

Drainage Reports

Abbreviated Water & Sewer Need Reports

Water Study

Wastewater Study

Stormwater Waiver Application

ACCEPTED
CITY OF SCOTTSDALE
TRANSPORTATION DEPARTMENT

DATE: June 7, 2017

REVIEWER: Alon Rock

WOLF SPRINGS RANCH

RESIDENTIAL DEVELOPMENT

TRAFFIC IMPACT ANALYSIS

Prepared for

The Empire Group of Companies, LLC

6617 N. Scottsdale Road, Ste 101

Scottsdale, AZ 85250

Phone: 480.951.2207

Prepared by



ASJ Engineering Consultants, LLC

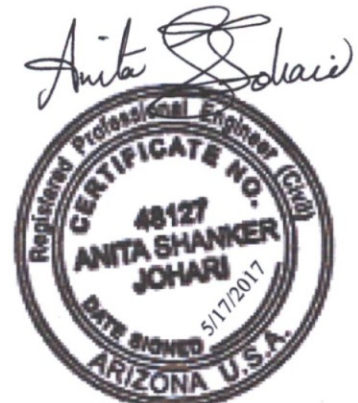
3310 E. Azalea Drive,

Chandler, AZ 85286 USA

Phone: 480.678.8212

May 17, 2017

File No. 2016008



Expire: 06/30/2020

28-ZN-2016

05/22/2017

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INTRODUCTION

ASJ Engineering prepared this Traffic Impact Analysis (TIA) for the proposed Wolf Springs Ranch (single-family) residential development in Scottsdale, Arizona. This report is prepared at the request of the Empire Group of Companies. The proposed Development is located between Cactus Road and Larkspur Drive and between 93rd Street and 94th Street in Scottsdale, Arizona and is shown in the site location map (Figure 1).



Figure 1 – Site Location Map

The proposed development will consist of 40 single-family dwelling units. The development is anticipated to be completed and occupied in 2020. Access to the development will be provided via one full movement proposed driveway intersection along 94th Street. Figure 2 shows the Conceptual Site Plan for the development. The land currently serves large acre residential units, Casy Preschool and Mission Montessori School.

As part of this project, Larkspur Drive will be extended west of its current location to intersect with 93rd Street. This intersection of 93rd Street at Larkspur Drive will be an unsignalized intersection with a stop sign at the westbound approach of Larkspur Drive.

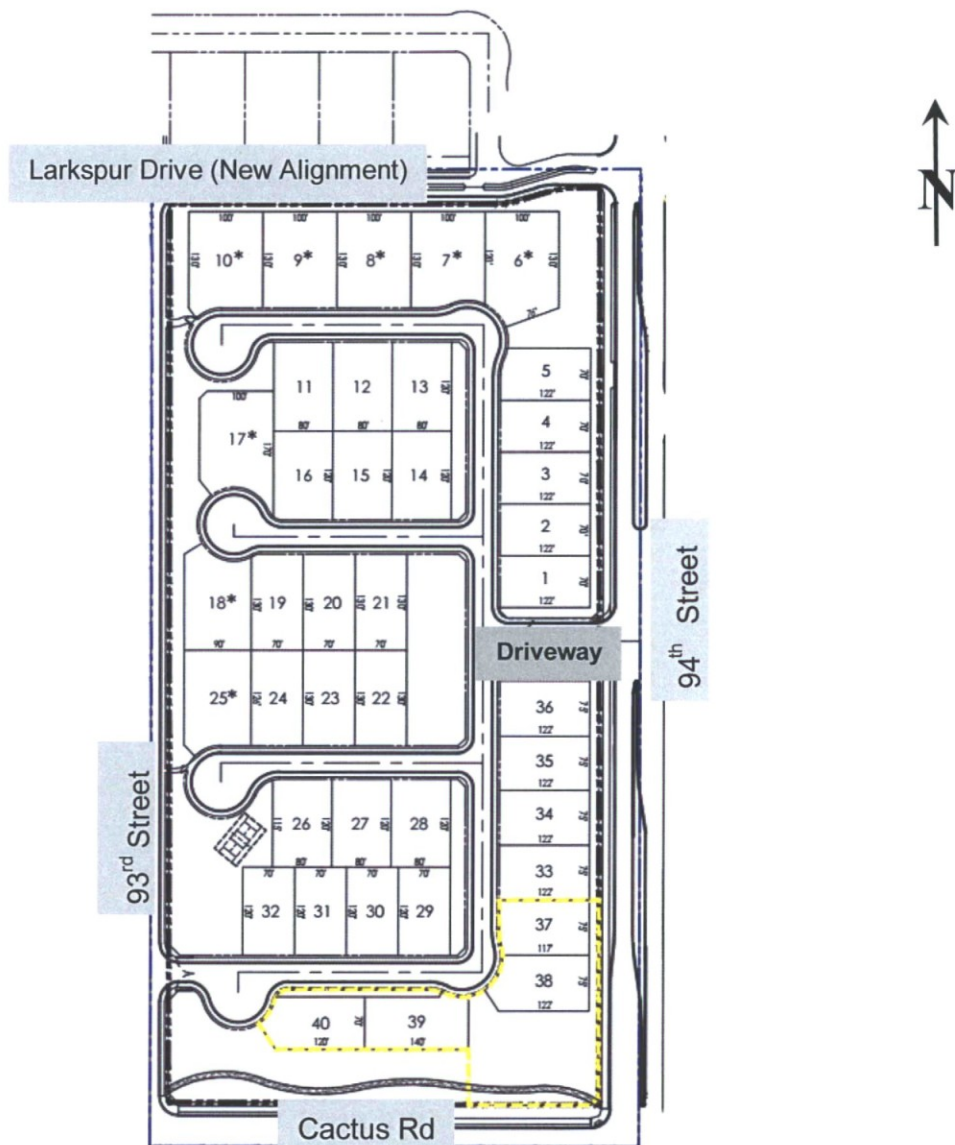


Figure 2: Conceptual Site Plan

STUDY OBJECTIVES

Per the City of Scottsdale, Traffic Impact Study guidelines, a Category 1 study is required for this development. The objective of this study is to evaluate traffic operations of the adjacent roadway network, and develop access recommendations including the assessment of turn lane requirements. This study follows the City of Scottsdale TIA guidelines.

This study will evaluate traffic operations for the existing and future (2020) conditions along 94th Street, Cactus Road, and the following intersections:

1. 94th Street at Cactus Road
2. 93rd Street at Cactus Road
3. 94th Street at Larkspur Drive
4. 94th Street at Sweetwater Avenue
5. 93rd Street at Sweetwater Avenue

STUDY AREA

Study Area Land uses

The study area is predominantly residential. Casy Preschool and Misson Montessori Schools are located on Cactus Road at its intersections with 93rd Street and 94th Street respectively. Access to Casy Preschool is via one site driveway located east of 93rd Street. Access to Mission Montessori School via one access on 94th Street and one access on Cactus Road, located just west of 94th Street. Both these schools will be closed as part of this development. Figure 4 shows the existing land uses in the vicinity of this site.

Roadways:

Cactus Road: Cactus Road borders the site to the south. Near the site, Cactus Road is a four-lane divided major collector with a center turn lane and the posted speed limit is 40 miles per hour. Field Data Services, Inc. In April 2016 (FDS) obtained 24-hour daily traffic volume counts on Cactus Avenue, between 94th Street and 93rd Street, and these counts showed approximately 21,260 vehicles per day (vpd).

94th Street: 94th Street borders the site to the east. 94th Street is a four-lane divided arterial with a raised median. The posted speed limit on 94th Street is 40 mph. FDS obtained 24-hour daily traffic volume counts on 94th Street near the proposed development. These counts were obtained in April 2016 and these counts showed approximately 13,670 vehicles per day (vpd).

93rd Street: 93rd Street borders the site to the west. This is a two-lane local road. (FDS) obtained 24-hour daily traffic volume counts on 93rd Street near the proposed development, these counts were obtained in April 2016 and these counts showed approximately 644 vpd.

Larkspur Drive: Larkspur Drive is another two-lane local residential roadway. West of 94th Street, Larkspur Drive terminates at 93rd Way. At the request of the neighbors, 24-hour tube counts were obtained on Larkspur Drive, just west of 94th Street. Field Data Services, Inc, obtained these counts on Thursday September 1st, 2016, and these counts showed approximately 335 vehicles per day on Larkspur Drive.

Sweetwater Avenue: Sweetwater Avenue is located approximately quarter mile north of Larkspur Drive. Sweetwater Avenue is a four-lane minor collector roadway with a center turn lane and posted speed limit of 30 mph.

Area Intersections:

There are five intersections in the study area of which two are signalized and others are unsignalized, stop-controlled intersections. Figure 4 shows the existing intersection geometry and traffic control at these intersections.

Accident Data Analysis

City of Scottsdale provided three-year crash data for the study area intersection. Table 1 below summarizes the number of crashes, severity and crash rate at each intersection.

Table 1: Crash Data Analysis for Study Area Intersections

Intersection	Number of Crashes in 5 years (2011 – 2015)	Average Crashes /Year	Crash Rate/ Million Entering Vehicles
94 th Street at Cactus Ave	40	8	0.6
93 rd Street at Cactus Ave	2	0.4	0.05
94 th Street at Larkspur Dr.	0	0.0	0.0
94 th Street at Sweetwater Ave.	12	2.4	0.36
93 rd Street at Sweetwater Ave.	0	0.0	0.0

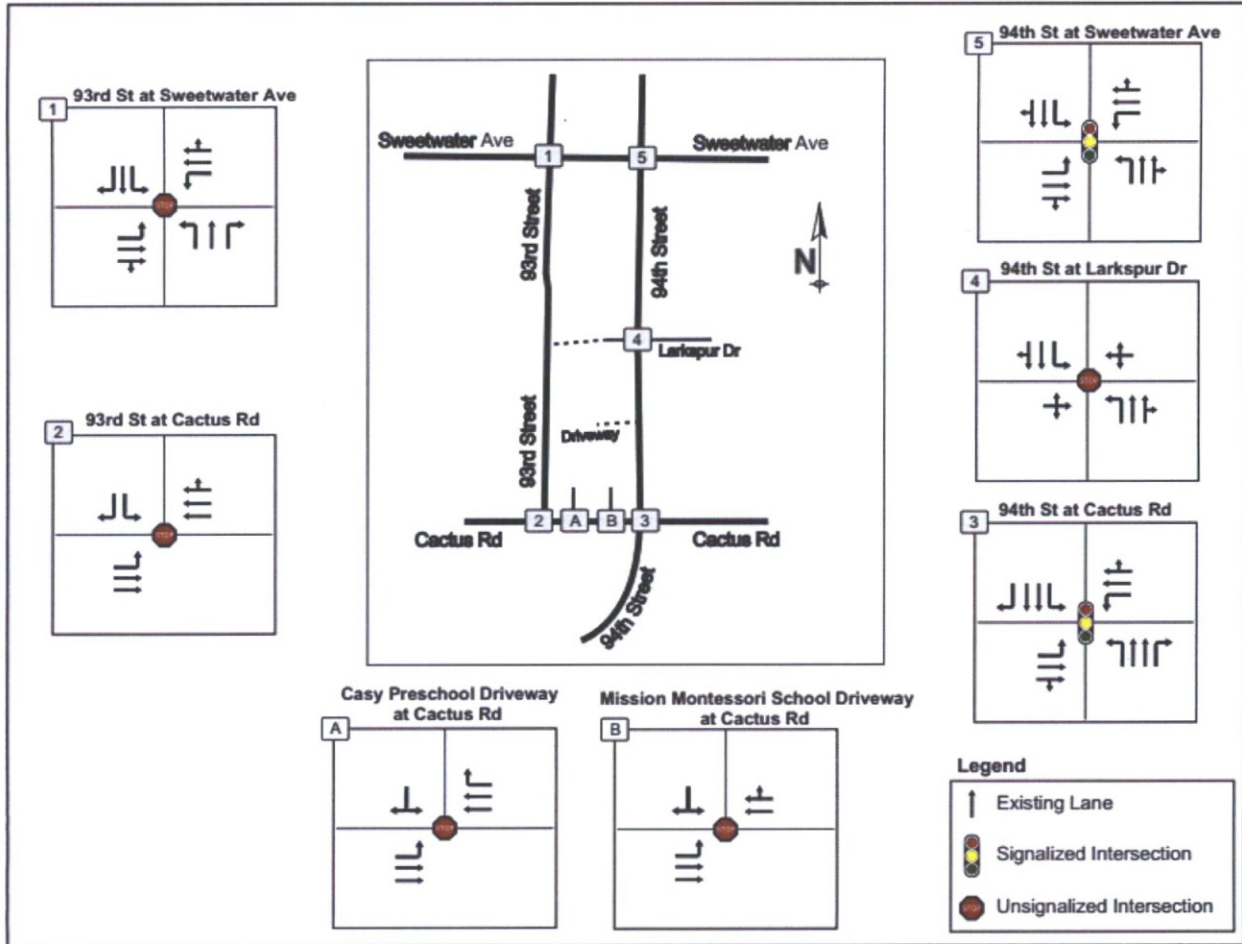


Figure 4 – Existing Intersection Geometry and Traffic Control

TRAFFIC VOLUMES

This section summarizes the existing volumes and 2020 projected volumes, site-traffic generation methodology and results, site traffic distribution, and 2020 build-out condition traffic volumes.

Existing Volumes

AM and PM turning movement counts were collected on Tuesday April 5th 2016 by Field Data Services, Inc. From the counts, the AM peak hour occurred between 7:15 am and 8:15 am. The PM peak hour occurred between 4:30 pm and 5:30 pm. A cursory field review was conducted on March 30, 2016. Figure 5 shows traffic volumes in the AM and PM peak hours.

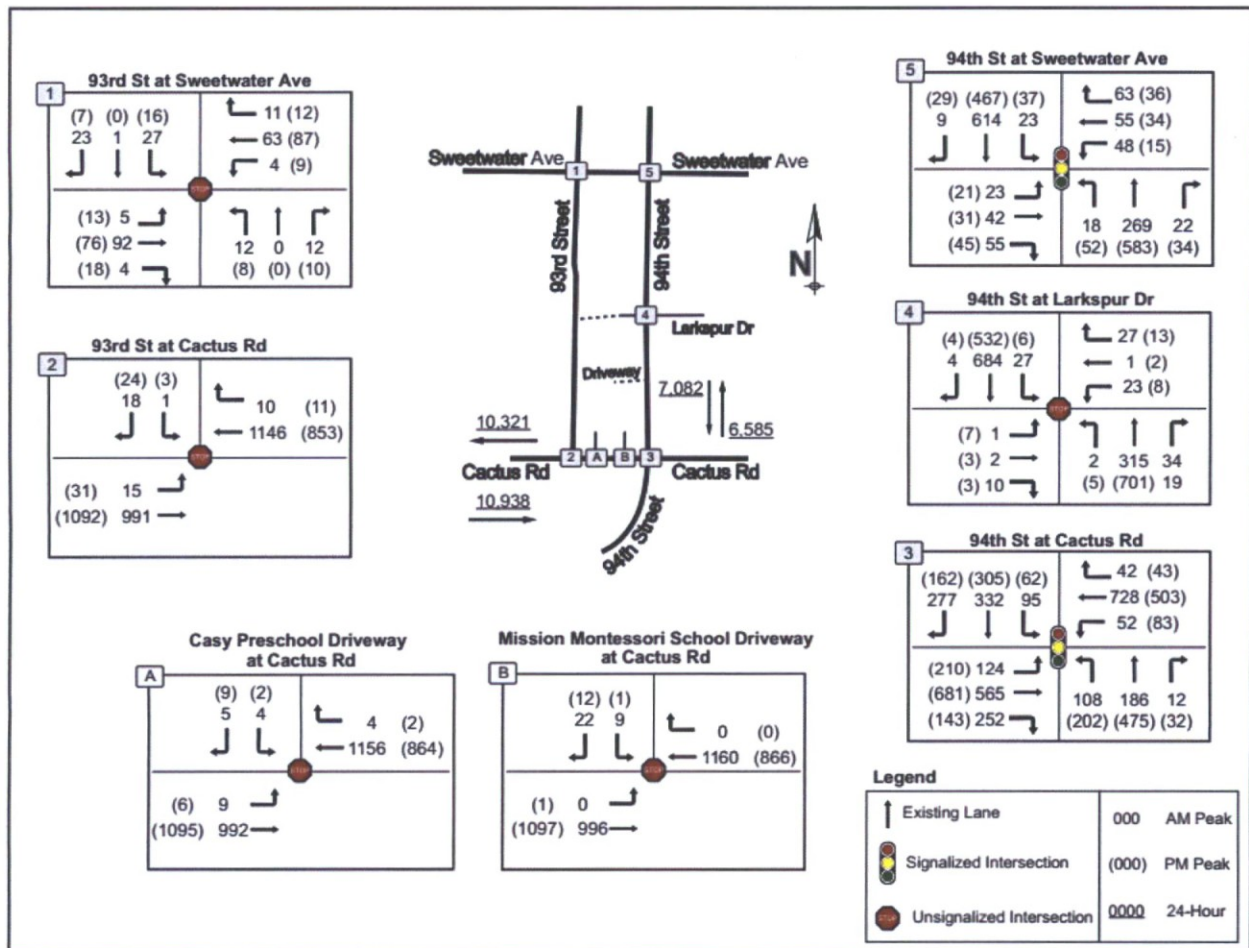


Figure 5 – Existing Turning Movement Counts for AM and PM Peak Hour

Background growth

The proposed development is anticipated to be the constructed and occupied in 2020. Based on the historic growth for this area a one percent (1%) growth rate is used to project the 2016 existing volumes to 2020 future volumes. Figures 6 show the 2020 future projected volumes without the addition of the site generated traffic volumes.

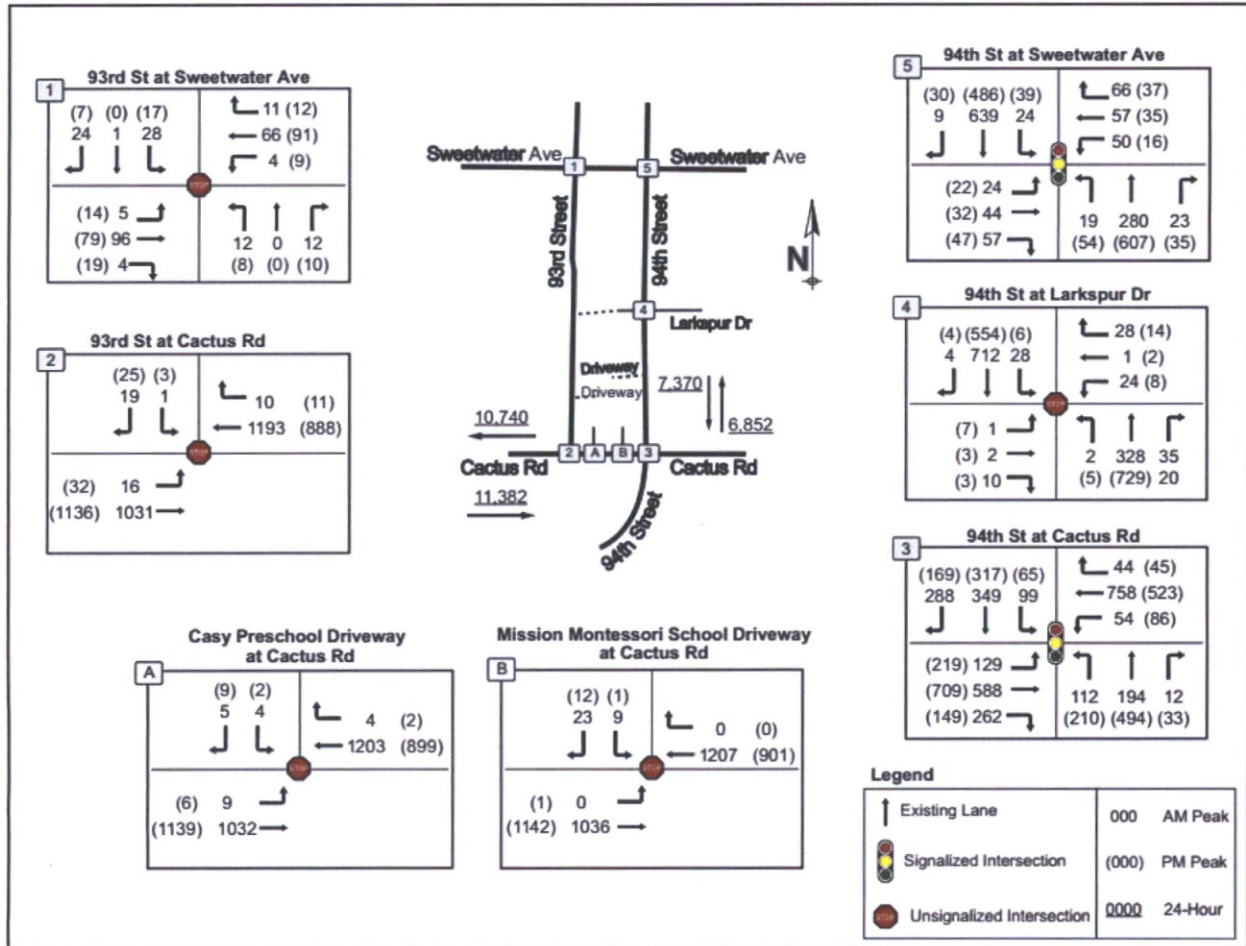


Figure 6 – 2020 Projected Turning Movement Counts for AM and PM Peak Hour

Trip Generation and Trip Distribution:

Trips generated by the proposed residential development are estimated using the methodology provided in the ITE Trip Generation Handbook (Edition 9) for land use code 210 single-family residential units. These trips were compared to the traffic generated by the existing land uses (existing residential uses, Casy preschool and Mission Montessori). Since the residential area, is mostly being used a ranch facility, for trip comparison purposes, the area was assumed to be built out per the existing zone R1-35 with 12 homes.

Table 2 compares the anticipated trips generated by this development and the existing land uses.

From table 2, with the proposed development, there is an overall reduction in traffic compared to the traffic generated by the existing land uses. The school and the day care contribute to the majority of existing trips generated at this site.

Table 2: Comparison of Trips from Existing Land use and Proposed Single-Family Residential Development

Land Use	Size	Trips						
		24-Hour	AM			PM		
			Total	Enter	Exit	Total	Enter	Exit
Existing Land use								
Single family Homes	12	114	9	2	7	12	8	4
Casy Preschool (From Counts)		148	22	13	9	19	8	11
Mission Montessori (From Counts)		216	66	35	31	15	2	13
Total Existing Traffic		478	97	50	47	46	18	28
Proposed Land use								
Single family Homes	40	381	30	8	23	40	25	15
Change in Trips (Proposed – Existing)		-97	-67	-42	-24	-6	7	-13

Traffic generated by the development was distributed along the roadway network based on the existing traffic patterns in the area, traffic counts, and the location of trip attractions, such as commercial and office uses. Table 3 shows the site traffic distribution percentages used to distribute the site traffic generated by this development.

Table 3: Trips Distribution Percentages

Trip Distribution:	Enter	Exit
Cactus Rd: West	50%	50%
94th Street: North	30%	30%
94th Street: South	10%	10%
Sweetwater Ave: West	10%	10%
Total	100%	100%

Figure 7 shows the site traffic volumes distributed through the study intersections using the percentages in Table 3.

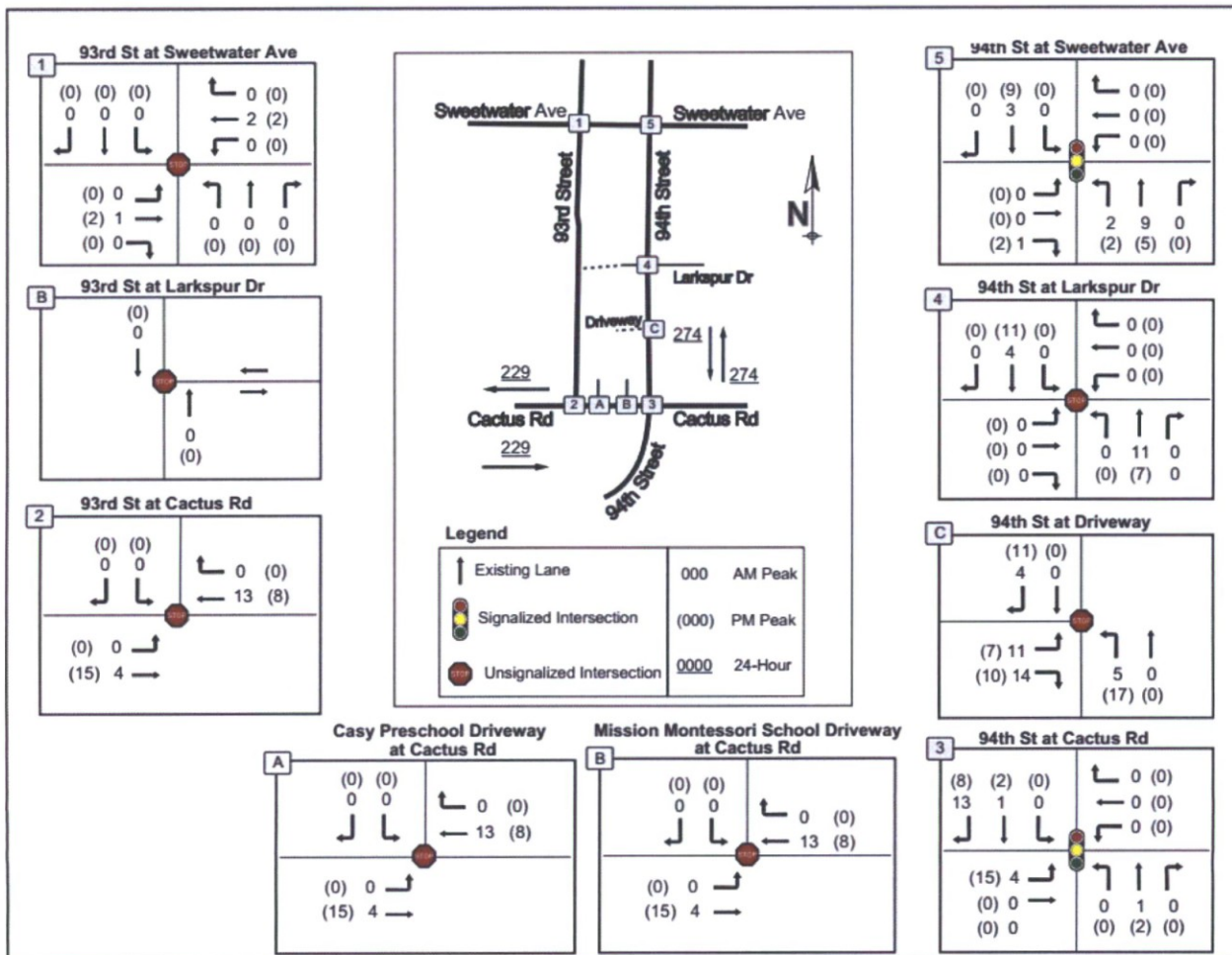


Figure 7: Site Traffic Assignment

Build-out Traffic Volumes

Although the site generated traffic will be less than the traffic generated by the existing land uses, the distribution of traffic from the existing land uses is different from proposed land uses, because the proposed driveway is on 94th Street, while the existing residential uses' s driveway is on 93rd Street and school driveways on Cactus Road. Because of the reduction in the overall traffic, there will be some reduction on the vehicle volume at the study area intersection, but this reduction is no accounted for in the 2020 Build Condition traffic volumes. To obtain the 2020 volumes, site traffic volumes were added to the 2020 future projected volume. Figures 8 shows the 2020 build out conditions traffic volumes for AM and PM peak hours.

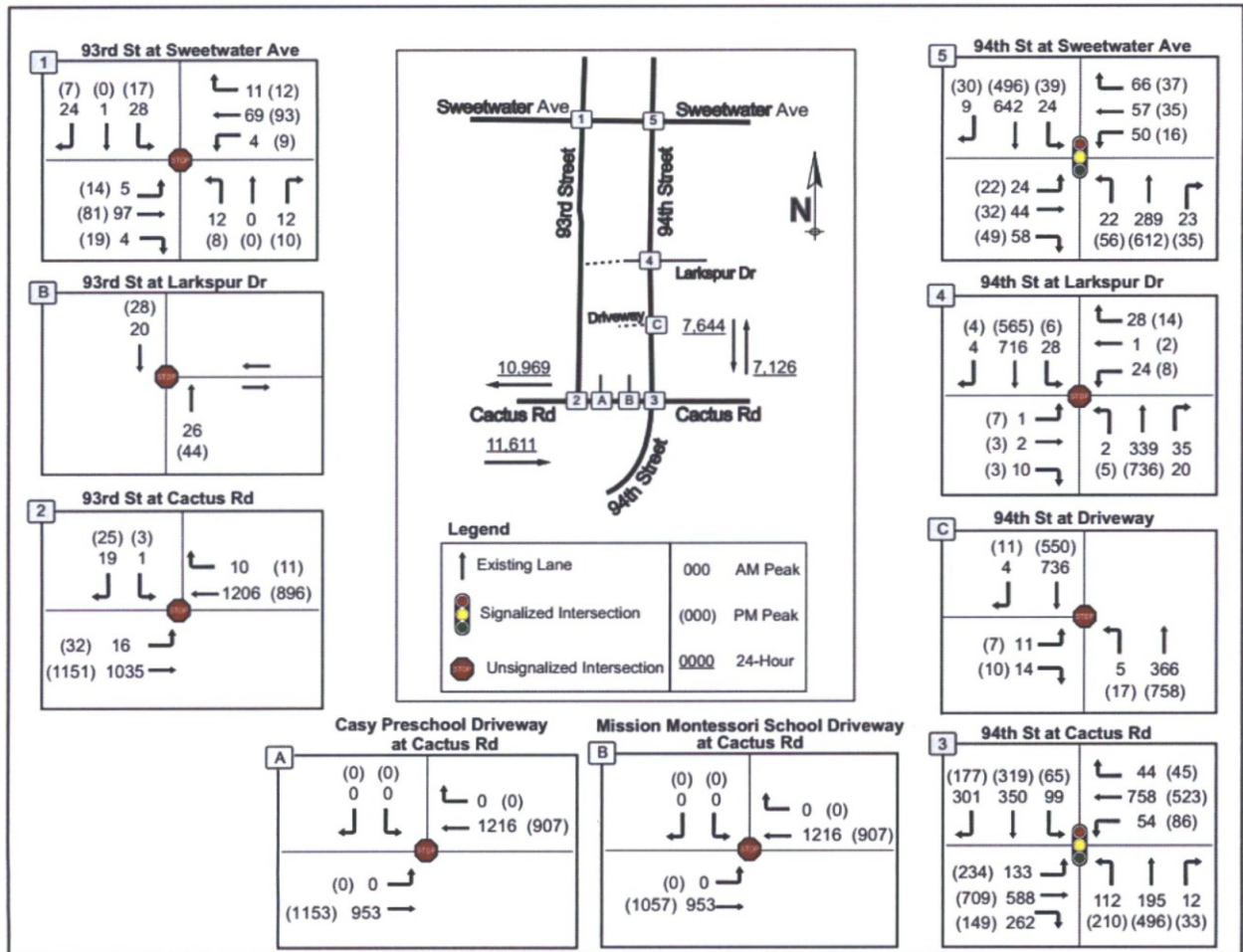


Figure 8: 2020 Build-out Traffic Volumes for AM and PM Peak Hours

ALTERNATIVE ANALYSIS

City of Scottsdale requested the analysis for two alternative scenario with two driveways.

Alternative 1: - One full movement driveway on 94th Street and exit only driveway on 93rd Street.

Alternative 2: One full movement driveways on both 93rd Street and 94th Street.

Alternative 1: - One full movement driveway on 94th Street and exit only driveway on 93rd Street.

Using the trip distribution provided in Table 3, site traffic is distributed via the two driveways.

Figure 9 shows the site traffic distribution for this Alternative 1. The site traffic is added to the 2020 no-build volumes to develop 2020 build volumes for Alternative 1.

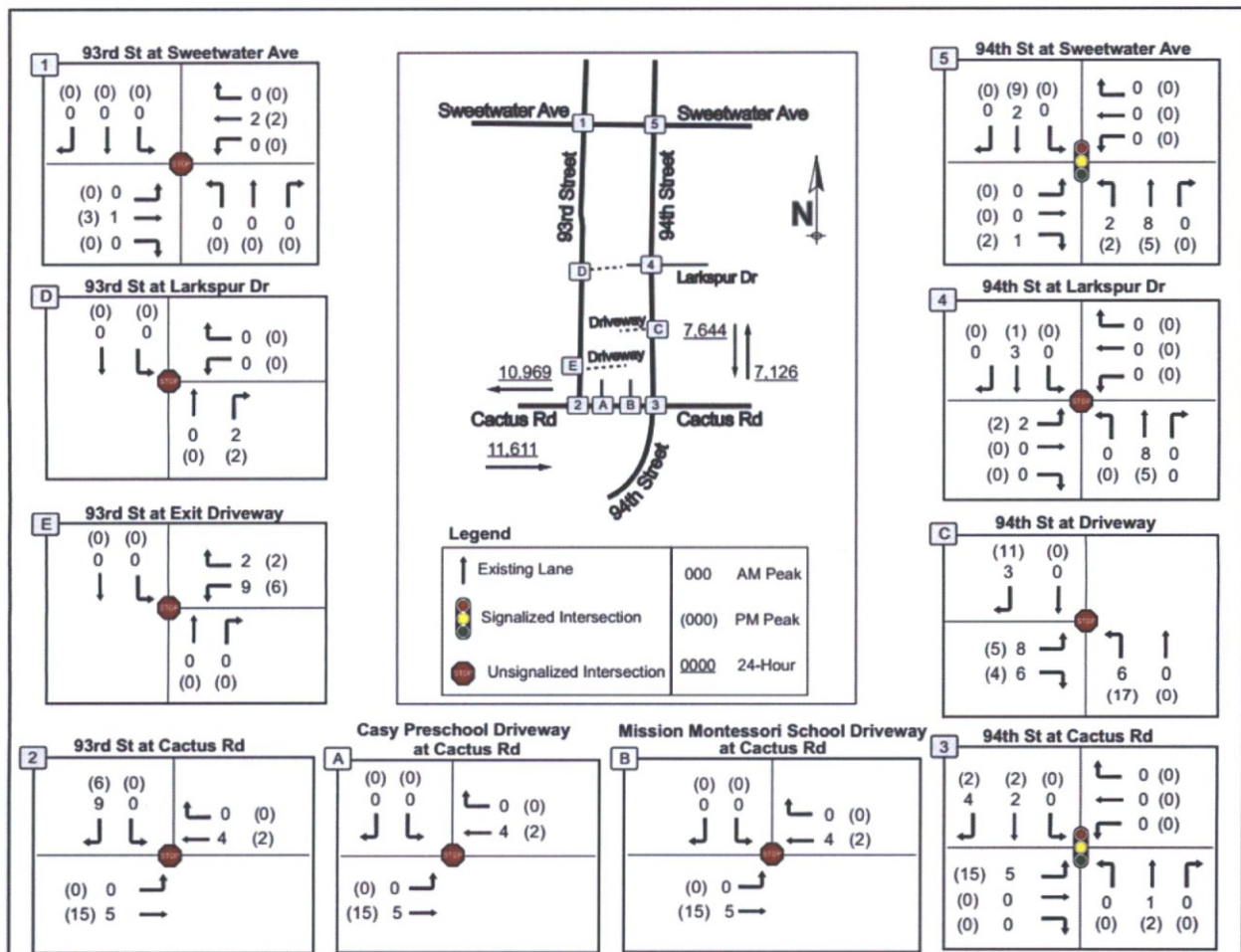


Figure 9: Site Traffic Assignment, Alternative 1

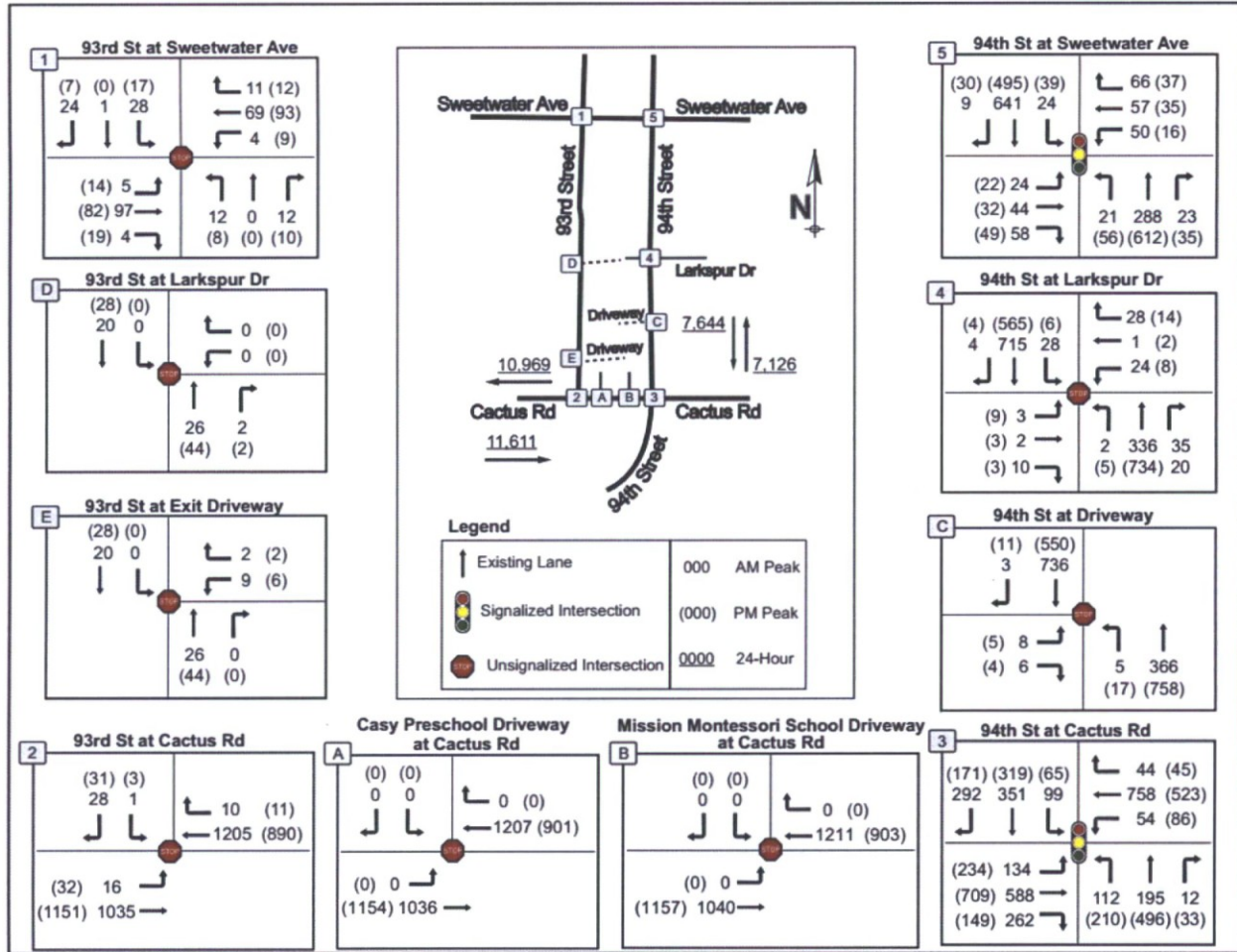


Figure 10: 2020 Build-out Traffic Volumes for AM and PM Peak Hours, Alternative 1

Alternative 2: - full movement driveway on both 94th Street and 93rd Street.

Similarly, using the trip distribution provided in Table 3, site traffic is distributed via the two driveways. Figure 11 shows the site traffic distribution for this Alternative 2. The site traffic is added to the 2020 no-build volumes to develop 2020 build volumes for Alternative 2.

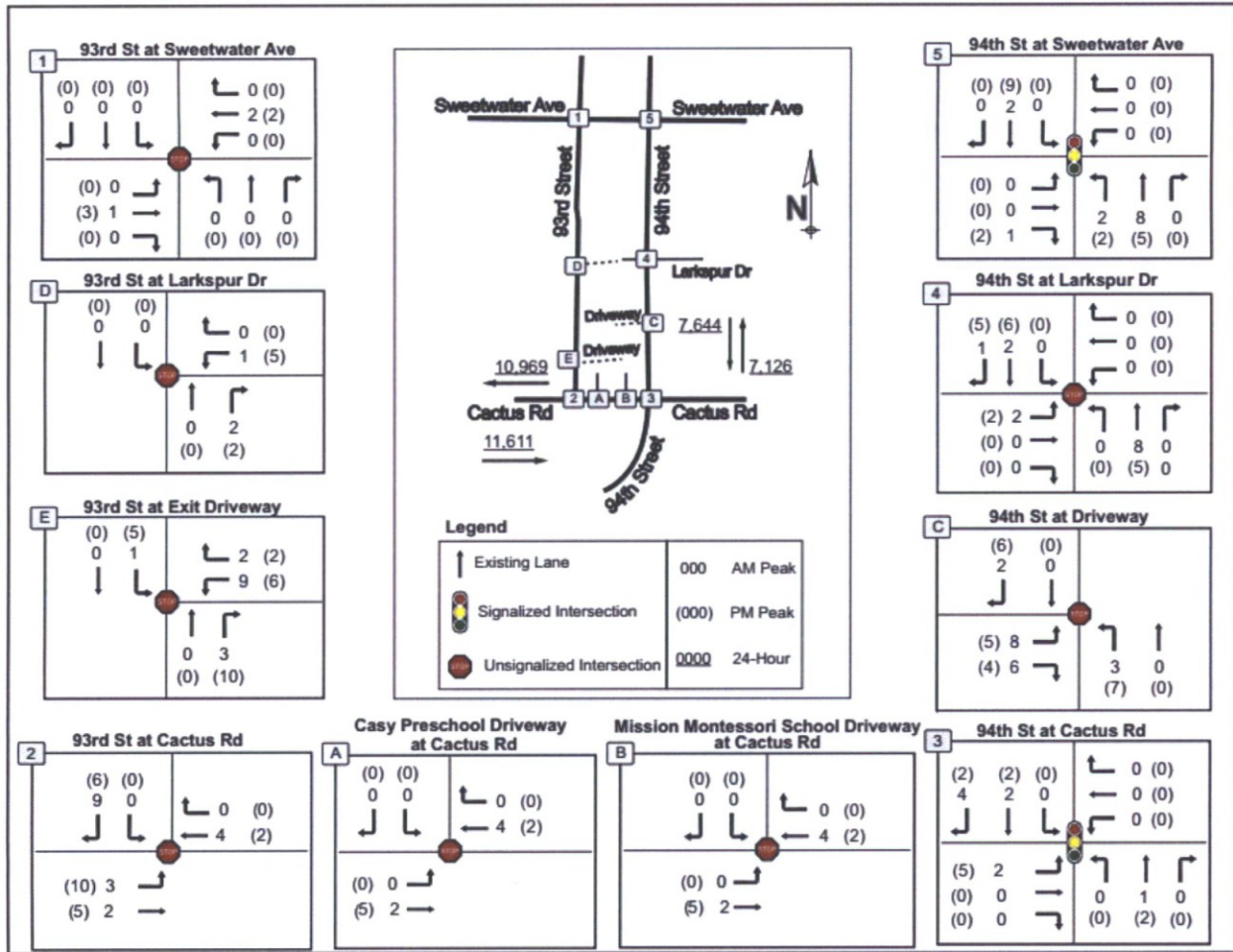


Figure 11: Site Traffic Assignment, Alternative 2

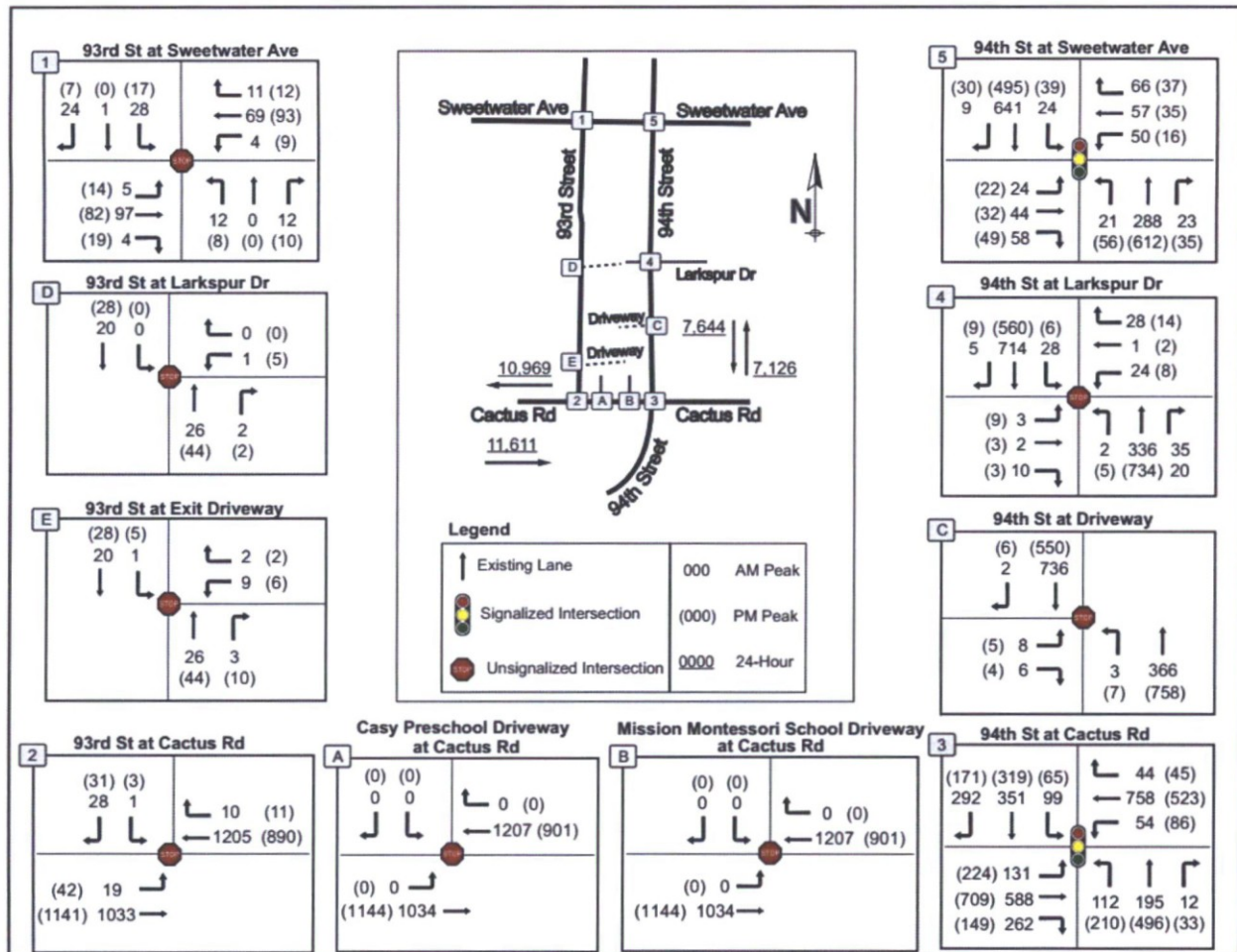


Figure 12: 2020 Build-out Traffic Volumes for AM and PM Peak Hours, Alternative 2

CAPACITY ANALYSIS

Intersection capacity analyses measure the performance of traffic operations of the study area intersections in terms of Level of Service (LOS) and quantified in terms of delay per vehicle. Levels of Service range from LOS A through F. LOS A represents the best traffic conditions and LOS F, represents the worst conditions. Quantitative measures of LOS are given in the following paragraphs. Operations at LOS A through C are generally considered acceptable. In heavily developed sections of metropolitan areas, LOS D may be appropriate.

The LOS measurement for stop-controlled intersections is average control delay, which is quantified in terms of seconds of delay per vehicle. Control delay includes the initial deceleration delay, queue move-up time, stopped delay, and acceleration delay. At unsignalized intersections, delays resulting in LOS E or F are sometimes considered acceptable for individual minor-street movements based on the volume of the approach and other performance measures for the specific movement. The LOS criteria for both signalized and unsignalized, taken from the *Highway Capacity Manual 2010*, is shown in Table 4.

Table 4 – LOS and Delay Criteria for Unsignalized and Signalized Intersections

Level of Service	Description	Unsignalized Intersections Average Control Delay, Seconds per vehicle	Signalized Intersections Average Control Delay, Seconds per vehicle
A	Little or no delay	<10.0	<10.0
B	Short traffic delays	≥ 10.0 < 15.0	≥ 10.0 < 20.0
C	Average traffic delays	≥ 15.0 <25.0	≥ 20.0 < 35.0
D	Long traffic delays	≥ 25.0 <35.0	≥ 35.0 < 55.0
E	Very long traffic delays	≥ 35.0 < 50.0	≥ 55.0 < 80.0
F	Demand exceeds capacity	≥50.0	≥80.0

City of Scottsdale provided existing signal timings for the signalized intersections of Cactus Road and 94th Street and Sweetwater Ave at 94th Street. These timing plans were used while calculating the intersection level of service and delays. Table 5 shows the results of the intersection capacity analysis for existing and 2020 with and without the addition of proposed development generated traffic volumes. The analyses results show that all intersections and stop-controlled approaches operate at LOS D or better in the AM and PM peak hours.

Table 5 – AM and PM Peak Hour Intersection LOS and Delay for Study Area Intersections, for Existing and 2020 No-Build and Build Conditions.

Traffic Control	Intersection/ Approach	Existing				2020 No-Build				2020 Build			
		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Signal	94 th Street at Cactus Road	C	21.9	C	23.9	C	22.5	C	24.8	C	23.8	C	24.8
Signal	94 th Street at Sweetwater Ave.	B	10.4	A	6.5	B	10.5	A	6.6	B	10.3	A	7.8
Stop	94 th Street at Larkspur Dr. EB Approach WB Approach	B	14.5	D	25.7	C	15.0	D	27.4	C	15.7	D	28.1
		C	15.5	C	20.9	C	16.2	C	21.7	C	17.3	C	22.4
Stop	93 th Street at Cactus SB Approach	C	16.6	C	16.5	C	17.2	C	17.1	C	18.2	C	17.4
Stop	93 th Street at Sweetwater Ave. NB Approach SB Approach	A	9.3	A	9.4	A	9.3	A	9.3	A	9.4	A	9.8
		A	9.4	A	9.8	A	9.8	A	9.8	A	9.5	A	9.9
Stop	94 th Street at Driveway EB Approach	-	-	-	-	-	-	-	-	C	16.3	B	13.1

Table 6 – AM and PM Peak Hour Intersection LOS and Delay for Study Area Intersections, for 2020 Build Conditions for Alternative Scenario 1 and 2.

Traffic Control	Intersection/ Approach	Alternative Scenario 1 2020 Build				Alternative Scenario 2 2020 Build			
		AM Peak		PM Peak		AM Peak		PM Peak	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Signal	94 th Street at Cactus Road	C	23.1	C	24.8	C	24.4	C	24.3
Signal	94 th Street at Sweetwater Ave.	B	10.3	A	8.2	B	10.3	A	8.2
Stop	94 th Street at Larkspur Dr. EB Approach WB Approach	C	17.6	D	28.8	C	17.6	D	28.6
		C	17.2	C	22.4	C	17.2	C	22.0
Stop	93 th Street at Cactus SB Approach	C	17.4	C	16.9	C	17.6	C	16.9
Stop	93 th Street at Sweetwater Ave. NB Approach SB Approach	A	9.2	A	9.4	A	9.2	A	9.4
		A	9.3	A	9.9	A	9.3	A	9.9
Stop	94 th Street at Driveway EB Approach	C	17.8	C	17.7	C	17.7	C	17.2
Stop	93 rd Street at Driveway WB Approach	A	8.7	A	8.9	A	8.7	A	8.9

ACCESS MANAGEMENT

Access to the development is via one proposed full movement driveway on 94th Street. The following are recommended for this driveway intersection:

1. Construct driveway with one inbound and one out bound lane
2. Construct a northbound left-turn lane with minimum 75 feet storage, and 70 feet taper
3. Install stop sign at the driveway approach of this intersection.

If the Alternative 1 is approved. The above recommendations for the driveway on 94th Street will be required.

The following are recommended for the exit only driveway on 93rd Street:

1. Construct driveway with one out bound lane only
2. Install stop sign at the driveway approach of this intersection.

If the Alternative 2 is approved. The above recommendations for the driveway on 94th Street will be required.

The following are recommended for the exit only driveway on 93rd Street:

1. Construct driveway with one inbound lane and one outbound lane
2. Install stop sign at the driveway approach of this intersection.

SUMMARY AND RECOMMENDATIONS

The proposed 40 unit single-family residential development is located between 93rd Street and 94th Street and between Cactus Road and Larkspur Drive in Scottsdale, Arizona. This development will be built in 2020. Access to the site is via one full driveway on 94th Street. Currently there are a few residences and two school (Casy Preschool and Mission Montessori School) are located on the site. These land uses will be replaced by the proposed development. Traffic generated by the existing land uses is more than the anticipated traffic from the proposed development.

Traffic volumes, 24-hour tube counts and turning movement counts (AM and PM peak hour), were obtained at the study area roadways and intersections. Capacity Analysis for the study area intersection showed that all signalized intersections and stop-controlled approaches at unsignalized intersection operate at LOS D or better in the AM and PM peak hours.

Crash data for the study intersection were obtained from the City. Crash rates calculated for the study intersections showed a range of 0.0 to 0.6 crashes per million entering vehicles. The 0.6 crash rate was recorded at the intersection 94th Street at Cactus Road.

As part of this development, Larkspur Drive will be extended west of its current location to intersect with 93rd Street. The volumes at this intersection is very small, hence detailed capacity analysis was not completed for this intersection. With the projected traffic volumes on this road, the road should be constructed as a two-lane local road. At the intersection of 93rd Street at Larkspur Drive, a stop – sign should be installed at the westbound approach of Larkspur Drive. The following improvements are necessary at the site driveway on 94th Street.

1. Construct driveway with one inbound and one out bound lane
2. Construct a northbound left-turn lane with minimum 75 feet storage, and 70 feet taper
3. Install stop sign at the driveway approach of this intersection.

If an exit only driveway is constructed on 93rd Street, the following improvements should be implemented at this driveway

1. Construct driveway with one out bound lane only
2. Install stop sign at the driveway approach of this intersection.

If a full movement driveway is constructed on 93rd Street, the following improvements should be implemented at this driveway

1. Construct driveway with one inbound lane and one outbound lane
2. Install stop sign at the driveway approach of this intersection.

APPENDIX

- **Traffic Impact Analysis – Correspondence with City Staff**
- **Turning Movement Counts**
- **Capacity Analysis**

Anita S. Johari

From: Kercher, Phillip <PKercher@Scottsdaleaz.Gov>
Sent: Thursday, April 21, 2016 4:27 PM
To: 'Anita S Johari'
Cc: Merkley, Andrew; Nguyen, Sonny
Subject: RE: Wolf Springs Ranch TIA

Anita:

The scope seems fairly accurate. It should include trip generation comparison to the existing land use. I'm not sure if the proposed development includes the two private schools along Cactus west of 94th Street. It appears from your site graphic that it does include the CASY school on the 93rd Street intersection. You will want to include this trip generation in your comparison.

My other concern is that I am still unclear on the proposed access to 94th Street. We had directed the applicant to include a street connection to Larkspur. If that is not proposed, we will want the analysis to include both scenarios, one with this connection and one with a right-in, right-out access (if that is what is proposed). I would also be very careful in the assignment of traffic heading northbound if there is no connection to Larkspur. Some percentage of traffic will head north on 93rd Street and use Larkspur or Sweetwater to get to 94th Street.

Please be sure to include Average Daily Traffic volumes for all four impacted streets: Cactus, 94th Street, 93rd Street, and Larkspur. These daily traffic volumes should be included in all graphics – existing traffic volumes, site generated volumes, and future volumes.

Andy Merkley is our Traffic Engineer for this area, and he will send you the collision data. You should contact Sonny Nguyen in our Traffic Management Center for the signal timing plans for 94th Street and Cactus, or Andy may be able to send it. Both are copied on this email.

Phillip Kercher
Traffic Engineering Manager
City of Scottsdale
480-312-7645

From: Anita S Johari [mailto:anita@asjengineering.com]
Sent: Wednesday, April 20, 2016 9:28 AM
To: Kercher, Phillip
Subject: RE: Wolf Springs Ranch TIA

Good Afternoon Phil,

Per my voice message, attached is the TIA scoping letter for Wolf Springs Ranch (residential community) on Cactus Road between 93rd and 94th Streets. This letter includes my assumptions for the TIA. Can you please review and let me know if you concur with my assumptions or guide me on the changes.

Also per the City's requirements, from the Transportation Dept., I need to collect accident history for the study area and other developments in the area, if they affect background growth. Can you please help me obtain this information.

Please feel free to contact me with your questions or comments.

Thanks,
Anita

Anita Shanker Johari, PE, PTOE, EVN SP
Principal, ASJ Engineering Consultants LLC
Tel: 480.678.8212 | Email: anita@asjengineering.com



From: Kercher, Phillip <pker@scottsdaleaz.gov>
Sent: Monday, January 23, 2017 2:39 PM
To: 'Anita S Johari'
Cc: Ruck, Alan; Niederer, Keith
Subject: RE: Wolf Springs Ranch TIA

Anita:

After some internal discussion, we request that the traffic impact study include an alternative scenario with a site connection to 93rd Street in addition to the connection to 94th Street. The previous direction was to eliminate the 94th Street access, but we understand that the neighbors are concerned that not having a 94th Street access would encourage traffic coming to and from the north to use 93rd Street to connect to Sweetwater Boulevard and Larkspur Drive. Having both access points should help disperse site traffic and minimize the impact on both 93rd Street and 94th Street.

If you have any questions feel free to call.

Phil

From: Kercher, Phillip
Sent: Thursday, January 12, 2017 11:25 AM
To: 'Anita S Johari'
Cc: Ruck, Alan; Niederer, Keith
Subject: RE: Wolf Springs Ranch TIA

Anita:

Our comments on the Wolf Springs Ranch traffic impact study, dated Nov. 9, 2016, are noted below:

1. We would like an alternative scenario examined that assumes site access on 93rd Street, as was originally proposed, and no access to 94th Street. The site plan has evolved and we believe that the best site access scenario with the proposed Larkspur Drive connection would be to have access on 93rd Street. This provides direct access to Cactus Road for traffic heading to the 101 Freeway (avoids the more congested 94th Street and Cactus Road intersection), and allows access to 94th Street via the new Larkspur extension without increasing traffic on Desert Trail.
2. Sweetwater "Drive" should be referred to as Sweetwater Avenue.
3. Cactus Road is designated as a major collector, not an arterial street.
4. Sweetwater Avenue is a minor collector with a speed limit of 30 mph, not 40 mph.
5. What data was collected to support the assumed 1% growth rate? It should be included in the appendix.
6. In Table 2 the difference in trips for the PM Enter is 15, not 12 as shown.
7. Can daily traffic volumes for the two schools be determined from the peak hour counts, or by using ITE data?
8. Page 10 - Figure 7 - PM Enter trips is 30 but should be 28. AM Exit trips is 28 but should be 25.
9. Page 11 - Figure 8 – A & B (Casy and Mission Montessori driveways) are missing through volumes on Cactus Road.

Phillip H. Kercher, P.E., PTOE
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Anita Shanker Johari, PE, PTOE, EVN SP

Principal, ASJ Engineering Consultants LLC
Tel: 480.678.8212 | Email: anita@asjengineering.com

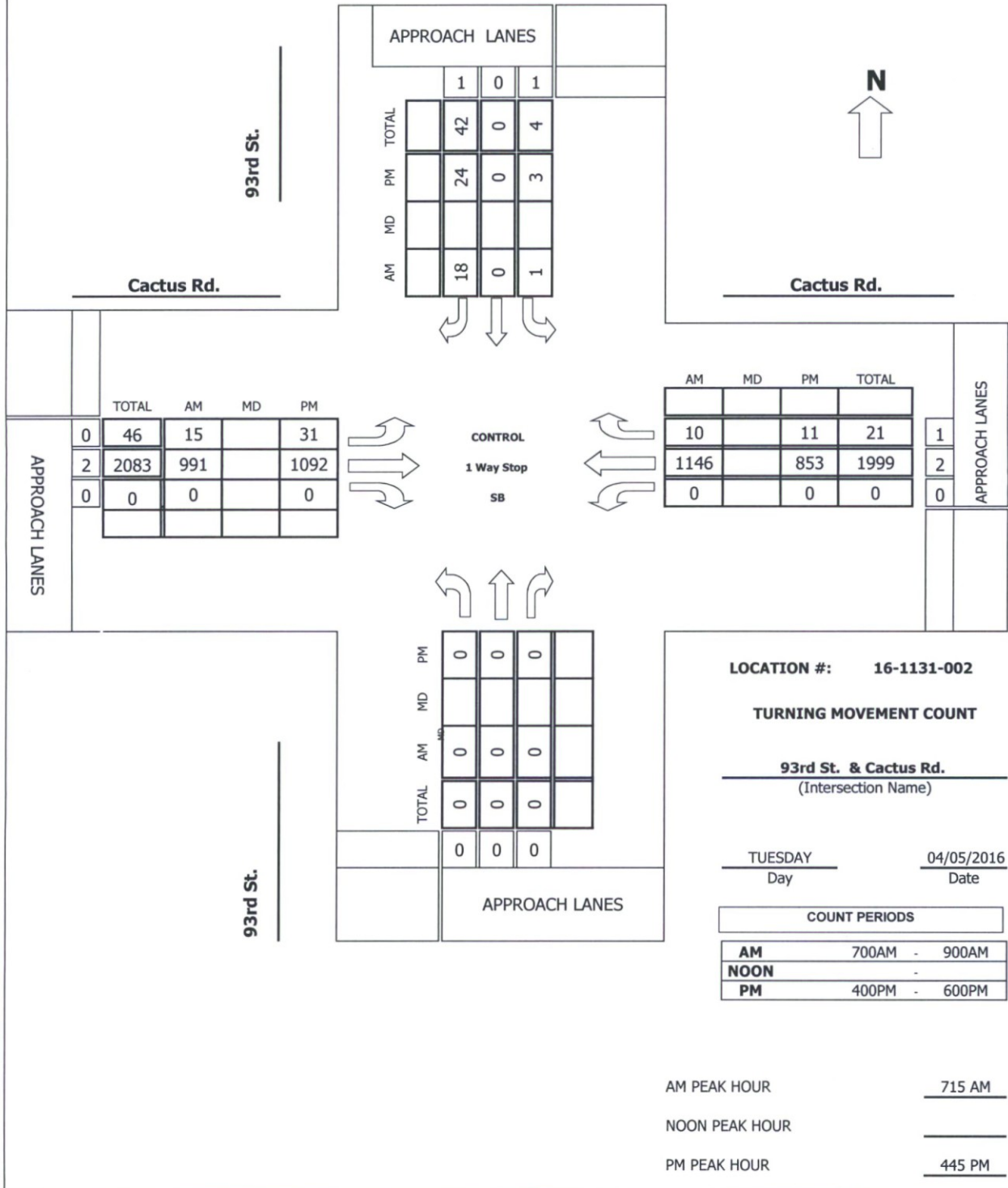


Intersection Turning Movement
Prepared by:



Project #: 16-1131-002

TMC SUMMARY OF 93rd St. & Cactus Rd.



Intersection Turning Movement

Prepared by:



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



veracitytrafficgroup

N-S STREET: 93rd St. DATE: 04/05/2016 LOCATION: Scottsdale
 E-W STREET: Cactus Rd. DAY: TUESDAY PROJECT#: 16-1131-002

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	0	0	1	0	1	0	2	0	0	2	1	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	0	0	0	3	0	12	6	173	0	0	236	0	430
7:15 AM	0	0	0	1	0	5	3	264	0	0	275	1	549
7:30 AM	0	0	0	0	0	4	2	257	0	0	328	5	596
7:45 AM	0	0	0	0	0	5	6	253	0	0	283	2	549
8:00 AM	0	0	0	0	0	4	4	217	0	0	260	2	487
8:15 AM	0	0	0	0	0	6	7	213	0	0	229	3	458
8:30 AM	0	0	0	1	0	5	5	205	0	0	283	1	500
8:45 AM	0	0	0	0	0	3	5	179	0	0	187	6	380
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	0	0	0	5	0	44	38	1761	0	0	2081	20	3949
Approach %	####	####	####	10.20	0.00	89.80	2.11	97.89	0.00	0.00	99.05	0.95	
App/Depart	0	/	58	49	/	0	1799	/	1766	2101	/	2125	

AM Peak Hr Begins at: 715 AM

PEAK

Volumes	0	0	0	1	0	18	15	991	0	0	1146	10	2181
Approach %	####	####	####	5.26	0.00	94.74	1.49	98.51	0.00	0.00	99.13	0.87	

PEAK HR.

FACTOR:	0.000	0.792	0.942	0.868	0.915
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CONTROL: 1 Way Stop (SB)
 COMMENT 1:
 GPS: 33.597150, -111.880594

Intersection Turning Movement



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: 93rd St. DATE: 04/05/2016 LOCATION: Scottsdale
 E-W STREET: Cactus Rd. DAY: TUESDAY PROJECT#: 16-1131-002

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	0	0	1	0	1	0	2	0	0	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	0	0	0	0	0	4	3	234	0	0	228	3	472
4:15 PM	0	0	0	1	0	3	5	242	0	0	219	2	472
4:30 PM	0	0	0	2	0	8	2	210	0	0	223	2	447
4:45 PM	0	0	0	0	0	5	6	272	0	0	192	3	478
5:00 PM	0	0	0	1	0	11	11	297	0	0	233	2	555
5:15 PM	0	0	0	2	0	4	8	275	0	0	217	3	509
5:30 PM	0	0	0	0	0	4	6	248	0	0	211	3	472
5:45 PM	0	0	0	2	0	2	5	207	0	0	146	0	362
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	0	0	0	8	0	41	46	1985	0	0	1669	18	3767
Approach %	####	####	####	16.33	0.00	83.67	2.26	97.74	0.00	0.00	98.93	1.07	
App/Depart	0	/	64	49	/	0	2031	/	1993	1687	/	1710	

PM Peak Hr Begins at: 445 PM

PEAK

Volumes	0	0	0	3	0	24	31	1092	0	0	853	11	2014
Approach %	####	####	####	11.11	0.00	88.89	2.76	97.24	0.00	0.00	98.73	1.27	

PEAK HR.

FACTOR:	0.000	0.563	0.912	0.919	0.907
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CONTROL: 1 Way Stop (SB)
 COMMENT 1: 0
 GPS: 33.597150, -111.880594



Pedestrian & Bicycle Study

N-S STREET: 93rd St.
E-W STREET: Cactus Rd.

Date: 04/05/2016
Day: TUESDAY

City: Scottsdale
Project #: 16-1131-002

	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	2	0	0	0
7:15 AM	0	0	0	0
7:30 AM	0	0	0	0
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	2	0	0	0
8:45 AM	0	0	0	0
TOTAL	4	0	0	0

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	0	0	0
7:15 AM	0	0	0	0
7:30 AM	0	0	0	0
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
TOTAL	0	0	0	0

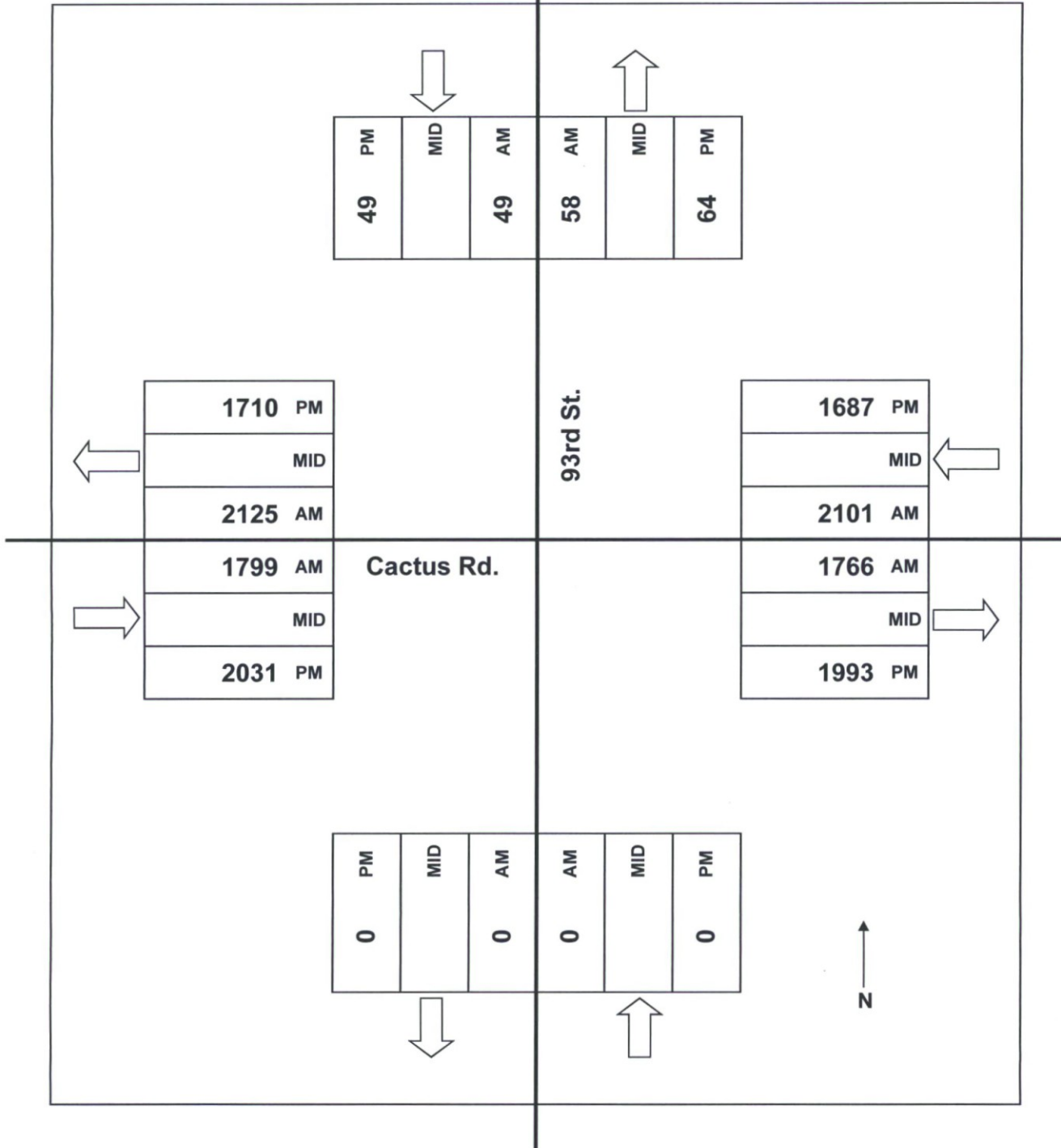
	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	0	0	0	0
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	0	0	0
5:45 PM	0	0	0	0
TOTAL	0	0	0	0

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	1	0	0	0
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	0	0	0
5:45 PM	0	0	0	0
TOTAL	1	0	0	0



JOB# 16-1131-002
VALIDATED: _____

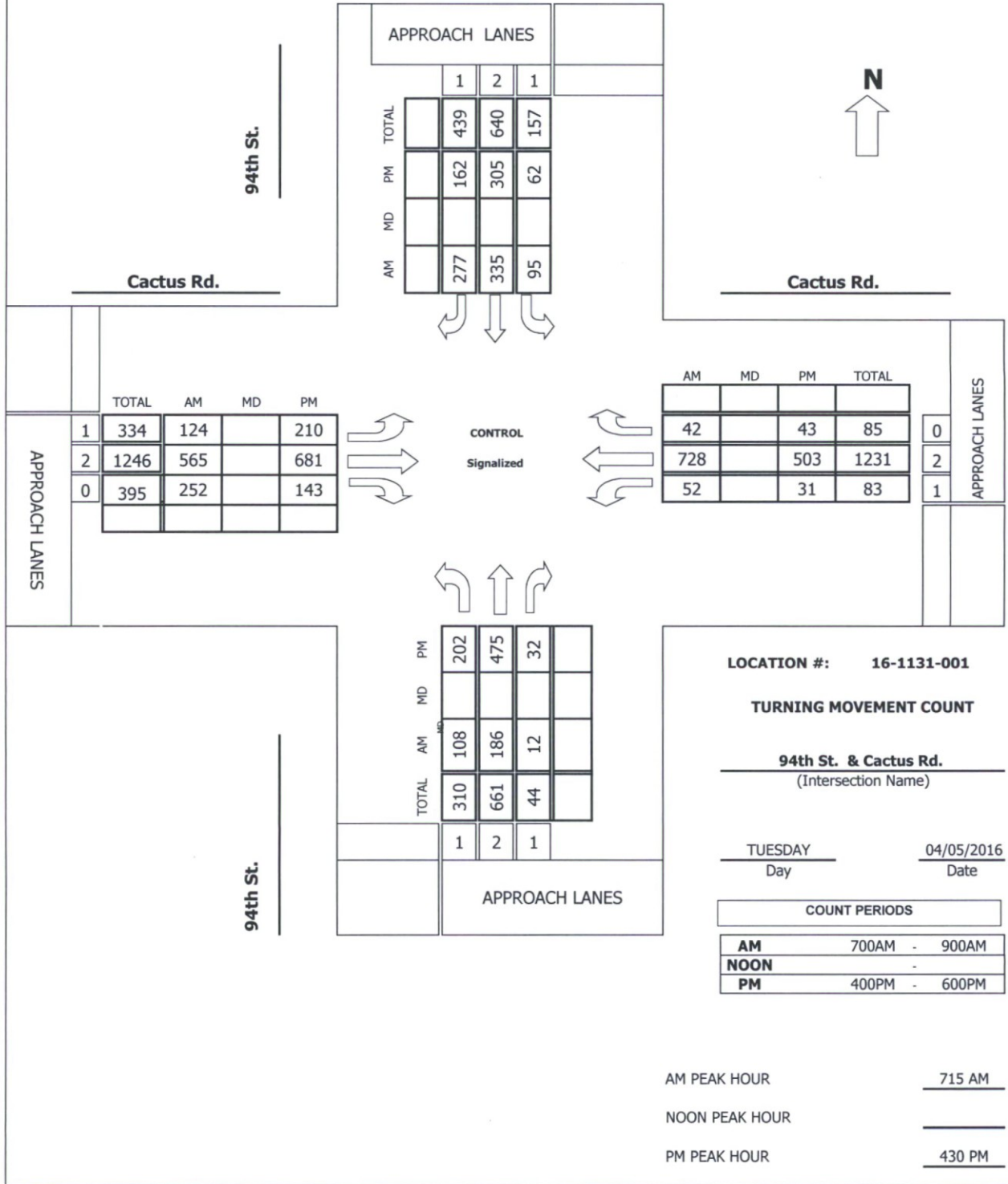
DATE: 04/05/2016
DAY: TUESDAY





Project #: 16-1131-001

TMC SUMMARY OF 94th St. & Cactus Rd.



Intersection Turning Movement

Prepared by:



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



veracitytrafficgroup

N-S STREET: 94th St. DATE: 04/05/2016 LOCATION: Scottsdale
 E-W STREET: Cactus Rd. DAY: TUESDAY PROJECT#: 16-1131-001

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL 1	NT 2	NR 1	SL 1	ST 2	SR 1	EL 1	ET 2	ER 0	WL 1	WT 2	WR 0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	22	44	3	18	62	58	21	109	36	5	151	4	533
7:15 AM	29	37	6	17	72	64	41	162	63	18	180	13	702
7:30 AM	23	55	2	27	96	83	22	128	75	12	209	13	745
7:45 AM	37	47	3	33	78	75	39	168	70	12	182	7	751
8:00 AM	19	47	1	18	89	55	22	107	44	10	157	9	578
8:15 AM	24	30	3	21	88	44	25	142	51	13	167	16	624
8:30 AM	30	52	6	18	99	66	28	129	42	9	167	13	659
8:45 AM	30	55	6	14	102	44	22	113	45	9	117	14	571
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	214	367	30	166	686	489	220	1058	426	88	1330	89	5163
Approach %	35.02	60.07	4.91	12.38	51.16	36.47	12.91	62.09	25.00	5.84	88.25	5.91	
App/Depart	611	/	676	1341	/	1200	1704	/	1254	1507	/	2033	

AM Peak Hr Begins at: 715 AM

PEAK

Volumes	108	186	12	95	335	277	124	565	252	52	728	42	2776
Approach %	35.29	60.78	3.92	13.44	47.38	39.18	13.18	60.04	26.78	6.33	88.56	5.11	

PEAK HR. FACTOR:

	0.879	0.858	0.849	0.878	0.924
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CONTROL: Signalized
 COMMENT 1:
 GPS: 33.596952, -111.878516

Intersection Turning Movement



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: 94th St. DATE: 04/05/2016 LOCATION: Scottsdale
 E-W STREET: Cactus Rd. DAY: TUESDAY PROJECT#: 16-1131-001

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	1	2	1	1	2	1	1	2	0	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	44	100	13	12	82	39	49	167	31	11	135	13	696
4:15 PM	46	134	10	18	81	45	47	149	45	4	133	7	719
4:30 PM	58	122	8	19	80	35	48	135	31	7	130	11	684
4:45 PM	28	109	10	10	56	43	55	178	33	7	128	8	665
5:00 PM	60	128	7	11	91	35	46	203	40	6	134	12	773
5:15 PM	56	116	7	22	78	49	61	165	39	11	111	12	727
5:30 PM	33	86	10	15	73	37	70	168	34	6	135	6	673
5:45 PM	23	86	8	16	78	32	41	142	25	6	88	9	554
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	348	881	73	123	619	315	417	1307	278	58	994	78	5491
Approach %	26.73	67.67	5.61	11.64	58.56	29.80	20.83	65.28	13.89	5.13	87.96	6.90	
App/Depart	1302	/	1376	1057	/	955	2002	/	1503	1130	/	1657	

PM Peak Hr Begins at: 430 PM

PEAK

Volumes	202	475	32	62	305	162	210	681	143	31	503	43	2849
Approach %	28.49	67.00	4.51	11.72	57.66	30.62	20.31	65.86	13.83	5.37	87.18	7.45	

PEAK HR.

FACTOR:	0.909	0.888	0.894	0.949	0.921
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CONTROL: Signalized
 COMMENT 1: 0
 GPS: 33.596952, -111.878516

Pedestrian & Bicycle Study

N-S STREET: 94th St.
W STREET: Cactus Rd.

Date: 04/05/2016
Day: TUESDAY

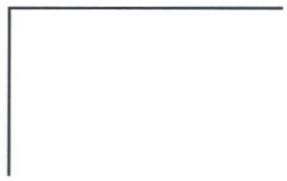
City: Scottsdale
Project #: 16-1131-001

	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	0	0	0
7:15 AM	0	0	0	0
7:30 AM	0	0	0	0
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	0	1	0
8:45 AM	0	0	0	0
TOTAL	0	0	1	0

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	0	2	0
7:15 AM	0	0	0	0
7:30 AM	0	0	0	0
7:45 AM	0	0	0	0
8:00 AM	1	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
TOTAL	1	0	2	0

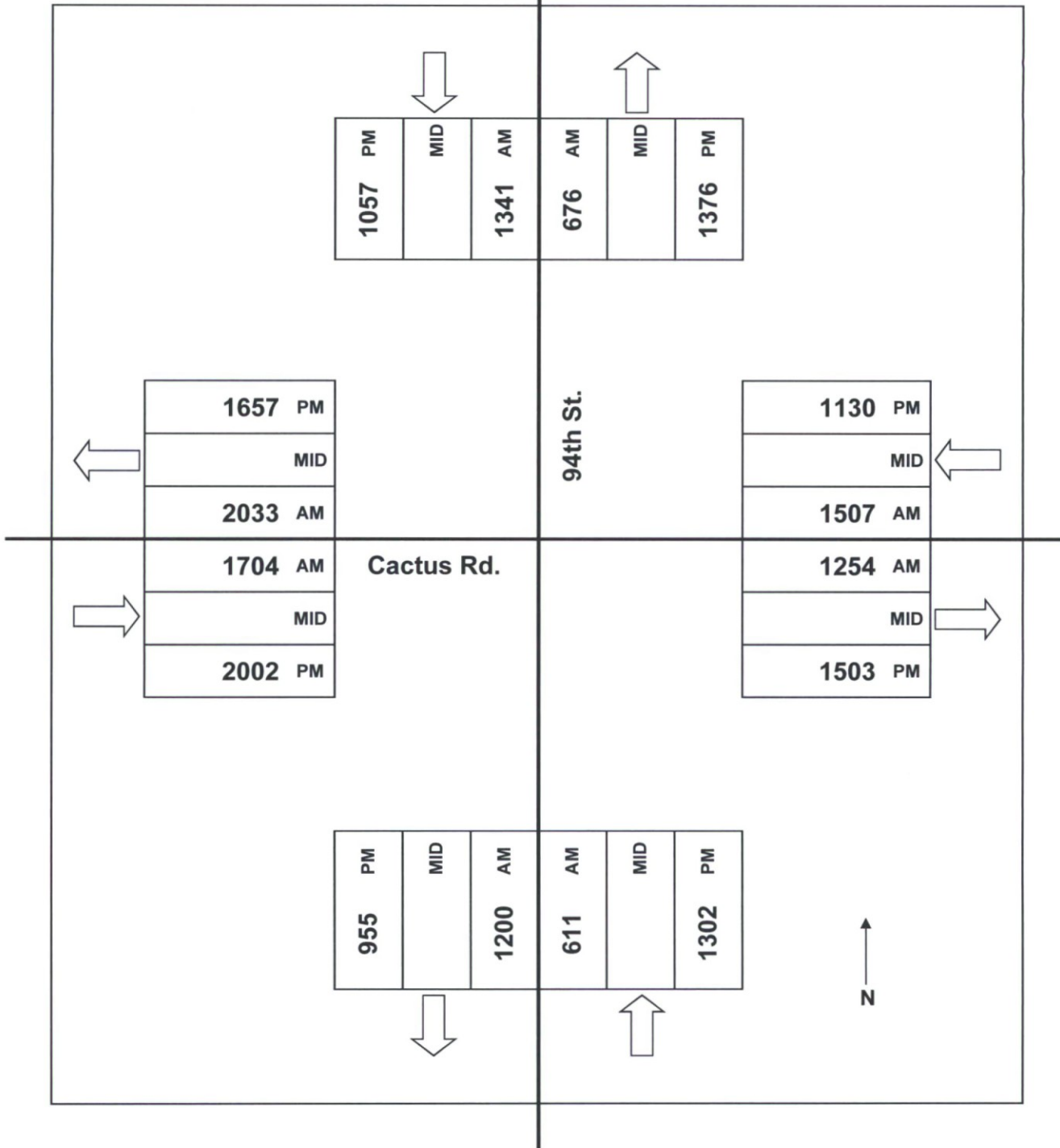
	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	0	0	0	0
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	0	0	0
5:45 PM	0	0	0	0
TOTAL	0	0	0	0

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	1
4:45 PM	0	0	0	0
5:00 PM	0	0	0	1
5:15 PM	0	0	0	1
5:30 PM	0	0	0	0
5:45 PM	0	0	0	0
TOTAL	0	0	0	3



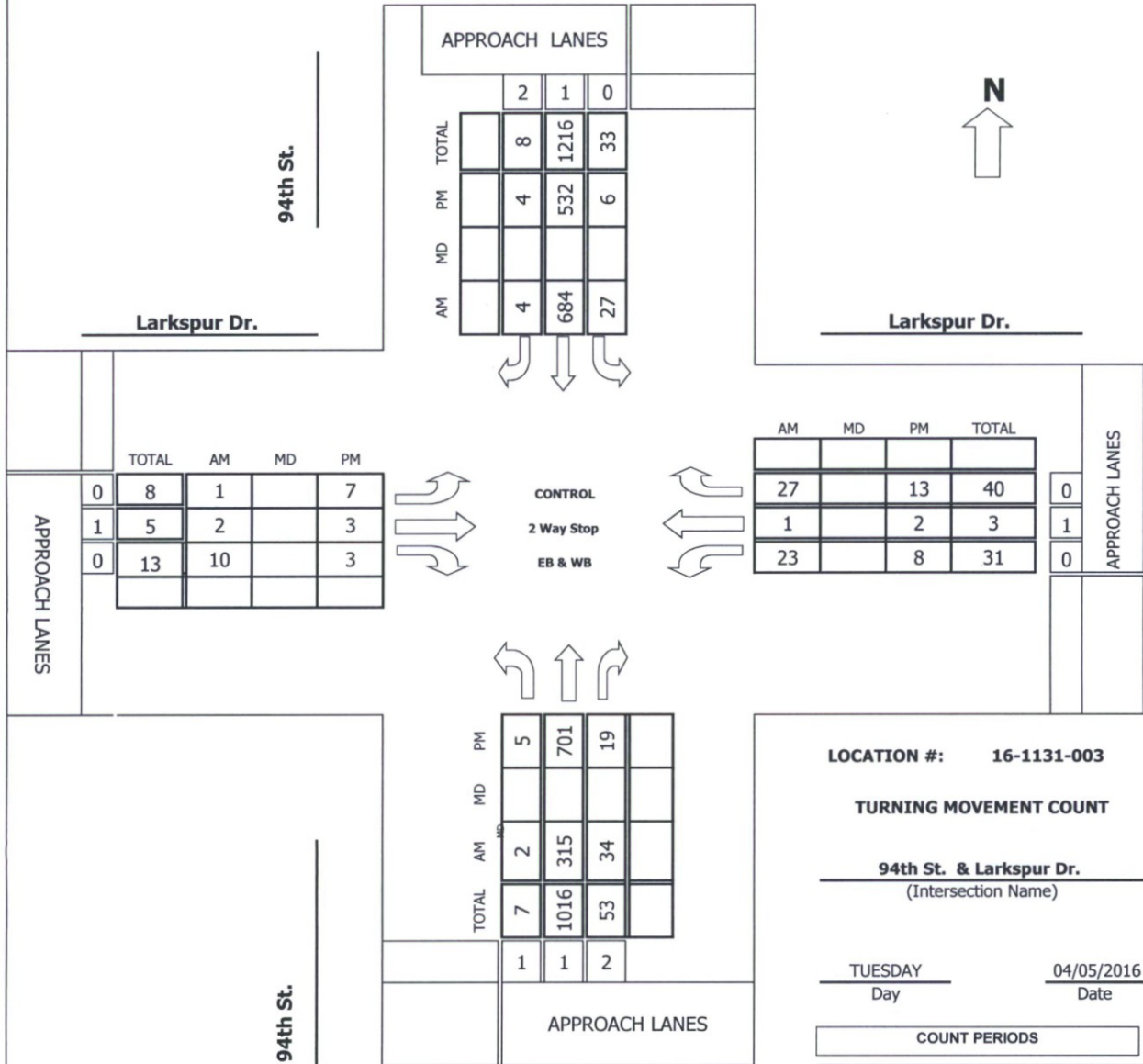
JOB# 16-1131-001
VALIDATED: _____

DATE: 04/05/2016
DAY: TUESDAY



Project #: 16-1131-003

TMC SUMMARY OF 94th St. & Larkspur Dr.



		APPROACH LANES		
		2	1	0
TOTAL		8	1216	33
PM		4	532	6
MD				
AM		4	684	27

	TOTAL	AM	MD	PM
APPROACH LANES	0	8	1	7
	1	5	2	3
	0	13	10	3

	AM	MD	PM	TOTAL
APPROACH LANES	27		13	40
	1		2	3
	23		8	31

	TOTAL	AM	MD	PM
APPROACH LANES	7	2		5
	1016	315		701
	53	34		19

LOCATION #: **16-1131-003**

TURNING MOVEMENT COUNT

94th St. & Larkspur Dr.
(Intersection Name)

TUESDAY 04/05/2016
Day Date

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

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

Intersection Turning Movement

Prepared by:



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



veracitytrafficgroup

N-S STREET: 94th St. DATE: 04/05/2016 LOCATION: Scottsdale
 E-W STREET: Larkspur Dr. DAY: TUESDAY PROJECT#: 16-1131-003

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	1	1	2	0	1	2	0	1	0	0	1	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	0	65	2	3	120	3	0	1	1	5	1	6	207
7:15 AM	0	82	7	5	153	0	0	0	4	9	0	4	264
7:30 AM	1	67	9	13	192	0	0	1	0	4	0	10	297
7:45 AM	1	82	16	8	184	2	1	1	5	5	1	11	317
8:00 AM	0	84	2	1	155	2	0	0	1	5	0	2	252
8:15 AM	0	74	0	2	161	0	4	0	3	2	0	2	248
8:30 AM	1	77	3	1	169	0	0	0	4	4	0	2	261
8:45 AM	3	92	1	1	155	1	1	0	0	4	0	3	261
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	6	623	40	34	1289	8	6	3	18	38	2	40	2107
Approach %	0.90	93.12	5.98	2.55	96.84	0.60	22.22	11.11	66.67	47.50	2.50	50.00	
App/Depart	669	/	669	1331	/	1345	27	/	77	80	/	16	

AM Peak Hr Begins at: 7:15 AM

PEAK

Volumes	2	315	34	27	684	4	1	2	10	23	1	27	1130
Approach %	0.57	89.74	9.69	3.78	95.66	0.56	7.69	15.38	76.92	45.10	1.96	52.94	

PEAK HR.

FACTOR:	0.886	0.872	0.464	0.750	0.891
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CONTROL: 2 Way Stop (EB & WB)
 COMMENT 1:
 GPS: 33.600598, -111.878474

Intersection Turning Movement



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: 94th St. DATE: 04/05/2016 LOCATION: Scottsdale
 E-W STREET: Larkspur Dr. DAY: TUESDAY PROJECT#: 16-1131-003

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	1	1	2	0	1	2	0	1	0	0	1	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	0	163	2	8	130	0	1	0	1	8	1	3	317
4:15 PM	2	171	5	8	131	3	2	0	0	4	0	6	332
4:30 PM	2	187	4	2	127	0	3	1	1	2	0	7	336
4:45 PM	0	158	6	1	114	1	2	1	1	1	0	4	289
5:00 PM	2	185	3	2	141	2	1	1	1	2	2	1	343
5:15 PM	1	171	6	1	150	1	1	0	0	3	0	1	335
5:30 PM	1	170	3	2	138	0	1	0	2	3	0	6	326
5:45 PM	0	129	1	1	114	2	0	0	0	3	0	4	254
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	8	1334	30	25	1045	9	11	3	6	26	3	32	2532
Approach %	0.58	97.23	2.19	2.32	96.85	0.83	55.00	15.00	30.00	42.62	4.92	52.46	
App/Depart	1372	/	1377	1079	/	1077	20	/	58	61	/	20	

PM Peak Hr Begins at: 430 PM

PEAK

Volumes	5	701	19	6	532	4	7	3	3	8	2	13	1303
Approach %	0.69	96.69	2.62	1.11	98.15	0.74	53.85	23.08	23.08	34.78	8.70	56.52	

PEAK HR.

FACTOR:	0.939	0.891	0.650	0.639	0.950
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CONTROL: 2 Way Stop (EB & WB)
 COMMENT 1: 0
 GPS: 33.600598, -111.878474

Pedestrian & Bicycle Study

N-S STREET: 94th St.
E-W STREET: Larkspur Dr.

Date: 04/05/2016
Day: TUESDAY

City: Scottsdale
Project #: 16-1131-003

	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	0	0	2
7:15 AM	0	0	0	0
7:30 AM	0	0	1	0
7:45 AM	0	0	0	5
8:00 AM	0	0	0	3
8:15 AM	0	0	0	0
8:30 AM	0	3	1	2
8:45 AM	0	0	0	0
TOTAL	0	3	2	12

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	0	1	0
7:15 AM	0	0	1	0
7:30 AM	0	0	1	0
7:45 AM	0	0	0	0
8:00 AM	0	2	1	0
8:15 AM	0	0	0	0
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
TOTAL	0	2	4	0

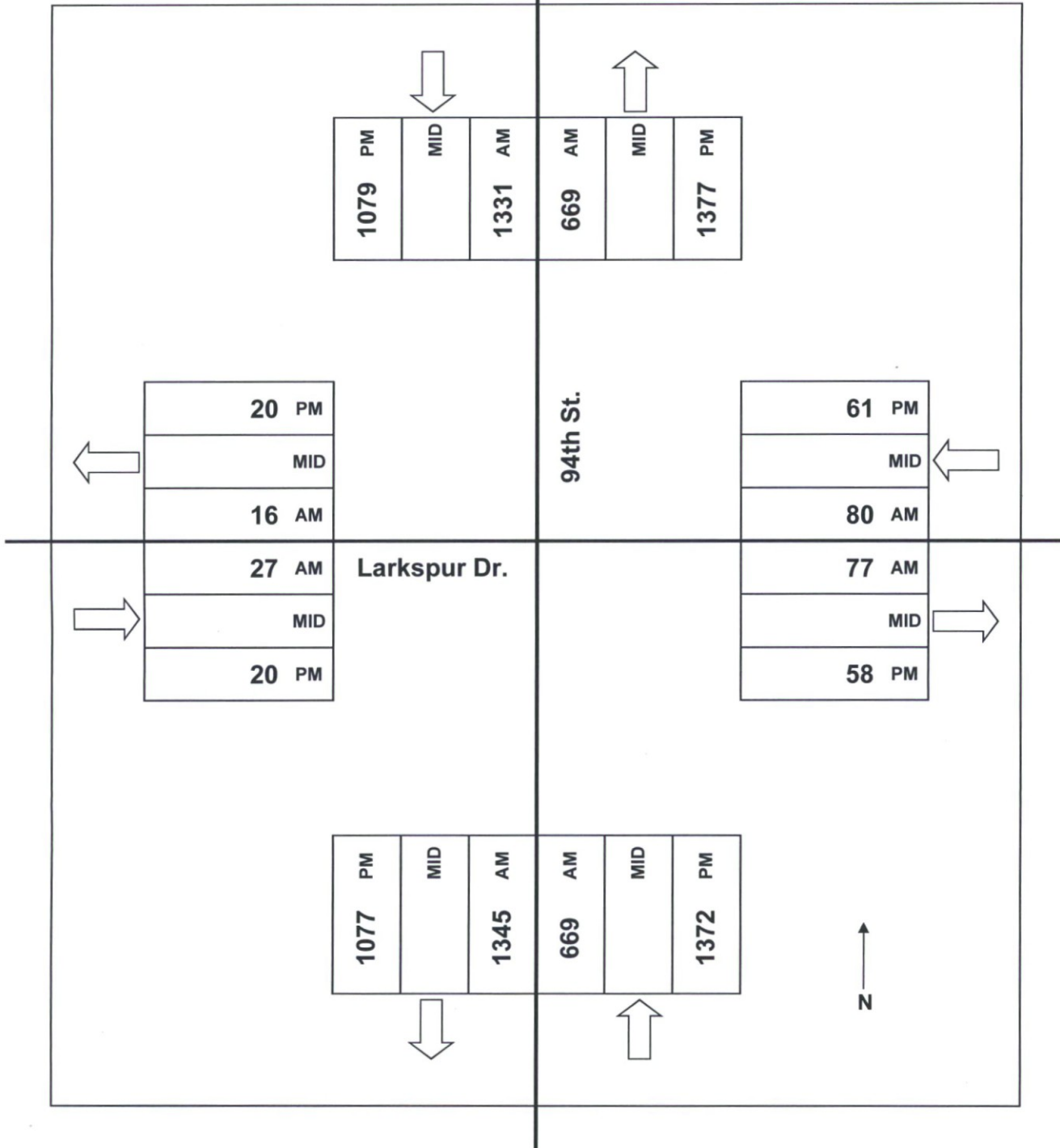
	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	0	0	0	0
5:00 PM	0	0	0	0
5:15 PM	0	0	1	1
5:30 PM	0	0	0	0
5:45 PM	0	0	0	2
TOTAL	0	0	1	3

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	1
4:45 PM	0	0	0	0
5:00 PM	0	0	2	1
5:15 PM	0	0	2	1
5:30 PM	0	0	0	0
5:45 PM	0	0	0	0
TOTAL	0	0	4	3



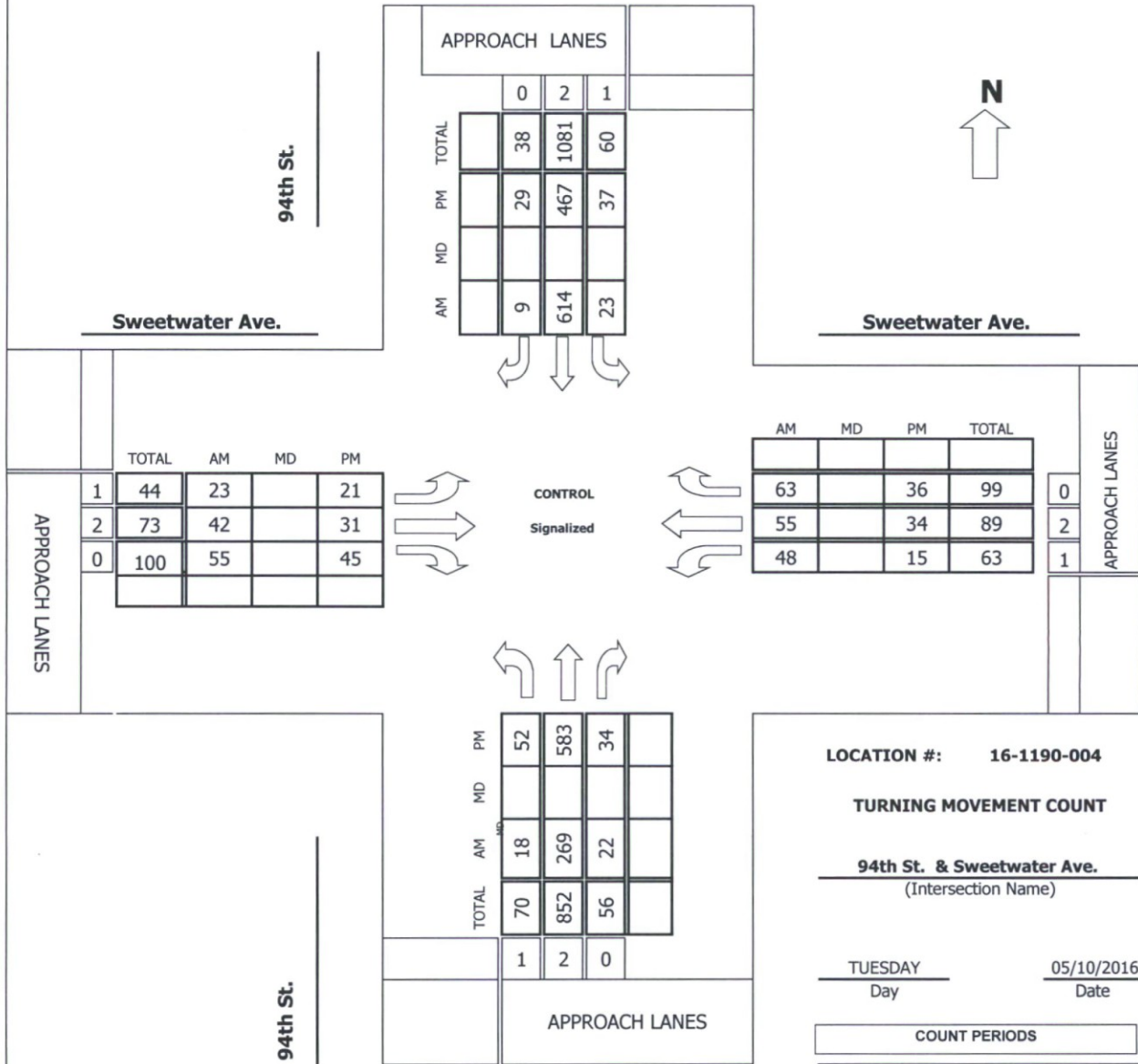
JOB# 16-1131-003
VALIDATED: _____

DATE: 04/05/2016
DAY: TUESDAY



Project #: 16-1190-004

TMC SUMMARY OF 94th St. & Sweetwater Ave.



	TOTAL	AM	MD	PM
1	44	23		21
2	73	42		31
0	100	55		45

AM	MD	PM	TOTAL
63		36	99
55		34	89
48		15	63

TOTAL	AM	MD	PM
70	18	269	22
52		583	34

LOCATION #: 16-1190-004

TURNING MOVEMENT COUNT

94th St. & Sweetwater Ave.
(Intersection Name)

TUESDAY 05/10/2016
Day Date

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

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

Intersection Turning Movement

Prepared by:



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



veracitytrafficgroup

N-S STREET: 94th St. DATE: 05/10/2016 LOCATION: Scottsdale
 E-W STREET: Sweetwater Ave. DAY: TUESDAY PROJECT#: 16-1190-004

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	1	2	0	1	2	0	1	2	0	1	2	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	6	52	1	7	105	4	6	17	8	7	5	14	232
7:15 AM	6	62	5	5	143	2	9	14	16	13	17	29	321
7:30 AM	4	71	5	8	193	5	4	14	13	16	14	18	365
7:45 AM	7	68	8	4	150	0	6	8	14	8	9	8	290
8:00 AM	1	68	4	6	128	2	4	6	12	11	15	8	265
8:15 AM	6	67	3	4	138	3	7	3	20	13	8	12	284
8:30 AM	8	95	1	5	157	1	5	5	14	8	6	5	310
8:45 AM	6	63	11	2	104	2	3	6	9	4	2	11	223
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	44	546	38	41	1118	19	44	73	106	80	76	105	2290
Approach %	7.01	86.94	6.05	3.48	94.91	1.61	19.73	32.74	47.53	30.65	29.12	40.23	
App/Depart	628	/	695	1178	/	1304	223	/	152	261	/	139	

AM Peak Hr Begins at: 715 AM

PEAK

Volumes	18	269	22	23	614	9	23	42	55	48	55	63	1241
Approach %	5.83	87.06	7.12	3.56	95.05	1.39	19.17	35.00	45.83	28.92	33.13	37.95	

PEAK HR.

FACTOR:	0.931	0.784	0.769	0.703	0.850
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CONTROL: Signalized

COMMENT 1:

GPS: 33.604185, -111.878466

Intersection Turning Movement



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: 94th St. DATE: 05/10/2016 LOCATION: Scottsdale
 E-W STREET: Sweetwater Ave. DAY: TUESDAY PROJECT#: 16-1190-004

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	1	2	0	1	2	0	1	2	0	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	6	140	11	9	114	7	8	4	17	5	8	4	333
4:15 PM	15	118	8	13	92	5	3	9	16	3	7	13	302
4:30 PM	13	131	7	16	111	12	2	4	6	4	9	11	326
4:45 PM	13	129	9	10	104	4	1	7	6	7	6	8	304
5:00 PM	14	152	10	8	119	10	8	5	14	2	11	12	365
5:15 PM	12	162	5	5	121	6	5	6	7	3	9	8	349
5:30 PM	13	140	10	14	123	9	7	13	18	3	8	8	366
5:45 PM	8	101	8	6	85	3	4	6	9	4	7	4	245
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	94	1073	68	81	869	56	38	54	93	31	65	68	2590
Approach %	7.61	86.88	5.51	8.05	86.38	5.57	20.54	29.19	50.27	18.90	39.63	41.46	
App/Depart	1235	/	1179	1006	/	993	185	/	203	164	/	215	

PM Peak Hr Begins at: 445 PM

PEAK

Volumes	52	583	34	37	467	29	21	31	45	15	34	36	1384
Approach %	7.77	87.14	5.08	6.94	87.62	5.44	21.65	31.96	46.39	17.65	40.00	42.35	

PEAK HR.

FACTOR:	0.934	0.913	0.638	0.850	0.945
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CONTROL: Signalized
 COMMENT 1: 0
 GPS: 33.604185, -111.878466

Pedestrian & Bicycle Study

N-S STREET: 94th St.
E-W STREET: Sweetwater Ave.

Date: 05/10/2016
Day: TUESDAY

City: Scottsdale
Project #: 16-1190-004

	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	1	1	0
7:15 AM	0	1	0	0
7:30 AM	0	0	0	0
7:45 AM	1	0	0	0
8:00 AM	0	0	0	1
8:15 AM	1	4	1	1
8:30 AM	1	0	0	0
8:45 AM	1	1	1	2
TOTAL	4	7	3	4

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	0	0	0
7:15 AM	1	0	0	0
7:30 AM	2	0	0	0
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	1	1	0	0
8:30 AM	0	0	0	0
8:45 AM	1	0	0	0
TOTAL	5	1	0	0

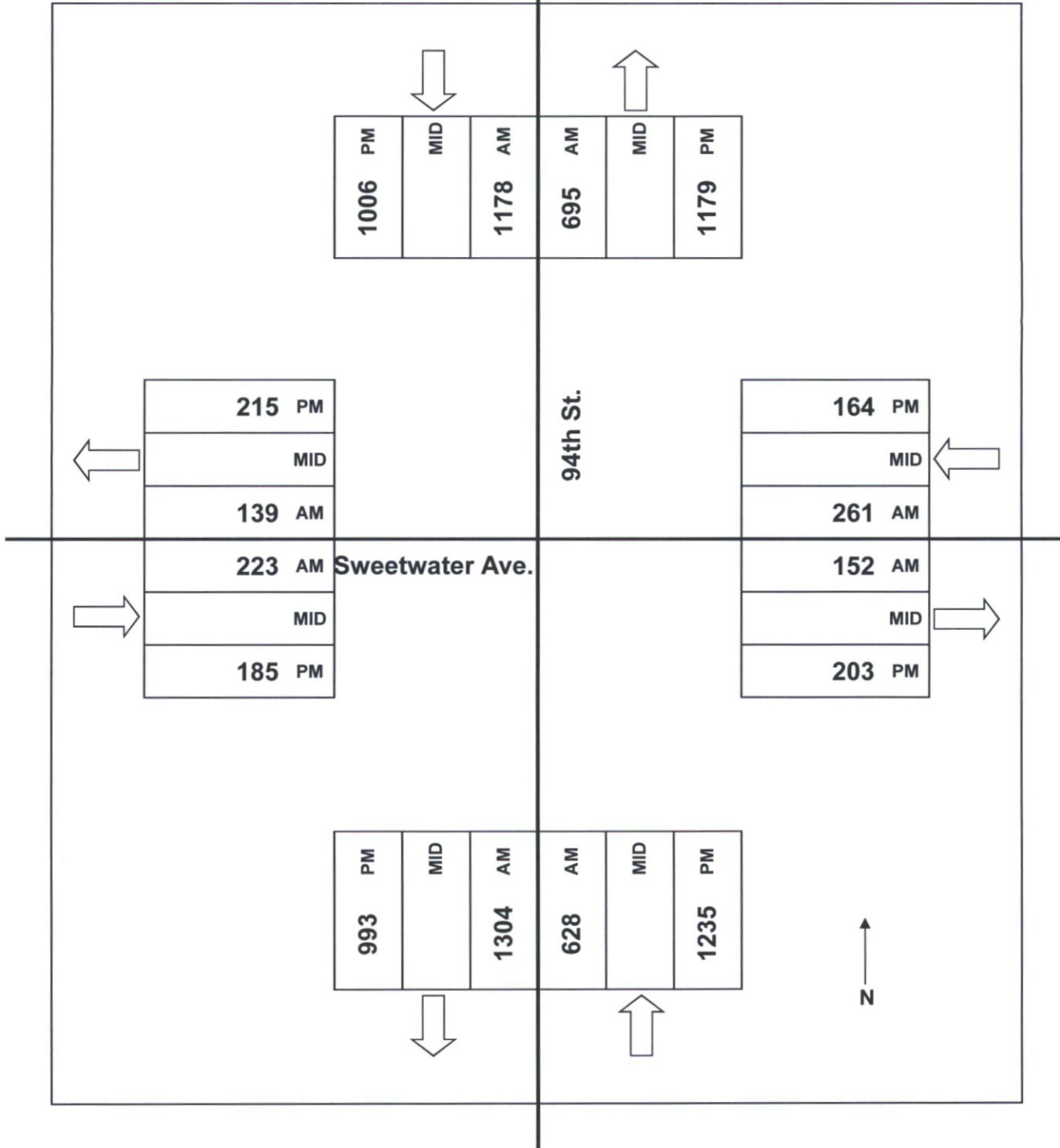
	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	0	0	0	0
5:00 PM	0	0	0	1
5:15 PM	0	0	0	0
5:30 PM	0	0	0	0
5:45 PM	0	0	1	0
TOTAL	0	0	1	1

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	0	0	0	0
5:00 PM	0	0	0	0
5:15 PM	2	0	1	0
5:30 PM	0	0	0	0
5:45 PM	1	0	0	1
TOTAL	3	0	1	1



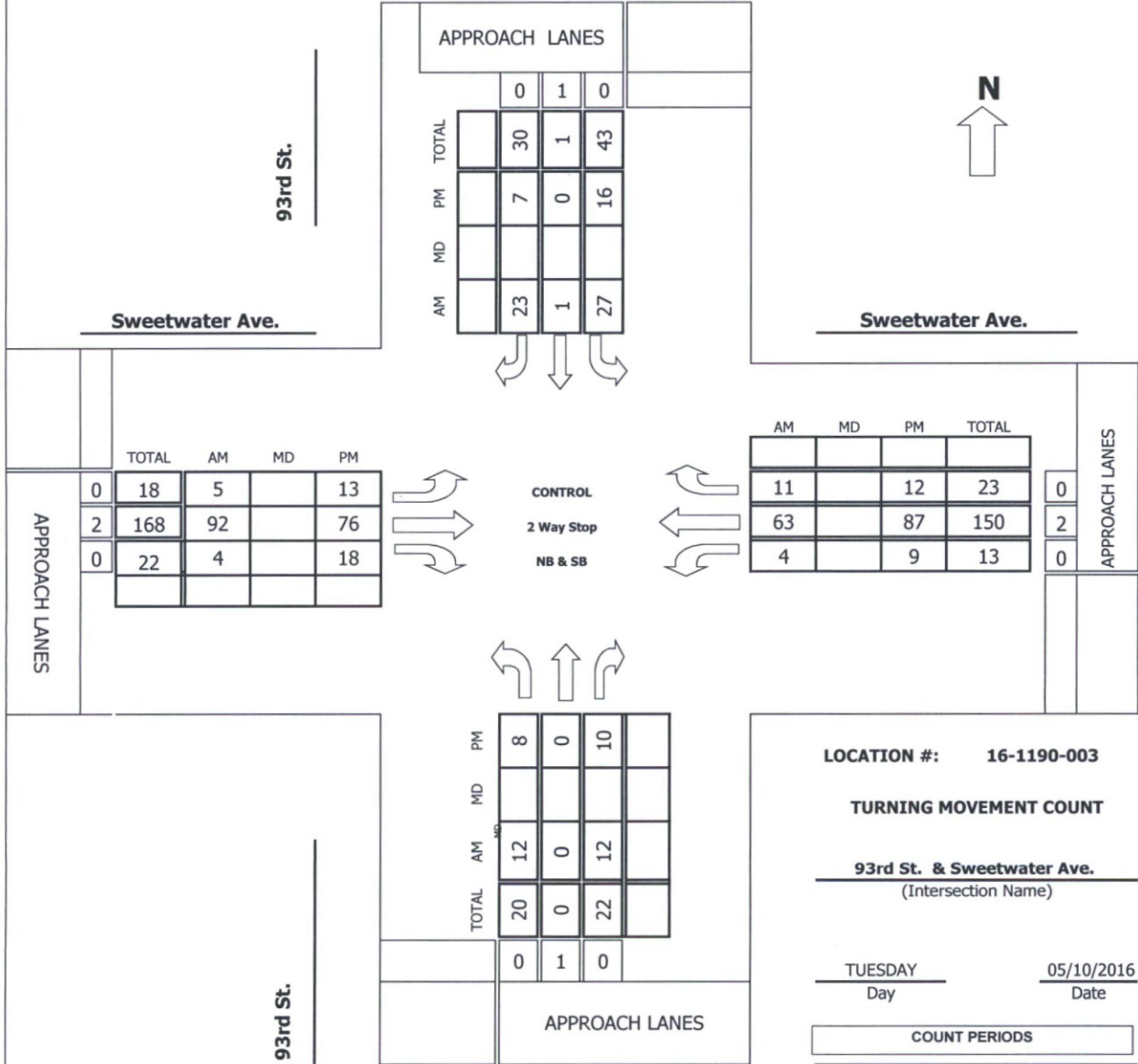
JOB# 16-1190-004
VALIDATED: _____

DATE: 05/10/2016
DAY: TUESDAY



Project #: 16-1190-003

TMC SUMMARY OF 93rd St. & Sweetwater Ave.



	TOTAL	AM	MD	PM
0	18	5		13
2	168	92		76
0	22	4		18

APPROACH LANES

CONTROL
2 Way Stop
NB & SB

AM	MD	PM	TOTAL	
11		12	23	0
63		87	150	2
4		9	13	0

APPROACH LANES

TOTAL	AM	MD	PM
20	12		8
0	0		0
22	12		10

APPROACH LANES

LOCATION #: **16-1190-003**

TURNING MOVEMENT COUNT

93rd St. & Sweetwater Ave.
(Intersection Name)

TUESDAY 05/10/2016
Day Date

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

AM PEAK HOUR 700 AM
NOON PEAK HOUR _____
PM PEAK HOUR 500 PM

Intersection Turning Movement

Prepared by:



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: 93rd St. DATE: 05/10/2016 LOCATION: Scottsdale
 E-W STREET: Sweetwater Ave. DAY: TUESDAY PROJECT#: 16-1190-003

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	1	0	0	1	0	0	2	0	0	2	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	4	0	3	10	0	10	1	21	2	0	11	2	64
7:15 AM	6	0	6	9	0	5	2	27	1	1	21	3	81
7:30 AM	1	0	1	5	0	5	1	22	0	2	17	5	59
7:45 AM	1	0	2	3	1	3	1	22	1	1	14	1	50
8:00 AM	3	0	2	5	1	4	2	15	2	1	14	5	54
8:15 AM	2	0	0	3	0	6	0	28	1	2	14	2	58
8:30 AM	6	0	3	3	0	6	2	20	4	0	13	3	60
8:45 AM	1	0	2	1	0	1	1	12	0	2	7	0	27
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	24	0	19	39	2	40	10	167	11	9	111	21	453
Approach %	55.81	0.00	44.19	48.15	2.47	49.38	5.32	88.83	5.85	6.38	78.72	14.89	
App/Depart	43	/	31	81	/	22	188	/	225	141	/	175	

AM Peak Hr Begins at: 700 AM

PEAK

Volumes	12	0	12	27	1	23	5	92	4	4	63	11	254
Approach %	50.00	0.00	50.00	52.94	1.96	45.10	4.95	91.09	3.96	5.13	80.77	14.10	

PEAK HR.

FACTOR:	0.500	0.638	0.842	0.780	0.784
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CONTROL: 2 Way Stop (NB & SB)
 COMMENT 1:
 GPS: 33.604240, -111.880604

Intersection Turning Movement



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: 93rd St. DATE: 05/10/2016 LOCATION: Scottsdale
 E-W STREET: Sweetwater Ave. DAY: TUESDAY PROJECT#: 16-1190-003

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	1	0	0	1	0	0	2	0	0	2	0	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	1	0	2	5	0	0	4	27	7	2	16	2	66
4:15 PM	1	0	3	3	1	0	4	18	3	5	16	6	60
4:30 PM	2	0	0	1	0	1	3	11	6	4	25	7	60
4:45 PM	0	0	1	0	0	1	4	15	0	2	14	6	43
5:00 PM	2	0	5	6	0	1	5	19	2	4	28	3	75
5:15 PM	3	0	1	2	0	2	3	15	7	2	25	1	61
5:30 PM	1	0	2	3	0	3	2	30	6	2	22	4	75
5:45 PM	2	0	2	5	0	1	3	12	3	1	12	4	45
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	12	0	16	25	1	9	28	147	34	22	158	33	485
Approach %	42.86	0.00	57.14	71.43	2.86	25.71	13.40	70.33	16.27	10.33	74.18	15.49	
App/Depart	28	/	61	35	/	57	209	/	188	213	/	179	

PM Peak Hr Begins at: 500 PM

PEAK	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	8	0	10	16	0	7	13	76	18	9	87	12	256
Approach %	44.44	0.00	55.56	69.57	0.00	30.43	12.15	71.03	16.82	8.33	80.56	11.11	

PEAK HR. FACTOR:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	0.643			0.821			0.704			0.771			0.853

CONTROL: 2 Way Stop (NB & SB)
 COMMENT 1: 0
 GPS: 33.604240, -111.880604

Pedestrian & Bicycle Study

N-S STREET: 93rd St.
E-W STREET: Sweetwater Ave.

Date: 05/10/2016
Day: TUESDAY

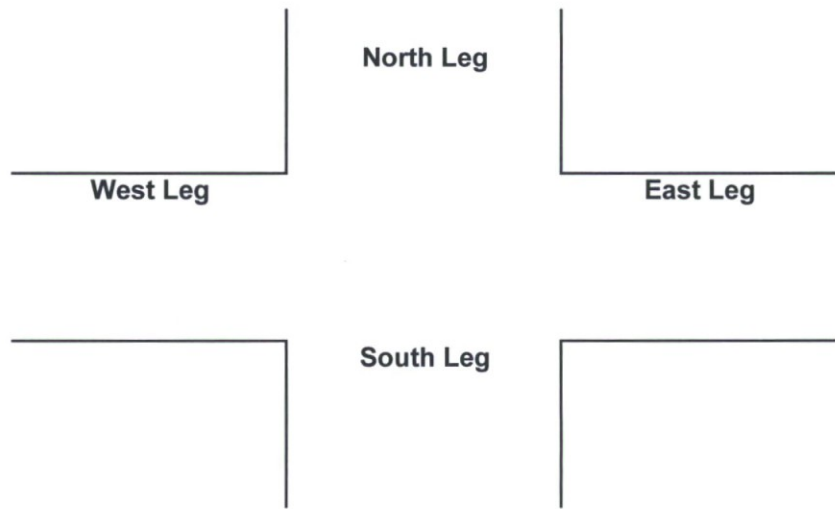
City: Scottsdale
Project #: 16-1190-003

	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	1	0	0
7:15 AM	1	0	1	0
7:30 AM	1	0	1	0
7:45 AM	0	0	1	0
8:00 AM	2	2	0	1
8:15 AM	1	2	0	0
8:30 AM	1	1	0	0
8:45 AM	0	0	0	0
TOTAL	6	6	3	1

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	0	0	0
7:15 AM	0	1	1	0
7:30 AM	2	0	0	0
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
TOTAL	2	1	1	0

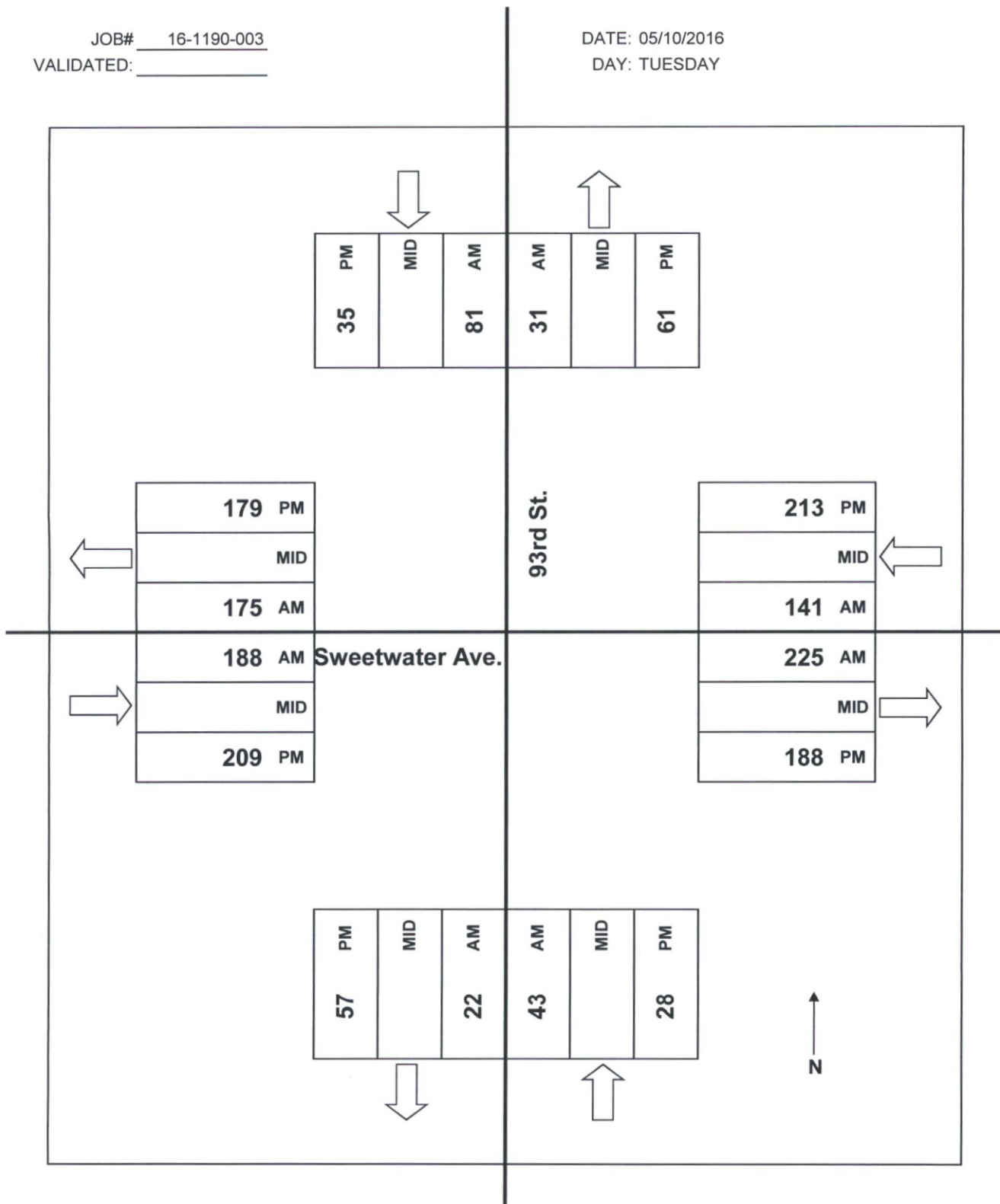
	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	0	0	0	0
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	2	0	0	0
5:45 PM	1	1	0	0
TOTAL	3	1	0	0

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	1	0	0
4:15 PM	0	0	1	0
4:30 PM	0	0	0	0
4:45 PM	0	0	0	0
5:00 PM	0	0	0	0
5:15 PM	2	0	0	0
5:30 PM	0	0	1	0
5:45 PM	0	0	0	0
TOTAL	2	1	2	0



JOB# 16-1190-003
VALIDATED: _____

DATE: 05/10/2016
DAY: TUESDAY



35 PM	MID	81 AM	31 AM	MID	61 PM
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179 PM
MID
175 AM



213 PM
MID
141 AM



188 AM
MID
209 PM



225 AM
MID
188 PM

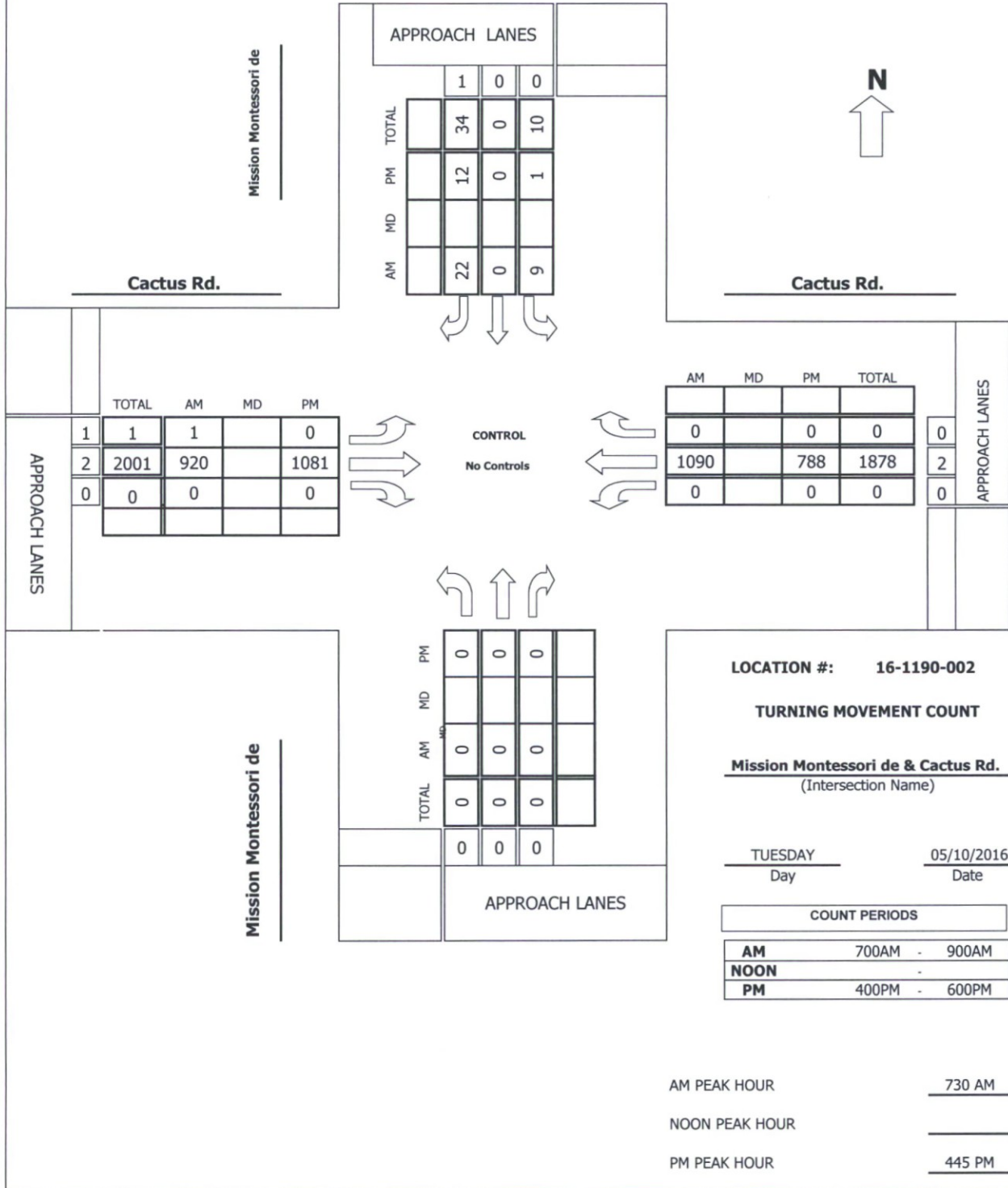


57 PM	MID	22 AM	43 AM	MID	28 PM
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Project #: 16-1190-002

TMC SUMMARY OF Mission Montessori de & Cactus Rd.



Intersection Turning Movement

Prepared by:



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: Mission Montessori de Cielo Drwy. DATE: 05/10/2016 LOCATION: Scottsdale
 E-W STREET: Cactus Rd. DAY: TUESDAY PROJECT#: 16-1190-002

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	0	0	0	0	1	1	2	0	0	2	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	0	0	0	0	0	0	0	146	0	0	210	0	356
7:15 AM	0	0	0	0	0	0	1	184	0	0	224	0	409
7:30 AM	0	0	0	0	0	3	0	268	0	0	312	0	583
7:45 AM	0	0	0	1	0	6	0	232	0	0	279	0	518
8:00 AM	0	0	0	2	0	8	0	226	0	0	250	0	486
8:15 AM	0	0	0	6	0	5	1	194	0	0	249	0	455
8:30 AM	0	0	0	2	0	6	0	223	0	0	217	0	448
8:45 AM	0	0	0	0	0	2	0	187	0	0	193	0	382
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	0	0	0	11	0	30	2	1660	0	0	1934	0	3637
Approach %	####	####	####	26.83	0.00	73.17	0.12	99.88	0.00	0.00	100.00	0.00	
App/Depart	0	/	2	41	/	0	1662	/	1671	1934	/	1964	

AM Peak Hr Begins at: 730 AM

PEAK

Volumes	0	0	0	9	0	22	1	920	0	0	1090	0	2042
Approach %	####	####	####	29.03	0.00	70.97	0.11	99.89	0.00	0.00	100.00	0.00	

PEAK HR.

FACTOR:	0.000	0.705	0.859	0.873	0.876
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CONTROL: No Control
 COMMENT 1:
 GPS: 33.597134, -111.878849

Intersection Turning Movement



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: Mission Montessori de DATE: 05/10/2016 LOCATION: Scottsdale
 E-W STREET: Cactus Rd. DAY: TUESDAY PROJECT#: 16-1190-002

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	0	0	0	0	1	1	2	0	0	2	0	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	0	0	0	2	0	6	0	221	0	0	239	0	468
4:15 PM	0	0	0	0	0	0	0	247	0	0	227	0	474
4:30 PM	0	0	0	1	0	2	0	244	0	0	206	0	453
4:45 PM	0	0	0	0	0	3	0	252	0	0	210	0	465
5:00 PM	0	0	0	0	0	3	0	273	0	0	190	0	466
5:15 PM	0	0	0	1	0	5	0	282	0	0	195	0	483
5:30 PM	0	0	0	0	0	1	0	274	0	0	193	0	468
5:45 PM	0	0	0	0	0	0	0	224	0	0	164	0	388
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	0	0	0	4	0	20	0	2017	0	0	1624	0	3665
Approach %	####	####	####	16.67	0.00	83.33	0.00	100.00	0.00	0.00	100.00	0.00	
App/Depart	0	/	0	24	/	0	2017	/	2021	1624	/	1644	

PM Peak Hr Begins at: 445 PM

PEAK

Volumes	0	0	0	1	0	12	0	1081	0	0	788	0	1882
Approach %	####	####	####	7.69	0.00	92.31	0.00	100.00	0.00	0.00	100.00	0.00	

PEAK HR. FACTOR:

	0.000	0.542	0.958	0.938	0.974
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CONTROL: No Control
 COMMENT 1: 0
 GPS: 33.597134, -111.878849

Pedestrian & Bicycle Study

N-S STREET: Mission Montessori de
E-W STREET: Cactus Rd.

Date: 05/10/2016
Day: TUESDAY

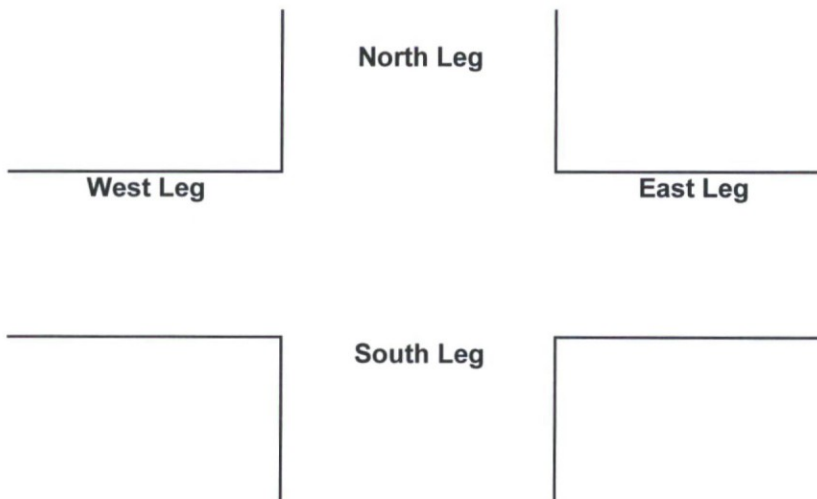
City: Scottsdale
Project #: 16-1190-002

	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	0	0	0
7:15 AM	1	0	0	0
7:30 AM	0	0	0	0
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
TOTAL	1	0	0	0

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	0	0	0
7:15 AM	0	0	0	0
7:30 AM	0	0	0	0
7:45 AM	1	0	0	0
8:00 AM	0	0	0	0
8:15 AM	1	0	0	0
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
TOTAL	2	0	0	0

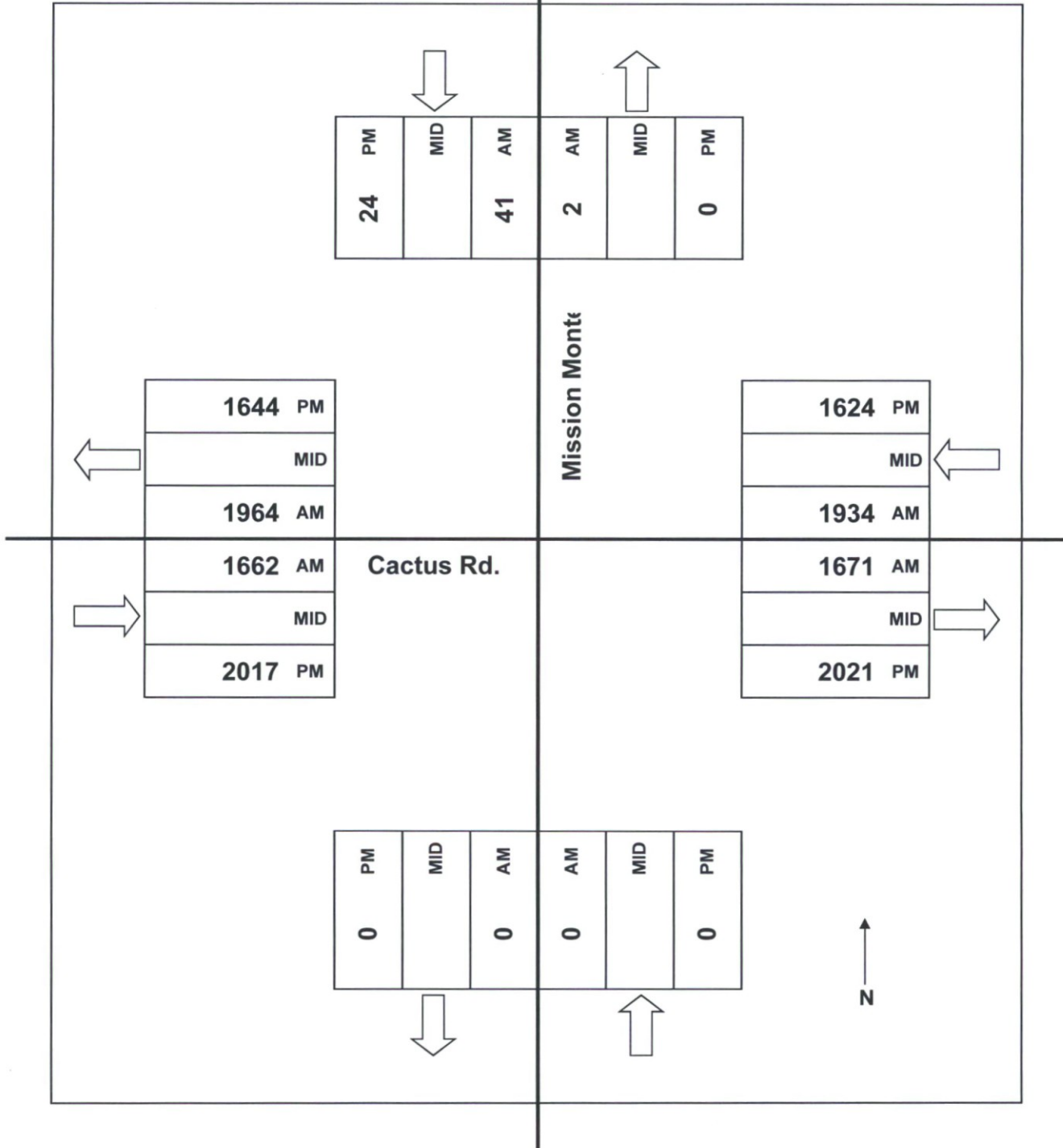
	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	0	0	0	0
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	0	0	0
5:45 PM	1	0	0	0
TOTAL	1	0	0	0

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	1	0	0	0
4:30 PM	0	0	0	0
4:45 PM	0	0	0	0
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	0	0	0
5:45 PM	0	0	0	0
TOTAL	1	0	0	0



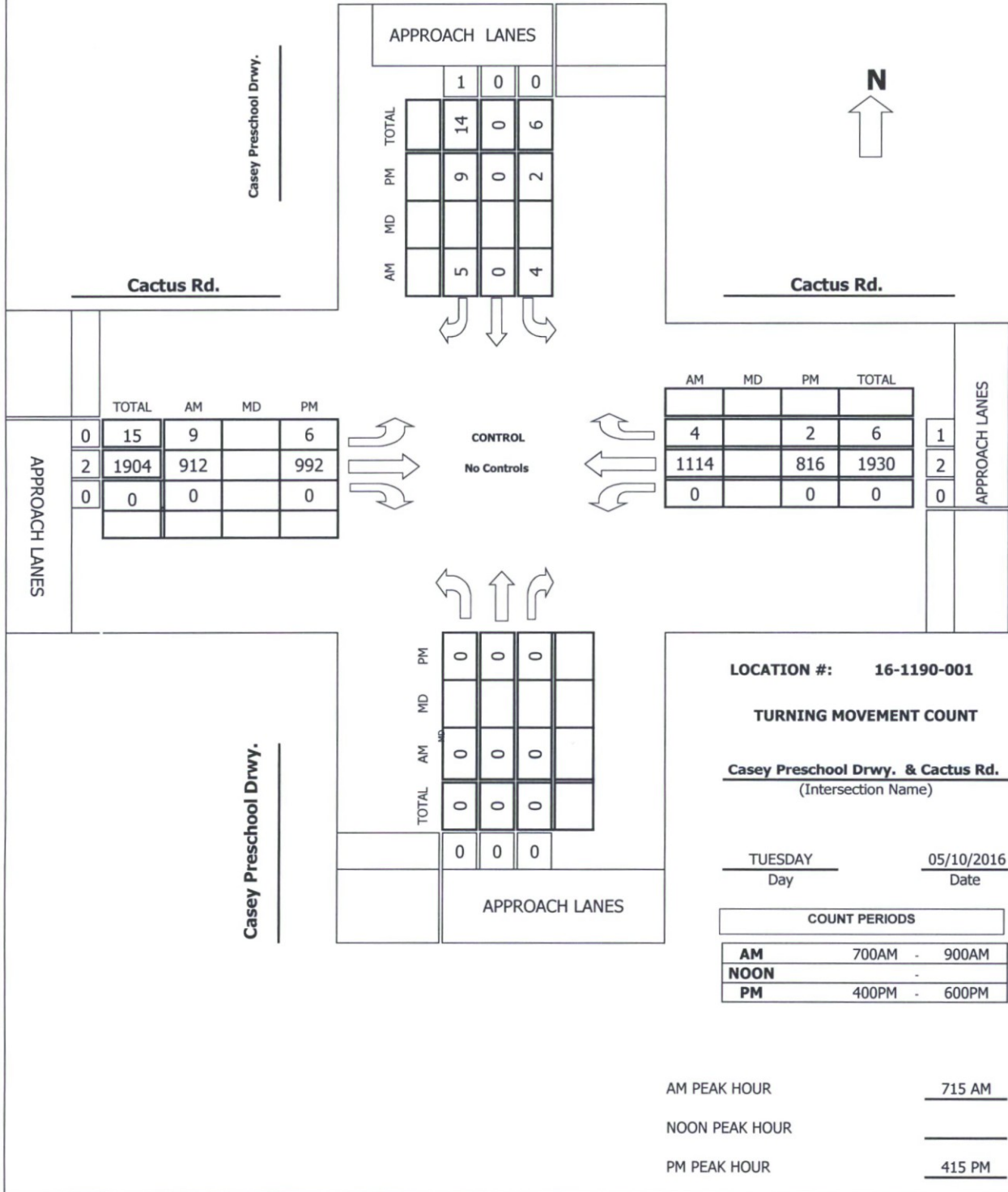
JOB# 16-1190-002
VALIDATED: _____

DATE: 05/10/2016
DAY: TUESDAY



Project #: 16-1190-001

TMC SUMMARY OF Casey Preschool Drwy. & Cactus Rd.



Intersection Turning Movement

Prepared by:



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: Casey Preschool Drwy. DATE: 05/10/2016 LOCATION: Scottsdale
 E-W STREET: Cactus Rd. DAY: TUESDAY PROJECT#: 16-1190-001

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	0	0	0	0	1	0	2	0	0	2	1	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	0	0	0	0	0	1	1	157	0	0	206	0	365
7:15 AM	0	0	0	0	0	0	1	216	0	0	255	0	472
7:30 AM	0	0	0	2	0	1	3	240	0	0	329	0	575
7:45 AM	0	0	0	2	0	2	3	258	0	0	261	1	527
8:00 AM	0	0	0	0	0	2	2	198	0	0	269	3	474
8:15 AM	0	0	0	1	0	3	7	209	0	0	225	4	449
8:30 AM	0	0	0	7	0	18	19	203	0	0	189	20	456
8:45 AM	0	0	0	14	0	20	13	176	0	0	164	16	403
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	0	0	0	26	0	47	49	1657	0	0	1898	44	3721
Approach %	####	####	####	35.62	0.00	64.38	2.87	97.13	0.00	0.00	97.73	2.27	
App/Depart	0	/	93	73	/	0	1706	/	1683	1942	/	1945	

AM Peak Hr Begins at: 715 AM

PEAK

Volumes	0	0	0	4	0	5	9	912	0	0	1114	4	2048
Approach %	####	####	####	44.44	0.00	55.56	0.98	99.02	0.00	0.00	99.64	0.36	

PEAK HR.

FACTOR:	0.000	0.563	0.882	0.850	0.890
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CONTROL: No Control
 COMMENT 1:
 GPS: 33.597170, -111.880077

Intersection Turning Movement



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: Casey Preschool Drwy. DATE: 05/10/2016 LOCATION: Scottsdale
 E-W STREET: Cactus Rd. DAY: TUESDAY PROJECT#: 16-1190-001

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
1:00 PM	0	0	0	0	0	1	0	2	0	0	2	1	
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	0	0	0	0	0	1	2	218	0	0	242	0	463
4:15 PM	0	0	0	1	0	4	3	269	0	0	237	1	515
4:30 PM	0	0	0	0	0	1	1	247	0	0	205	0	454
4:45 PM	0	0	0	0	0	0	0	213	0	0	175	0	388
5:00 PM	0	0	0	1	0	4	2	263	0	0	199	1	470
5:15 PM	0	0	0	1	0	1	0	298	0	0	202	2	504
5:30 PM	0	0	0	0	0	1	0	245	0	0	205	0	451
5:45 PM	0	0	0	1	0	4	0	237	0	0	154	1	397
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	0	0	0	4	0	16	8	1990	0	0	1619	5	3642
Approach %	####	####	####	20.00	0.00	80.00	0.40	99.60	0.00	0.00	99.69	0.31	
App/Depart	0	/	13	20	/	0	1998	/	1994	1624	/	1635	

PM Peak Hr Begins at: 415 PM

PEAK

Volumes	0	0	0	2	0	9	6	992	0	0	816	2	1827
Approach %	####	####	####	18.18	0.00	81.82	0.60	99.40	0.00	0.00	99.76	0.24	

PEAK HR.

FACTOR:	0.000	0.550	0.917	0.859	0.887
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CONTROL: No Control
 COMMENT 1: 0
 GPS: 33.597170, -111.880077

Pedestrian & Bicycle Study

N-S STREET: Casey Preschool Drwy
E-W STREET: Cactus Rd.

Date: 05/10/2016
Day: TUESDAY

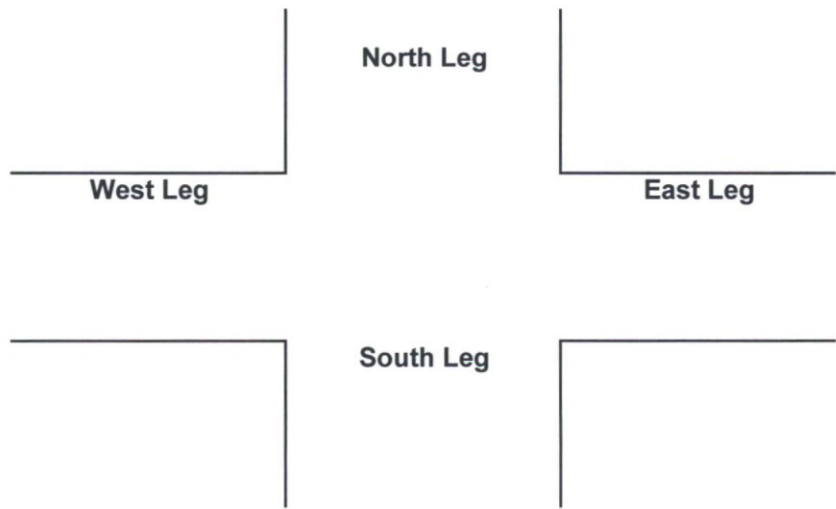
City: Scottsdale
Project #: 16-1190-001

	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	2	0	0	0
7:15 AM	1	0	0	0
7:30 AM	0	0	0	0
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	0	0	0
8:45 AM	1	0	0	0
TOTAL	4	0	0	0

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
7:00 AM	0	0	0	0
7:15 AM	0	0	0	0
7:30 AM	0	0	0	0
7:45 AM	1	0	0	0
8:00 AM	0	0	0	0
8:15 AM	1	0	0	0
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
TOTAL	2	0	0	0

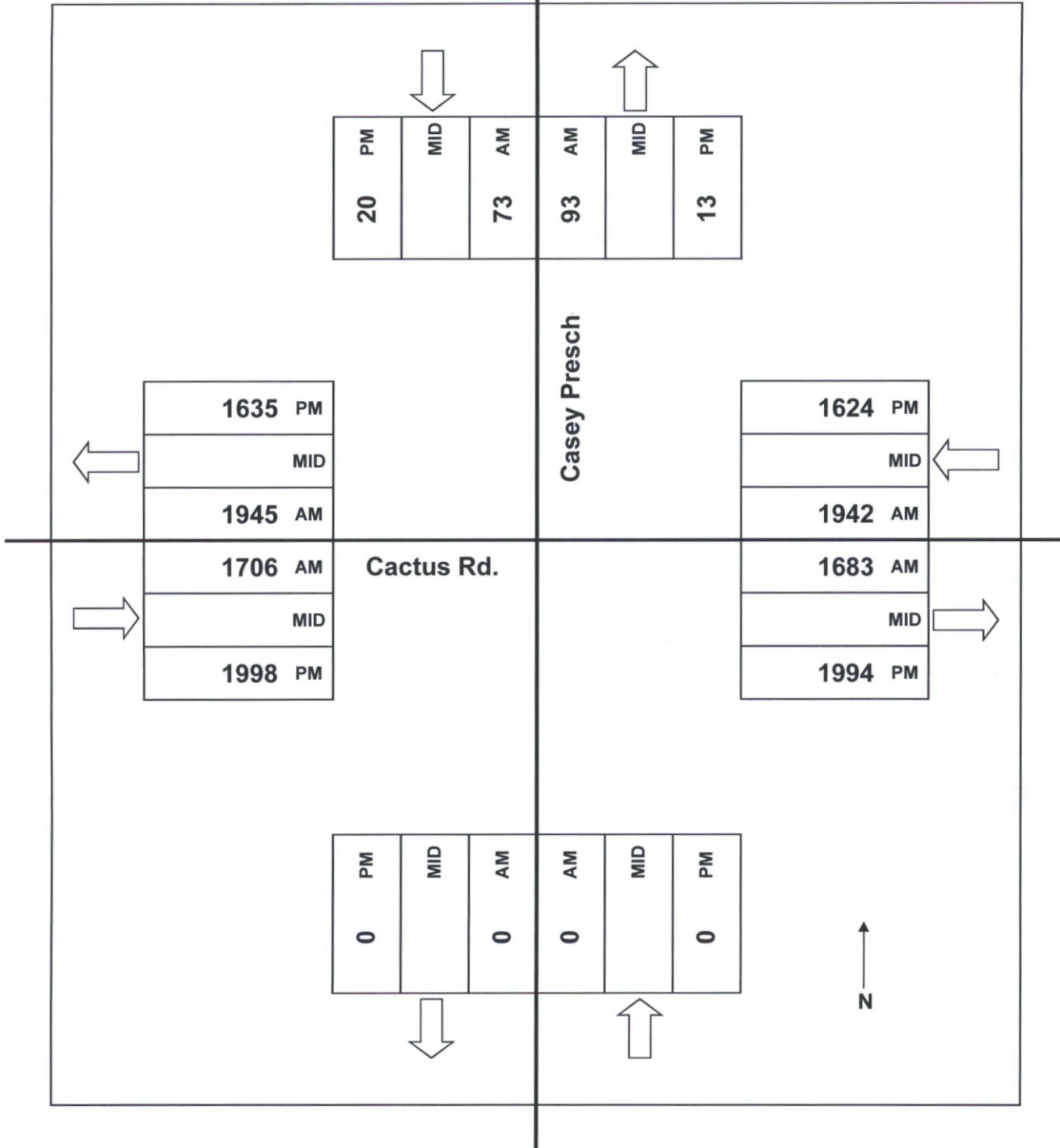
	PEDESTRIANS			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	0	0	0	0
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	1	0	0	0
5:45 PM	1	0	0	0
TOTAL	2	0	0	0

	BICYCLES			
	N-LEG	S-LEG	E-LEG	W-LEG
4:00 PM	0	0	0	0
4:15 PM	1	0	0	0
4:30 PM	1	0	0	0
4:45 PM	0	0	0	0
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	0	0	0
5:45 PM	0	0	0	0
TOTAL	2	0	0	0



JOB# 16-1190-001
VALIDATED: _____

DATE: 05/10/2016
DAY: TUESDAY



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

Volumes for: Thursday, September 1, 2016

City: Scottsdale

Project# 16-1320-001

Location : Larkspur Dr. east of 93rd Way

DAY 1

AM Period	NB	SB	EB	WB	PM Period	NB	SB	EB	WB			
00:00			0	0	12:00			3	1			
00:15			0	0	12:15			4	6			
00:30			0	0	12:30			3	1			
00:45			0	0	12:45			2	12	4	12	24
01:00			0	0	13:00			0	1			
01:15			0	0	13:15			3	1			
01:30			0	0	13:30			2	1			
01:45			0	0	13:45			3	8	5	8	16
02:00			0	0	14:00			3	2			
02:15			0	0	14:15			1	4			
02:30			0	0	14:30			4	4			
02:45			0	0	14:45			6	14	1	11	25
03:00			0	0	15:00			4	6			
03:15			0	0	15:15			5	2			
03:30			0	0	15:30			4	2			
03:45			0	0	15:45			1	14	2	12	26
04:00			0	0	16:00			4	4			
04:15			0	0	16:15			1	2			
04:30			2	1	16:30			4	3			
04:45			0	2	16:45			3	12	4	13	25
05:00			0	1	17:00			3	1			
05:15			0	0	17:15			3	2			
05:30			0	0	17:30			7	4			
05:45			1	1	17:45			2	15	2	9	24
06:00			2	4	18:00			4	3			
06:15			1	0	18:15			1	5			
06:30			1	3	18:30			0	3			
06:45			6	10	18:45			2	7	2	13	20
07:00			4	7	19:00			1	1			
07:15			2	0	19:15			2	2			
07:30			3	4	19:30			2	4			
07:45			1	10	19:45			1	6	4	11	17
08:00			2	2	20:00			2	4			
08:15			4	4	20:15			1	1			
08:30			10	7	20:30			1	0			
08:45			2	18	20:45			0	4	3	8	12
09:00			2	0	21:00			0	1			
09:15			3	0	21:15			1	1			
09:30			3	3	21:30			0	0			
09:45			0	8	21:45			0	1	1	3	4
10:00			5	2	22:00			0	0			
10:15			0	1	22:15			1	1			
10:30			3	0	22:30			0	1			
10:45			2	10	22:45			1	2	2	4	6
11:00			0	1	23:00			0	1			
11:15			4	1	23:15			0	0			
11:30			1	3	23:30			0	0			
11:45			5	10	23:45			0	0	0	1	1

Total Vol. 69 64 133 95 105 200

GPS Coordinates:

		Daily Totals		
NB	SB	EB	WB	Combined
		164	169	333

Split %	AM			PM		
	51.9%	48.1%	39.9%	47.5%	52.5%	60.1%
Peak Hour	08:00	08:00	08:00	14:30	13:45	14:30
Volume	18	17	35	19	15	32
P.H.F.	0.45	0.61	0.51	0.79	0.75	0.80

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

Volumes for: Tuesday, April 5, 2016

City: Scottsdale

Project #: 16-1131-002

Location: 93rd St. north of Cactus Rd.

AM Period	NB	SB	EB	WB	PM Period	NB	SB	EB	WB
00:00	1	0			12:00	3	5		
00:15	0	1			12:15	6	3		
00:30	0	0			12:30	4	7		
00:45	0	1	0	1	12:45	5	18	7	22
01:00	0	0			13:00	5	7		
01:15	0	0			13:15	4	5		
01:30	0	0			13:30	3	3		
01:45	0	0	0	0	13:45	6	18	1	16
02:00	0	0			14:00	3	2		
02:15	0	0			14:15	3	0		
02:30	0	0			14:30	6	5		
02:45	0	0	0	0	14:45	4	16	0	7
03:00	2	0			15:00	2	2		
03:15	1	0			15:15	3	9		
03:30	0	0			15:30	7	10		
03:45	0	3	0	0	15:45	6	18	5	26
04:00	0	1			16:00	6	4		
04:15	0	0			16:15	7	4		
04:30	1	1			16:30	4	10		
04:45	0	1	2	4	16:45	9	26	5	23
05:00	0	3			17:00	13	12		
05:15	0	3			17:15	11	6		
05:30	2	1			17:30	9	4		
05:45	1	3	3	10	17:45	5	38	4	26
06:00	2	2			18:00	6	8		
06:15	4	5			18:15	5	4		
06:30	0	7			18:30	6	1		
06:45	4	10	2	16	18:45	3	20	1	14
07:00	6	15			19:00	1	3		
07:15	4	6			19:15	2	1		
07:30	7	4			19:30	5	1		
07:45	8	25	5	30	19:45	2	10	1	6
08:00	6	4			20:00	2	1		
08:15	10	6			20:15	3	2		
08:30	6	6			20:30	4	5		
08:45	11	33	3	19	20:45	4	13	1	9
09:00	5	4			21:00	4	2		
09:15	4	4			21:15	2	1		
09:30	3	4			21:30	3	1		
09:45	6	18	5	17	21:45	3	12	2	6
10:00	7	12			22:00	2	2		
10:15	4	6			22:15	1	0		
10:30	8	3			22:30	1	0		
10:45	6	25	7	28	22:45	1	5	1	3
11:00	2	9			23:00	0	0		
11:15	5	6			23:15	1	0		
11:30	6	2			23:30	2	1		
11:45	4	17	9	26	23:45	0	3	1	2

Total Vol.	136	151		287		197	160		357
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GPS Coordinates:										
						Daily Totals				
						NB	SB	EB	WB	Combined
						333	311			644

	AM			PM		
Split %	47.4%	52.6%	44.6%	55.2%	44.8%	55.4%
Peak Hour	08:00	06:30	07:00	16:45	16:30	16:30
Volume	33	30	55	42	33	70
P.H.F.	0.75	0.50	0.65	0.81	0.69	0.70

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

Volumes for: Tuesday, April 5, 2016

City: Scottsdale

Project #: 16-1131-003

Location: Cactus Rd. btwn. 93rd St. & 94th St.

AM Period	NB	SB	EB	WB	PM Period	NB	SB	EB	WB			
00:00			6	9	12:00			164	149			
00:15			12	5	12:15			174	170			
00:30			5	6	12:30			150	162			
00:45			5	28	3	23	51	166	654	153	634	1288
01:00			6	3	13:00			159	149			
01:15			4	1	13:15			168	149			
01:30			5	4	13:30			147	141			
01:45			0	15	1	9	24	175	649	148	587	1236
02:00			5	2	14:00			167	154			
02:15			4	3	14:15			184	188			
02:30			5	2	14:30			208	186			
02:45			1	15	3	10	25	225	784	193	721	1505
03:00			2	3	15:00			195	237			
03:15			4	1	15:15			207	232			
03:30			5	1	15:30			217	246			
03:45			3	14	1	6	20	187	806	232	947	1753
04:00			1	3	16:00			247	218			
04:15			8	9	16:15			241	224			
04:30			6	17	16:30			214	223			
04:45			7	22	17	46	68	266	968	199	864	1832
05:00			11	27	17:00			289	229			
05:15			22	26	17:15			265	216			
05:30			30	44	17:30			272	205			
05:45			42	105	58	155	260	208	1034	143	793	1827
06:00			51	67	18:00			209	139			
06:15			87	103	18:15			189	122			
06:30			105	138	18:30			162	103			
06:45			149	392	173	481	873	142	702	89	453	1155
07:00			166	231	19:00			103	70			
07:15			266	273	19:15			93	74			
07:30			225	315	19:30			113	60			
07:45			277	934	294	1113	2047	85	394	56	260	654
08:00			173	231	20:00			76	32			
08:15			218	235	20:15			71	36			
08:30			199	263	20:30			81	44			
08:45			180	770	191	920	1690	69	297	52	164	461
09:00			166	154	21:00			87	55			
09:15			159	148	21:15			68	35			
09:30			146	152	21:30			54	21			
09:45			163	634	158	612	1246	49	258	27	138	396
10:00			158	166	22:00			45	28			
10:15			163	159	22:15			38	20			
10:30			166	158	22:30			35	19			
10:45			157	644	164	647	1291	35	153	9	76	229
11:00			135	158	23:00			19	15			
11:15			148	165	23:15			17	6			
11:30			145	152	23:30			14	2			
11:45			174	602	159	634	1236	14	64	5	28	92

Total Vol. 4175 4656 **8831** 6763 5665 **12428**

GPS Coordinates: **Daily Totals**

NB	SB	EB	WB	Combined
		10938	10321	21259

Split %	AM			PM		
	47.3%	52.7%	41.5%	54.4%	45.6%	58.5%
Peak Hour	07:15	07:00	07:15	16:45	15:00	16:45
Volume	941	1113	2054	1092	947	1941
P.H.F.	0.85	0.88	0.90	0.94	0.96	0.94

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

Volumes for: Tuesday, April 5, 2016

City: Scottsdale

Project #: 16-1131-001

Location: 94th St. north of Cactus Rd.

AM Period	NB	SB	EB	WB	PM Period	NB	SB	EB	WB
00:00	7	6			12:00	123	115		
00:15	6	5			12:15	122	114		
00:30	5	2			12:30	97	127		
00:45	3	21	3	16	12:45	106	448	129	485
01:00	3	2			13:00	121	97		
01:15	2	1			13:15	85	107		
01:30	4	2			13:30	103	123		
01:45	3	12	2	7	13:45	97	406	106	433
02:00	3	2			14:00	109	96		
02:15	2	3			14:15	123	108		
02:30	3	4			14:30	124	125		
02:45	1	9	1	10	14:45	128	484	120	449
03:00	2	3			15:00	157	144		
03:15	2	1			15:15	146	148		
03:30	1	2			15:30	136	162		
03:45	2	7	0	6	15:45	157	596	146	600
04:00	0	5			16:00	162	133		
04:15	4	4			16:15	188	144		
04:30	1	15			16:30	181	134		
04:45	1	6	11	35	16:45	172	703	109	520
05:00	3	18			17:00	186	137		
05:15	7	14			17:15	189	149		
05:30	9	34			17:30	162	125		
05:45	18	37	36	102	17:45	136	673	126	537
06:00	16	44			18:00	138	102		
06:15	33	56			18:15	127	82		
06:30	39	104			18:30	114	97		
06:45	45	133	105	309	18:45	78	457	71	352
07:00	69	138			19:00	94	77		
07:15	91	153			19:15	80	40		
07:30	90	206			19:30	61	52		
07:45	93	343	186	683	19:45	66	301	41	210
08:00	78	162			20:00	63	39		
08:15	71	153			20:15	43	28		
08:30	93	183			20:30	61	33		
08:45	91	333	160	658	20:45	61	228	36	136
09:00	82	123			21:00	56	27		
09:15	84	104			21:15	40	24		
09:30	83	121			21:30	27	16		
09:45	72	321	92	440	21:45	30	153	17	84
10:00	88	133			22:00	26	17		
10:15	80	122			22:15	26	16		
10:30	87	128			22:30	20	9		
10:45	98	353	132	515	22:45	19	91	3	45
11:00	93	96			23:00	14	12		
11:15	93	107			23:15	16	5		
11:30	116	110			23:30	11	6		
11:45	115	417	108	421	23:45	12	53	6	29

Total Vol. 1992 3202 **5194** 4593 3880 **8473**

GPS Coordinates:

Daily Totals				
NB	SB	EB	WB	Combined
6585	7082			13667

Split %	AM			PM		
	38.4%	61.6%	38.0%	54.2%	45.8%	62.0%
Peak Hour	11:30	07:15	07:15	16:30	15:00	16:30
Volume	476	707	1059	728	600	1257
P.H.F.	0.97	0.86	0.89	0.96	0.93	0.93

Background Growth Rate Calculations

Roadway	ADT				Change in Percentage			
	2016 (from Counts)	2014	2012	2010				
Cactus	22122	19600	18500	19300	6%	3%	-2%	
94th Street	14222	12500	12700	12600	7%	-1%	0.40%	
Sweetwater Dr		2300	2400	3300		-2%	-10%	
Average Growth Rate over the past 6 years							0.2%	
Growth Rate used in the Study							1%	

CITY OF SCOTTSDALE

'11 -'12 COLLISION SUMMARY

REPORT #	DATE YYMMDD	TIME HHMM	NORTH / SOUTH ST.	TYPE	EAST WEST ST.	TYPE	DIR FROM	DIST FROM	INJ. SEV.		PHYS. COND.		VIOLATION		ACTION		TRAV. DIR.		MANNER OF COLLISION	COMMENTS
									#1	#2	#1	#2	#1	#2	#1	#2	#1	#2		
11-04483	110223	1622	94	ST	CACTUS	RD	W	300	2	2	0	0	17	0	1	3	E	E	6	4 VEH
11-07647	110330	2057	94	ST	CACTUS	RD	AT		1	1	0	0	8	0	4	1	E	W	3	
11-08177	110405	1953	94	ST	CACTUS	RD	AT		1	1	0	0	3	0	4	1	W	E	4	
11-11287	110511	1628	94	ST	CACTUS	RD	AT		1	1	0	0	17	0	1	3	E	E	6	3 VEH
11-15979	110707	1717	94	ST	CACTUS	RD	W	30	1	1	0	0	8	1	6	1	W	W	7	
11-19102	110815	0833	94	ST	CACTUS	RD	AT		2	1	0	0	6	1	1	1	NB	EB	2	
11-19298	110817	1607	93	ST	CACTUS	RD	AT		1	1	0	0	2	1	1	3	WB	WB	4	
11-19489	110819	2135	94	ST	CACTUS	RD	AT		1	1	0	0	1	1	1	4	WB	NB	3	
11-19827	110824	0838	94	ST	CACTUS	RD	AT		1	1	0	0	7	1	4	1	EB	WB	3	
11-24147	111014	0727	94	ST	CACTUS	RD	W	96	2	1										
11-25860	111102	0714	94	ST	CACTUS	RD	W	100	1	1	0	0	7	1	5	1	WB	SB	2	
11-28051	111127	1840	94	ST	CACTUS	RD	AT		1	1	0	0	6	1	4	1	EB	WB	3	FAIL TO YIELD TURNING LEFT
12-11300	120516	0133	92	ST	CACTUS	RD	E	106	2		9		2		1		EB		1	
12-12083	120525	1848	94	ST	CACTUS	RD	AT		3	2	0	0	2	1	1	1	WB	SB	2	
12-25870	121120	0945	94	ST	CACTUS	RD	AT		3	3	0	0	16	1	1	3	SB	SB	4	
12-27862	121215	0843	94	ST	CACTUS	RD	AT		1	3	0	0	97	1	4	17	NB	WB	3	

KEY (January 1, 2011-June 21,2011)

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

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

VIOLATION: 0=NO IMPROPER ACTION, 1=SPEED TOO FAST FOR CONDITIONS, 2=EXCEEDED LAWFUL SPEED 3=FAILED TO YIELD RIGHT-OF-WAY, 4=FOLLOWED TOO CLOSELY. 5=FAILED TO OBEY STOP SIGN, 6=FAILED TO STOP FOR RED SIGNAL, 7=DISREGARDED TRAFFIC SIGNAL 8=MADE IMPROPER TURN, 9=DROVE/RODE IN OPPOSING TRAFFIC LANE, 10=KNOWINGLY OPERATED WITH FAULTY / MISSING EQUIPMENT, 11=REQUIRED MOTORCYCLE SAFETY EQUIPMENT NOT USED, 12=PASSED IN NO PASSING ZONE, 13=UNSAFE LANE CHANGE, 14=FAILED TO KEEP IN PROPER LANE, 15=DISREGARDED PAVEMENT MARKINGS, 16=OTHER UNSAFE PASSING, 17=INATTENTION/DISTRACTION, 18=DID NOT USE CROSSWALK, 19=WALKED ON WRONG SIDE OF ROAD, 20 ELECTRONIC COMMUNICATIONS DEVICE, 97=OTHER, 99 UNKNOWN

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

MANNER OF COLLISION: 1=SINGLE VEHICLE, 2=ANGLE (front to side) SAME DIRECTION, 3=ANGLE (front to side) OPPOSITE DIRECTION, 4=ANGLE (front to side) RIGHT ANGLE, 5=ANGLE - DIRECTION NOT SPECIFIED, 6=REAR END, 7=HEAD-ON, 8=SIDESWIPE, SAME DIRECTION, 9=SIDESWIPE, OPPOSITE DIRECTION, 10=REAR-TO-SIDE 11=REAR-TO-REAR 97=OTHER 99=UNKNOWN D=U-Turn, @=Pedestrian, #=Pedalcycle

KEY (June 22, 2011-December 31,2012)

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

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

VIOLATION: 1=NO IMPROPER ACTION, 2=SPEED TOO FAST FOR CONDITIONS, 3=EXCEEDED LAWFUL SPEED 4=FOLLOWED TOO CLOSELY. 5=RAN STOP SIGN, 6=DISREGARDED TRAFFIC SIGNAL 7=MADE IMPROPER TURN, 8=DROVE/RODE IN OPPOSING TRAFFIC LANE, 9=KNOWINGLY OPERATED WITH FAULTY / MISSING EQUIPMENT, 10=REQUIRED MOTORCYCLE SAFETY EQUIPMENT NOT USED, 11=PASSED IN NO PASSING ZONE, 12=UNSAFE LANE CHANGE, 13=FAILED TO KEEP IN PROPER LANE, 14=DISREGARDED PAVEMENT MARKINGS, 15=OTHER UNSAFE PASSING, 16=INATTENTION/DISTRACTION, 17=DID NOT USE CROSSWALK, 18=WALKED ON WRONG SIDE OF ROAD, 19=ELECTRONIC COMMUNICATIONS DEVICE, 97=OTHER, 99 UNKNOWN

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

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

TOTAL 16

CITY OF SCOTTSDALE

'13 -'14 COLLISION SUMMARY

REPORT #	DATE YYMMDD	TIME HHMM	NORTH / SOUTH ST.	TYPE	EAST WEST ST.	TYPE	DIR FROM	DIST FROM	INJ. SEV.		PHYS. COND.		VIOLATION		ACTION		TRAV. DIR.		MANNER OF COLLISION	COMMENTS
									#1	#2	#1	#2	#1	#2	#1	#2	#1	#2		
13-07691	130403	1608	94	ST	CACTUS	RD	AT		1	1	0	0	2	1	1	3	WB	WB	4	
13-08515	130413	1448	94	ST	CACTUS	RD	AT		1	1	0	0	6	1	5	1	SB	SB	4	
13-09563	130425	1942	94	ST	CACTUS	RD	AT		1	1	0	0	97	1	4	1	NB	WB	2	
13-14185	130620	1547	94	ST	CACTUS	RD	AT		1	1	0	0	16	1	1	5	EB	SB	4	
13-16115	130715	1853	94	ST	CACTUS	RD	N	593	1		4		7		1		NB		1	DUI
13-18017	130808	0947	94	ST	LARKSPUR	DR	AT		1	1	0	0	7	1	4	1	SB	NB	3	
13-21750	130922	1455	94	ST	CACTUS	RD	AT		1	1	0	0	6	1	1	1	SB	WB	2	MULTI VEH 3
13-25150	131101	1814	94	ST	CACTUS	RD	AT		2	2	0	0	2	1	1	3	EB	EB	4	
14-00073	140101	1853	94	ST	CACTUS	RD	AT		99	2	5	0	2	1	1	3	WB	WB	4	DUI
14-00428	140106	1735	94	ST	CACTUS	RD	AT		1	2	0	0	7	1	4	1	EB	WB	3	
14-00427	140106	1659	94	ST	CACTUS	RD	AT		1	1	0	0	97	1	4	1	NB	SB	3	
14-06613	140322	1810	94	ST	CACTUS	RD	AT		1	1	4	0	2	1	1	1	EB	EB	4	DUI
14-12093	140531	2112	94	ST	CACTUS	RD	E	101	1	1	0	0	6	1	1	1	EB	NB	2	
14-15228	140714	0959	94	ST	CACTUS	RD	S	347	1	1	0	0	12	1	8	1	NB	NB	6	
14-17760	140817	1907	94	ST	CACTUS	RD	AT		1		4		2		4		NB		1	DUI
14-19293	140906	1933	94	ST	CACTUS	RD	AT		1	1	0	0	2	1	4	1	NB	SB	3	
14-24192	141108	2334	94	ST	CACTUS	RD	AT		99	1	99	0	99	1	99	4	EB	EB	4	HIT AND RUN
14-25388	141124	1743	94	ST	CACTUS	RD	AT		2	3	0	0	1	1	1	3	WB	EB	3	MULTI VEH 3
14-26966	141214	2350	94	ST	CACTUS	RD	AT		1	1	0	0		1	4	1	EB	WB	2	

REPORT #	DATE YYMMDD	TIME HHMM	NORTH / SOUTH ST.	TYPE	EAST WEST ST.	TYPE	DIR	DIST FROM	DIST FROM	INJ. SEV.		PHYS. COND.		VIOLATION		ACTION		TRAV. DIR.		MANNER OF COLLISION	COMMENTS
										#1	#2	#1	#2	#1	#2	#1	#2	#1	#2		

KEY

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

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VIOLATION: 1=NO IMPROPER ACTION, 2=SPEED TOO FAST FOR CONDITIONS, 3=EXCEEDED LAWFUL SPEED 4=FOLLOWED TOO CLOSELY. 5=RAN STOP SIGN, 6=DISREGARDED TRAFFIC SIGNAL 7=MADE IMPROPER TURN, 8=DROVE/RODE IN OPPOSING TRAFFIC LANE, 9=KNOWINGLY OPERATED WITH FAULTY / MISSING EQUIPMENT, 10=REQUIRED MOTORCYCLE SAFETY EQUIPMENT NOT USED, 11=PASSED IN NO PASSING ZONE, 12=UNSAFE LANE CHANGE, 13=FAILED TO KEEP IN PROPER LANE, 14=DISREGARDED PAVEMENT MARKINGS, 15=OTHER UNSAFE PASSING, 16=INATTENTION/DISTRACTION, 17=DID NOT USE CROSSWALK, 18=WALKED ON WRONG SIDE OF ROAD, 19=ELECTRONIC COMMUNICATIONS DEVICE, 20=FAILED TO YIELD RIGHT OF WAY (added August 2014), 97=OTHER, 99 UNKNOWN

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

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

TOTAL 19

CITY OF SCOTTSDALE

'15 -'16 COLLISION SUMMARY

REPORT #	DATE TIME YYMMDD HHMM	NORTH / SOUTH ST.	TYPE	EAST WEST ST.	TYPE	DIR FROM	DIST FROM	INJ. SEV.		PHYS. COND.		VIOLATION		ACTION		TRAV. DIR.		MANNER OF COLLISION	COMMENTS
								#1	#2	#1	#2	#1	#2	#1	#2	#1	#2		
15-00485	150107 1731	94	ST	CACTUS	RD	AT		1	1	0	0	2	1	1	3	EB	EB	4	
15-16759	150731 0831	94	ST	CACTUS	RD	AT		3	1	0	0	99	1	1	3	SB	SB	4	
15-19132	150901 1343	94	ST	CACTUS	RD	AT		1	2	0	0	20	1	4	1	SB	NB	3	
15-22383	151014 1451	94	ST	CACTUS	RD	AT		1	1	0	0	2	1	1	3	SB	SB	4	
15-25515	151121 1657	94	ST	CACTUS	RD	AT		1	2	0	0	2	1	4	4	NB	NB	4	
16-02654	160202 1553	94	ST	CACTUS	RD	AT		3	1	0	0	6	1	1	1	EB	EB	2	MULTI VEH 3
16-07408	160329 1001	94	ST	CACTUS	RD	AT		1	1	0	0	4	1	1	3	NB	NB	4	

KEY

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

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

TOTAL 7

Lanes, Volumes, Timings
Wolf Springs Ranch TIA

1: 94th Street & Cactus Rd
Existing Conditions, AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵	↑↑		↵	↑↑		↵	↑↑	↵	↵	↑↑	↵
Traffic Volume (vph)	124	565	252	52	728	42	108	186	12	95	335	277
Future Volume (vph)	124	565	252	52	728	42	108	186	12	95	335	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	250		175	125		300
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.954			0.992				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3376	0	1770	3511	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.295			0.275			0.446			0.622		
Satd. Flow (perm)	550	3376	0	512	3511	0	831	3539	1583	1159	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		67			6				27			57
Link Speed (mph)		40			40			40				40
Link Distance (ft)		699			655			968				725
Travel Time (s)		10.6			9.9			16.5				12.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	138	628	280	58	809	47	120	207	13	106	372	308
Shared Lane Traffic (%)												
Lane Group Flow (vph)	138	908	0	58	856	0	120	207	13	106	372	308
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1		1	1		1
Detector Phase	3	3		3	3		1	1	1	1	1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	30.0	30.0		30.0	30.0		26.0	26.0	26.0	26.0	26.0	26.0
Total Split (s)	50.0	50.0		50.0	50.0		70.0	70.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%		41.7%	41.7%		58.3%	58.3%	58.3%	58.3%	58.3%	58.3%
Maximum Green (s)	44.0	44.0		44.0	44.0		64.0	64.0	64.0	64.0	64.0	64.0
Yellow Time (s)	3.8	3.8		3.8	3.8		4.4	4.4	4.4	4.4	4.4	4.4
All-Red Time (s)	2.2	2.2		2.2	2.2		1.6	1.6	1.6	1.6	1.6	1.6
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)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	None
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	77.2	77.2		77.2	77.2		30.8	30.8	30.8	30.8	30.8	30.8
Actuated g/C Ratio	0.64	0.64		0.64	0.64		0.26	0.26	0.26	0.26	0.26	0.26
v/c Ratio	0.39	0.41		0.18	0.38		0.56	0.23	0.03	0.36	0.41	0.69
Control Delay	17.1	11.5		13.2	12.0		47.1	34.0	3.5	39.1	38.6	41.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.1	11.5		13.2	12.0		47.1	34.0	3.5	39.1	38.6	41.0

Lanes, Volumes, Timings
Wolf Springs Ranch TIA

1: 94th Street & Cactus Rd
Existing Conditions, AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	B		B	B		D	C	A	D	D	D
Approach Delay		12.3			12.0			37.4			39.6	
Approach LOS		B			B			D			D	
Queue Length 50th (ft)	45	146		16	145		82	67	0	71	132	185
Queue Length 95th (ft)	129	266		52	260		124	83	7	107	153	247
Internal Link Dist (ft)		619			575			888			645	
Turn Bay Length (ft)	200			200			250		175	125		300
Base Capacity (vph)	354	2195		329	2260		443	1887	856	618	1887	870
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.41		0.18	0.38		0.27	0.11	0.02	0.17	0.20	0.35

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 50 (42%), Referenced to phase 3:EBWB, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 21.9
 Intersection Capacity Utilization 83.7%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service E

Splits and Phases: 1: 94th Street & Cactus Rd



Lanes, Volumes, Timings
 Wolf Springs Ranch TIA

2: 94th Street & Sweetwater Dr
 Existing Conditions, AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	42	55	48	55	63	18	269	22	23	614	9
Future Volume (vph)	23	42	55	48	55	63	18	269	22	23	614	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.915			0.920			0.989			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3238	0	1770	3256	0	1770	3500	0	1770	3532	0
Flt Permitted	0.669			0.684			0.389			0.556		
Satd. Flow (perm)	1246	3238	0	1274	3256	0	725	3500	0	1036	3532	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		61			70			18			3	
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		652			322			1304			601	
Travel Time (s)		9.9			4.9			22.2			10.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	26	47	61	53	61	70	20	299	24	26	682	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	108	0	53	131	0	20	323	0	26	692	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		36.0	36.0		36.0	36.0	
Total Split (s)	26.0	26.0		26.0	26.0		94.0	94.0		94.0	94.0	
Total Split (%)	21.7%	21.7%		21.7%	21.7%		78.3%	78.3%		78.3%	78.3%	
Maximum Green (s)	20.0	20.0		20.0	20.0		88.0	88.0		88.0	88.0	
Yellow Time (s)	3.7	3.7		3.7	3.7		4.3	4.3		4.3	4.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		1.7	1.7		1.7	1.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	
Walk Time (s)	6.0	6.0		6.0	6.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	9.6	9.6		9.6	9.6		98.4	98.4		98.4	98.4	
Actuated g/C Ratio	0.08	0.08		0.08	0.08		0.82	0.82		0.82	0.82	
v/c Ratio	0.26	0.34		0.52	0.40		0.03	0.11		0.03	0.24	
Control Delay	56.8	27.1		70.0	28.6		1.9	1.4		2.6	2.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	56.8	27.1		70.0	28.6		1.9	1.4		2.6	2.8	

Lanes, Volumes, Timings
Wolf Springs Ranch TIA

2: 94th Street & Sweetwater Dr
Existing Conditions, AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	C		E	C		A	A		A	A	
Approach Delay		32.8			40.5			1.5			2.8	
Approach LOS		C			D			A			A	
Queue Length 50th (ft)	19	18		40	23		1	8		3	48	
Queue Length 95th (ft)	48	45		81	53		m6	27		10	80	
Internal Link Dist (ft)		572			242			1224			521	
Turn Bay Length (ft)	150			150			150			150		
Base Capacity (vph)	207	590		212	601		594	2872		849	2895	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.13	0.18		0.25	0.22		0.03	0.11		0.03	0.24	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 70 (58%), Referenced to phase 0:, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.52

Intersection Signal Delay: 10.4

Intersection LOS: B

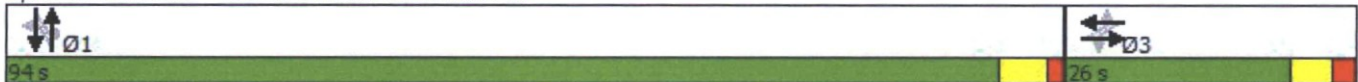
Intersection Capacity Utilization 38.4%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: 94th Street & Sweetwater Dr



Intersection

Int Delay, s/veh 0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘ ↗	↗ ↗	↗ ↗	↗	↘ ↗	↗
Traffic Vol, veh/h	15	991	1146	10	1	18
Future Vol, veh/h	15	991	1146	10	1	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	175	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	1101	1273	11	1	20

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1273	0	637
Stage 1	-	-	1273
Stage 2	-	-	584
Critical Hdwy	4.14	-	6.94
Critical Hdwy Stg 1	-	-	5.84
Critical Hdwy Stg 2	-	-	5.84
Follow-up Hdwy	2.22	-	3.32
Pot Cap-1 Maneuver	541	-	420
Stage 1	-	-	227
Stage 2	-	-	521
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	541	-	420
Mov Cap-2 Maneuver	-	-	63
Stage 1	-	-	227
Stage 2	-	-	505

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	16.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	541	-	-	-	63	420
HCM Lane V/C Ratio	0.031	-	-	-	0.018	0.048
HCM Control Delay (s)	11.9	-	-	-	63.2	14
HCM Lane LOS	B	-	-	-	F	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	0.1

Intersection

Int Delay, s/veh 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔ ↕ ↔			↔ ↕ ↔			↕			↕		
Traffic Vol, veh/h	5	92	4	4	63	11	12	0	12	27	1	23
Future Vol, veh/h	5	92	4	4	63	11	12	0	12	27	1	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	102	4	4	70	12	13	0	13	30	1	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	82	0	0	107	0	0	160	207	53	147	203	41
Stage 1	-	-	-	-	-	-	116	116	-	85	85	-
Stage 2	-	-	-	-	-	-	44	91	-	62	118	-
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	1513	-	-	1482	-	-	790	689	1003	807	692	1021
Stage 1	-	-	-	-	-	-	876	799	-	913	824	-
Stage 2	-	-	-	-	-	-	965	819	-	942	797	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1513	-	-	1482	-	-	765	684	1003	792	687	1021
Mov Cap-2 Maneuver	-	-	-	-	-	-	765	684	-	792	687	-
Stage 1	-	-	-	-	-	-	873	796	-	909	822	-
Stage 2	-	-	-	-	-	-	937	817	-	926	794	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.4	9.3	9.4
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	868	1513	-	-	1482	-	-	878
HCM Lane V/C Ratio	0.031	0.004	-	-	0.003	-	-	0.065
HCM Control Delay (s)	9.3	7.4	-	-	7.4	-	-	9.4
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.2

Intersection

Int Delay, s/veh 1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	1	2	10	23	1	27	2	315	34	27	684	4
Future Vol, veh/h	1	2	10	23	1	27	2	315	34	27	684	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	2	11	26	1	30	2	350	38	30	760	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1002	1214	382	814	1197	194	764	0	0	388	0	0
Stage 1	822	822	-	373	373	-	-	-	-	-	-	-
Stage 2	180	392	-	441	824	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
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	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	197	180	616	270	185	815	845	-	-	1167	-	-
Stage 1	334	386	-	620	617	-	-	-	-	-	-	-
Stage 2	804	605	-	565	385	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	185	175	616	257	180	815	845	-	-	1167	-	-
Mov Cap-2 Maneuver	185	175	-	257	180	-	-	-	-	-	-	-
Stage 1	333	376	-	619	616	-	-	-	-	-	-	-
Stage 2	771	604	-	537	375	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.5	15.5	0.1	0.3
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	845	-	-	393	398	1167	-	-
HCM Lane V/C Ratio	0.003	-	-	0.037	0.142	0.026	-	-
HCM Control Delay (s)	9.3	-	-	14.5	15.5	8.2	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.5	0.1	-	-

Lanes, Volumes, Timings
Wolf Springs Ranch

1: 94th Street & Cactus Rd
Existing Conditions, PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	681	143	83	503	43	202	475	32	62	305	162
Future Volume (vph)	219	709	149	86	523	45	210	494	33	65	317	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	250		175	125		300
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.974			0.988				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3447	0	1770	3497	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.376			0.235			0.501			0.348		
Satd. Flow (perm)	700	3447	0	438	3497	0	933	3539	1583	648	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			8				37			135
Link Speed (mph)		45			45			40				40
Link Distance (ft)		699			655			968				725
Travel Time (s)		10.6			9.9			16.5				12.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	243	788	166	96	581	50	233	549	37	72	352	188
Shared Lane Traffic (%)												
Lane Group Flow (vph)	243	954	0	96	631	0	233	549	37	72	352	188
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1		1	1		1
Detector Phase	3	3		3	3		1	1	1	1	1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	30.0	30.0		30.0	30.0		26.0	26.0	26.0	26.0	26.0	26.0
Total Split (s)	50.0	50.0		50.0	50.0		70.0	70.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%		41.7%	41.7%		58.3%	58.3%	58.3%	58.3%	58.3%	58.3%
Maximum Green (s)	44.0	44.0		44.0	44.0		64.0	64.0	64.0	64.0	64.0	64.0
Yellow Time (s)	3.8	3.8		3.8	3.8		4.4	4.4	4.4	4.4	4.4	4.4
All-Red Time (s)	2.2	2.2		2.2	2.2		1.6	1.6	1.6	1.6	1.6	1.6
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)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		Ped	Ped	Ped	Ped	Ped	Ped
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	67.0	67.0		67.0	67.0		41.0	41.0	41.0	41.0	41.0	41.0
Actuated g/C Ratio	0.56	0.56		0.56	0.56		0.34	0.34	0.34	0.34	0.34	0.34
v/c Ratio	0.62	0.49		0.39	0.32		0.73	0.45	0.07	0.33	0.29	0.30
Control Delay	31.5	19.4		26.8	17.1		46.1	30.6	5.6	27.9	27.1	7.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	19.4		26.8	17.1		46.1	30.6	5.6	27.9	27.1	7.1

Lanes, Volumes, Timings
Wolf Springs Ranch

1: 94th Street & Cactus Rd
Existing Conditions, PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	B		C	B		D	C	A	C	C	A
Approach Delay		21.9			18.4			33.9			21.0	
Approach LOS		C			B			C			C	
Queue Length 50th (ft)	122	221		40	131		157	172	0	39	98	23
Queue Length 95th (ft)	#330	384		122	235		196	167	18	56	99	53
Internal Link Dist (ft)		619			575			888			645	
Turn Bay Length (ft)	200			200			250		175	125		300
Base Capacity (vph)	390	1933		244	1954		497	1887	861	345	1887	907
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.49		0.39	0.32		0.47	0.29	0.04	0.21	0.19	0.21

Intersection Summary





















Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 105 (88%), Referenced to phase 3:EBWB, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 23.9
 Intersection LOS: C
 Intersection Capacity Utilization 83.4%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: 94th Street & Cactus Rd



Lanes, Volumes, Timings
Wolf Springs Ranch

2: 94th Street & Sweetwater Dr
Existing Conditions, PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	31	45	15	34	36	52	583	34	37	467	29
Future Volume (vph)	22	32	47	16	35	37	54	607	35	39	486	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.911			0.923			0.992			0.991	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3224	0	1770	3267	0	1770	3511	0	1770	3507	0
Flt Permitted	0.702			0.697			0.436			0.381		
Satd. Flow (perm)	1308	3224	0	1298	3267	0	812	3511	0	710	3507	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		52			41			13			14	
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		652			322			1304			601	
Travel Time (s)		9.9			4.9			22.2			10.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	24	36	52	18	39	41	60	674	39	43	540	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	88	0	18	80	0	60	713	0	43	573	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		36.0	36.0		36.0	36.0	
Total Split (s)	26.0	26.0		26.0	26.0		94.0	94.0		94.0	94.0	
Total Split (%)	21.7%	21.7%		21.7%	21.7%		78.3%	78.3%		78.3%	78.3%	
Maximum Green (s)	20.0	20.0		20.0	20.0		88.0	88.0		88.0	88.0	
Yellow Time (s)	3.7	3.7		3.7	3.7		4.3	4.3		4.3	4.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		1.7	1.7		1.7	1.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	6.0	6.0		6.0	6.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	7.2	7.2		7.2	7.2		100.8	100.8		100.8	100.8	
Actuated g/C Ratio	0.06	0.06		0.06	0.06		0.84	0.84		0.84	0.84	
v/c Ratio	0.31	0.36		0.23	0.34		0.09	0.24		0.07	0.19	
Control Delay	63.5	29.5		60.2	33.0		1.8	1.7		2.1	2.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	63.5	29.5		60.2	33.0		1.8	1.7		2.1	2.0	

Lanes, Volumes, Timings
Wolf Springs Ranch

2: 94th Street & Sweetwater Dr
Existing Conditions, PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	C		E	C		A	A		A	A	
Approach Delay		36.8			38.0			1.7			2.0	
Approach LOS		D			D			A			A	
Queue Length 50th (ft)	18	14		14	15		4	26		4	30	
Queue Length 95th (ft)	46	41		38	41		m12	50		12	50	
Internal Link Dist (ft)		572			242			1224			521	
Turn Bay Length (ft)	150			150			150			150		
Base Capacity (vph)	218	580		216	578		682	2950		596	2947	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.11	0.15		0.08	0.14		0.09	0.24		0.07	0.19	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 25 (21%), Referenced to phase 1:NBSB, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.36
 Intersection Signal Delay: 6.5 Intersection LOS: A
 Intersection Capacity Utilization 48.4% ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: 94th Street & Sweetwater Dr



Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘ ↑↑	↑↑	↑↑ ↘	↘	↘	↘
Traffic Vol, veh/h	31	1092	853	11	3	24
Future Vol, veh/h	32	1136	888	11	3	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	175	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	36	1262	987	12	3	28

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	987	0	1689
Stage 1	-	-	987
Stage 2	-	-	702
Critical Hdwy	4.14	-	6.84
Critical Hdwy Stg 1	-	-	5.84
Critical Hdwy Stg 2	-	-	5.84
Follow-up Hdwy	2.22	-	3.52
Pot Cap-1 Maneuver	696	-	84
Stage 1	-	-	322
Stage 2	-	-	453
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	696	-	80
Mov Cap-2 Maneuver	-	-	80
Stage 1	-	-	322
Stage 2	-	-	430

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	16.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	696	-	-	-	80	522
HCM Lane V/C Ratio	0.051	-	-	-	0.042	0.053
HCM Control Delay (s)	10.5	-	-	-	51.9	12.3
HCM Lane LOS	B	-	-	-	F	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.2

Intersection

Int Delay, s/veh 2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘ ↗	↕		↘ ↗	↕		↕			↕		
Traffic Vol, veh/h	13	76	18	9	87	12	8	0	10	16	0	7
Future Vol, veh/h	14	79	19	9	91	12	8	0	10	17	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	88	21	10	101	13	9	0	11	19	0	8

Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	114	0	0	109	0	0	200	263	54	203	268	57
Stage 1	-	-	-	-	-	-	129	129	-	128	128	-
Stage 2	-	-	-	-	-	-	71	134	-	75	140	-
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	1473	-	-	1479	-	-	741	641	1002	737	637	997
Stage 1	-	-	-	-	-	-	861	788	-	862	789	-
Stage 2	-	-	-	-	-	-	931	785	-	926	780	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1473	-	-	1479	-	-	725	630	1002	719	626	997
Mov Cap-2 Maneuver	-	-	-	-	-	-	725	630	-	719	626	-
Stage 1	-	-	-	-	-	-	852	779	-	853	784	-
Stage 2	-	-	-	-	-	-	917	780	-	906	772	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0.6	9.3	9.8
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	857	1473	-	-	1479	-	-	783
HCM Lane V/C Ratio	0.023	0.011	-	-	0.007	-	-	0.034
HCM Control Delay (s)	9.3	7.5	-	-	7.5	-	-	9.8
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection

Int Delay, s/veh 0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	7	3	3	8	2	13	5	701	19	6	532	4
Future Vol, veh/h	7	3	3	8	2	14	5	729	20	6	554	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	3	3	9	2	16	6	810	22	7	616	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1048	1474	310	1155	1465	416	620	0	0	832	0	0
Stage 1	631	631	-	832	832	-	-	-	-	-	-	-
Stage 2	417	843	-	323	633	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
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	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	182	125	686	152	127	585	956	-	-	796	-	-
Stage 1	436	473	-	330	382	-	-	-	-	-	-	-
Stage 2	584	378	-	663	472	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	173	123	686	146	125	585	956	-	-	796	-	-
Mov Cap-2 Maneuver	173	123	-	146	125	-	-	-	-	-	-	-
Stage 1	433	469	-	328	380	-	-	-	-	-	-	-
Stage 2	562	376	-	649	468	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	25.7	20.9	0.1	0.1
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	956	-	-	188	253	796	-	-
HCM Lane V/C Ratio	0.006	-	-	0.077	0.105	0.008	-	-
HCM Control Delay (s)	8.8	-	-	25.7	20.9	9.6	-	-
HCM Lane LOS	A	-	-	D	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.3	0	-	-

Lanes, Volumes, Timings
Wolf Springs Ranch TIA

1: 94th Street & Cactus Rd
2020 No-Build Conditions, AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	588	262	54	758	44	112	194	12	99	349	288
Future Volume (vph)	129	588	262	54	758	44	112	194	12	99	349	288
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	250		175	125		300
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.954			0.992				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3376	0	1770	3511	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.279			0.259			0.438			0.617		
Satd. Flow (perm)	520	3376	0	482	3511	0	816	3539	1583	1149	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		67			6				27			50
Link Speed (mph)		40			40			40				40
Link Distance (ft)		699			655			968				725
Travel Time (s)		11.9			11.2			16.5				12.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	143	653	291	60	842	49	124	216	13	110	388	320
Shared Lane Traffic (%)												
Lane Group Flow (vph)	143	944	0	60	891	0	124	216	13	110	388	320
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		3			3			1				1
Permitted Phases	3			3			1		1	1		1
Detector Phase	3	3		3	3		1	1	1	1	1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	30.0	30.0		30.0	30.0		26.0	26.0	26.0	26.0	26.0	26.0
Total Split (s)	50.0	50.0		50.0	50.0		70.0	70.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%		41.7%	41.7%		58.3%	58.3%	58.3%	58.3%	58.3%	58.3%
Maximum Green (s)	44.0	44.0		44.0	44.0		64.0	64.0	64.0	64.0	64.0	64.0
Yellow Time (s)	3.8	3.8		3.8	3.8		4.4	4.4	4.4	4.4	4.4	4.4
All-Red Time (s)	2.2	2.2		2.2	2.2		1.6	1.6	1.6	1.6	1.6	1.6
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)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	None
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	75.7	75.7		75.7	75.7		32.3	32.3	32.3	32.3	32.3	32.3
Actuated g/C Ratio	0.63	0.63		0.63	0.63		0.27	0.27	0.27	0.27	0.27	0.27
v/c Ratio	0.44	0.44		0.20	0.40		0.57	0.23	0.03	0.36	0.41	0.69
Control Delay	19.9	12.6		14.7	13.1		45.8	32.8	3.3	38.1	37.7	41.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.9	12.6		14.7	13.1		45.8	32.8	3.3	38.1	37.7	41.6

Lanes, Volumes, Timings
Wolf Springs Ranch TIA

1: 94th Street & Cactus Rd
2020 No-Build Conditions, AM Peak

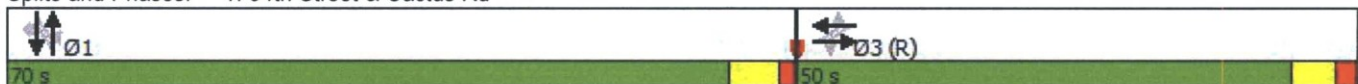


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	B		B	B		D	C	A	D	D	D
Approach Delay		13.6			13.2			36.3			39.3	
Approach LOS		B			B			D			D	
Queue Length 50th (ft)	52	165		18	163		84	68	0	72	135	196
Queue Length 95th (ft)	147	293		57	285		125	84	7	112	158	263
Internal Link Dist (ft)		619			575			888			645	
Turn Bay Length (ft)	200			200			250		175	125		300
Base Capacity (vph)	327	2153		304	2216		435	1887	856	612	1887	867
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.44		0.20	0.40		0.29	0.11	0.02	0.18	0.21	0.37

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	50 (42%), Referenced to phase 3:EBWB, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.69
Intersection Signal Delay:	22.5
Intersection LOS:	C
Intersection Capacity Utilization:	84.6%
ICU Level of Service:	E
Analysis Period (min):	15

Splits and Phases: 1: 94th Street & Cactus Rd



Lanes, Volumes, Timings
Wolf Springs Ranch TIA

2: 94th Street & Sweetwater Dr
2020 No-Build Conditions, AM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	44	57	50	57	66	19	280	23	24	639	9
Future Volume (vph)	24	44	57	50	57	66	19	280	23	24	639	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.916			0.919			0.988			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3242	0	1770	3253	0	1770	3497	0	1770	3532	0
Flt Permitted	0.666			0.681			0.378			0.549		
Satd. Flow (perm)	1241	3242	0	1269	3253	0	704	3497	0	1023	3532	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		63			73			19			3	
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		652			322			1304			601	
Travel Time (s)		9.9			4.9			22.2			10.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	27	49	63	56	63	73	21	311	26	27	710	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	112	0	56	136	0	21	337	0	27	720	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		36.0	36.0		36.0	36.0	
Total Split (s)	26.0	26.0		26.0	26.0		94.0	94.0		94.0	94.0	
Total Split (%)	21.7%	21.7%		21.7%	21.7%		78.3%	78.3%		78.3%	78.3%	
Maximum Green (s)	20.0	20.0		20.0	20.0		88.0	88.0		88.0	88.0	
Yellow Time (s)	3.7	3.7		3.7	3.7		4.3	4.3		4.3	4.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		1.7	1.7		1.7	1.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	
Walk Time (s)	6.0	6.0		6.0	6.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)	9.9	9.9		9.9	9.9		98.1	98.1		98.1	98.1	
Actuated g/C Ratio	0.08	0.08		0.08	0.08		0.82	0.82		0.82	0.82	
v/c Ratio	0.26	0.34		0.54	0.40		0.04	0.12		0.03	0.25	
Control Delay	56.4	26.8		70.3	28.2		2.3	1.6		2.7	2.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	56.4	26.8		70.3	28.2		2.3	1.6		2.7	2.9	

Lanes, Volumes, Timings
Wolf Springs Ranch TIA

2: 94th Street & Sweetwater Dr
2020 No-Build Conditions, AM Peak

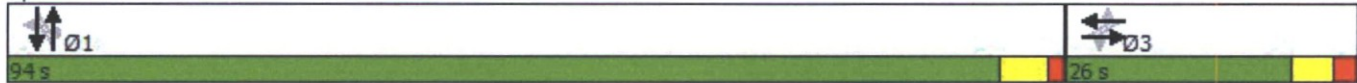


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	C		E	C		A	A		A	A	
Approach Delay		32.6			40.5			1.7			2.9	
Approach LOS		C			D			A			A	
Queue Length 50th (ft)	20	18		42	24		1	9		3	51	
Queue Length 95th (ft)	49	46		84	54		m8	36		10	86	
Internal Link Dist (ft)		572			242			1224			521	
Turn Bay Length (ft)	150			150			150			150		
Base Capacity (vph)	206	592		211	603		575	2861		836	2887	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.13	0.19		0.27	0.23		0.04	0.12		0.03	0.25	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 70 (58%), Referenced to phase 0:, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.54
 Intersection Signal Delay: 10.5 Intersection LOS: B
 Intersection Capacity Utilization 44.9% ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: 94th Street & Sweetwater Dr



Intersection

Int Delay, s/veh 0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘ ↗	↗ ↗	↗ ↗	↘ ↗	↘ ↗	↘ ↗
Traffic Vol, veh/h	16	1031	1193	10	1	19
Future Vol, veh/h	16	1031	1193	10	1	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	175	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	18	1146	1326	11	1	21

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1326	0	663
Stage 1	-	-	-
Stage 2	-	-	608
Critical Hdwy	4.14	-	6.94
Critical Hdwy Stg 1	-	-	5.84
Critical Hdwy Stg 2	-	-	5.84
Follow-up Hdwy	2.22	-	3.32
Pot Cap-1 Maneuver	517	-	404
Stage 1	-	-	212
Stage 2	-	-	506
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	517	-	404
Mov Cap-2 Maneuver	-	-	56
Stage 1	-	-	212
Stage 2	-	-	488

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	17.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	517	-	-	-	56	404
HCM Lane V/C Ratio	0.034	-	-	-	0.02	0.052
HCM Control Delay (s)	12.2	-	-	-	70.6	14.4
HCM Lane LOS	B	-	-	-	F	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	0.2

Intersection

Int Delay, s/veh 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↕		↘	↕			↕			↕	
Traffic Vol, veh/h	5	96	4	4	66	11	12	0	12	28	1	24
Future Vol, veh/h	5	96	4	4	66	11	12	0	12	28	1	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	107	4	4	73	12	13	0	13	31	1	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	86	0	0	111	0	0	166	214	56	152	210	43
Stage 1	-	-	-	-	-	-	120	120	-	88	88	-
Stage 2	-	-	-	-	-	-	46	94	-	64	122	-
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	1508	-	-	1477	-	-	783	682	999	801	686	1018
Stage 1	-	-	-	-	-	-	872	796	-	910	821	-
Stage 2	-	-	-	-	-	-	962	816	-	939	794	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1508	-	-	1477	-	-	758	677	999	786	681	1018
Mov Cap-2 Maneuver	-	-	-	-	-	-	758	677	-	786	681	-
Stage 1	-	-	-	-	-	-	869	793	-	906	819	-
Stage 2	-	-	-	-	-	-	933	814	-	923	791	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.4	9.3	9.4
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	862	1508	-	-	1477	-	-	874
HCM Lane V/C Ratio	0.031	0.004	-	-	0.003	-	-	0.067
HCM Control Delay (s)	9.3	7.4	-	-	7.4	-	-	9.4
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.2

Intersection

Int Delay, s/veh 1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	1	2	10	24	1	28	2	328	35	28	712	4
Future Vol, veh/h	1	2	10	24	1	28	2	328	35	28	712	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	2	11	27	1	31	2	364	39	31	791	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1043	1264	398	847	1246	202	796	0	0	403	0	0
Stage 1	856	856	-	388	388	-	-	-	-	-	-	-
Stage 2	187	408	-	459	858	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
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	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	184	168	601	255	172	805	822	-	-	1152	-	-
Stage 1	319	373	-	607	607	-	-	-	-	-	-	-
Stage 2	797	595	-	551	372	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	172	163	601	242	167	805	822	-	-	1152	-	-
Mov Cap-2 Maneuver	172	163	-	242	167	-	-	-	-	-	-	-
Stage 1	318	363	-	606	606	-	-	-	-	-	-	-
Stage 2	763	594	-	523	362	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15	16.2	0.1	0.3
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	822	-	-	374	379	1152	-	-
HCM Lane V/C Ratio	0.003	-	-	0.039	0.155	0.027	-	-
HCM Control Delay (s)	9.4	-	-	15	16.2	8.2	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.5	0.1	-	-

Lanes, Volumes, Timings
Wolf Springs Ranch

1: 94th Street & Cactus Rd
2020 No Build Conditions, PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	219	709	149	86	523	45	210	494	33	65	317	169
Future Volume (vph)	228	738	155	89	544	47	219	514	34	68	330	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	250		175	125		300
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.974			0.988				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3447	0	1770	3497	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.359			0.216			0.493			0.341		
Satd. Flow (perm)	669	3447	0	402	3497	0	918	3539	1583	635	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			8				38			124
Link Speed (mph)		45			45			40				40
Link Distance (ft)		699			655			968				725
Travel Time (s)		10.6			9.9			16.5				12.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	253	820	172	99	604	52	243	571	38	76	367	196
Shared Lane Traffic (%)												
Lane Group Flow (vph)	253	992	0	99	656	0	243	571	38	76	367	196
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		3			3			1				1
Permitted Phases	3			3			1		1	1		1
Detector Phase	3	3		3	3		1	1	1	1	1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	30.0	30.0		30.0	30.0		26.0	26.0	26.0	26.0	26.0	26.0
Total Split (s)	50.0	50.0		50.0	50.0		70.0	70.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%		41.7%	41.7%		58.3%	58.3%	58.3%	58.3%	58.3%	58.3%
Maximum Green (s)	44.0	44.0		44.0	44.0		64.0	64.0	64.0	64.0	64.0	64.0
Yellow Time (s)	3.8	3.8		3.8	3.8		4.4	4.4	4.4	4.4	4.4	4.4
All-Red Time (s)	2.2	2.2		2.2	2.2		1.6	1.6	1.6	1.6	1.6	1.6
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)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		Ped	Ped	Ped	Ped	Ped	Ped
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	65.1	65.1		65.1	65.1		42.9	42.9	42.9	42.9	42.9	42.9
Actuated g/C Ratio	0.54	0.54		0.54	0.54		0.36	0.36	0.36	0.36	0.36	0.36
v/c Ratio	0.70	0.53		0.46	0.35		0.74	0.45	0.06	0.33	0.29	0.30
Control Delay	37.3	21.2		31.5	18.4		45.5	29.4	5.3	27.0	25.4	8.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.3	21.2		31.5	18.4		45.5	29.4	5.3	27.0	25.4	8.3

Lanes, Volumes, Timings
Wolf Springs Ranch

1: 94th Street & Cactus Rd
2020 No Build Conditions, PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C		C	B		D	C	A	C	C	A
Approach Delay		24.5			20.2			32.9			20.4	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	139	243		45	142		163	176	0	41	100	33
Queue Length 95th (ft)	#366	417		#149	253		200	168	18	57	100	59
Internal Link Dist (ft)		619			575			888			645	
Turn Bay Length (ft)	200			200			250		175	125		300
Base Capacity (vph)	362	1879		217	1899		489	1887	862	338	1887	902
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.53		0.46	0.35		0.50	0.30	0.04	0.22	0.19	0.22

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 105 (88%), Referenced to phase 3:EBWB, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 24.8
 Intersection LOS: C
 Intersection Capacity Utilization 84.4%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: 94th Street & Cactus Rd



Lanes, Volumes, Timings
Wolf Springs Ranch

2: 94th Street & Sweetwater Dr
2020 No Build Conditions, PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	32	47	16	35	37	54	607	35	39	486	30
Future Volume (vph)	23	33	49	17	36	39	56	632	36	41	506	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.911			0.922			0.992			0.991	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3224	0	1770	3263	0	1770	3511	0	1770	3507	0
Flt Permitted	0.700			0.695			0.427			0.370		
Satd. Flow (perm)	1304	3224	0	1295	3263	0	795	3511	0	689	3507	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		54			43			13			14	
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		652			322			1304			601	
Travel Time (s)		9.9			4.9			22.2			10.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	26	37	54	19	40	43	62	702	40	46	562	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	91	0	19	83	0	62	742	0	46	596	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		36.0	36.0		36.0	36.0	
Total Split (s)	26.0	26.0		26.0	26.0		94.0	94.0		94.0	94.0	
Total Split (%)	21.7%	21.7%		21.7%	21.7%		78.3%	78.3%		78.3%	78.3%	
Maximum Green (s)	20.0	20.0		20.0	20.0		88.0	88.0		88.0	88.0	
Yellow Time (s)	3.7	3.7		3.7	3.7		4.3	4.3		4.3	4.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		1.7	1.7		1.7	1.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	6.0	6.0		6.0	6.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	7.4	7.4		7.4	7.4		100.6	100.6		100.6	100.6	
Actuated g/C Ratio	0.06	0.06		0.06	0.06		0.84	0.84		0.84	0.84	
v/c Ratio	0.33	0.37		0.24	0.34		0.09	0.25		0.08	0.20	
Control Delay	63.9	29.0		60.1	32.4		1.9	1.9		2.2	2.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	63.9	29.0		60.1	32.4		1.9	1.9		2.2	2.1	

Lanes, Volumes, Timings
Wolf Springs Ranch

2: 94th Street & Sweetwater Dr
2020 No Build Conditions, PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	E	C		E	C		A	A		A	A	
Approach Delay		36.8			37.5			1.9			2.1	
Approach LOS		D			D			A			A	
Queue Length 50th (ft)	20	14		14	15		5	30		4	32	
Queue Length 95th (ft)	49	41		39	41		m12	54		13	53	
Internal Link Dist (ft)		572			242			1224			521	
Turn Bay Length (ft)	150			150			150			150		
Base Capacity (vph)	217	582		215	579		666	2944		577	2941	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.12	0.16		0.09	0.14		0.09	0.25		0.08	0.20	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 25 (21%), Referenced to phase 1:NBSB, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.37
 Intersection Signal Delay: 6.6 Intersection LOS: A
 Intersection Capacity Utilization 49.1% ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: 94th Street & Sweetwater Dr



Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘ ↗	↗ ↗	↗ ↗	↗ ↗	↘ ↗	↗ ↗
Traffic Vol, veh/h	32	1136	888	11	3	25
Future Vol, veh/h	33	1182	924	11	3	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	175	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	1313	1027	12	3	29

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1027	0	1757
Stage 1	-	-	1027
Stage 2	-	-	730
Critical Hdwy	4.14	-	6.84
Critical Hdwy Stg 1	-	-	5.84
Critical Hdwy Stg 2	-	-	5.84
Follow-up Hdwy	2.22	-	3.52
Pot Cap-1 Maneuver	672	-	506
Stage 1	-	-	306
Stage 2	-	-	438
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	672	-	506
Mov Cap-2 Maneuver	-	-	72
Stage 1	-	-	306
Stage 2	-	-	414

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	17.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	672	-	-	-	72	506
HCM Lane V/C Ratio	0.055	-	-	-	0.046	0.057
HCM Control Delay (s)	10.7	-	-	-	57.4	12.5
HCM Lane LOS	B	-	-	-	F	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.2

Intersection

Int Delay, s/veh 2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔ ↕ ↔			↔ ↕ ↔			↔			↔		
Traffic Vol, veh/h	14	79	19	9	91	12	8	0	10	17	0	7
Future Vol, veh/h	15	82	20	9	95	12	8	0	10	18	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	91	22	10	106	13	9	0	11	20	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	119	0	0	113	0	0	209	275	57	211	279	59
Stage 1	-	-	-	-	-	-	136	136	-	132	132	-
Stage 2	-	-	-	-	-	-	73	139	-	79	147	-
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	1467	-	-	1474	-	-	730	631	997	728	628	994
Stage 1	-	-	-	-	-	-	853	783	-	858	786	-
Stage 2	-	-	-	-	-	-	928	781	-	921	774	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1467	-	-	1474	-	-	714	619	997	710	617	994
Mov Cap-2 Maneuver	-	-	-	-	-	-	714	619	-	710	617	-
Stage 1	-	-	-	-	-	-	843	774	-	848	781	-
Stage 2	-	-	-	-	-	-	914	776	-	900	765	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.6	9.3	9.8
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	848	1467	-	-	1474	-	-	772
HCM Lane V/C Ratio	0.024	0.011	-	-	0.007	-	-	0.036
HCM Control Delay (s)	9.3	7.5	-	-	7.5	-	-	9.8
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection

Int Delay, s/veh 0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	7	3	3	8	2	14	5	729	20	6	554	4
Future Vol, veh/h	7	3	3	8	2	15	5	759	21	6	576	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	3	3	9	2	17	6	843	23	7	640	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1090	1534	322	1201	1524	433	644	0	0	867	0	0
Stage 1	656	656	-	866	866	-	-	-	-	-	-	-
Stage 2	434	878	-	335	658	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
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	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	170	115	674	140	117	571	937	-	-	772	-	-
Stage 1	421	460	-	314	369	-	-	-	-	-	-	-
Stage 2	570	364	-	653	459	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	161	113	674	135	115	571	937	-	-	772	-	-
Mov Cap-2 Maneuver	161	113	-	135	115	-	-	-	-	-	-	-
Stage 1	418	456	-	312	367	-	-	-	-	-	-	-
Stage 2	546	362	-	639	455	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	27.4	21.7	0.1	0.1
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	937	-	-	175	243	772	-	-
HCM Lane V/C Ratio	0.006	-	-	0.083	0.114	0.009	-	-
HCM Control Delay (s)	8.9	-	-	27.4	21.7	9.7	-	-
HCM Lane LOS	A	-	-	D	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.4	0	-	-

Intersection

Int Delay, s/veh 2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙ ↕	↕ ↕		↙ ↕	↕ ↕			↕			↕	
Traffic Vol, veh/h	14	79	19	9	91	12	8	0	10	17	0	7
Future Vol, veh/h	15	82	20	9	95	12	8	0	10	18	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	91	22	10	106	13	9	0	11	20	0	8

Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	119	0	0	113	0	0	209	275	57	211	279	59
Stage 1	-	-	-	-	-	-	136	136	-	132	132	-
Stage 2	-	-	-	-	-	-	73	139	-	79	147	-
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	1467	-	-	1474	-	-	730	631	997	728	628	994
Stage 1	-	-	-	-	-	-	853	783	-	858	786	-
Stage 2	-	-	-	-	-	-	928	781	-	921	774	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1467	-	-	1474	-	-	714	619	997	710	617	994
Mov Cap-2 Maneuver	-	-	-	-	-	-	714	619	-	710	617	-
Stage 1	-	-	-	-	-	-	843	774	-	848	781	-
Stage 2	-	-	-	-	-	-	914	776	-	900	765	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.6	9.3	9.8
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	848	1467	-	-	1474	-	-	772
HCM Lane V/C Ratio	0.024	0.011	-	-	0.007	-	-	0.036
HCM Control Delay (s)	9.3	7.5	-	-	7.5	-	-	9.8
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection

Int Delay, s/veh 0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	7	3	3	8	2	14	5	729	20	6	554	4
Future Vol, veh/h	7	3	3	8	2	15	5	759	21	6	576	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	3	3	9	2	17	6	843	23	7	640	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1090	1534	322	1201	1524	433	644	0	0	867	0	0
Stage 1	656	656	-	866	866	-	-	-	-	-	-	-
Stage 2	434	878	-	335	658	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
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	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	170	115	674	140	117	571	937	-	-	772	-	-
Stage 1	421	460	-	314	369	-	-	-	-	-	-	-
Stage 2	570	364	-	653	459	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	161	113	674	135	115	571	937	-	-	772	-	-
Mov Cap-2 Maneuver	161	113	-	135	115	-	-	-	-	-	-	-
Stage 1	418	456	-	312	367	-	-	-	-	-	-	-
Stage 2	546	362	-	639	455	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	27.4	21.7	0.1	0.1
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	937	-	-	175	243	772	-	-
HCM Lane V/C Ratio	0.006	-	-	0.083	0.114	0.009	-	-
HCM Control Delay (s)	8.9	-	-	27.4	21.7	9.7	-	-
HCM Lane LOS	A	-	-	D	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.4	0	-	-

Lanes, Volumes, Timings
Wolf Springs Ranch

3: 94th Street & Cactus Rd
2020 Build Conditions, AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↕		↙	↕		↙	↕	↗	↙	↕	↗
Traffic Volume (vph)	133	588	262	54	758	44	112	195	12	100	352	301
Future Volume (vph)	138	612	273	56	789	46	117	203	12	104	366	313
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	250		175	125		300
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frnt		0.954			0.992				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3376	0	1770	3511	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.270			0.251			0.406			0.603		
Satd. Flow (perm)	503	3376	0	468	3511	0	756	3539	1583	1123	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		91			8				27			124
Link Speed (mph)		45			45			40				40
Link Distance (ft)		699			655			968				725
Travel Time (s)		10.6			9.9			16.5				12.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	153	680	303	62	877	51	130	226	13	116	407	348
Shared Lane Traffic (%)												
Lane Group Flow (vph)	153	983	0	62	928	0	130	226	13	116	407	348
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1		1	1		1
Detector Phase	3	3		3	3		1	1	1	1	1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	30.0	30.0		30.0	30.0		26.0	26.0	26.0	26.0	26.0	26.0
Total Split (s)	70.0	70.0		70.0	70.0		50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	58.3%	58.3%		58.3%	58.3%		41.7%	41.7%	41.7%	41.7%	41.7%	41.7%
Maximum Green (s)	64.0	64.0		64.0	64.0		44.0	44.0	44.0	44.0	44.0	44.0
Yellow Time (s)	3.8	3.8		3.8	3.8		4.4	4.4	4.4	4.4	4.4	4.4
All-Red Time (s)	2.2	2.2		2.2	2.2		1.6	1.6	1.6	1.6	1.6	1.6
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)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		Ped	Ped	Ped	Ped	Ped	Ped
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	78.2	78.2		78.2	78.2		29.8	29.8	29.8	29.8	29.8	29.8
Actuated g/C Ratio	0.65	0.65		0.65	0.65		0.25	0.25	0.25	0.25	0.25	0.25
v/c Ratio	0.47	0.44		0.20	0.41		0.70	0.26	0.03	0.42	0.46	0.72
Control Delay	19.5	11.1		13.4	11.8		58.3	35.2	3.6	48.0	45.4	42.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.5	11.1		13.4	11.8		58.3	35.2	3.6	48.0	45.4	42.8

Lanes, Volumes, Timings
Wolf Springs Ranch

3: 94th Street & Cactus Rd
2020 Build Conditions, AM Peak



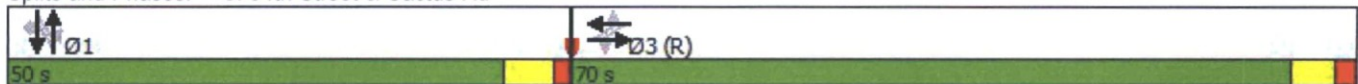
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	B		B	B		E	D	A	D	D	D
Approach Delay		12.3			11.9			42.2			44.7	
Approach LOS		B			B			D			D	
Queue Length 50th (ft)	52	154		17	156		94	75	0	82	152	186
Queue Length 95th (ft)	157	286		56	283		141	91	7	138	195	282
Internal Link Dist (ft)		619			575			888			645	
Turn Bay Length (ft)	200			200			250		175	125		300
Base Capacity (vph)	327	2231		305	2290		277	1297	597	411	1297	658
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.44		0.20	0.41		0.47	0.17	0.02	0.28	0.31	0.53

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 50 (42%), Referenced to phase 3:EBWB, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 23.8
 Intersection Capacity Utilization 84.6%
 Analysis Period (min) 15





















Intersection LOS: C
 ICU Level of Service E

Splits and Phases: 3: 94th Street & Cactus Rd



Lanes, Volumes, Timings
Wolf Springs Ranch

11: 94th Street & Sweetwater Dr
2020 Build Conditions, AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	44	58	50	57	66	22	289	23	24	642	9
Future Volume (vph)	25	46	60	52	59	69	23	301	24	25	668	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.915			0.919			0.989			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3238	0	1770	3253	0	1770	3500	0	1770	3532	0
Flt Permitted	0.661			0.677			0.354			0.536		
Satd. Flow (perm)	1231	3238	0	1261	3253	0	659	3500	0	998	3532	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		67			77			18			3	
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		652			322			1304			601	
Travel Time (s)		9.9			4.9			22.2			10.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	28	51	67	58	66	77	26	334	27	28	742	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	118	0	58	143	0	26	361	0	28	752	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		36.0	36.0		36.0	36.0	
Total Split (s)	27.0	27.0		27.0	27.0		93.0	93.0		93.0	93.0	
Total Split (%)	22.5%	22.5%		22.5%	22.5%		77.5%	77.5%		77.5%	77.5%	
Maximum Green (s)	21.0	21.0		21.0	21.0		87.0	87.0		87.0	87.0	
Yellow Time (s)	3.7	3.7		3.7	3.7		4.3	4.3		4.3	4.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		1.7	1.7		1.7	1.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Ped	Ped		Ped	Ped		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	6.0	6.0		6.0	6.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	20.0	20.0		20.0	20.0		88.0	88.0		88.0	88.0	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.73	0.73		0.73	0.73	
v/c Ratio	0.14	0.20		0.28	0.24		0.05	0.14		0.04	0.29	
Control Delay	44.7	21.1		47.8	21.9		4.4	3.9		4.6	5.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	44.7	21.1		47.8	21.9		4.4	3.9		4.6	5.7	

Lanes, Volumes, Timings
Wolf Springs Ranch

11: 94th Street & Sweetwater Dr
2020 Build Conditions, AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C		D	C		A	A		A	A	
Approach Delay		25.6			29.4			3.9			5.7	
Approach LOS		C			C			A			A	
Queue Length 50th (ft)	19	17		40	23		4	30		5	90	
Queue Length 95th (ft)	47	45		82	53		m11	42		13	114	
Internal Link Dist (ft)		572			242			1224			521	
Turn Bay Length (ft)	150			150			150			150		
Base Capacity (vph)	215	621		220	632		483	2571		731	2590	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.13	0.19		0.26	0.23		0.05	0.14		0.04	0.29	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 1:NBSB, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.29

Intersection Signal Delay: 10.3

Intersection LOS: B

Intersection Capacity Utilization 44.9%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: 94th Street & Sweetwater Dr



Intersection

Int Delay, s/veh 0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘ ↑↑	↑↑	↑↑ ↘	↘	↘	↘
Traffic Vol, veh/h	16	1035	1205	10	1	19
Future Vol, veh/h	17	1077	1254	10	1	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	175	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	19	1197	1393	11	1	22

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1393	0	697
Stage 1	-	-	1393
Stage 2	-	-	636
Critical Hdwy	4.14	-	6.94
Critical Hdwy Stg 1	-	-	5.84
Critical Hdwy Stg 2	-	-	5.84
Follow-up Hdwy	2.22	-	3.32
Pot Cap-1 Maneuver	487	-	383
Stage 1	-	-	195
Stage 2	-	-	489
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	487	-	383
Mov Cap-2 Maneuver	-	-	48
Stage 1	-	-	195
Stage 2	-	-	470

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	18.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	487	-	-	-	48	383
HCM Lane V/C Ratio	0.039	-	-	-	0.023	0.058
HCM Control Delay (s)	12.7	-	-	-	81.8	15
HCM Lane LOS	B	-	-	-	F	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	0.2

Intersection

Int Delay, s/veh 1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	1	2	10	24	1	28	2	340	35	28	716	4
Future Vol, veh/h	1	2	10	25	1	29	2	354	36	29	745	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	2	11	28	1	32	2	393	40	32	828	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1096	1332	416	897	1315	217	832	0	0	433	0	0
Stage 1	894	894	-	418	418	-	-	-	-	-	-	-
Stage 2	202	438	-	479	897	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
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	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	168	153	585	235	157	787	796	-	-	1123	-	-
Stage 1	302	358	-	583	589	-	-	-	-	-	-	-
Stage 2	781	577	-	537	357	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	156	148	585	223	152	787	796	-	-	1123	-	-
Mov Cap-2 Maneuver	156	148	-	223	152	-	-	-	-	-	-	-
Stage 1	301	348	-	582	588	-	-	-	-	-	-	-
Stage 2	746	576	-	509	347	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.7	17.3	0	0.3
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	796	-	-	351	354	1123	-	-
HCM Lane V/C Ratio	0.003	-	-	0.041	0.173	0.029	-	-
HCM Control Delay (s)	9.5	-	-	15.7	17.3	8.3	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.6	0.1	-	-

Intersection

Int Delay, s/veh 2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↕		↖ ↗	↕		↕				↕	
Traffic Vol, veh/h	5	97	4	4	69	11	12	0	12	28	1	24
Future Vol, veh/h	5	101	4	4	72	11	12	0	12	29	1	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	112	4	4	80	12	13	0	13	32	1	28

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	92	0	0	117	0	0	175	227	58	162	223	46
Stage 1	-	-	-	-	-	-	126	126	-	95	95	-
Stage 2	-	-	-	-	-	-	49	101	-	67	128	-
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	1501	-	-	1469	-	-	771	671	996	788	675	1014
Stage 1	-	-	-	-	-	-	865	791	-	901	815	-
Stage 2	-	-	-	-	-	-	958	811	-	936	789	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1501	-	-	1469	-	-	745	666	996	773	670	1014
Mov Cap-2 Maneuver	-	-	-	-	-	-	745	666	-	773	670	-
Stage 1	-	-	-	-	-	-	862	788	-	897	813	-
Stage 2	-	-	-	-	-	-	928	809	-	920	786	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.3	9.4	9.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	852	1501	-	-	1469	-	-	864
HCM Lane V/C Ratio	0.031	0.004	-	-	0.003	-	-	0.071
HCM Control Delay (s)	9.4	7.4	-	-	7.5	-	-	9.5
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.2

Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↗	↘
Traffic Vol, veh/h	12	16	5	366	736	4
Future Vol, veh/h	12	17	5	381	766	4
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	0	150	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	19	6	423	851	4

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1074	426	851 0
Stage 1	851	-	- -
Stage 2	223	-	- -
Critical Hdwy	6.84	6.94	4.14 -
Critical Hdwy Stg 1	5.84	-	- -
Critical Hdwy Stg 2	5.84	-	- -
Follow-up Hdwy	3.52	3.32	2.22 -
Pot Cap-1 Maneuver	215	577	783 -
Stage 1	379	-	- -
Stage 2	793	-	- -
Platoon blocked, %	-	-	- -
Mov Cap-1 Maneuver	213	577	783 -
Mov Cap-2 Maneuver	213	-	- -
Stage 1	379	-	- -
Stage 2	787	-	- -

Approach	EB	NB	SB
HCM Control Delay, s	16.3	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	783	-	213	577	-	-
HCM Lane V/C Ratio	0.007	-	0.063	0.033	-	-
HCM Control Delay (s)	9.6	-	23	11.5	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	0.1	-	-

Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↗	↗	↘	↘	↘
Traffic Vol, veh/h	32	1152	897	11	3	25
Future Vol, veh/h	32	1152	897	11	3	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	175	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	36	1280	997	12	3	28

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	997	0	498
Stage 1	-	-	997
Stage 2	-	-	711
Critical Hdwy	4.14	-	6.94
Critical Hdwy Stg 1	-	-	5.84
Critical Hdwy Stg 2	-	-	5.84
Follow-up Hdwy	2.22	-	3.32
Pot Cap-1 Maneuver	690	-	518
Stage 1	-	-	318
Stage 2	-	-	448
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	690	-	518
Mov Cap-2 Maneuver	-	-	78
Stage 1	-	-	318
Stage 2	-	-	425

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	16.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	690	-	-	-	78	518
HCM Lane V/C Ratio	0.052	-	-	-	0.043	0.054
HCM Control Delay (s)	10.5	-	-	-	53.2	12.3
HCM Lane LOS	B	-	-	-	F	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.2

Intersection

Int Delay, s/veh 0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	7	3	3	8	2	13	5	736	20	6	565	4
Future Vol, veh/h	7	3	3	8	2	13	5	736	20	6	565	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	3	3	9	2	14	6	818	22	7	628	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1064	1494	316	1169	1486	420	632	0	0	840	0	0
Stage 1	643	643	-	840	840	-	-	-	-	-	-	-
Stage 2	421	851	-	329	646	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
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	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	177	122	680	148	123	582	947	-	-	791	-	-
Stage 1	428	467	-	326	379	-	-	-	-	-	-	-
Stage 2	581	375	-	658	465	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	168	120	680	142	121	582	947	-	-	791	-	-
Mov Cap-2 Maneuver	168	120	-	142	121	-	-	-	-	-	-	-
Stage 1	425	463	-	324	377	-	-	-	-	-	-	-
Stage 2	560	373	-	644	461	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26.4	21.6	0.1	0.1
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	947	-	-	183	242	791	-	-
HCM Lane V/C Ratio	0.006	-	-	0.079	0.106	0.008	-	-
HCM Control Delay (s)	8.8	-	-	26.4	21.6	9.6	-	-
HCM Lane LOS	A	-	-	D	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.3	0	-	-

Intersection

Int Delay, s/veh 2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	81	19	9	92	12	8	0	10	17	0	7
Future Vol, veh/h	14	81	19	9	92	12	8	0	10	17	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	90	21	10	102	13	9	0	11	19	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	116	0	0	111	0	0	203	268	56	205	271	58
Stage 1	-	-	-	-	-	-	132	132	-	129	129	-
Stage 2	-	-	-	-	-	-	71	136	-	76	142	-
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	1470	-	-	1477	-	-	737	637	999	735	634	996
Stage 1	-	-	-	-	-	-	858	786	-	861	788	-
Stage 2	-	-	-	-	-	-	931	783	-	924	778	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1470	-	-	1477	-	-	721	626	999	717	623	996
Mov Cap-2 Maneuver	-	-	-	-	-	-	721	626	-	717	623	-
Stage 1	-	-	-	-	-	-	849	777	-	852	783	-
Stage 2	-	-	-	-	-	-	917	778	-	904	770	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0.6	9.3	9.8
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	853	1470	-	-	1477	-	-	781
HCM Lane V/C Ratio	0.023	0.011	-	-	0.007	-	-	0.034
HCM Control Delay (s)	9.3	7.5	-	-	7.5	-	-	9.8
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↗	↘
Traffic Vol, veh/h	6	12	21	366	550	11
Future Vol, veh/h	6	12	21	366	550	11
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	0	150	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	13	23	407	611	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	861	306	611	0	-	0
Stage 1	611	-	-	-	-	-
Stage 2	250	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	295	690	964	-	-	-
Stage 1	504	-	-	-	-	-
Stage 2	768	-	-	-	-	-
Platoon blocked, %						
Mov Cap-1 Maneuver	288	690	964	-	-	-
Mov Cap-2 Maneuver	288	-	-	-	-	-
Stage 1	504	-	-	-	-	-
Stage 2	750	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.8	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	964	-	288	690	-	-
HCM Lane V/C Ratio	0.024	-	0.023	0.019	-	-
HCM Control Delay (s)	8.8	-	17.8	10.3	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.1	-	-

Lanes, Volumes, Timings
 Wolf Springs Ranch TIA

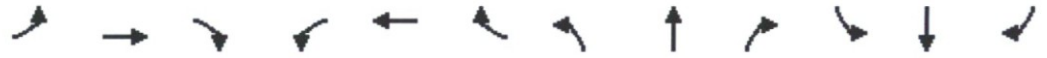
3: 94th Street & Cactus Rd
 2020 Build Conditions, PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	234	709	149	86	523	45	210	499	33	65	321	178
Future Volume (vph)	234	709	149	86	523	45	210	499	33	65	321	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	250		175	125		300
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.974			0.988				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3447	0	1770	3497	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.377			0.237			0.494			0.340		
Satd. Flow (perm)	702	3447	0	441	3497	0	920	3539	1583	633	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			10				37			195
Link Speed (mph)		45			45			40				40
Link Distance (ft)		699			655			968				725
Travel Time (s)		10.6			9.9			16.5				12.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	260	788	166	96	581	50	233	554	37	72	357	198
Shared Lane Traffic (%)												
Lane Group Flow (vph)	260	954	0	96	631	0	233	554	37	72	357	198
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1		1	1		1
Detector Phase	3	3		3	3		1	1	1	1	1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	30.0	30.0		30.0	30.0		26.0	26.0	26.0	26.0	26.0	26.0
Total Split (s)	59.0	59.0		59.0	59.0		61.0	61.0	61.0	61.0	61.0	61.0
Total Split (%)	49.2%	49.2%		49.2%	49.2%		50.8%	50.8%	50.8%	50.8%	50.8%	50.8%
Maximum Green (s)	53.0	53.0		53.0	53.0		55.0	55.0	55.0	55.0	55.0	55.0
Yellow Time (s)	3.8	3.8		3.8	3.8		4.4	4.4	4.4	4.4	4.4	4.4
All-Red Time (s)	2.2	2.2		2.2	2.2		1.6	1.6	1.6	1.6	1.6	1.6
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)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		Ped	Ped	Ped	Ped	Ped	Ped
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	67.8	67.8		67.8	67.8		40.2	40.2	40.2	40.2	40.2	40.2
Actuated g/C Ratio	0.56	0.56		0.56	0.56		0.34	0.34	0.34	0.34	0.34	0.34
v/c Ratio	0.65	0.49		0.39	0.32		0.76	0.47	0.07	0.34	0.30	0.30
Control Delay	31.9	18.3		25.0	16.1		49.6	31.6	6.2	29.3	29.2	3.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.9	18.3		25.0	16.1		49.6	31.6	6.2	29.3	29.2	3.4

Lanes, Volumes, Timings
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3: 94th Street & Cactus Rd
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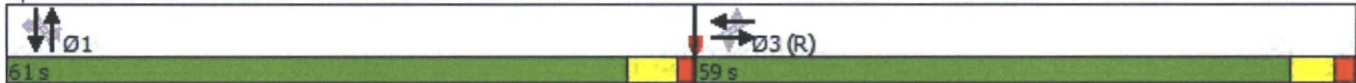


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	B		C	B		D	C	A	C	C	A
Approach Delay		21.2			17.3			35.5			21.1	
Approach LOS		C			B			D			C	
Queue Length 50th (ft)	135	220		40	130		158	175	0	38	97	0
Queue Length 95th (ft)	#338	355		113	217		215	184	19	58	108	29
Internal Link Dist (ft)		619			575			888			645	
Turn Bay Length (ft)	200			200			250		175	125		300
Base Capacity (vph)	397	1960		249	1981		421	1622	745	290	1622	831
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.49		0.39	0.32		0.55	0.34	0.05	0.25	0.22	0.24

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 105 (88%), Referenced to phase 3:EBWB, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 23.8 Intersection LOS: C
 Intersection Capacity Utilization 84.4% ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 3: 94th Street & Cactus Rd



Lanes, Volumes, Timings
Wolf Springs Ranch TIA

11: 94th Street & Sweetwater Dr
2020 Build Conditions, PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	32	49	15	35	36	55	612	35	39	495	30
Future Volume (vph)	22	32	49	15	35	36	55	612	35	39	495	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.910			0.924			0.992			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3221	0	1770	3270	0	1770	3511	0	1770	3511	0
Flt Permitted	0.703			0.696			0.428			0.366		
Satd. Flow (perm)	1310	3221	0	1296	3270	0	797	3511	0	682	3511	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		54			40			13			13	
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		652			322			1304			601	
Travel Time (s)		9.9			4.9			22.2			10.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	24	36	54	17	39	40	61	680	39	43	550	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	90	0	17	79	0	61	719	0	43	583	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	27.0	27.0		27.0	27.0		93.0	93.0		93.0	93.0	
Total Split (%)	22.5%	22.5%		22.5%	22.5%		77.5%	77.5%		77.5%	77.5%	
Maximum Green (s)	21.0	21.0		21.0	21.0		87.0	87.0		87.0	87.0	
Yellow Time (s)	3.7	3.7		3.7	3.7		4.3	4.3		4.3	4.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		1.7	1.7		1.7	1.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	21.0	21.0		21.0	21.0		87.0	87.0		87.0	87.0	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.72	0.72		0.72	0.72	
v/c Ratio	0.10	0.15		0.08	0.13		0.11	0.28		0.09	0.23	
Control Delay	43.1	20.1		42.5	23.5		4.5	4.8		5.4	5.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	43.1	20.1		42.5	23.5		4.5	4.8		5.4	5.6	

Lanes, Volumes, Timings
Wolf Springs Ranch TIA

11: 94th Street & Sweetwater Dr
2020 Build Conditions, PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C		D	C		A	A		A	A	
Approach Delay		25.0			26.9			4.7			5.5	
Approach LOS		C			C			A			A	
Queue Length 50th (ft)	16	12		11	13		10	70		9	67	
Queue Length 95th (ft)	41	36		33	36		m20	85		20	87	
Internal Link Dist (ft)		572			242			1224			521	
Turn Bay Length (ft)	150			150			150			150		
Base Capacity (vph)	229	608		226	605		577	2549		494	2549	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.10	0.15		0.08	0.13		0.11	0.28		0.09	0.23	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 25 (21%), Referenced to phase 1:NBSB, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.28
 Intersection Signal Delay: 7.8
 Intersection LOS: A
 Intersection Capacity Utilization 49.2%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: 94th Street & Sweetwater Dr



Lanes, Volumes, Timings
Wolf Springs Ranch, Alternative Scenario 1

3: 94th Street & Cactus Rd
2020 Build Conditions, AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	588	262	54	758	44	112	195	12	99	351	292
Future Volume (vph)	139	612	273	56	789	46	117	203	12	103	365	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	250		175	125		300
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.954			0.992				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3376	0	1770	3511	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.266			0.247			0.419			0.606		
Satd. Flow (perm)	495	3376	0	460	3511	0	780	3539	1583	1129	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		77			6				27			81
Link Speed (mph)		45			45			40				40
Link Distance (ft)		699			655			968				725
Travel Time (s)		10.6			9.9			16.5				12.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	154	680	303	62	877	51	130	226	13	114	406	338
Shared Lane Traffic (%)												
Lane Group Flow (vph)	154	983	0	62	928	0	130	226	13	114	406	338
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1		1	1		1
Detector Phase	3	3		3	3		1	1	1	1	1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	30.0	30.0		30.0	30.0		26.0	26.0	26.0	26.0	26.0	26.0
Total Split (s)	60.0	60.0		60.0	60.0		60.0	60.0	60.0	60.0	60.0	60.0
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	54.0	54.0		54.0	54.0		54.0	54.0	54.0	54.0	54.0	54.0
Yellow Time (s)	3.8	3.8		3.8	3.8		4.4	4.4	4.4	4.4	4.4	4.4
All-Red Time (s)	2.2	2.2		2.2	2.2		1.6	1.6	1.6	1.6	1.6	1.6
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)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		Ped	Ped	Ped	Ped	Ped	Ped
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effect Green (s)	76.1	76.1		76.1	76.1		31.9	31.9	31.9	31.9	31.9	31.9
Actuated g/C Ratio	0.63	0.63		0.63	0.63		0.27	0.27	0.27	0.27	0.27	0.27
v/c Ratio	0.49	0.45		0.21	0.42		0.63	0.24	0.03	0.38	0.43	0.70
Control Delay	22.0	12.5		15.0	13.1		50.4	33.3	3.3	40.9	39.9	40.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.0	12.5		15.0	13.1		50.4	33.3	3.3	40.9	39.9	40.6

Lanes, Volumes, Timings
 Wolf Springs Ranch, Alternative Scenario 1

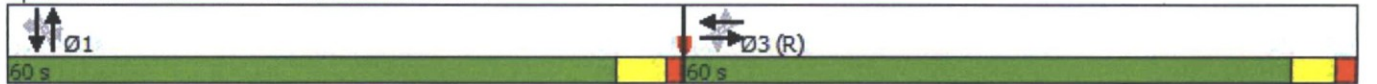
3: 94th Street & Cactus Rd
 2020 Build Conditions, AM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	B		B	B		D	C	A	D	D	D
Approach Delay		13.8			13.2			38.3			40.3	
Approach LOS		B			B			D			D	
Queue Length 50th (ft)	57	169		18	167		90	73	0	76	144	193
Queue Length 95th (ft)	170	307		60	300		134	87	7	122	177	283
Internal Link Dist (ft)		619			575			888			645	
Turn Bay Length (ft)	200			200			250		175	125		300
Base Capacity (vph)	314	2169		291	2229		351	1592	727	508	1592	756
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.45		0.21	0.42		0.37	0.14	0.02	0.22	0.26	0.45

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 50 (42%), Referenced to phase 3:EBWB, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 23.1
 Intersection LOS: C
 Intersection Capacity Utilization 84.6%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 3: 94th Street & Cactus Rd



Lanes, Volumes, Timings
 Wolf Springs Ranch, Alternative Scenario 1

11: 94th Street & Sweetwater Dr
 2020 Build Conditions, AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	44	58	50	57	66	22	288	23	24	641	9
Future Volume (vph)	25	46	60	52	59	69	23	300	24	25	667	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.915			0.919			0.989			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3238	0	1770	3253	0	1770	3500	0	1770	3532	0
Flt Permitted	0.661			0.677			0.354			0.537		
Satd. Flow (perm)	1231	3238	0	1261	3253	0	659	3500	0	1000	3532	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		67			77			19			3	
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		652			322			1304			601	
Travel Time (s)		9.9			4.9			22.2			10.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	28	51	67	58	66	77	26	333	27	28	741	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	118	0	58	143	0	26	360	0	28	751	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		36.0	36.0		36.0	36.0	
Total Split (s)	26.0	26.0		26.0	26.0		94.0	94.0		94.0	94.0	
Total Split (%)	21.7%	21.7%		21.7%	21.7%		78.3%	78.3%		78.3%	78.3%	
Maximum Green (s)	20.0	20.0		20.0	20.0		88.0	88.0		88.0	88.0	
Yellow Time (s)	3.7	3.7		3.7	3.7		4.3	4.3		4.3	4.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		1.7	1.7		1.7	1.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Ped	Ped		Ped	Ped		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	6.0	6.0		6.0	6.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	20.0	20.0		20.0	20.0		88.0	88.0		88.0	88.0	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.73	0.73		0.73	0.73	
v/c Ratio	0.14	0.20		0.28	0.24		0.05	0.14		0.04	0.29	
Control Delay	44.7	21.1		47.8	21.9		4.7	3.8		4.6	5.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	44.7	21.1		47.8	21.9		4.7	3.8		4.6	5.7	

Lanes, Volumes, Timings
 Wolf Springs Ranch, Alternative Scenario 1

11: 94th Street & Sweetwater Dr
 2020 Build Conditions, AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C		D	C		A	A		A	A	
Approach Delay		25.6			29.4			3.9			5.7	
Approach LOS		C			C			A			A	
Queue Length 50th (ft)	19	17		40	23		3	20		5	90	
Queue Length 95th (ft)	47	45		82	53		m13	54		13	114	
Internal Link Dist (ft)		572			242			1224			521	
Turn Bay Length (ft)	150			150			150			150		
Base Capacity (vph)	205	595		210	606		483	2571		733	2590	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.14	0.20		0.28	0.24		0.05	0.14		0.04	0.29	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 1:NBSB, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.29
 Intersection Signal Delay: 10.3
 Intersection LOS: B
 Intersection Capacity Utilization 44.9%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: 94th Street & Sweetwater Dr



Intersection

Int Delay, s/veh 0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘ ↗	↗ ↗	↗ ↗	↘ ↗	↘ ↗	↘ ↗
Traffic Vol, veh/h	16	1035	1197	10	1	28
Future Vol, veh/h	17	1077	1246	10	1	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	175	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	19	1197	1384	11	1	32

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1384	0	692
Stage 1	-	-	1384
Stage 2	-	-	636
Critical Hdwy	4.14	-	6.84
Critical Hdwy Stg 1	-	-	5.84
Critical Hdwy Stg 2	-	-	5.84
Follow-up Hdwy	2.22	-	3.52
Pot Cap-1 Maneuver	491	-	386
Stage 1	-	-	198
Stage 2	-	-	489
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	491	-	386
Mov Cap-2 Maneuver	-	-	49
Stage 1	-	-	198
Stage 2	-	-	470

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	17.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	491	-	-	-	49	386
HCM Lane V/C Ratio	0.038	-	-	-	0.023	0.083
HCM Control Delay (s)	12.6	-	-	-	80.2	15.2
HCM Lane LOS	B	-	-	-	F	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	0.3

Intersection

Int Delay, s/veh 1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	3	2	10	24	1	28	2	336	35	28	715	4
Future Vol, veh/h	3	2	10	25	1	29	2	350	36	29	744	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	2	11	28	1	32	2	389	40	32	827	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1092	1326	416	892	1309	214	831	0	0	429	0	0
Stage 1	893	893	-	413	413	-	-	-	-	-	-	-
Stage 2	199	433	-	479	896	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
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	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	169	154	585	237	158	791	797	-	-	1127	-	-
Stage 1	303	358	-	587	592	-	-	-	-	-	-	-
Stage 2	784	580	-	537	357	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	157	149	585	224	153	791	797	-	-	1127	-	-
Mov Cap-2 Maneuver	157	149	-	224	153	-	-	-	-	-	-	-
Stage 1	302	348	-	586	591	-	-	-	-	-	-	-
Stage 2	749	579	-	509	347	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.6	17.2	0	0.3
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	797	-	-	302	355	1127	-	-
HCM Lane V/C Ratio	0.003	-	-	0.055	0.172	0.029	-	-
HCM Control Delay (s)	9.5	-	-	17.6	17.2	8.3	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.6	0.1	-	-

Intersection												
Int Delay, s/veh	2.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕			↕			↕	
Traffic Vol, veh/h	5	97	4	4	69	11	12	0	12	28	1	24
Future Vol, veh/h	5	101	4	4	72	11	12	0	12	29	1	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	112	4	4	80	12	13	0	13	32	1	28

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	92	0	0	117	0	0	175	227	58	162	223	46
Stage 1	-	-	-	-	-	-	126	126	-	95	95	-
Stage 2	-	-	-	-	-	-	49	101	-	67	128	-
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	1501	-	-	1469	-	-	771	671	996	788	675	1014
Stage 1	-	-	-	-	-	-	865	791	-	901	815	-
Stage 2	-	-	-	-	-	-	958	811	-	936	789	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1501	-	-	1469	-	-	745	666	996	773	670	1014
Mov Cap-2 Maneuver	-	-	-	-	-	-	745	666	-	773	670	-
Stage 1	-	-	-	-	-	-	862	788	-	897	813	-
Stage 2	-	-	-	-	-	-	928	809	-	920	786	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.3	9.4	9.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	852	1501	-	-	1469	-	-	864
HCM Lane V/C Ratio	0.031	0.004	-	-	0.003	-	-	0.071
HCM Control Delay (s)	9.4	7.4	-	-	7.5	-	-	9.5
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.2

Intersection

Int Delay, s/veh 0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↗	↘
Traffic Vol, veh/h	8	6	6	366	736	3
Future Vol, veh/h	8	6	6	381	766	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	0	150	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	7	7	423	851	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1076	426	851	0	-	0
Stage 1	851	-	-	-	-	-
Stage 2	225	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	214	577	783	-	-	-
Stage 1	379	-	-	-	-	-
Stage 2	791	-	-	-	-	-
Platoon blocked, %						
Mov Cap-1 Maneuver	212	577	783	-	-	-
Mov Cap-2 Maneuver	212	-	-	-	-	-
Stage 1	379	-	-	-	-	-
Stage 2	784	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.8	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	783	-	212	577	-	-
HCM Lane V/C Ratio	0.009	-	0.042	0.012	-	-
HCM Control Delay (s)	9.6	-	22.7	11.3	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0	-	-

Intersection

Int Delay, s/veh 1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		T			T
Traffic Vol, veh/h	6	2	26	0	0	20
Future Vol, veh/h	6	2	27	0	0	21
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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	2	30	0	0	23

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	53	30	0	0	30	0
Stage 1	30	-	-	-	-	-
Stage 2	23	-	-	-	-	-
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	955	1044	-	-	1583	-
Stage 1	993	-	-	-	-	-
Stage 2	1000	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	955	1044	-	-	1583	-
Mov Cap-2 Maneuver	955	-	-	-	-	-
Stage 1	993	-	-	-	-	-
Stage 2	1000	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	- 976	1583	-
HCM Lane V/C Ratio	-	- 0.009	-	-
HCM Control Delay (s)	-	- 8.7	0	-
HCM Lane LOS	-	- A	A	-
HCM 95th %tile Q(veh)	-	- 0	0	-

Lanes, Volumes, Timings
 Wolf Springs Ranch TIA, Alternative Scenario 1

3: 94th Street & Cactus Rd
 2020 Build Conditions, PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	234	709	149	86	523	45	210	496	33	65	319	171
Future Volume (vph)	244	738	155	89	544	47	219	516	34	68	332	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	250		175	125		300
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.974			0.988				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3447	0	1770	3497	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.361			0.219			0.489			0.336		
Satd. Flow (perm)	672	3447	0	408	3497	0	911	3539	1583	626	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			10				38			181
Link Speed (mph)		45			45			40				40
Link Distance (ft)		699			655			968				725
Travel Time (s)		10.6			9.9			16.5				12.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	271	820	172	99	604	52	243	573	38	76	369	198
Shared Lane Traffic (%)												
Lane Group Flow (vph)	271	992	0	99	656	0	243	573	38	76	369	198
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		3			3			1				1
Permitted Phases	3			3			1		1	1		1
Detector Phase	3	3		3	3		1	1	1	1	1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	30.0	30.0		30.0	30.0		26.0	26.0	26.0	26.0	26.0	26.0
Total Split (s)	59.0	59.0		59.0	59.0		61.0	61.0	61.0	61.0	61.0	61.0
Total Split (%)	49.2%	49.2%		49.2%	49.2%		50.8%	50.8%	50.8%	50.8%	50.8%	50.8%
Maximum Green (s)	53.0	53.0		53.0	53.0		55.0	55.0	55.0	55.0	55.0	55.0
Yellow Time (s)	3.8	3.8		3.8	3.8		4.4	4.4	4.4	4.4	4.4	4.4
All-Red Time (s)	2.2	2.2		2.2	2.2		1.6	1.6	1.6	1.6	1.6	1.6
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)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		Ped	Ped	Ped	Ped	Ped	Ped
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	66.0	66.0		66.0	66.0		42.0	42.0	42.0	42.0	42.0	42.0
Actuated g/C Ratio	0.55	0.55		0.55	0.55		0.35	0.35	0.35	0.35	0.35	0.35
v/c Ratio	0.73	0.52		0.44	0.34		0.76	0.46	0.07	0.35	0.30	0.30
Control Delay	38.4	19.7		28.7	17.2		48.8	30.3	6.1	28.1	25.0	6.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.4	19.7		28.7	17.2		48.8	30.3	6.1	28.1	25.0	6.6

Lanes, Volumes, Timings
 Wolf Springs Ranch TIA, Alternative Scenario 1

3: 94th Street & Cactus Rd
 2020 Build Conditions, PM Peak

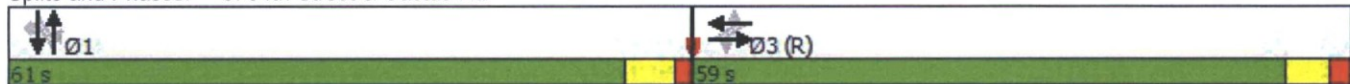


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	B		C	B		D	C	A	C	C	A
Approach Delay		23.7			18.7			34.5			19.7	
Approach LOS		C			B			C			B	
Queue Length 50th (ft)	156	244		45	143		163	176	0	44	110	37
Queue Length 95th (ft)	#368	374		124	227		228	191	20	78	130	68
Internal Link Dist (ft)		619			575			888			645	
Turn Bay Length (ft)	200			200			250		175	125		300
Base Capacity (vph)	369	1907		224	1928		417	1622	746	286	1622	823
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.52		0.44	0.34		0.58	0.35	0.05	0.27	0.23	0.24

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 35 (29%), Referenced to phase 3:EBWB, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 24.5
 Intersection LOS: C
 Intersection Capacity Utilization 84.4%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 3: 94th Street & Cactus Rd



Lanes, Volumes, Timings
 Wolf Springs Ranch TIA, Alternative Scenario 1

11: 94th Street & Sweetwater Dr
 2020 Build Conditions, PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	32	49	16	35	36	56	612	35	39	495	30
Future Volume (vph)	23	33	51	17	36	37	58	637	36	41	515	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.909			0.924			0.992			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3217	0	1770	3270	0	1770	3511	0	1770	3511	0
Flt Permitted	0.702			0.693			0.418			0.355		
Satd. Flow (perm)	1308	3217	0	1291	3270	0	779	3511	0	661	3511	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		57			41			13			13	
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		652			322			1304			601	
Travel Time (s)		9.9			4.9			22.2			10.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	26	37	57	19	40	41	64	708	40	46	572	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	94	0	19	81	0	64	748	0	46	606	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		36.0	36.0		36.0	36.0	
Total Split (s)	26.0	26.0		26.0	26.0		94.0	94.0		94.0	94.0	
Total Split (%)	21.7%	21.7%		21.7%	21.7%		78.3%	78.3%		78.3%	78.3%	
Maximum Green (s)	20.0	20.0		20.0	20.0		88.0	88.0		88.0	88.0	
Yellow Time (s)	3.7	3.7		3.7	3.7		4.3	4.3		4.3	4.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		1.7	1.7		1.7	1.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
Recall Mode	Ped	Ped		Ped	Ped		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	6.0	6.0		6.0	6.0		15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	20.0	20.0		20.0	20.0		88.0	88.0		88.0	88.0	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.73	0.73		0.73	0.73	
v/c Ratio	0.12	0.16		0.09	0.14		0.11	0.29		0.10	0.24	
Control Delay	44.3	20.2		43.7	24.0		4.1	5.8		5.1	5.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	44.3	20.2		43.7	24.0		4.1	5.8		5.1	5.3	

Lanes, Volumes, Timings
 Wolf Springs Ranch TIA, Alternative Scenario 1

11: 94th Street & Sweetwater Dr
 2020 Build Conditions, PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C		D	C		A	A		A	A	
Approach Delay		25.4			27.7			5.7			5.3	
Approach LOS		C			C			A			A	
Queue Length 50th (ft)	17	12		13	13		6	121		9	67	
Queue Length 95th (ft)	45	37		35	37		m21	205		20	87	
Internal Link Dist (ft)		572			242			1224			521	
Turn Bay Length (ft)	150			150			150			150		
Base Capacity (vph)	218	583		215	579		571	2578		484	2578	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.12	0.16		0.09	0.14		0.11	0.29		0.10	0.24	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 25 (21%), Referenced to phase 1:NBSB, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.29
 Intersection Signal Delay: 8.2
 Intersection LOS: A
 Intersection Capacity Utilization 49.2%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: 94th Street & Sweetwater Dr



Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↗	↗	↘	↘	↘
Traffic Vol, veh/h	32	1151	890	11	3	28
Future Vol, veh/h	33	1198	926	11	3	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	175	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	1331	1029	12	3	32

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1029	0	1768
Stage 1	-	-	1029
Stage 2	-	-	739
Critical Hdwy	4.14	-	6.84
Critical Hdwy Stg 1	-	-	5.84
Critical Hdwy Stg 2	-	-	5.84
Follow-up Hdwy	2.22	-	3.52
Pot Cap-1 Maneuver	671	-	75
Stage 1	-	-	306
Stage 2	-	-	433
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	671	-	71
Mov Cap-2 Maneuver	-	-	71
Stage 1	-	-	306
Stage 2	-	-	409

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	16.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	671	-	-	-	71	505
HCM Lane V/C Ratio	0.055	-	-	-	0.047	0.064
HCM Control Delay (s)	10.7	-	-	-	58.2	12.6
HCM Lane LOS	B	-	-	-	F	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.2

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↙	↕		↙	↕	
Traffic Vol, veh/h	9	3	3	8	2	13	5	734	20	6	565	4
Future Vol, veh/h	9	3	3	8	2	14	5	764	21	6	588	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	3	3	9	2	16	6	849	23	7	653	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1106	1552	329	1214	1543	436	658	0	0	872	0	0
Stage 1	669	669	-	872	872	-	-	-	-	-	-	-
Stage 2	437	883	-	342	671	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
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	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	165	112	667	137	114	568	926	-	-	769	-	-
Stage 1	413	454	-	312	366	-	-	-	-	-	-	-
Stage 2	568	362	-	646	453	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	156	110	667	132	112	568	926	-	-	769	-	-
Mov Cap-2 Maneuver	156	110	-	132	112	-	-	-	-	-	-	-
Stage 1	410	450	-	310	364	-	-	-	-	-	-	-
Stage 2	546	360	-	632	449	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	28.8	22.4	0.1	0.1
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	926	-	-	168	233	769	-	-
HCM Lane V/C Ratio	0.006	-	-	0.099	0.114	0.009	-	-
HCM Control Delay (s)	8.9	-	-	28.8	22.4	9.7	-	-
HCM Lane LOS	A	-	-	D	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.4	0	-	-

Intersection

Int Delay, s/veh 2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵ ↑↑			↵ ↑↑			↕			↕		
Traffic Vol, veh/h	14	81	19	9	92	12	8	0	10	17	0	7
Future Vol, veh/h	15	84	20	9	96	12	8	0	10	18	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	93	22	10	107	13	9	0	11	20	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	120	0	0	116	0	0	211	278	58	213	282	60
Stage 1	-	-	-	-	-	-	138	138	-	133	133	-
Stage 2	-	-	-	-	-	-	73	140	-	80	149	-
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	1466	-	-	1470	-	-	728	629	996	725	625	993
Stage 1	-	-	-	-	-	-	851	781	-	857	785	-
Stage 2	-	-	-	-	-	-	928	780	-	919	773	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1466	-	-	1470	-	-	712	617	996	707	614	993
Mov Cap-2 Maneuver	-	-	-	-	-	-	712	617	-	707	614	-
Stage 1	-	-	-	-	-	-	841	772	-	847	780	-
Stage 2	-	-	-	-	-	-	914	775	-	898	764	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0.6	9.4	9.9
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	846	1466	-	-	1470	-	-	769
HCM Lane V/C Ratio	0.024	0.011	-	-	0.007	-	-	0.036
HCM Control Delay (s)	9.4	7.5	-	-	7.5	-	-	9.9
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection

Int Delay, s/veh 0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↗	↘
Traffic Vol, veh/h	5	4	17	758	550	11
Future Vol, veh/h	5	4	18	789	572	11
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	0	150	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	4	20	877	636	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1114	318	636	0	-	0
Stage 1	636	-	-	-	-	-
Stage 2	478	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	202	678	943	-	-	-
Stage 1	489	-	-	-	-	-
Stage 2	590	-	-	-	-	-
Platoon blocked, %						
Mov Cap-1 Maneuver	198	678	943	-	-	-
Mov Cap-2 Maneuver	198	-	-	-	-	-
Stage 1	489	-	-	-	-	-
Stage 2	577	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.7	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	943	-	198	678	-	-
HCM Lane V/C Ratio	0.021	-	0.028	0.007	-	-
HCM Control Delay (s)	8.9	-	23.7	10.3	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0	-	-

Intersection

Int Delay, s/veh 0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	2	44	0	0	28
Future Vol, veh/h	6	2	46	0	0	29
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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	2	51	0	0	32

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	83	51	0	0	51	0
Stage 1	51	-	-	-	-	-
Stage 2	32	-	-	-	-	-
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	919	1017	-	-	1555	-
Stage 1	971	-	-	-	-	-
Stage 2	991	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	919	1017	-	-	1555	-
Mov Cap-2 Maneuver	919	-	-	-	-	-
Stage 1	971	-	-	-	-	-
Stage 2	991	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	942	1555	-
HCM Lane V/C Ratio	-	-	0.009	-	-
HCM Control Delay (s)	-	-	8.9	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Lanes, Volumes, Timings
 Wolf Springs Ranch, Alternative Scenario 2

3: 94th Street & Cactus Rd
 2020 Build Conditions, AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	588	262	54	758	44	112	195	12	99	351	292
Future Volume (vph)	136	612	273	56	789	46	117	203	12	103	365	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	250		175	125		300
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.954			0.992				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3376	0	1770	3511	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.273			0.254			0.398			0.600		
Satd. Flow (perm)	509	3376	0	473	3511	0	741	3539	1583	1118	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		108			9				27			164
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		699			655			968			725	
Travel Time (s)		10.6			9.9			16.5			12.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	151	680	303	62	877	51	130	226	13	114	406	338
Shared Lane Traffic (%)												
Lane Group Flow (vph)	151	983	0	62	928	0	130	226	13	114	406	338
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1		1	1		1
Detector Phase	3	3		3	3		1	1	1	1	1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	30.0	30.0		30.0	30.0		26.0	26.0	26.0	26.0	26.0	26.0
Total Split (s)	79.0	79.0		79.0	79.0		41.0	41.0	41.0	41.0	41.0	41.0
Total Split (%)	65.8%	65.8%		65.8%	65.8%		34.2%	34.2%	34.2%	34.2%	34.2%	34.2%
Maximum Green (s)	73.0	73.0		73.0	73.0		35.0	35.0	35.0	35.0	35.0	35.0
Yellow Time (s)	3.8	3.8		3.8	3.8		4.4	4.4	4.4	4.4	4.4	4.4
All-Red Time (s)	2.2	2.2		2.2	2.2		1.6	1.6	1.6	1.6	1.6	1.6
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)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		Ped	Ped	Ped	Ped	Ped	Ped
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	79.8	79.8		79.8	79.8		28.2	28.2	28.2	28.2	28.2	28.2
Actuated g/C Ratio	0.66	0.66		0.66	0.66		0.24	0.24	0.24	0.24	0.24	0.24
v/c Ratio	0.45	0.43		0.20	0.40		0.75	0.27	0.03	0.43	0.49	0.68
Control Delay	16.6	9.7		11.4	10.4		67.0	37.1	4.5	55.2	52.2	41.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.6	9.7		11.4	10.4		67.0	37.1	4.5	55.2	52.2	41.4

Lanes, Volumes, Timings
 Wolf Springs Ranch, Alternative Scenario 2

3: 94th Street & Cactus Rd
 2020 Build Conditions, AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	A		B	B		E	D	A	E	D	D
Approach Delay		10.6			10.5			46.5			48.4	
Approach LOS		B			B			D			D	
Queue Length 50th (ft)	52	153		17	158		93	75	0	85	157	153
Queue Length 95th (ft)	126	230		46	232		161	103	8	144	203	273
Internal Link Dist (ft)		619			575			888			645	
Turn Bay Length (ft)	200			200			250		175	125		300
Base Capacity (vph)	338	2280		314	2337		216	1032	480	326	1032	577
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.43		0.20	0.40		0.60	0.22	0.03	0.35	0.39	0.59

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 50 (42%), Referenced to phase 3:EBWB, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 24.2
 Intersection LOS: C
 Intersection Capacity Utilization 84.6%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 3: 94th Street & Cactus Rd



Intersection

Int Delay, s/veh 0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘ ↗	↗ ↗	↗ ↗	↗	↘	↗
Traffic Vol, veh/h	19	1033	1205	10	1	28
Future Vol, veh/h	20	1075	1254	10	1	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	175	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	1194	1393	11	1	32

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1393	0	697
Stage 1	-	-	1393
Stage 2	-	-	642
Critical Hdwy	4.14	-	6.94
Critical Hdwy Stg 1	-	-	5.84
Critical Hdwy Stg 2	-	-	5.84
Follow-up Hdwy	2.22	-	3.32
Pot Cap-1 Maneuver	487	-	383
Stage 1	-	-	195
Stage 2	-	-	486
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	487	-	383
Mov Cap-2 Maneuver	-	-	47
Stage 1	-	-	195
Stage 2	-	-	464

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	17.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	487	-	-	-	47	383
HCM Lane V/C Ratio	0.046	-	-	-	0.024	0.084
HCM Control Delay (s)	12.7	-	-	-	83.4	15.3
HCM Lane LOS	B	-	-	-	F	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	0.3

Intersection

Int Delay, s/veh 1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	3	2	10	24	1	28	2	336	35	28	714	5
Future Vol, veh/h	3	2	10	25	1	29	2	350	36	29	743	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	2	11	28	1	32	2	389	40	32	826	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1092	1326	416	891	1309	214	831	0	0	429	0	0
Stage 1	893	893	-	413	413	-	-	-	-	-	-	-
Stage 2	199	433	-	478	896	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
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	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	169	154	585	237	158	791	797	-	-	1127	-	-
Stage 1	303	358	-	587	592	-	-	-	-	-	-	-
Stage 2	784	580	-	537	357	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	157	149	585	224	153	791	797	-	-	1127	-	-
Mov Cap-2 Maneuver	157	149	-	224	153	-	-	-	-	-	-	-
Stage 1	302	348	-	586	591	-	-	-	-	-	-	-
Stage 2	749	579	-	509	347	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.6	17.2	0	0.3
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	797	-	-	302	355	1127	-	-
HCM Lane V/C Ratio	0.003	-	-	0.055	0.172	0.029	-	-
HCM Control Delay (s)	9.5	-	-	17.6	17.2	8.3	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.6	0.1	-	-

Intersection												
Int Delay, s/veh	2.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↔		↔	↕↔			↕↔			↕↔	
Traffic Vol, veh/h	5	97	4	4	69	11	12	0	12	28	1	24
Future Vol, veh/h	5	101	4	4	72	11	12	0	12	29	1	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	112	4	4	80	12	13	0	13	32	1	28

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	92	0	0	117	0	0	175	227	58	162	223	46
Stage 1	-	-	-	-	-	-	126	126	-	95	95	-
Stage 2	-	-	-	-	-	-	49	101	-	67	128	-
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	1501	-	-	1469	-	-	771	671	996	788	675	1014
Stage 1	-	-	-	-	-	-	865	791	-	901	815	-
Stage 2	-	-	-	-	-	-	958	811	-	936	789	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1501	-	-	1469	-	-	745	666	996	773	670	1014
Mov Cap-2 Maneuver	-	-	-	-	-	-	745	666	-	773	670	-
Stage 1	-	-	-	-	-	-	862	788	-	897	813	-
Stage 2	-	-	-	-	-	-	928	809	-	920	786	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.3	9.4	9.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	852	1501	-	-	1469	-	-	864
HCM Lane V/C Ratio	0.031	0.004	-	-	0.003	-	-	0.071
HCM Control Delay (s)	9.4	7.4	-	-	7.5	-	-	9.5
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.2

Intersection

Int Delay, s/veh 0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↗	↖
Traffic Vol, veh/h	8	6	3	366	736	2
Future Vol, veh/h	8	6	3	381	766	2
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	0	150	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	7	3	423	851	2

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1069	426	851
Stage 1	851	-	-
Stage 2	218	-	-
Critical Hdwy	6.84	6.94	4.14
Critical Hdwy Stg 1	5.84	-	-
Critical Hdwy Stg 2	5.84	-	-
Follow-up Hdwy	3.52	3.32	2.22
Pot Cap-1 Maneuver	216	577	783
Stage 1	379	-	-
Stage 2	797	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	215	577	783
Mov Cap-2 Maneuver	215	-	-
Stage 1	379	-	-
Stage 2	794	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.7	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	783	-	215	577	-	-
HCM Lane V/C Ratio	0.004	-	0.041	0.012	-	-
HCM Control Delay (s)	9.6	-	22.5	11.3	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0	-	-

Intersection

Int Delay, s/veh 1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	2	26	3	1	20
Future Vol, veh/h	6	2	27	3	1	21
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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	2	30	3	1	23

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	58	32	0	0	33	0
Stage 1	32	-	-	-	-	-
Stage 2	26	-	-	-	-	-
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	949	1042	-	-	1579	-
Stage 1	991	-	-	-	-	-
Stage 2	997	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	948	1042	-	-	1579	-
Mov Cap-2 Maneuver	948	-	-	-	-	-
Stage 1	991	-	-	-	-	-
Stage 2	996	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	- 970	1579	-
HCM Lane V/C Ratio	-	- 0.009	0.001	-
HCM Control Delay (s)	-	- 8.7	7.3	0
HCM Lane LOS	-	- A	A	A
HCM 95th %tile Q(veh)	-	- 0	0	-

Lanes, Volumes, Timings
 Wolf Springs Ranch TIA, Alternative Scenario2

3: 94th Street & Cactus Rd
 2020 Build Conditions, PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑		↘	↑↑		↘	↑↑	↘	↘	↑↑	↘
Traffic Volume (vph)	224	709	149	86	523	45	210	496	33	65	319	171
Future Volume (vph)	233	738	155	89	544	47	219	516	34	68	332	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	250		175	125		300
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.974			0.988				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3447	0	1770	3497	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.361			0.219			0.489			0.336		
Satd. Flow (perm)	672	3447	0	408	3497	0	911	3539	1583	626	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			10				38			181
Link Speed (mph)		45			45			40				40
Link Distance (ft)		699			655			968				725
Travel Time (s)		10.6			9.9			16.5				12.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	259	820	172	99	604	52	243	573	38	76	369	198
Shared Lane Traffic (%)												
Lane Group Flow (vph)	259	992	0	99	656	0	243	573	38	76	369	198
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		3			3			1				1
Permitted Phases	3			3			1		1	1		1
Detector Phase	3	3		3	3		1	1	1	1	1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	30.0	30.0		30.0	30.0		26.0	26.0	26.0	26.0	26.0	26.0
Total Split (s)	59.0	59.0		59.0	59.0		61.0	61.0	61.0	61.0	61.0	61.0
Total Split (%)	49.2%	49.2%		49.2%	49.2%		50.8%	50.8%	50.8%	50.8%	50.8%	50.8%
Maximum Green (s)	53.0	53.0		53.0	53.0		55.0	55.0	55.0	55.0	55.0	55.0
Yellow Time (s)	3.8	3.8		3.8	3.8		4.4	4.4	4.4	4.4	4.4	4.4
All-Red Time (s)	2.2	2.2		2.2	2.2		1.6	1.6	1.6	1.6	1.6	1.6
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)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		Ped	Ped	Ped	Ped	Ped	Ped
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	66.0	66.0		66.0	66.0		42.0	42.0	42.0	42.0	42.0	42.0
Actuated g/C Ratio	0.55	0.55		0.55	0.55		0.35	0.35	0.35	0.35	0.35	0.35
v/c Ratio	0.70	0.52		0.44	0.34		0.76	0.46	0.07	0.35	0.30	0.30
Control Delay	36.1	19.7		28.7	17.2		48.8	30.3	6.1	28.1	25.0	6.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.1	19.7		28.7	17.2		48.8	30.3	6.1	28.1	25.0	6.6

Lanes, Volumes, Timings
 Wolf Springs Ranch TIA, Alternative Scenario2

3: 94th Street & Cactus Rd
 2020 Build Conditions, PM Peak

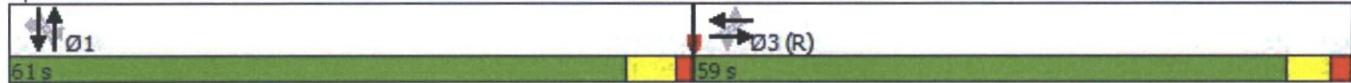


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	B		C	B		D	C	A	C	C	A
Approach Delay		23.1			18.7			34.5			19.7	
Approach LOS		C			B			C			B	
Queue Length 50th (ft)	145	244		45	143		163	176	0	44	110	37
Queue Length 95th (ft)	#348	374		124	227		228	191	20	79	130	69
Internal Link Dist (ft)		619			575			888			645	
Turn Bay Length (ft)	200			200			250		175	125		300
Base Capacity (vph)	369	1907		224	1928		417	1622	746	286	1622	823
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.52		0.44	0.34		0.58	0.35	0.05	0.27	0.23	0.24

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 35 (29%), Referenced to phase 3:EBWB, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 24.3
 Intersection LOS: C
 Intersection Capacity Utilization 84.4%
 ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 3: 94th Street & Cactus Rd



Intersection

Int Delay, s/veh 0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘ ↗	↗ ↗	↗ ↗	↗	↘	↗
Traffic Vol, veh/h	42	1141	890	11	3	31
Future Vol, veh/h	44	1187	926	11	3	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	175	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	49	1319	1029	12	3	36

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1029	0	1786
Stage 1	-	-	1029
Stage 2	-	-	757
Critical Hdwy	4.14	-	6.84
Critical Hdwy Stg 1	-	-	5.84
Critical Hdwy Stg 2	-	-	5.84
Follow-up Hdwy	2.22	-	3.52
Pot Cap-1 Maneuver	671	-	73
Stage 1	-	-	306
Stage 2	-	-	424
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	671	-	68
Mov Cap-2 Maneuver	-	-	68
Stage 1	-	-	306
Stage 2	-	-	393

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	16.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	671	-	-	-	68	505
HCM Lane V/C Ratio	0.073	-	-	-	0.049	0.07
HCM Control Delay (s)	10.8	-	-	-	60.7	12.7
HCM Lane LOS	B	-	-	-	F	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.2	0.2

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	9	3	3	8	2	14	5	734	20	6	560	9
Future Vol, veh/h	9	3	3	8	2	15	5	764	21	6	583	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	3	3	9	2	17	6	849	23	7	648	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1103	1549	329	1211	1543	436	658	0	0	872	0	0
Stage 1	666	666	-	872	872	-	-	-	-	-	-	-
Stage 2	437	883	-	339	671	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
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	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	166	113	667	138	114	568	926	-	-	769	-	-
Stage 1	415	456	-	312	366	-	-	-	-	-	-	-
Stage 2	568	362	-	649	453	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	157	111	667	133	112	568	926	-	-	769	-	-
Mov Cap-2 Maneuver	157	111	-	133	112	-	-	-	-	-	-	-
Stage 1	412	452	-	310	364	-	-	-	-	-	-	-
Stage 2	544	360	-	635	449	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	28.6	22	0.1	0.1
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	926	-	-	169	239	769	-	-
HCM Lane V/C Ratio	0.006	-	-	0.099	0.116	0.009	-	-
HCM Control Delay (s)	8.9	-	-	28.6	22	9.7	-	-
HCM Lane LOS	A	-	-	D	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.4	0	-	-

Intersection

Int Delay, s/veh 2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↖ ↗		↖ ↗	↖ ↗		↕			↕		
Traffic Vol, veh/h	14	81	19	9	92	12	8	0	10	17	0	7
Future Vol, veh/h	15	84	20	9	96	12	8	0	10	18	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	93	22	10	107	13	9	0	11	20	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	120	0	0	116	0	0	211	278	58	213	282	60
Stage 1	-	-	-	-	-	-	138	138	-	133	133	-
Stage 2	-	-	-	-	-	-	73	140	-	80	149	-
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	1466	-	-	1470	-	-	728	629	996	725	625	993
Stage 1	-	-	-	-	-	-	851	781	-	857	785	-
Stage 2	-	-	-	-	-	-	928	780	-	919	773	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1466	-	-	1470	-	-	712	617	996	707	614	993
Mov Cap-2 Maneuver	-	-	-	-	-	-	712	617	-	707	614	-
Stage 1	-	-	-	-	-	-	841	772	-	847	780	-
Stage 2	-	-	-	-	-	-	914	775	-	898	764	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0.6	9.4	9.9
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	846	1466	-	-	1470	-	-	769
HCM Lane V/C Ratio	0.024	0.011	-	-	0.007	-	-	0.036
HCM Control Delay (s)	9.4	7.5	-	-	7.5	-	-	9.9
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection

Int Delay, s/veh 0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↗	↘
Traffic Vol, veh/h	5	4	7	758	550	6
Future Vol, veh/h	5	4	7	789	572	6
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	0	150	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	4	8	877	636	7

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1090	318	636
Stage 1	636	-	-
Stage 2	454	-	-
Critical Hdwy	6.84	6.94	4.14
Critical Hdwy Stg 1	5.84	-	-
Critical Hdwy Stg 2	5.84	-	-
Follow-up Hdwy	3.52	3.32	2.22
Pot Cap-1 Maneuver	210	678	943
Stage 1	489	-	-
Stage 2	606	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	208	678	943
Mov Cap-2 Maneuver	208	-	-
Stage 1	489	-	-
Stage 2	601	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.2	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	943	-	208	678	-	-
HCM Lane V/C Ratio	0.008	-	0.027	0.007	-	-
HCM Control Delay (s)	8.8	-	22.8	10.3	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0	-	-

Intersection

Int Delay, s/veh 1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	2	44	10	5	28
Future Vol, veh/h	6	2	46	10	5	29
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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	2	51	11	6	32

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	100	57	0	0	62	0
Stage 1	57	-	-	-	-	-
Stage 2	43	-	-	-	-	-
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	899	1009	-	-	1541	-
Stage 1	966	-	-	-	-	-
Stage 2	979	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	895	1009	-	-	1541	-
Mov Cap-2 Maneuver	895	-	-	-	-	-
Stage 1	966	-	-	-	-	-
Stage 2	975	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	1.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	921	1541
HCM Lane V/C Ratio	-	-	0.01	0.004
HCM Control Delay (s)	-	-	8.9	7.3
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

Wolf Springs Ranch

NWC 94th Street and Cactus Blvd

Scottsdale Arizona 85260

Preliminary Sewer Basis of Design Report

May 17, 2017

SHG Job No.TEG1603-000



Submitted by:

The Empire Group

6617 N Scottsdale Road, Ste. 101

Scottsdale, AZ 85250

Prepared By:

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Contact: Roger D. Theis, P.E.

A. Introduction

The proposed development consists of 40 single-family residential units covering 20 acres located in Scottsdale, Arizona. The project has a gross density of 2.0 du/ac. The site is located on the northwest corner of N. 94th Street and East Cactus Road. The Site is within the southeast quarter of Section 18 in Township 3 North, Range 5 East of the Gila and Salt River Base and Meridian, City of Scottsdale, Maricopa County, Arizona. Refer to the Vicinity Map in Appendix A for the project location.

B. Design Documentation

The infrastructure sewer lines and unit daily flows for this project have been determined using the City of Scottsdale Design Standards & Policies Manual (DS&PM).

C. Existing Conditions

The existing site encompasses approximately 20 acres of developed land on ground that slopes generally to the south and west. The existing zone for the property is R1-35 PRD. The existing Site is used as an equestrian facility and school. The existing low site outfall is located at the southwest corner of the project at the corner of 93rd Street and Cactus. An existing 8" sewer line is located west of the site in 93rd Street and conveys flow south to a 24" sewer main located in Cactus Road that conveys flows west. 144 lots north of this project contribute flow to the 8-inch line in 93rd Street.

D. Sewer flows summary

Per the City of Scottsdale DS&PM residential sewer demand for an 8-inch pipe is 100 gpd per person and a peaking factor of 4. The average day sewer flow for the 40 units (2.5 people per) is 10,000 gpd with a peaking flow of 40,000 gpd. The existing flows from 144 lots to the north are 36,000 gpd with a peaking flow of 144,000 gpd. The existing 8-inch line in 93rd Street with a slope of 0.0033 ft/ft flowing at 65% full has a capacity of 343,900 gpd. (See table in Section H).

The existing 8-inch sewer line in 93rd Avenue was analyzed for the peak flow of 184,000 gpd (127.78 gpm). The results are presented in Appendix C and show a d/D ratio of 0.45, less than the allowed 0.65.

E. Wastewater Collection System

The project is located within the City of Scottsdale Wastewater Service Area. Four runs of 8-inch PVC pipes will be installed within the proposed roadways and utility easements throughout the project. The 8-inch sewer lines will convey sewer flows from the 40 units to the existing 8-inch sewer line located in 93rd street west of the project. Existing manholes will be tied into to make the connection to the existing 8-inch sewer line. Individual 4-inch sewer laterals will service each residential unit. Flows from the development ultimately outfall to a 24-inch sewer main located in E. Cactus Road and is conveyed to a City of Scottsdale reclamation facility. See Appendix B – Utility Site Map

F. Design Considerations

All sewer lines will be designed using Manning's equation assuming pipe flowing full using a Manning's "n" value of 0.013. Pipe sizes will be designed such that the peak flow will not exceed a depth of flow to pipe diameter ratio of 0.65 (d/D).

G. Minimum Slopes

Per the City of Scottsdale DS&PM a minimum full flow velocity of 2.5 feet per second will be used to determine the minimum slope for each pipe segment. The maximum velocity will be limited to 10 fps at estimated peak flow.

H. Peaking Factor

The City of Scottsdale requires a sewer line to be designed to account for a peak flow scenario. A peaking factor is applied to the average day flows. A peaking factor of 4 was used for this parcel per the Engineer Design Standards and Policy Manual. Please see the table below for sewer flow calculations.

Development	2.5 persons per DU (P)	*Average Day (100gpcpd x P)	Peaking Factors (Average Day x 4)
Project	100	10,000	40,000

** 100 gallons per person and a peaking factor of 4. $100 \times (100) = 10,000\text{gpd} \times 4 = 40,000\text{gpd}$*

I. Conclusion

The project sewer design described within this Sewer Basis of Design Report was designed to collect and convey the wastewater flow under peak flow conditions. The 8-inch line in 93rd street has enough capacity to convey this project. The wastewater will ultimately be conveyed and treated at a City of Scottsdale Reclamation Facility.

- ❖ Approx. 1,300 LF of 8-inch PVC sewer line,
- ❖ Manhole Tap connections to the existing 8-inch sewer main.
- ❖ Individual 4" Sewer laterals (40)

J. References

- ❖ City of Scottsdale Design Standards & Policies Manual (DS&PM).
- ❖ City of Scottsdale Geographic Information Systems Quarter Section Maps 31-50 and 30-50

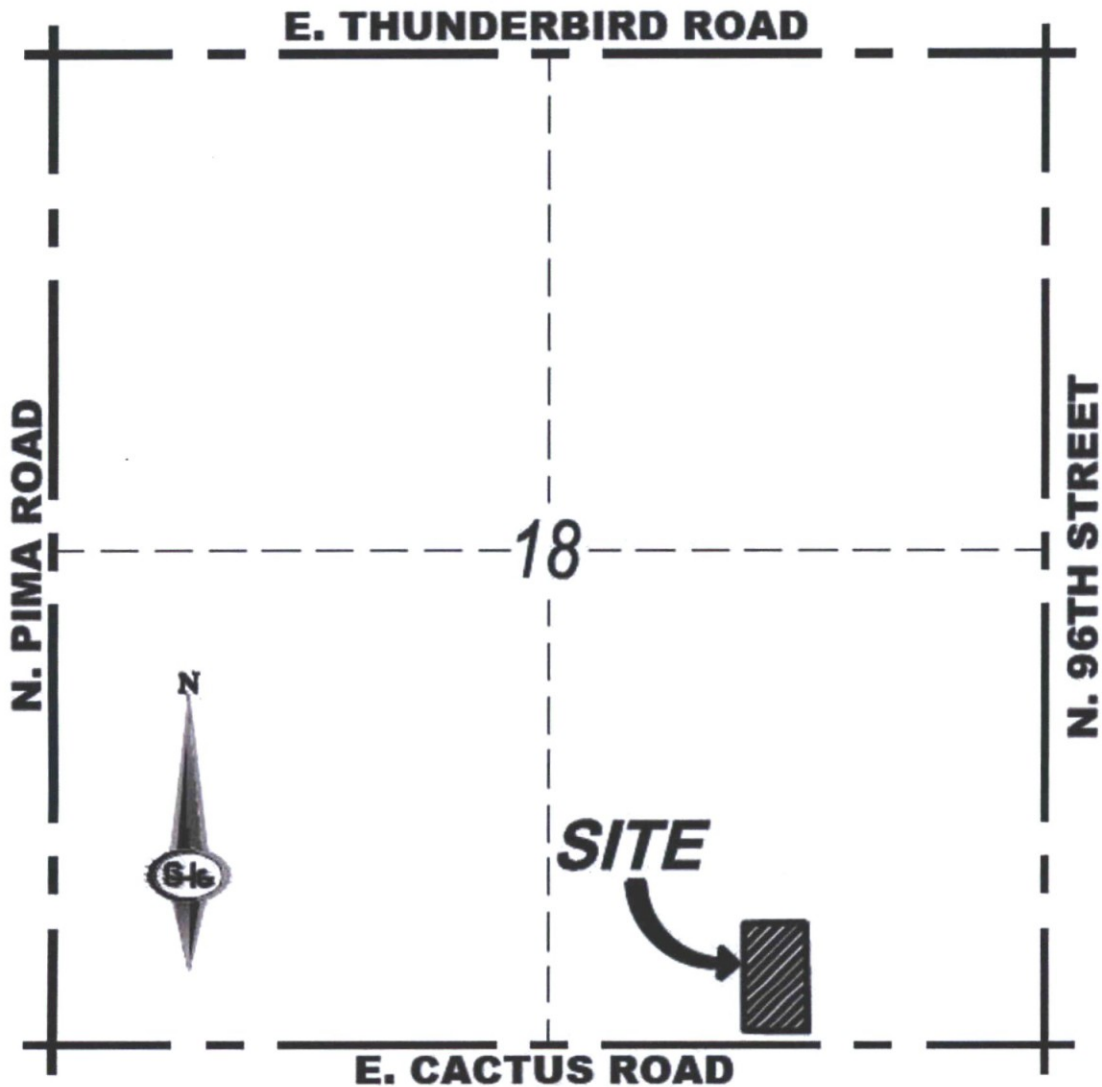
K. Appendices

Appendix A – Vicinity Map

Appendix B –Utility Site Map

Appendix C – 93rd Avenue Pipe Capacity Check

Appendix A – Vicinity Map



VICINITY MAP

SEC. 18, T3N, R5E.

Appendix B –Utility Site Map

Appendix C – 93rd Avenue Pipe Capacity Check

8104-Outlet

8104-Street

8104-UM

Project Description

File Name 93rd Ave Pipe Check.SPF

Project Options

Flow Units GPM
Elevation Type Elevation
Hydrology Method EPA SWMM
EPA SWMM Infiltration Method SCS Curve Number
Link Routing Method Steady Flow
Enable Overflow Ponding at Nodes YES
Skip Steady State Analysis Time Periods NO

Analysis Options

Start Analysis On Dec 21, 2016 00:00:00
End Analysis On Dec 22, 2016 00:00:00
Start Reporting On Dec 21, 2016 00:00:00
Antecedent Dry Days 0 days
Runoff (Dry Weather) Time Step 0 01:00:00 days hh:mm:ss
Runoff (Wet Weather) Time Step 0 00:05:00 days hh:mm:ss
Reporting Time Step 0 00:05:00 days hh:mm:ss
Routing Time Step 30 seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins.....	0
Nodes.....	2
<i>Junctions</i>	1
<i>Outfalls</i>	1
<i>Flow Diversions</i>	0
<i>Inlets</i>	0
<i>Storage Nodes</i>	0
Links.....	1
<i>Channels</i>	0
<i>Pipes</i>	1
<i>Pumps</i>	0
<i>Orifices</i>	0
<i>Weirs</i>	0
<i>Outlets</i>	0
Pollutants	0
Land Uses	0

Link Summary

SN Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (gpm)	Design Flow Capacity (gpm)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	93rd-Sewer Pipe	93rd-MH	93rd-Outfall	100.00	100.33	100.00	0.3300	8.000	0.0130	127.78	311.57	0.41	1.89	0.30	0.45	0.00	Calculated

Wolf Springs Ranch

NWC 94th Street and Cactus Blvd

Scottsdale Arizona 85260

Preliminary Water Basis of Design Report

May 17, 2017

SHG Job No.TEG1603-000

Submitted by:

The Empire Group

6617 N Scottsdale Road, Ste. 101

Scottsdale, AZ 85250



Prepared By:

Slater Hanifan Group, Inc.

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A. Introduction

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C. Design Documentation

The infrastructure water lines and unit daily demands requirements for this project have been determined using the City of Scottsdale Design Standards & Policies Manual (DS&PM).

D. Existing Conditions

The existing site encompasses approximately 20 acres of developed land on ground that slopes generally to the south and west. The existing zone for the property is R1-35 PRD. The existing Site is used as an equestrian facility and school. The existing low site outfall is located at the southwest corner of the project at the corner of 93rd Street and Cactus. An 8-inch Water line is located adjacent to the site in 94th Street and an 8" stub is located at the NEC of 93rd Street and Cactus Road. A 16-inch and 8-inch water line are located in Cactus Road. A 6-inch water line is located north of the site on Larkspur Lane.

E. Proposed Conditions

The project will connect to the existing water system at two locations using an 8-inch water line. The first connection will be at the northeast corner of the site to the existing 8-inch water line located in 94th Street. The second connection will be to an existing 8-inch stub located in Southeast corner of the site. The water system layout including water mains, fire hydrant locations is showed in Appendix 'B' – Utility Site Map.

Existing Water Meters

Approximately ten water meters exist on site. One meter will be used for irrigation. The remaining meters will be abandoned and a fee credit will be requested. An inventory of water meters and appurtenances will be provided in the final report.

Fire Hydrant Locations

There are six existing fire hydrants located near the property and will provide limited fire protection for the project. In addition 4 proposed fire hydrant locations have been proposed throughout the site to provide the appropriate coverage for fire protection. The project meet the allowed 1200 feet spacing of fire hydrants and 600 foot hose length as defined in section 6-1.502 of the City of Scottsdale DS&PM. See Appendix 'B' – Utility Site Map for further detail

F. Computations

According to the City of Scottsdale DS&PM, Residential with a 2 to 2.9 DU per acre assume 470.4 gpd per unit. The City of Scottsdale requires water lines to be designed to account for Average Day (ADD), Max Day (MDD), Peak hour (PHD) demands and Max day plus Fire flow (FFD). Please see the table below for water demand calculations.

** Per City of Scottsdale DS&PM 6-1.404: The peaking factors are 2 times the average day for maximum day, and 3 1/2 times the average day for peak hour*

Development	Dwelling Units (du)	Average Day Demand (ADD) 470.4 gpd X 40 du (gpd)	Max Day Demand ADD X 2 (gpd)	Peak Hour Demand ADD X 3.5 (gpd)
Single Family	40	18,816	37,632	65,856

G. Summary

The project will be design to meet fire flow requirements of maintaining 30 PSI when using the max day plus the fire flow of 1,000 gpm (section 6-1.502) at final design.

- ❖ 40 water services and meters.
- ❖ Approx. 1,480 LF of 8" water line located within the proposed roadway and utility easements.
- ❖ 1 Landscape water meter (utilize existing water meter if possible)

H. References

- ❖ City of Scottsdale Design Standards & Policies Manual (DS&PM).
- ❖ City of Scottsdale Geographic Information Systems Quarter Section Maps 31-50

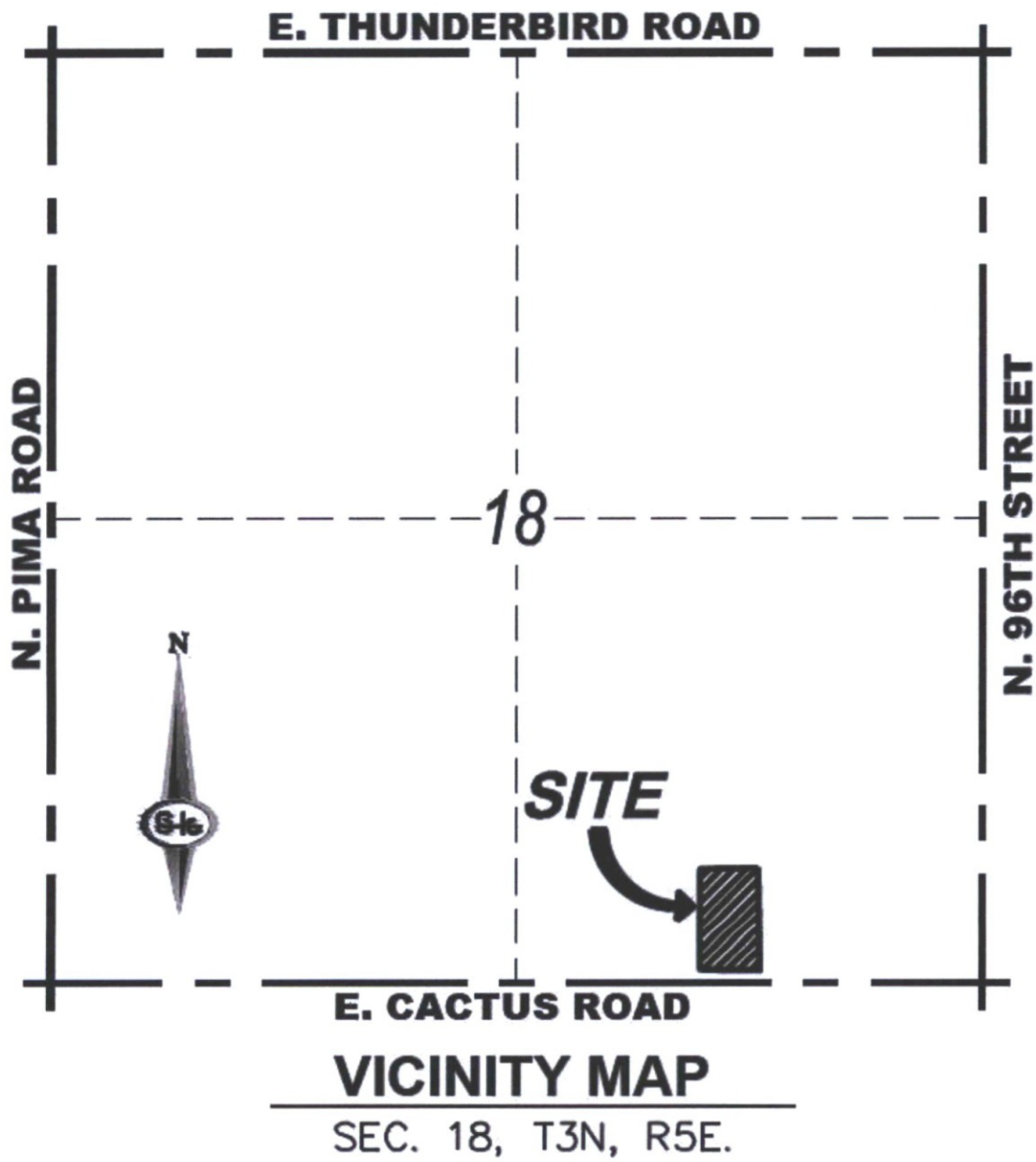
I. Appendices

Appendix 'A' – Vicinity Map & Site Plan

Appendix 'B' – Utility Site Map

Appendix 'C' – C.O.S. Water Pressure Zone Map / Water Service Area Map

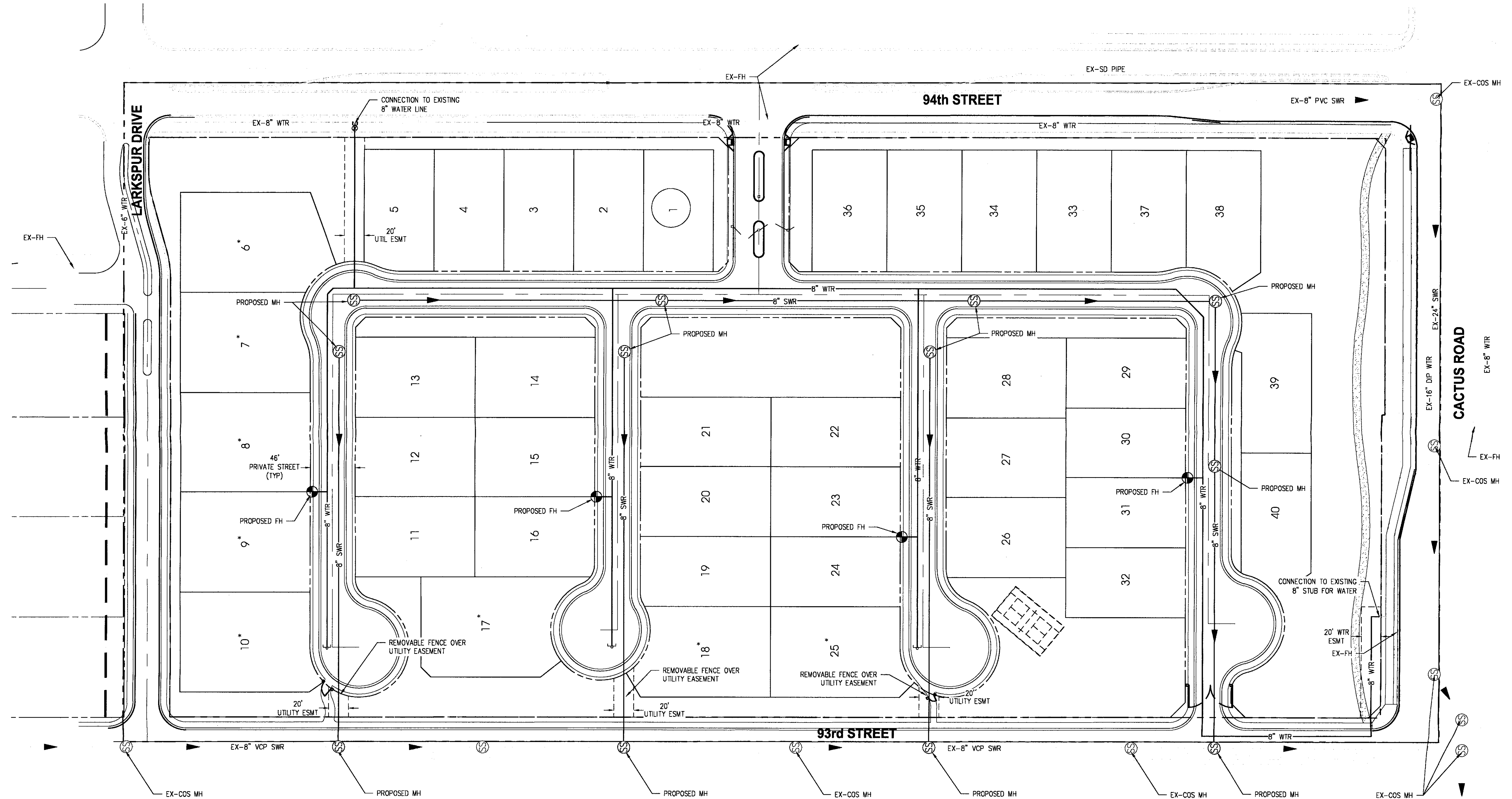
Appendix A - Vicinity Map



Appendix B - Utility Site Map

(See attached)

A:\1603-000\wdl_springs_ranch\dwg\figures\utility_plan.dwg, 5/17/2017, 6:35 AM Roger Thrus



- LEGEND**
- PROPOSED FIRE HYDRANT
 - PROPOSED 8" PVC WATER
 - PROPOSED WATER VALVE
 - PROPOSED WATER CAP
 - PROPOSED 8" PVC SEWER
 - PROPOSED SEWER MANHOLE
 - EXISTING FIRE HYDRANT
 - EXISTING 16" WATER
 - EXISTING NP WATER
 - EXISTING SEWER
 - EXISTING SEWER MANHOLE
 - EXISTING WATER VALVE
 - EXISTING STREET LIGHT

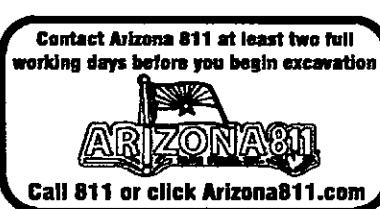
APP. DATE	APP. BY	DATE	DESCRIPTION

THE EMPIRE GROUP
 WOLF SPRINGS RANCH
 UTILITY MAP

DATE: 05-17-2017
 DRAFTER: SB
 DESIGNER: JP
 CHECKED: RT

PROJECT NO.
TEG1603-000

EX01
 SHEET 1 OF 1



Appendix C- C.O.S. Water Pressure Zone Map / Water Service Area Map

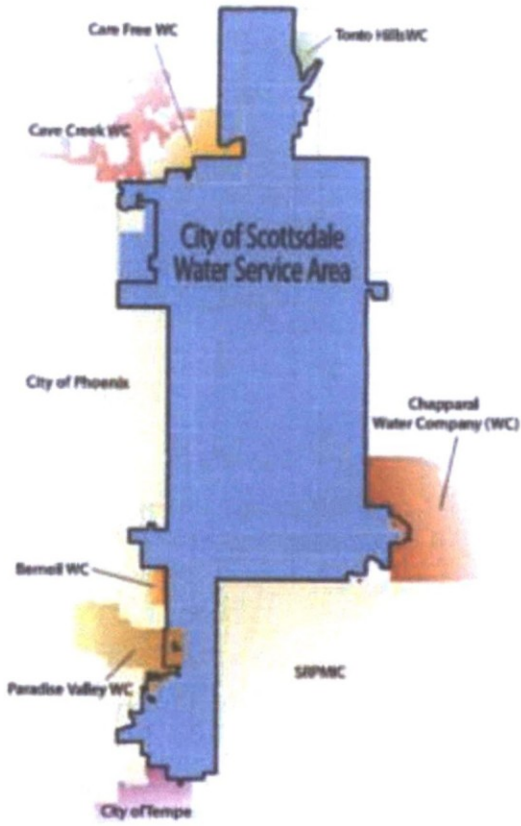
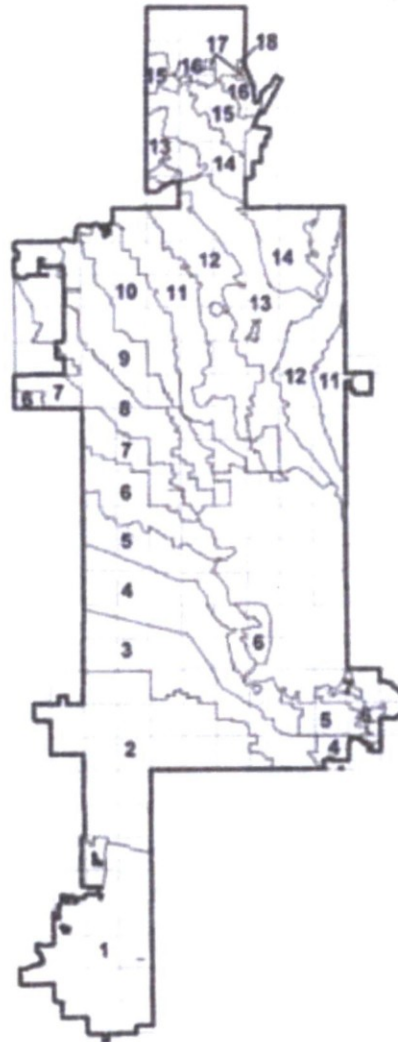


FIGURE B.1-1 WATER SERVICE AREAS



Zone	Ground Elevation Range (FL)
1	1180-1280
1A	1250-1330
2A	1280-1330
2	1330-1440
3	1440-1550
4	1510-1650
4E	1550-1650
5	1650-1790
5E	1650-1750
6	1790-1920
6E	1750-1934
7	1920-2050
7E	1934-2065
8	2050-2180
8E	2065-2200
9	2180-2310
10	2310-2440
11,11E	2440-2570
12,12E	2570-2700
13	2700-2830
14	2830-2960
15	2960-3090

FIGURE B.1-3 PRESSURE ZONE MAP

Preliminary Drainage Report for

WOLF SPRINGS RANCH

Scottsdale, AZ

May 17, 2017

Prepared For:

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SHG Job Number:

TEG1603-000

COS Case Number:

28-ZN-2016



EXPIRES: 12/31/18



SLATER
HANIFAN
GROUP

"The Benchmark of Our Profession."

28-ZN-2016
05/22/2017

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Plan #	_____
Case #	<u>28-ZN-2017</u>
Q-S #	_____
<input checked="" type="checkbox"/> Accepted	
<input type="checkbox"/> Corrections	
Reviewed By	<u>DG</u>
Date	<u>6/6/17</u>

Appendices

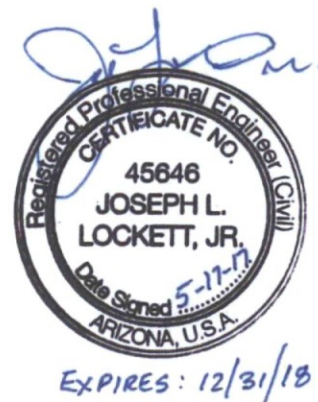
- Appendix A: Hydrology
Appendix B: Hydraulics
Appendix C: Stormwater Retention

Figures

- Figure 1A: Vicinity Map
Figure 1B: USGS Quadrangle Map
Figure 2: Existing Site Map
Figure 3: FEMA FIRMette

Exhibits (at back of Appendices)

- Exhibit 1: USGS Quad Map
Exhibit 2: FEMA FIRMette
Exhibit 3A: Offsite Drainage Map
Exhibit 3B: Existing Condition Drainage Map
Exhibit 4: Proposed Condition Drainage Map



1. Introduction

The Empire Group, LLC has retained Slater Hanifan Group (SHG) to prepare preliminary construction documents for a proposed 40 lot residential development known as Wolf Springs Ranch, herein referred to as the Site. The Site is located west of 94th Street and north of Cactus Road in Scottsdale, Arizona. Figure 1A shows a Site Vicinity Map.

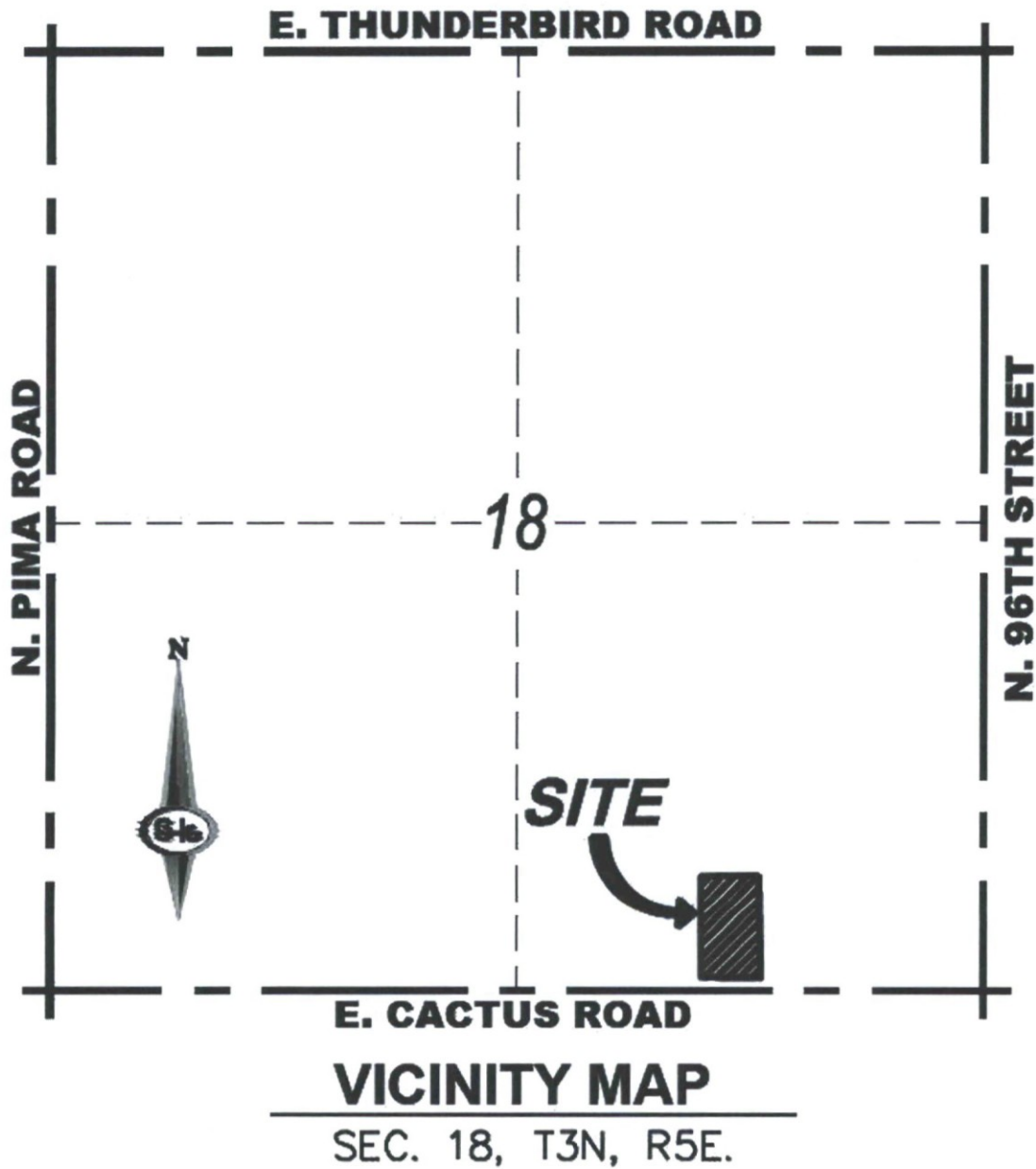


Figure 1A – Vicinity Map

The purpose of this report is to document the preliminary drainage requirements and supporting design calculations for the proposed Wolf Springs Ranch development.

2. Location

The Site is currently developed land located at the northwest corner of Cactus Road and 94th Street in Scottsdale, Arizona. The Site drains from north to south. The Site lies immediately south of the existing Sweetwater Ranch development. **Figure 1B** shows a portion of the USGS Quad map on which the Site falls. The Site is within the southeast quarter of Section 18 in Township 3 North, Range 5 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona.

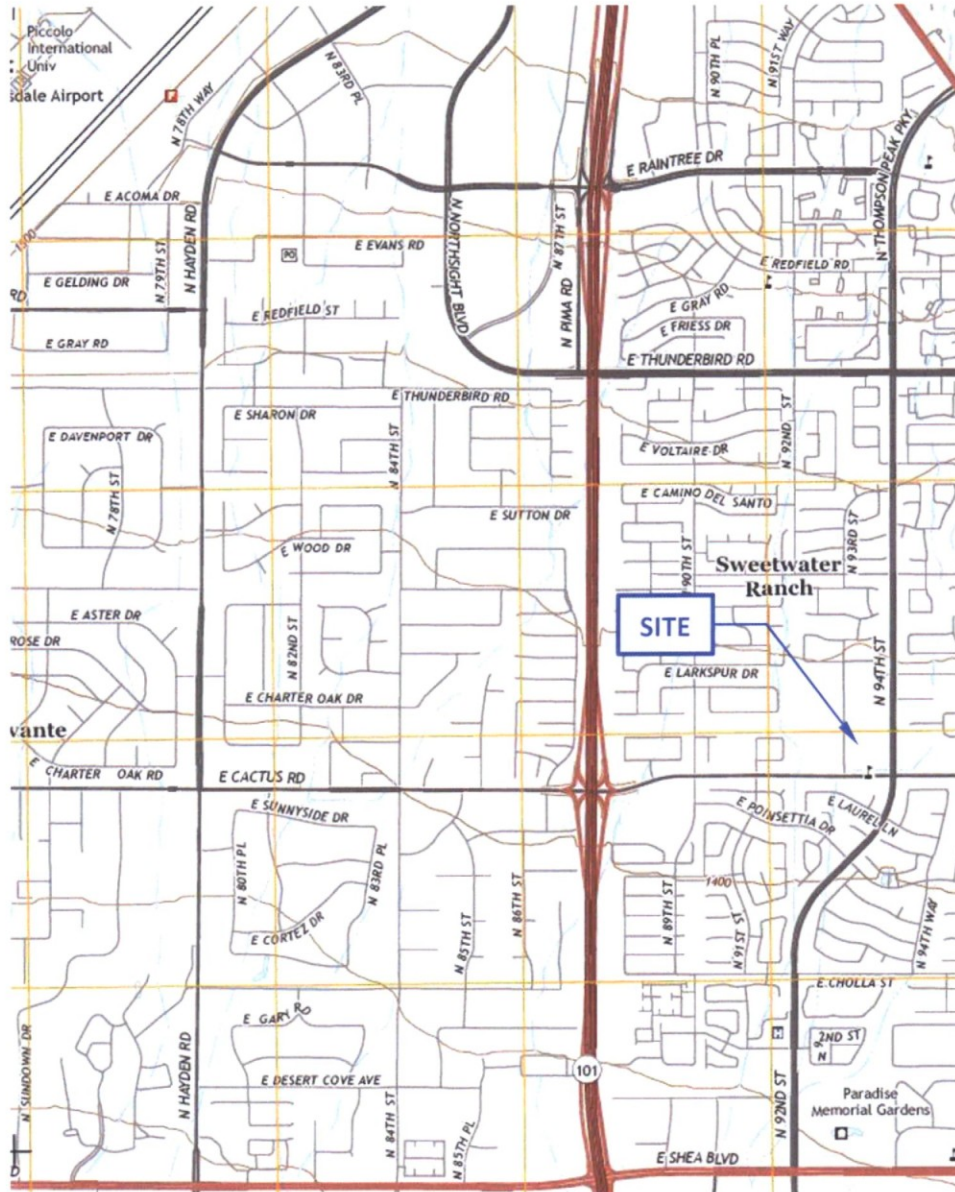


Figure 1B – USGS Quad Map

3. Site Description & Proposed Development

The Site encompasses approximately 20 acres of developed land on ground that slopes generally to the south and west. The existing Site is used as an equestrian facility and school. The existing low site outfall is located at the southwest corner of the project at the corner of 93rd Street and Cactus.



Figure 2 – Existing Site

As shown in **Figure 2**, drainage across the existing Site is characterized by grades that begin at the north end of the Site and drain to the south and southwest.

3.1. *Existing Studies*

At the time of drafting this Drainage Report, no existing drainage studies have been located that support the design of the developments surrounding the Site.

3.2. *Purpose of Report*

The purpose of this report is to document the preliminary drainage requirements for the proposed Wolf Springs Ranch development. This preliminary drainage report follows the drainage standards as established by the City of Scottsdale.

4. FEMA Floodplain Classification

The proposed Wolf Springs Ranch Site is located within the Federal Emergency Management Agency's (FEMA) Special Flood Hazard Area (SFHA) "Zone X (Shaded)" as shown on the FEMA Flood Insurance Rate Map (FIRM) Panel 04013C1760L (Figure 3, below). The effective date for this FIRM Panel was October 16, 2013.

The definition of "Zone X (Shaded)" is:

"Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or within drainage areas less than 1 square mile; and areas protected by levees from the 1% annual chance flood."

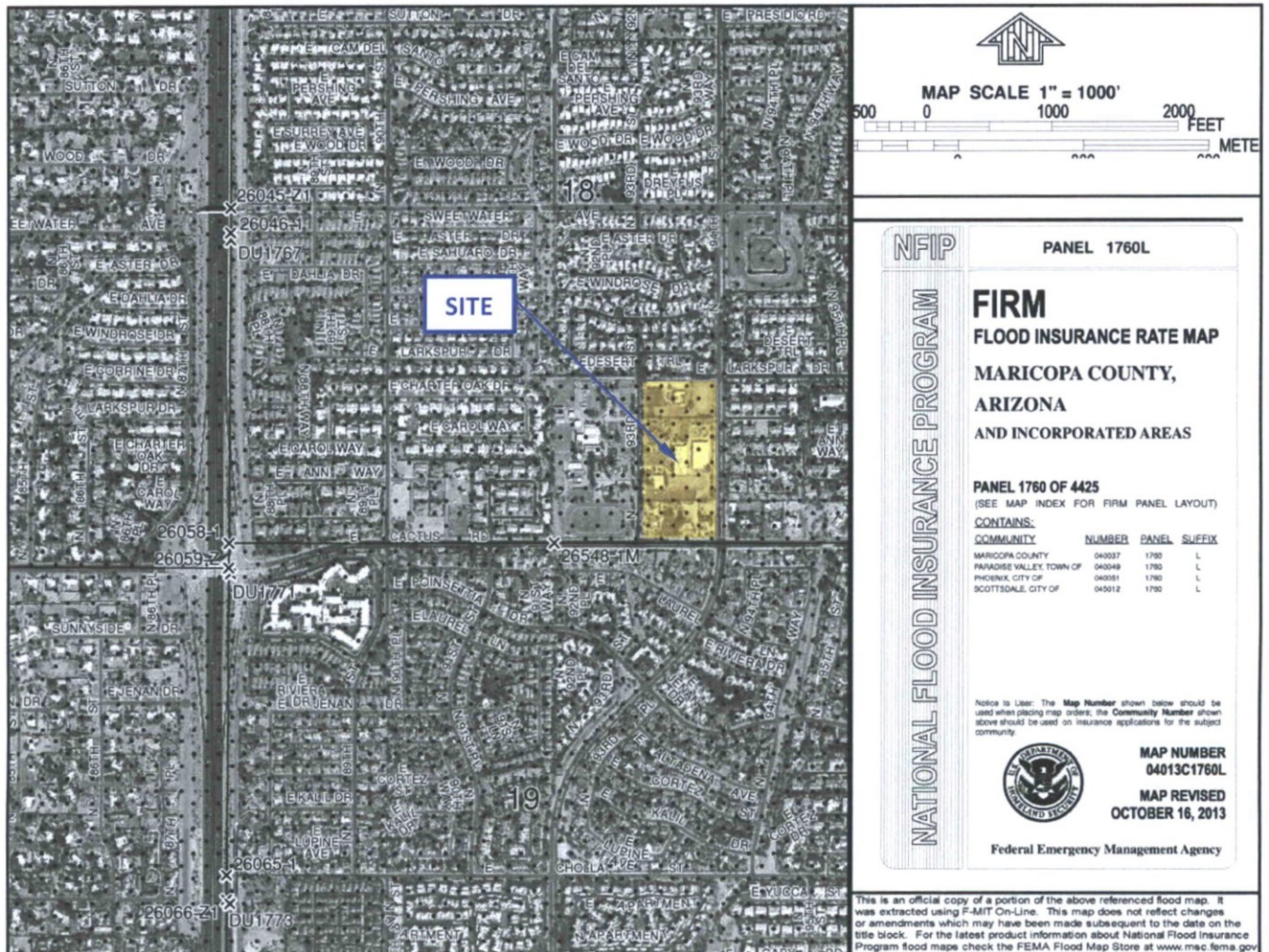


Figure 3 – FEMA FIRMette

5. Drainage Design

5.1. *Proposed Development*

The Empire Group, LLC proposes a 40 lot residential development on a net 16.8 -acre site. The project work includes lot grading, roadway infrastructure and basin grading for a development with proposed R1-18 PRD zoning. A portion of the onsite stormwater is collected in catch basins in the local streets and directed to a retention basins provided at the southwest corner of the Site.

Stormwater retention design for the Site has been granted the option by the City of Scottsdale to retain the greater of either the first-flush volume or the pre-vs-post C Value based 100-year volume, while also maintaining project outfall discharges for the 10 and 100 year events to be less than the pre-development condition discharges for the same frequencies.

5.2. *Design Standards*

Onsite drainage for the proposed Site will be designed to conform to the *City of Scottsdale Design Standards and Policies Manual* and the *Flood Control District of Maricopa County's Drainage Design Manual for Maricopa County, Arizona, Volume 1, Hydrology* and *Volume II, Hydraulics*.

6. Offsite Drainage

The Site is bounded to the north by several developments, some of which have existing retention storage (for reference, see **Exhibit 3A - Offsite Drainage Map**). However, the two developments immediately north of the Site, Sagewood and Sweetwater Ranch Estates do not appear to have retention provided onsite. Therefore, it is estimated that the 100-year flow from these two developments outfalls into 93rd Street at the northwest corner of the Site. 93rd Street west of the Site is partially improved and does not have curb and gutter with the exception of a short reach at the far south end near Cactus Road. Flows that reach 93rd Street are generally conveyed within the street corridor between two walls that are on the east and west sides of the street. However, some of these flows may break out to the southwest into properties that are west of the street through driveway openings, breaks in the fences, etc. In spite of this, the assumption has been made that the entire 100-yr flow from Sagewood and Sweetwater Ranch Estates as it enters 93rd Street at the northwest corner of the Site, is conveyed in the corridor. It is important to note that any improvements made to the east side of 93rd Street in support of the Wolf Springs development will not diminish the existing capacity of the street corridor to convey flows. Further, the finished floor elevations on the west side of the Site will be required to be elevated sufficiently to be above the estimated 100-yr water surface in 93rd Street corridor.

The Site is bounded to the east by 94th Street which appears to have stormdrain infrastructure in place that intercepts flows in the roadway. Preliminarily, it is assumed that the stormdrain has capacity for approximately the 10-yr storm. The finished floor elevations on the east side of the Site will be required to be above the estimated 100-yr flow depth in 94th Street.

Based upon preliminary review of available storm drain infrastructure information for Cactus Road, the Site may be able to bleed off to the existing Cactus Road catch basin at the southwest corner of the Site. The preliminary stormdrain design contained herein supports gravity bleed-off to the existing catch-basin on Cactus Road and 93rd Street.

7. Onsite Hydrology

7.1. Methodology

The Rational Method was used to generate peak discharges for the on-site areas and will be used for inlet design in final design. Sub-basins were delineated based on the preliminary Site layout. The Flood Control District of Maricopa County (FCDMC) DDMSW program was used to estimate peak flows for this report.

7.2. Parameters

T_c: Times of concentration were set to a minimum of 10 minutes.

Land Use: The proposed Site consists of R1-18 residential land use and local roadway with retention areas at the south and west edges of the project along 93rd Street and Cactus Road. The Rational method C values used for the project are:

Table 1 – Rational Method C Values

Land Use	C ₁₀	C ₁₀₀
Existing Condition		
R1-35	0.40	0.62
Proposed Condition		
R1-18 PRD	0.43	0.64
Paved/Hardscape	0.95	0.95
Landscape/Basins	0.20	0.30

Rainfall: The 10-year and 100-year return frequency rainfall intensities are based on the NOAA Atlas 14 rainfall data in the localized area.

Based on this data, peak discharges were determined for each of the drainage areas. The rainfall used as the basis for the Hydrologic data are provided in **Appendix A. Exhibit 3B – Existing Condition Drainage Map** indicates the existing condition drainage patterns and existing peak discharges for the Site. **Exhibit 4- Proposed Condition Drainage Map** shows the overall proposed drainage concept for the site, including the contributing drainage areas, flow patterns, peak discharges, and required/provided storage volumes for the retention basin.

8. Hydraulics

8.1. Methodology

A spreadsheet was used to estimate the street capacity of the proposed local streets. The spreadsheet takes into account the proposed typical street width from face of curb to face of curb, the depth of flow to top of curb (for 4 or 6-inch curbs), cross-slope, and assumed Manning's n value for pavement. The output tabulates the street capacity based on varying longitudinal slope of the roadway. The capacity assumes a water surface at the specified top of curb height (4 or 6-inches). The calculation is attached in **Appendix B**.

For this preliminary design, an AutoCAD Storm and Sanitary Analysis (SSA) model was assembled to roughly depict the routing of 10 and 100 year flows through the Site. The model routes flows through inlets, conveying them through various pipe systems (18-inch minimum) and small swales to the two retention areas (Basins 1 and 2-3) on the Site. The stormwater storage basins store the first-flush volume in the first foot of the basin. An orifice was placed at the outlet of each basin, above the first-flush volume elevation, that bleeds off the 10 and 100-year volumes that collect in the basins. The basins are sized in an attempt to attenuate the incoming 10 and 100-year volumes to allow for lower discharges to be drained out to the Cactus Road storm drain. Output for the 10 and 100-year storm models is included in **Appendix B**. The output includes a schematic of the system and 10 and 100-year tabular output for each node of the model.

The existing condition hydrology and preliminary SSA analysis for the proposed condition 10 and 100-year frequencies were compared. The following table summarizes the discharges for the existing and proposed condition:

Table 2 - Pre-vs-Post 10 and 100-year Discharges at Site Outfall

Contributing Area(s)	Q ₁₀ (cfs)	Q ₁₀₀ (cfs)
Existing Condition at SW Corner of Site	25	50
Proposed Condition at SW Corner of Site	1	23

The above results indicate that the first-flush retention basin and its bleed-off structure at the outlet of the retention basin sufficiently reduces the combined proposed condition 10 and 100-year peak discharges such that they are less than the existing condition peak discharges for the same frequencies.

The final hydraulic calculations to assess sizing of inlets, stormdrains, basin emergency spillway weir, etc. will be provided with the final drainage report.

9. Storm Water Storage

This project is a redevelopment project located within the City of Scottsdale. The City has granted the option to retain the larger either the first-flush volume or the pre-vs-post C Value based 100-year volume.

Comparison of Volumes: The first-flush and differential C volumes were calculated for each area of the Site. The first-flush volume was calculated by the following equation, where A is the area of the subbasin and P is the first one-half inch of rainfall:

$$V_{FF} = A\left(\frac{P}{12}\right)$$

The differential 100-year volume (V_{PP}) was also calculated for the where C is the difference between the weighted C value for the proposed development condition and the existing condition C value. A 100-year C for the existing condition Site was estimated as rural residential ($C_{100} = 0.53$) and the overall proposed development C value, weighted by land use, was estimated as $C_{100} = 0.63$. Therefore, the differential C is $0.63 - 0.53 = 0.10$. The V_{PP} was estimated by the following equation where P is the rainfall depth in inches, A is the area, and C is the differential C, as described above:

$$V_{PP} = CA\left(\frac{P}{12}\right)$$

See **Appendix C** for the calculations. A summary of the compared first-flush and 100-year volume is summarized in **Table 3**, below:

Table 3 - On-Site First Flush vs Pre-vs-Post C 100-Yr, 2-Hr Retention Comparison

Contributing Area(s)	Area (ac)	FF Volume (ac-ft)	Pre-vs-Post C Volume (ac-ft)
DA-1	2.57	0.11	0.05
DA-2	2.97	0.12	0.06
DA-3	2.84	0.12	0.05
DA-4	2.66	0.11	0.05
DA-5	5.04	0.21	0.09
DA-LARK	0.77	0.03	0.01
Total	16.85	0.70	0.32

As noted in the above table, the greater of the first-flush and pre-vs-post volume is the first-flush. Therefore, the first-flush is to be retained on-site.

As noted in the hydraulics section, based upon review of the as-built Cactus Road storm drain improvements plans, it appears that the retention basin can bleed-off to the existing catch basin at the southwest corner of the Site. The catch basin is located at the northeast curb return of Cactus Road and 93rd Street.

10. Minimum Finished Floors

All finished floors are to be set at least 14 inches above the Site outfall and 12 inches above the 100-year water surface of adjacent retention basins and 100-year conveyances. The ultimate outfall for the Site is to be considered for design based upon the emergency spillway crest elevation of the retention basins.

11. Maintenance

Ongoing maintenance of the drainage systems are required to preserve the design integrity and function. Failure to provide adequate maintenance can prevent the drainage systems from performing in accordance with their design intent. It is the responsibility of the Wolf Springs Ranch Community Association to provide maintenance and to ensure the drainage structures on the Site are functioning as intended. A regular maintenance program is required for the drainage system to function and maintain the level of protection provided with the intent of the design presented herein.

12. Conclusions

The following conclusions have been reached as a result of this preliminary drainage investigation, in support of the proposed Wolf Springs Ranch development:

- This preliminary drainage report was prepared in accordance with the recommendations and design parameters from the *City of Scottsdale DS&PM* and the *Flood Control District of Maricopa County's Drainage Design Manual for Maricopa County, Arizona, Volume 1, Hydrology and Volume II, Hydraulics*.
- The first-flush volume is greater than the pre-vs-post C volume for the Site. Therefore, the required first-flush retention volume for all of the Wolf Springs Ranch development is to be held within Retention Basin 1.
- The 10 and 100-year onsite storm runoff will be designed to be conveyed through inlets, swales, and storm drains to Retention Basin 1.
- The design of hydraulic structures and systems will be based on generally accepted engineering practices and in accordance with the City of Scottsdale requirements.

13. References

1. City of Scottsdale, Cactus Road Improvements - Loop 101 to 96th Street, (As-built plans), January 2008.
2. City of Scottsdale, City of Scottsdale Design Standards and Policies Manual, January 2010.
3. Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map, Panel 04013C1760L, October 16, 2013.
4. Flood Control District of Maricopa County, Drainage Design Manual for Maricopa County, Arizona, Volume I - Hydrology, 2011.
5. Flood Control District of Maricopa County, Drainage Design Manual for Maricopa County, Arizona, Volume I - Hydraulics, 2011.

Appendix A: Hydrology

Rainfall (NOAA14)

On-Site Rational Method

Existing Conditions

Proposed Conditions



Flood Control District of Maricopa County
Drainage Design Management System
RAINFALL DATA
Project Reference: TEG-1603-000

ID	Method	Duration	2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
DEFAULT	NOAA14	5 MIN	0.248	0.335	0.403	0.493	0.563	0.635
	NOAA14	10 MIN	0.378	0.511	0.613	0.751	0.857	0.966
	NOAA14	15 MIN	0.469	0.633	0.760	0.931	1.063	1.198
	NOAA14	30 MIN	0.631	0.852	1.024	1.253	1.431	1.613
	NOAA14	1 HOUR	0.781	1.055	1.267	1.551	1.771	1.996
	NOAA14	2 HOUR	0.905	1.206	1.437	1.752	1.990	2.238
	NOAA14	3 HOUR	0.992	1.297	1.540	1.879	2.148	2.427
	NOAA14	6 HOUR	1.176	1.503	1.764	2.120	2.396	2.684
	NOAA14	12 HOUR	1.307	1.652	1.921	2.285	2.565	2.854
	NOAA14	24 HOUR	1.536	1.985	2.343	2.837	3.227	3.635

Flood Control District of Maricopa County
 Drainage Design Management System
LAND USE
 Project Reference: TEG-1603-000

Sub Basin	Land Use Code	Area (acres)	Area (%)	Kb	Runoff Coefficient C						Description
					2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	
Major Basin ID: 01											
CP23	COS TRANS	8.80	100.0	0.034	0.95	0.95	0.95	0.95	0.95	0.95	City of Scottsdale, pavement
		8.800	100.0								
CP34	COS TRANS	11.80	100.0	0.033	0.95	0.95	0.95	0.95	0.95	0.95	City of Scottsdale, pavement
		11.800	100.0								
DA-1	COS LS	0.22	8.6	0.074	0.20	0.20	0.20	0.20	0.25	0.30	City of Scottsdale, Landscaping
	COS R1-18	1.85	72.0	0.074	0.43	0.43	0.43	0.43	0.58	0.64	City of Scottsdale, R1-18
	COS TRANS	0.50	19.5	0.037	0.95	0.95	0.95	0.95	0.95	0.95	City of Scottsdale, pavement
		2.570	100.1								
DA-1 E	110	16.08	100.0	0.032	0.42	0.42	0.42	0.46	0.50	0.53	Rural Residential (<= 1/5 du per acre)
		16.080	100.0								
DA-2	COS LS	0.65	21.8	0.073	0.20	0.20	0.20	0.20	0.25	0.30	City of Scottsdale, Landscaping
	COS R1-18	1.51	50.7	0.073	0.43	0.43	0.43	0.43	0.58	0.64	City of Scottsdale, R1-18
	COS TRANS	0.82	27.5	0.037	0.95	0.95	0.95	0.95	0.95	0.95	City of Scottsdale, pavement
		2.980	100.0								
DA-3	COS LS	0.50	17.6	0.074	0.20	0.20	0.20	0.20	0.25	0.30	City of Scottsdale, Landscaping
	COS R1-18	1.88	66.2	0.074	0.43	0.43	0.43	0.43	0.58	0.64	City of Scottsdale, R1-18
	COS TRANS	0.46	16.2	0.037	0.95	0.95	0.95	0.95	0.95	0.95	City of Scottsdale, pavement
		2.840	100.0								
DA-4	COS LS	0.60	22.6	0.074	0.20	0.20	0.20	0.20	0.25	0.30	City of Scottsdale, Landscaping

* Non default value

Flood Control District of Maricopa County
 Drainage Design Management System
LAND USE
 Project Reference: TEG-1603-000

Sub Basin	Land Use Code	Area (acres)	Area (%)	Kb	Runoff Coefficient C						Description
					2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	
Major Basin ID: 01											
	COS R1-18	1.61	60.8	0.074	0.43	0.43	0.43	0.43	0.58	0.64	City of Scottsdale, R1-18
	COS TRANS	0.44	16.6	0.037	0.95	0.95	0.95	0.95	0.95	0.95	City of Scottsdale, pavement
		2.650	100.0								
DA-5	COS LS	1.88	37.3	0.070	0.20	0.20	0.20	0.20	0.25	0.30	City of Scottsdale, Landscaping
	COS R1-18	2.31	45.8	0.070	0.43	0.43	0.43	0.43	0.58	0.64	City of Scottsdale, R1-18
	COS TRANS	0.85	16.9	0.036	0.95	0.95	0.95	0.95	0.95	0.95	City of Scottsdale, pavement
		5.040	100.0								
DA-LAR	COS LS	0.18	23.1	0.082	0.20	0.20	0.20	0.20	0.25	0.30	City of Scottsdale, Landscaping
	COS TRANS	0.60	76.9	0.041	0.95	0.95	0.95	0.95	0.95	0.95	City of Scottsdale, pavement
		0.780	100.0								
OFF-1	COS R1-18	3.70	9.9	0.058	0.43	0.43	0.43	0.43	0.58	0.64	City of Scottsdale, R1-18
	COS R1-7	33.60	90.1	0.030	0.51	0.51	0.51	0.51	0.64	0.94	City of Scottsdale, R1-7
		37.300	100.0								
OFF-2	COS TRANS	5.50	100.0	0.035	0.95	0.95	0.95	0.95	0.95	0.95	City of Scottsdale, pavement
		5.500	100.0								
OFF-3	COS TRANS	3.30	100.0	0.037	0.95	0.95	0.95	0.95	0.95	0.95	City of Scottsdale, pavement
		3.300	100.0								
OFF-4	COS TRANS	3.00	100.0	0.037	0.95	0.95	0.95	0.95	0.95	0.95	City of Scottsdale, pavement

* Non default value

Flood Control District of Maricopa County
 Drainage Design Management System
LAND USE
 Project Reference: TEG-1603-000

Sub Basin	Land Use Code	Area (acres)	Area (%)	Kb	Runoff Coefficient C						Description
					2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	
Major Basin ID: 01		3.000	100.0								

* Non default value

Flood Control District of Maricopa County
 Drainage Design Management System
 SUB BASINS
 Project Reference: TEG-1603-000

ID	Sub Basin Data						Sub Basin Hydrology Summary						
	Area (acres)	Length (ft)	USGE	DSGE	Slope (ft/mi)	Kb	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	
Major Basin ID: 01													
DA-1 E	16.1	1,328	1,421.00	1,408.00	51.7	0.032	Q (cfs)	12.9	18.8	23.4	32.1	40.0	48.0
							C	0.42	0.42	0.42	0.46	0.50	0.53
							CA (ac)	6.75	6.75	6.75	7.40	8.04	8.52
							Volume (ac-ft)	0.3131	0.3941	0.4518	0.5903	0.7355	0.8826
							Tc (min)	13	11	11	10	10	10
							i (in/hr)	1.91	2.78	3.47	4.34	4.98	5.63
DA-LAR	0.8	565	1,421.00	1,417.00	37.4	0.050	Q (cfs)	1.2	1.8	2.1	2.6	3.0	3.5
							C	0.78	0.78	0.78	0.78	0.79	0.80
							CA (ac)	0.60	0.60	0.60	0.60	0.61	0.62
							Volume (ac-ft)	0.0256	0.0334	0.0386	0.0478	0.0552	0.0644
							Tc (min)	12	10	10	10	10	10
							i (in/hr)	2.03	2.92	3.53	4.34	4.98	5.63
DA-1	2.6	535	1,420.00	1,416.00	39.5	0.067	Q (cfs)	2.5	3.6	4.5	5.7	7.9	9.7
							C	0.51	0.51	0.51	0.51	0.62	0.67
							CA (ac)	1.31	1.31	1.31	1.31	1.59	1.72
							Volume (ac-ft)	0.0611	0.0761	0.0877	0.1048	0.1453	0.1784
							Tc (min)	13	12	11	10	10	10
							i (in/hr)	1.90	2.77	3.45	4.34	4.98	5.63
DA-2	3.0	705	1,421.00	1,417.00	30.0	0.063	Q (cfs)	2.6	3.8	4.8	6.2	8.5	10.5
							C	0.52	0.52	0.52	0.52	0.61	0.65
							CA (ac)	1.54	1.54	1.54	1.54	1.81	1.93
							Volume (ac-ft)	0.0808	0.1027	0.1183	0.1391	0.1782	0.2085
							Tc (min)	17	15	13	12	11	11
							i (in/hr)	1.70	2.45	3.10	4.00	4.72	5.46
DA-3	2.8	490	1,418.00	1,415.00	32.3	0.068	Q (cfs)	2.5	3.6	4.5	5.8	8.2	10.1
							C	0.47	0.47	0.47	0.47	0.58	0.63

* Non default value

Flood Control District of Maricopa County
 Drainage Design Management System
 SUB BASINS
 Project Reference: TEG-1603-000

ID	Sub Basin Data						Sub Basin Hydrology Summary						
	Area (acres)	Length (ft)	USGE	DSGE	Slope (ft/mi)	Kb	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	
Major Basin ID: 01													
							CA (ac)	1.33	1.33	1.33	1.33	1.65	1.79
							Volume (ac-ft)	0.0630	0.0788	0.0902	0.1067	0.1508	0.1857
							Tc (min)	14	12	11	10	10	10
							i (in/hr)	1.87	2.73	3.41	4.34	4.98	5.63
DA-4	2.7	510	1,417.00	1,413.00	41.4	0.068	Q (cfs)	2.4	3.4	4.3	5.3	7.6	9.1
							C	0.46	0.46	0.46	0.46	0.57	0.61
							CA (ac)	1.22	1.22	1.22	1.22	1.52	1.62
							Volume (ac-ft)	0.0565	0.0694	0.0807	0.0975	0.1398	0.1673
							Tc (min)	13	11	10	10	10	10
							i (in/hr)	1.94	2.81	3.51	4.34	4.98	5.63
DA-5	5.0	870	1,417.00	1,408.00	54.6	0.064	Q (cfs)	3.8	5.6	7.0	9.0	12.8	16.2
							C	0.43	0.43	0.43	0.43	0.52	0.57
							CA (ac)	2.17	2.17	2.17	2.17	2.62	2.87
							Volume (ac-ft)	0.1083	0.1380	0.1583	0.1837	0.2471	0.2979
							Tc (min)	16	13	12	11	11	10
							i (in/hr)	1.76	2.58	3.24	4.17	4.89	5.63
OFF-1	37.3	2,170	1,430.00	1,417.00	31.6	0.033	Q (cfs)	27.8	40.8	51.3	65.8	97.3	164.9
							C	0.50	0.50	0.50	0.50	0.63	0.91
							CA (ac)	18.65	18.65	18.65	18.65	23.50	33.94
							Volume (ac-ft)	1.1144	1.4105	1.6320	1.8996	2.6480	4.2148
							Tc (min)	22	19	17	16	15	14
							i (in/hr)	1.49	2.19	2.75	3.53	4.14	4.86
OFF-2	5.5	970	1,437.00	1,430.00	38.1	0.035	Q (cfs)	10.1	14.6	18.3	22.7	26.0	29.4
							C	0.95	0.95	0.95	0.95	0.95	0.95
							CA (ac)	5.23	5.23	5.23	5.23	5.23	5.23
							Volume (ac-ft)	0.2396	0.3007	0.3466	0.4174	0.4781	0.5406
							Tc (min)	13	11	10	10	10	10
							i (in/hr)	1.93	2.80	3.49	4.34	4.98	5.63

* Non default value

Flood Control District of Maricopa County
 Drainage Design Management System
 SUB BASINS

Project Reference: TEG-1603-000

ID	Sub Basin Data						Sub Basin Hydrology Summary						
	Area (acres)	Length (ft)	USGE	DSGE	Slope (ft/mi)	Kb	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	
Major Basin ID: 01													
OFF-3	3.3	1,310	1,430.00	1,422.00	32.2	0.037	Q (cfs)	5.3	7.7	9.7	12.6	14.8	17.1
							C	0.95	0.95	0.95	0.95	0.95	0.95
							CA (ac)	3.14	3.14	3.14	3.14	3.14	3.14
							Volume (ac-ft)	0.1657	0.2081	0.2408	0.2827	0.3130	0.3396
							Tc (min)	17	15	14	12	12	11
							i (in/hr)	1.69	2.45	3.09	4.00	4.70	5.46
OFF-4	3.0	1,280	1,422.00	1,410.00	49.5	0.037	Q (cfs)	5.2	7.7	9.6	12.2	14.2	16.0
							C	0.95	0.95	0.95	0.95	0.95	0.95
							CA (ac)	2.85	2.85	2.85	2.85	2.85	2.85
							Volume (ac-ft)	0.1367	0.1742	0.1995	0.2311	0.2611	0.2942
							Tc (min)	14	12	11	10	10	10
							i (in/hr)	1.83	2.69	3.36	4.29	4.98	5.63
CP23	8.8	2,225	1,437.00	1,422.00	35.6	0.034	Q (cfs)	12.5	18.4	23.1	29.6	34.9	40.7
							C	0.95	0.95	0.95	0.95	0.95	0.95
							CA (ac)	8.36	8.36	8.36	8.36	8.36	8.36
							Volume (ac-ft)	0.4965	0.6327	0.7264	0.8491	0.9370	1.0328
							Tc (min)	22	19	17	16	15	14
							i (in/hr)	1.50	2.20	2.76	3.54	4.18	4.87
CP34	11.8	3,510	1,437.00	1,410.00	40.6	0.033	Q (cfs)	14.5	21.9	27.7	36.0	42.5	49.4
							C	0.95	0.95	0.95	0.95	0.95	0.95
							CA (ac)	11.21	11.21	11.21	11.21	11.21	11.21
							Volume (ac-ft)	0.7279	0.9383	1.0849	1.2776	1.4145	1.5533
							Tc (min)	27	23	21	19	18	17
							i (in/hr)	1.29	1.95	2.47	3.21	3.79	4.41

* Non default value

Appendix B: Hydraulics

Street Capacity

Preliminary 10 and 100-year SSA model output



Description: Calculation of Street Flow Conveyance Capacity
 Date: 03/13/17
 References: Federal Highway Administration, Hydraulic Engineering Circular No. 12, "Drainage of Highway Pavements", March 1984

10 Year Flows

Known Values:

Depth of Flow = 0.33 ft
 Cross Slope = 0.02 ft/ft
 Street Width (F/C to F/C) = 28 ft
 Manning's "n" Value = 0.015

Calculated Values:

Referenced Equations:

$Q = 0.56 * (S_x^{1.67}) * (S^{0.5}) * (T^{2.67}) / n$ for flow below crown (FHWA Procedure)

$Q = 1.486 * A * (R^{0.67}) * (S^{0.5}) / n$ for flow above crown (Manning's equation)

where

Q = flow rate, cfs

S_x = cross slope, ft/ft

S = longitudinal slope, ft/ft

T = width of flow, ft

A = conveyance area, sq ft

R = hydraulic radius, ft

Longitudinal Slope (ft/ft)	Conveyance Area (ft ²)	Velocity (fps)	Hydraulic Capacity (cfs)	Capacity	Half-Street Hydraulic Capacity (cfs)
0.0020	5.32	1.43	8		4
0.0025	5.32	1.60	9		5
0.0030	5.32	1.76	9		5
0.0035	5.32	1.90	10		6
0.0040	5.32	2.03	11		6
0.0045	5.32	2.15	11		6
0.0050	5.32	2.27	12		7
0.0055	5.32	2.38	13		7
0.0060	5.32	2.48	13		7
0.0065	5.32	2.58	14		8
0.0070	5.32	2.68	14		8
0.0075	5.32	2.78	15		8
0.0080	5.32	2.87	15		9
0.0085	5.32	2.96	16		9
0.0090	5.32	3.04	16		9
0.0095	5.32	3.12	17		9
0.0100	5.32	3.21	17		10
0.0105	5.32	3.28	17		10
0.0110	5.32	3.36	18		10
0.0115	5.32	3.44	18		10
0.0120	5.32	3.51	19		11
0.0125	5.32	3.58	19		11
0.0130	5.32	3.65	19		11
0.0135	5.32	3.72	20		11
0.0140	5.32	3.79	20		11
0.0145	5.32	3.86	21		12
0.0150	5.32	3.93	21		12
0.0155	5.32	3.99	21		12
0.0160	5.32	4.05	22		12
0.0165	5.32	4.12	22		12
0.0170	5.32	4.18	22		13
0.0175	5.32	4.24	23		13
0.0180	5.32	4.30	23		13
0.0185	5.32	4.36	23		13
0.0190	5.32	4.42	24		13
0.0195	5.32	4.48	24		14
0.0200	5.32	4.53	24		14
0.0205	5.32	4.59	24		14
0.0210	5.32	4.64	25		14
0.0215	5.32	4.70	25		14
0.0220	5.32	4.75	25		14
0.0225	5.32	4.81	26		15
0.0230	5.32	4.86	26		15
0.0235	5.32	4.91	26		15
0.0240	5.32	4.97	26		15
0.0245	5.32	5.02	27		15
0.0250	5.32	5.07	27		15

Street Capacity Computations

4" Curb

Description: Calculation of Street Flow Conveyance Capacity
 Date: 03/13/17
 References: Federal Highway Administration, Hydraulic Engineering Circular No. 12, "Drainage of Highway Pavements", March 1984

100 Year Flows

Known Values:

Depth of Flow = 0.67 ft
 Cross Slope = 0.02 ft/ft
 Street Width (F/C to F/C) = 28 ft
 Manning's "n" Value = 0.015

Calculated Values:

Referenced Equations:
 $Q = 0.56 * (S_x^{1.486}) * (S^{0.5}) * (T^{2.67}) / n$ for flow below crown (FHWA Procedure)
 $Q = 1.486 * A * (R^{0.67}) * (S^{0.5}) / n$ for flow above crown (Manning's equation)
 where
 Q = flow rate, cfs
 S_x = cross slope, ft/ft
 S = longitudinal slope, ft/ft
 T = width of flow, ft
 A = conveyance area, sq ft
 R = hydraulic radius, ft

Longitudinal Slope (ft/ft)	Conveyance Area (ft ²)	Velocity (fps)	Hydraulic Capacity (cfs)	Capacity	Half-Street Hydraulic Capacity (cfs)
0.0020	14.84	2.81	42		29
0.0025	14.84	3.14	47		32
0.0030	14.84	3.44	51		35
0.0035	14.84	3.71	55		38
0.0040	14.84	3.97	59		41
0.0045	14.84	4.21	62		43
0.0050	14.84	4.44	66		45
0.0055	14.84	4.65	69		48
0.0060	14.84	4.86	72		50
0.0065	14.84	5.06	75		52
0.0070	14.84	5.25	78		54
0.0075	14.84	5.43	81		55
0.0080	14.84	5.61	83		57
0.0085	14.84	5.78	86		59
0.0090	14.84	5.95	88		61
0.0095	14.84	6.11	91		62
0.0100	14.84	6.27	93		64
0.0105	14.84	6.43	95		66
0.0110	14.84	6.58	98		67
0.0115	14.84	6.73	100		69
0.0120	14.84	6.87	102		70
0.0125	14.84	7.01	104		72
0.0130	14.84	7.15	106		73
0.0135	14.84	7.29	108		74
0.0140	14.84	7.42	110		76
0.0145	14.84	7.55	112		77
0.0150	14.84	7.68	114		78
0.0155	14.84	7.81	116		80
0.0160	14.84	7.94	118		81
0.0165	14.84	8.06	120		82
0.0170	14.84	8.18	121		84
0.0175	14.84	8.30	123		85
0.0180	14.84	8.42	125		86
0.0185	14.84	8.53	127		87
0.0190	14.84	8.65	128		88
0.0195	14.84	8.76	130		89
0.0200	14.84	8.87	132		91
0.0205	14.84	8.98	133		92
0.0210	14.84	9.09	135		93
0.0215	14.84	9.20	137		94
0.0220	14.84	9.31	138		95
0.0225	14.84	9.41	140		96
0.0230	14.84	9.51	141		97
0.0235	14.84	9.62	143		98
0.0240	14.84	9.72	144		99
0.0245	14.84	9.82	146		100
0.0250	14.84	9.92	147		101

Description: Calculation of Street Flow Conveyance Capacity
 Date: 03/13/17
 References: Federal Highway Administration, Hydraulic Engineering Circular No. 12, "Drainage of Highway Pavements", March 1984

10 Year Flows

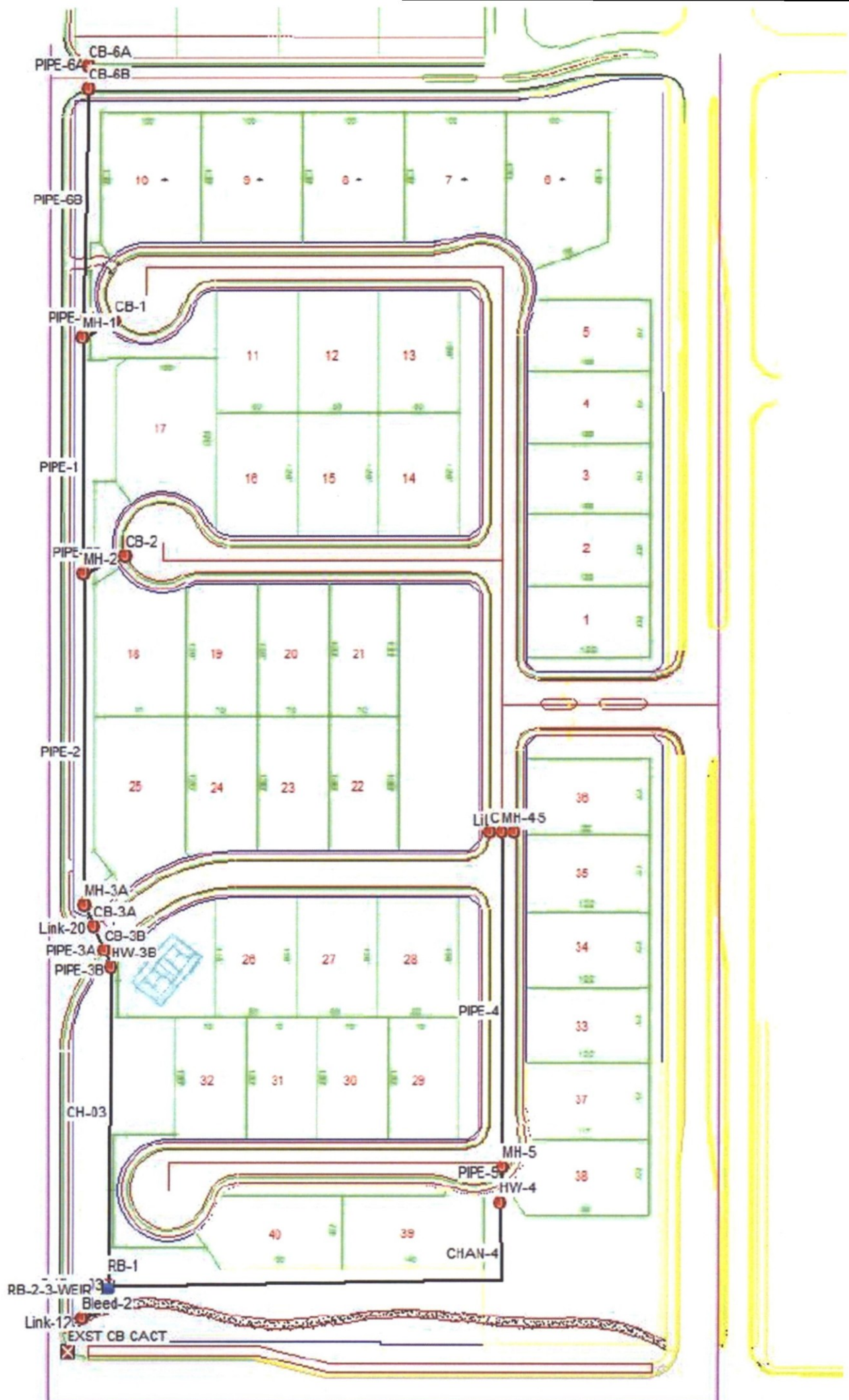
Known Values:

Depth of Flow = 0.5 ft
 Cross Slope = 0.02 ft/ft
 Street Width (F/C to F/C) = 28 ft
 Manning's "n" Value = 0.015

Calculated Values:

Referenced Equations:
 $Q = 0.56 * (S_x^{1.67}) * (S^{0.5}) * (T^{2.67}) / n$ for flow below crown (FHWA Procedure)
 $Q = 1.486 * A * (R^{0.67}) * (S^{0.5}) / n$ for flow above crown (Manning's equation)
 where
 Q = flow rate, cfs
 S_x = cross slope, ft/ft
 S = longitudinal slope, ft/ft
 T = width of flow, ft
 A = conveyance area, sq ft
 R = hydraulic radius, ft

Longitudinal Slope (ft/ft)	Conveyance Area (ft ²)	Velocity (fps)	Hydraulic Capacity (cfs)	Capacity	Half-Street Hydraulic Capacity (cfs)
0.0020	10.08	2.18	22		13
0.0025	10.08	2.44	25		15
0.0030	10.08	2.67	27		16
0.0035	10.08	2.89	29		17
0.0040	10.08	3.09	31		19
0.0045	10.08	3.27	33		20
0.0050	10.08	3.45	35		21
0.0055	10.08	3.62	36		22
0.0060	10.08	3.78	38		23
0.0065	10.08	3.93	40		24
0.0070	10.08	4.08	41		25
0.0075	10.08	4.23	43		25
0.0080	10.08	4.36	44		26
0.0085	10.08	4.50	45		27
0.0090	10.08	4.63	47		28
0.0095	10.08	4.76	48		29
0.0100	10.08	4.88	49		29
0.0105	10.08	5.00	50		30
0.0110	10.08	5.12	52		31
0.0115	10.08	5.23	53		31
0.0120	10.08	5.35	54		32
0.0125	10.08	5.46	55		33
0.0130	10.08	5.56	56		33
0.0135	10.08	5.67	57		34
0.0140	10.08	5.77	58		35
0.0145	10.08	5.88	59		35
0.0150	10.08	5.98	60		36
0.0155	10.08	6.08	61		37
0.0160	10.08	6.17	62		37
0.0165	10.08	6.27	63		38
0.0170	10.08	6.36	64		38
0.0175	10.08	6.46	65		39
0.0180	10.08	6.55	66		39
0.0185	10.08	6.64	67		40
0.0190	10.08	6.73	68		40
0.0195	10.08	6.81	69		41
0.0200	10.08	6.90	70		41
0.0205	10.08	6.99	70		42
0.0210	10.08	7.07	71		43
0.0215	10.08	7.15	72		43
0.0220	10.08	7.24	73		44
0.0225	10.08	7.32	74		44
0.0230	10.08	7.40	75		44
0.0235	10.08	7.48	75		45
0.0240	10.08	7.56	76		45
0.0245	10.08	7.64	77		46
0.0250	10.08	7.72	78		46



Project Description

File Name Wolf Springs Ranch Proposed Condition 10yr.SPF

Project Options

Flow Units CFS
 Elevation Type Elevation
 Hydrology Method EPA SWMM
 EPA SWMM Infiltration Method SCS Curve Number
 Link Routing Method Kinematic Wave
 Enable Overflow Ponding at Nodes YES
 Skip Steady State Analysis Time Periods NO

Analysis Options

Start Analysis On Feb 22, 2017 00:00:00
 End Analysis On Feb 24, 2017 00:00:00
 Start Reporting On Feb 22, 2017 00:00:00
 Antecedent Dry Days 0 days
 Runoff (Dry Weather) Time Step 0 01:00:00 days hh:mm:ss
 Runoff (Wet Weather) Time Step 0 00:05:00 days hh:mm:ss
 Reporting Time Step 0 00:05:00 days hh:mm:ss
 Routing Time Step 30 seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins.....	0
Nodes.....	18
<i>Junctions</i>	16
<i>Outfalls</i>	1
<i>Flow Diversions</i>	0
<i>Inlets</i>	0
<i>Storage Nodes</i>	1
Links.....	18
<i>Channels</i>	2
<i>Pipes</i>	14
<i>Pumps</i>	0
<i>Orifices</i>	1
<i>Weirs</i>	1
<i>Outlets</i>	0
Pollutants	0
Land Uses	0

10-YR STORMDRAIN DESIGN

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft ²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Bleed-2	Junction	1405.00	1408.49	0.00	0.00	0.00	0.56	1405.21	0.00	3.28	0 00:00	0.00	0.00
2	CB-1	Junction	1412.00	1416.00	0.00	6.00	0.00	2.00	1412.39	0.00	3.61	0 00:00	0.00	0.00
3	CB-2	Junction	1411.00	1415.00	0.00	6.00	0.00	5.00	1411.67	0.00	3.33	0 00:00	0.00	0.00
4	CB-3A	Junction	1408.90	1413.00	0.00	0.00	0.00	10.74	1409.95	0.00	3.05	0 00:00	0.00	0.00
5	CB-3B	Junction	1408.70	1413.00	0.00	0.00	0.00	13.04	1409.84	0.00	3.16	0 00:00	0.00	0.00
6	CB-4	Junction	1413.00	1417.00	0.00	0.00	0.00	2.50	1413.37	0.00	3.63	0 00:00	0.00	0.00
7	CB-5	Junction	1413.00	1417.00	0.00	0.00	0.00	2.50	1413.37	0.00	3.63	0 00:00	0.00	0.00
8	CB-6A	Junction	1413.00	1417.00	0.00	0.00	0.00	1.00	1413.42	0.00	3.58	0 00:00	0.00	0.00
9	CB-6B	Junction	1412.90	1417.00	0.00	0.00	0.00	1.99	1413.45	0.00	3.55	0 00:00	0.00	0.00
10	HW-3B	Junction	1408.60	1412.50	0.00	0.00	0.00	13.04	1409.74	0.00	2.76	0 00:00	0.00	0.00
11	HW-4	Junction	1405.70	1409.70	0.00	0.00	0.00	10.90	1406.99	0.00	2.71	0 00:00	0.00	0.00
12	MH-1	Junction	1411.50	1415.00	0.00	6.00	0.00	3.87	1412.19	0.00	2.81	0 00:00	0.00	0.00
13	MH-2	Junction	1410.50	1414.00	0.00	6.00	0.00	8.56	1411.53	0.00	2.47	0 00:00	0.00	0.00
14	MH-3A	Junction	1409.00	1413.00	0.00	0.00	0.00	8.47	1410.05	0.00	2.95	0 00:00	0.00	0.00
15	MH-4	Junction	1412.50	1417.30	0.00	0.00	0.00	4.98	1413.22	0.00	4.08	0 00:00	0.00	0.00
16	MH-5	Junction	1408.00	1413.00	0.00	0.00	0.00	10.87	1408.71	0.00	4.29	0 00:00	0.00	0.00
17	EXST CB CACT	Outfall	1404.02					0.56	1404.22					
18	RB-1	Storage Node	1405.00	1408.50	0.00		0.00	27.44	1406.88				0.00	0.00

10-YR STORMDRAIN DESIGN

Link Summary

SN Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1 Link-12	Pipe	Bleed-2	EXST CB CACT	53.33	1405.00	1404.02	1.8400	24.000	0.0150	0.56	26.58	0.02	3.34	0.20	0.10	0.00	Calculated
2 Link-13	Pipe	CB-4	MH-4	11.70	1413.00	1412.50	4.2700	18.000	0.0150	2.50	18.82	0.13	7.39	0.34	0.25	0.00	Calculated
3 Link-14	Pipe	CB-5	MH-4	12.44	1413.00	1412.50	4.0200	18.000	0.0150	2.48	18.25	0.14	7.21	0.35	0.25	0.00	Calculated
4 Link-20	Pipe	MH-3A	CB-3A	23.54	1409.00	1408.90	0.4200	30.000	0.0150	8.46	23.17	0.37	4.35	0.98	0.42	0.00	Calculated
5 PIPE-01	Pipe	CB-1	MH-1	35.48	1412.00	1411.50	1.4100	18.000	0.0120	1.99	13.51	0.15	5.46	0.39	0.26	0.00	Calculated
6 PIPE-02	Pipe	CB-2	MH-2	43.87	1411.00	1410.50	1.1400	18.000	0.0120	4.96	12.15	0.41	6.52	0.67	0.45	0.00	Calculated
7 PIPE-1	Pipe	MH-1	MH-2	230.57	1411.50	1410.50	0.4300	30.000	0.0150	3.82	23.41	0.16	3.55	0.66	0.27	0.00	Calculated
8 PIPE-2	Pipe	MH-2	MH-3A	323.94	1410.50	1409.00	0.4600	30.000	0.0150	8.47	24.19	0.35	4.53	0.99	0.41	0.00	Calculated
9 PIPE-3A	Pipe	CB-3A	CB-3B	25.48	1408.90	1408.70	0.7800	30.000	0.0150	10.76	31.49	0.34	5.81	0.97	0.40	0.00	Calculated
10 PIPE-3B	Pipe	CB-3B	HW-3B	18.65	1408.70	1408.60	0.5400	36.000	0.0150	13.04	42.33	0.31	5.27	1.11	0.38	0.00	Calculated
11 PIPE-4	Pipe	MH-4	MH-5	330.47	1412.50	1408.00	1.3600	18.000	0.0150	4.89	10.62	0.46	6.97	0.67	0.48	0.00	Calculated
12 PIPE-5	Pipe	MH-5	HW-4	34.76	1408.00	1405.70	6.6200	30.000	0.0150	10.90	91.44	0.12	12.52	0.58	0.23	0.00	Calculated
13 PIPE-6A	Pipe	CB-6A	CB-6B	23.48	1413.00	1412.90	0.4300	18.000	0.0150	0.99	5.94	0.17	2.50	0.42	0.28	0.00	Calculated
14 PIPE-6B	Pipe	CB-6B	MH-1	244.06	1412.90	1411.50	0.5700	18.000	0.0150	1.94	6.90	0.28	3.73	0.54	0.36	0.00	Calculated
15 CH-03	Channel	HW-3B	RB-1	297.97	1408.60	1405.00	1.2100	36.000	0.0320	12.85	516.77	0.02	2.65	0.39	0.14	0.00	
16 CHAN-4	Channel	HW-4	RB-1	478.53	1405.70	1405.00	0.1500	36.000	0.0320	10.05	91.38	0.11	1.99	1.23	0.41	0.00	
17 Orifice-03	Orifice	RB-1	Bleed-2		1405.00	1405.00		4.000		0.56							
18 RB-2-3-WEIR	Weir	RB-1	Bleed-2		1405.00	1405.00				0.00							

Junction Input

SN Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft ²)	Minimum Pipe Cover (in)
1 Bleed-2	1405.00	1408.49	3.49	0.00	-1405.00	0.00	-1408.49	0.00	0.00
2 CB-1	1412.00	1416.00	4.00	0.00	-1412.00	6.00	-1410.00	0.00	30.00
3 CB-2	1411.00	1415.00	4.00	0.00	-1411.00	6.00	-1409.00	0.00	30.00
4 CB-3A	1408.90	1413.00	4.10	0.00	-1408.90	0.00	-1413.00	0.00	19.20
5 CB-3B	1408.70	1413.00	4.30	0.00	-1408.70	0.00	-1413.00	0.00	15.60
6 CB-4	1413.00	1417.00	4.00	0.00	-1413.00	0.00	-1417.00	0.00	30.00
7 CB-5	1413.00	1417.00	4.00	0.00	-1413.00	0.00	-1417.00	0.00	30.00
8 CB-6A	1413.00	1417.00	4.00	0.00	-1413.00	0.00	-1417.00	0.00	30.00
9 CB-6B	1412.90	1417.00	4.10	0.00	-1412.90	0.00	-1417.00	0.00	31.20
10 HW-3B	1408.60	1412.50	3.90	0.00	-1408.60	0.00	-1412.50	0.00	10.80
11 HW-4	1405.70	1409.70	4.00	0.00	-1405.70	0.00	-1409.70	0.00	12.00
12 MH-1	1411.50	1415.00	3.50	0.00	-1411.50	6.00	-1409.00	0.00	12.00
13 MH-2	1410.50	1414.00	3.50	0.00	-1410.50	6.00	-1408.00	0.00	12.00
14 MH-3A	1409.00	1413.00	4.00	0.00	-1409.00	0.00	-1413.00	0.00	18.00
15 MH-4	1412.50	1417.30	4.80	0.00	-1412.50	0.00	-1417.30	0.00	39.60
16 MH-5	1408.00	1413.00	5.00	0.00	-1408.00	0.00	-1413.00	0.00	30.00

10-YR STORMDRAIN DESIGN

Junction Results

SN Element ID	Peak Inflow	Peak Lateral Inflow	Max HGL Elevation Attained	Max HGL Depth Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Average HGL Elevation Attained	Average HGL Depth Attained	Time of Max HGL Occurrence	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(days hh:mm)	(days hh:mm)	(ac-in)	(min)
1 Bleed-2	0.56	0.00	1405.21	0.21	0.00	3.28	1405.09	0.09	0 00:42	0 00:00	0.00	0.00
2 CB-1	2.00	2.00	1412.39	0.39	0.00	3.61	1412.00	0.00	0 00:10	0 00:00	0.00	0.00
3 CB-2	5.00	5.00	1411.67	0.67	0.00	3.33	1411.00	0.00	0 00:10	0 00:00	0.00	0.00
4 CB-3A	10.74	2.50	1409.95	1.05	0.00	3.05	1408.91	0.01	0 00:11	0 00:00	0.00	0.00
5 CB-3B	13.04	2.50	1409.84	1.14	0.00	3.16	1408.71	0.01	0 00:11	0 00:00	0.00	0.00
6 CB-4	2.50	2.50	1413.37	0.37	0.00	3.63	1413.00	0.00	0 00:12	0 00:00	0.00	0.00
7 CB-5	2.50	2.50	1413.37	0.37	0.00	3.63	1413.00	0.00	0 00:12	0 00:00	0.00	0.00
8 CB-6A	1.00	1.00	1413.42	0.42	0.00	3.58	1413.00	0.00	0 00:10	0 00:00	0.00	0.00
9 CB-6B	1.99	1.00	1413.45	0.55	0.00	3.55	1412.90	0.00	0 00:10	0 00:00	0.00	0.00
10 HW-3B	13.04	0.00	1409.74	1.14	0.00	2.76	1408.61	0.01	0 00:11	0 00:00	0.00	0.00
11 HW-4	10.90	0.00	1406.99	1.29	0.00	2.71	1405.71	0.01	0 00:10	0 00:00	0.00	0.00
12 MH-1	3.87	0.00	1412.19	0.69	0.00	2.81	1411.50	0.00	0 00:10	0 00:00	0.00	0.00
13 MH-2	8.56	0.00	1411.53	1.03	0.00	2.47	1410.51	0.01	0 00:10	0 00:00	0.00	0.00
14 MH-3A	8.47	0.00	1410.05	1.05	0.00	2.95	1409.01	0.01	0 00:11	0 00:00	0.00	0.00
15 MH-4	4.98	0.00	1413.22	0.72	0.00	4.08	1412.51	0.01	0 00:12	0 00:00	0.00	0.00
16 MH-5	10.87	7.00	1408.71	0.71	0.00	4.29	1408.01	0.01	0 00:12	0 00:00	0.00	0.00

10-YR STORMDRAIN DESIGN

Channel Input

SN Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Shape	Height (ft)	Width (ft)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate
1 CH-03	297.97	1408.60	0.00	1405.00	0.00	3.60	1.2100	Trapezoidal	3.000	34.000	0.0320	0.5000	0.0000	0.0000	0.00	No
2 CHAN-4	478.53	1405.70	0.00	1405.00	0.00	0.70	0.1500	Trapezoidal	3.000	25.000	0.0320	0.5000	0.5000	0.0000	0.00	No

10-YR STORMDRAIN DESIGN

Channel Results

SN Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
	(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1 CH-03	12.85	0 00:12	516.77	0.02	2.65	1.87	0.39	0.14	0.00		
2 CHAN-4	10.05	0 00:15	91.38	0.11	1.99	4.01	1.23	0.41	0.00		

10-YR STORMDRAIN DESIGN

Pipe Input

SN Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1 Link-12	53.33	1405.00	0.00	1404.02	0.00	0.98	1.8400	CIRCULAR	24.000	24.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
2 Link-13	11.70	1413.00	0.00	1412.50	0.00	0.50	4.2700	CIRCULAR	18.000	18.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
3 Link-14	12.44	1413.00	0.00	1412.50	0.00	0.50	4.0200	CIRCULAR	18.000	18.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
4 Link-20	23.54	1409.00	0.00	1408.90	0.00	0.10	0.4200	CIRCULAR	30.000	30.000	0.0150	0.5000	0.0000	0.0000	0.00	No	1
5 PIPE-01	35.48	1412.00	0.00	1411.50	0.00	0.50	1.4100	CIRCULAR	18.000	18.000	0.0120	1.0000	0.0000	0.0000	0.00	No	1
6 PIPE-02	43.87	1411.00	0.00	1410.50	0.00	0.50	1.1400	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No	1
7 PIPE-1	230.57	1411.50	0.00	1410.50	0.00	1.00	0.4300	CIRCULAR	30.000	30.000	0.0150	0.5000	0.0000	0.0000	0.00	No	1
8 PIPE-2	323.94	1410.50	0.00	1409.00	0.00	1.50	0.4600	CIRCULAR	30.000	30.000	0.0150	0.5000	0.0000	0.0000	0.00	No	1
9 PIPE-3A	25.48	1408.90	0.00	1408.70	0.00	0.20	0.7800	CIRCULAR	30.000	30.000	0.0150	0.5000	0.0000	0.0000	0.00	No	1
10 PIPE-3B	18.65	1408.70	0.00	1408.60	0.00	0.10	0.5400	CIRCULAR	36.000	36.000	0.0150	0.5000	0.0000	0.0000	0.00	No	1
11 PIPE-4	330.47	1412.50	0.00	1408.00	0.00	4.50	1.3600	CIRCULAR	18.000	18.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
12 PIPE-5	34.76	1408.00	0.00	1405.70	0.00	2.30	6.6200	CIRCULAR	30.000	30.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
13 PIPE-6A	23.48	1413.00	0.00	1412.90	0.00	0.10	0.4300	CIRCULAR	18.000	18.000	0.0150	0.5000	0.0000	0.0000	0.00	No	1
14 PIPE-6B	244.06	1412.90	0.00	1411.50	0.00	1.40	0.5700	CIRCULAR	18.000	18.000	0.0150	0.5000	0.0000	0.0000	0.00	No	1

10-YR STORMDRAIN DESIGN

Pipe Results

SN Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
	(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1 Link-12	0.56	0 00:42	26.58	0.02	3.34	0.27	0.20	0.10	0.00		Calculated
2 Link-13	2.50	0 00:12	18.82	0.13	7.39	0.03	0.34	0.25	0.00		Calculated
3 Link-14	2.48	0 00:12	18.25	0.14	7.21	0.03	0.35	0.25	0.00		Calculated
4 Link-20	8.46	0 00:11	23.17	0.37	4.35	0.09	0.98	0.42	0.00		Calculated
5 PIPE-01	1.99	0 00:10	13.51	0.15	5.46	0.11	0.39	0.26	0.00		Calculated
6 PIPE-02	4.96	0 00:10	12.15	0.41	6.52	0.11	0.67	0.45	0.00		Calculated
7 PIPE-1	3.82	0 00:11	23.41	0.16	3.55	1.08	0.66	0.27	0.00		Calculated
8 PIPE-2	8.47	0 00:11	24.19	0.35	4.53	1.19	0.99	0.41	0.00		Calculated
9 PIPE-3A	10.76	0 00:11	31.49	0.34	5.81	0.07	0.97	0.40	0.00		Calculated
10 PIPE-3B	13.04	0 00:11	42.33	0.31	5.27	0.06	1.11	0.38	0.00		Calculated
11 PIPE-4	4.89	0 00:12	10.62	0.46	6.97	0.79	0.67	0.48	0.00		Calculated
12 PIPE-5	10.90	0 00:10	91.44	0.12	12.52	0.05	0.58	0.23	0.00		Calculated
13 PIPE-6A	0.99	0 00:10	5.94	0.17	2.50	0.16	0.42	0.28	0.00		Calculated
14 PIPE-6B	1.94	0 00:11	6.90	0.28	3.73	1.09	0.54	0.36	0.00		Calculated

Storage Nodes

Storage Node : RB-1

Input Data

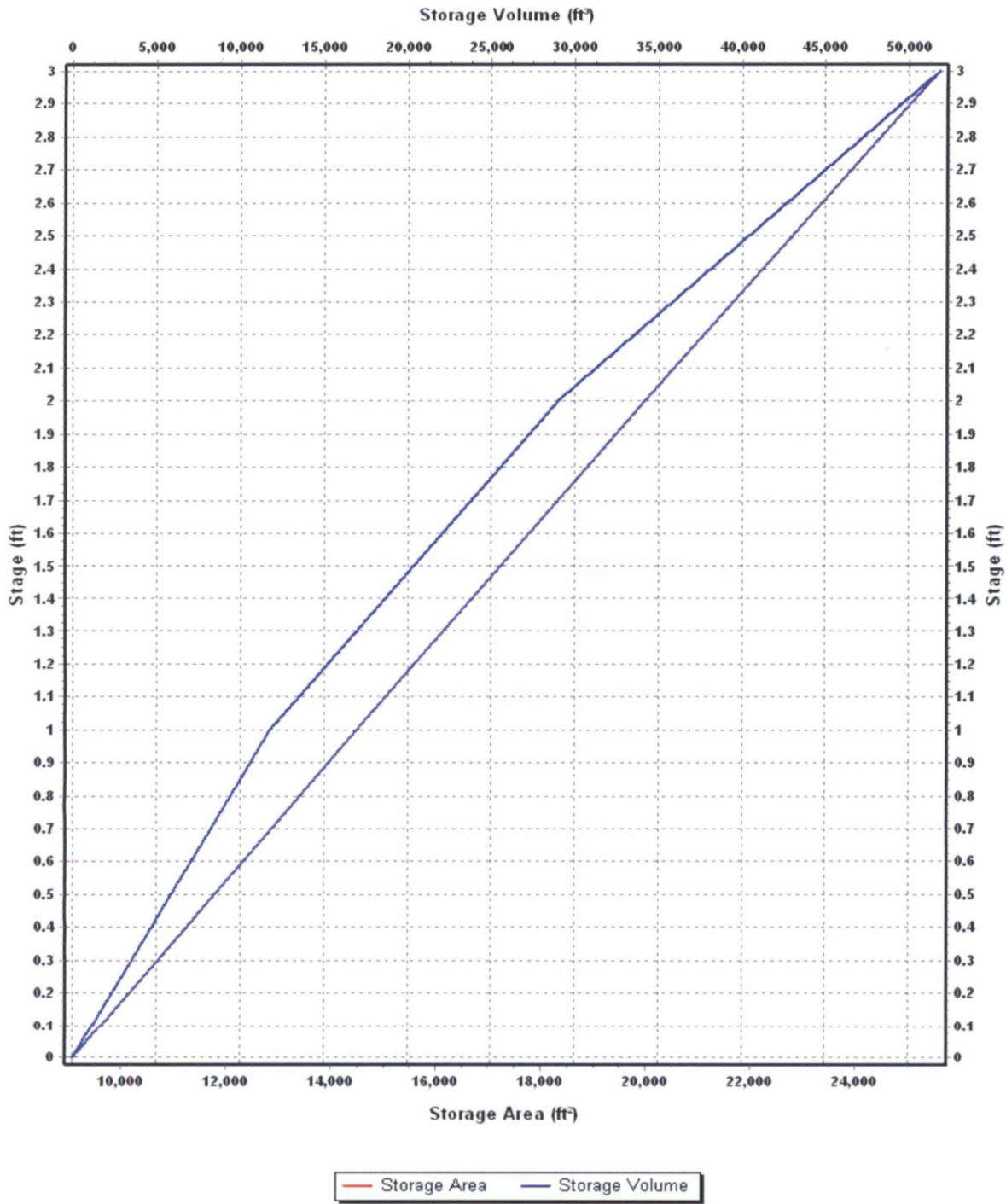
Invert Elevation (ft) 1405.00
 Max (Rim) Elevation (ft) 1408.50
 Max (Rim) Offset (ft) 3.50
 Initial Water Elevation (ft) 0.00
 Initial Water Depth (ft) -1405.00
 Pondered Area (ft²) 0.00
 Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : RB-2-3

Stage (ft)	Storage Area (ft ²)	Storage Volume (ft ³)
0	9064	0.000
1	14476	11770.00
2	19990	29003.00
3	25603	51799.50

Storage Area Volume Curves



Storage Node : RB-1 (continued)

Outflow Weirs

SN Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1 RB-2-3-WEIR	Trapezoidal	No	1407.10	2.10	10.00	1.00	3.33

Outflow Orifices

SN Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1 Orifice-03	Side	CIRCULAR	No	4.00			1405.00	0.61

Output Summary Results

Peak Inflow (cfs)	27.44
Peak Lateral Inflow (cfs)	7.00
Peak Outflow (cfs)	0.56
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	1406.88
Max HGL Depth Attained (ft)	1.88
Average HGL Elevation Attained (ft)	1405.44
Average HGL Depth Attained (ft)	0.44
Time of Max HGL Occurrence (days hh:mm)	0 00:42
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Project Description

File Name Wolf Springs Ranch Proposed Condition 100yr.SPF

Project Options

Flow Units CFS
 Elevation Type Elevation
 Hydrology Method EPA SWMM
 EPA SWMM Infiltration Method SCS Curve Number
 Link Routing Method Kinematic Wave
 Enable Overflow Ponding at Nodes YES
 Skip Steady State Analysis Time Periods NO

Analysis Options

Start Analysis On Feb 22, 2017 00:00:00
 End Analysis On Feb 24, 2017 00:00:00
 Start Reporting On Feb 22, 2017 00:00:00
 Antecedent Dry Days 0 days
 Runoff (Dry Weather) Time Step 0 01:00:00 days hh:mm:ss
 Runoff (Wet Weather) Time Step 0 00:05:00 days hh:mm:ss
 Reporting Time Step 0 00:05:00 days hh:mm:ss
 Routing Time Step 30 seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins.....	0
Nodes.....	18
<i>Junctions</i>	16
<i>Outfalls</i>	1
<i>Flow Diversions</i>	0
<i>Inlets</i>	0
<i>Storage Nodes</i>	1
Links.....	18
<i>Channels</i>	2
<i>Pipes</i>	14
<i>Pumps</i>	0
<i>Orifices</i>	1
<i>Weirs</i>	1
<i>Outlets</i>	0
Pollutants	0
Land Uses	0

100-YR STORMDRAIN DESIGN

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft ²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Bleed-2	Junction	1405.00	1408.49	0.00	0.00	0.00	22.73	1406.42	0.00	2.07	0 00:00	0.00	0.00
2	CB-1	Junction	1412.00	1416.00	0.00	6.00	0.00	10.00	1412.96	0.00	3.04	0 00:00	0.00	0.00
3	CB-2	Junction	1411.00	1415.00	0.00	6.00	0.00	9.00	1411.96	0.00	3.04	0 00:00	0.00	0.00
4	CB-3A	Junction	1408.90	1413.00	0.00	0.00	0.00	26.04	1410.84	0.00	2.16	0 00:00	0.00	0.00
5	CB-3B	Junction	1408.70	1413.00	0.00	0.00	0.00	30.16	1410.57	0.00	2.43	0 00:00	0.00	0.00
6	CB-4	Junction	1413.00	1417.00	0.00	0.00	0.00	5.50	1413.56	0.00	3.44	0 00:00	0.00	0.00
7	CB-5	Junction	1413.00	1417.00	0.00	0.00	0.00	5.50	1413.56	0.00	3.44	0 00:00	0.00	0.00
8	CB-6A	Junction	1413.00	1417.00	0.00	0.00	0.00	2.00	1413.60	0.00	3.40	0 00:00	0.00	0.00
9	CB-6B	Junction	1412.90	1417.00	0.00	0.00	0.00	3.98	1413.72	0.00	3.28	0 00:00	0.00	0.00
10	HW-3B	Junction	1408.60	1412.50	0.00	0.00	0.00	30.14	1410.47	0.00	2.03	0 00:00	0.00	0.00
11	HW-4	Junction	1405.70	1409.70	0.00	0.00	0.00	24.55	1407.49	0.00	2.21	0 00:00	0.00	0.00
12	MH-1	Junction	1411.50	1415.00	0.00	6.00	0.00	13.66	1412.87	0.00	2.13	0 00:00	0.00	0.00
13	MH-2	Junction	1410.50	1414.00	0.00	6.00	0.00	22.24	1412.39	0.00	1.61	0 00:00	0.00	0.00
14	MH-3A	Junction	1409.00	1413.00	0.00	0.00	0.00	21.96	1410.94	0.00	2.06	0 00:00	0.00	0.00
15	MH-4	Junction	1412.50	1417.30	0.00	0.00	0.00	10.99	1417.30	0.00	0.00	0 00:12	0.00	2.00
16	MH-5	Junction	1408.00	1413.00	0.00	0.00	0.00	24.53	1409.30	0.00	3.70	0 00:00	0.00	0.00
17	EXST CB CACT	Outfall	1404.02					22.73	1405.44					
18	RB-1	Storage Node	1405.00	1408.50	0.00		0.00	64.30	1407.83				0.00	0.00

100-YR STORMDRAIN DESIGN

Link Summary

SN Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Reported Surcharged	Condition
				(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1 Link-12	Pipe	Bleed-2	EXST CB CACT	53.33	1405.00	1404.02	1.8400	24.000	0.0150	22.73	26.58	0.86	9.50	1.42	0.71	0.00	Calculated
2 Link-13	Pipe	CB-4	MH-4	11.70	1413.00	1412.50	4.2700	18.000	0.0150	5.49	18.82	0.29	9.23	0.51	0.37	0.00	Calculated
3 Link-14	Pipe	CB-5	MH-4	12.44	1413.00	1412.50	4.0200	18.000	0.0150	5.49	18.25	0.30	9.03	0.52	0.38	0.00	Calculated
4 Link-20	Pipe	MH-3A	CB-3A	23.54	1409.00	1408.90	0.4200	30.000	0.0150	21.94	23.17	0.95	5.37	1.77	0.78	0.00	Calculated
5 PIPE-01	Pipe	CB-1	MH-1	35.48	1412.00	1411.50	1.4100	18.000	0.0120	9.94	13.51	0.74	8.36	0.96	0.64	0.00	Calculated
6 PIPE-02	Pipe	CB-2	MH-2	43.87	1411.00	1410.50	1.1400	18.000	0.0120	8.93	12.15	0.74	7.53	0.96	0.64	0.00	Calculated
7 PIPE-1	Pipe	MH-1	MH-2	230.57	1411.50	1410.50	0.4300	30.000	0.0150	13.55	23.41	0.58	4.97	1.34	0.55	0.00	Calculated
8 PIPE-2	Pipe	MH-2	MH-3A	323.94	1410.50	1409.00	0.4600	30.000	0.0150	21.96	24.19	0.91	5.67	1.79	0.75	0.00	Calculated
9 PIPE-3A	Pipe	CB-3A	CB-3B	25.48	1408.90	1408.70	0.7800	30.000	0.0150	26.06	31.49	0.83	7.17	1.64	0.69	0.00	Calculated
10 PIPE-3B	Pipe	CB-3B	HW-3B	18.65	1408.70	1408.60	0.5400	36.000	0.0150	30.14	42.33	0.71	6.50	1.80	0.62	0.00	Calculated
11 PIPE-4	Pipe	MH-4	MH-5	330.47	1412.50	1408.00	1.3600	18.000	0.0150	11.13	10.62	1.05	8.06	1.11	0.90	0.00	> CAPACITY
12 PIPE-5	Pipe	MH-5	HW-4	34.76	1408.00	1405.70	6.6200	30.000	0.0150	24.55	91.44	0.27	15.80	0.88	0.35	0.00	Calculated
13 PIPE-6A	Pipe	CB-6A	CB-6B	23.48	1413.00	1412.90	0.4300	18.000	0.0150	1.98	5.94	0.33	3.03	0.60	0.40	0.00	Calculated
14 PIPE-6B	Pipe	CB-6B	MH-1	244.06	1412.90	1411.50	0.5700	18.000	0.0150	3.89	6.90	0.56	4.45	0.80	0.54	0.00	Calculated
15 CH-03	Channel	HW-3B	RB-1	297.97	1408.60	1405.00	1.2100	36.000	0.0320	29.85	516.77	0.06	3.48	0.64	0.23	0.00	
16 CHAN-4	Channel	HW-4	RB-1	478.53	1405.70	1405.00	0.1500	36.000	0.0320	23.31	91.38	0.26	2.36	1.72	0.58	0.00	
17 Orifice-03	Orifice	RB-1	Bleed-2		1405.00	1405.00		4.000		0.70							
18 RB-2-3-WEIR	Weir	RB-1	Bleed-2		1405.00	1405.00				22.03							

100-YR STORMDRAIN DESIGN

Junction Input

SN Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft ²)	Minimum Pipe Cover (in)
1 Bleed-2	1405.00	1408.49	3.49	0.00	-1405.00	0.00	-1408.49	0.00	0.00
2 CB-1	1412.00	1416.00	4.00	0.00	-1412.00	6.00	-1410.00	0.00	0.00
3 CB-2	1411.00	1415.00	4.00	0.00	-1411.00	6.00	-1409.00	0.00	0.00
4 CB-3A	1408.90	1413.00	4.10	0.00	-1408.90	0.00	-1413.00	0.00	0.00
5 CB-3B	1408.70	1413.00	4.30	0.00	-1408.70	0.00	-1413.00	0.00	0.00
6 CB-4	1413.00	1417.00	4.00	0.00	-1413.00	0.00	-1417.00	0.00	0.00
7 CB-5	1413.00	1417.00	4.00	0.00	-1413.00	0.00	-1417.00	0.00	0.00
8 CB-6A	1413.00	1417.00	4.00	0.00	-1413.00	0.00	-1417.00	0.00	0.00
9 CB-6B	1412.90	1417.00	4.10	0.00	-1412.90	0.00	-1417.00	0.00	0.00
10 HW-3B	1408.60	1412.50	3.90	0.00	-1408.60	0.00	-1412.50	0.00	0.00
11 HW-4	1405.70	1409.70	4.00	0.00	-1405.70	0.00	-1409.70	0.00	0.00
12 MH-1	1411.50	1415.00	3.50	0.00	-1411.50	6.00	-1409.00	0.00	0.00
13 MH-2	1410.50	1414.00	3.50	0.00	-1410.50	6.00	-1408.00	0.00	0.00
14 MH-3A	1409.00	1413.00	4.00	0.00	-1409.00	0.00	-1413.00	0.00	0.00
15 MH-4	1412.50	1417.30	4.80	0.00	-1412.50	0.00	-1417.30	0.00	0.00
16 MH-5	1408.00	1413.00	5.00	0.00	-1408.00	0.00	-1413.00	0.00	0.00

100-YR STORMDRAIN DESIGN

Junction Results

SN Element ID	Peak Inflow	Peak Lateral Inflow	Max HGL Elevation Attained	Max HGL Depth Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Average HGL Elevation Attained	Average HGL Depth Attained	Time of Max HGL Occurrence	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(days hh:mm)	(days hh:mm)	(ac-in)	(min)
1 Bleed-2	22.73	0.00	1406.42	1.42	0.00	2.07	1405.11	0.11	0 00:25	0 00:00	0.00	0.00
2 CB-1	10.00	10.00	1412.96	0.96	0.00	3.04	1412.01	0.01	0 00:10	0 00:00	0.00	0.00
3 CB-2	9.00	9.00	1411.96	0.96	0.00	3.04	1411.01	0.01	0 00:10	0 00:00	0.00	0.00
4 CB-3A	26.04	4.50	1410.84	1.94	0.00	2.16	1408.91	0.01	0 00:11	0 00:00	0.00	0.00
5 CB-3B	30.16	4.50	1410.57	1.87	0.00	2.43	1408.71	0.01	0 00:11	0 00:00	0.00	0.00
6 CB-4	5.50	5.50	1413.56	0.56	0.00	3.44	1413.00	0.00	0 00:12	0 00:00	0.00	0.00
7 CB-5	5.50	5.50	1413.56	0.56	0.00	3.44	1413.00	0.00	0 00:12	0 00:00	0.00	0.00
8 CB-6A	2.00	2.00	1413.60	0.60	0.00	3.40	1413.00	0.00	0 00:10	0 00:00	0.00	0.00
9 CB-6B	3.98	2.00	1413.72	0.82	0.00	3.28	1412.90	0.00	0 00:10	0 00:00	0.00	0.00
10 HW-3B	30.14	0.00	1410.47	1.87	0.00	2.03	1408.61	0.01	0 00:11	0 00:00	0.00	0.00
11 HW-4	24.55	0.00	1407.49	1.79	0.00	2.21	1405.71	0.01	0 00:10	0 00:00	0.00	0.00
12 MH-1	13.66	0.00	1412.87	1.37	0.00	2.13	1411.51	0.01	0 00:10	0 00:00	0.00	0.00
13 MH-2	22.24	0.00	1412.39	1.89	0.00	1.61	1410.51	0.01	0 00:10	0 00:00	0.00	0.00
14 MH-3A	21.96	0.00	1410.94	1.94	0.00	2.06	1409.01	0.01	0 00:11	0 00:00	0.00	0.00
15 MH-4	10.99	0.00	1417.30	4.80	0.00	0.00	1412.51	0.01	0 00:12	0 00:12	0.00	2.00
16 MH-5	24.53	16.00	1409.30	1.30	0.00	3.70	1408.01	0.01	0 00:13	0 00:00	0.00	0.00

100-YR STORMDRAIN DESIGN

Channel Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Shape	Height (ft)	Width (ft)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate
1	CH-03	297.97	1408.60	0.00	1405.00	0.00	3.60	1.2100	Trapezoidal	3.000	34.000	0.0320	0.5000	0.0000	0.0000	0.00	No
2	CHAN-4	478.53	1405.70	0.00	1405.00	0.00	0.70	0.1500	Trapezoidal	3.000	25.000	0.0320	0.5000	0.5000	0.0000	0.00	No

Channel Results

SN Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
	(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1 CH-03	29.85	0 00:12	516.77	0.06	3.48	1.43	0.64	0.23	0.00		
2 CHAN-4	23.31	0 00:15	91.38	0.26	2.36	3.38	1.72	0.58	0.00		

100-YR STORMDRAIN DESIGN

Pipe Input

SN Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1 Link-12	53.33	1405.00	0.00	1404.02	0.00	0.98	1.8400	CIRCULAR	24.000	24.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
2 Link-13	11.70	1413.00	0.00	1412.50	0.00	0.50	4.2700	CIRCULAR	18.000	18.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
3 Link-14	12.44	1413.00	0.00	1412.50	0.00	0.50	4.0200	CIRCULAR	18.000	18.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
4 Link-20	23.54	1409.00	0.00	1408.90	0.00	0.10	0.4200	CIRCULAR	30.000	30.000	0.0150	0.5000	0.0000	0.0000	0.00	No	1
5 PIPE-01	35.48	1412.00	0.00	1411.50	0.00	0.50	1.4100	CIRCULAR	18.000	18.000	0.0120	1.0000	0.0000	0.0000	0.00	No	1
6 PIPE-02	43.87	1411.00	0.00	1410.50	0.00	0.50	1.1400	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No	1
7 PIPE-1	230.57	1411.50	0.00	1410.50	0.00	1.00	0.4300	CIRCULAR	30.000	30.000	0.0150	0.5000	0.0000	0.0000	0.00	No	1
8 PIPE-2	323.94	1410.50	0.00	1409.00	0.00	1.50	0.4600	CIRCULAR	30.000	30.000	0.0150	0.5000	0.0000	0.0000	0.00	No	1
9 PIPE-3A	25.48	1408.90	0.00	1408.70	0.00	0.20	0.7800	CIRCULAR	30.000	30.000	0.0150	0.5000	0.0000	0.0000	0.00	No	1
10 PIPE-3B	18.65	1408.70	0.00	1408.60	0.00	0.10	0.5400	CIRCULAR	36.000	36.000	0.0150	0.5000	0.0000	0.0000	0.00	No	1
11 PIPE-4	330.47	1412.50	0.00	1408.00	0.00	4.50	1.3600	CIRCULAR	18.000	18.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
12 PIPE-5	34.76	1408.00	0.00	1405.70	0.00	2.30	6.6200	CIRCULAR	30.000	30.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1
13 PIPE-6A	23.48	1413.00	0.00	1412.90	0.00	0.10	0.4300	CIRCULAR	18.000	18.000	0.0150	0.5000	0.0000	0.0000	0.00	No	1
14 PIPE-6B	244.06	1412.90	0.00	1411.50	0.00	1.40	0.5700	CIRCULAR	18.000	18.000	0.0150	0.5000	0.0000	0.0000	0.00	No	1

Pipe Results

SN Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1 Link-12	22.73	0 00:25	26.58	0.86	9.50	0.09	1.42	0.71	0.00		Calculated
2 Link-13	5.49	0 00:12	18.82	0.29	9.23	0.02	0.51	0.37	0.00		Calculated
3 Link-14	5.49	0 00:12	18.25	0.30	9.03	0.02	0.52	0.38	0.00		Calculated
4 Link-20	21.94	0 00:11	23.17	0.95	5.37	0.07	1.77	0.78	0.00		Calculated
5 PIPE-01	9.94	0 00:10	13.51	0.74	8.36	0.07	0.96	0.64	0.00		Calculated
6 PIPE-02	8.93	0 00:10	12.15	0.74	7.53	0.10	0.96	0.64	0.00		Calculated
7 PIPE-1	13.55	0 00:11	23.41	0.58	4.97	0.77	1.34	0.55	0.00		Calculated
8 PIPE-2	21.96	0 00:11	24.19	0.91	5.67	0.95	1.79	0.75	0.00		Calculated
9 PIPE-3A	26.06	0 00:11	31.49	0.83	7.17	0.06	1.64	0.69	0.00		Calculated
10 PIPE-3B	30.14	0 00:11	42.33	0.71	6.50	0.05	1.80	0.62	0.00		Calculated
11 PIPE-4	11.13	0 00:13	10.62	1.05	8.06	0.68	1.11	0.90	0.00		> CAPACITY
12 PIPE-5	24.55	0 00:10	91.44	0.27	15.80	0.04	0.88	0.35	0.00		Calculated
13 PIPE-6A	1.98	0 00:10	5.94	0.33	3.03	0.13	0.60	0.40	0.00		Calculated
14 PIPE-6B	3.89	0 00:11	6.90	0.56	4.45	0.91	0.80	0.54	0.00		Calculated

Storage Nodes

Storage Node : RB-1

Input Data

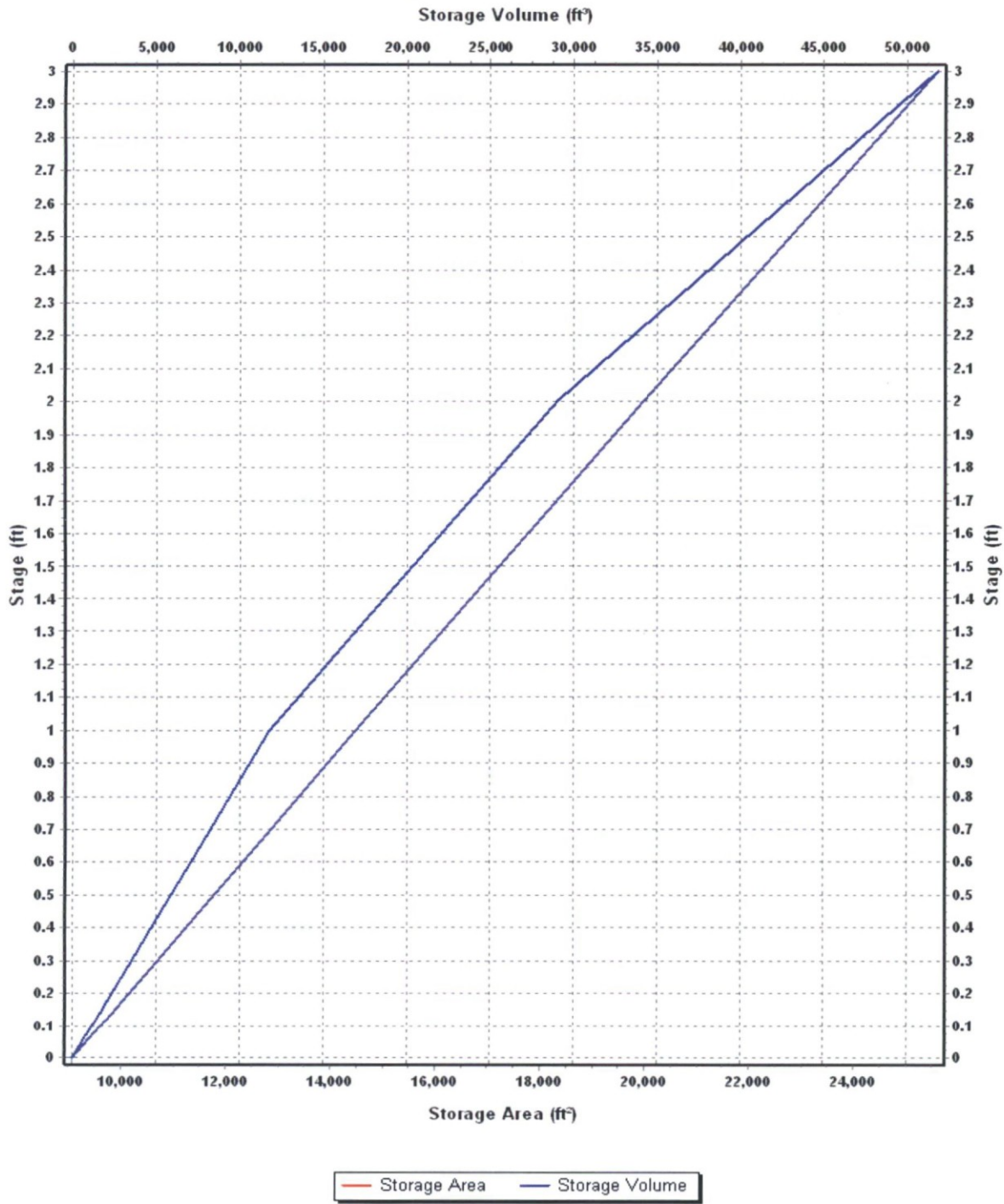
Invert Elevation (ft) 1405.00
 Max (Rim) Elevation (ft) 1408.50
 Max (Rim) Offset (ft) 3.50
 Initial Water Elevation (ft) 0.00
 Initial Water Depth (ft) -1405.00
 Ponded Area (ft²) 0.00
 Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : RB-2-3

Stage (ft)	Storage Area (ft ²)	Storage Volume (ft ³)
0	9064	0.000
1	14476	11770.00
2	19990	29003.00
3	25603	51799.50

Storage Area Volume Curves



Storage Node : RB-1 (continued)

Outflow Weirs

SN Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1 RB-2-3-WEIR	Trapezoidal	No	1407.10	2.10	10.00	1.00	3.33

Outflow Orifices

SN Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
1 Orifice-03	Side	CIRCULAR	No	4.00			1405.00	0.61

Output Summary Results

Peak Inflow (cfs)	64.30
Peak Lateral Inflow (cfs)	16.00
Peak Outflow (cfs)	22.73
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	1407.83
Max HGL Depth Attained (ft)	2.83
Average HGL Elevation Attained (ft)	1405.58
Average HGL Depth Attained (ft)	0.58
Time of Max HGL Occurrence (days hh:mm)	0 00:25
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Appendix C: Stormwater Retention

Required Volume

Drywell Calculations



Weighted C Calculations

$C_{\text{Landscaping}}$	C_{lots}	C_{paved}	P (100-Yr, 2-hr) (in)
0.30	0.64	0.95	2.256

Drainage Area Number	Total Area	Total Area	Landscaping/ Basin Area	Lot Area	Paving Area	Weighted C
DA-1	111986	2.57	9398	80644	21944	0.67
DA-2	129579	2.97	28106	65829	35644	0.65
DA-3	123540	2.84	21753	81799	19988	0.63
DA-4	115654	2.66	26206	70182	19266	0.61
DA-5	219681	5.04	81810	100780	37091	0.57
DA-LARK	33719	0.77	7762	0	25957	0.80

Total

734159
16.9

175035

399234

159890

0.63
PROJECT WEIGHTED C

0.53
PRE-PROJECT C

Wolf Springs Ranch Required Retention Volume

P (100-Yr, 2-hr) (in) ¹ =	2.256
Existing Condition 100-yr C value	0.53
Prop Cond Weighted 100-yr C value	0.63

FIRST FLUSH VOLUME VS. DIFFERENTIAL C VOLUME						
DRAINAGE AREA	TOTAL AREA (AC)	WEIGHTED C ²	FIRST FLUSH VOLUME (AC-FT)	FIRST FLUSH VOLUME (FT ³)	DIFFERENTIAL C VOLUME (AC-FT) ³	DIFFERENTIAL C VOLUME (FT ³)
DA-1	2.57	0.67	0.11	4666	0.05	2105
DA-2	2.97	0.65	0.12	5399	0.06	2436
DA-3	2.84	0.63	0.12	5148	0.05	2323
DA-4	2.66	0.61	0.11	4819	0.05	2174
DA-5	5.04	0.57	0.21	9153	0.09	4130
DA-LARK	0.77	0.80	0.03	1405	0.01	634
Total ²			0.70	30590	0.32	13802

Notes: 1. Point 100-yr, 2-Hr rainfall depth per NOAA14 (FCDMC).

2. Weighted C based upon proportion of lotting, paving, and landscaping in each subbasin.

3. 100-year volume based on City of Scottsdale redevelopment policy where volume is based upon the difference in C values for post-development vs pre-development.

4. Based upon comparison of the first-flush volume and the pre-vs-post "C" volume, the first flush will be provided on the Site because it is greater.

Wolf Springs Ranch Provided Retention Volume

Provided Volume - Stage-Storage

Retention Basin 1

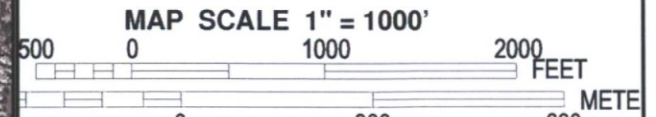
Elevation	Area	Incremental Vol	Cumulative Vol	Cumulative Vol	Depth
ft	ft ²	ac-ft	ac-ft	ft ³	
1405	10681				0
1406	16721	0.315	0.31	13701	1
1407	23081	0.457	0.77	33602	2
1408	29694	0.606	1.38	59990	3

Notes: 1. At the weir crest elevation of 1407.0, the basin stores 33602 cu-ft. The required first-flush volume is 30590 cu-ft.

Exhibits

- USGS Quad Map
- FEMA FIRMette
- Offsite Drainage Map
- Existing Conditions Drainage Map
- Proposed Conditions Drainage Map





NFIP

PANEL 1760L

NATIONAL FLOOD INSURANCE PROGRAM

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

PANEL 1760 OF 4425
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	1760	L
PARADISE VALLEY, TOWN OF	040049	1760	L
PHOENIX, CITY OF	040051	1760	L
SCOTTSDALE, CITY OF	045012	1760	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
04013C1760L
MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

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

