3.9 - Transportation and Traffic

3.9.1 - Introduction

This section describes the existing transportation and traffic conditions and potential effects from project implementation on surrounding roads and intersections. Descriptions and analysis in this section are based on information contained in the Vista Verde Project Traffic Impact Analysis dated December 2010 by RBF Consulting, included in this EIR in Appendix G.

3.9.2 - Environmental Setting

This section describes the regional and local transportation and traffic setting.

Regional

A network of federal and State freeways, toll roads, and local jurisdictional major arterials provides vehicular transportation in the Southern California region. Freeways and toll roads in the general vicinity of the site include the San Diego Freeway (Interstate [I] 405) north of the project site and the Laguna Freeway (State Route [SR] 133) to the southeast of the site. Major arterials include University Drive, south of the project site, Yale Avenue west of the site and Michelson Drive directly north, fronting the site.

John Wayne Airport is located approximately 3.3 miles to the northwest of the project site. The Southern California Regional Rail Authority (Metrolink) commuter train operates the Orange County Line approximately 2.5 miles northeast of the site. The nearest Metrolink stations to the project site are the Tustin Metrolink Station located at 2975 Edinger Avenue in the City of Tustin, and the Irvine Metrolink Station at 15215 Barranca Parkway, both approximately 3 miles from the site.

Local

Traffic Characteristics

The project site is located south of Michelson Drive and North of University Drive in the City of Irvine. Regional access to the site is provided by the Interstate 405 (I-405) Freeway, which connects to University Drive, approximately half a mile northeast of the project site. Various roadways in the vicinity of the site provide local access as identified in Exhibit 3.9-1. The following roadways provide both local and regional service to the site:

Culver Drive in the study area is a six-lane divided roadway trending in a north-south direction. The posted speed limit on Culver Drive is 45 miles per hour. On-street parking is prohibited on Culver Drive in the study area. In the study area, Culver Drive is classified as a Major Highway in the City of Irvine Master Plan of Arterial Highways. Culver Drive contains a sidewalk on both sides of the roadway (approximately 5 feet in width), as well as a bike lane (approximately 7 feet in width) on both sides of the roadway.

Michelson Drive between Culver Driver and University Drive is a two-lane divided roadway trending in an east-west direction. Michelson Drive west of Culver Drive is a four-lane divided roadway. Michelson Drive east of University Drive changes name to Strawberry Farm Road and is a two-lane undivided roadway. The posted speed limit on Michelson Drive between Culver Drive and University Drive is 35 miles per hour. On-street parking is prohibited on Michelson Drive in the study area. Michelson Drive is classified as a Commuter Highway in the City of Irvine Master Plan of Arterial Highways. Michelson Drive contains a sidewalk on both sides of the roadway (approximately 5 feet in width), as well as a bike lane (approximately 7 feet in width) on both sides of the roadway.

Ridgeline Drive is a four-lane undivided roadway trending in a north-south direction. This roadway is a component for a key intersection related to the Project. The posted speed limit on Ridgeline Drive is 50 miles per hour. On-street parking is prohibited on Ridgeline Drive. According to City of Irvine Master Plan of Arterial Highways, Ridgeline Drive is classified as a Secondary Highway. North of University Drive, Ridgeline Drive changes name to Rosa Drew Lane. Ridgeline Drive contains a sidewalk on the east side of the roadway (approximately 5 feet in width), as well as a bike lane (approximately 7 feet in width) on both sides of the roadway.

Rosa Drew Lane is a two-lane undivided roadway trending in a north-south direction between University Drive and Michelson Drive. On-street parking is permitted on Rosa Drew Lane. North of Michelson Drive, Rosa Drew Lane changes name to Jordan Avenue, and south of University Drive, Rosa Drew Lane changes name to Ridgeline Drive. Rosa Drew Lane is a Local Street. Rosa Drew Lane contains a sidewalk on both sides of the roadway (approximately 5 to 10 feet in width) and does not have a striped bike lane on either side of the roadway.

Sandburg Way in the study area is a two-lane undivided roadway in a north-south direction. The posted speed limit on Sandburg Way is 25 miles per hour. On-street parking is permitted on Sandburg Way. Sandburg Way is a Local Street. Sandburg Way contains a sidewalk on both sides of the roadway (approximately 5 feet in width) and does not have a striped bike lane on either side of the roadway.

University Drive is a four- to six-lane divided roadway in an east-west direction. The posted speed limit on University Drive ranges between 50 and 55 miles per hour. On-street parking is prohibited on University Drive. According to City of Irvine Master Plan of Arterial Highways, University Drive is classified as a Primary Highway between Culver Drive and Michelson Drive and as Major Highway everywhere else in the study area. University Drive contains a sidewalk on the north side of the roadway (approximately 5 feet in width), as well as a bike lane (approximately 7 feet in width) on both sides of the roadway.

Exhibit 3.9-1: Study Intersection Locations

Yale Avenue is a two-lane undivided roadway in a north-south direction. On-street parking is prohibited on Yale Avenue. In the study area, Yale Avenue is classified as a Secondary Highway in the City of Irvine Master Plan of Arterial Highways. Yale Avenue contains a sidewalk on both sides of the roadway (approximately 5 to 10 feet in width), as well as a bike lane (approximately 7 feet in width) on both sides of the roadway. It should be noted, for existing and forecast year 2015 conditions, Yale Avenue is assumed to remain in its current condition where it terminates just north of Michelson Drive, allowing vehicular access to and from the Rancho San Joaquin Middle School and does not allow for vehicular access over the I-405 freeway; however, for forecast year 2030 conditions, Yale Avenue is assumed to allow vehicular traffic to and from the north over the I-405 freeway.

Methodology for Traffic Analysis

The ease with which intersections in the study area convey traffic largely controls the operation of the roadway system as a whole. Seven study intersections were evaluated based on their potential to be significantly affected by project traffic. These intersections are:

1) Culver Drive/Michelson Drive
2) Sandburg Way/Michelson Drive
3) Yale Avenue/Michelson Drive
4) Yale Avenue/University Drive
5) Rosa Drew Lane/Michelson Drive
6) Ridgeline Drive-Rosa Drew Lane/University Drive
7) Michelson Drive/University Drive

None of the seven study intersections is identified as priority intersections in the 2008 Citywide Circulation Phasing Analysis (RBF Consulting, 2010). This report is a development monitoring tool that identifies roadway and intersection deficiencies that will not meet the City's General Plan Level of Service (LOS) standards within the next five years. This document is important because it makes recommendations for improvements needed to maintain acceptable levels of mobility for those the roadways and intersections identified as having deficiencies.

Additionally, this analysis includes the following five roadway links for analysis:

1) University Drive between Rosa Drew Lane and Yale Avenue
2) University Drive between Rosa Drew Lane and Michelson Drive
3) Rosa Drew Lane between Michelson Drive and University Drive
4) Michelson Drive west of Rosa Drew Lane; and
5) Michelson Drive west of Yale Avenue

Refer to the Study Intersection Locations exhibit, which show the locations of study intersections and roadway links. The seven study intersections and five roadway links listed above were analyzed in

RBF Consulting's December 2010 Traffic Impact Analysis for the study scenarios listed below. Forecast traffic volumes are identified using the Irvine Transportation Analysis Model (ITAM).

- Existing conditions.
- Existing plus project conditions (including arterial peak hour link analysis).
- Year 2015 (interim) scenario (with and without project conditions and including arterial peak hour link analysis for University Drive): these scenarios include addition of trips forecast to be generated by approved projects identified by City of Irvine staff, as well as affects of background traffic growth.
- Post-2030 scenario (with and without project conditions and including arterial peak hour link analysis for University Drive): these scenarios include addition of trips forecast to be generated by cumulative projects as identified by City of Irvine staff.
- Post-2030 Pending (with and without project conditions) and including addition of trips forecast to be generated by cumulative projects as identified by City staff including those whose approvals are still pending. As detailed in the Traffic Impact Analysis, both the Post-2030 Pending with and without project conditions result in less than significant impacts. Refer to Section 4, Cumulative Impact Analysis, of this document for additional information. For reference, Appendix G of this document contains RBF's Traffic Impact Analysis.

Existing Conditions Peak Hour Intersection Level of Service (LOS)

Level of service (referred to as LOS) is a qualitative description of intersection operation. LOS is based on the capacity of the intersection and the volume of traffic using the intersection. The City of Irvine General Plan Circulation Element established that a Level of Service D or better shall be considered acceptable for roadway links and intersections. As detailed in the Traffic Impact Analysis: To determine the existing operation of the study intersections, two days of a.m. peak hour and p.m. peak hour intersection movement counts were collected, November 18, 2009 and November 19, 2009; a.m. peak period intersection counts were collected from 7:00 a.m. to 9:00 a.m. and p.m. peak period intersection counts were collected from 4:00 p.m. to 6:00 p.m. The highest hour within the peak period counted was identified for each day of counts, and then averaged to identify intersection peak hour movements and submitted to the City of Irvine. The City of Irvine incorporated the collected volumes into the existing ITAM model and produced revised existing volumes for use in the Traffic Impact Analysis; refer to Table 3.9-1. The table summarizes existing conditions a.m. and p.m. peak hour LOS of the study intersections based on ICU calculations provided by the City of Irvine and HCM calculations based on data supplied by the City of Irvine.

Table 3.9-1: Existing Conditions AM & PM Peak Hour LOS of Study Intersections

Study Intersection	AM Peak Hour	PM Peak Hour
	V/C - Delay - LOS	V/C - Delay - LOS
Culver Dr/Michelson Dr[1]	0.55 - N/A - A	0.77 - N/A - C
Sandburg Wy/Michelson Dr[2]	N/A - 10.4 - B	N/A - 15.3 - C
Yale Ave/Michelson Dr[2]	N/A - 10.6 - B	N/A - 12.5 - B
Yale Ave/University Dr[1]	0.72 - N/A - C	0.66 - N/A - B
Rosa Drew Ln/Michelson Dr[2]	N/A - 8.9 - A	N/A - 10.9 - B
Ridgeline Dr-Rosa Drew Ln/University Dr[1]	0.78 - N/A - C	**0.92 - N/A - E**
Michelson Dr/University Dr[1]	0.61 - N/A - B	0.90 - N/A - D

Notes:
V/C = volume to capacity ratio; delay shown in seconds per vehicle; deficient intersection operation shown in bold.
[1] Signalized intersection analyzed utilizing the ICU methodology.
[2] Unsignalized intersection analyzed utilizing the HCM methodology.
Source: RBF Consulting, December 2010.

As shown in the table above, according to City of Irvine performance criteria, the study intersections are currently operating at an acceptable LOS (LOS D or better) during the a.m. peak hour and p.m. peak hour with the exception of the Rosa Drew Lane/University Drive intersection during the p.m. peak hour.

Existing Conditions Roadway Segment Average Daily Traffic (ADT) Analysis

To determine the existing operation of the study roadway segments, two days of average daily traffic (ADT) volumes for the roadway circulation system were collected and submitted to the City of Irvine. ADT volumes were collected at respective roadway segments on November 18 and 19, 2009, September 23 and 24, 2009, and October 22 and 23, 2009. Table 3.9-2 below summarizes the study roadway segment average daily traffic (ADT) analysis for existing conditions near the project site.

Table 3.9-2: Existing Conditions Study Roadway Segment ADT Analysis

Study Roadway Segment	Capacity	ADT	V/C - LOS
University Dr from Rosa Drew Ln to Yale Ave	32,000	30,000	**0.94 - E**
University Dr from Rosa Drew Ln to Michelson Dr	32,000	41,400	**1.29 - F**
Rosa Drew Ln from Michelson Dr to University Dr	13,000	1,650	0.13 - A
Michelson Dr west of Rosa Drew Ln	18,000	5,500	0.31 - A
Michelson Dr west of Yale Ave	18,000	5,700	0.32 - B

Notes:
V/C = volume to capacity ratio; deficient operation shown in bold.
Source: RBF Consulting, December 2010.

As shown in the table above, according to City of Irvine performance criteria, the following study roadway segments are calculated as currently operating at a deficient LOS (LOS E or worse):

1) University Drive from Rosa Drew Lane to Yale Avenue
2) University Drive from Rosa Drew Lane to Michelson Drive

Existing roadway segment peak hour link analysis was preformed using peak hour volumes obtained from the City provided ITAM data. Table 3.9-3 below summarizes the existing roadway segment peak hour link analysis.

Table 3.9-3: University Drive Existing Roadway Segment Peak Hour Link Analysis

Study Roadway Segment	Number of Lanes	Capacity[1]	AM Peak Hour		PM Peak Hour	
			Volume	V/C - LOS	Volume	V/C - LOS
University Dr WO Yale Ave						
- Eastbound	2	3,200	1,082	0.34 - A	2,068	0.65 - B
- Westbound	2	3,200	1,978	0.62 - B	1,338	0.42 - A
University Dr EO Yale Ave						
- Eastbound	2	3,200	1,076	0.34 - A	2,042	0.64 - B
- Westbound	2	3,200	2,294	0.72 - C	1,690	0.53 - A
University Dr SO Michelson Dr						
- Eastbound	2	3,200	1,629	0.51 - A	2,423	0.76 - C
- Westbound	2	3,200	2,417	0.76 - C	1,925	0.60 - A
University Dr NO Michelson Dr						
- Eastbound	2	3,200	1,852	0.58 - A	2,795	0.87 - D
- Westbound	3	4,800	2,272	0.47 - A	1,670	0.35 - A

Notes:
V/C = volume to capacity ratio; NO = north of; SO = south of; WO = west of; EO = east of.
[1] Roadway capacity assumes 1,600 vehicles/hour/lane.
Source: RBF Consulting, December 2010.

As presented in the Traffic Impact Analysis, the table above shows that the University Drive study roadway segments are currently operating at an acceptable level of service (LOS D or better) during both the a.m. peak hour and p.m. peak hour, according to the City of Irvine performance criteria. While the University Drive roadway segment between Rosa Drew Lane and Michelson Drive is calculated as currently operating at a deficient level of service (LOS E or worse) over a 24-hour period, the associated University Drive roadway segment west of Michelson Drive is operating at an acceptable level of service (LOS D or better) during both the a.m. and p.m. peak hours, which are the key to overall roadway segment operation.

As detailed in the Traffic Impact Analysis for the project, the City of Irvine has established the following thresholds of significance to determine whether the addition of project-generated trips at a study intersection or roadway link results in a significant impact and thus requires mitigation.

1) If the roadway link or signalized intersection in question exceeds the acceptable LOS in the baseline condition and the impact of the development is greater than or equal to 0.02 rounded to the second decimal place, or for intersections projected to be deficient in the most recent Circulation Phasing Analysis Report, the project raises the V/C or ICU by 0.01 rounded to the third decimal place, causing it to become deficient, then project mitigation will be required back at a minimum, to baseline; and
2) The City of Irvine's Link Capacity Analysis guidelines require roadway segments theoretically impacted by the project on an ADT basis be further analyzed using peak hour data. If the roadway segment peak hour data meets the performance criteria then the roadway capacity is determined to satisfy City of Irvine Standards.

3.9.3 - Regulatory Setting

Federal

No federal regulations are associated with this topical environmental issue area.

State

The State Department of Transportation (Caltrans) established performance standards for all State highway facilities. If a State highway facility operates below the transition between LOS C and D, the Caltrans' thresholds is to maintain the lower level of service. Highway Capacity Manual (HCM) analysis for State facilities is not required in the Traffic Impact Analysis for the project for the intersections of I-405 ramps at Jeffrey Road/University Drive because the project is expected to contribute minimal number of trips to these facilities. As detailed in a letter from Caltrans District 12, the minimal trips generated from the project are not likely to result in significant traffic impacts at these locations. Caltrans requested Highway Capacity Manual (HCM) analysis for the intersections of I-405 ramps at Culver Drive. In a letter dated July 6, 2010, Caltrans determined that HCM analysis is no longer required for I-405 ramp intersections at Culver Drive because the project is not expected to have significant impacts at these intersections. Refer to the June 21, 2010 and July 6, 2010 letters from the California Department of Transportation, District 12 in Appendix A, comment letters, of this document for additional information.

Local

County of Orange

Congestion Management Program

The Orange County Congestion Management Program (CMP) administered by OCTA is a requirement of the Proposition 111 gas tax increase passed in 1990. The CMP requires that designated intersections throughout the county be maintained at a specified level of service. Guidelines with respect to CMP traffic studies require that the potential impacts at CMP intersections be analyzed for any significant land use proposals.

Growth Management Plan

The Orange County Measure M Growth Management Plan (GMP) was developed to assess and mitigate the impacts of local land use decisions on the county's transportation system. Central to the program is the requirement that each jurisdiction in the county adopt a Growth Management Element of its General Plan to be applied in the development review process in order to receive transportation revenues generated from the Measure M half-cent sales tax increase. The GMP includes specific guidelines for traffic impact studies, establishing LOS thresholds and requirements for mitigation. The information contained in this report satisfies the requirements of those guidelines.

City of Irvine

The traffic study for the project was developed based on the requirements of the City of Irvine (City) guidelines. The Traffic Impact Analysis utilized the Intersection Capacity Utilization (ICU) analysis method to determine the operating Level of Service of the signalized study intersections. The ICU analysis describes intersection operation using a range of LOS from LOS A (free-flow conditions) to LOS F (severely congested conditions), based on corresponding Volume/Capacity (V/C) ratios. Table 3.9-4 below shows the Level of Service for signalized study intersections using the Intersection Capacity Utilization (ICU) analysis method.

Table 3.9-4: Level of Service Descriptions- Signalized Intersections (ICU Analysis)

LOS	V/C Ratio
A	≤ 0.60
B	0.61 ≤ 0.70
C	0.71 ≤ 0.80
D	0.81 ≤ 0.90
E	0.91 ≤ 1.00
F	> 1.00
Source: RBF Consulting, December 2010.	

As requested by the City of Irvine, the Traffic Impact Analysis utilized the Highway Capacity Manual (HCM) intersection analysis methodology to analyze unsignalized intersection operation. The HCM analysis uses a range of LOS A (free-flow conditions) to LOS F (severely congested conditions), based on the corresponding stopped delay experienced by each vehicle for unsignalized intersections. Table 3.9-5 shows the Level of Service for unsignalized study intersections using the Highway Capacity Manual (HCM) intersection analysis method.

Table 3.9-5: Level of Service Descriptions- Unsignalized Intersections (HCM Analysis)

LOS	Delay (seconds/vehicle)
	Unsignalized Intersections
A	< 10.0
B	> 10.0 to ≤ 15.0
C	> 15.0 to ≤ 25.0
D	> 25.0 to ≤ 35.0
E	> 35.0 to ≤ 50.0
F	> 50.0
Source: RBF Consulting, December 2010.	

3.9.4 - Thresholds of Significance

The Initial Study, included as Appendix A, substantiates that impacts associated with the following thresholds would be less than significant. Would the project:

e) Result in inadequate emergency access?

f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

The Initial Study also found that there would be no impacts associated with the following threshold. Would the project:

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

According to the CEQA Guidelines' Appendix G Environmental Checklist, to determine whether impacts to transportation and traffic are significant environmental effects, the following remaining questions are analyzed in the impact analysis that follows. Would the project:

a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

3.9.5 - Project Impacts

This section discusses potential impacts associated with the development of the project.

Project Traffic Generation

Traffic forecasts contained in RBF's Traffic Impact Analysis have been prepared by the City of Irvine, utilizing Irvine's Transportation Analysis Model (ITAM) forecast traffic runs. The ITAM model was utilized to evaluate the study intersections and study roadway segments. As detailed in the Traffic Impact Analysis the table below shows the number of trips forecast to be generated by the project. The Institute of Transportation Engineers (ITE) trip generation rates for single family dwelling units was used to estimate the number of trips generated from the Project.

Table 3.9-6: Project ITE-Based Forecast Trip Generation

Land Use	AM Peak Hour Trips			PM Peak Hour Trips			Daily Trips
	In	Out	Total	In	Out	Total	
66 Detached Single-Family Dwelling Units	13	37	50	42	24	66	632
Source: RBF Consulting, December 2010.							

Table 3.9-6 above shows that based on ITE trip generation rates, the Project is forecast to generate 632 daily trips, which include 50 a.m. peak hour trips (13 inbound and 37 outbound) and 66 p.m. peak hour trips (42 inbound and 24 outbound).

Project Traffic Distribution

Traffic distribution determines the directional orientation of traffic based upon the location, intensity of use, accessibility of existing planned residential areas, employment centers, and other commercial activities. Forecast distribution of trips to be generated by the Project is based on select zone run model plots provided by the City of Irvine. Refer to Exhibits 8 and 9 in the Traffic Impact Analysis, which show the forecast inbound and outbound trip percent distribution for the Project.

Existing Plus Project Conditions

The existing plus project conditions table below summarizes existing plus project conditions a.m. and p.m. peak hour LOS of the study intersections based on ICU calculations provided by the City and HCM calculations based on data supplied by the City.

As shown in Table 3.9-7, with the addition of project-generated trips, all the study intersections are forecast to operate at an acceptable LOS (LOS D or better) according to City of Irvine performance

criteria with the exception of the Rosa Drew Lane/University Drive intersection during the a.m. peak hour only for existing plus project conditions.

The addition of project-generated trips is forecast to not result in a change in the level of service at any of the study intersections, and based on City-established thresholds of significance, the addition of project-generated trips is forecast to result in no significant impacts at the study intersections for existing plus project conditions since the LOS at the Rosa Drew Lane/University Drive intersection does not change with implementation of the project.

Table 3.9-7: Existing and Existing Plus Project Conditions AM & PM Peak Hour LOS of Study Intersections

Study Intersection	Existing Conditions		Existing Plus Project Conditions					
	AM Peak Hour	PM Peak Hour	AM Peak Hour			PM Peak Hour		
	V/C - Delay - LOS	V/C - Delay - LOS	V/C - Delay - LOS	Change in V/C or Delay	Significant Impact?	V/C - Delay - LOS	Change in V/C or Delay	Significant Impact?
Culver Dr/Michelson Dr[1]	0.55 - N/A - A	0.77 - N/A - C	0.56 - N/A - A	0.01	No	0.77 - N/A - C	0.00	No
Sandburg Wy/Michelson Dr[2]	N/A - 10.4 - B	N/A - 15.3 - C	N/A - 10.5 - B	0.10	No	N/A - 15.6 - C	0.30	No
Yale Ave/Michelson Dr[2]	N/A - 10.6 - B	N/A - 12.5 - B	N/A - 10.9 - B	0.30	No	N/A - 12.7 - B	0.20	No
Yale Ave/University Dr[1]	0.72 - N/A - C	0.66 - N/A - B	0.73 - N/A - C	0.01	No	0.66 - N/A - B	0.00	No
Rosa Drew Ln/Michelson Dr[2]	N/A - 8.9 - A	N/A - 10.9 - B	N/A - 9.0 - A	0.10	No	N/A - 11.1 - B	0.20	No
Ridgeline Dr-Rosa Drew Ln /University Dr[1]	0.78 - N/A - C	**0.92 - N/A - E**	0.78 - N/A - C	0.00	No	**0.92 - N/A - E**	0.00	No
Michelson Dr/University Dr[1]	0.61 - N/A - B	0.90 - N/A - D	0.61 - N/A - B	0.00	No	0.90 - N/A - D	0.00	No

Notes:
V/C = volume to capacity ratio; delay shown in seconds per vehicle.
Change in V/C or Delay = change in V/C ratio or delay in seconds.
N/A = not applicable; deficient intersection operation shown in **bold**.
[1] Signalized intersection analyzed utilizing the ICU methodology.
[2] Unsignalized intersection analyzed utilizing the HCM methodology.
Source: RBF Consulting, December 2010.

Circulation System

Impact TRAN-1	**Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?**

Impact Analysis

The project proposes to construct residential units on a former school site, which would cause an increase in traffic on area roadways. In order to determine whether significant impacts would result from the addition of project traffic onto local roadways, several scenarios were analyzed. As detailed in the methodology section, the Traffic Impact Analysis analyzed the following scenarios:

- Existing conditions
- Existing plus project conditions (including arterial peak hour link analysis)
- Year 2015 (interim) scenario (with and without project conditions and including arterial peak hour link analysis for University Drive): these scenarios include addition of trips forecast to be generated by approved projects identified by City of Irvine staff, as well as affects of background traffic growth.
- Post-2030 scenario (with and without project conditions and including arterial peak hour link analysis for University Drive): these scenarios include addition of trips forecast to be generated by cumulative projects as identified by City of Irvine staff.
- Post-2030 Pending (with and without project conditions) and including addition of trips forecast to be generated by cumulative projects as identified by City staff including those whose approvals are still pending. As detailed in the Traffic Impact Analysis, both the Post-2030 Pending with and without project conditions result in less than significant impacts. Refer to Section 4, Cumulative Impact Analysis, of this document for additional information. For reference, Appendix G of this document contains RBF's Traffic Impact Analysis.

For the purposes of analyzing Project impacts, the Post-2030 scenarios are discussed below because they have the potential to have the greatest impacts on traffic because they include the addition of trips forecast to be generated by cumulative projects. As stated in the Traffic Impact Analysis for the Project, the post-2030 condition is considered the worst-case scenario analyzed in the report. For both the "with project" and "without project" scenarios, traffic was analyzed in terms of : 1) AM & PM Peak Hour LOS of study intersections and 2) study roadway segment ADT analysis and 3) arterial peak hour link analysis along University Drive.

To determine the impacts of the Project, the analysis in the project's traffic impact report examined post-2030 without project conditions prior to post-2030 pending with project conditions. Both of these conditions are discussed in more detail below.

Post-2030 Without Project Conditions AM & PM Peak Hour LOS

Table 3.9-8 below summarizes post-2030 without project conditions a.m. and p.m. peak hour LOS of the study intersections based on ICU calculations provided by the City and HCM calculations based on data supplied by the City.

Table 3.9-8: Post-2030 Without Project Conditions AM & PM Peak Hour LOS of Study Intersections

Study Intersection	AM Peak Hour	PM Peak Hour
	V/C - Delay - LOS	V/C - Delay - LOS
Culver Dr/Michelson Dr[1]	0.60 - N/A - A	0.85 - N/A - D
Sandburg Wy/Michelson Dr[2]	N/A - 13.1 - B	**N/A - 35.8 - E**
Yale Ave/Michelson Dr[2]	N/A - 22.7 - C	N/A - 32.4 - D
Yale Ave/University Dr[1]	0.76 - N/A - C	0.67 - N/A - B
Rosa Drew Ln/Michelson Dr[2]	N/A - 14.3 - B	N/A - 20.4 - C
Ridgeline Dr-Rosa Drew Ln /University Dr[1]	0.78 - N/A - C	0.87 - N/A - D
Michelson Dr/University Dr[1]	0.78 - N/A - C	0.90 - N/A - D

Notes:
V/C = volume to capacity ratio; delay shown in seconds per vehicle; deficient intersection operation shown in bold.
[1] Signalized intersection analyzed utilizing the ICU methodology.
[2] Unsignalized intersection analyzed utilizing the HCM methodology.
Source: RBF Consulting, December 2010.

As shown in Table 3.9-8, the study intersections are forecast to operate at an acceptable LOS (LOS D or better) according to City of Irvine performance criteria for post-2030 without project conditions with the exception of the Sandburg Way/Michelson Drive intersection during the p.m. peak hour.

In addition to the study intersection analysis, a post-2030 without project conditions roadway segment ADT analysis was conducted. As detailed in the Traffic Impact Analysis, the study roadway segments are forecast to operate at an acceptable LOS (LOS D or better) for post-2030 without project conditions with the exception of University Drive from Rosa Drew lane to Michelson Drive (LOS F).

Post-2030 Without Project Conditions Arterial Peak Hour Link Analysis

Post-2030 without project conditions roadway segment peak hour link analysis has been performed using peak hour volumes obtained from City provided ITAM data. Table 3.9-9 below summarizes post-2030 without project conditions roadway segment peak hour link analysis.

Table 3.9-9: University Drive Post-2030 Roadway Segment Peak Hour Link Analysis

Study Roadway Segment	Number of Lanes	Capacity[1]	AM Peak Hour		PM Peak Hour	
			Volume	V/C - LOS	Volume	V/C - LOS
University Dr WO Yale Ave						
- Eastbound	2	3,200	1,462	0.46 - A	2,192	0.69 - B
- Westbound	3	4,800	2,464	0.51 - A	1,841	0.38 - A
University Dr EO Yale Ave						
- Eastbound	2	3,200	1,463	0.46 - A	2,065	0.65 - B
- Westbound	3	4,800	2,807	0.58 - A	2,095	0.44 - A
University Dr SO Michelson Dr						
- Eastbound	2	3,200	1,941	0.61 - A	2,340	0.73 - C
- Westbound	2	3,200	2,609	0.82 - D	2,296	0.72 - C
University Dr NO Michelson Dr						
- Eastbound	3	4,800	2,450	0.51 - A	2,801	0.58 - A
- Westbound	3	4,800	2,300	0.48 - A	1,900	0.40 - A

Notes:
V/C = volume to capacity ratio NO = north of SO = south of WO = west of EO = east of
[1] = Roadway capacity assumes 1,600 vehicles/hour/lane.
Source: RBF Consulting, December 2010.

As shown in Table 3.9-9, the University Drive study roadway segments are forecast to operate at an acceptable LOS (LOS D or better) during both the a.m. peak hour and p.m. peak hour according to City of Irvine performance criteria for post-2030 without project conditions.

While the University Drive roadway segment between Rosa Drew Lane and Michelson Drive is calculated and forecast to operate at a deficient LOS (LOS E or worse) over a 24-hour period for post-2030 without project conditions, the associated University Drive roadway segment west of Michelson Drive is forecast to operate at an acceptable LOS (LOS D or better) during both the a.m. peak hour and p.m. peak hour for post-2030 without project conditions, which are the key to overall roadway segment operation.

Post-2030 With Project Conditions AM & PM Peak Hour LOS

Table 3.9-10 summarizes post-2030 with project conditions a.m. and p.m. peak hour LOS of the study intersections based on ICU calculations provided by the City and HCM calculations based on data supplied by the City of Irvine.

Table 3.9-10: Post-2030 Without Project Conditions and Post-2030 With Project Conditions AM & PM Peak Hour LOS of Study Intersections

Study Intersection	Post-2030 Without Project Conditions		Post-2030 With Project Conditions					
	AM Peak Hour	PM Peak Hour	AM Peak Hour			PM Peak Hour		
	V/C - Delay - LOS	V/C - Delay - LOS	V/C - Delay - LOS	Change in V/C or Delay	Significant Impact?	V/C - Delay - LOS	Change in V/C or Delay	Significant Impact?
Culver Dr/Michelson Dr[1]	0.60 - N/A - A	0.85 - N/A - D	0.60 - N/A - A	0.00	No	0.85 - N/A - D	0.00	No
Sandburg Wy/Michelson Dr[2]	N/A - 13.1 - B	**N/A - 35.8 - E**	N/A - 13.3 - B	0.20	No	**N/A - 35.8 - E**	0.00	No
Yale Ave/Michelson Dr[2]	N/A - 22.7 - C	N/A - 32.4 - D	N/A - 23.2 - C	0.50	No	N/A - 34.2 - D	1.80	No
Yale Ave/University Dr[1]	0.76 - N/A - C	0.67 - N/A - B	0.76 - N/A - C	0.00	No	0.67 - N/A - B	0.00	No
Rosa Drew Ln/Michelson Dr[2]	N/A - 14.3 - B	N/A - 20.4 - C	N/A - 14.6 - B	0.30	No	N/A - 20.7 - C	0.30	No
Ridgeline Dr-Rosa Drew Ln /University Dr[1]	0.78 - N/A - C	0.87 - N/A - D	0.80 - N/A - C	0.02	No	0.87 - N/A - D	0.00	No
Michelson Dr/University Dr[1]	0.78 - N/A - C	0.90 - N/A - D	0.78 - N/A - C	0.00	No	0.90 - N/A - D	0.00	No

Notes:
V/C = volume to capacity ratio; delay shown in seconds per vehicle; Change in V/C or Delay = change in V/C ratio or delay in seconds; deficient intersection operation shown in bold; N/A = not applicable.
[1] Signalized intersection analyzed utilizing the ICU methodology.
[2] Unsignalized intersection analyzed utilizing the HCM methodology.
Source: RBF Consulting, December 2010.

As shown in Table 3.9-10, with the addition of project-generated trips, the study intersections are forecast to continue to operate at an acceptable LOS (LOS D or better) during the a.m. peak hour and p.m. peak hour according to City of Irvine performance criteria for post-2030 with project conditions with the exception of the Sandburg Way/Michelson Drive intersection during the p.m. peak hour.

Table 3.9-10 also shows that the addition of project-generated trips is forecast to not result in a change in the level of service at any of the study intersections, and based on City-established thresholds of significance, the addition of project-generated trips is forecast to result in no significant impacts at the study intersections for post-2030 with project conditions since the LOS at the Rosa Drew Lane/University Drive intersection does not change with implementation of the project.

In addition to the above described analysis, Post-2030 with project conditions roadway segment ADT analysis has been performed using ADT volumes provided by the City. As detailed in the Traffic Impact Analysis, with the addition of project-generated trips, the study roadway segments are forecast to continue to operate at an acceptable LOS (LOS D or better) for post-2030 with project conditions with the exception of University Drive from Rosa Drew Land to Michelson Drive. The addition of project-generated trips is forecast to not result in a change in the level of service at any of the study roadway segments, and based on City-established thresholds of significance, the addition of project-generated trips is forecast to result in no significant impact at the study roadway segments for post-2030 with project conditions.

Post-2030 With Project Conditions Arterial Peak Hour Link Analysis

Post-2030 with project conditions roadway segment peak hour link analysis has been performed using peak hour volumes obtained from City provided ITAM data. Post-2030 with project conditions roadway segment peak hour link analysis volumes are derived by adding trips associated with the project to year post-2030 without project conditions. Table 3.9-11 below summarizes post-2030 with project conditions roadway segment peak hour link analysis.

Table 3.9-11: University Drive Post-2030 Without Project Conditions and Post-2030 With Project Conditions Roadway Segment Peak Hour Link Analysis

Study Roadway Segment	Number of Lanes/ Capacity[1]	Post-2030 Conditions				Post-2030 With Project Conditions							
		AM Peak Hour		PM Peak Hour		AM Peak Hour				PM Peak Hour			
		Vol.	V/C - LOS	Vol.	V/C - LOS	Vol.	V/C - LOS	Change in V/C	Significant Impact?	Vol.	V/C - LOS	Change in V/C	Significant Impact?
University Dr WO Yale Ave													
- Eastbound	2/3,200	1,462	0.46 - A	2,192	0.69 - B	1,450	0.45 - A	-0.01	No	2,189	0.68 - B	-0.01	No
- Westbound	3/4,800	2,464	0.51 - A	1,841	0.38 - A	2,496	0.52 - A	0.01	No	1,845	0.38 - A	0.00	No
University Dr EO Yale Ave													
- Eastbound	2/3,200	1,463	0.46 - A	2,065	0.65 - B	1,450	0.45 - A	-0.01	No	2,060	0.64 - B	-0.01	No
- Westbound	3/4,800	2,807	0.58 - A	2,095	0.44 - A	2,840	0.59 - A	0.01	No	2,104	0.44 - A	0.00	No
University Dr SO Michelson Dr													
- Eastbound	2/3,200	1,941	0.61 - A	2,340	0.73 - C	1,930	0.60 - A	-0.01	No	2,346	0.73 - C	0.00	No
- Westbound	2/3,200	2,609	0.82 - D	2,296	0.72 - C	2,629	0.82 - D	0.00	No	2,315	0.72 - C	0.00	No
University Dr NO Michelson Dr													
- Eastbound	3/4,800	2,450	0.51 - A	2,801	0.58 - A	2,450	0.51 - A	0.00	No	2,810	0.59 - A	0.01	No
- Westbound	3/4,800	2,300	0.48 - A	1,900	0.40 - A	2,320	0.48 - A	0.00	No	1,909	0.40 - A	0.00	No

Notes:
[1] Roadway capacity assumes 1,600 vehicles/hour/lane.
V/C = volume to capacity ratio NO = north of SO = south of WO = west of EO = east of
Source: RBF Consulting, December 2010.

As shown in Table 3.9-11 on the previous page, with the addition of project-generated trips, the University Drive study roadway segments are forecast to operate at an acceptable LOS (LOS D or better) during both the a.m. peak hour and p.m. peak hour according to City of Irvine performance criteria for year 2015 (interim) with project conditions.

While the University Drive roadway segment between Rosa Drew Lane and Michelson Drive is calculated as forecast to operate at a deficient LOS (LOS E or worse) over a 24-hour period for post-2030 with project conditions, the associated University Drive roadway segment west of Michelson Drive is operating at an acceptable LOS (LOS D or better) during both the a.m. and p.m. peak hours, which are the key to overall roadway segment operation.

The addition of project-generated trips is forecast to not result in a change in the level of service at any of the study roadway segments, and based on City-established thresholds of significance, the addition of project-generated trips is forecast to result in no significant impact at the study roadway segments during both the a.m. peak hour and p.m. peak hour for post-2030 with project conditions.

Post-2030 With Project Conditions Signal Warrant Analysis

A Manual on Uniform Traffic Control Devices (MUTCD) was used to prepare a signal warrant analysis to determine if signalization is projected to be warranted at the Sandburg Way/Michelson Drive study intersection for the following the signal warrants: Minimum Vehicular Traffic Warrant, Interruption of Continuous Traffic Warrant and Combinations Warrant. As detailed in the Project's Traffic Impact Analysis, the traffic signal warrants are not satisfied at the Sandburg Way/Michelson Drive intersection for post-2030 with project conditions.

Pedestrian Circulation

Internal project sidewalks will link to the existing peripheral pedestrian circulation network at the project access point on Michelson. Pedestrian movement will be facilitated along the project frontage on Michelson Drive with the proposed removal of the existing school site driveways, thereby reducing the number of locations where potential conflicts between pedestrians and vehicles entering/exiting the project site can occur.

Sidewalks currently exist along Rosa Drew Lane and Michelson Drive along the project frontage, as well as at adjacent properties. Therefore, since a connective sidewalk system already exists on Rosa Drew Lane and Michelson Drive, the pedestrian facilities will be maintained upon completion of the Project and as such, consistency with Circulation Objective B-3 will be maintained. Additionally, sidewalk widths adjacent the project frontage will be constructed in accordance with City of Irvine standards.

Bicycle Circulation

The project site will be linked with existing bicycle circulation at the project access point. Bicycling will be facilitated along the project frontage on Michelson Drive with the removal of the existing

school site driveways, thereby reducing the number of locations where potential conflicts between bicyclists and vehicles entering/exiting the project site can occur. A Class II (on-street) bicycle trail exists on Michelson Drive. The Project will not change the City of Irvine General Plan Circulation Element Trails Network. Since a connective bicycle circulation system already exists on Michelson Drive and the bicycle facilities will be maintained upon completion of the project, consistency with General Plan Circulation Element Objective B-4 will be maintained. Additionally, bicycle facilities (i.e. bicycle trail) adjacent to the project frontage will be constructed in accordance with City of Irvine standards.

Summary

Based on City-established thresholds of significance, the addition of project-generated trips is forecast to result in no significant impacts at the study intersections or roadways for any of the analysis scenarios; hence, no mitigation measures are required for the Project since the LOS for any intersection operating at a deficient LOS (LOS E or worse) does not change with implementation of the Project. Thus, the Project will have a less than significant impact on transportation and circulation and no significant impacts will occur.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Less than significant.

Congestion Management Program Conflict

Impact TRAN-2	**Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?**

Impact Analysis

The Orange County Transportation Authority (OCTA) is the County's Congestion Management Agency (OCTA 2009). The OCTA is responsible for developing the Orange County Congestion Management Program (CMP). As detailed in the Project's Traffic Impact Analysis, the purpose of the CMP is to develop a coordinated approach to managing and decreasing traffic congestion by linking the various transportation, land use and air quality planning program throughout Orange County. The Orange County CMP states that if a project generating 1,600 or more trips/day will directly access, or is in close proximity to, a CMP Highway System link, a CMP traffic impact analysis is required. The Project is forecast to generate 632 trips per day; therefore, no CMP traffic impact analysis is required for the Project.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Less than significant.

Design Features/Uses

Impact TRAN-3	**Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?**

Impact Analysis

The Project would construct 66 detached single family dwelling units on the former Vista Verde Elementary school site. The development of single family homes is compatible with the land use of the surrounding community, which is predominantly comprised of residential dwelling units. Site access at the project site will be provided via a single stop-controlled full-access location at Michelson Drive consisting of one inbound lane and one outbound stop-controlled, shared left-turn/right-turn lane. Since only one access location at the project site is planned, the number of existing access locations at the project site will be reduced by one location. Existing roadway striping of the westbound left-turn lane pocket on Michelson Drive at the project access location is planned to be shifted slightly easterly to line up with the single project access location. Motorists turning left into the project site will yield to oncoming traffic on Michelson Drive, which is posted with a speed limit of 35 miles per hour. Motorists exiting the project site will be stop-controlled; motorists on Michelson Drive will continue to be uncontrolled. The access at Michelson will be required to conform to City sight distance standards, and no design features or line of sight issues that would create a hazard would occur. The Project will conform to the City of Irvine Transportation Design Procedures, which assist with both the review and design of transportation-related features of development projects in the City (Transportation Design Features, 2007) and in doing so will not substantially increase hazards due to a design feature or incompatible uses. Thus, the Project will not create a hazard due to its proposed design.

Additionally Project plans have been reviewed to ensure conformity and consistency with all applicable City design and development standards set in the City's General Plan, Zoning Ordinance, Subdivision Ordinance, and other transportation policy documents (City of Irvine, 2010). Thus, no mitigation is needed.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Less than significant.