

## TRAFFIC AND IMPROVEMENT ANALYSIS

### INTERSECTION CAPACITY ANALYSIS

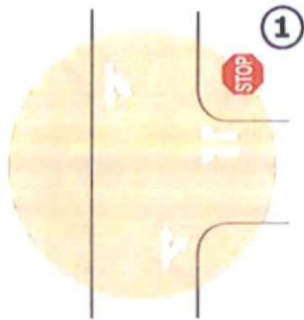
Peak hour capacity analyses were conducted for the study intersections and at the site accesses. All intersections were analyzed using the methodologies presented in the HCM 2000 using Traffix Version 8.0™ traffic analysis software.

For purpose of comparison, two analyses were completed for each study horizon year: one for a background traffic scenario (no-build) and one for total traffic (build). The overall intersection approach and/or movement levels of service yielded for the build-out/opening year 2015 analysis are summarized in Table 6. The level-of-service analyses are based on proposed geometrics as shown in Figure 9. Analysis worksheets for the 2015 no build and build scenarios can be found in Appendix F.

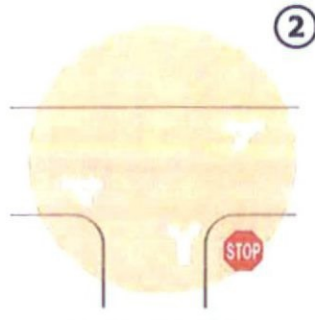
**Table 6 – Proposed Level-of-Service Summary**

ID	Intersection	Stop Control	Approach	2015 Build-out LOS	
				AM	PM
1	118 <sup>th</sup> St. & Ranch Gate Rd.	1-Way Stop	NB	A	A
			SB	A	A
			WB	A	A
			<b>Worst Case</b>	<b>A</b>	<b>A</b>
2	125 <sup>th</sup> Pl. & Ranch Gate Rd.	2-Way Stop	NEB	A	A
			SWB	A	A
			SEB	A	A
			NWB	A	A
<b>Worst Case</b>	<b>A</b>	<b>A</b>			
3	Happy Valley Rd. & Alameda Rd.	2-Way Stop	NEB	A	A
			SWB	A	A
			SEB	A	A
			NWB	B	B
<b>Worst Case</b>	<b>B</b>	<b>B</b>			
4	128 <sup>th</sup> St. & Ranch Gate Rd.	2-Way Stop	NEB	A	A
			SWB	A	A
			SEB	A	A
			NWB	A	A
<b>Worst Case</b>	<b>A</b>	<b>A</b>			
5	120 <sup>th</sup> Pl. & Alameda Rd.	2-Way Stop	NB	A	A
			SB	A	A
			EB	A	A
			WB	A	A
<b>Worst Case</b>	<b>A</b>	<b>A</b>			
6	121 <sup>st</sup> Pl. & Alameda Rd.	1-Way Stop	SB	A	A
			EB	A	A
			WB	A	A
			<b>Worst Case</b>	<b>A</b>	<b>A</b>
7	128 <sup>th</sup> St. & Access A	1-Way Stop	SB	A	A
			EB	A	A
			<b>Worst Case</b>	<b>A</b>	<b>A</b>

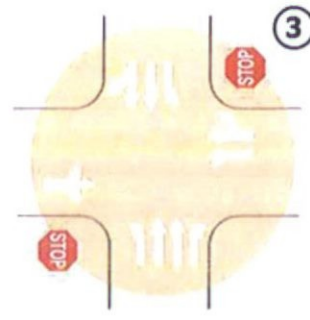
The results summarized in **Table 6** reveal that all approaches to all of the study intersections and proposed site access points are expected to operate at an overall good level of service (LOS "B" or better) in both the AM and PM peak hours during the build-out/opening year of 2015. The intersections are sufficiently capable of controlling the existing and anticipated traffic from the proposed development without any additional lanes or changes to traffic control. Therefore, mitigation to the existing intersections is not required.



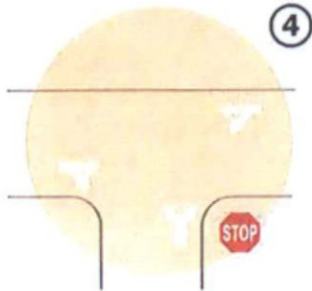
118th St. & Ranch Gate Rd.



125th Pl. & Ranch Gate Rd.



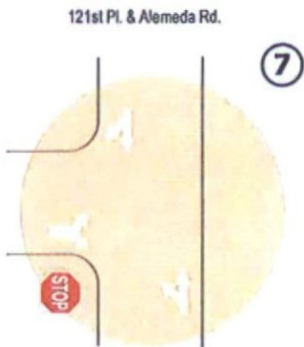
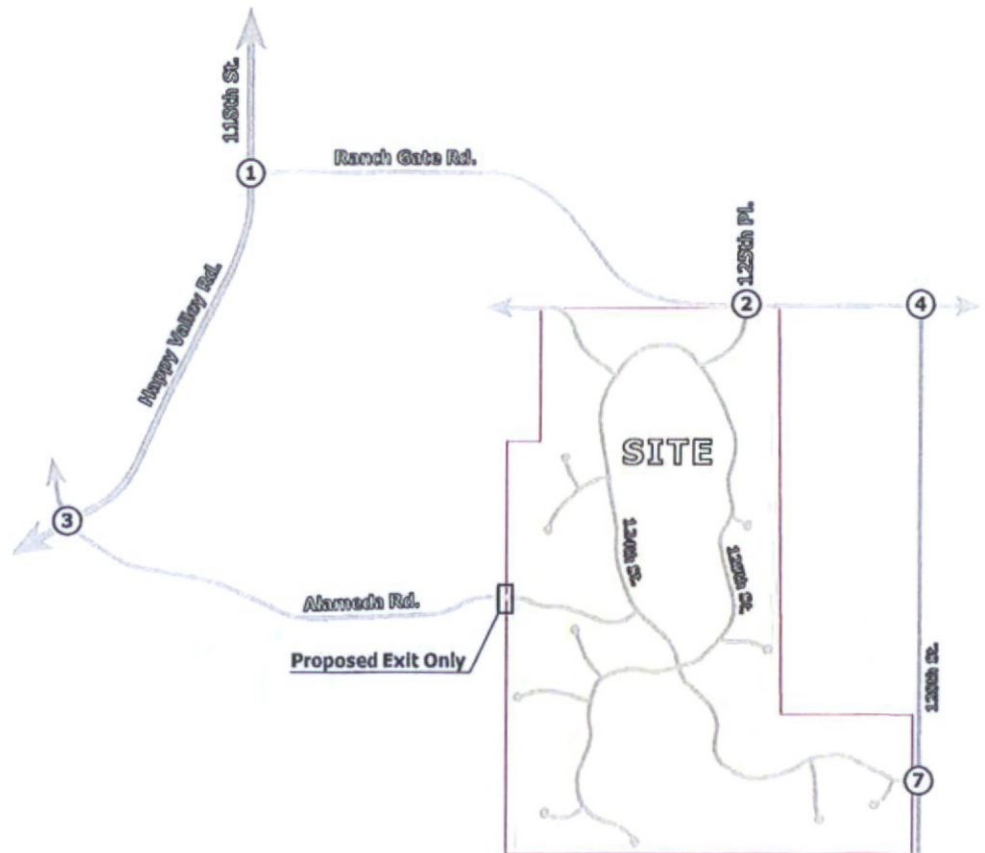
Happy Valley Rd. & Alameda Rd.



128th St. & Ranch Gate Rd.

**LEGEND**

- Thru or Turning Movement
- Traffic Signal
- Stop Sign



121st Pl. & Alameda Rd.

128th St. & Access A

Figure 9: Proposed Lane Configuration and Stop Control

**Figure 9 – Proposed Lane Configurations**



## QUEUING ANALYSIS

A queuing analysis for right and left turns was performed for intersection turn lanes adjacent to the development site, according to the methodology documented in AASHTO's *A Policy on Geometric Design of Highways and Streets*. The intersections were analyzed to determine the queue length requirement to accommodate the expected traffic volumes in the 2015 horizon year.

The formula used for the calculation is stated below and the resulting queue storage requirements for the 2015 horizon year are summarized in **Table 8**. The queue storage calculations can be found in **Appendix G**.

For unsignalized intersections, the storage length is determined by the following formula:

$$\text{Storage Length} = [(\text{veh/hr}) / (30 \text{ periods/hr})] \times 25 \text{ feet}$$

**Table 8 – 2015 Proposed Lane Queue Storage Length**

ID	Intersection	Intersection Control	Approach	Existing Storage	Calculated Storage	Recommended Storage <sup>1</sup>
1	118 <sup>th</sup> St. & Ranch Gate Rd.	1-Way Stop	WB Left NB Right	- -	75' 100'	75' <sup>(3)</sup> 100' <sup>(3)</sup>
2	125 <sup>th</sup> Pl. & Ranch Gate Rd.	2-Way Stop	EB Right	-	75'	75' <sup>(3)</sup>
3	Happy Valley Rd. & Alameda Rd.	2-Way Stop	SB Left WB Left NB Right	110' - 110'	25' 200' 75'	110' <sup>(2)</sup> 200' <sup>(3)</sup> 110' <sup>(2)</sup>
4	128 <sup>th</sup> St. & Ranch Gate Rd.	2-Way Stop	EB Right	-	75'	75' <sup>(3)</sup>

(1) A minimum of 75' of storage is recommended for all movements at unsignalized intersections and 150' of storage at signalized intersections.

(2) Existing turn lane length.

(3) Turn lane not required but information provided for planning purposes.

It is recommended that the existing dedicated right and left turn lanes remain unchanged. Level of service analysis at the intersections indicates that mitigation (addition of turn lanes) is not required to maintain acceptable operations. However, should right turn deceleration lanes or dedicated left turn lanes be desired, their queue storage requirements have been included in **Table 8**.

## SIGHT DISTANCE

Adequate sight distance must be provided at the intersections to allow safe turning movements into and out of the development. A sight triangle is the area encompassed by the line of sight from a stopped vehicle on the minor roadway to the approaching vehicle on the major roadway; there must be sufficient unobstructed sight distance along both approaches of a street or driveway intersection and across their included corners to allow operators of vehicles to see each other in time to prevent a collision. There must also be sufficient sight distance along the major street to allow a driver intending to turn left into the site to see an oncoming vehicle in the opposing direction.

Sight distance should be provided at the proposed access based on the standards provided in the *City of Scottsdale'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.

Figures depicting the method and sight distance requirements are provided in the City of Scottsdale's *Design Standards and Policies Manual, 2010 Update*. Copies of the applicable standards are provided in **Appendix H** for reference.



## CONCLUSIONS AND RECOMMENDATIONS

- ◆ 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 125<sup>th</sup> Place and 128<sup>th</sup> 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.

## **LIST OF REFERENCES**

- A Policy on Geometric Design of Highways and Streets*, American Association of State Highway and Transportation Officials, Washington, D.C., 2001.
- Design and Safety of Pedestrian Facilities*, Institute of Transportation Engineers, Washington, D.C., March 1998.
- Design Standards and Policies Manual, 2006 Update*, City of Scottsdale
- Highway Capacity Manual*. Transportation Research Board, National Research Council, Washington, D.C., 2000.
- Manual of Uniform Traffic Control Devices*. U.S. Department of Transportation, Federal Highways Administration, Washington, D.C., 2003.
- Street Classification Map, City of Scottsdale website, 2008.*
- Transportation and Land Development*, Stover, V. G. and Koepke, F. J., Institute of Transportation Engineers, Washington, D.C, 1988.
- Trip Generation 8<sup>th</sup> Edition*, Institute of Transportation Engineers, Washington, D.C, 2008.
- Design Standards & Policies Manual – Section 5: Transportation Impact Studies*, City of Scottsdale, Arizona, January 2010.



**TRAFFIC IMPACT ANALYSIS SUMMARY**  
**Sereno Canyon Spa & Resort**  
**Ranch Gate east of 128<sup>th</sup> Street**  
**10-GP-20011 & 16-ZN-2011**

**Summary Prepared by Phillip Kercher, COS Traffic Engineering**  
**Traffic Impact Study Prepared by Dawn Cartier, CivTech, Inc.**

**Existing Conditions:**

Site Location – Southwest of the Ranch Gate Road and 128<sup>th</sup> Street

Existing Development – Site is currently undeveloped; previously approved 128 dwelling unit residential subdivision on the site (1-ZN-2005).

Street Classifications –

- 128<sup>th</sup> Street is classified as a Minor Collector.
- Ranch Gate Road is classified as a Local Collector.
- Alameda Road is classified as a Local Collector.
- Happy Valley/118<sup>th</sup> Street is classified as a minor arterial from Pima Road to Whispering Wind Drive; at Whispering Wind Drive it transitions to a minor collector that extends north to Dynamite Boulevard.

Existing Street Conditions –

- The Happy Valley Road and Alameda Road intersection is stop controlled on ~~the~~ Alameda Road and 115<sup>th</sup> Street approaches. There are exclusive left turn lanes on the northbound and southbound approaches, and a northbound right turn lane.
- The 118<sup>th</sup> Street and Ranch Gate Road intersection is stop controlled on the Ranch Gate Road approach.
- The 128<sup>th</sup> Street and Ranch Gate Road intersection is not signed for stop control; both streets are unpaved at the intersection, although the City recently installed asphalt millings on 128<sup>th</sup> Street.
- Both Alameda Road and Ranch Gate Road are two-lane collector streets.
- 128<sup>th</sup> Street is not improved from Dynamite Boulevard to Ranch Gate Road; there are asphalt millings from Ranch Gate Road to the trailhead south of Pinnacle Peak Road in the Preserve.

Existing Volumes –

- There are 91 daily vehicles on Ranch Gate Road east of 118<sup>th</sup> Street.
- There are 1,261 daily vehicles on Alameda Road east of Happy Valley Road.
- There are approximately 3,000 daily vehicles on Happy Valley south of Alameda Road.

Existing Speed Limits –

- Happy Valley/118<sup>th</sup> Street has a 40 mph speed limit from Alma School Road to Whispering Wind Drive. North of Whispering Wind the speed limit is 35 mph.
- Alameda Road has a 30 mph speed limit from Happy Valley to 121<sup>st</sup> Place.
- All other streets in this vicinity of the site have a 25 mph speed limit.

Collision Information –

The intersection of Happy Valley Road and Alameda Road has had one reported collision from 2000 to 2010.

**Proposed Development:**

Description - The proposed development plan consists of a resort hotel with 100 rooms, 113 casitas, 52 resort villas, 115 resort townhomes, and 44 single family homes.



Site Access – The applicant is proposing to have main site access from Ranch Gate Road at the existing entrance along the 125<sup>th</sup> Place alignment. The resort hotel and associated villas access is proposed to be restricted to 128<sup>th</sup> Street. The existing access from Alameda Road is proposed to be gated to the public, for use by emergency vehicles only.

**TRIP GENERATION COMPARISON TABLE:**

	Daily Total	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Proposed - Resort Hotel	3,196	81	180	261	196	132	328
Previously Approved - Res. Subdivision 128 d.u.'s	1,226	24	62	96	82	48	130
Increase/Decrease	+1,970	+57	+118	165	+114	+84	+198

**Traffic Analysis:**

Intersection Level of Service – Using a 2015 horizon year with traffic generated by the build out of the proposed development, all of the study intersections in the vicinity of the site operate a level of service **C** or better for both peak hours.

Additional Traffic Volumes – With site access restricted to the Ranch Gate Road and 128<sup>th</sup> Street entrances and emergency only access on Alameda Road, all site generated traffic will be directed to Ranch Gate Road. Development of the site is estimated to increase daily traffic volumes along Ranch Gate Road by 3,196 vehicles. Ranch Gate Road has adequate capacity to handle this additional traffic.

**Additional Information:**

Character of Alameda Road – There are no direct residential driveways along Alameda Road. There is no sidewalk along either side of Alameda Road, which is consistent with the rural character of the streets in the area; there are graded shoulders along both sides of the street.

Use of Alameda Road - Residents who live in proximity of Alameda Road have requested that Sereno Canyon residents and resort guests not be allowed to use the public street for site access. There are no technical reasons to restrict this access.

**Summary:**

The approval of the zoning district change for the proposed resort hotel will result in an estimated 3,196 trips generated per day to and from the project site. The facility is estimated to generate 165 a.m. peak hour trips, and 198 p.m. peak hour trips. This represents an increase of 1,970 daily trips over the existing approved single family subdivision.

With the addition of the proposed site generated traffic, operations at the intersections in the vicinity of the site will continue to operate at acceptable levels (LOS C or better).

**Comments/Concerns:**

- Transportation staff recommends that access not be restricted at the existing Alameda Road entrance. There are no direct residential driveways along Alameda Road. The road had been classified and improved to the Rural Minor Collector street standard. Requiring resort traffic to only utilize the 128<sup>th</sup> Street entrance adds approximately 1.5 miles of extra travel to each trip.
- If the resort access is restricted to the 128<sup>th</sup> Street entrance, staff recommends that 128<sup>th</sup> Street be improved with asphalt concrete prior to allowing the resort hotel to open to the public.