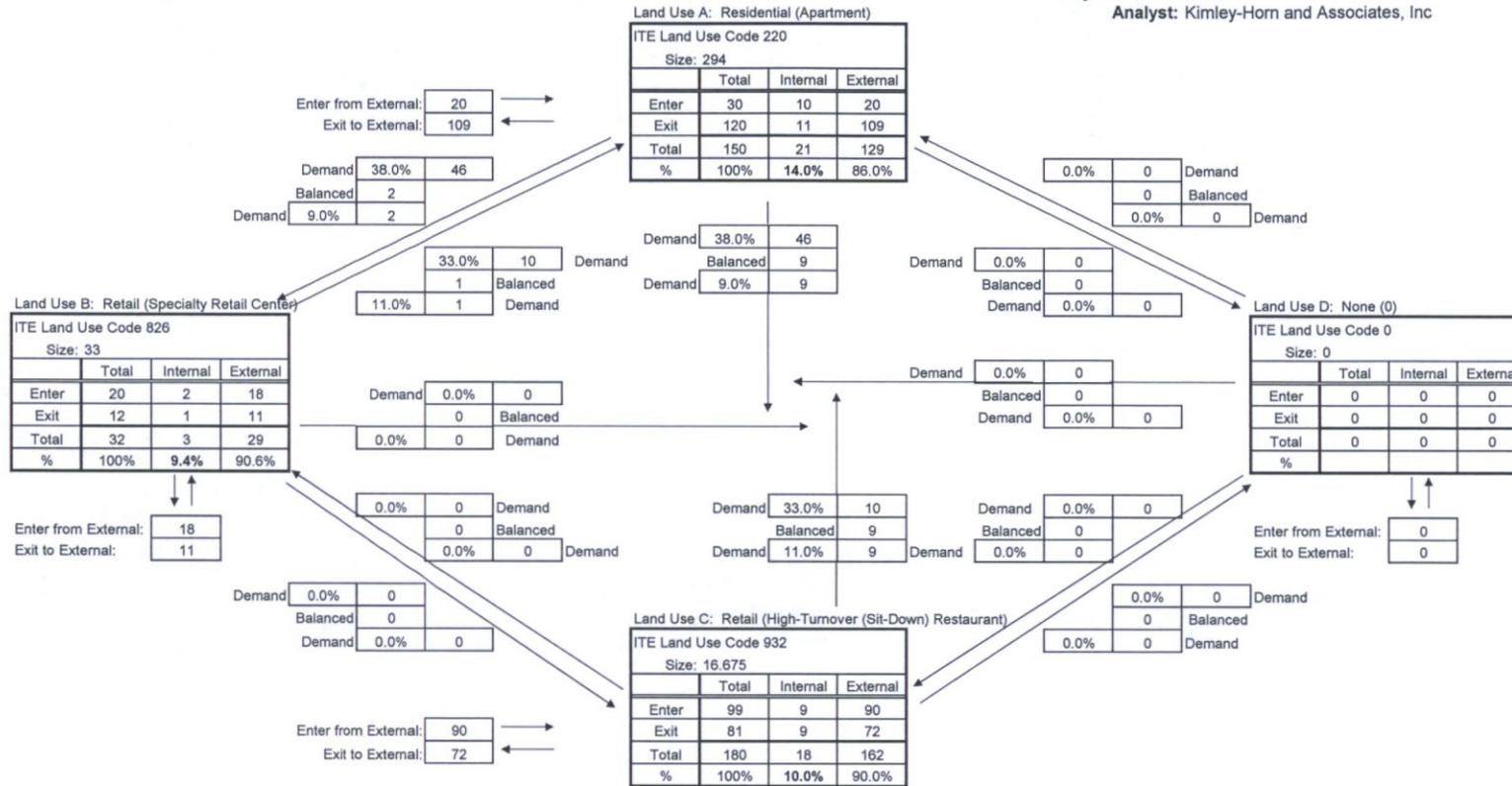
Project Number: 291005000

Project Name: SEC Scottsdale Rd & Chauncey Ln

Scenario:

Analysis Period: AM Peak

Analyst: Kimley-Horn and Associates, Inc



Category	Land Use				Total
	A	B	C	D	
Enter	20	18	90	0	128
Exit	109	11	72	0	192
Total	129	29	162	0	320
Single Use Trip Gen Estimate	150	32	180	0	362

Overall Internal Capture = **11.60%**

ITE MULTI-USE PROJECT INTERNAL CAPTURE WORKSHEET

(Source: Chapter 7, ITE Trip Generation Handbook, June 2004)

Adjusted

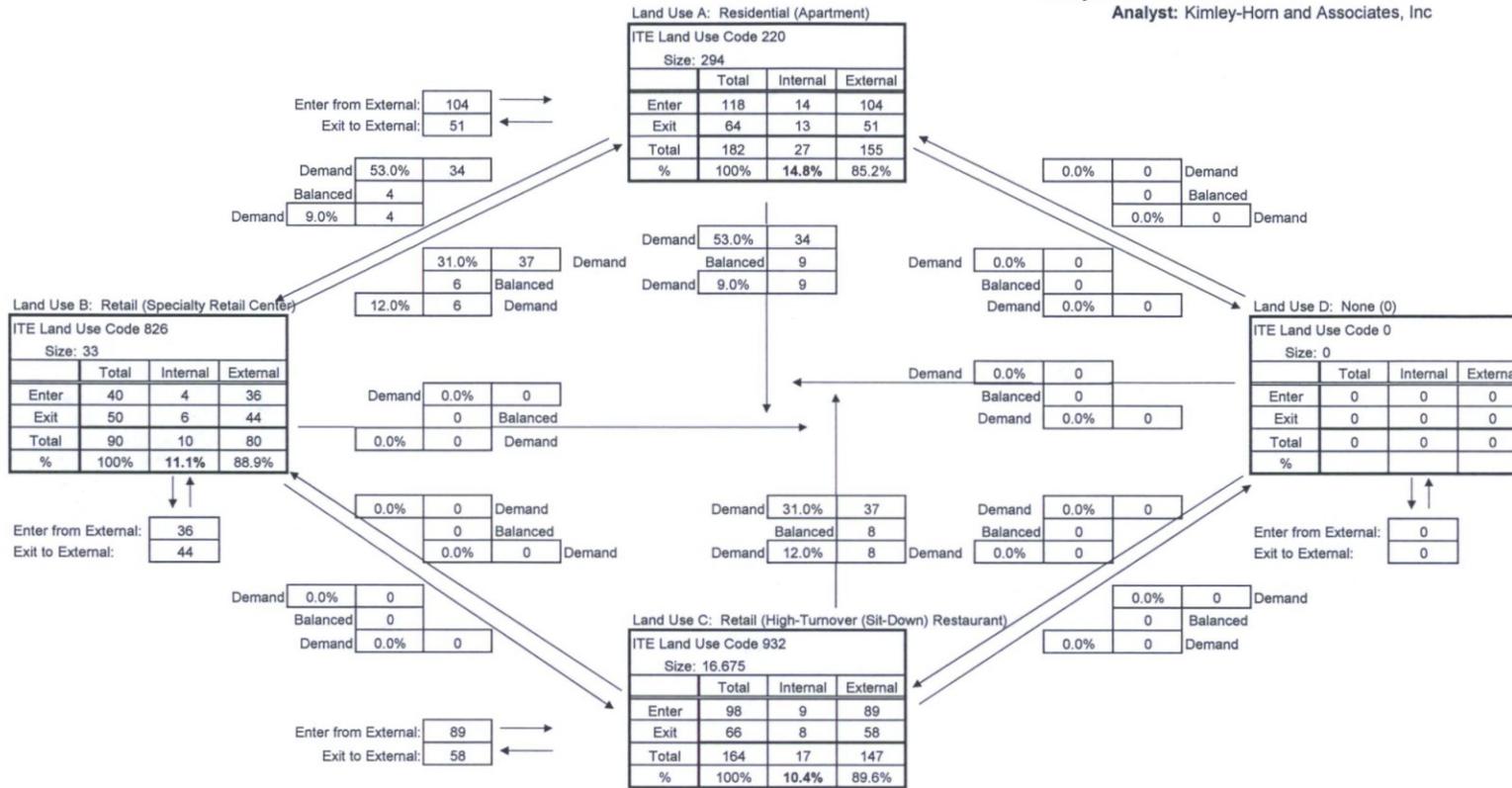
Project Number: 291005000

Project Name: SEC Scottsdale Rd & Chauncey Ln

Scenario:

Analysis Period: PM Peak

Analyst: Kimley-Horn and Associates, Inc



Category	Land Use				Total
	A	B	C	D	
Enter	104	36	89	0	229
Exit	51	44	58	0	153
Total	155	80	147	0	382
Single Use Trip Gen Estimate	182	90	164	0	436

Overall Internal Capture = 12.39%

Adjacent Development Trip Generation

Trip Generation Planner (ITE 9th Edition) - Summary Report



Weekday Trip Generation
Trips Based on Average Rates/Equations

Project Name NEC Scottsdale Rd & Chauncey Ln
Project Number 191447014

ITE Code	Internal Capture Land Use	Land Use Description	Independent Variable	No. of Units	Avg Rate or Eq	Rates			Total Trips				Net Trips after Internal Capture				Net Trips after Internal Capture & Pass-By													
						Daily Rate	AM Rate	PM Rate	Daily Trips	AM Trips	PM Trips	PM Trips	Daily Trips	AM Trips	PM Trips	PM Trips	Daily Trips	AM Trips	PM Trips	PM Trips										
220	Select Use	Apartment	Dwelling Unit(s)	187	Avg	6.65	0.51	0.62	1244	95	116	19	76	75	41	1244	95	116	19	76	75	41	1244	95	116	19	76	75	41	
310	Select Use	Hotel	Room(s)	232	Avg	8.17	0.53	0.60	1896	123	139	73	50	71	68	1896	123	139	73	50	71	68	1896	123	139	73	50	71	68	
710	Select Use	General Office Building (1)	1,000 Sq Ft	11,763	Avg	11.03	1.56	1.49	130	18	18	16	2	3	15	130	18	18	16	2	3	15	130	18	18	16	2	3	15	
826-N	Select Use	Specialty Retail Center (North Pad)	1,000 Sq Ft GLA	15,683	Avg	44.32	0.96	2.71	696	15	43	9	6	19	24	696	15	43	9	6	19	24	696	15	43	9	6	19	24	
826-S	Select Use	Specialty Retail Center (South Pad)	1,000 Sq Ft GLA	9,997	Avg	44.32	0.96	2.71	444	10	27	7	3	12	15	444	10	27	7	3	12	15	444	10	27	7	3	12	15	
Totals									4410	261	343	124	137	180	163	4410	261	343	124	137	180	163	4410	261	343	124	137	180	163	163

Notes:

(1) AM and/or PM rates correspond to peak hour of generator

- A Trip Generation data from ITE Trip Generation, 9th Edition
- B AM/PM rates correspond to peak of adjacent street traffic (if data available)
- C Includes weekday rates only
- D Total trips include pass-by trips w/ no internal capture
- E Pass-by rates from ITE Trip Generation Handbook, 2nd Edition
- F Internal capture rates from ITE Trip Generation Handbook, 2nd Edition
- G Worksheet is intended as a planning tool. Verify results w/ ITE Trip Generation 9th Edition

Project NEC Scottsdale Rd & Chauncey Ln
 Trip generation for Apartment
 Designed by NB Date January 19, 2015 Job No. 191447014
 Checked by CRW Date January 19, 2015 Sheet No. 1 of 5

TRIP GENERATION MANUAL TECHNIQUES

ITE *Trip Generation 9th Edition*, Average Rate Equations

Land Use Code - **220** Apartment

Independent Variable - Dwelling Unit(s)

Number of Units (X) - 187

T = Trip Ends

Peak Hour Adjacent Street Traffic One Hour Between 7 and 9 AM

AM Peak			Directional Distribution:
T = (X) * 0.51	Trip Ends Per Dwelling Unit(s)	20% Entering	80% Exiting
T = 95	Trip Ends	19 Entering	76 Exiting

Peak Hour Adjacent Street Traffic One Hour Between 4 and 6 PM

PM Peak			Directional Distribution:
T = (X) * 0.62	Trip Ends Per Dwelling Unit(s)	65% Entering	35% Exiting
T = 116	Trip Ends	75 Entering	41 Exiting

Weekday

Daily Weekday			Directional Distribution:
T = (X) * 6.65	Trip Ends Per Dwelling Unit(s)	50% Entering	50% Exiting
T = 1244	Trip Ends	622 Entering	622 Exiting

Non-Pass-By Trip Percentage

AM 100%
 PM 100%

Non-Pass-By Trip Volumes

AM Peak	19 Entering	76 Exiting
PM Peak	75 Entering	41 Exiting

Note: Rounding may occur in calculations

Project NEC Scottsdale Rd & Chauncey Ln

Trip generation for Hotel

Designed by NB

Date January 19, 2015

Job No. 191447014

Checked by CRW

Date January 19, 2015

Sheet No. 2 of 5

TRIP GENERATION MANUAL TECHNIQUES

ITE *Trip Generation 9th Edition*, Average Rate Equations

Land Use Code - **310** Hotel

Independent Variable - Room(s)

Number of Units (X) - 232

T = Trip Ends

Peak Hour Adjacent Street Traffic One Hour Between 7 and 9 AM

AM Peak

T = (X) * 0.53

Trip Ends Per Room(s)

T = 123

Trip Ends

Directional Distribution:

59% Entering

41% Exiting

73 Entering

50 Exiting

Peak Hour Adjacent Street Traffic One Hour Between 4 and 6 PM

PM Peak

T = (X) * 0.60

Trip Ends Per Room(s)

T = 139

Trip Ends

Directional Distribution:

51% Entering

49% Exiting

71 Entering

68 Exiting

Weekday

Daily Weekday

T = (X) * 8.17

Trip Ends Per Room(s)

T = 1896

Trip Ends

Directional Distribution:

50% Entering

50% Exiting

948 Entering

948 Exiting

Non-Pass-By Trip Percentage

AM 100%

PM 100%

Non-Pass-By Trip Volumes

AM Peak

73 Entering

50 Exiting

PM Peak

71 Entering

68 Exiting

Note: Rounding may occur in calculations

Project NEC Scottsdale Rd & Chauncey Ln
 Trip generation for General Office Building (1)
 Designed by NB Date January 19, 2015 Job No. 191447014
 Checked by CRW Date January 19, 2015 Sheet No. 3 of 5

TRIP GENERATION MANUAL TECHNIQUES

ITE *Trip Generation 9th Edition*, Average Rate Equations

Land Use Code - **710** General Office Building (1)
 Independent Variable - 1,000 Sq Ft
 Number of Units (X) - 11.763

T = Trip Ends

Peak Hour Generator

AM Peak
 T = (X) * 1.56 Trip Ends Per 1,000 Sq Ft
 T = 18 Trip Ends

Directional Distribution:
 88% Entering 12% Exiting
 16 Entering 2 Exiting

Peak Hour Generator

PM Peak
 T = (X) * 1.49 Trip Ends Per 1,000 Sq Ft
 T = 18 Trip Ends

Directional Distribution:
 17% Entering 83% Exiting
 3 Entering 15 Exiting

Weekday

Daily Weekday
 T = (X) * 11.03 Trip Ends Per 1,000 Sq Ft
 T = 130 Trip Ends

Directional Distribution:
 50% Entering 50% Exiting
 65 Entering 65 Exiting

Non-Pass-By Trip Percentage

AM 100%
 PM 100%

Non-Pass-By Trip Volumes

AM Peak 16 Entering 2 Exiting
 PM Peak 3 Entering 15 Exiting

Note: Rounding may occur in calculations

Project NEC Scottsdale Rd & Chauncey Ln

Trip generation for Specialty Retail Center (North Pad)

Designed by NB

Date January 19, 2015

Job No. 191447014

Checked by CRW

Date January 19, 2015

Sheet No. 4 of 5

TRIP GENERATION MANUAL TECHNIQUES

ITE *Trip Generation 9th Edition*, Average Rate Equations

Land Use Code - **826-N** Specialty Retail Center (North Pad)

Independent Variable - 1,000 Sq Ft GLA

Number of Units (X) - 15.683

T = Trip Ends

Peak Hour Adjacent Street Traffic One Hour Between 7 and 9 AM

AM Peak

Directional Distribution:

T = (X) * 0.96 Trip Ends Per 1,000 Sq Ft GLA

62% Entering 38% Exiting

T = 15 Trip Ends

9 Entering 6 Exiting

Peak Hour Adjacent Street Traffic One Hour Between 4 and 6 PM

PM Peak

Directional Distribution:

T = (X) * 2.71 Trip Ends Per 1,000 Sq Ft GLA

44% Entering 56% Exiting

T = 43 Trip Ends

19 Entering 24 Exiting

Weekday

Daily Weekday

Directional Distribution:

T = (X) * 44.32 Trip Ends Per 1,000 Sq Ft GLA

50% Entering 50% Exiting

T = 696 Trip Ends

348 Entering 348 Exiting

Non-Pass-By Trip Percentage

Non-Pass-By Trip Volumes

AM 100%

AM Peak 9 Entering

6 Exiting

PM 100%

PM Peak 19 Entering

24 Exiting

Note: Rounding may occur in calculations

Project NEC Scottsdale Rd & Chauncey Ln
 Trip generation for Specialty Retail Center (South Pad)
 Designed by NB Date January 19, 2015 Job No. 191447014
 Checked by CRW Date January 19, 2015 Sheet No. 5 of 5

TRIP GENERATION MANUAL TECHNIQUES

ITE *Trip Generation 9th Edition*, Average Rate Equations

Land Use Code - **826-S** Specialty Retail Center (South Pad)

Independent Variable - 1,000 Sq Ft GLA

Number of Units (X) - 9.997

T = Trip Ends

Peak Hour Adjacent Street Traffic One Hour Between 7 and 9 AM

AM Peak			Directional Distribution:
T = (X) * 0.96	Trip Ends Per 1,000 Sq Ft GLA	73% Entering	27% Exiting
T = 10	Trip Ends	7 Entering	3 Exiting

Peak Hour Adjacent Street Traffic One Hour Between 4 and 6 PM

PM Peak			Directional Distribution:
T = (X) * 2.71	Trip Ends Per 1,000 Sq Ft GLA	44% Entering	56% Exiting
T = 27	Trip Ends	12 Entering	15 Exiting

Weekday

Daily Weekday			Directional Distribution:
T = (X) * 44.32	Trip Ends Per 1,000 Sq Ft GLA	50% Entering	50% Exiting
T = 444	Trip Ends	222 Entering	222 Exiting

Non-Pass-By Trip Percentage

AM 100%
 PM 100%

Non-Pass-By Trip Volumes

AM Peak	7 Entering	3 Exiting
PM Peak	12 Entering	15 Exiting

Note: Rounding may occur in calculations

Trip Generation Planner (ITE 9th Edition) - Summary Report



Weekday Trip Generation
Trips Based on Average Rates/Equations

Project Name ASDL Trip Gen
Project Number 291005000

ITE Code	Internal Capture Land Use	Land Use Description	Independent Variable	No. of Units	Avg Rate or Eq	Rates			Total Trips				Net Trips after Internal Capture				Net Trips after Internal Capture & Pass-By													
						Daily Rate	AM Rate	PM Rate	Daily Trips	AM Trips	PM Trips	AM Trips In	AM Trips Out	PM Trips In	PM Trips Out	Daily Trips	AM Trips	PM Trips	AM Trips In	AM Trips Out	PM Trips In	PM Trips Out								
220	Residential	Apartment	Dwelling Unit(s)	323	Avg	6.65	0.51	0.62	2148	165	200	33	132	130	70	1760	142	170	22	120	114	56	1760	142	170	22	120	114	56	
826	Retail	Specialty Retail Center	1,000 Sq Ft GLA	36	Avg	44.32	0.96	2.71	1596	35	98	22	13	43	55	1436	32	87	20	12	39	48	1436	32	87	20	12	39	48	
932	Retail	High-Turnover (Sit-Down) Restaurant	1,000 Sq Ft	18	Avg	127.15	10.81	9.85	2290	195	177	107	88	106	71	2062	175	158	97	78	96	62	2062	175	90	97	78	55	35	
	Select Use																													
Totals									6034	395	475	162	233	279	196	5258	349	415	139	210	249	166	5258	349	347	139	210	208	139	

Notes:

- (1) AM and/or PM rates correspond to peak hour of generator
- A Trip Generation data from ITE Trip Generation, 9th Edition
- B AM/PM rates correspond to peak of adjacent street traffic (if data available)
- C Includes weekday rates only
- D Total trips include pass-by trips w/ no internal capture
- E Pass-by rates from ITE Trip Generation Handbook, 2nd Edition
- F Internal capture rates from ITE Trip Generation Handbook, 2nd Edition
- G Worksheet is intended as a planning tool. Verify results w/ ITE Trip Generation 9th Edition

Project ASDL Trip Gen
 Trip generation for Apartment
 Designed by NB Date March 24, 2016 Job No. 291005000
 Checked by CRW Date March 24, 2016 Sheet No. 1 of 3

TRIP GENERATION MANUAL TECHNIQUES

ITE *Trip Generation 9th Edition*, Average Rate Equations

Land Use Code - **220** Apartment

Independent Variable - Dwelling Unit(s)

Number of Units (X) - 323

T = Trip Ends

Peak Hour Adjacent Street Traffic One Hour Between 7 and 9 AM

AM Peak			Directional Distribution:
T = (X) * 0.51	Trip Ends Per Dwelling Unit(s)		20% Entering 80% Exiting
T = 165	Trip Ends		33 Entering 132 Exiting

Peak Hour Adjacent Street Traffic One Hour Between 4 and 6 PM

PM Peak			Directional Distribution:
T = (X) * 0.62	Trip Ends Per Dwelling Unit(s)		65% Entering 35% Exiting
T = 200	Trip Ends		130 Entering 70 Exiting

Weekday

Daily Weekday			Directional Distribution:
T = (X) * 6.65	Trip Ends Per Dwelling Unit(s)		50% Entering 50% Exiting
T = 2148	Trip Ends		1074 Entering 1074 Exiting

Non-Pass-By Trip Percentage

AM 100%
 PM 100%

Non-Pass-By Trip Volumes

AM Peak	33 Entering	132 Exiting
PM Peak	130 Entering	70 Exiting

Note: Rounding may occur in calculations

Project ASDL Trip Gen
 Trip generation for Specialty Retail Center
 Designed by NB Date March 24, 2016 Job No. 291005000
 Checked by CRW Date March 24, 2016 Sheet No. 2 of 3

TRIP GENERATION MANUAL TECHNIQUES

ITE *Trip Generation 9th Edition*, Average Rate Equations

Land Use Code - **826** Specialty Retail Center

Independent Variable - 1,000 Sq Ft GLA

Number of Units (X) - 36

T = Trip Ends

Peak Hour Adjacent Street Traffic One Hour Between 7 and 9 AM

AM Peak			Directional Distribution:
T = (X) * 0.96	Trip Ends Per 1,000 Sq Ft GLA	62% Entering	38% Exiting
T = 35	Trip Ends	22 Entering	13 Exiting

Peak Hour Adjacent Street Traffic One Hour Between 4 and 6 PM

PM Peak			Directional Distribution:
T = (X) * 2.71	Trip Ends Per 1,000 Sq Ft GLA	44% Entering	56% Exiting
T = 98	Trip Ends	43 Entering	55 Exiting

Weekday

Daily Weekday			Directional Distribution:
T = (X) * 44.32	Trip Ends Per 1,000 Sq Ft GLA	50% Entering	50% Exiting
T = 1596	Trip Ends	798 Entering	798 Exiting

Non-Pass-By Trip Percentage

AM 100%
 PM 100%

Non-Pass-By Trip Volumes

AM Peak	22 Entering	13 Exiting
PM Peak	43 Entering	55 Exiting

Note: Rounding may occur in calculations

Project ASDL Trip Gen

Trip generation for High-Turnover (Sit-Down) Restaurant

Designed by NB

Date March 24, 2016

Job No. 291005000

Checked by CRW

Date March 24, 2016

Sheet No. 3 of 3

TRIP GENERATION MANUAL TECHNIQUES

ITE *Trip Generation 9th Edition*, Average Rate Equations

Land Use Code - **932** High-Turnover (Sit-Down) Restaurant

Independent Variable - 1,000 Sq Ft

Number of Units (X) - 18

T = Trip Ends

Peak Hour Adjacent Street Traffic One Hour Between 7 and 9 AM

AM Peak

Directional Distribution:

T = (X) * 10.81

Trip Ends Per 1,000 Sq Ft

55% Entering

45% Exiting

T = 195

Trip Ends

107 Entering

88 Exiting

Peak Hour Adjacent Street Traffic One Hour Between 4 and 6 PM

PM Peak

Directional Distribution:

T = (X) * 9.85

Trip Ends Per 1,000 Sq Ft

60% Entering

40% Exiting

T = 177

Trip Ends

106 Entering

71 Exiting

Weekday

Daily Weekday

Directional Distribution:

T = (X) * 127.15

Trip Ends Per 1,000 Sq Ft

50% Entering

50% Exiting

T = 2290

Trip Ends

1145 Entering

1145 Exiting

Non-Pass-By Trip Percentage

Non-Pass-By Trip Volumes

AM 100%

AM Peak

107 Entering

88 Exiting

PM 57%

PM Peak

61 Entering

40 Exiting

Note: Rounding may occur in calculations

2035 Traffic Volume Projections

**2018 Background AM
Peak Hour Traffic
Capacity Analysis**

Timings
1: Scottsdale Road & Mayo Boulevard

2018 Background AM
3/29/2016

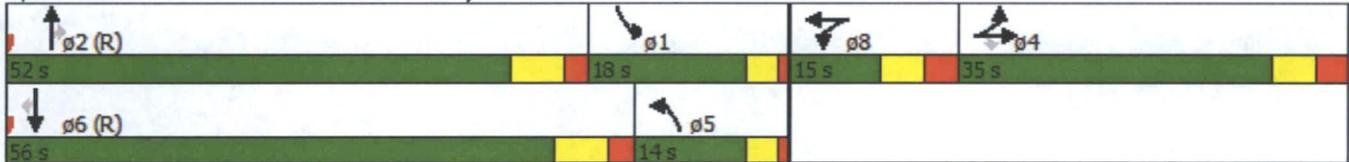


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↑↑↑	↗	↖↖	↑↑	↖↖	↑↑↑	↗	↖↖	↑↑↑	↗
Traffic Volume (vph)	357	13	242	7	4	102	862	5	22	1516	455
Future Volume (vph)	357	13	242	7	4	102	862	5	22	1516	455
Turn Type	Split	NA	Perm	Split	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8	8	5	2		1	6	
Permitted Phases			4					2			6
Detector Phase	4	4	4	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	4.0	4.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	17.0	17.0	17.0	11.0	11.0	9.5	40.0	40.0	9.5	40.0	40.0
Total Split (s)	35.0	35.0	35.0	15.0	15.0	14.0	52.0	52.0	18.0	56.0	56.0
Total Split (%)	29.2%	29.2%	29.2%	12.5%	12.5%	11.7%	43.3%	43.3%	15.0%	46.7%	46.7%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.0	4.8	4.8	3.0	4.8	4.8
All-Red Time (s)	3.1	3.1	3.1	3.1	3.1	1.0	2.2	2.2	1.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag						Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Scottsdale Road & Mayo Boulevard



HCM 2010 Signalized Intersection Summary
1: Scottsdale Road & Mayo Boulevard

2018 Background AM
3/29/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	357	13	242	7	4	11	102	862	5	22	1516	455
Future Volume (veh/h)	357	13	242	7	4	11	102	862	5	22	1516	455
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	388	14	263	8	4	12	111	937	5	24	1648	495
Adj No. of Lanes	2	3	1	2	2	0	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	641	947	295	63	32	29	615	1907	594	730	2076	647
Arrive On Green	0.19	0.19	0.19	0.02	0.02	0.02	0.36	0.75	0.75	0.21	0.41	0.41
Sat Flow, veh/h	3442	5085	1583	3442	1770	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	388	14	263	8	4	12	111	937	5	24	1648	495
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	12.4	0.3	19.5	0.3	0.3	0.9	2.7	8.8	0.1	0.7	34.0	32.3
Cycle Q Clear(g_c), s	12.4	0.3	19.5	0.3	0.3	0.9	2.7	8.8	0.1	0.7	34.0	32.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	641	947	295	63	32	29	615	1907	594	730	2076	647
V/C Ratio(X)	0.61	0.01	0.89	0.13	0.12	0.41	0.18	0.49	0.01	0.03	0.79	0.77
Avail Cap(c_a), veh/h	803	1187	369	229	118	106	615	1907	594	730	2076	647
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.97	0.97	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.8	39.8	47.7	58.0	57.9	58.3	32.5	10.5	9.4	37.5	31.1	30.6
Incr Delay (d2), s/veh	0.3	0.0	17.5	0.3	0.6	3.4	0.1	0.9	0.0	0.0	3.2	8.4
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	5.9	0.1	10.0	0.1	0.1	0.4	1.3	4.1	0.0	0.3	16.5	15.5
LnGrp Delay(d),s/veh	45.1	39.9	65.1	58.3	58.6	61.7	32.6	11.4	9.4	37.5	34.3	39.0
LnGrp LOS	D	D	E	E	E	E	C	B	A	D	C	D
Approach Vol, veh/h		665			24			1053			2167	
Approach Delay, s/veh		52.9			60.0			13.6			35.4	
Approach LOS		D			E			B			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	29.5	52.0		29.3	25.5	56.0		9.2				
Change Period (Y+Rc), s	* 4	7.0		7.0	* 4	7.0		7.0				
Max Green Setting (Gmax), s	* 14	45.0		28.0	* 10	49.0		8.0				
Max Q Clear Time (g_c+I1), s	2.7	10.8		21.5	4.7	36.0		2.9				
Green Ext Time (p_c), s	0.2	1.6		0.9	0.1	2.7		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			32.7									
HCM 2010 LOS			C									
Notes												

Timings
2: Scottsdale Road & Chauncey Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	1	76	58	3	16	95	921	18	27	1581	114
Future Volume (vph)	70	1	76	58	3	16	95	921	18	27	1581	114
Turn Type	Perm	NA	Perm									
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	37.0	37.0	37.0	37.0	37.0	37.0
Total Split (s)	21.0	21.0	21.0	21.0	21.0	21.0	99.0	99.0	99.0	99.0	99.0	99.0
Total Split (%)	17.5%	17.5%	17.5%	17.5%	17.5%	17.5%	82.5%	82.5%	82.5%	82.5%	82.5%	82.5%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	4.9	4.9	4.9	4.9	4.9	4.9
All-Red Time (s)	3.1	3.1	3.1	3.1	3.1	3.1	2.1	2.1	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 25 (21%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated

Splits and Phases: 2: Scottsdale Road & Chauncey Lane



HCM 2010 Signalized Intersection Summary
2: Scottsdale Road & Chauncey Lane

2018 Background AM
3/29/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	1	76	58	3	16	95	921	18	27	1581	114
Future Volume (veh/h)	70	1	76	58	3	16	95	921	18	27	1581	114
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	76	1	83	63	3	17	103	1001	20	29	1718	124
Adj No. of Lanes	1	2	1	1	2	1	1	3	1	1	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	258	115	155	258	115	263	4121	1283	480	4121	1283
Arrive On Green	0.07	0.07	0.07	0.07	0.07	0.07	0.81	0.81	0.81	1.00	1.00	1.00
Sat Flow, veh/h	1386	3539	1583	1308	3539	1583	250	5085	1583	550	5085	1583
Grp Volume(v), veh/h	76	1	83	63	3	17	103	1001	20	29	1718	124
Grp Sat Flow(s),veh/h/ln	1386	1770	1583	1308	1770	1583	250	1695	1583	550	1695	1583
Q Serve(g_s), s	6.5	0.0	6.2	5.6	0.1	1.2	15.9	5.6	0.3	0.4	0.0	0.0
Cycle Q Clear(g_c), s	6.6	0.0	6.2	5.7	0.1	1.2	15.9	5.6	0.3	6.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	160	258	115	155	258	115	263	4121	1283	480	4121	1283
V/C Ratio(X)	0.48	0.00	0.72	0.41	0.01	0.15	0.39	0.24	0.02	0.06	0.42	0.10
Avail Cap(c_a), veh/h	221	413	185	212	413	185	263	4121	1283	480	4121	1283
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.80	0.80	0.80
Uniform Delay (d), s/veh	54.7	51.6	54.4	54.2	51.6	52.1	3.7	2.7	2.2	0.2	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.0	3.1	0.6	0.0	0.2	4.3	0.1	0.0	0.2	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	2.8	2.1	0.0	0.5	1.4	2.6	0.1	0.1	0.1	0.0
LnGrp Delay(d),s/veh	55.5	51.6	57.6	54.8	51.6	52.4	8.0	2.8	2.2	0.4	0.2	0.1
LnGrp LOS	E	D	E	D	D	D	A	A	A	A	A	A
Approach Vol, veh/h		160			83			1124			1871	
Approach Delay, s/veh		56.5			54.2			3.3			0.2	
Approach LOS		E			D			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		104.3		15.7		104.3		15.7				
Change Period (Y+Rc), s		7.0		7.0		7.0		7.0				
Max Green Setting (Gmax), s		92.0		14.0		92.0		14.0				
Max Q Clear Time (g_c+1), s		17.9		8.6		8.0		7.7				
Green Ext Time (p_c), s		9.5		0.2		9.5		0.2				
Intersection Summary												
HCM 2010 Ctrl Delay			5.5									
HCM 2010 LOS			A									

Intersection												
Int Delay, s/veh	7.3											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	40	6	0	0	6	0	0	0	0	0	0	66
Future Vol, veh/h	40	6	0	0	6	0	0	0	0	0	0	66
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	150	-	0	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	7	0	0	7	0	0	0	0	0	0	72

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	7	0	0	7	0	0	135	100	7	100	100	7
Stage 1	-	-	-	-	-	-	93	93	-	7	7	-
Stage 2	-	-	-	-	-	-	42	7	-	93	93	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1614	-	-	1614	-	-	836	790	1075	881	790	1075
Stage 1	-	-	-	-	-	-	914	818	-	1015	890	-
Stage 2	-	-	-	-	-	-	972	890	-	914	818	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1614	-	-	1614	-	-	764	769	1075	863	769	1075
Mov Cap-2 Maneuver	-	-	-	-	-	-	764	769	-	863	769	-
Stage 1	-	-	-	-	-	-	890	796	-	988	890	-
Stage 2	-	-	-	-	-	-	907	890	-	890	796	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6.3	0	0	8.6
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1614	-	-	1614	-	-	1075
HCM Lane V/C Ratio	-	0.027	-	-	-	-	-	0.067
HCM Control Delay (s)	0	7.3	-	-	0	-	-	8.6
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	0.2

Intersection

Int Delay, s/veh 1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	163	105	17	87	27	8
Future Vol, veh/h	163	105	17	87	27	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	160	190	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	177	114	18	95	29	9

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	177	0	261	89
Stage 1	-	-	-	-	177	-
Stage 2	-	-	-	-	84	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1396	-	706	951
Stage 1	-	-	-	-	836	-
Stage 2	-	-	-	-	930	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1396	-	697	951
Mov Cap-2 Maneuver	-	-	-	-	697	-
Stage 1	-	-	-	-	836	-
Stage 2	-	-	-	-	918	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	10.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	742	-	-	1396	-
HCM Lane V/C Ratio	0.051	-	-	0.013	-
HCM Control Delay (s)	10.1	-	-	7.6	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Timings
1: Scottsdale Road & Mayo Boulevard

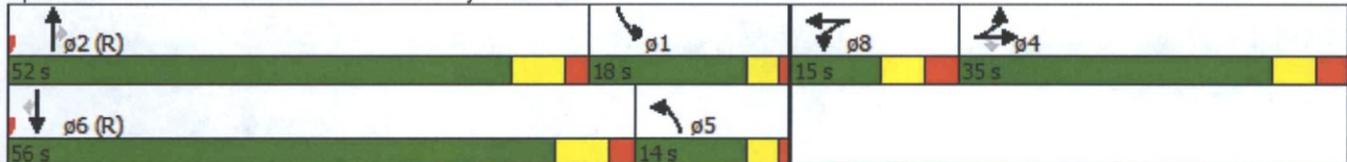


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↑↑↑	↗	↖↖	↑↑	↖↖	↑↑↑	↗	↖↖	↑↑↑	↗
Traffic Volume (vph)	357	13	242	7	4	102	862	5	22	1516	455
Future Volume (vph)	357	13	242	7	4	102	862	5	22	1516	455
Turn Type	Split	NA	Perm	Split	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8	8	5	2		1	6	
Permitted Phases			4					2			6
Detector Phase	4	4	4	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	4.0	4.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	17.0	17.0	17.0	11.0	11.0	9.5	40.0	40.0	9.5	40.0	40.0
Total Split (s)	35.0	35.0	35.0	15.0	15.0	14.0	52.0	52.0	18.0	56.0	56.0
Total Split (%)	29.2%	29.2%	29.2%	12.5%	12.5%	11.7%	43.3%	43.3%	15.0%	46.7%	46.7%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.0	4.8	4.8	3.0	4.8	4.8
All-Red Time (s)	3.1	3.1	3.1	3.1	3.1	1.0	2.2	2.2	1.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag						Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Scottsdale Road & Mayo Boulevard



HCM 2010 Signalized Intersection Summary
1: Scottsdale Road & Mayo Boulevard

2018 Background AM (Mitigated)
3/29/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	357	13	242	7	4	11	102	862	5	22	1516	455
Future Volume (veh/h)	357	13	242	7	4	11	102	862	5	22	1516	455
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	388	14	263	8	4	12	111	937	5	24	1648	495
Adj No. of Lanes	2	3	1	2	2	0	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	641	947	295	63	32	29	615	1907	594	753	2282	647
Arrive On Green	0.19	0.19	0.19	0.02	0.02	0.02	0.36	0.75	0.75	0.21	0.41	0.41
Sat Flow, veh/h	3442	5085	1583	3442	1770	1583	3442	5085	1583	3548	5588	1583
Grp Volume(v), veh/h	388	14	263	8	4	12	111	937	5	24	1648	495
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1583	1721	1695	1583	1774	1863	1583
Q Serve(g_s), s	12.4	0.3	19.5	0.3	0.3	0.9	2.7	8.8	0.1	0.6	29.7	32.3
Cycle Q Clear(g_c), s	12.4	0.3	19.5	0.3	0.3	0.9	2.7	8.8	0.1	0.6	29.7	32.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	641	947	295	63	32	29	615	1907	594	753	2282	647
V/C Ratio(X)	0.61	0.01	0.89	0.13	0.12	0.41	0.18	0.49	0.01	0.03	0.72	0.77
Avail Cap(c_a), veh/h	803	1187	369	229	118	106	615	1907	594	753	2282	647
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.97	0.97	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.8	39.8	47.7	58.0	57.9	58.3	32.5	10.5	9.4	37.5	29.8	30.6
Incr Delay (d2), s/veh	0.3	0.0	17.5	0.3	0.6	3.4	0.1	0.9	0.0	0.0	2.0	8.4
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	5.9	0.1	10.0	0.1	0.1	0.4	1.3	4.1	0.0	0.3	15.7	15.5
LnGrp Delay(d),s/veh	45.1	39.9	65.1	58.3	58.6	61.7	32.6	11.4	9.4	37.5	31.8	39.0
LnGrp LOS	D	D	E	E	E	E	C	B	A	D	C	D
Approach Vol, veh/h		665			24			1053			2167	
Approach Delay, s/veh		52.9			60.0			13.6			33.5	
Approach LOS		D			E			B			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	29.5	52.0		29.3	25.5	56.0		9.2				
Change Period (Y+Rc), s	*4	7.0		7.0	*4	7.0		7.0				
Max Green Setting (Gmax), s	*14	45.0		28.0	*10	49.0		8.0				
Max Q Clear Time (g_c+l1), s	2.6	10.8		21.5	4.7	34.3		2.9				
Green Ext Time (p_c), s	0.2	1.6		0.9	0.1	2.7		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			31.6									
HCM 2010 LOS			C									
Notes												

**2018 Background PM
Peak Hour Traffic
Capacity Analysis**

Timings
1: Scottsdale Road & Mayo Boulevard

2018 Background PM
3/29/2016

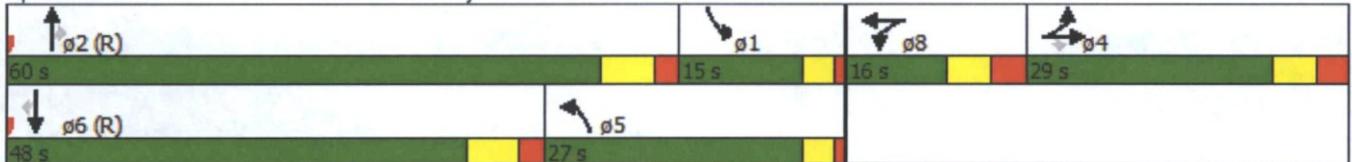


Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	608	3	221	11	346	1525	4	9	1325	760
Future Volume (vph)	608	3	221	11	346	1525	4	9	1325	760
Turn Type	Split	NA	Perm	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8	5	2		1	6	
Permitted Phases			4				2			6
Detector Phase	4	4	4	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	4.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	17.0	17.0	17.0	11.0	9.5	40.0	40.0	9.5	40.0	40.0
Total Split (s)	29.0	29.0	29.0	16.0	27.0	60.0	60.0	15.0	48.0	48.0
Total Split (%)	24.2%	24.2%	24.2%	13.3%	22.5%	50.0%	50.0%	12.5%	40.0%	40.0%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.0	4.8	4.8	3.0	4.8	4.8
All-Red Time (s)	3.1	3.1	3.1	3.1	1.0	2.2	2.2	1.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag					Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Scottsdale Road & Mayo Boulevard



HCM 2010 Signalized Intersection Summary
1: Scottsdale Road & Mayo Boulevard

2018 Background PM
3/29/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	608	3	221	0	11	23	346	1525	4	9	1325	760
Future Volume (veh/h)	608	3	221	0	11	23	346	1525	4	9	1325	760
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	661	3	240	0	12	25	376	1658	4	10	1440	826
Adj No. of Lanes	2	3	1	2	2	0	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	631	932	290	81	42	37	836	2246	699	492	1737	541
Arrive On Green	0.18	0.18	0.18	0.00	0.02	0.02	0.32	0.59	0.59	0.14	0.34	0.34
Sat Flow, veh/h	3442	5085	1583	3442	1770	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	661	3	240	0	12	25	376	1658	4	10	1440	826
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	22.0	0.1	17.5	0.0	0.8	1.9	10.4	28.5	0.1	0.3	31.2	41.0
Cycle Q Clear(g_c), s	22.0	0.1	17.5	0.0	0.8	1.9	10.4	28.5	0.1	0.3	31.2	41.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	631	932	290	81	42	37	836	2246	699	492	1737	541
V/C Ratio(X)	1.05	0.00	0.83	0.00	0.29	0.67	0.45	0.74	0.01	0.02	0.83	1.53
Avail Cap(c_a), veh/h	631	932	290	258	133	119	836	2246	699	492	1737	541
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00	0.83	0.83	0.83	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.0	40.0	47.2	0.0	57.6	58.1	34.2	19.7	13.8	44.2	36.3	39.5
Incr Delay (d2), s/veh	48.9	0.0	16.6	0.0	1.4	7.4	0.1	1.9	0.0	0.0	4.7	246.4
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	14.7	0.0	9.0	0.0	0.4	0.9	5.0	13.5	0.1	0.1	15.3	54.9
LnGrp Delay(d),s/veh	97.9	40.0	63.8	0.0	59.0	65.5	34.4	21.6	13.9	44.2	41.0	285.9
LnGrp LOS	F	D	E		E	E	C	C	B	D	D	F
Approach Vol, veh/h		904			37			2038			2276	
Approach Delay, s/veh		88.7			63.4			23.9			129.9	
Approach LOS		F			E			C			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	21.2	60.0		29.0	33.2	48.0		9.8				
Change Period (Y+Rc), s	* 4	7.0		7.0	* 4	7.0		7.0				
Max Green Setting (Gmax), s	* 11	53.0		22.0	* 23	41.0		9.0				
Max Q Clear Time (g_c+1), s	2.3	30.5		24.0	12.4	43.0		3.9				
Green Ext Time (p_c), s	0.5	3.1		0.0	0.6	0.0		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			81.2									
HCM 2010 LOS			F									
Notes												

Timings
2: Scottsdale Road & Chauncey Lane

2018 Background PM
3/29/2016

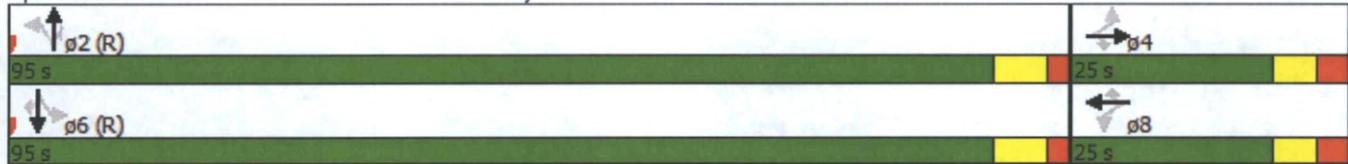


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	134	1	102	70	4	11	97	1812	25	36	1463	86
Future Volume (vph)	134	1	102	70	4	11	97	1812	25	36	1463	86
Turn Type	Perm	NA	Perm									
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	37.0	37.0	37.0	37.0	37.0	37.0
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	95.0	95.0	95.0	95.0	95.0	95.0
Total Split (%)	20.8%	20.8%	20.8%	20.8%	20.8%	20.8%	79.2%	79.2%	79.2%	79.2%	79.2%	79.2%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	4.9	4.9	4.9	4.9	4.9	4.9
All-Red Time (s)	3.1	3.1	3.1	3.1	3.1	3.1	2.1	2.1	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 25 (21%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated

Splits and Phases: 2: Scottsdale Road & Chauncey Lane



HCM 2010 Signalized Intersection Summary
2: Scottsdale Road & Chauncey Lane

2018 Background PM
3/29/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	134	1	102	70	4	11	97	1812	25	36	1463	86
Future Volume (veh/h)	134	1	102	70	4	11	97	1812	25	36	1463	86
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	146	1	111	76	4	12	105	1970	27	39	1590	93
Adj No. of Lanes	1	2	1	1	2	1	1	3	1	1	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	229	434	194	216	434	194	282	3869	1205	191	3869	1205
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.76	0.76	0.76	1.00	1.00	1.00
Sat Flow, veh/h	1392	3539	1583	1276	3539	1583	292	5085	1583	215	5085	1583
Grp Volume(v), veh/h	146	1	111	76	4	12	105	1970	27	39	1590	93
Grp Sat Flow(s),veh/h/ln	1392	1770	1583	1276	1770	1583	292	1695	1583	215	1695	1583
Q Serve(g_s), s	12.4	0.0	7.9	6.7	0.1	0.8	16.1	18.2	0.5	5.7	0.0	0.0
Cycle Q Clear(g_c), s	12.5	0.0	7.9	6.7	0.1	0.8	16.1	18.2	0.5	23.8	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	229	434	194	216	434	194	282	3869	1205	191	3869	1205
V/C Ratio(X)	0.64	0.00	0.57	0.35	0.01	0.06	0.37	0.51	0.02	0.20	0.41	0.08
Avail Cap(c_a), veh/h	267	531	237	251	531	237	282	3869	1205	191	3869	1205
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.68	0.68	0.68
Uniform Delay (d), s/veh	51.7	46.2	49.7	49.1	46.2	46.5	5.4	5.6	3.5	2.4	0.0	0.0
Incr Delay (d2), s/veh	2.2	0.0	1.0	0.4	0.0	0.0	3.7	0.5	0.0	1.6	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	0.0	3.5	2.4	0.1	0.4	1.6	8.6	0.2	0.4	0.1	0.0
LnGrp Delay(d),s/veh	54.0	46.2	50.7	49.5	46.2	46.6	9.1	6.1	3.5	4.0	0.2	0.1
LnGrp LOS	D	D	D	D	D	D	A	A	A	A	A	A
Approach Vol, veh/h		258			92			2102			1722	
Approach Delay, s/veh		52.5			49.0			6.2			0.3	
Approach LOS		D			D			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		98.3		21.7		98.3		21.7				
Change Period (Y+Rc), s		7.0		7.0		7.0		7.0				
Max Green Setting (Gmax), s		88.0		18.0		88.0		18.0				
Max Q Clear Time (g_c+l1), s		20.2		14.5		25.8		8.7				
Green Ext Time (p_c), s		16.2		0.2		16.0		0.4				
Intersection Summary												
HCM 2010 Ctrl Delay			7.6									
HCM 2010 LOS			A									

Intersection

Int Delay, s/veh 7.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	59	3	0	0	5	0	0	0	0	0	0	57
Future Vol, veh/h	59	3	0	0	5	0	0	0	0	0	0	57
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	150	-	0	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	64	3	0	0	5	0	0	0	0	0	0	62

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	5	0	0	3	0	0	168	137	3	137	137	5
Stage 1	-	-	-	-	-	-	132	132	-	5	5	-
Stage 2	-	-	-	-	-	-	36	5	-	132	132	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1616	-	-	1619	-	-	796	754	1081	834	754	1078
Stage 1	-	-	-	-	-	-	871	787	-	1017	892	-
Stage 2	-	-	-	-	-	-	980	892	-	871	787	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1616	-	-	1619	-	-	728	724	1081	809	724	1078
Mov Cap-2 Maneuver	-	-	-	-	-	-	728	724	-	809	724	-
Stage 1	-	-	-	-	-	-	837	756	-	977	892	-
Stage 2	-	-	-	-	-	-	924	892	-	837	756	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	7	0	0	8.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1616	-	-	1619	-	-	1078
HCM Lane V/C Ratio	-	0.04	-	-	-	-	-	0.057
HCM Control Delay (s)	0	7.3	-	-	0	-	-	8.5
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	0.2

Intersection

Int Delay, s/veh 2.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	169	50	15	197	106	13
Future Vol, veh/h	169	50	15	197	106	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	-	160	190	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	184	54	16	214	115	14

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	184	0	324	92
Stage 1	-	-	-	-	184	-
Stage 2	-	-	-	-	140	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1388	-	645	947
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	872	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1388	-	638	947
Mov Cap-2 Maneuver	-	-	-	-	638	-
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	862	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	11.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	662	-	-	1388	-
HCM Lane V/C Ratio	0.195	-	-	0.012	-
HCM Control Delay (s)	11.8	-	-	7.6	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.7	-	-	0	-

Timings

1: Scottsdale Road & Mayo Boulevard

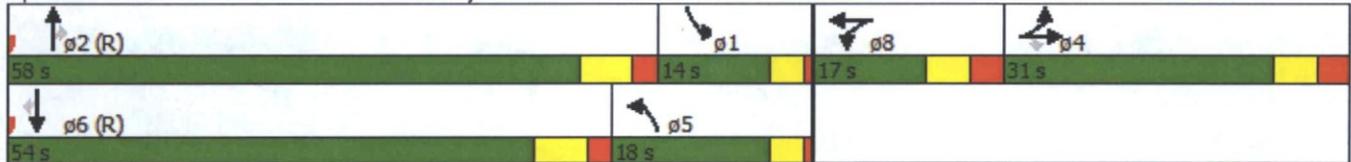


Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	608	3	221	11	346	1525	4	9	1325	760
Future Volume (vph)	608	3	221	11	346	1525	4	9	1325	760
Turn Type	Split	NA	Perm	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8	5	2		1	6	
Permitted Phases				4			2			6
Detector Phase	4	4	4	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	4.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	17.0	17.0	17.0	11.0	9.5	40.0	40.0	9.5	40.0	40.0
Total Split (s)	31.0	31.0	31.0	17.0	18.0	58.0	58.0	14.0	54.0	54.0
Total Split (%)	25.8%	25.8%	25.8%	14.2%	15.0%	48.3%	48.3%	11.7%	45.0%	45.0%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.0	4.8	4.8	3.0	4.8	4.8
All-Red Time (s)	3.1	3.1	3.1	3.1	1.0	2.2	2.2	1.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag					Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Scottsdale Road & Mayo Boulevard



HCM 2010 Signalized Intersection Summary
1: Scottsdale Road & Mayo Boulevard

2018 Background PM (Mitigated)
3/29/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	608	3	221	0	11	23	346	1525	4	9	1325	760
Future Volume (veh/h)	608	3	221	0	11	23	346	1525	4	9	1325	760
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	661	3	240	0	12	25	376	1658	4	10	1829	566
Adj No. of Lanes	2	3	1	2	2	0	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	688	1017	317	81	42	37	607	2161	673	508	2189	620
Arrive On Green	0.20	0.20	0.20	0.00	0.02	0.02	0.23	0.57	0.57	0.14	0.39	0.39
Sat Flow, veh/h	3442	5085	1583	3442	1770	1583	3442	5085	1583	3548	5588	1583
Grp Volume(v), veh/h	661	3	240	0	12	25	376	1658	4	10	1829	566
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1583	1721	1695	1583	1774	1863	1583
Q Serve(g_s), s	22.8	0.1	17.2	0.0	0.8	1.9	11.7	30.0	0.1	0.3	35.5	40.6
Cycle Q Clear(g_c), s	22.8	0.1	17.2	0.0	0.8	1.9	11.7	30.0	0.1	0.3	35.5	40.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	688	1017	317	81	42	37	607	2161	673	508	2189	620
V/C Ratio(X)	0.96	0.00	0.76	0.00	0.29	0.67	0.62	0.77	0.01	0.02	0.84	0.91
Avail Cap(c_a), veh/h	688	1017	317	287	147	132	607	2161	673	508	2189	620
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	0.00	1.00	1.00	0.83	0.83	0.83	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.5	38.4	45.3	0.0	57.6	58.1	42.3	21.5	15.0	44.2	33.0	34.6
Incr Delay (d2), s/veh	24.6	0.0	9.1	0.0	1.4	7.4	1.2	2.2	0.0	0.0	4.0	20.1
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	13.2	0.0	8.3	0.0	0.4	0.9	5.7	14.4	0.1	0.1	19.1	21.2
LnGrp Delay(d),s/veh	72.2	38.4	54.4	0.0	59.0	65.5	43.5	23.8	15.0	44.2	37.0	54.6
LnGrp LOS	E	D	D		E	E	D	C	B	D	D	D
Approach Vol, veh/h		904			37			2038			2405	
Approach Delay, s/veh		67.3			63.4			27.4			41.2	
Approach LOS		E			E			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	21.2	58.0		31.0	25.2	54.0		9.8				
Change Period (Y+Rc), s	* 4	7.0		7.0	* 4	7.0		7.0				
Max Green Setting (Gmax), s	* 10	51.0		24.0	* 14	47.0		10.0				
Max Q Clear Time (g_c+l1), s	2.3	32.0		24.8	13.7	42.6		3.9				
Green Ext Time (p_c), s	0.5	3.1		0.0	0.0	1.9		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			40.5									
HCM 2010 LOS			D									
Notes												

**2023 Background AM
Peak Hour Traffic
Capacity Analysis**

Timings
1: Scottsdale Road & Mayo Boulevard

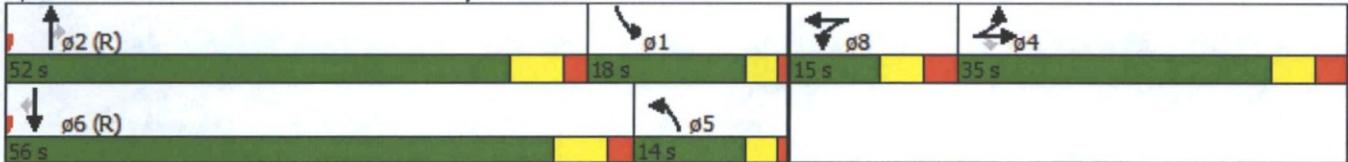


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↑↑↑	↗	↖↖	↑↑	↖↖	↑↑↑	↗	↖↖	↑↑↑	↗
Traffic Volume (vph)	369	14	256	7	5	115	967	5	29	1610	470
Future Volume (vph)	369	14	256	7	5	115	967	5	29	1610	470
Turn Type	Split	NA	Perm	Split	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8	8	5	2		1	6	
Permitted Phases			4					2			6
Detector Phase	4	4	4	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	4.0	4.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	17.0	17.0	17.0	11.0	11.0	9.5	40.0	40.0	9.5	40.0	40.0
Total Split (s)	35.0	35.0	35.0	15.0	15.0	14.0	52.0	52.0	18.0	56.0	56.0
Total Split (%)	29.2%	29.2%	29.2%	12.5%	12.5%	11.7%	43.3%	43.3%	15.0%	46.7%	46.7%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.0	4.8	4.8	3.0	4.8	4.8
All-Red Time (s)	3.1	3.1	3.1	3.1	3.1	1.0	2.2	2.2	1.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag						Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Scottsdale Road & Mayo Boulevard



HCM 2010 Signalized Intersection Summary
1: Scottsdale Road & Mayo Boulevard

2023 Background AM
3/29/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	369	14	256	7	5	18	115	967	5	29	1610	470
Future Volume (veh/h)	369	14	256	7	5	18	115	967	5	29	1610	470
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	401	15	278	8	5	20	125	1051	5	32	1750	511
Adj No. of Lanes	2	3	1	2	2	0	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	671	992	309	77	39	35	571	1907	594	686	2076	647
Arrive On Green	0.20	0.20	0.20	0.02	0.02	0.02	0.33	0.75	0.75	0.20	0.41	0.41
Sat Flow, veh/h	3442	5085	1583	3442	1770	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	401	15	278	8	5	20	125	1051	5	32	1750	511
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	12.7	0.3	20.6	0.3	0.3	1.5	3.1	10.6	0.1	0.9	37.3	33.8
Cycle Q Clear(g_c), s	12.7	0.3	20.6	0.3	0.3	1.5	3.1	10.6	0.1	0.9	37.3	33.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	671	992	309	77	39	35	571	1907	594	686	2076	647
V/C Ratio(X)	0.60	0.02	0.90	0.10	0.13	0.57	0.22	0.55	0.01	0.05	0.84	0.79
Avail Cap(c_a), veh/h	803	1187	369	229	118	106	571	1907	594	686	2076	647
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.96	0.96	0.96	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.0	39.0	47.2	57.5	57.5	58.1	34.5	10.7	9.4	38.8	32.0	31.0
Incr Delay (d2), s/veh	0.3	0.0	19.8	0.2	0.5	5.3	0.1	1.1	0.0	0.0	4.4	9.5
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	6.1	0.1	10.7	0.1	0.2	0.7	1.5	4.9	0.0	0.4	18.2	16.5
LnGrp Delay(d),s/veh	44.3	39.0	67.0	57.7	58.1	63.3	34.5	11.8	9.4	38.8	36.4	40.5
LnGrp LOS	D	D	E	E	E	E	C	B	A	D	D	D
Approach Vol, veh/h		694			33			1181			2293	
Approach Delay, s/veh		53.3			61.2			14.2			37.4	
Approach LOS		D			E			B			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	27.9	52.0		30.4	23.9	56.0		9.7				
Change Period (Y+Rc), s	* 4	7.0		7.0	* 4	7.0		7.0				
Max Green Setting (Gmax), s	* 14	45.0		28.0	* 10	49.0		8.0				
Max Q Clear Time (g_c+l1), s	2.9	12.6		22.6	5.1	39.3		3.5				
Green Ext Time (p_c), s	0.2	1.8		0.8	0.1	2.7		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			33.7									
HCM 2010 LOS			C									
Notes												

Timings
2: Scottsdale Road & Chauncey Lane

2023 Background AM
3/29/2016

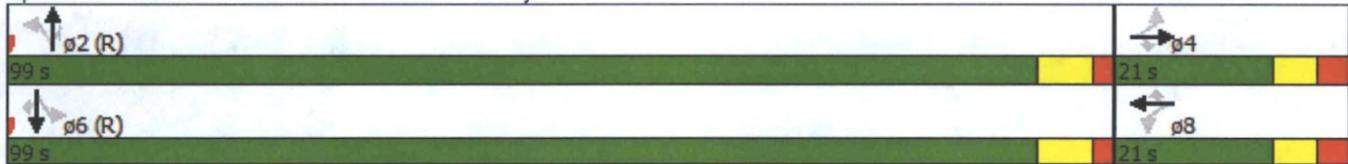


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	72	101	81	54	103	9	104	1044	16	21	1693	118
Future Volume (vph)	72	101	81	54	103	9	104	1044	16	21	1693	118
Turn Type	Perm	NA	Perm									
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	37.0	37.0	37.0	37.0	37.0	37.0
Total Split (s)	21.0	21.0	21.0	21.0	21.0	21.0	99.0	99.0	99.0	99.0	99.0	99.0
Total Split (%)	17.5%	17.5%	17.5%	17.5%	17.5%	17.5%	82.5%	82.5%	82.5%	82.5%	82.5%	82.5%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	4.9	4.9	4.9	4.9	4.9	4.9
All-Red Time (s)	3.1	3.1	3.1	3.1	3.1	3.1	2.1	2.1	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 25 (21%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated

Splits and Phases: 2: Scottsdale Road & Chauncey Lane



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	101	81	54	103	9	104	1044	16	21	1693	118
Future Volume (veh/h)	72	101	81	54	103	9	104	1044	16	21	1693	118
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	78	110	88	59	112	10	113	1135	17	23	1840	128
Adj No. of Lanes	1	2	1	1	2	1	1	3	1	1	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	383	171	154	383	171	232	3942	1227	405	3942	1227
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.78	0.78	0.78	1.00	1.00	1.00
Sat Flow, veh/h	1264	3539	1583	1180	3539	1583	221	5085	1583	486	5085	1583
Grp Volume(v), veh/h	78	110	88	59	112	10	113	1135	17	23	1840	128
Grp Sat Flow(s),veh/h/ln	1264	1770	1583	1180	1770	1583	221	1695	1583	486	1695	1583
Q Serve(g_s), s	7.3	3.4	6.3	5.8	3.5	0.7	28.2	7.8	0.3	0.5	0.0	0.0
Cycle Q Clear(g_c), s	10.8	3.4	6.3	9.2	3.5	0.7	28.2	7.8	0.3	8.3	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	160	383	171	154	383	171	232	3942	1227	405	3942	1227
V/C Ratio(X)	0.49	0.29	0.51	0.38	0.29	0.06	0.49	0.29	0.01	0.06	0.47	0.10
Avail Cap(c_a), veh/h	171	413	185	164	413	185	232	3942	1227	405	3942	1227
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.76	0.76	0.76
Uniform Delay (d), s/veh	54.2	49.3	50.5	53.5	49.3	48.0	6.2	3.9	3.1	0.3	0.0	0.0
Incr Delay (d2), s/veh	0.9	0.2	0.9	0.6	0.2	0.1	7.2	0.2	0.0	0.2	0.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	1.7	2.8	1.9	1.7	0.3	2.2	3.6	0.1	0.1	0.1	0.0
LnGrp Delay(d),s/veh	55.1	49.4	51.4	54.1	49.4	48.1	13.4	4.1	3.1	0.5	0.3	0.1
LnGrp LOS	E	D	D	D	D	D	B	A	A	A	A	A
Approach Vol, veh/h		276			181			1265			1991	
Approach Delay, s/veh		51.7			50.9			4.9			0.3	
Approach LOS		D			D			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		100.0		20.0		100.0		20.0				
Change Period (Y+Rc), s		7.0		7.0		7.0		7.0				
Max Green Setting (Gmax), s		92.0		14.0		92.0		14.0				
Max Q Clear Time (g_c+l1), s		30.2		12.8		10.3		11.2				
Green Ext Time (p_c), s		12.1		0.2		12.2		0.4				
Intersection Summary												
HCM 2010 Ctrl Delay			8.1									
HCM 2010 LOS			A									

Intersection												
Int Delay, s/veh	2.5											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	27	106	0	0	107	2	0	0	0	3	0	56
Future Vol, veh/h	27	106	0	0	107	2	0	0	0	3	0	56
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	150	-	0	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	115	0	0	116	2	0	0	0	3	0	61

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	118	0	0	115	0	0	322	292	115	291	291	117
Stage 1	-	-	-	-	-	-	174	174	-	117	117	-
Stage 2	-	-	-	-	-	-	148	118	-	174	174	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1470	-	-	1474	-	-	631	619	937	661	619	935
Stage 1	-	-	-	-	-	-	828	755	-	888	799	-
Stage 2	-	-	-	-	-	-	855	798	-	828	755	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1470	-	-	1474	-	-	581	607	937	651	607	935
Mov Cap-2 Maneuver	-	-	-	-	-	-	581	607	-	651	607	-
Stage 1	-	-	-	-	-	-	812	740	-	870	799	-
Stage 2	-	-	-	-	-	-	799	798	-	812	740	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.5	0	0	9.2
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1470	-	-	1474	-	-	915
HCM Lane V/C Ratio	-	0.02	-	-	-	-	-	0.07
HCM Control Delay (s)	0	7.5	-	-	0	-	-	9.2
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	0.2

Intersection												
Int Delay, s/veh	3.3											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	59	169	109	17	88	54	27	0	8	56	0	51
Future Vol, veh/h	59	169	109	17	88	54	27	0	8	56	0	51
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	150	-	160	190	-	160	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	64	184	118	18	96	59	29	0	9	61	0	55

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	96	0	0	184	0	0	397	445	92	353	445	48
Stage 1	-	-	-	-	-	-	312	312	-	133	133	-
Stage 2	-	-	-	-	-	-	85	133	-	220	312	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1496	-	-	1388	-	-	537	506	947	577	506	1011
Stage 1	-	-	-	-	-	-	673	656	-	857	785	-
Stage 2	-	-	-	-	-	-	913	785	-	762	656	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1496	-	-	1388	-	-	486	478	947	548	478	1011
Mov Cap-2 Maneuver	-	-	-	-	-	-	486	478	-	548	478	-
Stage 1	-	-	-	-	-	-	644	628	-	820	775	-
Stage 2	-	-	-	-	-	-	852	775	-	723	628	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0.8	12.1	10.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	547	1496	-	-	1388	-	-	548	1011
HCM Lane V/C Ratio	0.07	0.043	-	-	0.013	-	-	0.111	0.055
HCM Control Delay (s)	12.1	7.5	-	-	7.6	-	-	12.4	8.8
HCM Lane LOS	B	A	-	-	A	-	-	B	A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.4	0.2

Intersection				
Intersection Delay, s/veh	4.9			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	119	115	140	139
Demand Flow Rate, veh/h	121	117	143	142
Vehicles Circulating, veh/h	137	145	121	117
Vehicles Exiting, veh/h	122	119	137	145
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.9	4.9	5.0	5.0
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193
Entry Flow, veh/h	121	117	143	142
Cap Entry Lane, veh/h	985	977	1001	1005
Entry HV Adj Factor	0.982	0.981	0.981	0.982
Flow Entry, veh/h	119	115	140	139
Cap Entry, veh/h	967	959	982	987
V/C Ratio	0.123	0.120	0.143	0.141
Control Delay, s/veh	4.9	4.9	5.0	5.0
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Timings
1: Scottsdale Road & Mayo Boulevard

2023 Background AM (Mitigated)
3/29/2016

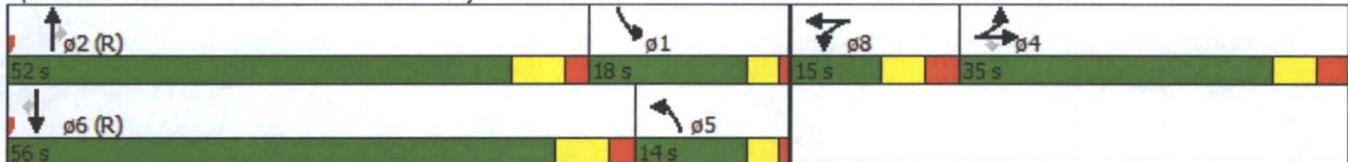


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↑↑↑	↗	↖↖	↑↑	↖↖	↑↑↑	↗	↖↖	↑↑↑	↗
Traffic Volume (vph)	369	14	256	7	5	115	967	5	29	1610	470
Future Volume (vph)	369	14	256	7	5	115	967	5	29	1610	470
Turn Type	Split	NA	Perm	Split	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8	8	5	2		1	6	
Permitted Phases			4					2			6
Detector Phase	4	4	4	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	4.0	4.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	17.0	17.0	17.0	11.0	11.0	9.5	40.0	40.0	9.5	40.0	40.0
Total Split (s)	35.0	35.0	35.0	15.0	15.0	14.0	52.0	52.0	18.0	56.0	56.0
Total Split (%)	29.2%	29.2%	29.2%	12.5%	12.5%	11.7%	43.3%	43.3%	15.0%	46.7%	46.7%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.0	4.8	4.8	3.0	4.8	4.8
All-Red Time (s)	3.1	3.1	3.1	3.1	3.1	1.0	2.2	2.2	1.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag						Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Scottsdale Road & Mayo Boulevard



HCM 2010 Signalized Intersection Summary
1: Scottsdale Road & Mayo Boulevard

2023 Background AM (Mitigated)
3/29/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	369	14	256	7	5	18	115	967	5	29	1610	470
Future Volume (veh/h)	369	14	256	7	5	18	115	967	5	29	1610	470
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	388	15	269	7	5	19	121	1018	5	31	1695	495
Adj No. of Lanes	2	3	1	2	2	0	2	3	1	2	3	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	653	965	300	74	38	34	592	1907	594	729	2282	647
Arrive On Green	0.19	0.19	0.19	0.02	0.02	0.02	0.34	0.75	0.75	0.21	0.41	0.41
Sat Flow, veh/h	3442	5085	1583	3442	1770	1583	3442	5085	1583	3548	5588	1583
Grp Volume(v), veh/h	388	15	269	7	5	19	121	1018	5	31	1695	495
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1583	1721	1695	1583	1774	1863	1583
Q Serve(g_s), s	12.4	0.3	19.9	0.2	0.3	1.4	3.0	10.0	0.1	0.8	30.9	32.3
Cycle Q Clear(g_c), s	12.4	0.3	19.9	0.2	0.3	1.4	3.0	10.0	0.1	0.8	30.9	32.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	653	965	300	74	38	34	592	1907	594	729	2282	647
V/C Ratio(X)	0.59	0.02	0.90	0.09	0.13	0.56	0.20	0.53	0.01	0.04	0.74	0.77
Avail Cap(c_a), veh/h	803	1187	369	229	118	106	592	1907	594	729	2282	647
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.96	0.96	0.96	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.4	39.5	47.5	57.6	57.6	58.1	33.5	10.6	9.4	38.2	30.1	30.6
Incr Delay (d2), s/veh	0.3	0.0	18.4	0.2	0.6	5.2	0.1	1.0	0.0	0.0	2.2	8.4
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	5.9	0.1	10.2	0.1	0.2	0.7	1.4	4.7	0.0	0.4	16.3	15.5
LnGrp Delay(d),s/veh	44.7	39.5	65.9	57.8	58.2	63.4	33.6	11.7	9.4	38.2	32.4	39.0
LnGrp LOS	D	D	E	E	E	E	C	B	A	D	C	D
Approach Vol, veh/h		672			31			1144			2221	
Approach Delay, s/veh		53.1			61.3			14.0			33.9	
Approach LOS		D			E			B			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	28.7	52.0		29.8	24.7	56.0		9.6				
Change Period (Y+Rc), s	* 4	7.0		7.0	* 4	7.0		7.0				
Max Green Setting (Gmax), s	* 14	45.0		28.0	* 10	49.0		8.0				
Max Q Clear Time (g_c+1), s	2.8	12.0		21.9	5.0	34.3		3.4				
Green Ext Time (p_c), s	0.2	1.7		0.9	0.1	2.8		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			31.7									
HCM 2010 LOS			C									
Notes												

**2023 Background PM
Peak Hour Traffic
Capacity Analysis**

Timings
1: Scottsdale Road & Mayo Boulevard

2023 Background PM
3/29/2016

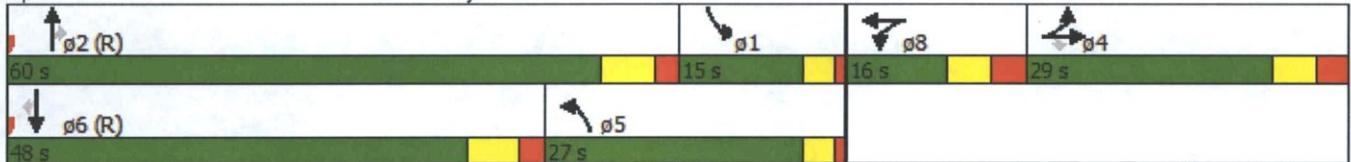


Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↑↑↑	↗	↑↑	↖↖	↑↑↑	↗	↖↖	↑↑↑	↗
Traffic Volume (vph)	629	4	239	12	365	1631	4	23	1450	785
Future Volume (vph)	629	4	239	12	365	1631	4	23	1450	785
Turn Type	Split	NA	Perm	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8	5	2		1	6	
Permitted Phases			4				2			6
Detector Phase	4	4	4	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	4.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	17.0	17.0	17.0	11.0	9.5	40.0	40.0	9.5	40.0	40.0
Total Split (s)	29.0	29.0	29.0	16.0	27.0	60.0	60.0	15.0	48.0	48.0
Total Split (%)	24.2%	24.2%	24.2%	13.3%	22.5%	50.0%	50.0%	12.5%	40.0%	40.0%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.0	4.8	4.8	3.0	4.8	4.8
All-Red Time (s)	3.1	3.1	3.1	3.1	1.0	2.2	2.2	1.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag					Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Scottsdale Road & Mayo Boulevard



HCM 2010 Signalized Intersection Summary
1: Scottsdale Road & Mayo Boulevard

2023 Background PM
3/29/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	629	4	239	0	12	28	365	1631	4	23	1450	785
Future Volume (veh/h)	629	4	239	0	12	28	365	1631	4	23	1450	785
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	684	4	260	0	13	30	397	1773	4	25	1576	853
Adj No. of Lanes	2	3	1	2	2	0	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	631	932	290	94	48	43	824	2246	699	480	1737	541
Arrive On Green	0.18	0.18	0.18	0.00	0.03	0.03	0.16	0.30	0.30	0.14	0.34	0.34
Sat Flow, veh/h	3442	5085	1583	3442	1770	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	684	4	260	0	13	30	397	1773	4	25	1576	853
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	22.0	0.1	19.3	0.0	0.9	2.3	12.6	38.4	0.2	0.8	35.5	41.0
Cycle Q Clear(g_c), s	22.0	0.1	19.3	0.0	0.9	2.3	12.6	38.4	0.2	0.8	35.5	41.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	631	932	290	94	48	43	824	2246	699	480	1737	541
V/C Ratio(X)	1.08	0.00	0.90	0.00	0.27	0.70	0.48	0.79	0.01	0.05	0.91	1.58
Avail Cap(c_a), veh/h	631	932	290	258	133	119	824	2246	699	480	1737	541
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00	0.79	0.79	0.79	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.0	40.0	47.9	0.0	57.2	57.9	43.6	37.1	23.7	44.8	37.7	39.5
Incr Delay (d2), s/veh	60.7	0.0	27.2	0.0	1.1	7.3	0.1	2.3	0.0	0.0	8.4	268.4
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	15.8	0.0	10.6	0.0	0.4	1.1	6.0	18.5	0.1	0.4	18.0	58.2
LnGrp Delay(d),s/veh	109.7	40.0	75.1	0.0	58.3	65.2	43.7	39.4	23.7	44.8	46.1	307.9
LnGrp LOS	F	D	E		E	E	D	D	C	D	D	F
Approach Vol, veh/h		948			43			2174			2454	
Approach Delay, s/veh		99.9			63.1			40.2			137.1	
Approach LOS		F			E			D			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	20.7	60.0		29.0	32.7	48.0		10.3				
Change Period (Y+Rc), s	* 4	7.0		7.0	* 4	7.0		7.0				
Max Green Setting (Gmax), s	* 11	53.0		22.0	* 23	41.0		9.0				
Max Q Clear Time (g_c+l1), s	2.8	40.4		24.0	14.6	43.0		4.3				
Green Ext Time (p_c), s	0.6	3.1		0.0	0.6	0.0		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			92.8									
HCM 2010 LOS			F									
Notes												

Timings
2: Scottsdale Road & Chauncey Lane

2023 Background PM
3/29/2016

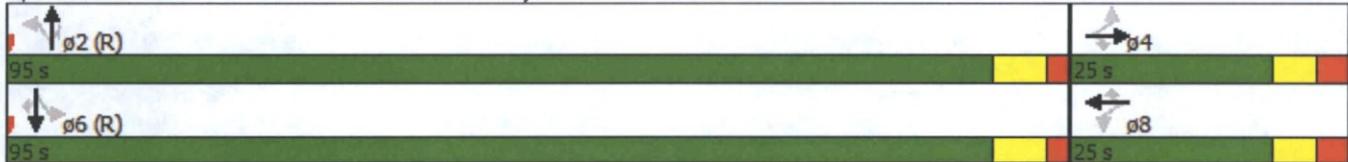


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	138	101	112	66	104	5	105	1945	21	26	1618	89
Future Volume (vph)	138	101	112	66	104	5	105	1945	21	26	1618	89
Turn Type	Perm	NA	Perm									
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	37.0	37.0	37.0	37.0	37.0	37.0
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	95.0	95.0	95.0	95.0	95.0	95.0
Total Split (%)	20.8%	20.8%	20.8%	20.8%	20.8%	20.8%	79.2%	79.2%	79.2%	79.2%	79.2%	79.2%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	4.9	4.9	4.9	4.9	4.9	4.9
All-Red Time (s)	3.1	3.1	3.1	3.1	3.1	3.1	2.1	2.1	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 25 (21%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated

Splits and Phases: 2: Scottsdale Road & Chauncey Lane



HCM 2010 Signalized Intersection Summary
 2: Scottsdale Road & Chauncey Lane

2023 Background PM
 3/29/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	138	101	112	66	104	5	105	1945	21	26	1618	89
Future Volume (veh/h)	138	101	112	66	104	5	105	1945	21	26	1618	89
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	150	110	122	72	113	5	114	2114	23	28	1759	97
Adj No. of Lanes	1	2	1	1	2	1	1	3	1	1	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	215	531	237	200	531	237	241	3729	1161	162	3729	1161
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.73	0.73	0.73	1.00	1.00	1.00
Sat Flow, veh/h	1269	3539	1583	1144	3539	1583	247	5085	1583	187	5085	1583
Grp Volume(v), veh/h	150	110	122	72	113	5	114	2114	23	28	1759	97
Grp Sat Flow(s),veh/h/ln	1269	1770	1583	1144	1770	1583	247	1695	1583	187	1695	1583
Q Serve(g_s), s	14.1	3.3	8.5	7.1	3.4	0.3	27.5	22.8	0.5	5.8	0.0	0.0
Cycle Q Clear(g_c), s	17.5	3.3	8.5	10.3	3.4	0.3	27.5	22.8	0.5	28.6	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	215	531	237	200	531	237	241	3729	1161	162	3729	1161
V/C Ratio(X)	0.70	0.21	0.51	0.36	0.21	0.02	0.47	0.57	0.02	0.17	0.47	0.08
Avail Cap(c_a), veh/h	215	531	237	200	531	237	241	3729	1161	162	3729	1161
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50
Uniform Delay (d), s/veh	52.5	44.7	47.0	49.3	44.8	43.5	7.9	7.3	4.3	3.7	0.0	0.0
Incr Delay (d2), s/veh	8.2	0.1	0.8	0.4	0.1	0.0	6.5	0.6	0.0	1.2	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	1.6	3.8	2.3	1.7	0.1	2.3	10.8	0.2	0.3	0.1	0.0
LnGrp Delay(d),s/veh	60.6	44.8	47.8	49.7	44.9	43.5	14.5	7.9	4.4	4.9	0.2	0.1
LnGrp LOS	E	D	D	D	D	D	B	A	A	A	A	A
Approach Vol, veh/h		382			190			2251			1884	
Approach Delay, s/veh		52.0			46.6			8.2			0.3	
Approach LOS		D			D			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		95.0		25.0		95.0		25.0				
Change Period (Y+Rc), s		7.0		7.0		7.0		7.0				
Max Green Setting (Gmax), s		88.0		18.0		88.0		18.0				
Max Q Clear Time (g_c+l1), s		29.5		19.5		30.6		12.3				
Green Ext Time (p_c), s		20.0		0.0		19.9		0.9				
Intersection Summary												
HCM 2010 Ctrl Delay				10.1								
HCM 2010 LOS				B								

Intersection												
Int Delay, s/veh	2.6											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	43	102	0	0	106	3	0	0	0	3	0	49
Future Vol, veh/h	43	102	0	0	106	3	0	0	0	3	0	49
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	150	-	0	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	47	111	0	0	115	3	0	0	0	3	0	53

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	118	0	0	111	0	0	347	322	111	321	321	117
Stage 1	-	-	-	-	-	-	204	204	-	117	117	-
Stage 2	-	-	-	-	-	-	143	118	-	204	204	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1470	-	-	1479	-	-	607	595	942	632	596	935
Stage 1	-	-	-	-	-	-	798	733	-	888	799	-
Stage 2	-	-	-	-	-	-	860	798	-	798	733	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1470	-	-	1479	-	-	558	576	942	617	577	935
Mov Cap-2 Maneuver	-	-	-	-	-	-	558	576	-	617	577	-
Stage 1	-	-	-	-	-	-	772	710	-	860	799	-
Stage 2	-	-	-	-	-	-	811	798	-	772	710	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.2	0	0	9.2
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1470	-	-	1479	-	-	908
HCM Lane V/C Ratio	-	0.032	-	-	-	-	-	0.062
HCM Control Delay (s)	0	7.5	-	-	0	-	-	9.2
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	0.2

Intersection												
Int Delay, s/veh	4.9											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	65	173	52	15	203	57	110	0	13	56	0	52
Future Vol, veh/h	65	173	52	15	203	57	110	0	13	56	0	52
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	150	-	160	190	-	160	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	71	188	57	16	221	62	120	0	14	61	0	57

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	221	0	0	188	0	0	472	582	94	488	582	110
Stage 1	-	-	-	-	-	-	329	329	-	253	253	-
Stage 2	-	-	-	-	-	-	143	253	-	235	329	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1345	-	-	1384	-	-	475	423	944	463	423	922
Stage 1	-	-	-	-	-	-	658	645	-	729	696	-
Stage 2	-	-	-	-	-	-	845	696	-	747	645	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1345	-	-	1384	-	-	424	396	944	434	396	922
Mov Cap-2 Maneuver	-	-	-	-	-	-	424	396	-	434	396	-
Stage 1	-	-	-	-	-	-	623	611	-	691	688	-
Stage 2	-	-	-	-	-	-	784	688	-	697	611	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	0.4	16.3	12
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	450	1345	-	-	1384	-	-	434	922
HCM Lane V/C Ratio	0.297	0.053	-	-	0.012	-	-	0.14	0.061
HCM Control Delay (s)	16.3	7.8	-	-	7.6	-	-	14.6	9.2
HCM Lane LOS	C	A	-	-	A	-	-	B	A
HCM 95th %tile Q(veh)	1.2	0.2	-	-	0	-	-	0.5	0.2

Intersection				
Intersection Delay, s/veh	5.0			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	113	120	135	155
Demand Flow Rate, veh/h	115	122	138	158
Vehicles Circulating, veh/h	158	136	117	122
Vehicles Exiting, veh/h	122	119	156	136
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.9	4.9	4.9	5.1
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193
Entry Flow, veh/h	115	122	138	158
Cap Entry Lane, veh/h	965	986	1005	1000
Entry HV Adj Factor	0.981	0.982	0.981	0.982
Flow Entry, veh/h	113	120	135	155
Cap Entry, veh/h	946	968	986	982
V/C Ratio	0.119	0.124	0.137	0.158
Control Delay, s/veh	4.9	4.9	4.9	5.1
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	1

Lanes and Geometrics
1: Scottsdale Road & Mayo Boulevard

2023 Background PM (Mitigated)
3/29/2016

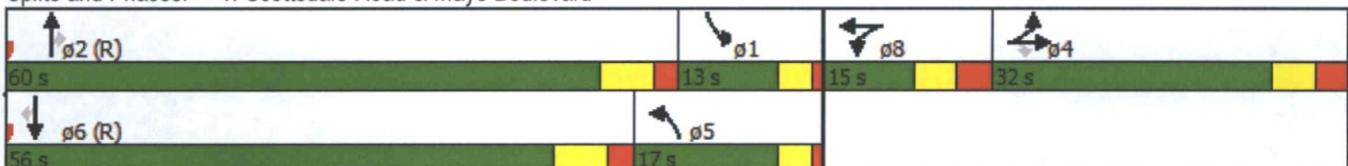


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	629	4	239	0	12	28	365	1631	4	23	1450	785
Future Volume (vph)	629	4	239	0	12	28	365	1631	4	23	1450	785
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	270		270	165		0	240		160	165		240
Storage Lanes	2		1	2		0	2		1	2		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.95	0.95	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Fr _t			0.850		0.896				0.850		0.976	0.850
Fl _t Protected	0.950						0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	3614	3171	0	3433	5085	1583	3433	4691	1362
Fl _t Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3614	3171	0	3433	5085	1583	3433	4691	1362
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			252		29				136		37	529
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		859			1051			1310			441	
Travel Time (s)		19.5			23.9			29.8			10.0	
Turn Type	Split	NA	Perm	Split	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4						2			6
Detector Phase	4	4	4	8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	4.0	4.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	17.0	17.0	17.0	11.0	11.0		9.5	40.0	40.0	9.5	40.0	40.0
Total Split (s)	32.0	32.0	32.0	15.0	15.0		17.0	60.0	60.0	13.0	56.0	56.0
Total Split (%)	26.7%	26.7%	26.7%	12.5%	12.5%		14.2%	50.0%	50.0%	10.8%	46.7%	46.7%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9		3.0	4.8	4.8	3.0	4.8	4.8
All-Red Time (s)	3.1	3.1	3.1	3.1	3.1		1.0	2.2	2.2	1.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0		4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag							Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Scottsdale Road & Mayo Boulevard



HCM 2010 Signalized Intersection Summary
 1: Scottsdale Road & Mayo Boulevard

2023 Background PM (Mitigated)
 3/29/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	629	4	239	0	12	28	365	1631	4	23	1450	785
Future Volume (veh/h)	629	4	239	0	12	28	365	1631	4	23	1450	785
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	662	4	252	0	13	29	384	1717	4	24	1883	588
Adj No. of Lanes	2	3	1	2	2	0	2	3	1	2	3	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	711	1050	327	91	47	42	518	2246	699	415	2282	647
Arrive On Green	0.21	0.21	0.21	0.00	0.03	0.03	0.15	0.44	0.44	0.12	0.41	0.41
Sat Flow, veh/h	3442	5085	1583	3442	1770	1583	3442	5085	1583	3548	5588	1583
Grp Volume(v), veh/h	662	4	252	0	13	29	384	1717	4	24	1883	588
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1583	1721	1695	1583	1774	1863	1583
Q Serve(g_s), s	22.7	0.1	18.0	0.0	0.9	2.2	12.8	34.2	0.2	0.7	36.1	41.9
Cycle Q Clear(g_c), s	22.7	0.1	18.0	0.0	0.9	2.2	12.8	34.2	0.2	0.7	36.1	41.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	711	1050	327	91	47	42	518	2246	699	415	2282	647
V/C Ratio(X)	0.93	0.00	0.77	0.00	0.28	0.69	0.74	0.76	0.01	0.06	0.83	0.91
Avail Cap(c_a), veh/h	717	1059	330	229	118	106	518	2246	699	415	2282	647
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(l)	1.00	1.00	1.00	0.00	1.00	1.00	0.81	0.81	0.81	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.8	37.8	44.9	0.0	57.3	57.9	48.7	28.2	18.8	47.1	31.7	33.4
Incr Delay (d2), s/veh	18.5	0.0	9.6	0.0	1.2	7.4	4.1	2.1	0.0	0.0	3.6	19.1
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	12.6	0.0	8.7	0.0	0.4	1.0	6.4	16.3	0.1	0.4	19.2	21.7
LnGrp Delay(d),s/veh	65.2	37.8	54.5	0.0	58.5	65.4	52.8	30.3	18.8	47.1	35.2	52.5
LnGrp LOS	E	D	D		E	E	D	C	B	D	D	D
Approach Vol, veh/h		918			42			2105			2495	
Approach Delay, s/veh		62.2			63.2			34.4			39.4	
Approach LOS		E			E			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	18.1	60.0		31.8	22.1	56.0		10.2				
Change Period (Y+Rc), s	*4	7.0		7.0	*4	7.0		7.0				
Max Green Setting (Gmax), s	*9	53.0		25.0	*13	49.0		8.0				
Max Q Clear Time (g_c+l1), s	2.7	36.2		24.7	14.8	43.9		4.2				
Green Ext Time (p_c), s	0.5	3.2		0.1	0.0	2.1		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			41.5									
HCM 2010 LOS			D									
Notes												

**2018 Total AM
Peak Hour Traffic
Capacity Analysis**

Timings
1: Scottsdale Road & Mayo Boulevard

2018 Total AM
3/29/2016

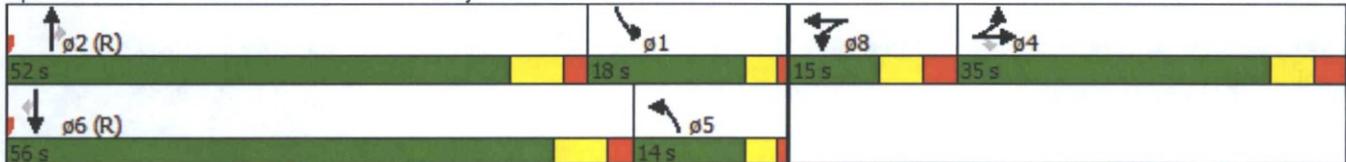


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	357	13	249	7	4	111	963	5	22	1584	455
Future Volume (vph)	357	13	249	7	4	111	963	5	22	1584	455
Turn Type	Split	NA	Perm	Split	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8	8	5	2		1	6	
Permitted Phases			4					2			6
Detector Phase	4	4	4	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	4.0	4.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	17.0	17.0	17.0	11.0	11.0	9.5	40.0	40.0	9.5	40.0	40.0
Total Split (s)	35.0	35.0	35.0	15.0	15.0	14.0	52.0	52.0	18.0	56.0	56.0
Total Split (%)	29.2%	29.2%	29.2%	12.5%	12.5%	11.7%	43.3%	43.3%	15.0%	46.7%	46.7%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.0	4.8	4.8	3.0	4.8	4.8
All-Red Time (s)	3.1	3.1	3.1	3.1	3.1	1.0	2.2	2.2	1.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag						Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Scottsdale Road & Mayo Boulevard



HCM 2010 Signalized Intersection Summary
 1: Scottsdale Road & Mayo Boulevard

2018 Total AM
 3/29/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	357	13	249	7	4	11	111	963	5	22	1584	455
Future Volume (veh/h)	357	13	249	7	4	11	111	963	5	22	1584	455
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	376	14	262	7	4	12	117	1014	5	23	1667	479
Adj No. of Lanes	2	3	1	2	2	0	2	3	1	2	3	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	638	943	294	61	32	28	620	1907	594	757	2282	647
Arrive On Green	0.19	0.19	0.19	0.02	0.02	0.02	0.36	0.75	0.75	0.21	0.41	0.41
Sat Flow, veh/h	3442	5085	1583	3442	1770	1583	3442	5085	1583	3548	5588	1583
Grp Volume(v), veh/h	376	14	262	7	4	12	117	1014	5	23	1667	479
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1583	1721	1695	1583	1774	1863	1583
Q Serve(g_s), s	12.0	0.3	19.4	0.2	0.3	0.9	2.8	9.9	0.1	0.6	30.2	30.8
Cycle Q Clear(g_c), s	12.0	0.3	19.4	0.2	0.3	0.9	2.8	9.9	0.1	0.6	30.2	30.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	638	943	294	61	32	28	620	1907	594	757	2282	647
V/C Ratio(X)	0.59	0.01	0.89	0.11	0.13	0.42	0.19	0.53	0.01	0.03	0.73	0.74
Avail Cap(c_a), veh/h	803	1187	369	229	118	106	620	1907	594	757	2282	647
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.97	0.97	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.7	39.9	47.7	58.0	58.0	58.3	32.4	10.6	9.4	37.4	29.9	30.1
Incr Delay (d2), s/veh	0.3	0.0	17.4	0.3	0.7	3.7	0.1	1.0	0.0	0.0	2.1	7.5
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	5.7	0.1	9.9	0.1	0.1	0.4	1.3	4.7	0.0	0.3	15.9	14.8
LnGrp Delay(d),s/veh	45.0	39.9	65.1	58.3	58.7	62.0	32.4	11.7	9.4	37.4	32.0	37.6
LnGrp LOS	D	D	E	E	E	E	C	B	A	D	C	D
Approach Vol, veh/h		652			23			1136			2169	
Approach Delay, s/veh		53.0			60.3			13.8			33.3	
Approach LOS		D			E			B			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	29.6	52.0		29.3	25.6	56.0		9.1				
Change Period (Y+Rc), s	* 4	7.0		7.0	* 4	7.0		7.0				
Max Green Setting (Gmax), s	* 14	45.0		28.0	* 10	49.0		8.0				
Max Q Clear Time (g_c+l1), s	2.6	11.9		21.4	4.8	32.8		2.9				
Green Ext Time (p_c), s	0.2	1.7		0.9	0.1	2.8		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			31.1									
HCM 2010 LOS			C									
Notes												

Timings
2: Scottsdale Road & Chauncey Lane

2018 Total AM
3/29/2016

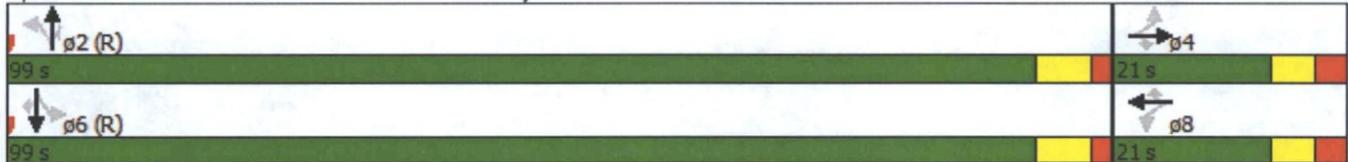


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	70	4	76	135	8	105	96	943	41	100	1581	114
Future Volume (vph)	70	4	76	135	8	105	96	943	41	100	1581	114
Turn Type	Perm	NA	Perm									
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	37.0	37.0	37.0	37.0	37.0	37.0
Total Split (s)	21.0	21.0	21.0	21.0	21.0	21.0	99.0	99.0	99.0	99.0	99.0	99.0
Total Split (%)	17.5%	17.5%	17.5%	17.5%	17.5%	17.5%	82.5%	82.5%	82.5%	82.5%	82.5%	82.5%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	4.9	4.9	4.9	4.9	4.9	4.9
All-Red Time (s)	3.1	3.1	3.1	3.1	3.1	3.1	2.1	2.1	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 25 (21%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated

Splits and Phases: 2: Scottsdale Road & Chauncey Lane



HCM 2010 Signalized Intersection Summary
 2: Scottsdale Road & Chauncey Lane

2018 Total AM
 3/29/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	4	76	135	8	105	96	943	41	100	1581	114
Future Volume (veh/h)	70	4	76	135	8	105	96	943	41	100	1581	114
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	74	4	80	142	8	111	101	993	43	105	1664	120
Adj No. of Lanes	1	2	1	1	2	1	1	3	1	1	3	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	205	413	185	211	413	185	263	3899	1214	445	3899	1214
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.77	0.77	0.77	1.00	1.00	1.00
Sat Flow, veh/h	1268	3539	1583	1308	3539	1583	265	5085	1583	542	5085	1583
Grp Volume(v), veh/h	74	4	80	142	8	111	101	993	43	105	1664	120
Grp Sat Flow(s),veh/h/ln	1268	1770	1583	1308	1770	1583	265	1695	1583	542	1695	1583
Q Serve(g_s), s	6.6	0.1	5.6	12.9	0.2	8.0	17.3	6.8	0.8	2.3	0.0	0.0
Cycle Q Clear(g_c), s	6.8	0.1	5.6	13.0	0.2	8.0	17.3	6.8	0.8	9.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	205	413	185	211	413	185	263	3899	1214	445	3899	1214
V/C Ratio(X)	0.36	0.01	0.43	0.67	0.02	0.60	0.38	0.25	0.04	0.24	0.43	0.10
Avail Cap(c_a), veh/h	205	413	185	211	413	185	263	3899	1214	445	3899	1214
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.75	0.75	0.75
Uniform Delay (d), s/veh	49.9	46.9	49.3	52.6	46.9	50.3	5.3	4.1	3.4	0.3	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.0	0.6	6.6	0.0	3.8	4.2	0.2	0.1	0.9	0.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.1	2.5	5.1	0.1	3.7	1.5	3.2	0.4	0.4	0.1	0.0
LnGrp Delay(d),s/veh	50.3	46.9	49.9	59.3	46.9	54.2	9.5	4.2	3.4	1.3	0.3	0.1
LnGrp LOS	D	D	D	E	D	D	A	A	A	A	A	A
Approach Vol, veh/h		158			261			1137			1889	
Approach Delay, s/veh		50.0			56.7			4.7			0.3	
Approach LOS		D			E			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		99.0		21.0		99.0		21.0				
Change Period (Y+Rc), s		7.0		7.0		7.0		7.0				
Max Green Setting (Gmax), s		92.0		14.0		92.0		14.0				
Max Q Clear Time (g_c+l1), s		19.3		8.8		11.1		15.0				
Green Ext Time (p_c), s		9.7		0.4		9.7		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			8.3									
HCM 2010 LOS			A									

Intersection												
Int Delay, s/veh	4.2											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	40	26	80	0	115	0	61	0	0	0	0	66
Future Vol, veh/h	40	26	80	0	115	0	61	0	0	0	0	66
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	150	-	0	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	28	87	0	125	0	66	0	0	0	0	72

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	125	0	0	28	0	0	276	240	28	240	240	125
Stage 1	-	-	-	-	-	-	115	115	-	125	125	-
Stage 2	-	-	-	-	-	-	161	125	-	115	115	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1462	-	-	1585	-	-	676	661	1047	714	661	926
Stage 1	-	-	-	-	-	-	890	800	-	879	792	-
Stage 2	-	-	-	-	-	-	841	792	-	890	800	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1462	-	-	1585	-	-	610	642	1047	698	642	926
Mov Cap-2 Maneuver	-	-	-	-	-	-	610	642	-	698	642	-
Stage 1	-	-	-	-	-	-	864	776	-	853	792	-
Stage 2	-	-	-	-	-	-	776	792	-	864	776	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.1	0	11.6	9.2
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	610	1462	-	-	1585	-	-	926
HCM Lane V/C Ratio	0.109	0.03	-	-	-	-	-	0.077
HCM Control Delay (s)	11.6	7.5	-	-	0	-	-	9.2
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	0.3

Intersection

Int Delay, s/veh 0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	0	22	1057	28	0	1792
Future Vol, veh/h	0	22	1057	28	0	1792
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	24	1149	30	0	1948

Major/Minor	Minor1	Minor2	Major1	Major2	Major3	Major4
Conflicting Flow All	1943	590	0	0	1179	0
Stage 1	1164	-	-	-	-	-
Stage 2	779	-	-	-	-	-
Critical Hdwy	5.74	7.14	-	-	5.34	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	-	-	3.12	-
Pot Cap-1 Maneuver	100	386	-	-	320	-
Stage 1	192	-	-	-	-	-
Stage 2	375	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	100	386	-	-	320	-
Mov Cap-2 Maneuver	100	-	-	-	-	-
Stage 1	192	-	-	-	-	-
Stage 2	375	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	386	320	-
HCM Lane V/C Ratio	-	-	0.062	-	-
HCM Control Delay (s)	-	-	14.9	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection

Int Delay, s/veh 1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	168	105	17	90	27	8
Future Vol, veh/h	168	105	17	90	27	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	160	190	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	183	114	18	98	29	9

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	183	0	269	91
Stage 1	-	-	-	-	183	-
Stage 2	-	-	-	-	86	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1389	-	698	949
Stage 1	-	-	-	-	830	-
Stage 2	-	-	-	-	927	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1389	-	689	949
Mov Cap-2 Maneuver	-	-	-	-	689	-
Stage 1	-	-	-	-	830	-
Stage 2	-	-	-	-	915	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	10.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	735	-	-	1389	-
HCM Lane V/C Ratio	0.052	-	-	0.013	-
HCM Control Delay (s)	10.2	-	-	7.6	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection

Int Delay, s/veh	7.3
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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	103	0	0	6	1	19
Future Vol, veh/h	103	0	0	6	1	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	112	0	0	7	1	21

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	18	11	22
Stage 1	11	-	-
Stage 2	7	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	1000	1070	1593
Stage 1	1012	-	-
Stage 2	1016	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	1000	1070	1593
Mov Cap-2 Maneuver	1000	-	-
Stage 1	1012	-	-
Stage 2	1016	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1593	-	1000	-	-
HCM Lane V/C Ratio	-	-	0.112	-	-
HCM Control Delay (s)	0	-	9.1	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection

Int Delay, s/veh 7.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	6	0	0	0	0	1
Future Vol, veh/h	6	0	0	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	0	0	0	0	1

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1	1	0
Stage 1	1	-	-
Stage 2	0	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	1022	1084	1622
Stage 1	1022	-	-
Stage 2	-	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	1022	1084	1622
Mov Cap-2 Maneuver	1022	-	-
Stage 1	1022	-	-
Stage 2	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1622	-	1022	-	-
HCM Lane V/C Ratio	-	-	0.006	-	-
HCM Control Delay (s)	0	-	8.5	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection			
Intersection Delay, s/veh	4.0		
Intersection LOS	A		
Approach	EB	NB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	29	118	7
Demand Flow Rate, veh/h	29	120	7
Vehicles Circulating, veh/h	0	7	120
Vehicles Exiting, veh/h	127	22	7
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.4	4.2	3.7
Approach LOS	A	A	A
Lane	Left	Left	Left
Designated Moves	LR	LT	TR
Assumed Moves	LR	LT	TR
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	29	120	7
Cap Entry Lane, veh/h	1130	1122	1002
Entry HV Adj Factor	1.000	0.983	1.000
Flow Entry, veh/h	29	118	7
Cap Entry, veh/h	1130	1103	1002
V/C Ratio	0.026	0.107	0.007
Control Delay, s/veh	3.4	4.2	3.7
LOS	A	A	A
95th %tile Queue, veh	0	0	0

**2018 Total PM
Peak Hour Traffic
Capacity Analysis**

Timings

2018 Total PM

1: Scottsdale Road & Mayo Boulevard

3/29/2016

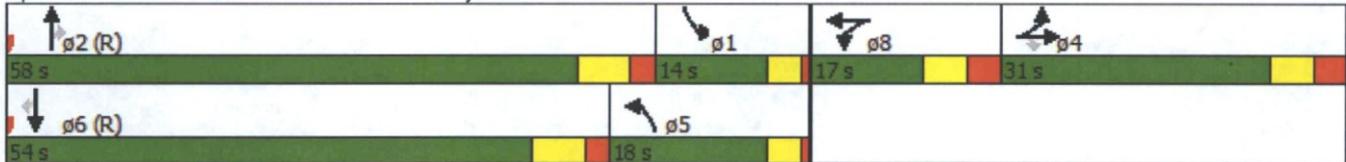


Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	608	4	230	11	353	1586	4	9	1425	760
Future Volume (vph)	608	4	230	11	353	1586	4	9	1425	760
Turn Type	Split	NA	Perm	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8	5	2		1	6	
Permitted Phases			4				2			6
Detector Phase	4	4	4	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	4.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	17.0	17.0	17.0	11.0	9.5	40.0	40.0	9.5	40.0	40.0
Total Split (s)	31.0	31.0	31.0	17.0	18.0	58.0	58.0	14.0	54.0	54.0
Total Split (%)	25.8%	25.8%	25.8%	14.2%	15.0%	48.3%	48.3%	11.7%	45.0%	45.0%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.0	4.8	4.8	3.0	4.8	4.8
All-Red Time (s)	3.1	3.1	3.1	3.1	1.0	2.2	2.2	1.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag					Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Scottsdale Road & Mayo Boulevard



HCM 2010 Signalized Intersection Summary
 1: Scottsdale Road & Mayo Boulevard

2018 Total PM
 3/29/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	608	4	230	0	11	23	353	1586	4	9	1425	760
Future Volume (veh/h)	608	4	230	0	11	23	353	1586	4	9	1425	760
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	640	4	242	0	12	24	372	1669	4	9	1838	575
Adj No. of Lanes	2	3	1	2	2	0	2	3	1	2	3	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	687	1015	316	80	41	37	609	2161	673	510	2189	620
Arrive On Green	0.20	0.20	0.20	0.00	0.02	0.02	0.24	0.57	0.57	0.14	0.39	0.39
Sat Flow, veh/h	3442	5085	1583	3442	1770	1583	3442	5085	1583	3548	5588	1583
Grp Volume(v), veh/h	640	4	242	0	12	24	372	1669	4	9	1838	575
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1583	1721	1695	1583	1774	1863	1583
Q Serve(g_s), s	21.9	0.1	17.3	0.0	0.8	1.8	11.6	30.4	0.1	0.3	35.8	41.6
Cycle Q Clear(g_c), s	21.9	0.1	17.3	0.0	0.8	1.8	11.6	30.4	0.1	0.3	35.8	41.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	687	1015	316	80	41	37	609	2161	673	510	2189	620
V/C Ratio(X)	0.93	0.00	0.77	0.00	0.29	0.65	0.61	0.77	0.01	0.02	0.84	0.93
Avail Cap(c_a), veh/h	688	1017	317	287	147	132	609	2161	673	510	2189	620
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00	0.83	0.83	0.83	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.2	38.5	45.4	0.0	57.6	58.1	42.2	21.6	15.0	44.1	33.1	34.9
Incr Delay (d2), s/veh	19.1	0.0	9.6	0.0	1.4	7.0	1.1	2.3	0.0	0.0	4.1	22.1
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	12.2	0.0	8.4	0.0	0.4	0.9	5.6	14.5	0.1	0.1	19.2	22.0
LnGrp Delay(d),s/veh	66.3	38.5	55.0	0.0	59.1	65.1	43.3	23.9	15.0	44.1	37.2	57.0
LnGrp LOS	E	D	E		E	E	D	C	B	D	D	E
Approach Vol, veh/h		886			36			2045			2422	
Approach Delay, s/veh		63.1			63.1			27.4			41.9	
Approach LOS		E			E			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	21.2	58.0		31.0	25.2	54.0		9.8				
Change Period (Y+Rc), s	* 4	7.0		7.0	* 4	7.0		7.0				
Max Green Setting (Gmax), s	* 10	51.0		24.0	* 14	47.0		10.0				
Max Q Clear Time (g_c+l1), s	2.3	32.4		23.9	13.6	43.6		3.8				
Green Ext Time (p_c), s	0.5	3.1		0.0	0.0	1.6		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			40.0									
HCM 2010 LOS			D									
Notes												

Timings
2: Scottsdale Road & Chauncey Lane

2018 Total PM
3/29/2016

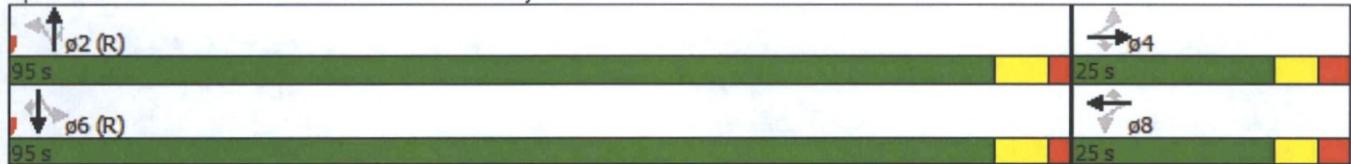


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	6	102	134	7	68	98	1822	78	164	1444	86
Future Volume (vph)	134	6	102	134	7	68	98	1822	78	164	1444	86
Turn Type	Perm	NA	Perm									
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	37.0	37.0	37.0	37.0	37.0	37.0
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	95.0	95.0	95.0	95.0	95.0	95.0
Total Split (%)	20.8%	20.8%	20.8%	20.8%	20.8%	20.8%	79.2%	79.2%	79.2%	79.2%	79.2%	79.2%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	4.9	4.9	4.9	4.9	4.9	4.9
All-Red Time (s)	3.1	3.1	3.1	3.1	3.1	3.1	2.1	2.1	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 25 (21%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated

Splits and Phases: 2: Scottsdale Road & Chauncey Lane



HCM 2010 Signalized Intersection Summary
2: Scottsdale Road & Chauncey Lane

2018 Total PM
3/29/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	134	6	102	134	7	68	98	1822	78	164	1444	86
Future Volume (veh/h)	134	6	102	134	7	68	98	1822	78	164	1444	86
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	146	7	111	146	8	74	107	1980	85	178	1570	93
Adj No. of Lanes	1	2	1	1	2	1	1	3	1	1	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	233	473	211	227	473	211	283	3813	1187	179	3813	1187
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.75	0.75	0.75	1.00	1.00	1.00
Sat Flow, veh/h	1311	3539	1583	1269	3539	1583	298	5085	1583	201	5085	1583
Grp Volume(v), veh/h	146	7	111	146	8	74	107	1980	85	178	1570	93
Grp Sat Flow(s),veh/h/ln	1311	1770	1583	1269	1770	1583	298	1695	1583	201	1695	1583
Q Serve(g_s), s	13.1	0.2	7.8	13.5	0.2	5.1	16.8	19.1	1.7	70.8	0.0	0.0
Cycle Q Clear(g_c), s	13.3	0.2	7.8	13.8	0.2	5.1	16.8	19.1	1.7	90.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	233	473	211	227	473	211	283	3813	1187	179	3813	1187
V/C Ratio(X)	0.63	0.01	0.52	0.64	0.02	0.35	0.38	0.52	0.07	1.00	0.41	0.08
Avail Cap(c_a), veh/h	254	531	237	248	531	237	283	3813	1187	179	3813	1187
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50
Uniform Delay (d), s/veh	50.9	45.1	48.4	51.1	45.1	47.3	5.9	6.2	4.0	21.4	0.0	0.0
Incr Delay (d2), s/veh	2.8	0.0	0.8	3.4	0.0	0.4	3.8	0.5	0.1	46.8	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	0.1	3.5	5.0	0.1	2.3	1.7	9.0	0.8	8.2	0.1	0.0
LnGrp Delay(d),s/veh	53.7	45.1	49.2	54.5	45.2	47.6	9.7	6.7	4.1	68.2	0.2	0.1
LnGrp LOS	D	D	D	D	D	D	A	A	A	E	A	A
Approach Vol, veh/h		264			228			2172			1841	
Approach Delay, s/veh		51.6			51.9			6.7			6.7	
Approach LOS		D			D			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		97.0		23.0		97.0		23.0				
Change Period (Y+Rc), s		7.0		7.0		7.0		7.0				
Max Green Setting (Gmax), s		88.0		18.0		88.0		18.0				
Max Q Clear Time (g_c+1), s		21.1		15.3		92.0		15.8				
Green Ext Time (p_c), s		27.5		0.3		0.0		0.3				
Intersection Summary												
HCM 2010 Ctrl Delay				11.6								
HCM 2010 LOS				B								

Intersection												
Int Delay, s/veh	4.3											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	59	106	83	0	56	0	72	0	0	0	0	57
Future Vol, veh/h	59	106	83	0	56	0	72	0	0	0	0	57
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	150	-	0	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	64	115	90	0	61	0	78	0	0	0	0	62

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	61	0	0	115	0	0	335	304	115	304	304	61
Stage 1	-	-	-	-	-	-	243	243	-	61	61	-
Stage 2	-	-	-	-	-	-	92	61	-	243	243	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1542	-	-	1474	-	-	619	609	937	648	609	1004
Stage 1	-	-	-	-	-	-	761	705	-	950	844	-
Stage 2	-	-	-	-	-	-	915	844	-	761	705	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1542	-	-	1474	-	-	562	584	937	627	584	1004
Mov Cap-2 Maneuver	-	-	-	-	-	-	562	584	-	627	584	-
Stage 1	-	-	-	-	-	-	729	676	-	911	844	-
Stage 2	-	-	-	-	-	-	859	844	-	729	676	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	0	12.4	8.8
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	562	1542	-	-	1474	-	-	1004
HCM Lane V/C Ratio	0.139	0.042	-	-	-	-	-	0.062
HCM Control Delay (s)	12.4	7.4	-	-	0	-	-	8.8
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	0.2

Intersection

Int Delay, s/veh	0.2
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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	0	30	1968	42	0	1681
Future Vol, veh/h	0	30	1968	42	0	1681
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	33	2139	46	0	1827

Major/Minor	Minor1	Minor2	Major1	Major2	Major3	Major4
Conflicting Flow All	2893	1092	0	0	2185	0
Stage 1	2162	-	-	-	-	-
Stage 2	731	-	-	-	-	-
Critical Hdwy	5.74	7.14	-	-	5.34	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	-	-	3.12	-
Pot Cap-1 Maneuver	30	180	-	-	101	-
Stage 1	45	-	-	-	-	-
Stage 2	397	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	30	180	-	-	101	-
Mov Cap-2 Maneuver	30	-	-	-	-	-
Stage 1	45	-	-	-	-	-
Stage 2	397	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	29.4	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	- 180	101	-
HCM Lane V/C Ratio	-	- 0.181	-	-
HCM Control Delay (s)	-	- 29.4	0	-
HCM Lane LOS	-	- D	A	-
HCM 95th %tile Q(veh)	-	- 0.6	0	-

Intersection

Int Delay, s/veh	2.7
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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	172	50	15	202	106	13
Future Vol, veh/h	172	50	15	202	106	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	-	160	190	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	187	54	16	220	115	14

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	187	0	329	93
Stage 1	-	-	-	-	187	-
Stage 2	-	-	-	-	142	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1385	-	640	946
Stage 1	-	-	-	-	826	-
Stage 2	-	-	-	-	870	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1385	-	633	946
Mov Cap-2 Maneuver	-	-	-	-	633	-
Stage 1	-	-	-	-	826	-
Stage 2	-	-	-	-	860	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	11.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	657	-	-	1385	-
HCM Lane V/C Ratio	0.197	-	-	0.012	-
HCM Control Delay (s)	11.8	-	-	7.6	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.7	-	-	0	-

Intersection

Int Delay, s/veh	2.8
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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	48	0	0	3	7	97
Future Vol, veh/h	48	0	0	3	7	97
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	0	0	3	8	105

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	63	60	113
Stage 1	60	-	-
Stage 2	3	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	943	1005	1476
Stage 1	963	-	-
Stage 2	1020	-	-
Platoon blocked, %			-
Mov Cap-1 Maneuver	943	1005	1476
Mov Cap-2 Maneuver	943	-	-
Stage 1	963	-	-
Stage 2	1020	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1476	-	943	-	-
HCM Lane V/C Ratio	-	-	0.055	-	-
HCM Control Delay (s)	0	-	9	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection

Int Delay, s/veh	2.6
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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	3	0	0	0	0	7
Future Vol, veh/h	3	0	0	0	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	0	0	0	0	8

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	4	4	8
Stage 1	4	-	-
Stage 2	0	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	1018	1080	1612
Stage 1	1019	-	-
Stage 2	-	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	1018	1080	1612
Mov Cap-2 Maneuver	1018	-	-
Stage 1	1019	-	-
Stage 2	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1612	-	1018	-	-
HCM Lane V/C Ratio	-	-	0.003	-	-
HCM Control Delay (s)	0	-	8.5	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection			
Intersection Delay, s/veh	4.0		
Intersection LOS	A		
Approach	EB	NB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	115	55	6
Demand Flow Rate, veh/h	117	56	6
Vehicles Circulating, veh/h	1	3	56
Vehicles Exiting, veh/h	61	115	3
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	4.1	3.7	3.4
Approach LOS	A	A	A
Lane	Left	Left	Left
Designated Moves	LR	LT	TR
Assumed Moves	LR	LT	TR
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	117	56	6
Cap Entry Lane, veh/h	1129	1127	1068
Entry HV Adj Factor	0.983	0.982	0.997
Flow Entry, veh/h	115	55	6
Cap Entry, veh/h	1110	1106	1065
V/C Ratio	0.104	0.050	0.006
Control Delay, s/veh	4.1	3.7	3.4
LOS	A	A	A
95th %tile Queue, veh	0	0	0

**2023 Total AM
Peak Hour Traffic
Capacity Analysis**

Timings
1: Scottsdale Road & Mayo Boulevard

2023 Total AM
3/29/2016

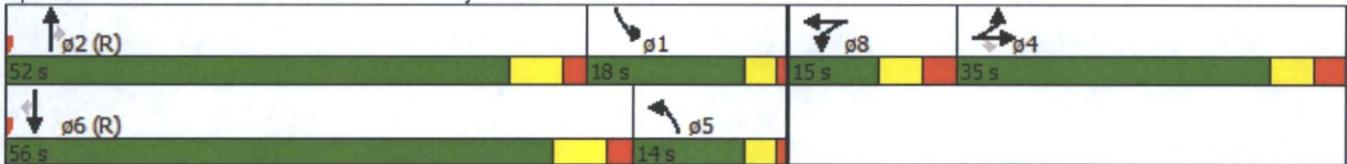


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↑↑↑	↗	↖↖	↑↑	↖↖	↑↑↑	↗	↖↖	↑↑↑	↗
Traffic Volume (vph)	369	14	263	7	5	125	1053	5	29	1668	470
Future Volume (vph)	369	14	263	7	5	125	1053	5	29	1668	470
Turn Type	Split	NA	Perm	Split	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8	8	5	2		1	6	
Permitted Phases			4					2			6
Detector Phase	4	4	4	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	4.0	4.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	17.0	17.0	17.0	11.0	11.0	9.5	40.0	40.0	9.5	40.0	40.0
Total Split (s)	35.0	35.0	35.0	15.0	15.0	14.0	52.0	52.0	18.0	56.0	56.0
Total Split (%)	29.2%	29.2%	29.2%	12.5%	12.5%	11.7%	43.3%	43.3%	15.0%	46.7%	46.7%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.0	4.8	4.8	3.0	4.8	4.8
All-Red Time (s)	3.1	3.1	3.1	3.1	3.1	1.0	2.2	2.2	1.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag						Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Scottsdale Road & Mayo Boulevard



HCM 2010 Signalized Intersection Summary
 1: Scottsdale Road & Mayo Boulevard

2023 Total AM
 3/29/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	369	14	263	7	5	18	125	1053	5	29	1668	470
Future Volume (veh/h)	369	14	263	7	5	18	125	1053	5	29	1668	470
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	388	15	277	7	5	19	132	1108	5	31	1756	495
Adj No. of Lanes	2	3	1	2	2	0	2	3	1	2	3	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	669	988	308	74	38	34	576	1907	594	713	2282	647
Arrive On Green	0.19	0.19	0.19	0.02	0.02	0.02	0.33	0.75	0.75	0.20	0.41	0.41
Sat Flow, veh/h	3442	5085	1583	3442	1770	1583	3442	5085	1583	3548	5588	1583
Grp Volume(v), veh/h	388	15	277	7	5	19	132	1108	5	31	1756	495
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1583	1721	1695	1583	1774	1863	1583
Q Serve(g_s), s	12.3	0.3	20.5	0.2	0.3	1.4	3.3	11.6	0.1	0.8	32.5	32.3
Cycle Q Clear(g_c), s	12.3	0.3	20.5	0.2	0.3	1.4	3.3	11.6	0.1	0.8	32.5	32.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	669	988	308	74	38	34	576	1907	594	713	2282	647
V/C Ratio(X)	0.58	0.02	0.90	0.09	0.13	0.56	0.23	0.58	0.01	0.04	0.77	0.77
Avail Cap(c_a), veh/h	803	1187	369	229	118	106	576	1907	594	713	2282	647
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.9	39.1	47.2	57.6	57.6	58.1	34.3	10.8	9.4	38.7	30.6	30.6
Incr Delay (d2), s/veh	0.3	0.0	19.8	0.2	0.6	5.2	0.1	1.2	0.0	0.0	2.6	8.4
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	5.8	0.1	10.7	0.1	0.2	0.7	1.6	5.3	0.0	0.4	17.3	15.5
LnGrp Delay(d),s/veh	44.2	39.1	66.9	57.8	58.2	63.4	34.4	12.1	9.4	38.7	33.2	39.0
LnGrp LOS	D	D	E	E	E	E	C	B	A	D	C	D
Approach Vol, veh/h		680			31			1245			2282	
Approach Delay, s/veh		53.3			61.3			14.4			34.5	
Approach LOS		D			E			B			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	28.1	52.0		30.3	24.1	56.0		9.6				
Change Period (Y+Rc), s	* 4	7.0		7.0	* 4	7.0		7.0				
Max Green Setting (Gmax), s	* 14	45.0		28.0	* 10	49.0		8.0				
Max Q Clear Time (g_c+I1), s	2.8	13.6		22.5	5.3	34.5		3.4				
Green Ext Time (p_c), s	0.2	1.9		0.8	0.1	3.0		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			31.8									
HCM 2010 LOS			C									
Notes												

Timings
2: Scottsdale Road & Chauncey Lane

2023 Total AM
3/29/2016

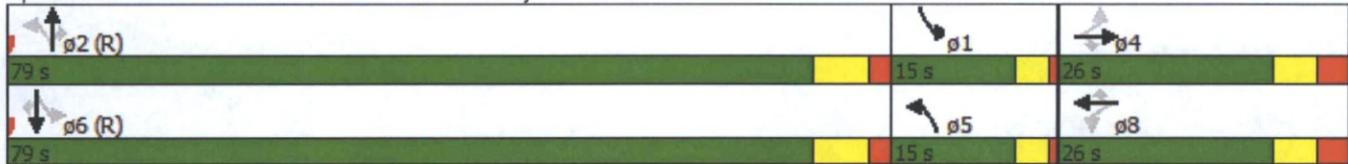


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	104	81	118	108	83	105	1065	33	84	1693	118
Future Volume (vph)	72	104	81	118	108	83	105	1065	33	84	1693	118
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	10.0	37.0	37.0	10.0	37.0	37.0
Total Split (s)	26.0	26.0	26.0	26.0	26.0	26.0	15.0	79.0	79.0	15.0	79.0	79.0
Total Split (%)	21.7%	21.7%	21.7%	21.7%	21.7%	21.7%	12.5%	65.8%	65.8%	12.5%	65.8%	65.8%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.0	4.9	4.9	3.0	4.9	4.9
All-Red Time (s)	3.1	3.1	3.1	3.1	3.1	3.1	1.0	2.1	2.1	1.0	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag							Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max						

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 110 (92%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated

Splits and Phases: 2: Scottsdale Road & Chauncey Lane



HCM 2010 Signalized Intersection Summary
2: Scottsdale Road & Chauncey Lane

2023 Total AM
3/29/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	104	81	118	108	83	105	1065	33	84	1693	118
Future Volume (veh/h)	72	104	81	118	108	83	105	1065	33	84	1693	118
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	76	109	85	124	114	87	111	1121	35	88	1782	124
Adj No. of Lanes	1	2	1	1	2	1	1	3	1	1	3	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	202	528	236	204	528	236	349	3051	950	475	3051	950
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.10	0.60	0.60	0.13	0.80	0.80
Sat Flow, veh/h	1177	3539	1583	1184	3539	1583	1774	5085	1583	1774	5085	1583
Grp Volume(v), veh/h	76	109	85	124	114	87	111	1121	35	88	1782	124
Grp Sat Flow(s),veh/h/ln	1177	1770	1583	1184	1770	1583	1774	1695	1583	1774	1695	1583
Q Serve(g_s), s	7.3	3.2	5.8	12.3	3.4	5.9	0.0	13.6	1.1	0.0	15.9	2.1
Cycle Q Clear(g_c), s	10.7	3.2	5.8	15.6	3.4	5.9	0.0	13.6	1.1	0.0	15.9	2.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	202	528	236	204	528	236	349	3051	950	475	3051	950
V/C Ratio(X)	0.38	0.21	0.36	0.61	0.22	0.37	0.32	0.37	0.04	0.19	0.58	0.13
Avail Cap(c_a), veh/h	213	560	251	215	560	251	349	3051	950	475	3051	950
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.70	0.70	0.70
Uniform Delay (d), s/veh	49.6	44.8	45.9	51.7	44.9	46.0	21.2	12.3	9.8	11.9	6.5	5.1
Incr Delay (d2), s/veh	0.4	0.1	0.3	2.9	0.1	0.4	0.5	0.3	0.1	0.1	0.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	1.6	2.6	4.2	1.7	2.6	3.0	6.4	0.5	1.4	7.5	1.0
LnGrp Delay(d),s/veh	50.0	44.9	46.3	54.6	45.0	46.3	21.7	12.7	9.9	12.0	7.0	5.3
LnGrp LOS	D	D	D	D	D	D	C	B	A	B	A	A
Approach Vol, veh/h		270			325			1267			1994	
Approach Delay, s/veh		46.8			49.0			13.4			7.1	
Approach LOS		D			D			B			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.1	79.0		24.9	16.1	79.0		24.9				
Change Period (Y+Rc), s	4.0	7.0		7.0	4.0	7.0		7.0				
Max Green Setting (Gmax), s	11.0	72.0		19.0	11.0	72.0		19.0				
Max Q Clear Time (g_c+1), s	2.0	15.6		12.7	2.0	17.9		17.6				
Green Ext Time (p_c), s	0.3	1.9		1.0	0.3	3.5		0.3				
Intersection Summary												
HCM 2010 Ctrl Delay			15.5									
HCM 2010 LOS			B									

Intersection

Int Delay, s/veh 3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	27	121	69	11	197	2	53	0	8	3	0	56
Future Vol, veh/h	27	121	69	11	197	2	53	0	8	3	0	56
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	150	-	0	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	132	75	12	214	2	58	0	9	3	0	61

Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	216	0	0	132	0	0	460	430	132	434	429	215
Stage 1	-	-	-	-	-	-	190	190	-	239	239	-
Stage 2	-	-	-	-	-	-	270	240	-	195	190	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1354	-	-	1453	-	-	512	518	917	532	518	825
Stage 1	-	-	-	-	-	-	812	743	-	764	708	-
Stage 2	-	-	-	-	-	-	736	707	-	807	743	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1354	-	-	1453	-	-	464	503	917	515	503	825
Mov Cap-2 Maneuver	-	-	-	-	-	-	464	503	-	515	503	-
Stage 1	-	-	-	-	-	-	795	727	-	748	702	-
Stage 2	-	-	-	-	-	-	676	701	-	782	727	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.4	13.4	9.9
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	496	1354	-	-	1453	-	-	800
HCM Lane V/C Ratio	0.134	0.022	-	-	0.008	-	-	0.08
HCM Control Delay (s)	13.4	7.7	-	-	7.5	-	-	9.9
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	0.3

Intersection

Int Delay, s/veh 0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	0	22	1181	28	0	1893
Future Vol, veh/h	0	22	1181	28	0	1893
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	24	1284	30	0	2058

Major/Minor	Minor1	Minor2	Major1	Major2	Major3	Major4
Conflicting Flow All	2122	657	0	0	1314	0
Stage 1	1299	-	-	-	-	-
Stage 2	823	-	-	-	-	-
Critical Hdwy	5.74	7.14	-	-	5.34	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	-	-	3.12	-
Pot Cap-1 Maneuver	80	349	-	-	275	-
Stage 1	158	-	-	-	-	-
Stage 2	355	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	80	349	-	-	275	-
Mov Cap-2 Maneuver	80	-	-	-	-	-
Stage 1	158	-	-	-	-	-
Stage 2	355	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.1	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	349	275	-
HCM Lane V/C Ratio	-	-	0.069	-	-
HCM Control Delay (s)	-	-	16.1	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection

Int Delay, s/veh 3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	62	169	109	17	88	58	27	0	8	60	0	59
Future Vol, veh/h	62	169	109	17	88	58	27	0	8	60	0	59
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	150	-	160	190	-	160	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	67	184	118	18	96	63	29	0	9	65	0	64

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	96	0	0	184	0	0	403	451	92	360	451	48
Stage 1	-	-	-	-	-	-	318	318	-	133	133	-
Stage 2	-	-	-	-	-	-	85	133	-	227	318	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1496	-	-	1388	-	-	532	502	947	571	502	1011
Stage 1	-	-	-	-	-	-	668	652	-	857	785	-
Stage 2	-	-	-	-	-	-	913	785	-	755	652	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1496	-	-	1388	-	-	476	473	947	541	473	1011
Mov Cap-2 Maneuver	-	-	-	-	-	-	476	473	-	541	473	-
Stage 1	-	-	-	-	-	-	638	623	-	819	775	-
Stage 2	-	-	-	-	-	-	844	775	-	715	623	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	0.8	12.2	10.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	537	1496	-	-	1388	-	-	541	1011
HCM Lane V/C Ratio	0.071	0.045	-	-	0.013	-	-	0.121	0.063
HCM Control Delay (s)	12.2	7.5	-	-	7.6	-	-	12.6	8.8
HCM Lane LOS	B	A	-	-	A	-	-	B	A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.4	0.2

Intersection

Int Delay, s/veh	3					
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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	93	11	3	138	127	16
Future Vol, veh/h	93	11	3	138	127	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	101	12	3	150	138	17

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	304	147	155 0
Stage 1	147	-	- -
Stage 2	157	-	- -
Critical Hdwy	6.42	6.22	4.12 -
Critical Hdwy Stg 1	5.42	-	- -
Critical Hdwy Stg 2	5.42	-	- -
Follow-up Hdwy	3.518	3.318	2.218 -
Pot Cap-1 Maneuver	688	900	1425 -
Stage 1	880	-	- -
Stage 2	871	-	- -
Platoon blocked, %			- -
Mov Cap-1 Maneuver	687	900	1425 -
Mov Cap-2 Maneuver	687	-	- -
Stage 1	880	-	- -
Stage 2	869	-	- -

Approach	EB	NB	SB
HCM Control Delay, s	11.1	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1425	-	705	-	-
HCM Lane V/C Ratio	0.002	-	0.16	-	-
HCM Control Delay (s)	7.5	0	11.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.6	-	-

Intersection

Int Delay, s/veh 0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	5	0	1	135	137	1
Future Vol, veh/h	5	0	1	135	137	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	0	1	147	149	1

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	298	149	150 0
Stage 1	149	-	- -
Stage 2	149	-	- -
Critical Hdwy	6.42	6.22	4.12 -
Critical Hdwy Stg 1	5.42	-	- -
Critical Hdwy Stg 2	5.42	-	- -
Follow-up Hdwy	3.518	3.318	2.218 -
Pot Cap-1 Maneuver	693	898	1431 -
Stage 1	879	-	- -
Stage 2	879	-	- -
Platoon blocked, %			- -
Mov Cap-1 Maneuver	692	898	1431 -
Mov Cap-2 Maneuver	692	-	- -
Stage 1	879	-	- -
Stage 2	878	-	- -

Approach	EB	NB	SB
HCM Control Delay, s	10.2	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1431	-	692	-	-
HCM Lane V/C Ratio	0.001	-	0.008	-	-
HCM Control Delay (s)	7.5	0	10.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection				
Intersection Delay, s/veh	5.7			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	145	118	250	145
Demand Flow Rate, veh/h	147	120	255	148
Vehicles Circulating, veh/h	139	258	128	223
Vehicles Exiting, veh/h	232	125	158	155
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.1	5.6	6.2	5.7
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193
Entry Flow, veh/h	147	120	255	148
Cap Entry Lane, veh/h	983	873	994	904
Entry HV Adj Factor	0.985	0.981	0.981	0.982
Flow Entry, veh/h	145	118	250	145
Cap Entry, veh/h	968	857	976	888
V/C Ratio	0.149	0.137	0.256	0.164
Control Delay, s/veh	5.1	5.6	6.2	5.7
LOS	A	A	A	A
95th %tile Queue, veh	1	0	1	1

**2023 Total PM
Peak Hour Traffic
Capacity Analysis**

Timings

2023 Total PM

1: Scottsdale Road & Mayo Boulevard

3/29/2016

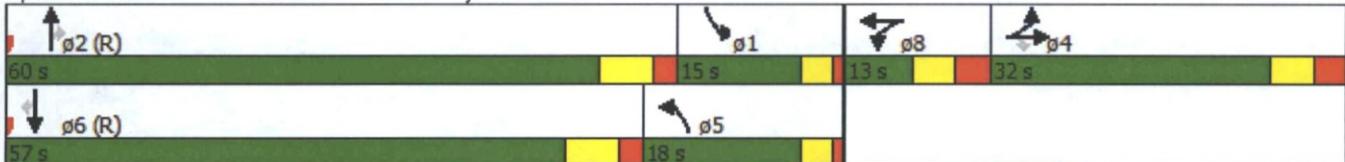


Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑↑	↗	↑↑	↖↗	↑↑↑	↗	↖↗	↑↑↑	↗
Traffic Volume (vph)	629	5	248	12	371	1682	4	23	1536	785
Future Volume (vph)	629	5	248	12	371	1682	4	23	1536	785
Turn Type	Split	NA	Perm	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8	5	2		1	6	
Permitted Phases			4				2			6
Detector Phase	4	4	4	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	4.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	17.0	17.0	17.0	11.0	9.5	40.0	40.0	9.5	40.0	40.0
Total Split (s)	32.0	32.0	32.0	13.0	18.0	60.0	60.0	15.0	57.0	57.0
Total Split (%)	26.7%	26.7%	26.7%	10.8%	15.0%	50.0%	50.0%	12.5%	47.5%	47.5%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.0	4.8	4.8	3.0	4.8	4.8
All-Red Time (s)	3.1	3.1	3.1	3.1	1.0	2.2	2.2	1.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag					Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Scottsdale Road & Mayo Boulevard



HCM 2010 Signalized Intersection Summary
 1: Scottsdale Road & Mayo Boulevard

2023 Total PM
 3/29/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	629	5	248	0	12	28	371	1682	4	23	1536	785
Future Volume (veh/h)	629	5	248	0	12	28	371	1682	4	23	1536	785
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	662	5	261	0	13	29	391	1771	4	24	1940	611
Adj No. of Lanes	2	3	1	2	2	0	2	3	1	2	3	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	711	1050	327	91	47	42	489	2246	699	416	2328	660
Arrive On Green	0.21	0.21	0.21	0.00	0.03	0.03	0.28	0.88	0.88	0.12	0.42	0.42
Sat Flow, veh/h	3442	5085	1583	3442	1770	1583	3442	5085	1583	3548	5588	1583
Grp Volume(v), veh/h	662	5	261	0	13	29	391	1771	4	24	1940	611
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1583	1721	1695	1583	1774	1863	1583
Q Serve(g_s), s	22.7	0.1	18.8	0.0	0.9	2.2	12.6	16.1	0.0	0.7	37.2	44.0
Cycle Q Clear(g_c), s	22.7	0.1	18.8	0.0	0.9	2.2	12.6	16.1	0.0	0.7	37.2	44.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	711	1050	327	91	47	42	489	2246	699	416	2328	660
V/C Ratio(X)	0.93	0.00	0.80	0.00	0.28	0.70	0.80	0.79	0.01	0.06	0.83	0.93
Avail Cap(c_a), veh/h	717	1059	330	172	88	79	489	2246	699	416	2328	660
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00	0.66	0.66	0.66	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.8	37.8	45.2	0.0	57.3	57.9	41.4	4.8	3.9	47.1	31.3	33.2
Incr Delay (d2), s/veh	18.5	0.0	11.9	0.0	1.2	7.5	5.8	1.9	0.0	0.0	3.7	21.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.6	0.0	9.3	0.0	0.4	1.0	6.4	7.0	0.0	0.4	19.8	23.0
LnGrp Delay(d),s/veh	65.2	37.8	57.1	0.0	58.5	65.5	47.1	6.8	3.9	47.1	35.0	54.2
LnGrp LOS	E	D	E		E	E	D	A	A	D	C	D
Approach Vol, veh/h		928			42			2166			2575	
Approach Delay, s/veh		62.8			63.3			14.1			39.6	
Approach LOS		E			E			B			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	18.1	60.0		31.8	21.1	57.0		10.2				
Change Period (Y+Rc), s	* 4	7.0		7.0	* 4	7.0		7.0				
Max Green Setting (Gmax), s	* 11	53.0		25.0	* 14	50.0		6.0				
Max Q Clear Time (g_c+l1), s	2.7	18.1		24.7	14.6	46.0		4.2				
Green Ext Time (p_c), s	0.6	3.5		0.1	0.0	1.9		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			33.9									
HCM 2010 LOS			C									
Notes												

Timings
2: Scottsdale Road & Chauncey Lane

2023 Total PM
3/29/2016

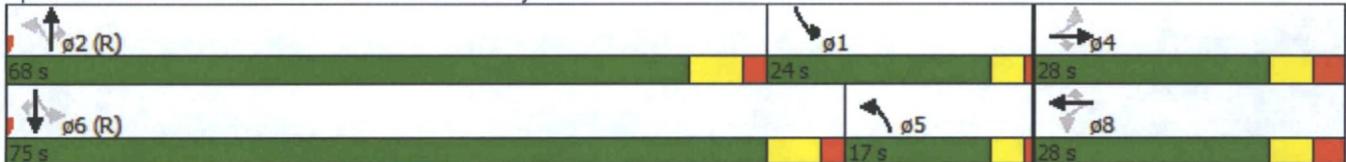


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	138	106	112	123	107	52	106	1955	54	140	1599	89
Future Volume (vph)	138	106	112	123	107	52	106	1955	54	140	1599	89
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	9.5	37.0	37.0	9.5	37.0	37.0
Total Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	17.0	68.0	68.0	24.0	75.0	75.0
Total Split (%)	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%	14.2%	56.7%	56.7%	20.0%	62.5%	62.5%
Yellow Time (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.0	4.9	4.9	3.0	4.9	4.9
All-Red Time (s)	3.1	3.1	3.1	3.1	3.1	3.1	1.0	2.1	2.1	1.0	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag							Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max						

Intersection Summary

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

Splits and Phases: 2: Scottsdale Road & Chauncey Lane



HCM 2010 Signalized Intersection Summary
 2: Scottsdale Road & Chauncey Lane

2023 Total PM
 3/29/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	138	106	112	123	107	52	106	1955	54	140	1599	89
Future Volume (veh/h)	138	106	112	123	107	52	106	1955	54	140	1599	89
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	145	112	118	129	113	55	112	2058	57	147	1683	94
Adj No. of Lanes	1	2	1	1	2	1	1	3	1	1	3	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	226	583	261	218	583	261	406	2585	805	404	2882	897
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.12	0.51	0.51	0.35	1.00	1.00
Sat Flow, veh/h	1212	3539	1583	1146	3539	1583	1774	5085	1583	1774	5085	1583
Grp Volume(v), veh/h	145	112	118	129	113	55	112	2058	57	147	1683	94
Grp Sat Flow(s),veh/h/ln	1212	1770	1583	1146	1770	1583	1774	1695	1583	1774	1695	1583
Q Serve(g_s), s	14.1	3.3	8.1	13.1	3.3	3.6	0.0	40.1	2.2	0.4	0.0	0.0
Cycle Q Clear(g_c), s	17.4	3.3	8.1	16.4	3.3	3.6	0.0	40.1	2.2	0.4	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	226	583	261	218	583	261	406	2585	805	404	2882	897
V/C Ratio(X)	0.64	0.19	0.45	0.59	0.19	0.21	0.28	0.80	0.07	0.36	0.58	0.10
Avail Cap(c_a), veh/h	239	619	277	229	619	277	406	2585	805	404	2882	897
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.40	0.40	0.40
Uniform Delay (d), s/veh	50.7	43.2	45.2	50.3	43.2	43.4	14.4	24.4	15.0	30.0	0.0	0.0
Incr Delay (d2), s/veh	3.8	0.1	0.5	2.3	0.1	0.1	0.4	2.6	0.2	0.2	0.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	1.6	3.5	4.3	1.6	1.6	2.4	19.3	1.0	3.2	0.1	0.0
LnGrp Delay(d),s/veh	54.6	43.3	45.7	52.6	43.3	43.5	14.8	27.0	15.2	30.2	0.4	0.1
LnGrp LOS	D	D	D	D	D	D	B	C	B	C	A	A
Approach Vol, veh/h		375			297			2227			1924	
Approach Delay, s/veh		48.4			47.4			26.1			2.6	
Approach LOS		D			D			C			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	25.2	68.0		26.8	18.2	75.0		26.8				
Change Period (Y+Rc), s	4.0	7.0		7.0	4.0	7.0		7.0				
Max Green Setting (Gmax), s	20.0	61.0		21.0	13.0	68.0		21.0				
Max Q Clear Time (g_c+l1), s	2.4	42.1		19.4	2.0	2.0		18.4				
Green Ext Time (p_c), s	0.7	4.2		0.4	0.5	3.2		0.6				
Intersection Summary												
HCM 2010 Ctrl Delay			19.8									
HCM 2010 LOS			B									

Intersection												
Int Delay, s/veh	3.3											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	43	180	74	9	148	3	65	0	8	3	0	49
Future Vol, veh/h	43	180	74	9	148	3	65	0	8	3	0	49
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	150	-	0	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	47	196	80	10	161	3	71	0	9	3	0	53

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	164	0	0	196	0	0	498	473	196	475	471	163
Stage 1	-	-	-	-	-	-	289	289	-	182	182	-
Stage 2	-	-	-	-	-	-	209	184	-	293	289	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1414	-	-	1377	-	-	483	490	845	500	491	882
Stage 1	-	-	-	-	-	-	719	673	-	820	749	-
Stage 2	-	-	-	-	-	-	793	747	-	715	673	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1414	-	-	1377	-	-	440	470	845	480	471	882
Mov Cap-2 Maneuver	-	-	-	-	-	-	440	470	-	480	471	-
Stage 1	-	-	-	-	-	-	695	651	-	793	744	-
Stage 2	-	-	-	-	-	-	740	742	-	684	651	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0.4	14.4	9.6
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	464	1414	-	-	1377	-	-	841
HCM Lane V/C Ratio	0.171	0.033	-	-	0.007	-	-	0.067
HCM Control Delay (s)	14.4	7.6	-	-	7.6	-	-	9.6
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0	-	-	0.2

Intersection

Int Delay, s/veh	0.2
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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	0	30	2084	42	0	1834
Future Vol, veh/h	0	30	2084	42	0	1834
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	33	2265	46	0	1993

Major/Minor	Minor1	Minor2	Major1	Major2	Major3	Major4
Conflicting Flow All	3085	1155	0	0	2311	0
Stage 1	2288	-	-	-	-	-
Stage 2	797	-	-	-	-	-
Critical Hdwy	5.74	7.14	-	-	5.34	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	-	-	3.12	-
Pot Cap-1 Maneuver	23	163	-	-	87	-
Stage 1	37	-	-	-	-	-
Stage 2	367	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	23	163	-	-	87	-
Mov Cap-2 Maneuver	23	-	-	-	-	-
Stage 1	37	-	-	-	-	-
Stage 2	367	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	32.5	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	- 163	87	-
HCM Lane V/C Ratio	-	- 0.2	-	-
HCM Control Delay (s)	-	- 32.5	0	-
HCM Lane LOS	-	- D	A	-
HCM 95th %tile Q(veh)	-	- 0.7	0	-

Intersection

Int Delay, s/veh 5.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	81	173	52	15	203	62	110	0	13	59	0	56
Future Vol, veh/h	81	173	52	15	203	62	110	0	13	59	0	56
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	150	-	160	190	-	160	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	88	188	57	16	221	67	120	0	14	64	0	61

Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	221	0	0	188	0	0	507	617	94	523	617	110
Stage 1	-	-	-	-	-	-	364	364	-	253	253	-
Stage 2	-	-	-	-	-	-	143	253	-	270	364	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1345	-	-	1384	-	-	449	404	944	437	404	922
Stage 1	-	-	-	-	-	-	627	622	-	729	696	-
Stage 2	-	-	-	-	-	-	845	696	-	713	622	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1345	-	-	1384	-	-	395	373	944	405	373	922
Mov Cap-2 Maneuver	-	-	-	-	-	-	395	373	-	405	373	-
Stage 1	-	-	-	-	-	-	586	581	-	681	688	-
Stage 2	-	-	-	-	-	-	780	688	-	656	581	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.1	0.4	17.5	12.5
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	421	1345	-	-	1384	-	-	405	922
HCM Lane V/C Ratio	0.318	0.065	-	-	0.012	-	-	0.158	0.066
HCM Control Delay (s)	17.5	7.9	-	-	7.6	-	-	15.6	9.2
HCM Lane LOS	C	A	-	-	A	-	-	C	A
HCM 95th %tile Q(veh)	1.3	0.2	-	-	0	-	-	0.6	0.2

Intersection

Int Delay, s/veh 1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	43	5	14	130	145	83
Future Vol, veh/h	43	5	14	130	145	83
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	47	5	15	141	158	90

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	375	203	248 0
Stage 1	203	-	- -
Stage 2	172	-	- -
Critical Hdwy	6.42	6.22	4.12 -
Critical Hdwy Stg 1	5.42	-	- -
Critical Hdwy Stg 2	5.42	-	- -
Follow-up Hdwy	3.518	3.318	2.218 -
Pot Cap-1 Maneuver	626	838	1318 -
Stage 1	831	-	- -
Stage 2	858	-	- -
Platoon blocked, %			- -
Mov Cap-1 Maneuver	618	838	1318 -
Mov Cap-2 Maneuver	618	-	- -
Stage 1	831	-	- -
Stage 2	848	-	- -

Approach	EB	NB	SB
HCM Control Delay, s	11.2	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1318	-	635	-	-
HCM Lane V/C Ratio	0.012	-	0.082	-	-
HCM Control Delay (s)	7.8	0	11.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection

Int Delay, s/veh	0.2					
------------------	-----	--	--	--	--	--

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	3	0	4	141	148	3
Future Vol, veh/h	3	0	4	141	148	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	0	4	153	161	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	325	163	164	0	-	0
Stage 1	163	-	-	-	-	-
Stage 2	162	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	669	882	1414	-	-	-
Stage 1	866	-	-	-	-	-
Stage 2	867	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	667	882	1414	-	-	-
Mov Cap-2 Maneuver	667	-	-	-	-	-
Stage 1	866	-	-	-	-	-
Stage 2	864	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.4	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1414	-	667	-	-
HCM Lane V/C Ratio	0.003	-	0.005	-	-
HCM Control Delay (s)	7.6	0	10.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection				
Intersection Delay, s/veh	5.6			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	207	125	188	165
Demand Flow Rate, veh/h	211	127	192	168
Vehicles Circulating, veh/h	167	194	124	176
Vehicles Exiting, veh/h	177	122	254	145
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	6.0	5.2	5.5	5.6
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193
Entry Flow, veh/h	211	127	192	168
Cap Entry Lane, veh/h	956	931	998	948
Entry HV Adj Factor	0.980	0.982	0.981	0.982
Flow Entry, veh/h	207	125	188	165
Cap Entry, veh/h	937	914	979	931
V/C Ratio	0.221	0.136	0.192	0.177
Control Delay, s/veh	6.0	5.2	5.5	5.6
LOS	A	A	A	A
95th %tile Queue, veh	1	0	1	1

Storage Calculations

Storage Analysis

Intersection	Direction (N,S,E,W)	Peak volume (vph)	Signalized???		If signalized		Required Storage per Lane (ft.) (75' min. default)
			(Place an "X")		Cycle Length (seconds)	# of Left-turn Lanes (#)	
			Yes	No			
							0
Scottsdale Road and Mayo Boulevard	NB	371	X		120	2	225
	SB	29	X		120	2	50
	EB	629	X		120	2	350
	WB	7	X		120	2	50
							0
Scottsdale Road and Chauncey Lane	NB	106	X		120	1	150
	SB	140	X		120	1	200
	EB	138	X		120	1	200
	WB	123	X		120	1	175
							0
Princess Boulevard and Cottage Terrace	SB	60		X			50
	EB	81		X			75
	WB	17		X			50
							0
Scottsdale Road and Driveway D1	WB	30		X			50
							0
Chauncey Lane and Driveway D2	NB	73		X			75
	EB	43		X			50
	WB	11		X			50
							0
73rd Place and Driveway D3	EB	104		X			100
							0

SAMPLE CALCULATIONS

SIGNALIZED INTERSECTIONS

Storage: = $(((veh/interval) + z \times (SQRT(veh/interval)))/L) \times 25 \text{ ft/vehicle}$

$N = (veh/interval)$

$N = [(V) \times (C/3600)]$

Where :

$z = 1.282$ for 90 % confidence level (Most commonly used)

$z = 1.645$ for 95 % confidence level

Where:

$V =$ vehicles per hour

$C =$ cycle length in seconds

$25 \text{ ft/veh} =$ Average Length of Vehicles

$L =$ number of left turn lanes

UNSIGNALIZED INTERSECTIONS

Storage = $[(V/60 \text{ minutes}) \times 2 \text{ minutes}] \times 25 \text{ ft/vehicle}$

Where:

$V =$ vehicles per hour

$25 \text{ ft/veh} =$ Average Length of Vehicles



PRELIMINARY DRAINAGE REPORT

Crossroads South Mixed-Use Development

Scottsdale, Arizona

Plan #	_____
Case #	<u>19-ZN-2002#4</u>
Q-S #	_____
<input checked="" type="checkbox"/> Accepted	
<input type="checkbox"/> Corrections	
<u>M. Rahman</u>	<u>9/2/16</u>
Reviewed By	Date

Prepared For:

JLB Partners, LP

191447014
August 2016
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Kimley » Horn



41-DR-2016
8/16/2016

19-ZN-2002#4
8/16/16

PRELIMINARY DRAINAGE REPORT

Crossroads South Mixed-Use Development

Scottsdale, Arizona

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August 2016
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- A Site Location Map and Legal Description
- B FEMA Federal Insurance Rate Map (FIRM) and Natural Grade Exhibit
- C Hydrologic/Hydraulic Calculations
- D Corp of Engineers Letter of Compliance for Nationwide Permit No. 39
- E Exhibits

List of Figures in Appendix E (Exhibits)

- Figure 1: Context Aerial plan
- Figure 2: Preliminary Grading and Drainage Plan
- Figure 3: Existing Conditions Topographic Map
- Figure 4: Site Basin Delineation
- Figure 5: 50 CFS Wash Exhibit

1.0 Introduction

1.1 Project Description

JLB Partners is proposing to construct a mixed-use development on a portion of Crossroads East Planning Unit IV (Planning Unit IV) at the southeast corner of Scottsdale Road and Chauncey Lane. The project is anticipated to consist of apartment buildings and restaurant/retail buildings with associated parking and infrastructure improvements.

1.2 Site Location

The proposed development encompasses approximately 11.3± net acres in a portion of the Northwest Quarter of Section 35, Township 4 North, Range 4 East of the Gila and Salt River Base and Meridian in Maricopa County, Arizona. The site is a portion of Planning Unit IV (138± acres), and is currently zoned PCD. More specifically, the parcel is bounded by Chauncey Lane to the north, vacant undeveloped land to the east and south, and Scottsdale Road to the west. See Appendix A for the site location map and legal description. See Figure 1 in Appendix E for a Context Aerial Map.

1.3 Purpose

This Preliminary Drainage Report is intended to satisfy City of Scottsdale requirements and demonstrate conformance to the Master Drainage Report for Crossroads East Planning Unit IV. This report provides a description of the current storm water drainage patterns and systems and a description of the required and proposed drainage improvements.

1.4 Objectives

This report provides a drainage plan for the site that is intended to meet the drainage standards and guidelines of the City of Scottsdale and the Flood Control District of Maricopa County (FCDMC). In particular, this report will demonstrate the following:

1. Off-site flows entering the site include discharge from an existing surface detention basin at the northwest corner of Chauncey Lane and 73rd Place, discharge from an existing box culvert at the southeast corner of Scottsdale Road and Chauncey Lane, and overland sheet flow from areas to the north and east of the site.
2. The site drainage patterns will remain consistent with the existing hydrologic divide that bisects the site.
3. Permanent drainage facilities will have a positive outfall and any detained storm water will be disposed of within 36 hours.
4. Storm water detention will be provided for the adjacent half-street roadways.

5. Drainage facilities will be designed such that the 100-year post-development flows are collected and conveyed in such a manner so as to not cause damage to buildings and property.
6. Building finished floor elevations have been set a minimum of two feet above the highest adjacent natural grade.
7. Building finished floor elevations have been set a minimum of 14 inches above the site outfall.

2.0 Description of Existing Drainage Conditions and Characteristics

2.1 Existing On-Site Drainage Conditions

The site currently consists of vacant, undeveloped land with sparse desert vegetation throughout the site. The parcel is bounded by Chauncey Lane to the north, vacant undeveloped land to the east and south, and Scottsdale Road to the west.

The site generally slopes from the northeast to the southwest at approximately 1.5%. An existing hydrologic divide bisects the site and directs the drainage to two separate facilities. Storm water from areas to the west of the hydrologic divide ultimately outfalls to Reach 11 (Dike 2) in the City of Phoenix. Storm water from areas to the east of the hydrologic divide ultimately outfalls to the TPC golf course (Dike 3), in the City of Scottsdale, as outlined in the Final Drainage Report for the Improvement Plans for Scottsdale Road and Chauncey Lane and Crossroads East Planning Unit IV (Kimley-Horn and Associates, August 2012).

Storm water from areas west of the hydrologic divide flows southwest towards an existing earthen channel along the east side of Scottsdale Road. This channel continues to the south, where it enters a box culvert under the intersection of Scottsdale Road and Princess Boulevard before outfalling to Reach 11.

For the 100-year, 2-hour rainfall event, approximately 28 cfs exits the site along the south property line west of the hydrologic divide and approximately 17 cfs exits the site east of the hydrologic divide. These flows reflect the pre-development site-generated flows, and do not include additional off-site contributing flows discussed in Section 2.2 and Section 4.4.

Refer to Figure 3 in Appendix E for the Existing Conditions Exhibit.

2.2 Existing Off-Site Drainage Conditions

A double-barrel 3-foot by 8-foot concrete box culvert discharges off-site storm water into an existing channel at the northwest corner of the property. The earthen channel conveys the storm water to the south at a slope of approximately 0.8%, with rip-rap drop structures placed at approximately 150-foot intervals to control channel velocity. The earthen channel has a bottom width of approximately 17 feet and side slopes of 4:1. According to the Crossroads East Planning Unit IV Drainage Report (COS Plan Check #2519-2, 1442-12), the existing box culvert discharges 317 cfs into the earthen channel in the 100-year event. The channel velocity is approximately 6 fps at a depth of approximately 2.4 feet.

Off-site storm water from areas to the north and east of the site enter the site as sheet flow across the eastern property line and flow towards an existing drainage path. A detailed discussion of these flows is provided in Section 4.2 of this report.

The adjacent portion of Scottsdale Road is crowned at the center, with storm water from the eastern half-street flowing to curb openings which discharge through rip-rap spillways to the existing earthen channel.

Storm water from areas east of the hydrologic divide flows southerly across undeveloped land and is intercepted by an earthen channel along the north side of Princess Boulevard. This channel continues to the TPC via an existing box culvert under Princess Boulevard.

The site is primarily located west of the hydrologic divide mentioned above, with the eastern portion of the site on the east side of the hydrologic divide. A surface detention basin was installed at the northwest corner of Chauncey Lane and 73rd Place. This detention basin discharges to an 18-inch RCP culvert under Chauncey Lane that outfalls to the northeast corner of the site. According to the Final Drainage Report for the Improvement Plans for Scottsdale Road and Chauncey Lane, a four-inch orifice plate is installed on the upstream headwall, thereby limiting flows to 0.7 cfs.

The adjacent portion of Chauncey Lane is crowned, with the southern half of the roadway draining towards the subject parcel. Storm water from the portion of the roadway located west of the hydrologic divide is captured by an existing curb inlet and conveyed to the box culvert under Chauncey Lane. Storm water from the portion of the roadway located east of the hydrologic divide currently discharges to the subject parcel via a curb opening and a rip-rap spillway. According to the Final Drainage Report for the Improvement Plans for Scottsdale Road and Chauncey Lane, the 10-year and 100-year discharges at this location are 1.7 cfs and 1.9 cfs, respectively. The 100-year storm water volume generated by the contributing area of Chauncey Lane is 2,170 cf.

Refer to Figure 3 in Appendix E for the Existing Conditions Exhibit.

2.3 Context Relative to Adjacent Projects and Improvements

The site is located south of Chauncey Lane and the Chauncey Crossroads development, east of Scottsdale Road, north of Chauncey Lane. See Figure 1 in Appendix E for Context Aerial of the site.

2.4 FEMA Flood Hazard Areas

The site is located in Flood Zone "AO" according to the Flood Insurance Rate Map 04013C1320L, dated October 16, 2013. Zone "AO" is designated by FEMA as "areas of flood depths of 1 foot (usually sheet flow on sloping terrain) average depths determined for areas of alluvial fan flooding, velocities also determined." Refer to Appendix B for the FEMA FIRMette map for the site. An elevation certificate will be required for each of the proposed buildings to be constructed in this flood hazard designation.

3.0 Proposed Drainage Plan

3.1 General Description

In the analysis of the proposed drainage conditions the following items are considered:

- Area Types (concrete pavement, building, and desert landscaping)
- Magnitude of areas
- Slopes
- Storm Drain
- Detention Basins

3.2 Proposed Site Conditions

The site proposes a combination of previously approved in-kind contribution and detention for the 100-year, 2-hour storm event. The previously approved in-kind contribution, in the form of a regional drainage channel along Scottsdale Road, will be used to convey off-site flows around the site and for direct drainage of site-generated storm water from areas west of the hydrologic divide. Detention will be used for site-generated storm water from areas east of the hydrologic divide.

West of Hydrologic Divide

Site-generated storm water from areas west of the hydrologic divide is proposed to be conveyed to the regional drainage channel along Scottsdale Road via underground storm drain pipes. No permanent surface or underground detention is required or proposed for this area due to the in-kind contribution agreement and construction of a regional drainage channel along Scottsdale Road.

The existing curb openings and rip-rap spillways along Scottsdale Road will be replaced with sidewalk scuppers and rip-rap spillways. Storm water from the adjacent portion of Scottsdale Road will continue to flow to the earthen channel.

The existing earthen channel will be relocated to allow for a new right-turn lane and sidewalk along Scottsdale Road. The new channel will remain an earthen channel with native landscaping. Rip-rap drop structures similar to the existing structures will be installed to control channel velocity. The bottom of the channel will remain 17 feet wide with 4:1 side slope on the west side of the channel. The eastern side of the channel will consist of two tiered retaining walls with an eight-foot wide multi-use path between the two retaining walls. Each retaining wall will be approximately three feet tall with a screening barrier. The channel flow depth will be approximately two feet, which leaves one foot of freeboard between the water surface elevation and the multi-use trail.

East of Hydrologic Divide

Site-generated storm water from areas east of the hydrologic divide will be detained in multiple surface detention basins along the west side of 73rd Place. Storm water from these surface basins will be routed south to discharge to the vacant undeveloped land to the south, in accordance with current drainage patterns. The surface basins will provide detention volume for the 100-year, 2-hour storm event.

The adjacent portion of 73rd Place will be constructed as part of these improvements. This roadway will be crowned at the centerline with the western half of the roadway draining to the subject parcel. Storm water from adjacent portions of 73rd Place will be collected in surface detention basins along with the on-site storm water for areas east of the hydrologic divide. Storm water from the east half of 73rd Place will be discharged to the adjacent undeveloped vacant land, in accordance with current drainage patterns. Drainage easements will be provided for the detention basins.

Per the Planning Unit IV Master Drainage Report, flows from areas east of the hydrologic divide will continue on their current path to the box culvert that crosses south under Princess Boulevard and outfalls into the TPC golf course. See Figure 3 in Appendix E for the Existing Conditions Exhibit.

Future development along the east side of 73rd Place and south of the subject parcel will be responsible for detaining storm water generated by the 100-year, 2-hour storm for their site and the adjacent half streets.

3.3 Proposed Off-Site Conditions

Regional off-site storm water runoff from north of the Loop 101 onto Planning Unit IV is proposed to be handled in accordance with the Crossroads East Planning Unit IV Master Drainage Report. Off-site storm water impacts beyond those discussed above are not anticipated due to the built-out condition of the upstream areas adjacent to the site.

3.4 Future Conditions

No future drainage impacts are anticipated for the site due to the previous development of areas upstream of the subject parcel. It is anticipated that undeveloped areas adjacent to the site will be developed in accordance with the Planning Unit IV Master Drainage Report and City of Scottsdale standards.

3.5 Storm Water Storage Requirements

As previously noted, surface detention basins will be provided to detain the 100-year, 2-hour storm event for areas east of the hydrologic divide. No storm water storage is required for areas west of the hydrologic divide.

Table 1 below summarizes the required and provided detention volumes for areas east of the hydrologic divide.

Table 1: On-Site Detention Volume Required

Basin	Land Use	Runoff Coefficient	Drainage Area (ft ²)	Required Volume (ft ³)	Provided Volume (ft ³)	Surplus (ft ³)
Basin A	Landscaping	0.45	19,586	1,682		
	Building	0.95	46,871	8,497		
	Pavement	0.95	8,886	1,611		
			66,457	11,790	12,129	339

Basin	Land Use	Runoff Coefficient	Drainage Area (ft ²)	Required Volume (ft ³)	Provided Volume (ft ³)	Surplus (ft ³)
Basin B	Landscaping	0.45	11,075	951		
	Building	0.95	28,963	5,251		
	Pavement	0.95	7,091	1,286		
			47,129	7,487	7,724	237

Basin	Land Use	Runoff Coefficient	Drainage Area (ft ²)	Required Volume (ft ³)	Provided Volume (ft ³)	Surplus (ft ³)
Basin C	Landscaping	0.45	6,540	562		
	Building	0.95	0	0		
	Pavement	0.95	5,114	927		
			11,654	1,489	1,856	367

Basin	Land Use	Runoff Coefficient	Drainage Area (ft ²)	Required Volume (ft ³)	Provided Volume (ft ³)	Surplus (ft ³)
Basin D	Landscaping	0.45	9,261	795		
	Building	0.95	0	0		
	Pavement	0.95	0	0		
			9,261	795	1,987	1,192

Basin	Land Use	Runoff Coefficient	Drainage Area (ft ²)	Required Volume (ft ³)	Provided Volume (ft ³)	Surplus (ft ³)
Basin OS1	Landscaping	0.45	8,700	747		
	Building	0.95	0	0		
	Pavement	0.95	4,917	891		
			13,617	1,639	2,494	855

Basin	Land Use	Runoff Coefficient	Drainage Area (ft ²)	Required Volume (ft ³)	Provided Volume (ft ³)	Surplus (ft ³)
Basin OS2	Landscaping	0.45	5,924	509		
	Building	0.95	0	0		
	Pavement	0.95	4,204	762		
			10,128	1,271	1,640	369

No permanent storm water storage will be provided for areas west of the hydrologic divide due to the approved in-kind contribution in the form of a regional drainage channel along the east side of Scottsdale Road. A Kri-Star Dual-Vortex Hydrodynamic Separator will be installed at each outfall to the channel to maintain storm water quality. See Appendix C for information regarding the Kri-Star storm water quality units and Figure 2 in Appendix E for the Preliminary Grading and Drainage Plans. Refer to Figure 4 in Appendix E for the Drainage Basin Delineation Map.

3.6 Pre- and Post-Development Runoff Characteristics at Concentration Points

The existing site consists of vacant, undeveloped land that drains from northeast to southwest. Upon site development, the site-generated storm water west of the hydrologic divide will sheet flow to catch basins and then be conveyed through underground storm drain to the earthen channel along the east side Scottsdale Road.

Storm water east of the hydrologic divide will be conveyed to the surface detention basins and discharged at the southeast corner of the parcel, after which it will flow south to the existing channel along the north side of Princess Boulevard, consistent with the current drainage patterns and the Crossroads East Planning Unit IV Master Drainage Report. Storm water discharge from the surface detention basins will be controlled using pipe sizing and orifice plates. Post-development storm water discharge will be limited to the pre-development flow at this location. Detailed discharge calculations will be included with the Final Drainage Report.

3.7 Proposed Drainage Structures or Special Drainage Facilities

As previously noted, a Kri-Star Dual-Vortex Hydrodynamic Separator is proposed to be installed immediately upstream of the connection to the earthen channel to maintain storm water quality.

One new driveway entrance is proposed along Scottsdale Road. This driveway entrance will cross the existing earthen channel, and a double-barrel 3-foot by 8-foot concrete box culvert will be installed at this crossing. Headwalls and rip-rap will be provided both ends of the culvert. Refer to Appendix C for the HY-8 analysis of the proposed culvert.

The existing earthen channel will be relocated to allow for a new right-turn lane and sidewalk along Scottsdale Road. The new channel will remain an earthen channel with native landscaping. Rip-rap drop structures similar to the existing structures will be installed to control channel velocity. The bottom of the channel will remain 17 feet wide with 4:1 side slope on the west side of the channel. The eastern side of the channel will consist of two tiered retaining walls with an eight-foot wide multi-use path between the two retaining walls. Each retaining wall will be approximately three feet tall with a screening barrier. The channel flow depth will be approximately two feet, which leaves one foot of freeboard between the water surface elevation and the multi-use trail.

The building finished floor elevations have been set at a minimum of two feet above natural grade to satisfy construction requirements within the floodplain area of Zone AO.

Per the FEMA map, this area is subject to a one-foot depth of sheet flow. FEMA requires that buildings placed within Zone AO have finished floor elevations placed above the depth of sheet flow, and the City of Scottsdale requires that buildings in Zone AO have one additional foot of freeboard above the depth of sheet flow. Therefore, the building finished floor elevation needs to be at least two feet above the highest adjacent natural grade. Table 2 below shows the proposed building finished floor elevations relative to the highest adjacent grade (HAG) elevations.

Table 2: Proposed Building Finished Floor Elevations

	Highest Adjacent Grade	Proposed Finish Floor Elevation	Elevation Difference
North Retail/Restaurant	71.30	73.35	2.05
Center Retail/Restaurant	69.48	72.15	2.67
South Retail/Restaurant	68.23	70.65	2.42
North Residential	72.72	74.75	2.03
Center Residential	69.82	72.75	2.93
South Residential	67.92	70.75	2.83

As previously noted, the site is currently vacant, undeveloped land. A topographical survey of the site was conducted in October 2014 and the ground elevations provided with this survey are determined to be the natural grade of the site. A review of historical aerials dating back to 1963 indicates no prior development in this area.

See Appendix B for the Natural Grade Exhibit.

3.8 ADEQ AZPDES requirements

Prior to construction an executed Notice of Intent (NOI) shall be submitted to Arizona Department of Environmental Quality (ADEQ) in conformance with the Arizona Pollution Discharge Elimination System Permit (AZPDES) permit. The NOI and associated storm water management best management practices will remain active on the site until construction is complete and a Notice of Termination is filed with ADEQ in conformance with AZPDES permit.

3.9 Project Phasing

This project will be constructed in a single phase.

4.0 Special Conditions

4.1 404 Discussion

Per correspondence with the U.S. Army Corp of Engineers 404 jurisdictional washes are impacted by the proposed Regional Channel improvements, roadway improvements, and temporary drainage basins. A Nationwide permit with the Corp of Engineers has been obtained for the disturbance of the existing 404 jurisdictional wash on-site. See Appendix D for Corp of Engineers Letter of Compliance for Nationwide Permit No. 39.

4.2 50 CFS Wash

According to the City of Scottsdale GIS maps, the apex of a 50 cfs wash is located near the southeast corner of the subject parcel. Per City of Scottsdale requirements, contributing off-site upstream flows must be maintained in the post-development condition. These drainage areas and resulting flows have been delineated on Figure 3 in Appendix E, and the flows are calculated using the Rational method as shown in Appendix C. The location of the 50 cfs wash is shown on Figure 5 in Appendix E.

Two upstream off-site areas contribute to the 50 cfs wash. Drainage area OS-1 consists of undeveloped land that generally slopes to the south and southwest. Drainage area OS-2 includes the eastern half of 73rd Place that is located north of Chauncey Lane. The existing 100-year, 2-hour flows from these drainage areas are 18.0 cfs and 5.2 cfs, respectively.

As previously noted, a hydrologic divide bisects the site. A portion of the site that is located to the east of the hydrologic divide contributes flow to the 50 cfs wash, and the remainder of the flow discharges across the southern property line as sheet flow. Drainage area DA-1 contributes 9.9 cfs to the wash, and drainage area DA-2 generates 7.1 cfs that exits the site along the southern property line as sheet flow.

As previously noted, the existing development to the north of Chauncey Lane discharges 0.7 cfs onto the subject parcel. Therefore, the total pre-development flow in the 50 cfs wash at the discharge from the site will be 34.1 cfs. The post-development discharge at this location will be 34.1 cfs or less. Refer to Appendix C for the Rational calculations, and to Figure 3 in Appendix E for the drainage area boundaries.

Post-development flows to the 50 cfs wash will be maintained by providing a drainage swale and berm along the east side of 73rd Place. The drainage swale will collect storm water runoff from the eastern half of the 73rd Place and will convey the water south along the west side of 73rd Place, discharging to the 50 cfs wash. The swale is designed to convey the flows from the existing eastern half of 73rd Place located north of Chauncey Lane (5.2 cfs), as well as the proposed eastern half of 73rd Place that is located south of Chauncey Lane (1.9 cfs). This will be a triangular channel with 3:1 side slopes, and will have a normal depth of 0.76 feet and a velocity of 4.1 cfs for the 100-year flow. FlowMaster analysis of this swale are provided in Appendix C.

The eastern bank of the swale will form a berm along which off-site storm water from areas north and east of the site will flow. The off-site storm water will flow south along this berm until 73rd Place terminates, after which the off-site storm water will continue to flow south and west in accordance with the existing drainage patterns. Refer to the Preliminary Grading and Drainage Plans in Appendix E for the location of the drainage swale and berm along the east side of 73rd Place.

5.0 Data Analysis Methods

5.1 Hydrologic Procedures, Parameter Selection, and Assumptions

Hydrologic calculations for the site were performed using the rational equation in the FCDMC Drainage Design Manual Volume I, which is limited to drainage areas of up to 160 acres. A weighted runoff coefficient was used for the site based upon the large amount of landscaping located adjacent to perimeters of the site.

For analysis of the development, the site was sub-divided into 32 sub-basins consisting of pavement, landscaping, and building areas. Figure 4 in Appendix E identifies the drainage sub-basins and concentration points.

5.2 Hydraulic Procedures, Methods, Parameter Selection, and Assumptions

All flows for proposed conditions will be determined using the rational method as outlined by the Drainage Design Manual by Maricopa County Flood Control District. Due to the small nature of the watersheds for the individual sub-basins, a minimum time of concentration of five minutes will be assumed. All of the drainage basins will assume a runoff coefficient of 0.95 (100-year) and 0.85 (10-year) with the exception of the landscape sub-basins. Due to the relatively large amount of landscaping in these areas, a runoff coefficient of 0.45 will be used per the City of Scottsdale Design Standards and Policy Manual. The peak flows at the sub-basin concentration points will be calculated and provided with the Final Drainage Report.

The following criteria will be used to size the proposed pipes for on-site storm water conveyance:

- A maximum allowable 100-year ponding depth of six inches above the catch basin grate.
- A minimum of 12 inches of freeboard between the 100-year ponding depth and the building finish floor elevation.
- The tailwater condition for the 100-year event will be assumed to be the hydraulic grade line at the pipe connection location.
- The 10-year tailwater condition will be assumed to be free outfall.

StormCAD analysis for the 10-year and 100-year events will be provided with the final drainage report.

Storm drain catch basins will be sized using Figure 3.29 from the FHWA HEC-12 dated 1984. A 50% clogging factor will be applied in the analysis. Catch basin analysis will be provided with the final drainage report.

This project proposes to utilize a Kri-Star Dual-Vortex Hydrodynamic Separator to maintain storm water quality. These units are designed to treat the first flush of storm

water before it enters the box culvert. The first flush flow rate will be calculated based on the following equation from Section 6.8.3 of the City of Phoenix Storm Water Policies and Standards (December 2013):

$$Q_{FF} = C * I * A$$

- Where:
- Q_{FF} = minimum first flush discharge in cfs
 - C = runoff coefficient (set to 1.00 for first flush condition)
 - A = area in acres
 - I = 0.5 inches/hour rainfall excess intensity divided by the time of concentration

For the preliminary analysis, a conservative Time of Concentration of 10 minutes was assumed. This resulted in a first flush flow of 18.9 cfs. Based on this first flush flow rate, the Kri-Star model DVS-144 will be required for this site. Flows in excess of the first flush will be bypassed through the structure.

See Appendix C for cut sheet for Kri-Star Dual-Vortex Hydrodynamic Separator.

5.3 Storm Water Storage Calculation Methods and Assumptions

Due to the existing in-kind contribution (storm water waiver) storm water storage is not required for the area west of the hydrologic divide. Storm water storage requirements for area east of the hydrologic divide were calculated per City of Scottsdale and Flood Control District of Maricopa County design standards. The standard formula for determining the required storage volumes for the 100-year, 2-hour storm is as follows:

$$V_R = CPA/12$$

- Where:
- V_R = storage volume required (cubic feet)
 - C = weighted runoff coefficient
 - P = precipitation depth for 100-year, 2-hour event = 2.29 inches
 - A = contributing drainage area to basin (square feet)

6.0 Conclusion

6.1 Overall Project

Based on the results of this final drainage report, the following can be concluded:

- Storm water west of the hydrologic divide will be conveyed to the earthen channel along the east side of Scottsdale Road.
- Storm water east of the hydrologic divide will be detained in surface basins and discharged near the southeast corner of the parcel.
- Discharge from the surface detention basins will be controlled using pipe sizing and orifice plates, and will be limited to the pre-development flow or less.
- Surface detention basins east of the hydrologic divide will continue to overland flow towards the channel along Princess Boulevard, in accordance with existing drainage conditions.
- Storm drainage systems consisting of catch basins, storm drain, and water quality devices will be provided to collect and convey drainage west of the hydrologic divide to the existing earthen channel along Scottsdale Road.
- The building finish floor elevations have been designed to be at least fourteen inches above the ultimate site outfall elevation and at least two feet above the highest adjacent natural grade.
- Off-site storm water from areas upstream of the site will be routed around the site and discharged at their historical flow path.
- Based on the current Flood Insurance Rate Map (FIRM), the site is located in the Zone "AO".
- Drainage easements will be provided for the permanent detention basins.

This drainage report is intended to provide a level of assurance that the site will adhere to all appropriate reviewing agency guidelines with respect to drainage and flood protection.

7.0 References

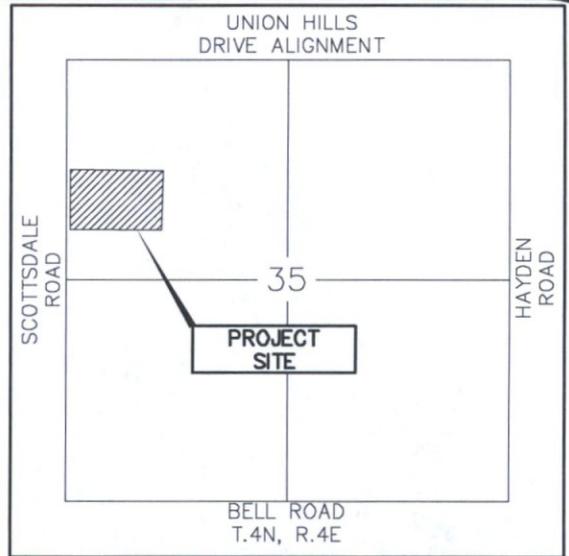
1. City of Scottsdale, *Design Standards and Policies Manual, Chapter 4: Grading and Drainage*, January 2010.
2. Federal Emergency Management Agency (FEMA), *Flood Insurance Rate Map (FIRM) of Maricopa County, Arizona and Incorporated Areas, Panel 1320 of 4425, Map Number 0413C1320L*, October 16, 2013.
3. Flood Control District of Maricopa County (FCDMC), *Drainage Design Manual for Maricopa County, Hydrology Volume, February*, 2008.
4. Flood Control District of Maricopa County (FCDMC), *Drainage Design Manual for Maricopa County, Hydraulics Volume*, January, 1996.
5. Kimley-Horn and Associates, Inc, *Final Drainage Report for Improvement Plans for Scottsdale Road and Chauncey Lane, Crossroads East Planning Unit IV*, August 2012.
6. City of Phoenix, *Storm Water Policies and Standards*, December 2013.

Appendix A

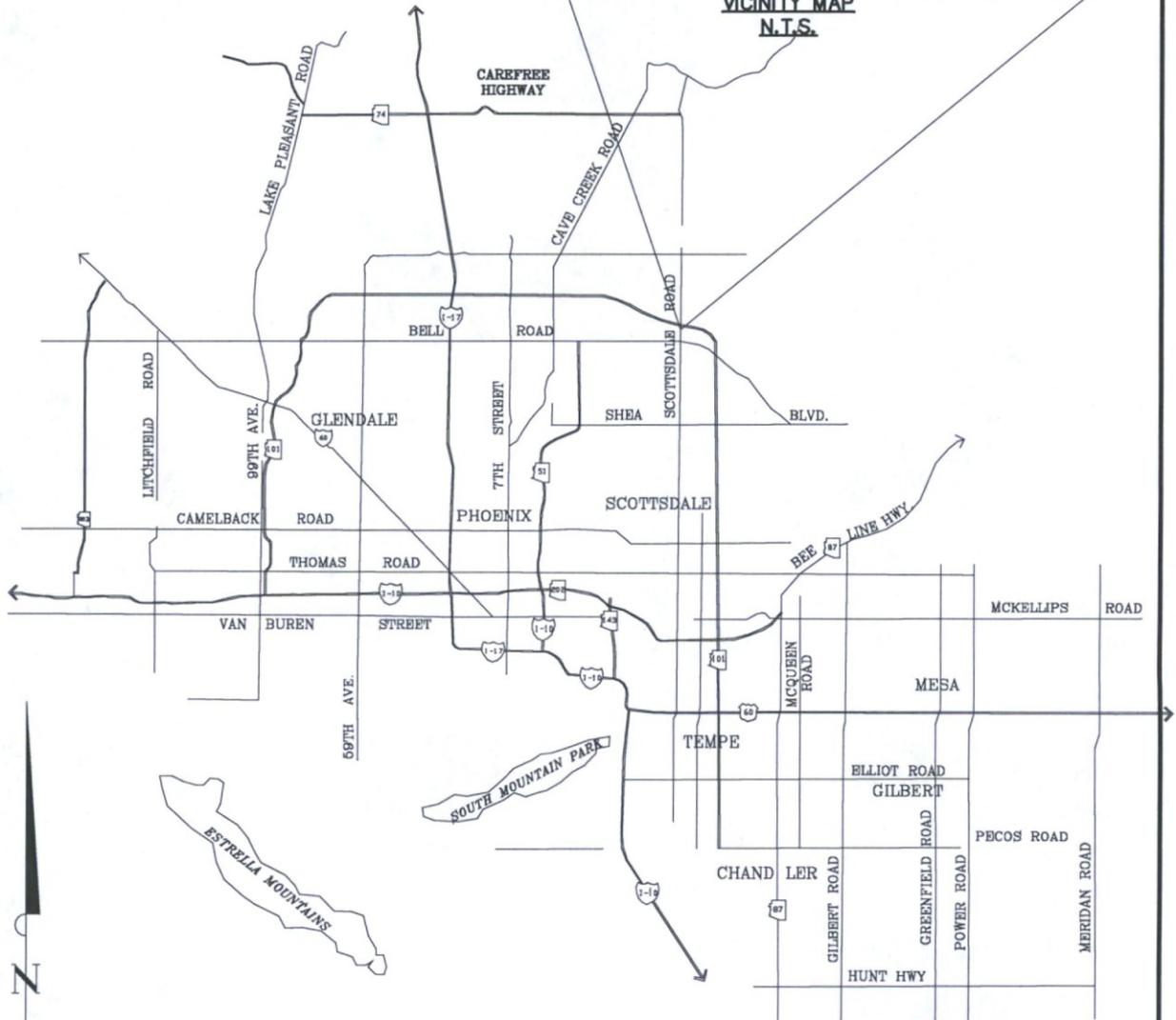
Site Location Map and Legal Descriptions

PROJECT INFORMATION

SITE ADDRESS: SEC OF SCOTTSDALE ROAD
AND CHAUNCEY LANE



VICINITY MAP
N.T.S.



(N.T.S.)

SITE LOCATION MAP



LEGAL DESCRIPTION

SEC SCOTTSDALE ROAD AND CHAUNCEY LANE

JOB #14-146



A PORTION OF TRACT 3A AS SHOWN ON STATE PLAT NO. 15 CORE SOUTH ACCORDING TO BOOK 324 OF MAPS, PAGE 50 AS RECORDED IN THE MARICOPA COUNTY RECORDERS OFFICE, MARICOPA COUNTY, ARIZONA, SITUATED IN THE NORTHWEST QUARTER OF SECTION 35, TOWNSHIP 4 NORTH, RANGE 4 EAST, OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE WEST QUARTER CORNER OF SAID SECTION 35, FROM WHICH THE NORTHWEST CORNER OF SAID SECTION 35 BEARS NORTH 00 DEGREES 09 MINUTES 29 SECONDS EAST, A DISTANCE OF 2640.37 FEET;

THENCE NORTH 00 DEGREES 09 MINUTES 29 SECONDS EAST, ALONG THE WEST LINE OF SAID SECTION 35, A DISTANCE OF 680.12 FEET TO THE **POINT OF BEGINNING** OF THE PARCEL HEREIN DESCRIBED;

THENCE NORTH 00 DEGREES 09 MINUTES 29 SECONDS EAST, CONTINUING ALONG THE WEST LINE OF SAID SECTION 35, A DISTANCE OF 545.14 FEET TO A POINT ON THE SOUTH LINE OF THE MINOR SUBDIVISION PLAT FOR THE SEC SCOTTSDALE ROAD & UNION HILLS DRIVE, ACCORDING TO BOOK 1131 OF MAPS, PAGE 32, RECORDS OF MARICOPA COUNTY, ARIZONA;

THENCE SOUTH 89 DEGREES 50 MINUTES 31 SECONDS EAST, LEAVING SAID SECTION LINE, ALONG SAID SOUTH SUBDIVISION LINE, A DISTANCE OF 75.00 FEET TO A POINT ON THE EAST RIGHT OF WAY LINE OF SCOTTSDALE ROAD;

THENCE NORTH 45 DEGREES 04 MINUTES 44 SECONDS EAST, LEAVING SAID EAST RIGHT OF WAY LINE, CONTINUING ALONG SAID SOUTH SUBDIVISION LINE, A DISTANCE OF 59.48 FEET;

THENCE NORTH 90 DEGREES 00 MINUTES 00 SECONDS EAST, A DISTANCE OF 441.07 FEET;

THENCE NORTH 84 DEGREES 27 MINUTES 19 SECONDS EAST, A DISTANCE OF 98.99 FEET;

THENCE SOUTH 82 DEGREES 46 MINUTES 39 SECONDS EAST, A DISTANCE OF 160.65 FEET TO THE POINT OF CURVE OF A NON TANGENT CURVE TO THE LEFT, OF WHICH THE RADIUS POINT LIES NORTH 47 DEGREES 23 MINUTES 41 SECONDS EAST, A RADIAL DISTANCE OF 94.00 FEET;

THENCE EASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 84 DEGREES 56 MINUTES 31 SECONDS, A DISTANCE OF 139.36 FEET;

THENCE SOUTH 07 DEGREES 09 MINUTES 14 SECONDS WEST, LEAVING SAID SOUTH SUBDIVISION LINE, A DISTANCE OF 225.71 FEET;

THENCE SOUTH 00 DEGREES 09 MINUTES 29 SECONDS WEST, A DISTANCE OF 343.98 FEET;

THENCE NORTH 89 DEGREES 50 MINUTES 31 SECONDS WEST, A DISTANCE OF 915.01 FEET TO THE **POINT OF BEGINNING** OF THE PARCEL HEREIN DESCRIBED.

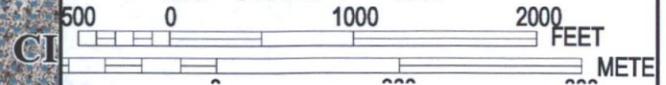
SAID PARCEL CONTAINS 534,054 SQUARE FEET OR 12.260 ACRES.

Appendix B

FEMA Flood Insurance Rate Map (FIRM) and Natural Grade Exhibit



MAP SCALE 1" = 1000'



NFIP

PANEL 1320L

FIRM
FLOOD INSURANCE RATE MAP
MARICOPA COUNTY,
ARIZONA
AND INCORPORATED AREAS

PANEL 1320 OF 4425
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	1320	L
PHOENIX, CITY OF	040051	1320	L
SCOTTSDALE, CITY OF	045012	1320	L

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



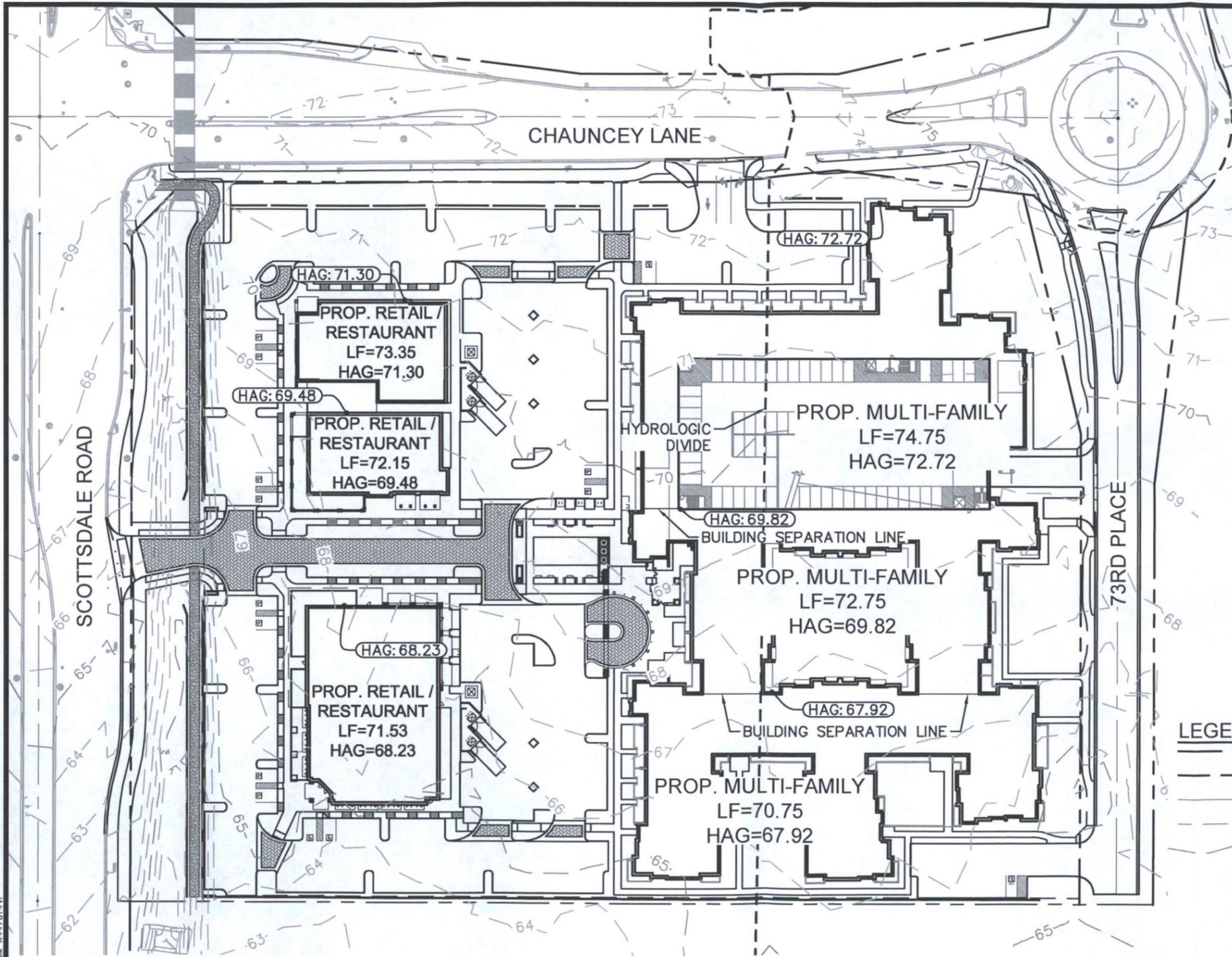
MAP NUMBER
04013C1320L
MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

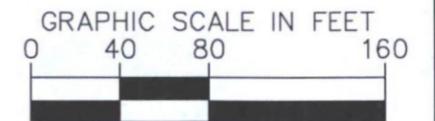
NATIONAL FLOOD INSURANCE PROGRAM

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

K:\PHX_Civil\191447014 - JLB Crossroads South\CADD\Exhibits\2016-03-29 HAG Exhibit.dwg Aug 10, 2016 traver.jones
XREFS: X447014BM X447014VF



NOTE: CONTOURS SHOWN HEREON ARE BASED ON A TOPOGRAPHIC SURVEY DATED 10/17/2014 AND REFLECT THE NATURAL UNDISTURBED GROUND SURFACE.



LEGEND	
	PROPERTY LINE
	RIGHT OF WAY LINE
	STREET CENTERLINE
	EASEMENT LINE
	PRE-DEVELOPMENT NATURAL CONTOURS

NATURAL GRADE EXHIBIT



Appendix C

Hydrologic/Hydraulic Calculations

Worksheet for Irregular Section - 1

Project Description

Friction Method Manning Formula
 Solve For Normal Depth

Input Data

Channel Slope 1.25 %
 Discharge 320.00 ft³/s
 Section Definitions

Station (ft)	Elevation (ft)
0+00	10.00
0+40	0.00
0+57	0.00
0+60	0.75
0+60	10.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 10.00)	(0+60, 0.75)	0.035
(0+60, 0.75)	(0+60, 10.00)	0.015

Options

Current Roughness Weighted Method Pavlovskii's Method
 Open Channel Weighting Method Pavlovskii's Method
 Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth 2.04 ft
 Elevation Range 0.00 to 10.00 ft
 Flow Area 48.12 ft²
 Wetted Perimeter 29.82 ft
 Hydraulic Radius 1.61 ft
 Top Width 28.18 ft
 Normal Depth 2.04 ft

Worksheet for Irregular Section - 1

Results

Critical Depth	1.91	ft
Critical Slope	0.01576	ft/ft
Velocity	6.65	ft/s
Velocity Head	0.69	ft
Specific Energy	2.73	ft
Froude Number	0.90	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.04	ft
Critical Depth	1.91	ft
Channel Slope	1.25	%
Critical Slope	0.01576	ft/ft

73rd Place Channel

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.020	
Channel Slope	0.01200	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Discharge	7.10	ft ³ /s

Results

Normal Depth	0.76	ft
Flow Area	1.73	ft ²
Wetted Perimeter	4.80	ft
Hydraulic Radius	0.36	ft
Top Width	4.55	ft
Critical Depth	0.81	ft
Critical Slope	0.00845	ft/ft
Velocity	4.11	ft/s
Velocity Head	0.26	ft
Specific Energy	1.02	ft
Froude Number	1.18	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.76	ft
Critical Depth	0.81	ft
Channel Slope	0.01200	ft/ft
Critical Slope	0.00845	ft/ft

Conceptual Overall Retention Summary								
Drainage Area	Land Use	Area [A]		Runoff Coefficient [C]	Precipitation Depth [P]	Required Storage (V _{REQ} = CPA/12)		Retention Basin
		sf	ac			cf	ac-ft	
5	Pavement	19,319	0.444	0.95	2.29	3,502	0.080	Channel
6	Pavement	17,476	0.401	0.95	2.29	3,168	0.073	Channel
10	Pavement	6,317	0.145	0.95	2.29	1,145	0.026	Channel
11	Landscaping	38,193	0.877	0.45	2.29	3,280	0.075	Channel
12	Pavement	10,812	0.248	0.95	2.29	1,960	0.045	Channel
15	Building	9,052	0.208	0.95	2.29	1,641	0.038	Channel
20	Building	7,564	0.174	0.95	2.29	1,371	0.031	Channel
25	Pavement	28,172	0.647	0.95	2.29	5,107	0.117	Channel
30	Pavement	22,379	0.514	0.95	2.29	4,057	0.093	Channel
31	Landscaping	20,237	0.465	0.45	2.29	1,738	0.040	Channel
32	Pavement	6,184	0.142	0.95	2.29	1,121	0.026	Channel
35	Pavement	15,894	0.365	0.95	2.29	2,881	0.066	Channel
40	Building	17,457	0.401	0.95	2.29	3,165	0.073	Channel
45	Pavement	35,036	0.804	0.95	2.29	6,352	0.146	Channel
50	Pavement	2,841	0.065	0.95	2.29	515	0.012	Channel
55	Pavement	20,078	0.461	0.95	2.29	3,640	0.084	Channel
56	Building	18,640	0.428	0.95	2.29	3,379	0.078	Channel
57	Building	8,708	0.200	0.95	2.29	1,579	0.036	Channel
58	Building	12,125	0.278	0.95	2.29	2,198	0.050	Channel
59	Building	37,607	0.863	0.95	2.29	6,818	0.157	Basin A
60	Building	9,264	0.213	0.95	2.29	1,679	0.039	Basin A
61	Landscaping	8,700	0.200	0.45	2.29	747	0.017	Basin OS1
62	Landscaping	19,586	0.450	0.45	2.29	1,682	0.039	Basin A
63	Pavement	3,188	0.073	0.95	2.29	578	0.013	Basin B
64	Landscaping	11,075	0.254	0.45	2.29	951	0.022	Basin B
65	Pavement	5,114	0.117	0.95	2.29	927	0.021	Basin C
66	Building	22,620	0.519	0.95	2.29	4,101	0.094	Basin B
67	Landscaping	5,924	0.136	0.45	2.29	509	0.012	Basin OS2
68	Building	6,343	0.146	0.95	2.29	1,150	0.026	Basin B
70	Landscaping	6,540	0.150	0.45	2.29	562	0.013	Basin C
75	Landscaping	12,354	0.284	0.45	2.29	1,061	0.024	Channel
80	Landscaping	9,261	0.213	0.45	2.29	795	0.018	Basin D
OS1	Pavement	4,917	0.113	0.95	2.29	891	0.020	Basin OS1
OS2	Pavement	8,886	0.204	0.95	2.29	1,611	0.037	Basin A
OS3	Pavement	3,903	0.090	0.95	2.29	708	0.016	Basin B
OS4	Pavement	4,204	0.097	0.95	2.29	762	0.017	Basin OS2
TOTAL	-	495,970	11.386	-	-	77,333	1.775	-

Basin	Land Use	Runoff Coefficient	Drainage Area (ft ²)	Required Volume (ft ³)	Provided Volume (ft ³)	Surplus (ft ³)
Basin A	Landscaping	0.45	19,586	1,682		
	Building	0.95	46,871	8,497		
	Pavement	0.95	8,886	1,611		
			66,457	11,790	12,129	339

Basin	Land Use	Runoff Coefficient	Drainage Area (ft ²)	Required Volume (ft ³)	Provided Volume (ft ³)	Surplus (ft ³)
Basin B	Landscaping	0.45	11,075	951		
	Building	0.95	28,963	5,251		
	Pavement	0.95	7,091	1,286		
			47,129	7,487	7,724	237

Basin	Land Use	Runoff Coefficient	Drainage Area (ft ²)	Required Volume (ft ³)	Provided Volume (ft ³)	Surplus (ft ³)
Basin C	Landscaping	0.45	6,540	562		
	Building	0.95	0	0		
	Pavement	0.95	5,114	927		
			11,654	1,489	1,856	367

Basin	Land Use	Runoff Coefficient	Drainage Area (ft ²)	Required Volume (ft ³)	Provided Volume (ft ³)	Surplus (ft ³)
Basin D	Landscaping	0.45	9,261	795		
	Building	0.95	0	0		
	Pavement	0.95	0	0		
			9,261	795	1,987	1,192

Basin	Land Use	Runoff Coefficient	Drainage Area (ft ²)	Required Volume (ft ³)	Provided Volume (ft ³)	Surplus (ft ³)
Basin OS1	Landscaping	0.45	8,700	747		
	Building	0.95	0	0		
	Pavement	0.95	4,917	891		
			13,617	1,639	2,494	855

Basin	Land Use	Runoff Coefficient	Drainage Area (ft ²)	Required Volume (ft ³)	Provided Volume (ft ³)	Surplus (ft ³)
Basin OS2	Landscaping	0.45	5,924	509		
	Building	0.95	0	0		
	Pavement	0.95	4,204	762		
			10,128	1,271	1,640	369

HY-8 Culvert Analysis Report

Rating Curve Plot for Crossing: Scottsdale Road Culvert

Total Rating Curve
Crossing: Scottsdale Road Culvert

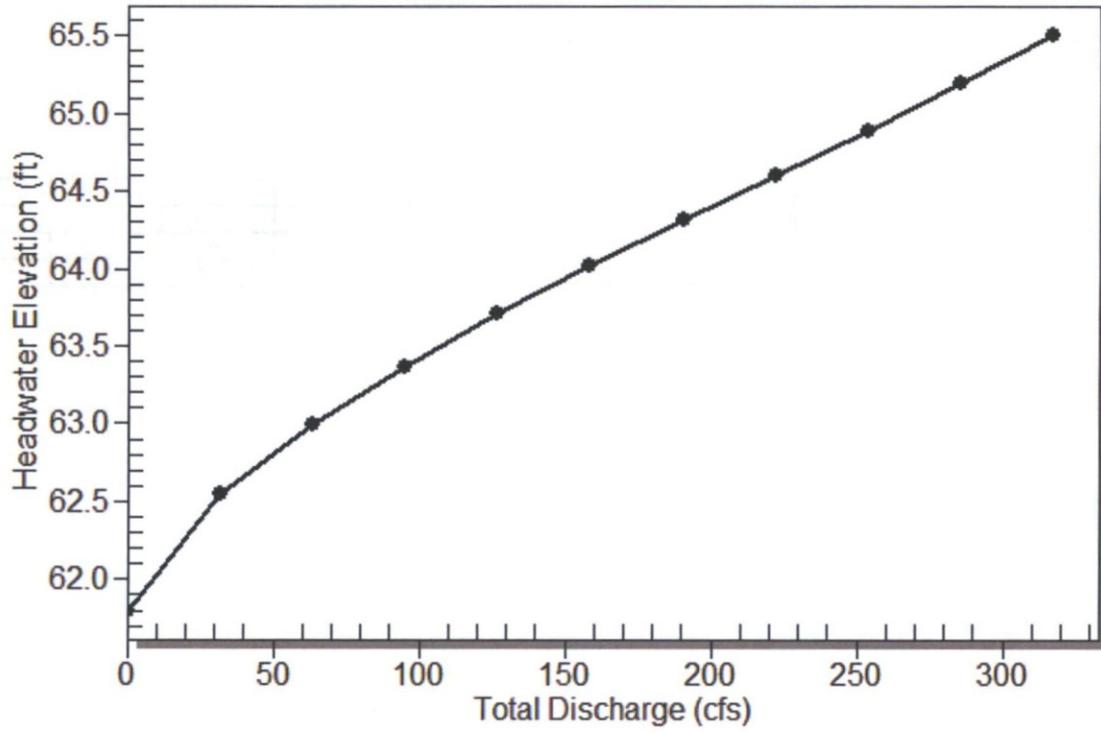


Table 1 - Summary of Culvert Flows at Crossing: Scottsdale Road Culvert

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
61.80	0.00	0.00	0.00	1
62.55	31.70	31.70	0.00	1
63.00	63.40	63.40	0.00	1
63.37	95.10	95.10	0.00	1
63.71	126.80	126.80	0.00	1
64.02	158.50	158.50	0.00	1
64.31	190.20	190.20	0.00	1
64.60	221.90	221.90	0.00	1
64.89	253.60	253.60	0.00	1
65.19	285.30	285.30	0.00	1
65.51	317.00	317.00	0.00	1
69.50	588.27	588.27	0.00	Overtopping

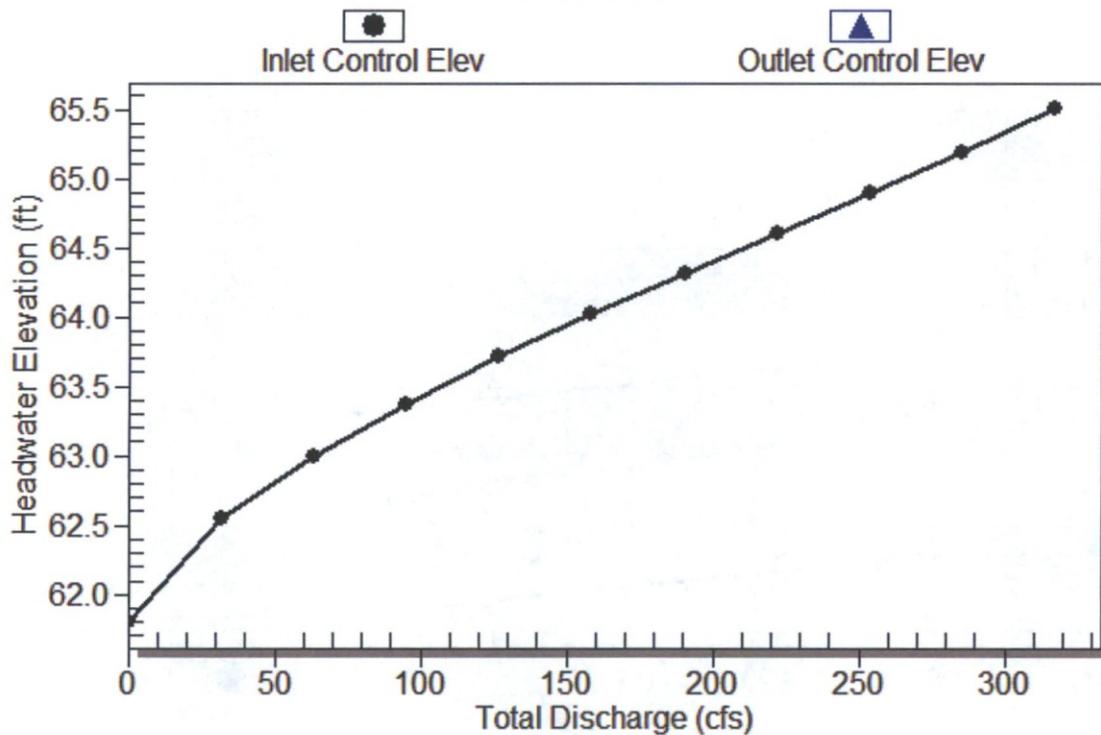
* theoretical depth is impractical. Depth reported is corrected.

Inlet Elevation (invert): 61.80 ft, Outlet Elevation (invert): 60.90 ft
Culvert Length: 69.01 ft, Culvert Slope: 0.0130

Culvert Performance Curve Plot: Culvert 1

Performance Curve

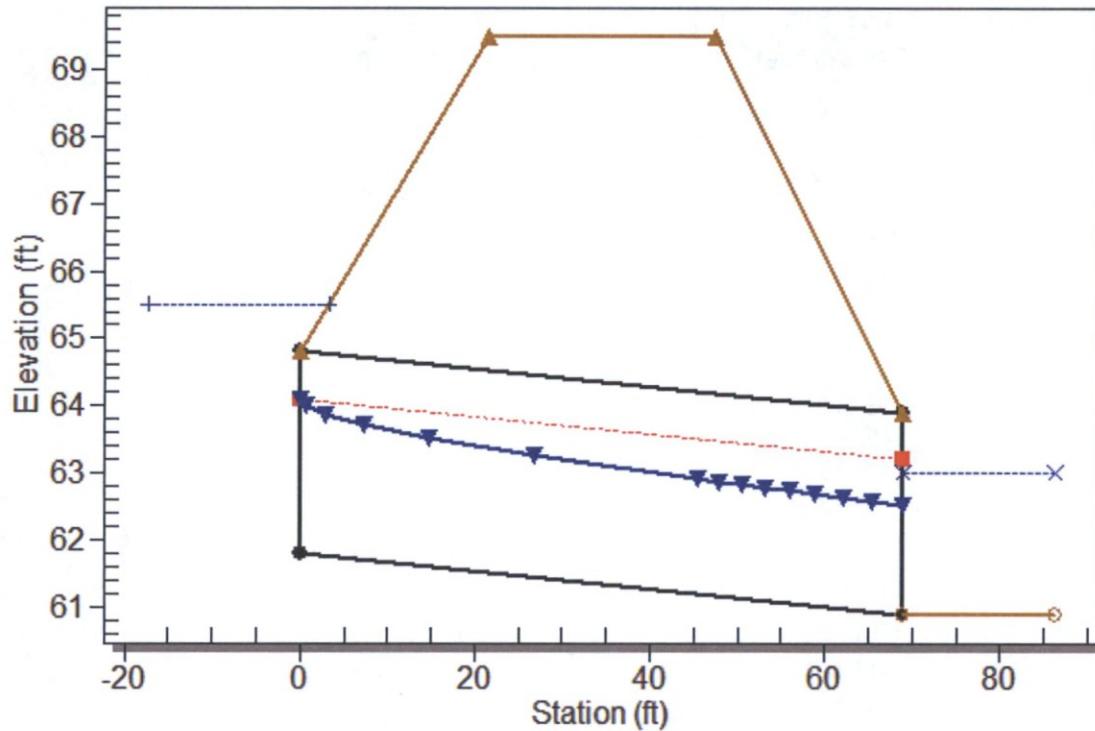
Culvert: Culvert 1



Water Surface Profile Plot for Culvert: Culvert 1

Crossing - Scottsdale Road Culvert, Design Discharge - 317.0 cfs

Culvert - Culvert 1, Culvert Discharge - 317.0 cfs



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 61.80 ft

Outlet Station: 69.00 ft

Outlet Elevation: 60.90 ft

Number of Barrels: 2

Culvert Data Summary - Culvert 1

Barrel Shape: Concrete Box

Barrel Span: 8.00 ft

Barrel Rise: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Inlet Type: Conventional

Inlet Edge Condition: Square Edge (30-75° flare) Wingwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: Scottsdale Road Culvert)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	60.90	0.00	0.00	0.00	0.00
31.70	61.48	0.58	2.84	0.29	0.70
63.40	61.76	0.86	3.60	0.43	0.74
95.10	61.99	1.09	4.11	0.54	0.76
126.80	62.17	1.27	4.50	0.64	0.78
158.50	62.34	1.44	4.83	0.72	0.79
190.20	62.49	1.59	5.10	0.80	0.80
221.90	62.63	1.73	5.35	0.87	0.81
253.60	62.76	1.86	5.57	0.93	0.82
285.30	62.89	1.99	5.76	0.99	0.83
317.00	63.00	2.10	5.94	1.05	0.83

Tailwater Channel Data - Scottsdale Road Culvert

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 17.00 ft

Side Slope (H:V): 4.00 (4:1)

Channel Slope: 0.0080

Channel Manning's n: 0.0300

Channel Invert Elevation: 60.90 ft

Roadway Data for Crossing: Scottsdale Road Culvert

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 69.50 ft

Roadway Surface: Paved

Roadway Top Width: 26.00 ft



FloGard® Dual-Vortex Hydrodynamic Separator

Characteristics and Capacities (English)

Model	ID	Depth Below Invert	Treated Flow Capacity ¹			Total Flow Capacity ³	Max. Pipe Size	Sediment Storage	Oil/ Floatable Storage
			67 μ m cfs	110 μ m cfs	Peak ² cfs				
	ft	ft				cfs	in	yd ³	gal
DVS-36	3	3.75	0.12	0.35	0.50	4	12	0.3	18
DVS-48	4	5.00	0.25	0.75	1.25	9	18	0.7	43
DVS-60	5	6.25	0.45	1.30	2.50	16	24	1.3	83
DVS-72	6	8.25	0.70	2.00	4.25	27	36	2.2	141
DVS-84 ⁴	7	9.50	1.00	3.00	6.50	40	42	3.5	294
DVS-96	8	10.75	1.40	4.20	9.50	57	48	5.3	337
DVS-120 ⁴	10	13.50	2.50	7.30	16.80	99	48	9.7	917
DVS-144 ⁴	12	16.00	3.90	11.60	26.40	154	60	15.5	1825

Characteristics and Capacities (Metric)

Model	ID	Depth Below Invert	Treated Flow Capacity ¹			Total Flow Capacity ³	Max. Pipe Size	Sediment Storage	Oil/ Floatable Storage
			67 μ m L/s	110 μ m L/s	Peak ² L/s				
	m	m				L/s	mm	m ³	L
DVS-36	0.9	1.14	3.5	10	14	113	300	0.23	68
DVS-48	1.2	1.52	7	21	35	255	450	0.54	163
DVS-60	1.5	1.91	13	37	71	453	600	1.00	314
DVS-72	1.8	2.51	20	57	120	765	900	1.70	534
DVS-84 ⁴	2.1	2.90	30	85	184	1133	1050	2.70	1113
DVS-96	2.4	3.28	40	120	269	1614	1200	4.00	1276
DVS-120 ⁴	3.0	4.11	70	205	475	2800	1200	7.40	3471
DVS-144 ⁴	3.7	4.88	110	330	750	4360	1500	11.90	6908

¹Treated Flow Capacity is based on 80% removal of suspended sediment with the approximate mean particle size shown. The appropriate flow capacity should be selected based on expected site sediment characteristics.

² Maximum flow prior to bypass. Correlates approximately to 80% removal of suspended sediment with a 250 μ m particle size mean.

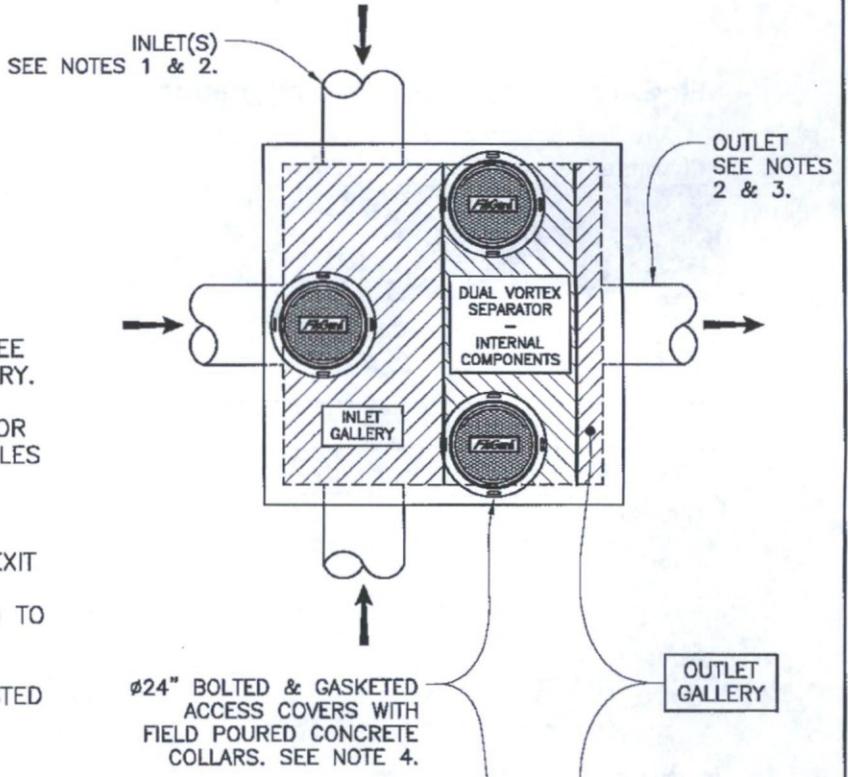
³ Total design flow to the system should not exceed the Peak Flow Capacity.

⁴ Call Kristar representative for availability in your area.

Notes: Systems may be sized based on a water quality flow (i.e. 1-inch design storm) or on net annual sediment load removal depending on local regulatory requirements.

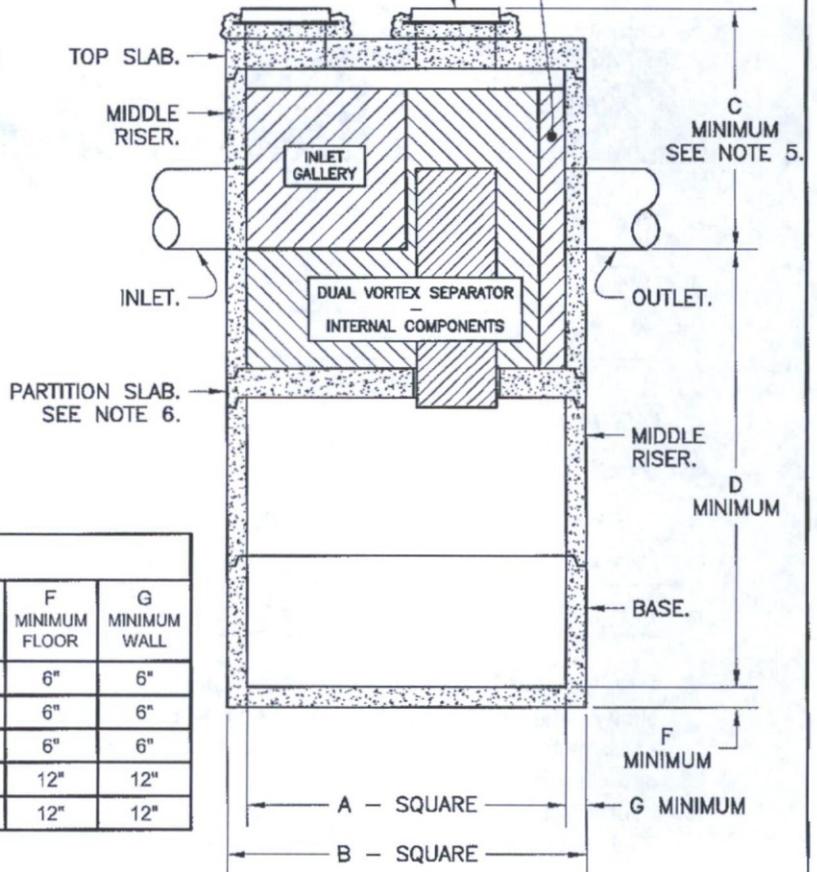
Contact Kristar for the most accurate and cost effective sizing for your project location.

When sizing system based on a water quality flow, the required flow to be treated must be less than or equal to the Treated Flow Capacity for the selected unit.



NOTES:

1. INLET PIPES MAY ENTER SEPARATOR ON THREE SIDES. POSITION RESTRICTED TO INLET GALLERY.
2. INLET AND OUTLET PIPES MAY JOIN SEPARATOR AT OBLIQUE ANGLES. SPECIFIC MAXIMUM ANGLES & PIPE SIZES APPLY. CONTACT KRISTAR ENTERPRISES FOR ENGINEERING DETAILS.
3. STANDARD OUTLET PIPE CONFIGURATION TO EXIT SEPARATOR AT THE CENTER LINE. CUSTOM ANGLED OUTLET CONFIGURATIONS RESTRICTED TO FACE OF UNIT OPPOSITE INLET GALLERY.
4. BOLTED & GASKETED ACCESS COVERS ADJUSTED TO GRADE, USING GRADE RINGS FIELD POUR CONCRETE COLLAR AS REQUIRED.
5. FOR DEPTHS LESS THAN THE MINIMUM SHOWN AS DIMENSION C IN THE TABULATION CONTACT KRISTAR ENTERPRISES FOR ENGINEERING DESIGN ASSISTANCE.
6. PARTITION SLAB MAY BE MADE AS A CONCRETE SLAB AS SHOWN, OR FROM ALTERNATIVE MATERIALS: e.g. FIBERGLASS COMPOSITE, STAINLESS STEEL, ETC.
7. CONCRETE COMPONENTS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM DESIGNATION C858.
8. REMOVABLE INTERNAL COMPONENTS MAY BE AVAILABLE TO FACILITATE MAINTENANCE. SEE DRAWING DVS-R-0001 OR CONTACT KRISTAR ENTERPRISES FOR DETAILS.



TABULATION

MODEL	A ID (SQUARE)	B OD (SQUARE)	C MINIMUM SEE NOTE 5	D MINIMUM SUMP	E MAXIMUM Ø PIPE	F MINIMUM FLOOR	G MINIMUM WALL
DVS-72S	6' [72"]	7' [84"]	4.5' [54"]	8.25' [99"]	36"	6"	6"
DVS-84S	7' [84"]	8' [96"]	5.0' [60"]	9.50' [114"]	42"	6"	6"
DVS-96S	8' [96"]	9' [108"]	5.5' [66"]	10.75' [129"]	48"	6"	6"
DVS-120S	10' [120"]	12' [144"]	7.0' [84"]	13.50' [162"]	48"	12"	12"
DVS-144S	12' [144"]	14' [168"]	8.0' [96"]	16.00' [192"]	60"	12"	12"

* FOR SMALLER SYSTEMS (DVS-36S, DVS-48S & DVS-60S) SEE DRAWING DVS-S-0001.

TITLE
FloGard DUAL-VORTEX
 HYDRODYNAMIC SEPARATOR
 SQUARE STRUCTURES
 DVS-72S, DVS-84S, DVS-96S, DVS-120S, DVS-144S



KriStar Enterprises, Inc.

360 Sutton Place, Santa Rosa, CA 95407
 Ph: 800.579.8819, Fax: 707.524.8186, www.kristar.com

Peak Flow Calculations Using The Rational Method

Source of Rainfall Data --->NOAA Atlas 14

Project: Crossroads South
 Proj #: 191447014
 Date: 6/7/16
 Prep by: TMJ
 Check by: TMJ

Base Sheet Prepared By GA, Version 2

Rainfall Depth-Duration-Frequency (D-D-F), (inch)					
Storm Frequency	Time				
	5 min	10 min	15 min	30 min	60 min
10-Yr	0.41	0.63	0.78	1.05	1.29
100-Yr	0.65	0.98	1.22	1.64	2.03
Derived Rainfall Intensity-Duration-Frequency (I-D-F), (in/hr)					
10-Yr	4.92	3.78	3.12	2.10	1.29
100-Yr	7.80	5.88	4.88	3.28	2.03

Attach source and supporting data for rainfall depths

AF for Cw per Cw _{10-Yr}		
Freq.	Typical	Applic.
2-Yr	1.00	1.00
5-Yr	1.00	1.00
10-Yr	1.00	1.00
25-Yr	1.10	1.10
50-Yr	1.20	1.20
100-Yr	1.25	1.25

AF=Frequency Adjustment Factor

Drainage Area ID: -----							Tc,calc method: 1=Papadakis and Kazan, 2=Avg Veloc.						10-Yr				100-Yr					
							1	Tc,calc=11.4*L^0.5*Kb^0.52*S^-0.31*i^-0.38					Cw for each frequency is adjusted as a function of the 100-year value per the table above									
Concent. Point #	Contributing Sub-basins	Total Area (ac)	Base Cw (2-10 yr)	Flow Path, L (ft)	Approx High pt (ft)	Approx Low pt (ft)	Average Slope ft/ft	K _b Class A-->D	m	b	K _b	Initial/lot Tc (min)	Minim allowed Tc,tot = 0.0				Q 10-Yr (cfs)	Minim allowed Tc,tot = 0.0				Q 100-Yr (cfs)
													Cw	Tc,calc (min)	Tc,tot (min)	i (in/hr)		Cw	Tc,calc (min)	Tc,tot (min)	i (in/hr)	
W of Divide		7.00	0.450	655	73	63.3	0.0148	B	-0.01375	0.08	0.0684	0	0.45	8.9	8.9	4.24	13.3	0.56	7.4	7.4	7.03	27.7
E of Divide		4.32	0.450	606	73	65.1	0.0130	B	-0.01375	0.08	0.0713	0	0.45	9.3	9.3	4.01	7.8	0.56	7.5	7.5	7.03	17.1
OS-1		6.30	0.450	1900	93	67	0.0137	B	-0.01375	0.08	0.0690	0	0.45	17.9	17.9	2.98	8.5	0.56	14.6	14.6	5.08	18.0
OS-2		1.00	0.950	1200	89	73	0.0133	B	-0.01375	0.08	0.0800	0	0.95	15.0	15.0	3.25	3.1	0.95	12.3	12.3	5.48	5.2
DA-1		2.50	0.450	610	72.5	64.8	0.0126	B	-0.01375	0.08	0.0745	0	0.45	9.7	9.7	4.01	4.5	0.56	7.8	7.8	7.03	9.9
DA-2		1.90	0.450	600	72.5	66	0.0108	B	-0.01375	0.08	0.0762	0	0.45	10.4	10.4	3.78	3.2	0.56	8.4	8.4	6.65	7.1

Appendix D

Corp of Engineers Letter of Compliance for Nationwide Permit No. 39

LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS

CERTIFICATION OF COMPLIANCE WITH
DEPARTMENT OF THE ARMY NATIONWIDE PERMIT

Permit Number: SPL-2011-375-AP
Date of Issuance: April 16, 2012
Name of Permittee: Maria Baier
Arizona State Land Department
1616 W. Adams Street
Phoenix, Arizona 85007

Upon completion of the activity authorized by this permit, sign this certification and return it with an original signature to the following address:

U.S. Army Corps of Engineers
ATTENTION: Regulatory Division (SPL-2011-375-AP)
3636 North Central Avenue, Suite 900
Phoenix, Arizona 85012-1939

Please note that your permitted activity is subject to a compliance inspection by a Corps of Engineers' representative. If you fail to comply with this Nationwide Permit you may be subject to permit suspension, modification, or revocation.

I hereby certify that the work authorized by the above referenced Nationwide Permit has been completed in accordance with the terms and conditions of said permit.



Signature of Permittee

5-18-12

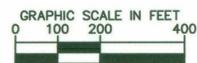
Date

Enclosure 2

Appendix E

Exhibits

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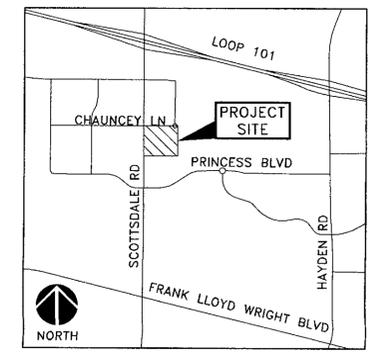
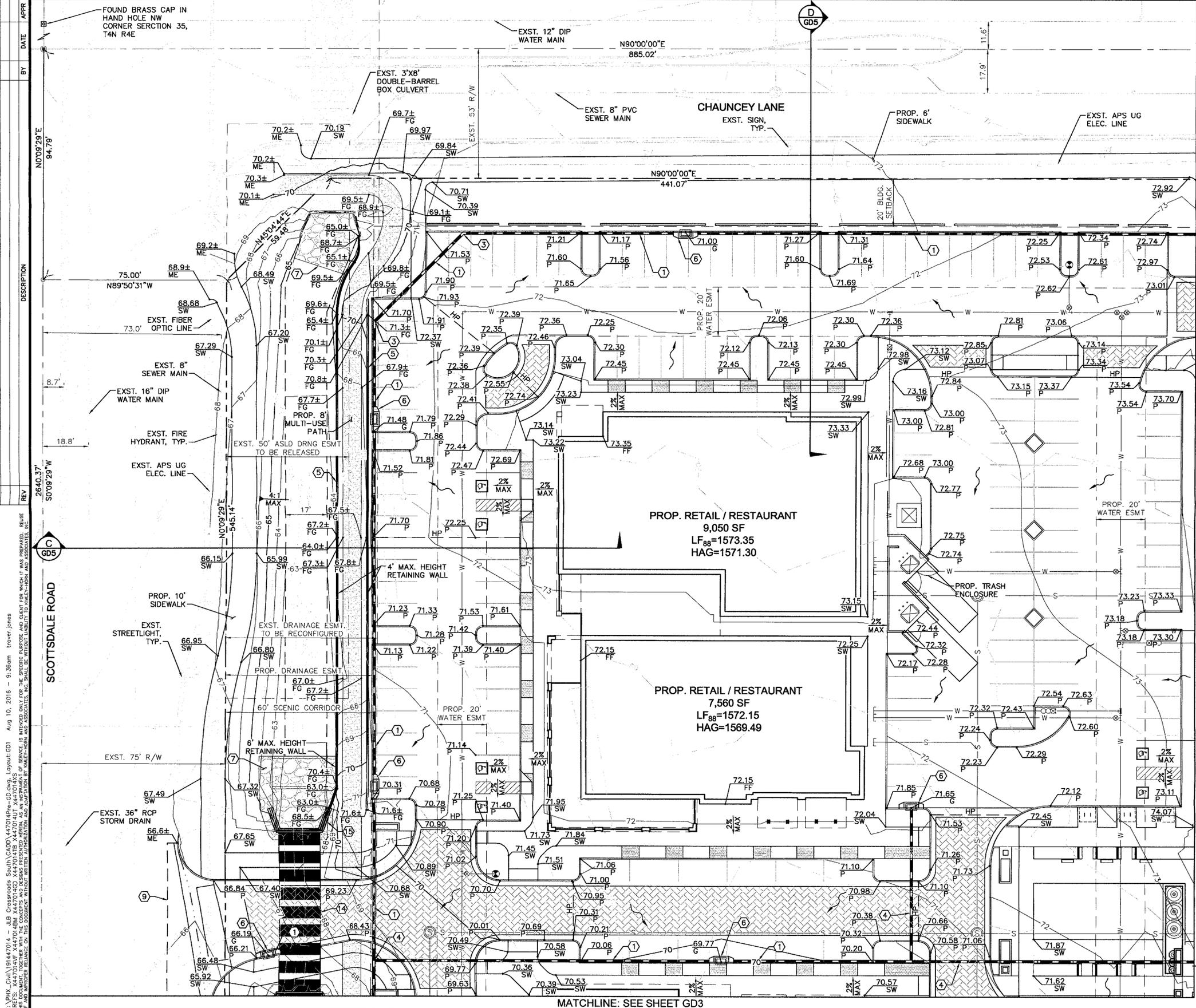


LEGEND

- CROSSROADS SOUTH MIXED-USE DEVELOPMENT
- CROSSROADS EAST PLANNING UNIT IV

FIGURE 1: CONTEXT AERIAL PLAN





VICINITY MAP
SCOTTSDALE, AZ
N.T.S.

GRADING AND DRAINAGE NOTES

- ① HDPE STORM DRAIN PIPE.
- ③ HDPE STORM DRAIN BEND.
- ④ HDPE STORM DRAIN TEE.
- ⑤ RETAINING WALL.
- ⑥ CATCH BASIN PER MAG STD DET 534.
- ⑦ RIP-RAP PROTECTION.
- ⑨ SAWCUT LINE.
- ⑭ 3'x8' DOUBLE-BARREL BOX CULVERT.
- ⑮ HEADWALL PER ADOT STD DET B-04.10.

DEVELOPER/OWNER

JLB PARTNERS
9237 E VIA DE VENTURA, SUITE 215
SCOTTSDALE, ARIZONA 85258
PH: (480) 800-3070
CONTACT: KEVIN RANSIL

CIVIL ENGINEER

KIMLEY-HORN AND ASSOCIATES, INC.
7740 N. 16TH STREET, SUITE 300
PHOENIX, ARIZONA 85020
TEL. NO. (602) 944-5500
CONTACT: STEVE HANEY, PE

MATCHLINE: SEE SHEET GD2

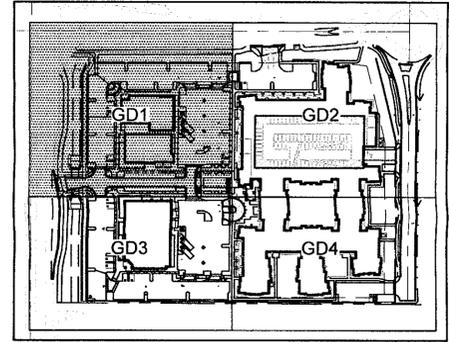
MATCHLINE: SEE SHEET GD3

LAND SURVEYOR

SURVEY INNOVATION GROUP, INC
7301 EAST EVANS ROAD
SCOTTSDALE, ARIZONA 85260
PH: (480) 922-0780
CONTACT: JASON SEGNERI, P.L.S.

ARCHITECT

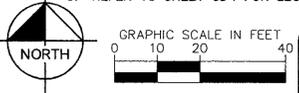
HENSLEY LAMKIN RACHEL, INC.
11200 BROADWAY, SUITE 2749
PEARLAND, TEXAS 77584
PH: (832) 379-2983
CONTACT: ROBERT BOOTH



KEY MAP
N.T.S.

NOTES

1. ADD 1500' TO ALL ELEVATIONS.
2. ADD 0.5' TO PAVEMENT (P) ELEVATIONS TO OBTAIN TOP OF CURB ELEVATIONS, UNLESS OTHERWISE NOTED.
3. REFER TO SHEET GD4 FOR LEGEND.



CALL TWO WEEKS BEFORE THE DATE OF THE MEETING
602-263-1100
1-800-STRAKE-IT
(OUTSIDE MARICOPA COUNTY)

PROJECT No.
191447014
SCALE (H): 1"=20'
SCALE (V): NONE
DRAWN BY: CGF
DESIGN BY: TMJ
CHECK BY: SEH
DATE: 08/05/16

PRELIMINARY
FOR REVIEW ONLY
NOT FOR CONSTRUCTION
Kimley-Horn
ENGINEER S. HANEY
PE NO. 37059, DATE 08/16

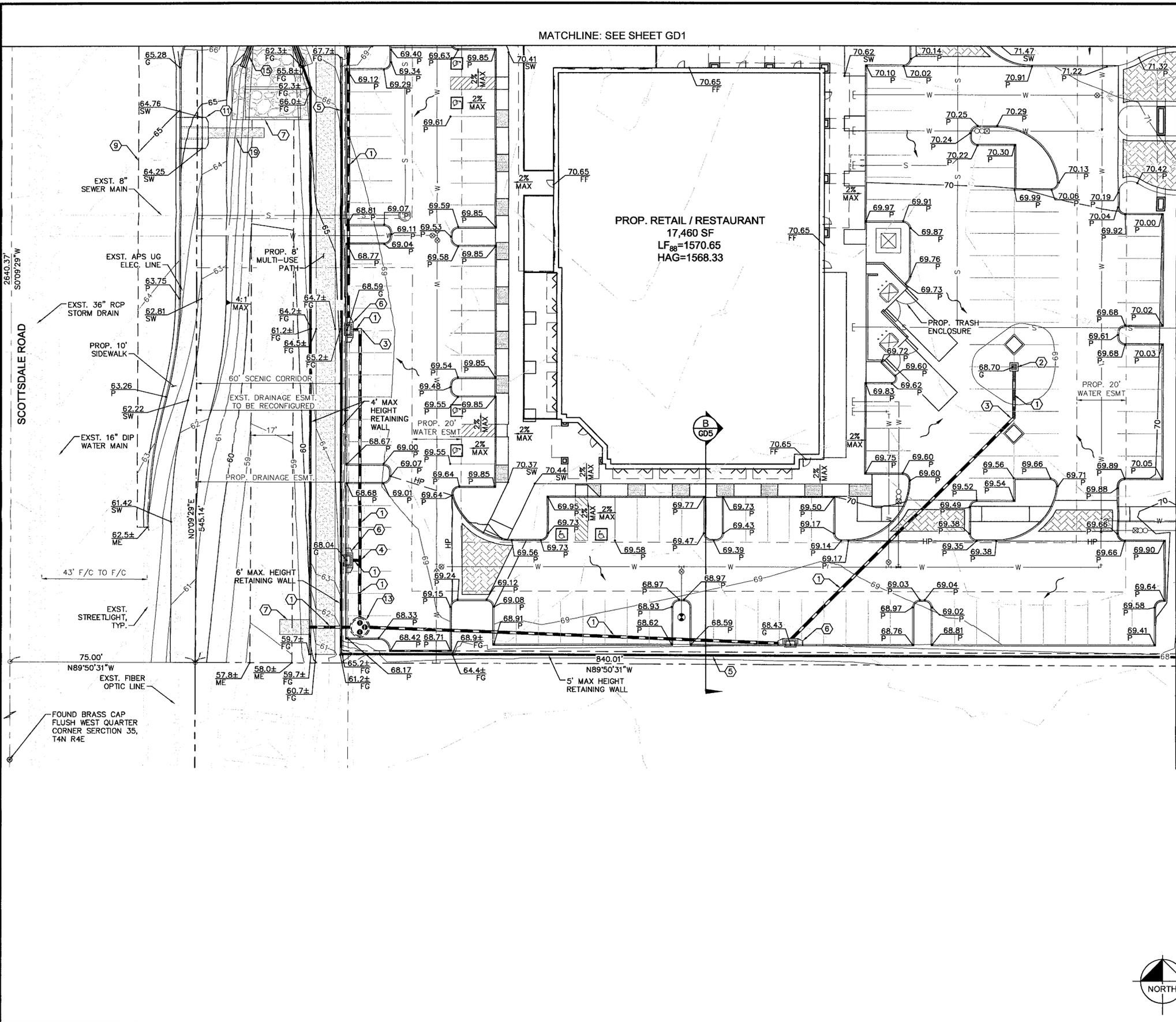
447014Pre-GD.dwg
GD1
1 OF 5 SHEETS

SEC SCOTTSDALE ROAD AND CHAUNCEY LANE
PRELIMINARY GRADING AND DRAINAGE PLAN
SCOTTSDALE, ARIZONA

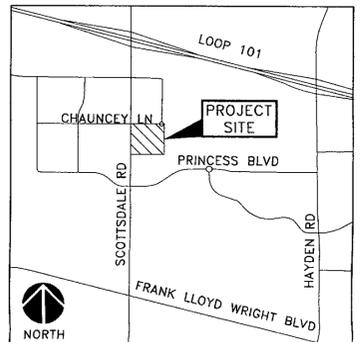
Kimley-Horn © 2016
7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

K:\PHX_Civil\191447014 - JB_Crossroads_South\CADD\447014Pre-GD.dwg, Layout (GD) Aug 10, 2016 - 9:36am tlover:jmes
XREFS: 447014VF 447014WB 447014WB 447014WB 447014WB 447014WB 447014WB 447014WB 447014WB 447014WB
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REV	DESCRIPTION	DATE	BY	APPR
26-00-37	SCOTTSDALE ROAD	09/29/16		



MATCHLINE: SEE SHEET GD1

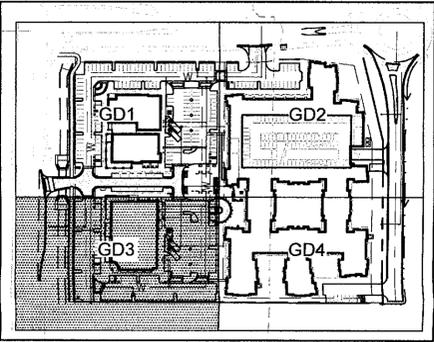


VICINITY MAP
SCOTTSDALE, AZ
N.T.S.

GRADING AND DRAINAGE NOTES

- ① HDPE STORM DRAIN PIPE.
- ② CATCH BASIN PER MAG STD DET 537.
- ③ HDPE STORM DRAIN BEND.
- ④ HDPE STORM DRAIN TEE.
- ⑤ RETAINING WALL.
- ⑥ CATCH BASIN PER MAG STD DET 534.
- ⑦ RIP-RAP PROTECTION.
- ⑧ SAWCUT LINE.
- ⑨ SIDEWALK SCUPPER PER MAG STD DET 206.
- ⑩ KRI-STAR DUAL-VORTEX HYDRODYNAMIC SEPARATOR WITH 144" INSIDE DIAMETER.
- ⑪ HEADWALL PER ADOT STD DET B-04.10.
- ⑫ RIP-RAP SPILLWAY.

MATCHLINE: SEE SHEET GD4



KEY MAP
N.T.S.

- NOTES
1. ADD 1500' TO ALL ELEVATIONS.
 2. ADD 0.5' TO PAVEMENT (P) ELEVATIONS TO OBTAIN TOP OF CURB ELEVATIONS, UNLESS OTHERWISE NOTED.
 3. REFER TO SHEET GD4 FOR LEGEND.



CALL FOR PRICING DATA BEFORE YOU BID
602-263-1100
1-800-STRAE-IT
(OUTSIDE MARICOPA COUNTY)

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7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

SEC SCOTTSDALE ROAD AND CHAUNCEY LANE
PRELIMINARY GRADING AND DRAINAGE PLAN
SCOTTSDALE, ARIZONA

PROJECT No.
191447014

SCALE (H): 1"=20'
SCALE (V): NONE

DRAWN BY: CGF
DESIGN BY: TMJ
CHECK BY: SEH
DATE: 08/05/16

PRELIMINARY
FOR REVIEW ONLY
NOT FOR CONSTRUCTION

Kimley»Horn

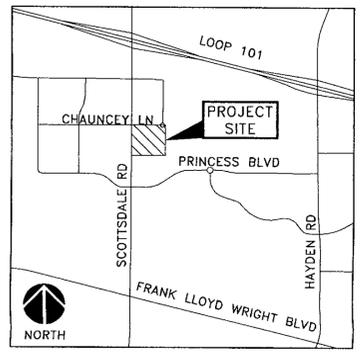
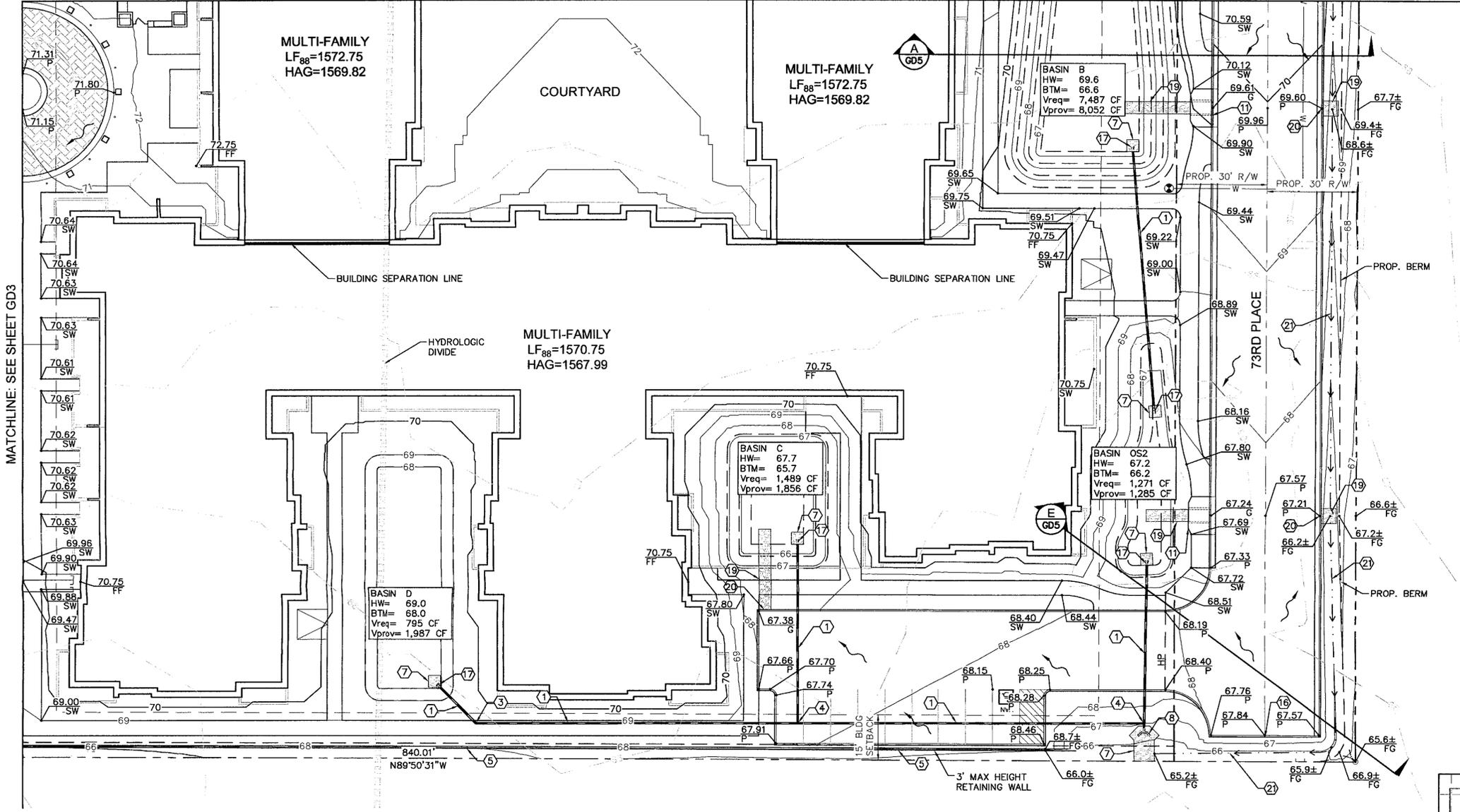
ENGINEER: S. HANEY
PE NO. 37059, DATE 08/16

447014P16-GD.dwg

GD3
3 OF 5 SHEETS

BY DATE APPR
 DESCRIPTION
 REV

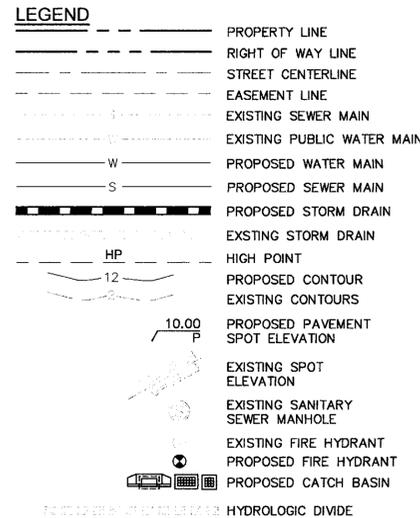
MATCHLINE: SEE SHEET GD2



VICINITY MAP
 SCOTTSDALE, AZ
 N.T.S.

GRADING AND DRAINAGE NOTES

- ① HDPE STORM DRAIN PIPE.
- ③ HDPE STORM DRAIN BEND.
- ④ HDPE STORM DRAIN TEE.
- ⑤ RETAINING WALL.
- ⑦ RIP-RAP PROTECTION.
- ⑧ STORM DRAIN HEADWALL PER MAG STD DET 501.
- ⑪ SIDEWALK SCUPPER PER MAG STD DET 206.
- ⑫ BARRICADES PER MAG STD DET 130.
- ⑬ ADS FLARED END SECTION.
- ⑭ RIP-RAP SPILLWAY.
- ⑯ 4' WIDE CURB OPENING.
- ⑰ DRAINAGE SWALE, 3:1 MAXIMUM SIDE SLOPES. ELEVATIONS PER PLAN.

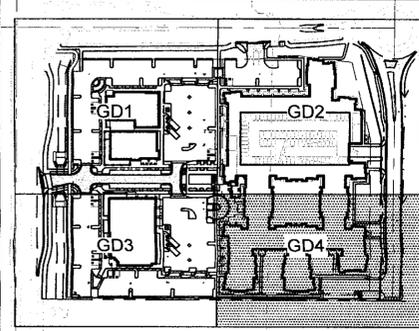


BENCHMARK
 PER SURVEY INNOVATION GROUP, THE BENCHMARK IS CITY OF SCOTTSDALE BRASS CAP IN HANDHOLE AT THE INTERSECTION OF UNION HILLS (MAYO BOULEVARD) AND SCOTTSDALE ROAD.

ELEVATION = 1588.43 (NAVD'88)

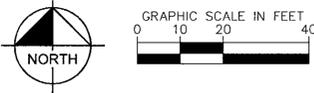
BASIS OF BEARING
 PER SURVEY INNOVATION GROUP, THE BASIS OF BEARING IS THE WEST LINE OF THE NORTHWEST QUARTER OF SECTION 35, TOWNSHIP 4 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA. SAID LINE BEARS S00°09'29"W.

FLOOD INFORMATION
 THE FLOOD ZONE DESIGNATION FOR THIS AREA IS ZONE AO. DEFINED AS: FLOOD DEPTH OF 1 FOOT (SHEET FLOW ON SLOPING TERRAIN) AVERAGE DEPTH DETERMINED FOR AREA OF ALLUVIAL FAN FLOODING, VELOCITY DETERMINED AT 3 FPS. MAP NUMBER 04013C1320 L, REVISED OCTOBER 16, 2013.



KEY MAP
 N.T.S.

- NOTES**
- ADD 1500' TO ALL ELEVATIONS.
 - ADD 0.5' TO PAVEMENT (P) ELEVATIONS TO OBTAIN TOP OF CURB ELEVATIONS, UNLESS OTHERWISE NOTED.



CALL THE WORKING DATE BEFORE YOU GO
602-263-1100
1-800-STAKE-IT
(OUTSIDE MARICOPA COUNTY)

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 7740 North 16th Street, Suite 300
 Phoenix, Arizona 85020 (602) 944-5500

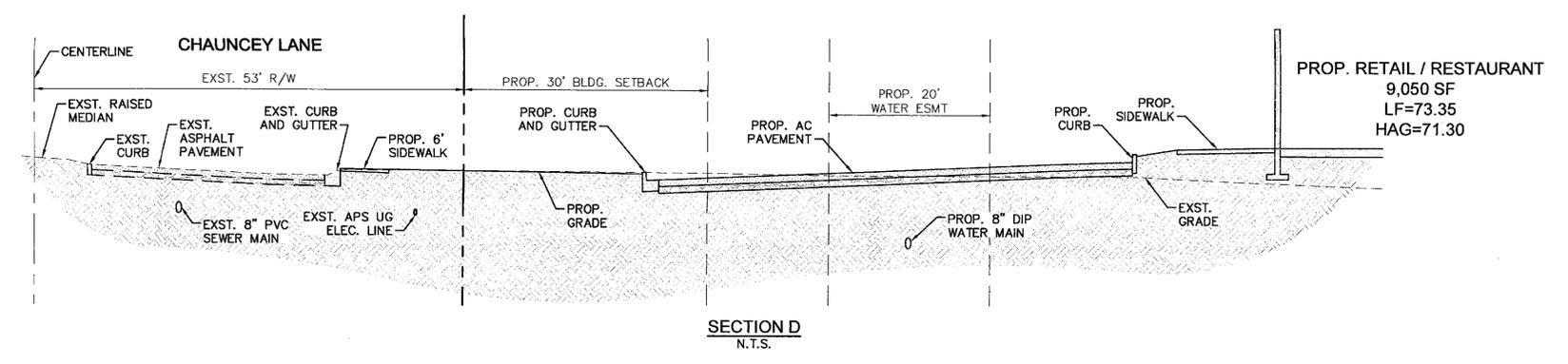
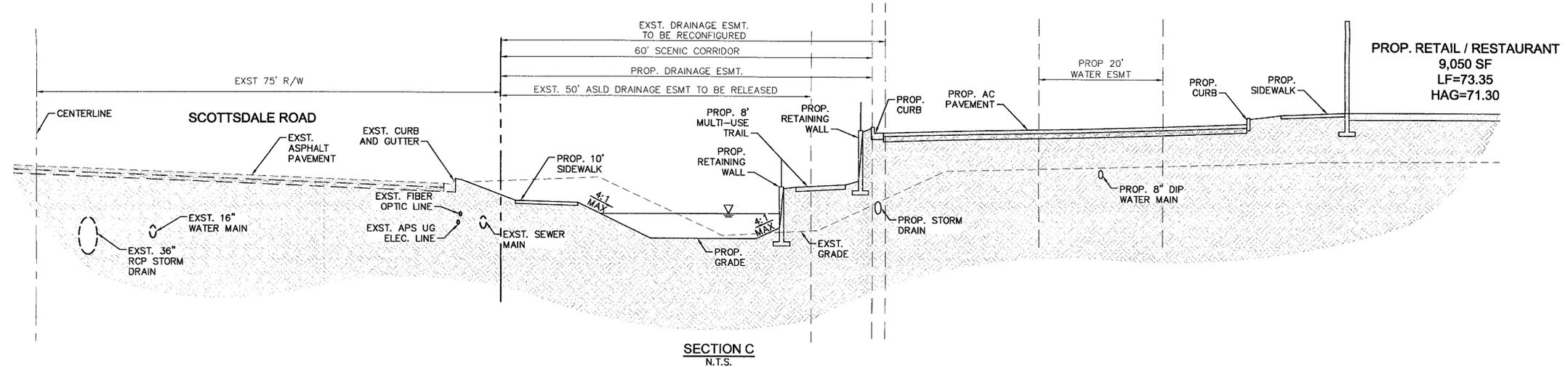
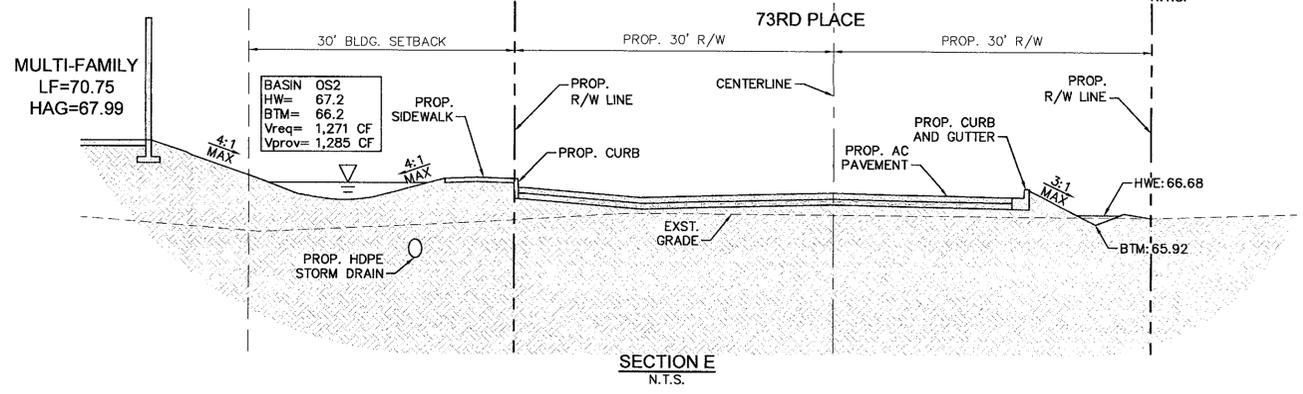
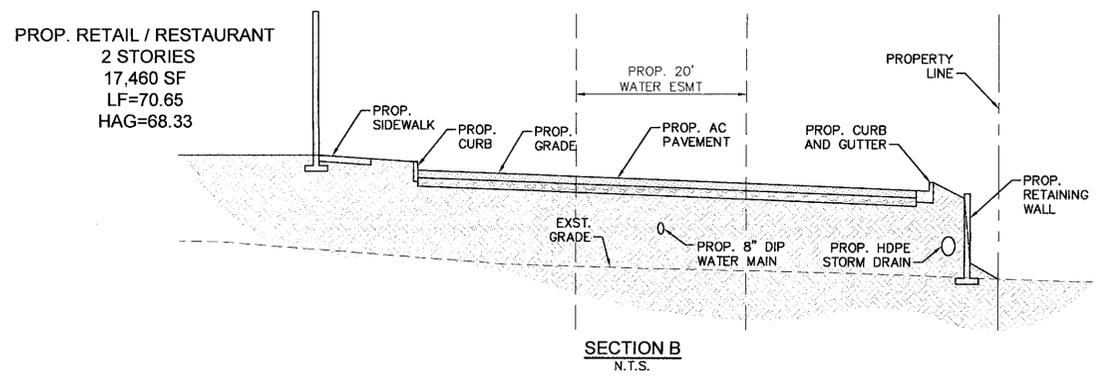
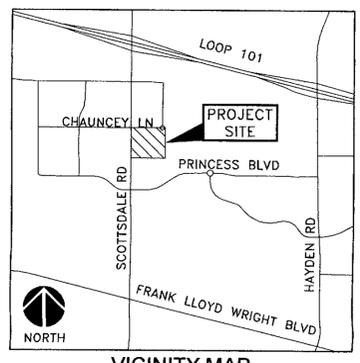
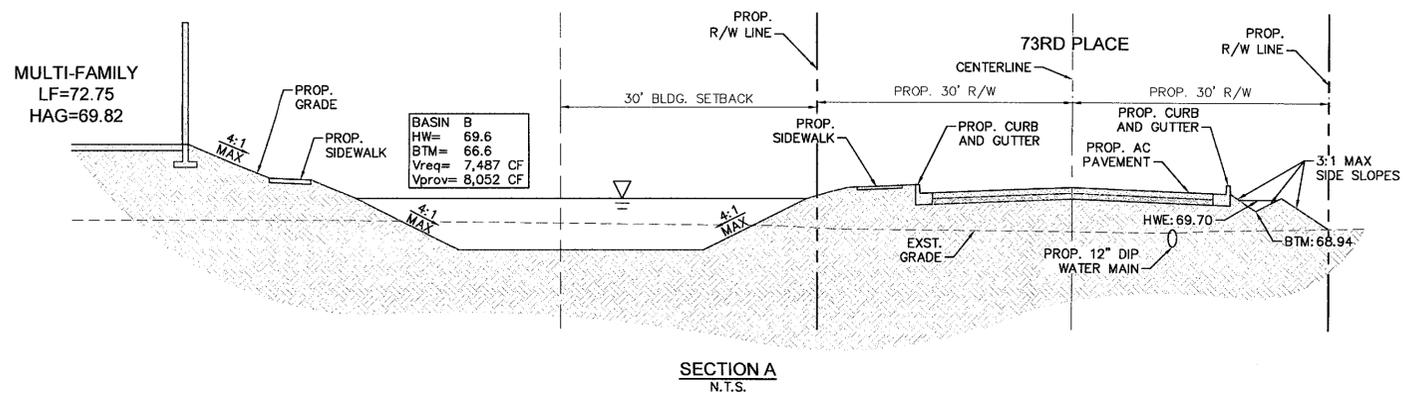
SEC SCOTTSDALE ROAD AND CHAUNCEY LANE
PRELIMINARY GRADING AND DRAINAGE PLAN
 SCOTTSDALE, ARIZONA

PROJECT No. 191447014
 SCALE (H): 1"=20'
 SCALE (V): NONE
 DRAWN BY: CGF
 DESIGN BY: TMJ
 CHECK BY: SEH
 DATE: 08/05/16

PRELIMINARY
 FOR REVIEW ONLY
 NOT FOR CONSTRUCTION
Kimley»Horn
 ENGINEER S. HANEY
 PE NO. 37059, DATE 08/16
 447014P16-GD.dwg

GD4
 4 OF 5 SHEETS

REV	DESCRIPTION	DATE	BY	APP



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 Phoenix, Arizona 85020 (602) 944-5500

SEC SCOTTSDALE ROAD AND CHAUNCEY LANE
SECTIONS
 SCOTTSDALE, ARIZONA

PROJECT No.
191447014
 SCALE (H): NONE
 SCALE (V): NONE
 DRAWN BY: CGF
 DESIGN BY: TMJ
 CHECK BY: SEH
 DATE: 08/05/16

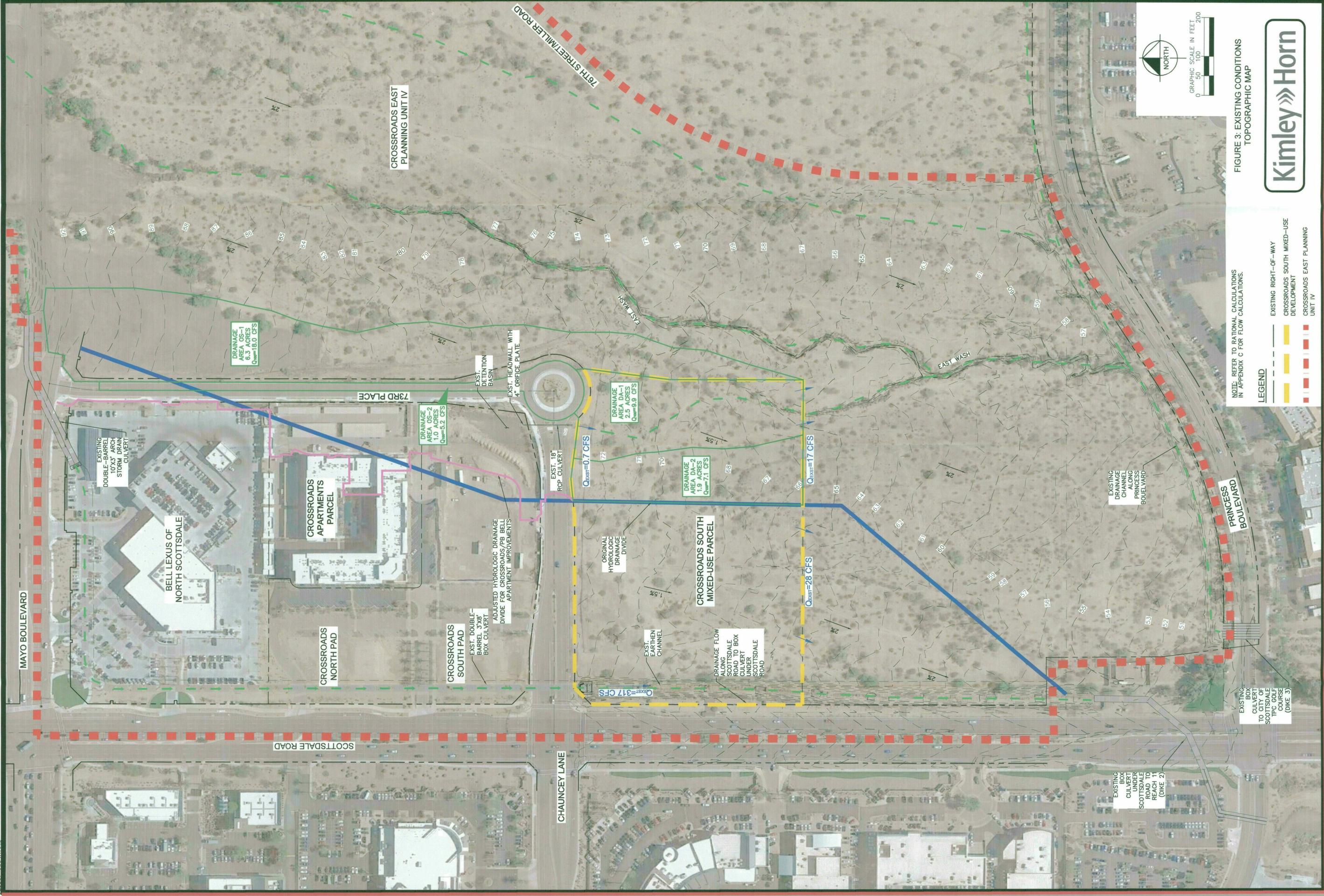
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 ENGINEER S. HANEY
 PE NO. 37059, DATE 08/16

NOTES
 1. ADD 1500' TO ALL ELEVATIONS.

CALL TWO WORKING DAYS BEFORE YOU RING
602-263-1100
1-800-STAKE-IT
 (OUTSIDE MARICOPA COUNTY)

447014Pre-GD.dwg
GD5
 5 OF 5 SHEETS

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 XREFS: 447014.dwg, 447014.tbl, 447014.tbl, 447014.tbl, 447014.tbl, 447014.tbl
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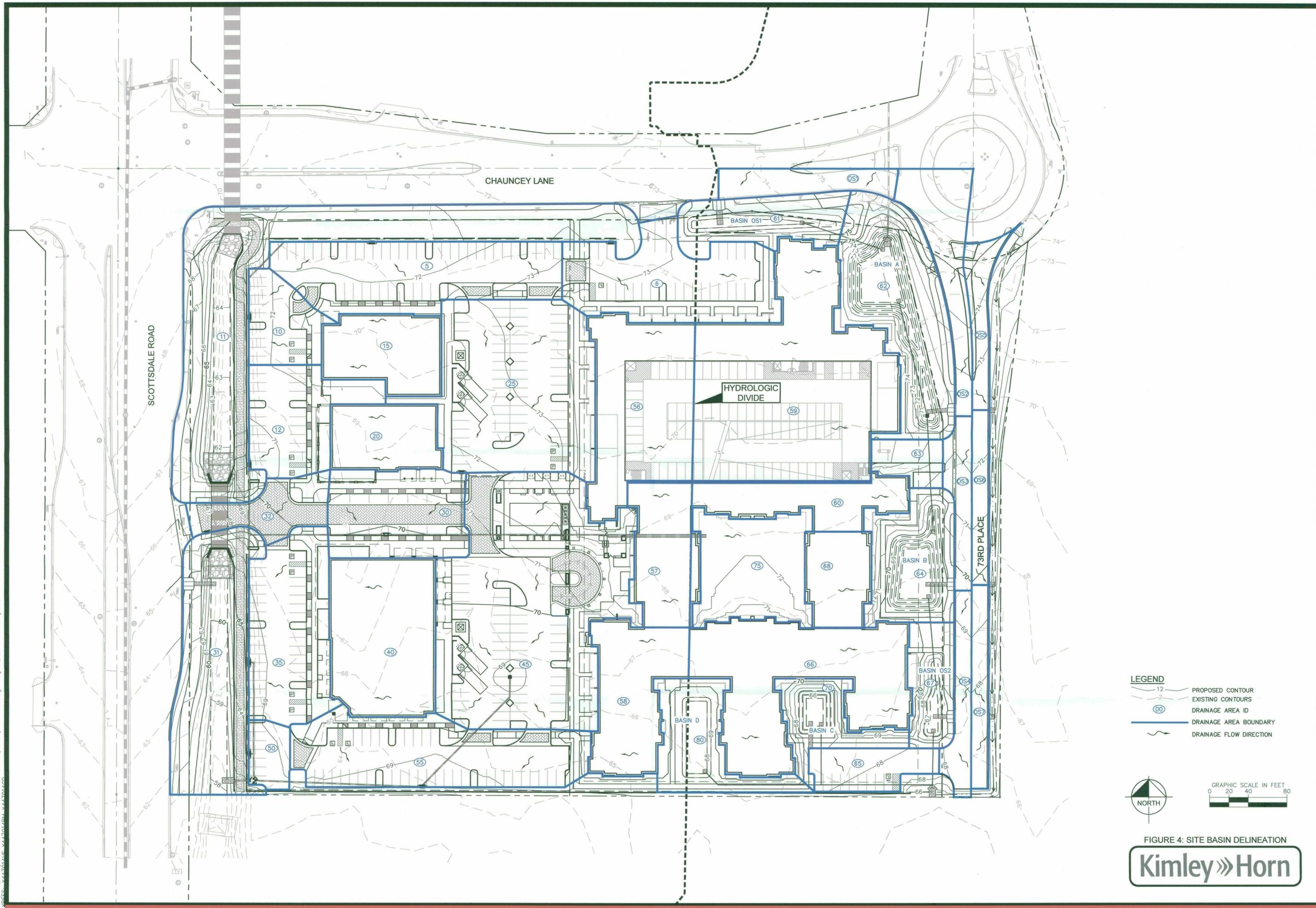
NOTE: REFER TO RATIONAL CALCULATIONS IN APPENDIX C FOR FLOW CALCULATIONS.

- LEGEND**
- EXISTING RIGHT-OF-WAY
 - CROSSROADS SOUTH MIXED-USE DEVELOPMENT
 - CROSSROADS EAST PLANNING UNIT IV

FIGURE 3: EXISTING CONDITIONS TOPOGRAPHIC MAP



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LEGEND
— 12 — PROPOSED CONTOUR
- - - 2 - - - EXISTING CONTOURS
①① DRAINAGE AREA ID
— DRAINAGE AREA BOUNDARY
→ DRAINAGE FLOW DIRECTION



FIGURE 4: SITE BASIN DELINEATION



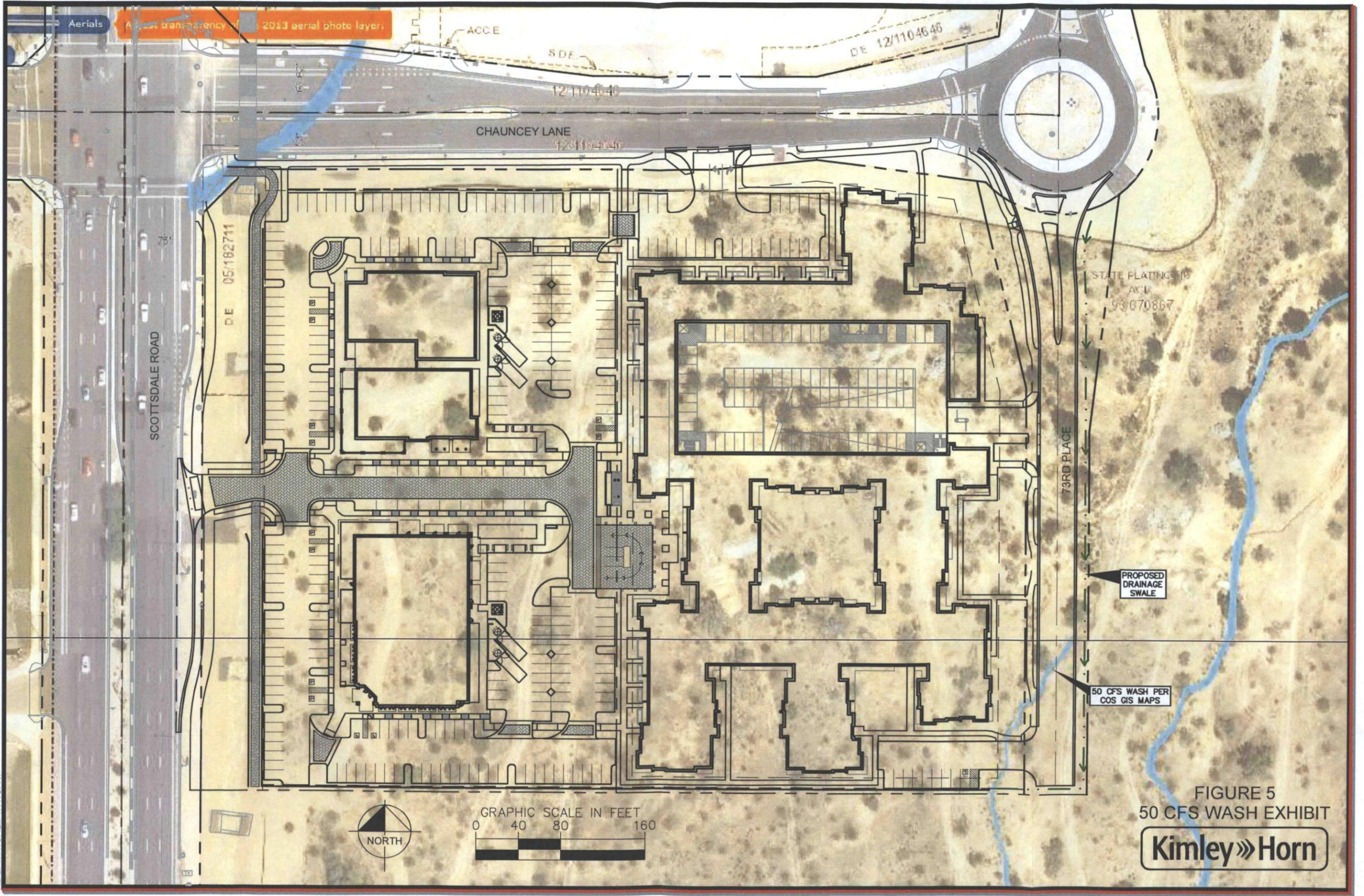


FIGURE 5
50 CFS WASH EXHIBIT
Kimley»Horn