Drainage Reports

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Water Study

Wastewater Study

Stormwater Waiver Application

Sereno Canyon

Traffic Impact and Mitigation Analysis

South of Ranch Gate Road,
West of 128th Street
Scottsdale, Arizona

January 2012
Project No. 11-930

Prepared For:
Crown Community Development
7325 Janes Avenue
Woodridge, IL 60517

For Submitted to:
City of Scottsdale

Prepared By:

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

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12/22/2017

ATTACHMENT #12

SERENO CANYON SPA AND RESORT
TRAFFIC IMPACT AND MITIGATION ANALYSIS
1ST SUBMITTAL

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CivTech, Inc.
10605 North Hayden Road
Suite 140
Scottsdale, Arizona 85260
(480) 659-4250

January 2012
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EXECUTIVE SUMMARY

The Sereno Canyon Spa and Resort development is located South of Ranch Gate Road and West of 128th Street in Scottsdale, Arizona. A previous *Circulation Master Plan* was prepared for Sereno Canyon Spa and Resort by Wood, Patel & Associates (dated August 2006) which documented the traffic impacts of a 122 dwelling unit single family residential subdivision. The plan has been updated to provide additional dwelling units and a resort hotel. The proposed plan provides 44 single family dwelling units and 206 hotel keys. The development is anticipated to be fully constructed in 2015.

The purpose of this study is to address traffic and transportation impacts of the proposed development on the surrounding streets and intersections and to compare those to the impacts previously required within the *Circulation Master Plan*. This traffic impact mitigation analysis (TIMA) was prepared for submittal to the City of Scottsdale.

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

The proposed site plan includes three (3) access points; a full movement access at 125th Place along Ranch Gate Road, a full movement access at Access A along 128th Street and an exit only on Alameda Drive. The original access for the development was to occur on Alameda Road to the west (ingress and egress) and Ranch Gate Road to the north. The roadway connections have been revised with the land uses and now propose Ranch Gate Road at 125th Place as the main entrance for the residential traffic while resort traffic will utilize 128th Street. Alameda Road will still provide access for the Sereno Canyon Spa and Resort site but will be limited to egress only and will provide for emergency access. The access at Alameda Road, to the west, is now planned to allow vehicles to enter from the adjacent subdivision (by reservation) to visit the resort restaurant and spa. The Alameda access will be controlled by an electric gate and will allow residents of Sereno Canyon Spa and Resort to use this access as an exit only.

Conclusions & Recommendations

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

- The previously approved plan could generate as many as 1,226 daily trips, with approximately 96 trips occurring during the AM peak hour and 130 trips occurring during the PM peak hour.

- The Proposed Plan could generate as many as 2,140 daily trips, with approximately 169 trips occurring during the AM peak hour and 218 trips occurring during the PM peak hour.

- The City's Transportation Master Plan is based on the General Plan for Land Use which shows one (1) dwelling unit per acre and a Resort. The proposed plan's daily trips fit within the City's plan.

- At full buildout in 2015, all study intersections are expected to operate at overall acceptable levels of service in both the AM and PM peak hours. The analysis further revealed that all movements at the study intersections and site accesses are expected to operate at an overall acceptable level of service (LOS B or better).

- The TIMA study Ranch Gate Road is to remain a two-lane undivided road along the frontage of the site. The results of the auxiliary lane evaluation indicate that the intersections of 125th Place and 128th Street do not meet the minimum criteria for their installation along Ranch Gate Road. Should improvements or auxiliary lanes be constructed, CivTech recommends lane design for applicable queue storage according to **Table 8**.

- Level of service analysis at the study intersections indicates that mitigation with auxiliary lanes is not required to maintain acceptable traffic operations. However, should dedicated auxiliary lanes be desired, their queue storage requirements have been included in **Table 8**.

- Sight distance should be provided at the proposed access based on the standards provided in the *City of Scottsdale's Design Standards and Policies Manual, 2010 Update*. The developer should ensure that adequate sight distance is provided at the intersections to allow safe left and right turning movements from the development. Landscaping should be maintained at a maximum of three feet in height. To maintain sight distance, tree branches should be trimmed lower than seven feet and maintained to meet current acceptable landscape requirements.

INTRODUCTION

The Sereno Canyon Spa and Resort development is located south of Ranch Gate Road and west of 128th Street in Scottsdale, Arizona. The proposed site consists of residential and hotel land uses. A project build-out year of 2015 was analyzed as the opening year for the proposed Sereno Canyon Spa and Resort development. The site is proposed to include a total of 44 single family dwelling units and 206 hotel units. The vicinity of the site is shown in **Figure 1**.

CivTech Inc. has been retained by Crown Community Development to perform a Traffic Impact and Mitigation Analysis of the proposed development for submittal to the City of Scottsdale.

Study Requirements

The traffic impact mitigation analysis (TIMA) has been prepared in accordance with the requirements of Chapter 5, Section 5-1, "Traffic Impact Mitigation Analysis (TIMA)" of the January 2010 City of Scottsdale *Design Standards & Policies* manual and per the requirements of the City of Scottsdale. The proposed site is anticipated to yield approximately 186 trips in the AM peak hour and 250 trips in the PM peak hour. Per the requirements, the proposed level of trip generation is characteristic of a Category 3 development. The proposed development requires analysis of the AM and PM peak hour for the existing conditions and for opening/build-out conditions. For purposes of this study, the development is assumed to be built-out by the year 2015.

Study Area

A Category 3 development normally requires a minimum study area of all site accesses, signalized intersections, and major unsignalized intersections within 2 miles of the site. Due to the remote location of the site with adjacency to other residential communities, this study will analyze the intersections of Happy Valley Road/Ranch Gate Road, Happy Valley Road/Alameda Road, 125th Street/Ranch Gate Road and the access point with 128th Street. Additional analysis will be prepared for Alameda Road to compare the number of trips anticipated from the Sereno Canyon Spa and Resort site.

Horizon Year

This analysis analyzes the proposed project at build-out. This evaluation assumes that the site will be built-out at full occupancy during its opening year, 2015. Therefore, this study will evaluate traffic impacts anticipated during the build-out year of 2015.

Time Periods

Both the AM and PM peak hours were evaluated given the residential and resort hotel uses at the project site. The AM peak hour was assumed to occur between 7:00 AM and 9:00 AM while the PM peak hour was assumed to occur between 4:00 PM and 6:00 PM.

Vicinity Map

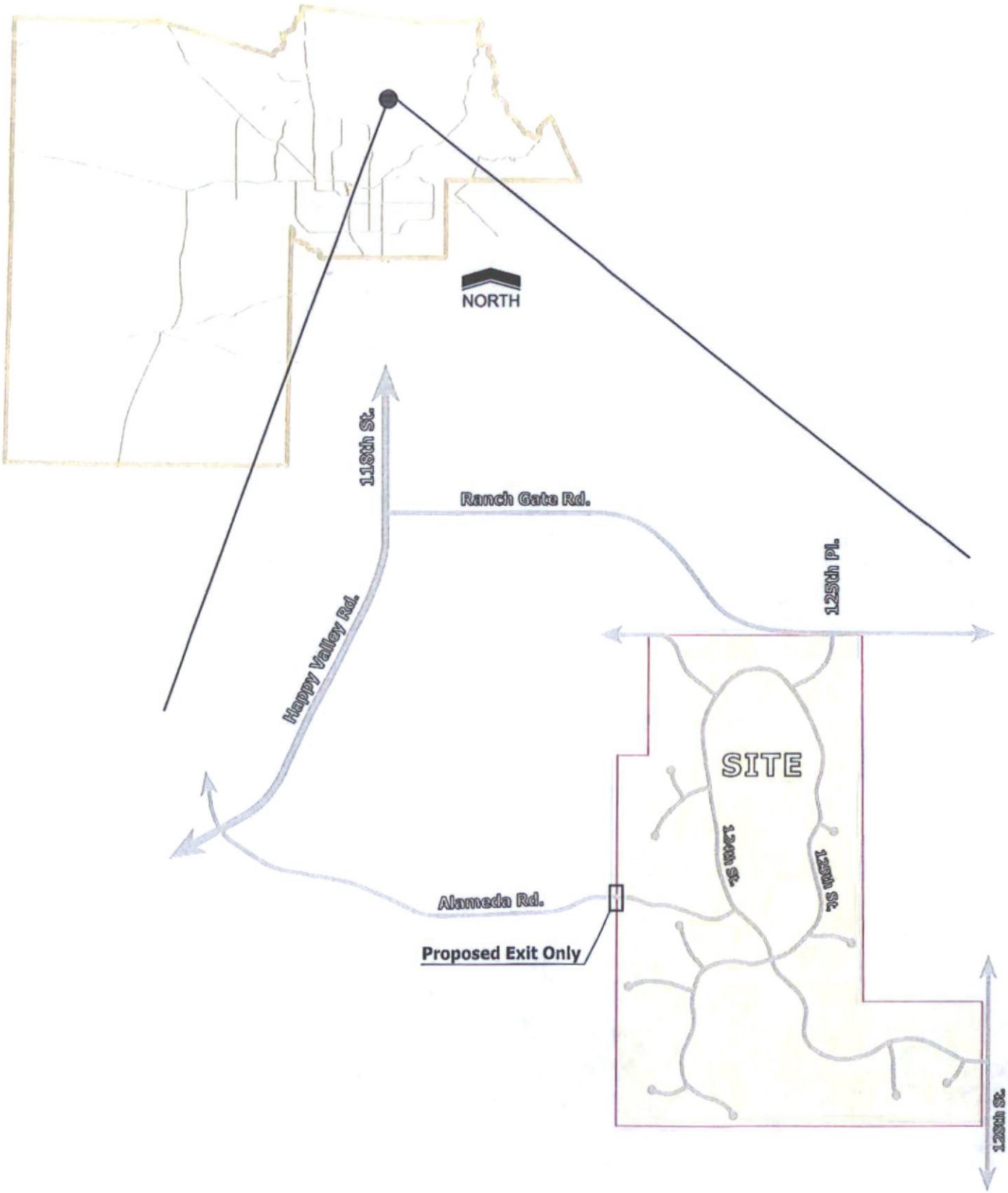


Figure 1: Vicinity Map

EXISTING CONDITIONS

EXISTING LAND USE

The proposed Sereno Canyon Spa and Resort development is planned for unoccupied land east of 121st Place, west of 128th Street, south of Ranch Gate Road, and north of the McDowell Sonoran preserve. The site had been previously approved for the development of 128 single-family detached dwelling units. Portions of the internal roadway infrastructure have been completed and currently connect to Alameda Drive and Ranch Gate Road. Single family residential housing is located to the west of the site. The McDowell Mountain Preserve is located to the south. The site is otherwise surrounded by vacant land to the north and east.

The City's General Plan designates this site as allowing up to one (1) dwelling unit per acre with a resort designated for the area.

EXISTING ROADWAY NETWORK

The existing roadway network within the study area includes Ranch Gate Road, Alameda Road, Happy Valley Road, 118th Street, and 128th Street. Existing local roads within the site will be used as internal collectors.

Ranch Gate Road is an east-west local roadway according to the classification map included in the City of Scottsdale's *Master Transportation Plan, updated 2008*. Ranch Gate Road begins at 118th Street as a two lane paved road and travels east to 125th Street. Ranch Gate Road continues after 125th Street as a two lane dirt road until 128th Street where it becomes a one lane dirt road/trail.

Alameda Road is an east-west rural minor arterial that begins as the southeast approach at the intersection of Happy Valley Road (NE-SW legs) and 115th Street (NW leg). Alameda Road travels east as a paved two lane road until it enters the Sereno Canyon Spa and Resort site. Alameda Road continues within the site with one travel lane in each direction separated by a raised median, terminating at its intersection with 124th Street. Alameda road provides access to residential subdivisions and communities.

Happy Valley Road is a north-south rural minor arterial that begins at Scottsdale Road and travels eastward until curving north and becoming 118th Street. Within the vicinity of the site, Happy Valley Road consists of two travel lanes in each direction separated by a raised median. Happy Valley Road has a posted speed limit of 40 mph within the study area.

118th Street is a north-south rural minor collector that begins north of Jomax Road in Scottsdale. 118th Street travels south approximately one mile until it reaches Buckskin Trail where it veers and becomes Happy Valley Road. 118th Street provides one travel lane in each direction and a northbound bicycle lane.

128th Street is classified as a north-south rural minor collector, but is currently an unpaved road that aligns with the easternmost edge of the site. 128th Street will be paved in the future to provide access to the site and may be paved up to Rio Verde Drive (2 miles north of the site, by others). Access to the proposed resort will be directed to 128th Street.

STUDY INTERSECTION CONFIGURATIONS

The intersection of **118th Street and Ranch Gate Road** is a 3-legged intersection under unsignalized conditions with stop control along the westbound approach. The northbound approach consists of a general purpose lane and a bicycle lane. The south- and westbound approaches consist of a single, general purpose lane.

The intersection of **125th Street and Ranch Gate Road** is a 3-legged intersection under unsignalized conditions with stop control in the northbound approach. All approaches consist of a single, general purpose lane. 128th Street at the intersection is separated by a wide, raised median. The westbound approach is currently unpaved. This intersection will be considered a site access and does not have a significant amount of entering traffic. Therefore, this intersection did not have traffic volume counts conducted as part of the existing conditions analysis.

The intersection of **Happy Valley Road and Alameda Road / 115th Street** is a 4-legged intersection operating with stop control at the northwest- and southeast-bound (Alameda Road / 115th Street) approaches. The northeast-bound approach consists of an exclusive left-turn lane, two through lanes, and an exclusive right-turn lane. The southwest-bound approach consists of an exclusive left-turn lane, one through lane, and a shared through/right-turn lane. The northwest-bound and southeast-bound approaches consist of a single, general purpose lane. 115th Street and Happy Valley Road both contain medians which provide access control.

The intersection of **120th Street and Alameda Road** is a 4-legged intersection under unsignalized conditions with stop control on the north- and southbound approaches. All approaches are unstriped and consist of a single, general purpose lane. 120th Street at the intersection is separated by wide, raised medians.

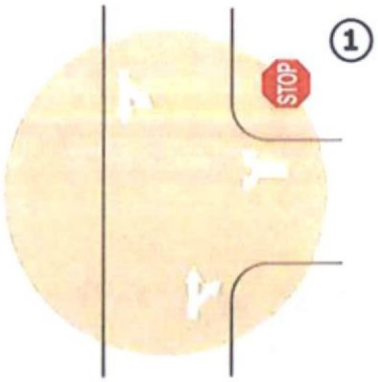
The intersection of **121st Street and Alameda Road** is a 3-legged intersection with stop control on the southbound approach. All approaches are unstriped and consist of a single, general purpose lane. 121st Street at the intersection is separated by a wide, raised median.

The existing lane geometry and traffic controls within the project area are depicted in **Figure 2**.

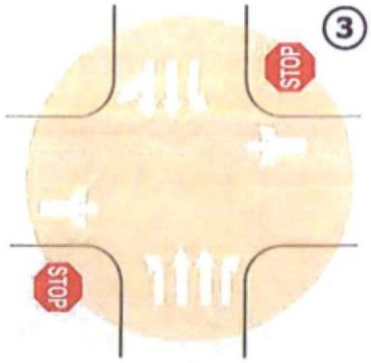
EXISTING TRAFFIC VOLUMES

Field Data Services (FDS) conducted intersection turning movement counts for the study intersections between 7:00 AM and 9:00 AM and between 4:00 PM and 6:00 PM on October 13, 2011. The existing hourly traffic volume counts utilized for the time

periods in this study are shown on **Figure 3**. The recorded volumes for the intersection turning movement counts are provided in **Appendix B**.

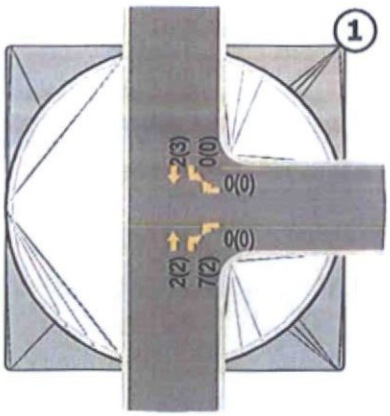


118th St. & Ranch Gate Rd.

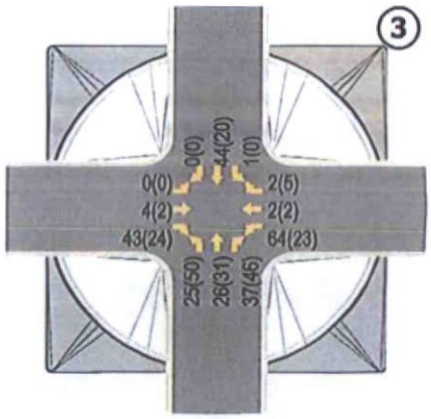


Happy Valley Rd. & Alemeda Rd.

Figure 2: Existing Lane Configuration and Stop Control



118th St. & Ranch Gate Rd.



Happy Valley Rd. & Alemeda Rd.

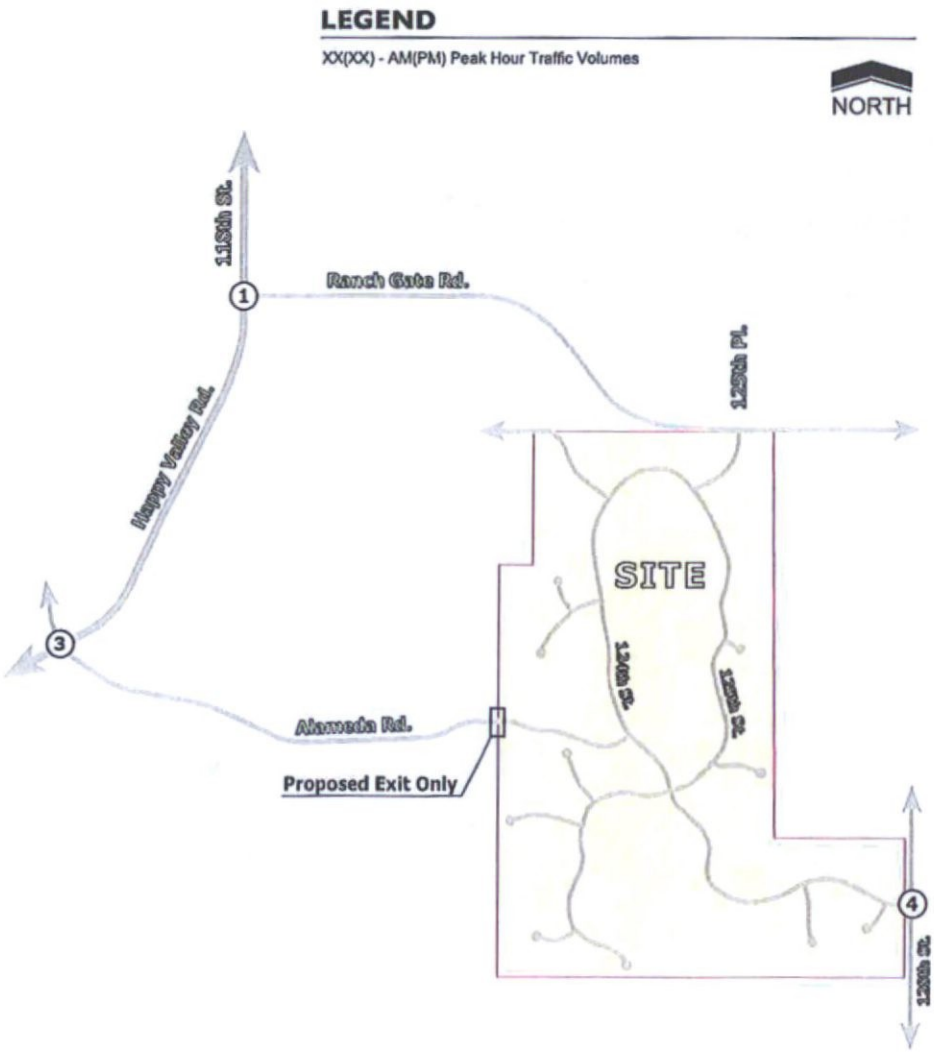


Figure 3: Existing Peak Hour Traffic Volumes

ANALYSIS OF EXISTING CONDITIONS

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

Table 1 – Level of Service Criteria

Level of Service	Control Delay (seconds/vehicle)	
	Signalized Intersections	Unsignalized Intersections
A	≤ 10	≤ 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80	> 50

Source: Exhibit 16-2 and Exhibit 17-2, *Highway Capacity Manual 2000*

Peak hour capacity analyses have been conducted for the study intersections based on their existing configurations and entering traffic volumes using the methodologies presented in the *Highway Capacity Manual* (HCM), using Traffix software. The overall approach levels of service are reported for the intersections.

The resulting levels of service for the existing conditions are summarized in **Table 2**. The existing conditions analysis has been included in **Appendix C**.

Table 2 – Existing Level-of-Service Summary

ID	Intersection	Stop Control	Approach	Existing LOS	
				AM	PM
1	118th St. & Ranch Gate Rd.	1-Way Stop	NB	A	A
			SB	A	A
			WB	A	A
			Worst Case	**A**	**A**
3	Happy Valley Rd. & Alameda Rd.	2-Way Stop	NEB	A	A
			SWB	A	A
			SEB	A	A
			NWB	A	A
			Worst Case	**A**	**A**
5	120th Pl. & Alameda Rd.	2-Way Stop	NB	A	A
			SB	A	A
			EB	A	A
			WB	A	A
			Worst Case	**A**	**A**

Table 2 – Existing Level-of-Service Summary (Continued.....)

ID	Intersection	Stop Control	Approach	Existing LOS	
				AM	PM
6	121st Pl. & Alameda Rd.	1-Way Stop	SB	A	A
			EB	A	A
			WB	A	A
			Worst Case	**A**	**A**

Capacity analysis of the existing year concludes that all approaches at all study intersections typically operate at excellent levels of service (LOS "A") during the AM and PM peak hours.

PROPOSED DEVELOPMENT

Sereno Canyon Spa and Resort will be located on 350 acres, consisting of high-end resort development located roughly east of 121st Place, west of 128th Street, south of Ranch Gate Road and north of the McDowell Sonoran preserve. The proposed Sereno Canyon Spa and Resort is proposed to consist of a Resort Hotel consisting of 96 rooms, 108 Casitas (condominium type units) detached from the resort, 102 Resort Villas and 44 Resort Estate Homes. The Casitas and Resort Villas both have the capacity to become a part of the rental pool even though they may be for sale units and privately owned. The operation of privately owned units which are leased back to the hotel rental pool allows for flexibility to provide additional resort rooms during high demand. Ownership units are typically occupied by their residents approximately 33 percent of the time. The remaining usage will come from resort nights. The Resort Estate Homes were assumed to be single family detached residences. The layout of the site is illustrated in **Figure 4**.

SITE ACCESS

As shown in **Figure 4** the proposed site plan includes three (3) access points. The original access for the development was to occur on Alameda Road to the west and Ranch Gate Road to the north. The roadway connections have been revised with the land uses and now propose Ranch Gate Road at 125th Place as the main entrance for the residential traffic while resort traffic will utilize 128th Street. Alameda Road will still provide access for the Sereno Canyon Spa and Resort site, but will be limited to egress only and used as an emergency access when needed. The access at Alameda Road, to the west, is now planned to allow vehicles to enter from the adjacent subdivision (by reservation) to visit the resort restaurant. The Alameda access will be controlled by an electric gate and will allow residents of Sereno Canyon Spa and Resort to use this access as an exit only.

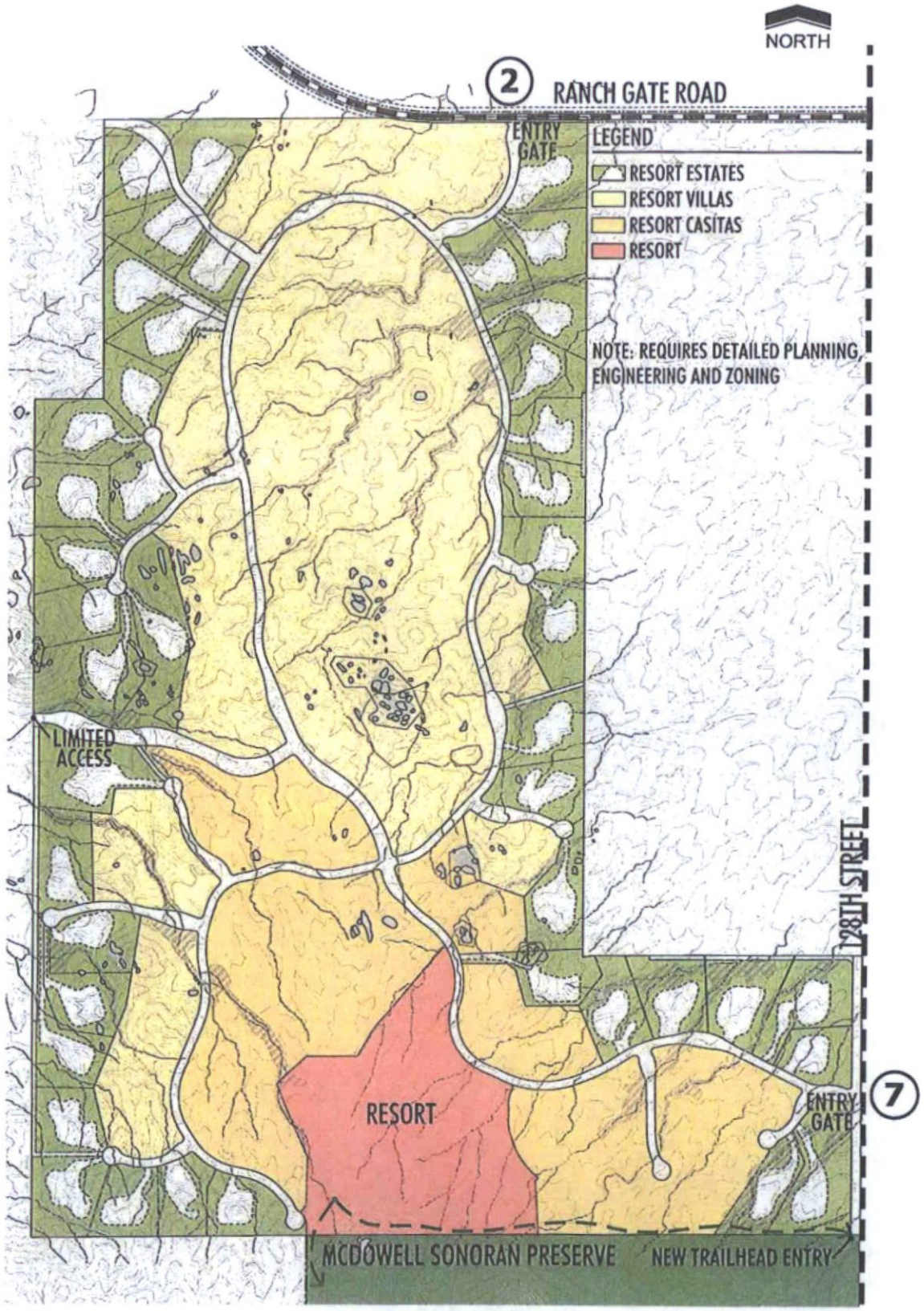


Figure 4: Site Plan and Access

TRIP GENERATION

PREVIOUSLY APPROVED DEVELOPMENT

The subject property has an approved site plan for single family housing development with 128 single family residences. However, construction has not started and the site has a new proposed development that is projected to generate a similar amount of trips per average day.

The potential trip generation for the approved site was estimated in the same manner as previously described, utilizing average trip rates provided in the ITE *Trip Generation, 8th Edition*. **Table 5** summarizes the trip generation potential of the proposed redevelopment. Detailed trip generation worksheets are included in **Appendix D** to this report.

Table 3 – Existing Trip Generation

Land Use	Land Use Code	Size	Units	Weekday Trips Generated						
				Daily Total	AM Peak Hour			PM Peak Hour		
					Enter	Exit	Total	Enter	Exit	Total
Homes	210	128	DU	1,226	24	62	96	82	48	130

The previously approved plan could generate as many as 1,226 daily trips, with approximately 96 trips occurring during the AM peak hour and 130 trips occurring during the PM peak hour.

PROPOSED DEVELOPMENT

Generated trips were estimated utilizing the data given in the *Institute of Transportation Engineers (ITE) Trip Generation, 8th Edition* report and the methodology discussed in the *ITE Trip Generation Handbook, 2nd Edition*. The *ITE Trip Generation* report contains data collected by various transportation professionals for a wide range of different land uses. The data are summarized in the report and average rates and equations have been established that correlate the relationship between an independent variable that describes the development size and generated trips for each categorized land use. The report provides information for daily and peak hour trips.

The proposed Sereno Canyon Spa and Resort is proposed to consist of a Resort Hotel consisting of 96 rooms, 108 Casitas (condominium type units) detached from the resort, 102 Resort Villas and 44 Resort Estate Homes. The Casitas and Resort Villas both have the capacity to become a part of the rental pool even though they may be for sale units and privately owned. The operation of privately owned units which are leased back to the hotel rental pool allows for flexibility to provide additional resort rooms during high demand. Ownership units are typically occupied by their residents approximately 33 percent of the time. The remaining usage will come from resort nights. The Resort Estate Homes were assumed to be single family detached residences. The potential trip generation for the site was estimated utilizing average trip rates provided in the ITE *Trip Generation, 8th Edition*. **Table 3** summarizes the trip generation potential of the

proposed redevelopment. Detailed trip generation worksheets are included in **Appendix D** to this report.

Table 4 – Proposed Development Trip Generation

Land Use	Land Use Code	Size	Units	Weekday Trips Generated						
				Daily Total	AM Peak Hour			PM Peak Hour		
					Enter	Exit	Total	Enter	Exit	Total
Resort Estates	210	44	DU	422	8	25	33	28	17	45
Resort Villas	210	34	DU	326	7	19	26	22	13	35
Resort Villas	330	68	Keys	340	19	7	26	15	19	34
Resort Casitas	233	36	DU	212	5	16	21	13	7	20
Resort Casitas	330	72	Keys	360	19	8	27	15	21	36
Resort Hotel	330	96	Keys	480	26	10	36	21	27	48
Total Trips				**2,140**	**84**	**85**	**169**	**114**	**104**	**218**

The Proposed Plan could generate as many as 2,140 daily trips, with approximately 169 trips occurring during the AM peak hour and 218 trips occurring during the PM peak hour.

TRIP DISTRIBUTION AND ASSIGNMENT

The Proposed Plan consists of primarily hotel/residential land use; therefore, trips are likely to be generated to/from employment opportunities and commercial areas. Most of the generated traffic should be considered to travel to/from the Phoenix metropolitan area.

The existing roadway network heavily influences the route drivers will use while traveling to their destinations. Sereno Canyon Spa and Resort is located in a secluded area without multiple roadway network options to satisfy trips. Therefore, the majority of the traffic added by the site is anticipated to utilize Happy Valley Road while some will travel along Alameda Road.

Table 4 displays the overall trip distribution percentages that were applied to the site traffic within the study area.

Table 5 – Trip Distribution

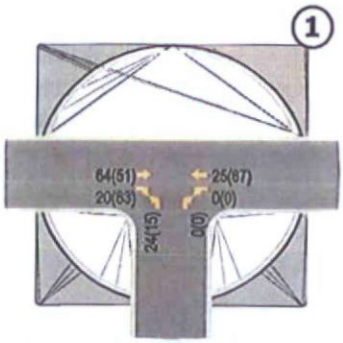
Direction	Direction	Percentage
Happy Valley Road	North	1%
Happy Valley Road	South	84%
Alameda Road	West	15%
Total		**100%**

Vehicles traveling along Alameda Road west of Happy Valley Road could also utilize Happy Valley Road to the north. Both Alameda Drive (115th Street) west of Happy

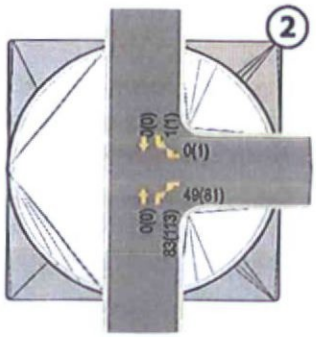
Valley Road and Happy Valley Road north of Alameda Drive are discontinuous after their intersection with Jomax Road. Jomax Road provides access to Alma School Road if trips are destined to the north.

The trip distribution along the roadway network is depicted in **Figure 5**. Site generated traffic as shown in **Table 3** was distributed based on the anticipated percentages described above and refined based on the adjacent roadway network. Site generated traffic during the AM and PM peak hours at the study intersections are shown in **Figure 6**.

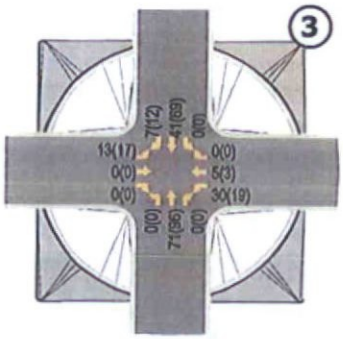
Figure 5: Trip Distribution



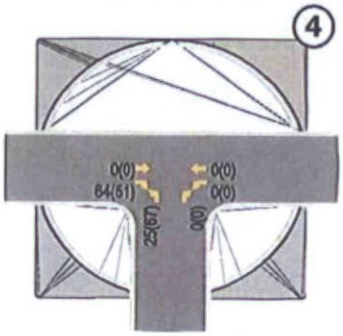
125th Pl. & Ranch Gate Rd.



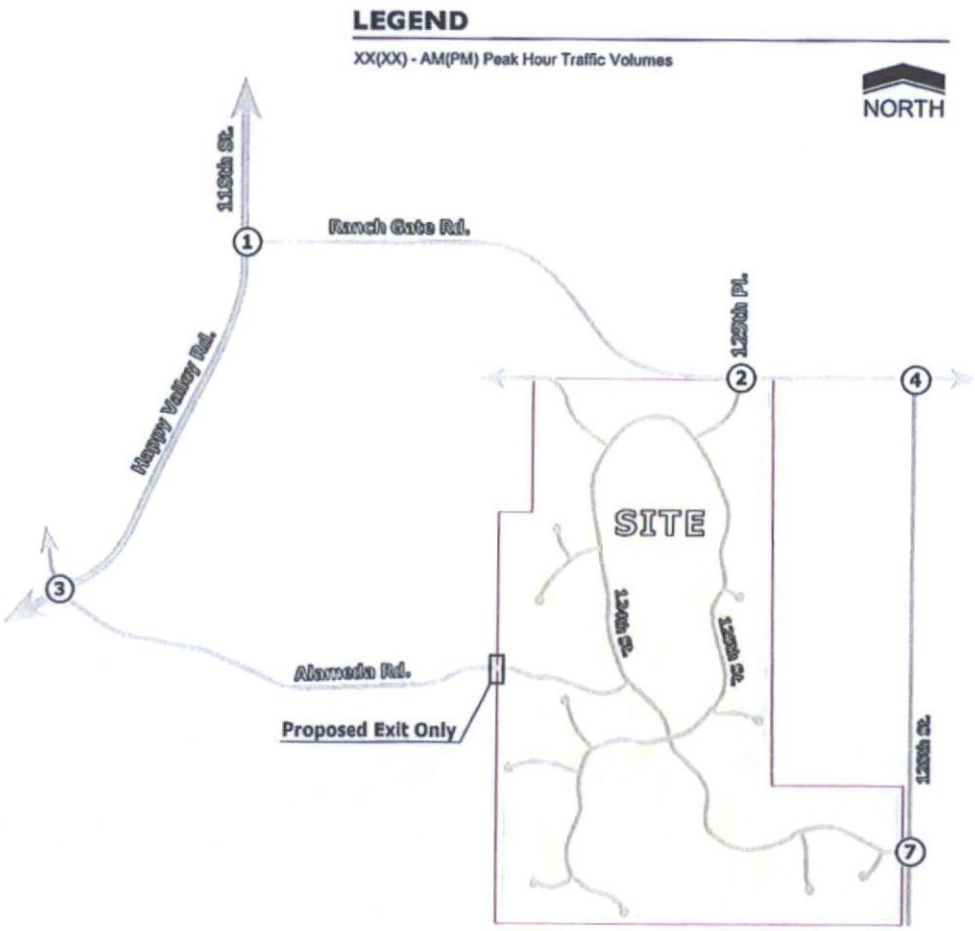
118th St. & Ranch Gate Rd.



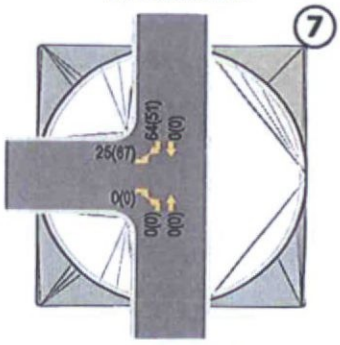
Happy Va"ey Rd. & Alemeda Rd.



128th St. & Ranch Gate Rd.



121st Pl. & Alemeda Rd.



128th St. & Access A

Figure 6: 2015 Site Traffic Volumes

FUTURE BACKGROUND TRAFFIC

The determination of the background traffic volumes in future horizon years can be assumed to be the product of a growth factor and the existing traffic volumes. The growth factor accounts for the increase in traveling vehicles on a roadway. A reasonable growth rate can be used by analyzing recent traffic counts within the study area. Future volume growth is also largely dependent on the opening/completion of future developments. Several properties within the study area are anticipated for future development and have also been considered as a part of the future background traffic.

GENERAL GROWTH

Historical daily traffic volumes were taken from the City of Scottsdale traffic count website to estimate an average annual growth rate. The City of Scottsdale's website provides average daily traffic (ADT) volumes along selected segments and ADT volumes entering selected intersections, updated in 2-year increments starting in 2004.

Historical segment ADT volume counts are not provided within the Sereno Canyon Spa and Resort study area vicinity. Entering intersection volumes along Happy Valley Road near Alma School Road were considered. Changes to traffic volumes varied throughout these years. From 2004 to 2006, volume along Happy Valley Road experienced significant growth. Traffic along Happy Valley Road then decreased from 2006 to 2008 and 2008 to 2010.

The average growth from 2004 to 2010 along Happy Valley Road just east of Alma School Road experienced an annual average growth rate less than 2 percent. For purposes of this study, a conservative 2 percent growth rate was applied to the entire roadway network to approximate possible future growth during all years during the study. Growth rate calculations can be found in **Appendix E**.

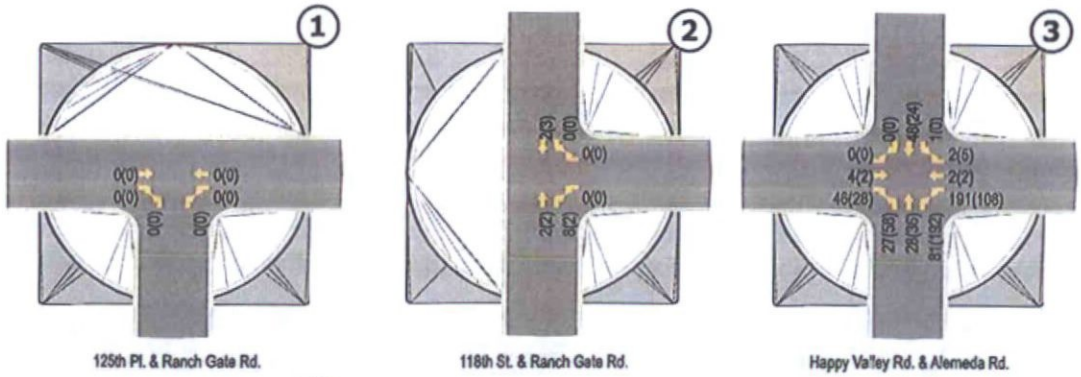
DEVELOPMENT OF SURROUNDING AREAS

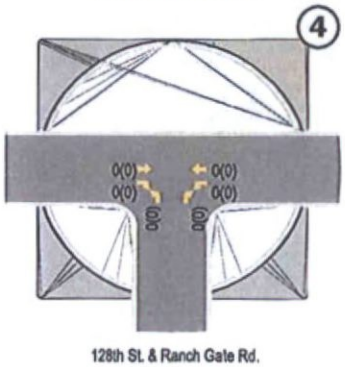
Surrounding areas such as the 20-acre exception parcel, the Recorp Property, property owned by the State Land Department and other properties located between Happy Valley Road and Sereno Canyon Spa and Resort along Alameda Road are anticipated for future development. The timing for the development of these properties is currently unknown. The Circulation Master Plan for Sereno Canyon Spa and Resort, prepared by Wood, Patel & Associates on August 26, 2006 documents the growth assumptions for the surrounding area. These areas were assumed to provide development consistent with the existing residential density of 0.31 dwelling units per acre. Therefore, the 20-acre exception parcel was assumed to provide 6 dwelling units, the Recorp Property will provide 74 dwelling units, the State Land parcel will provide 113 dwelling units and other adjacent lands will account for an additional 147 dwelling units. The distribution of the trips was assumed to be consistent with that previously proposed by Wood, Patel & Associates. Excerpts from the previous Circulation Master Plan along with the projected non-site traffic volumes are included in **Appendix E**.

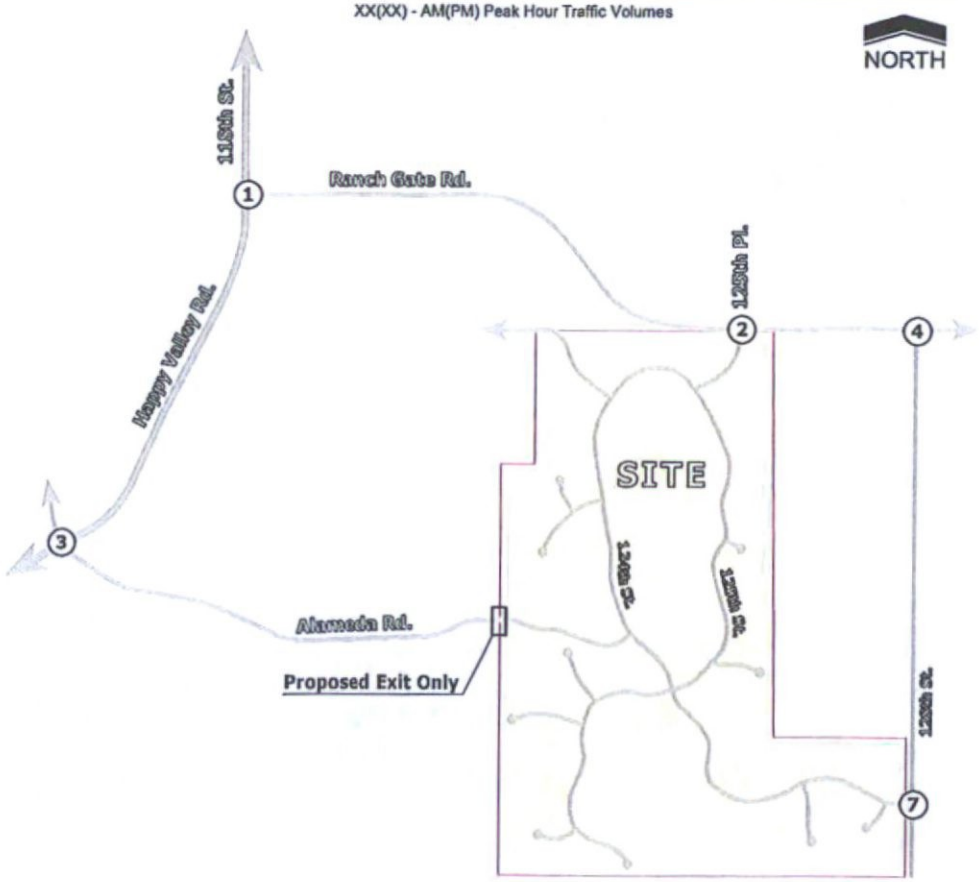
Projected background traffic volumes for the proposed development for the build-out year of 2015 are shown in **Figure 7** and include the existing traffic with the applied two percent growth rate and the adjacent development traffic volumes. Calculations for the future growth projections are included in **Appendix E**.

TOTAL TRAFFIC

Total traffic was determined by adding the site generated traffic to the projected background traffic. Total AM and PM peak hour traffic for build-out are shown in **Figure 8**, respectively.







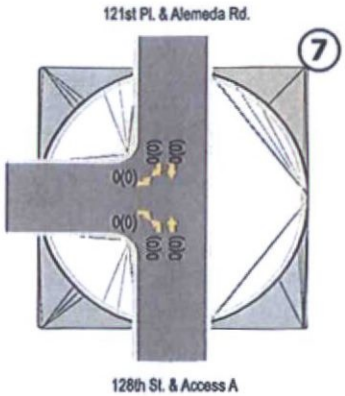
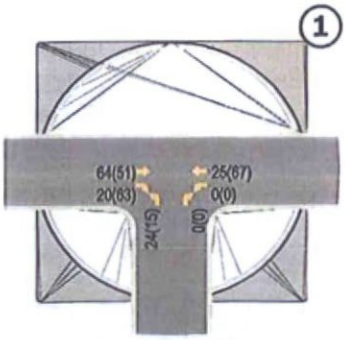
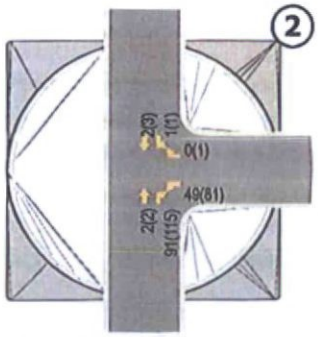


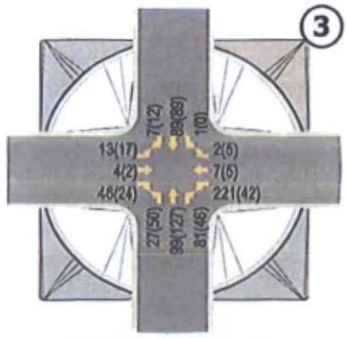
Figure 7: 2015 Background Traffic Volumes



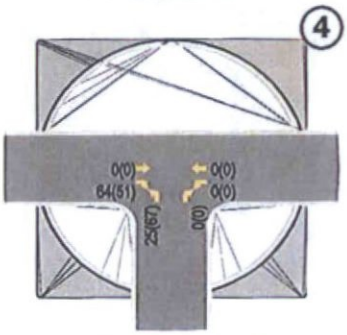
125th Pl. & Ranch Gate Rd.



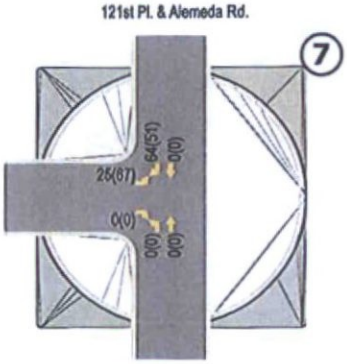
118th St. & Ranch Gate Rd.



Happy Va'ley Rd. & Alemeda Rd.



128th St. & Ranch Gate Rd.



121st Pl. & Alemeda Rd.

128th St. & Access A

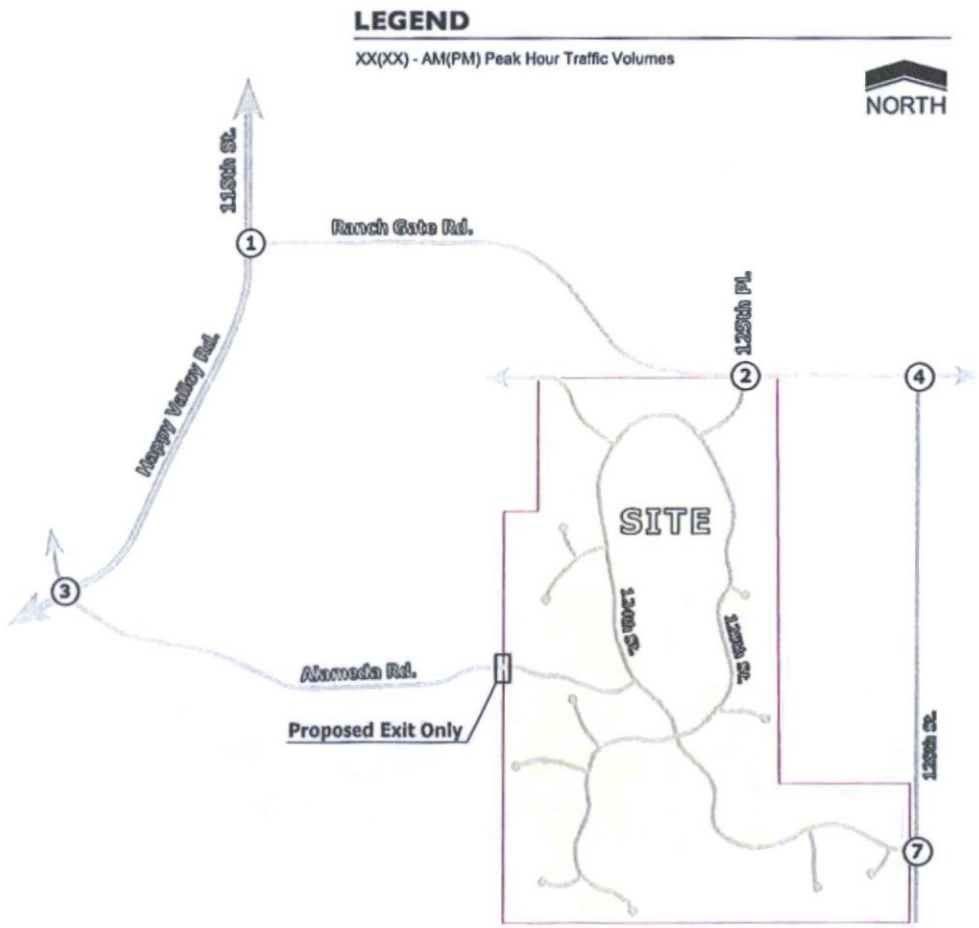


Figure 8: 2015 Total Traffic Volumes