

Traffic Impact Study Report

2550 Camino Tassajara Residential Development

Town of Danville, California

December 14, 2018



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EXECUTIVE SUMMARY

This report summarizes the results of the Traffic Impact Study (TIS) conducted for the proposed 18-unit residential development to be located at 2550 Camino Tassajara in Danville, California. In conjunction with the proposed project, the Town of Danville would close the existing connection between Fairwood Court and Camino Tassajara, such that existing homes would be accessed via the proposed extension of Fieldstone Drive to Sherburne Hills Road.

This analysis evaluated intersection level of service, as well as evaluations of project site access, on-site circulation, and parking.

To evaluate the impacts on the transportation infrastructure due to the addition of traffic from the proposed project, five study intersections were evaluated during the weekday a.m. peak hour, afternoon school peak hour, and p.m. peak hour, under three study scenarios. The study intersections were evaluated under Existing, Existing plus Project, Cumulative, and Cumulative plus Project scenarios. For the purposes of this analysis, potential traffic operational effects from the proposed project are identified based on established traffic operational thresholds of the Town of Danville.

Project Trip Generation

The proposed residential development is expected to generate 224 daily trips, including 28 a.m. peak hour trips (eight in, 20 out), 26 school peak hour (16 in, ten out), and 20 p.m. peak hour trips (12 in, eight out).

Existing Conditions

Under this scenario, all study intersections operate at acceptable LOS C or better during all peak periods.

Existing plus Project Conditions

Under this scenario, all intersections would continue to operate at acceptable LOS C or better during all peak periods. The project is expected to produce **a less-than-significant impact** at all study intersections under Existing plus Project Conditions.

Cumulative Conditions

Under this scenario, all intersections would continue to operate at acceptable LOS D or better during all peak periods.

Cumulative plus Project Conditions

Under this scenario, all intersections would continue to operate at acceptable LOS D or better during all peak periods. The project is expected to produce **a less-than-significant impact** at all study intersections under Cumulative plus Project Conditions.

Site Access, Circulation, and Parking

The project site would be accessed via two connections to existing roadways at Sherburne Drive and a private alley on Camino Tassajara. The extension of Fieldstone Drive and all internal alleys would be 30 feet wide. Together these would provide **adequate** access and circulation for vehicles, emergency vehicles, and garbage trucks. Each single family home would provide the required two parking spaces in

enclosed garages, and the site plan shows a total of 37 on-street parking spaces. The project is expected to produce a **less than significant impact** either on-site or on public streets. Closure of Fairwood Court and/or the access easement on the east side of the project site would produce virtually no operational changes at study intersections and would conform to General Plan goals.

1.0 INTRODUCTION

This report summarizes the results of the Traffic Impact Study (TIS) conducted for the proposed residential development to be located at 2550 Camino Tassajara in Danville, California. The purpose of this study is to evaluate the potential traffic impacts resulting from the development of the proposed project on the surrounding transportation system. The proposed project would subdivide an existing parcel and construct eighteen single family homes, on a site that is currently occupied by a nursery. In conjunction with the proposed project, the Town of Danville would close the existing connection between Fairwood Court and Camino Tassajara, such that existing homes would be accessed via the proposed extension of Fieldstone Drive to Sherburne Hills Road.

This chapter discusses the TIS purpose, project study area, analysis scenarios and levels of service methodology, and criteria used to identify significant impacts.

1.1 STUDY INTERSECTIONS AND SCENARIOS

TJKM evaluated traffic conditions at five study intersections during three peak periods: a.m., school, and p.m. peak periods. A list of intersections to be studied was provided by Town of Danville staff. The 7:00-9:00 a.m. peak period corresponds with peak morning commute and school drop-off traffic. The 2:00-4:00 p.m. school peak period corresponds with the period when most children are picked up from schools. The 4:00-6:00 p.m. peak period corresponds with peak afternoon commute traffic. The highest single one-hour periods recorded for each peak period are used in the analysis. The study intersections and associated traffic controls are as follows:

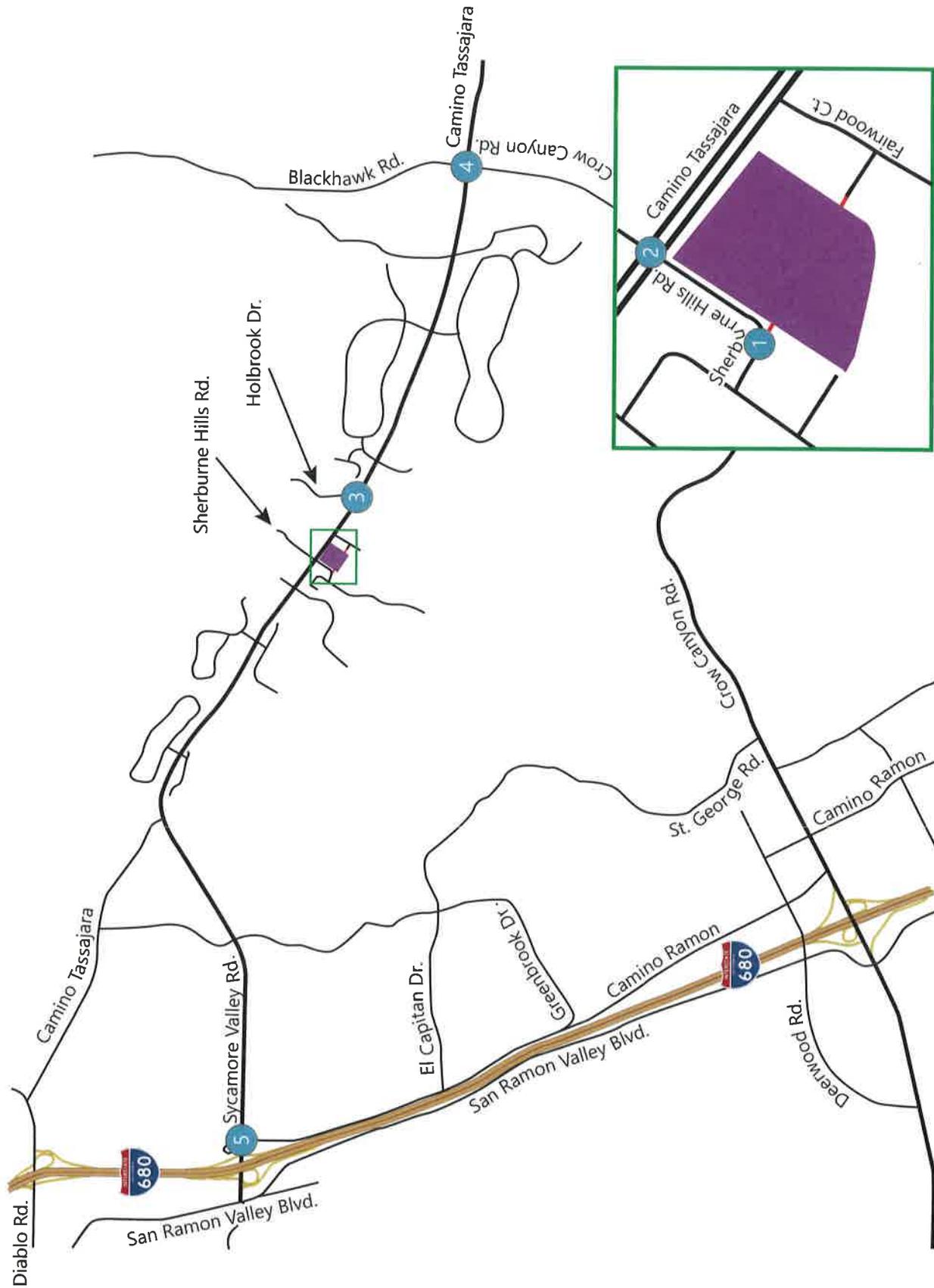
1. Project Entrance & Sherburne Hills Road (unsignalized)
2. Camino Tassajara & Sherburne Hills Road (signal)
3. Camino Tassajara & Holbrook Drive (signal) – entrance to Sycamore Valley Elementary School
4. Camino Tassajara & Crow Canyon Road (signal)
5. Sycamore Valley Road & Camino Ramon (signal)

Figure 1 illustrates the study intersections, and the vicinity map of the proposed project. **Figure 2** shows the proposed project site plan dated December 2018.

This study addresses the following four traffic scenarios:

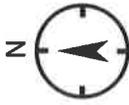
1. **Existing Conditions** – This scenario evaluates all the study locations based on existing traffic volumes, lane geometry and traffic controls.
2. **Existing plus Project Conditions** – This scenario is similar to Existing Conditions, but with the addition of traffic from the proposed project and the reassignment of traffic from existing homes on Fairwood Court.
3. **Cumulative Conditions** – This scenario evaluates projected traffic in the project vicinity in the year 2035, based on an annual growth rate of 0.42 percent applied to Existing Conditions.
4. **Cumulative plus Project Conditions** – This scenario is identical to Cumulative Conditions, but with the addition of traffic from the proposed project and the reassignment of traffic from existing homes on Fairwood Court.

Vicinity Map



LEGEND

- Project Site
- X Study Intersections



Site Plan



2.0 STUDY METHODOLOGY

This section describes the methods used to determine the traffic conditions for each scenario described above. It includes descriptions of the data requirements, the analysis methodologies, and the applicable level of service standards.

2.1 LEVEL OF SERVICE ANALYSIS METHODOLOGY

Level of Service (LOS) is a qualitative measure that describes operational conditions as they relate to the traffic stream and perceptions by motorists and passengers. The LOS generally describes these conditions in terms of such factors as speed, travel time, delays, freedom to maneuver, traffic interruptions, comfort, convenience, and safety. The operational LOS are given letter designations from A to F, with A representing the best operating conditions (free-flow with minimal delays) and F the worst (severely congested flow with high delays). Intersections generally are the capacity-controlling locations with respect to traffic operations on arterial and collector streets in urban areas.

Signalized Intersections

The study intersections under traffic signal control were analyzed using the 2000 Highway Capacity Manual (HCM) Operations Methodology for signalized intersections described in Chapter 16 (HCM 2000). TJKM utilized HCM 2000 methodology as the newer HCM 2010 and HCM 6th edition are unable to evaluate level of service for certain lane geometries and signal phasing. This methodology determines LOS based on average control delay per vehicle for the overall intersection during peak hour intersection operating conditions. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The average control delay for signalized intersections was calculated using Synchro 10 analysis software and was correlated to a LOS designation as shown in **Table 1**.

Table 1: Signalized Intersection Delay and LOS Definitions

Level of Service	Description	Average Control Delay
A	Signal progression is extremely favorable. Most vehicles arrive during the green phase and do not stop at all. Short cycle lengths may also contribute to the very low vehicle delay.	10.0 or less
B	Operations characterized by good signal progression and/or short cycle lengths. More vehicles stop than with LOS A, causing higher levels of average vehicle delay.	10.1 to 20.0
C	Higher delays may result from fair signal progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, though may still pass through the intersection without stopping.	20.1 to 35.0
D	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable signal progression, long cycle lengths, or high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 55.0
E	This is considered to be the limit of acceptable delay. These high delay values generally indicate poor signal progression, long cycle lengths, and high volume-to-capacity (V/C) ratios. Individual cycle failures occur frequently.	55.1 to 80.0
F	This level of delay is considered unacceptable by most drivers. This condition often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection. Poor progression and long cycle lengths may also be major-contributing causes of such delay levels.	greater than 80.0

Source: Highway Capacity Manual 2000
Average Control Delay per vehicle in seconds

Unsignalized Intersections

The study intersections were analyzed using the 2000 HCM Operations Methodology for signalized intersections described in Chapter 17 (HCM 2000). LOS ratings for stop-sign controlled intersections are based on the average control delay expressed in seconds per vehicle. The LOS methodology is approved and adopted by the Town of Danville. At side street and two-way stop controlled intersections, the control delay is calculated for each movement, not for the intersection as a whole. For approaches composed of a single lane, the control delay is computed as the average of all movements in that lane. The weighted average delay for the entire intersection is presented for all-way stop controlled intersections. **Table 2** summarizes the relationship between delay and LOS for unsignalized intersections. The delay ranges for unsignalized intersections are lower than for signalized intersections as drivers expect less delay at unsignalized intersections.

Table 2: Level of Service Definitions for Stop-Controlled Intersections

Level of Service	Description
A	Very low control delay less than 10 seconds per vehicle for each movement subject to delay.
B	Low control delay greater than 10 and up to 15 seconds per vehicle for each movement subject to delay.
C	Acceptable control delay greater than 15 and up to 25 seconds per vehicle for each movement subject to delay.
D	Tolerable control delay greater than 25 and up to 35 seconds per vehicle for each movement subject to delay.
E	Limit of tolerable control delay greater than 35 and up to 50 seconds per vehicle for each movement subject to delay.
F	Unacceptable control delay in excess of 50 seconds per vehicle, for each movement subject to delay.

Source: Highway Capacity Manual 2000

2.2 SIGNIFICANT IMPACT CRITERIA AND LEVEL OF SERVICE STANDARDS

The transportation impact analysis assesses how the study area’s transportation system would operate with the implementation of the proposed project. The potential impacts were identified by applying a set of significance criteria based on the California Environmental Quality Act (CEQA) guidelines and set forth by the Town of Danville.

The Town of Danville 2030 General Plan identifies level of service (LOS) D to be acceptable except in locations (to be specifically identified by the Town through CEQA processes) where the Town determines that LOS D cannot be maintained due traffic originating outside of Danville. Based on the General Plan criteria, any study intersection will be considered potentially impacted if service level exceeds LOS D under the Existing plus Project scenario.

Impacts to bicycle, pedestrian or transit circulation would be considered potentially significant if the Project were to conflict with an adopted bicycle, pedestrian or transit plan, or result in unsafe conditions for bicyclists or pedestrians, significant unserved transit demand, or significant delay to transit service.

3.0 EXISTING CONDITIONS

This section describes existing conditions in the immediate project site vicinity, including roadway facilities, bicycle and pedestrian facilities, and available transit service. In addition, existing traffic volumes and operations are presented for the study intersection, including the results of LOS calculations.

3.1 EXISTING SETTING AND ROADWAY SYSTEM

Important roadways adjacent to the project site are discussed below:

Interstate 680 (I-680) is an eight to ten lane, north-south freeway, with one express/high occupancy vehicle (HOV) lane and three to four mixed flow lanes in each direction. The speed limit on I-680 is 65 miles per hour (mph).

Camino Tassajara is a four-lane, generally east-west arterial that runs through much of Danville east of I-680. Camino Tassajara changes direction at the intersection with Sycamore Valley Road. The speed on Camino Tassajara is 45 mph. West of Sycamore Valley Road, Camino Tassajara has one lane in each direction.

Sycamore Valley Road is a four-lane, east-west arterial east of I-680. It continues west from Camino Tassajara. The speed limit on Sycamore Valley Road is 45 mph.

Crow Canyon Road is a four to six lane, generally east-west arterial that connects Camino Tassajara to I-680. Crow Canyon Road curves to become north-south at Camino Tassajara and continues as Blackhawk Road north of Camino Tassajara. The speed limit on Crow Canyon Road is 40 mph.

Blackhawk Road is a four-lane, north-south arterial running north from the intersection of Crow Canyon Road. The speed limit on Blackhawk Road in the project vicinity is 35 mph.

Sherburne Hills Road is a short, north-south local road that connects the project site to Camino Tassajara. North of Camino Tassajara, posted speed limit is 15 mph. South of Camino Tassajara, the roadway makes multiple sharp turns and has a speed limit of 25 mph.

Holbrook Drive is a short, north-south local road that functions as the entrance to Sycamore Valley Elementary School. South of Camino Tassajara, Holbrook Drive continues as Creekside Avenue and connects to Sunshine Circle. Holbrook Drive is a school zone with a speed limit of 25 mph.

Fairwood Court is a short, north-south local road located immediately east of the project site. The proposed project would provide a connection between Fairwood Court and Sherburne Hills Road.

3.2 EXISTING PEDESTRIAN AND TRANSIT FACILITIES

Walkability is defined as the ability to travel easily and safely between various origins and destinations without having to rely on automobiles or other motorized travel. The ideal “walkable” community includes wide sidewalks, a mix of land uses such as residential, employment, and shopping opportunities, a limited number of conflict points with vehicle traffic, and easy access to transit facilities and services. Pedestrian facilities consist of crosswalks, sidewalks, pedestrian signals, and off-street paths, which provide safe and

convenient routes for pedestrians to access the destinations such as institutions, businesses, public transportation, and recreation facilities.

In the project vicinity, all study intersections on Camino Tassajara are signalized. Surrounding intersections that connect to small subdivisions are generally uncontrolled. Crosswalks with pedestrian signal heads and ADA-compliant curb ramps are provided at all signalized intersections. Sidewalks are continuous on both sides of Camino Tassajara but are generally provided on only one side of most side streets. Curb cuts are uniformly compliant with the Americans with Disabilities Act. Parking strips with trees provide shade to the sidewalks on most major collectors. There is adequate street lighting in the vicinity.

Although there are existing bus stops on Camino Tassajara near the project site, the area is not currently served by any bus lines. The existing pedestrian facilities in the portion of the study area within one mile of the project site are shown in **Figure 3**. Existing peak hour pedestrian counts are provided in **Appendix A**.

3.3 EXISTING BICYCLE FACILITIES

Bicycle facilities include the following:

- Bike Paths (Class I) – Paved trails that are separated from roadways
- Bike Lanes (Class II) – Lanes on roadways designated for use by bicycles through striping, pavement legends, and signs
- Bike Routes (Class III) – Designated roadways for bicycle use by signs or other markings which may or may not include additional pavement width for cyclists

Class II bicycle lanes are provided along both sides of Camino Tassajara for its entire length. Two Class I multiuse trails provide connectivity for locations near the project site without direct street connections. Side streets are generally low volume, and there are adequate signage/markings for the bicyclists to maneuver without confusion. Overall, existing bicycle facilities provide adequate connectivity between the proposed project site and the adjacent residential neighborhoods.

The existing bicycle facilities in the study area are shown in **Figure 3**. Existing peak hour bicycle counts are provided in **Appendix A**.

Existing Pedestrian and Bicycle Facilities



LEGEND

- Project Site
- Study Intersections
- Crosswalk
- Sidewalk
- Class I Multi-Use Trail
- Class II Bike Lane

3.4 INTERSECTION LEVEL OF SERVICE ANALYSIS – EXISTING CONDITIONS

This scenario evaluates the study intersections based on existing traffic volumes, lane geometry and traffic controls. The existing operations of the study intersections were evaluated for the highest one-hour volume during the weekday morning, school, and afternoon peak periods. Turning movement counts for vehicles, bicycles, and pedestrians were conducted during typical weekday a.m. peak, afternoon school peak, and p.m. peak periods at the study intersections in June 2018. For intersection 1 on Sherburne Hills Road, traffic counts were conducted at the southern driveway of the existing nursery, which is currently uncontrolled.

Figure 4 illustrates the existing lane geometries and controls at the study intersections, and **Figure 5** shows existing peak hour traffic volumes. Midweek 48-hour roadway volumes were also collected on Camino Tassajara west of Sherburne Hills Road and east of Holbrook Drive. In the project vicinity, Camino Tassajara handles an average of 23,650 vehicles per day. **Appendix A** includes data sheets for the collected vehicle, bicycle, and pedestrian counts.

The peak hour factors calculated from the existing turning movement counts were used for the study intersections for the Existing Conditions analysis. The results of the LOS analysis using the HCM 2000 methodology and Synchro 10 software program for Existing Conditions are summarized in **Table 3**. Under this scenario, all study intersections operate at acceptable LOS C or better during all peak periods. LOS worksheets for Existing Conditions are provided in **Appendix B**.

Table 3: Intersection Level of Service Analysis – Existing Conditions

ID	Intersections	Control Type	Peak Hour ¹	Existing Conditions	
				Average Delay	LOS ²
1	Project Entrance & Sherburne Hills Rd. ³	Uncontrolled	AM	-	-
			School	-	-
			PM	-	-
2	Camino Tassajara & Sherburne Hills Rd.	Signal	AM	8.7	A
			School	9.8	A
			PM	7.8	A
3	Camino Tassajara & Holbrook Dr./ Creekside Ave.	Signal	AM	16.7	B
			School	17.0	B
			PM	14.4	B
4	Camino Tassajara & Crow Canyon Rd./ Blackhawk Rd.	Signal	AM	31.8	C
			School	28.6	C
			PM	33.9	C
5	Sycamore Valley Rd. & Camino Ramon	Signal	AM	29.3	C
			School	25.7	C
			PM	34.7	C

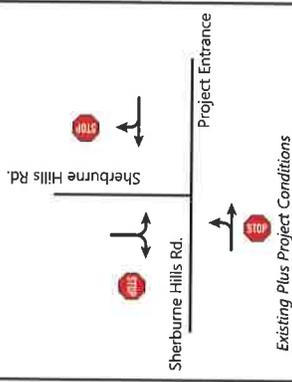
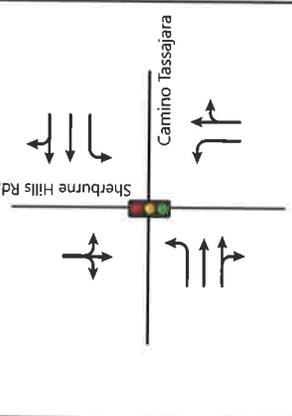
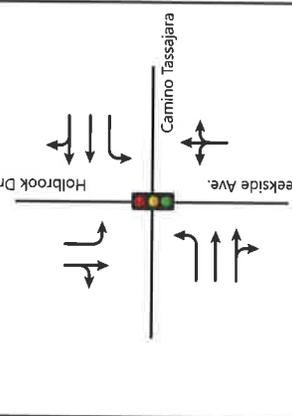
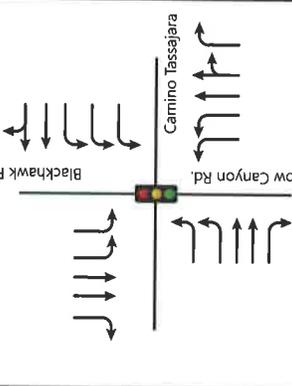
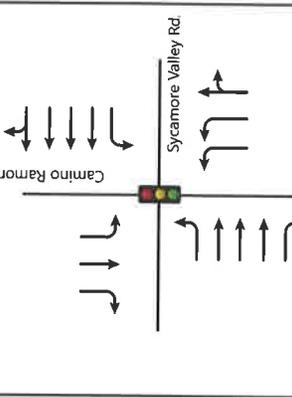
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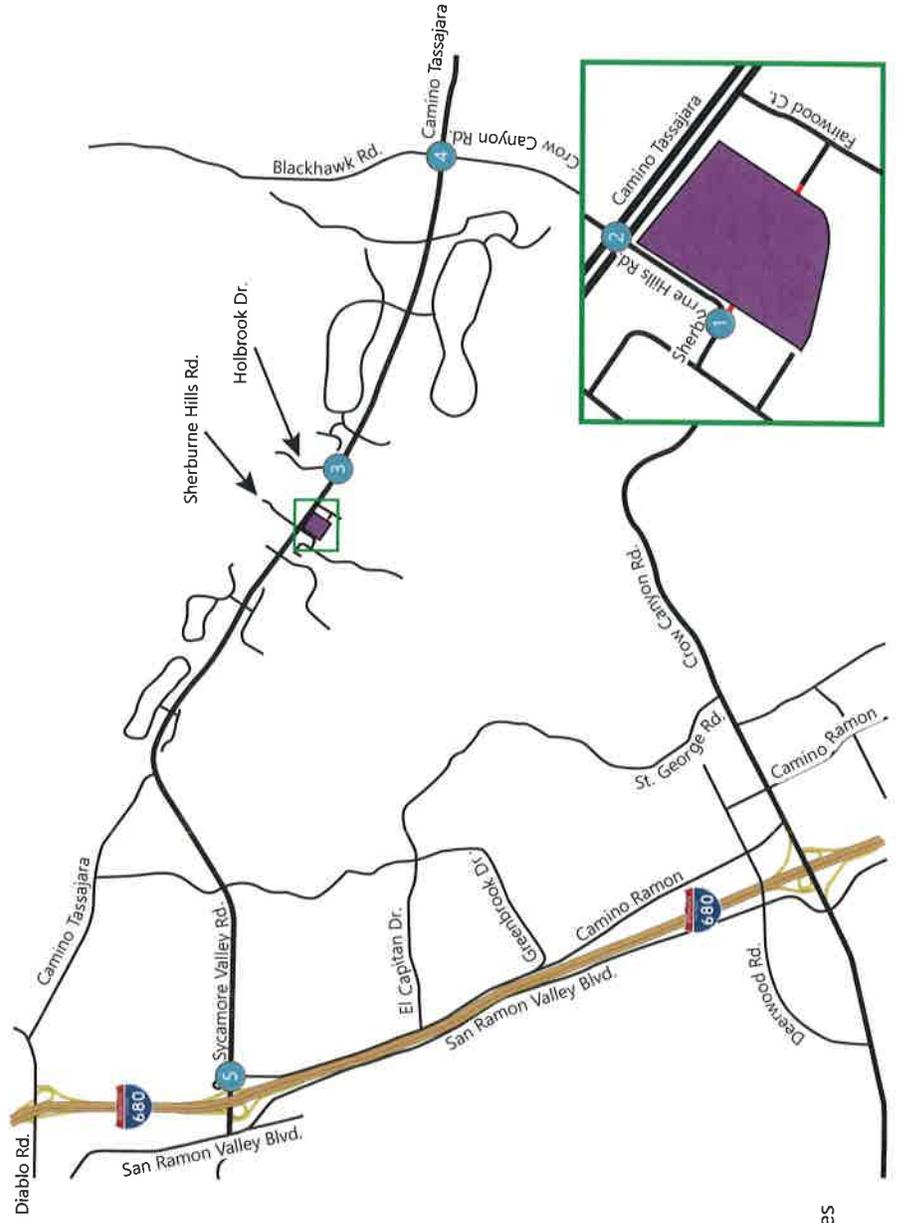
¹AM – morning peak hour (between 7 and 9 a.m.), School – afternoon school-related peak hour (between 2 and 4 p.m.), PM – afternoon peak hour (between 4 and 6 p.m.)

²LOS – Level of Service calculations conducted using the Synchro 10.0 level of service analysis software package, which applies the methodology described in the 2000 HCM.

Bold text indicates intersection operates at a deficient Level of Service.

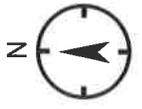
Existing Lane Geometry and Traffic Controls

Intersection #1 Project Entrance & Sherburne Hills Rd.	Intersection #2 Camino Tassajara & Sherburne Hills Rd.	Intersection #3 Camino Tassajara & Holbrook Dr. / Creekside Ave.	Intersection #4 Camino Tassajara & Crow Canyon Rd. / Blackhawk Rd.	Intersection #5 Sycamore Valley Rd. & Camino Ramon
				



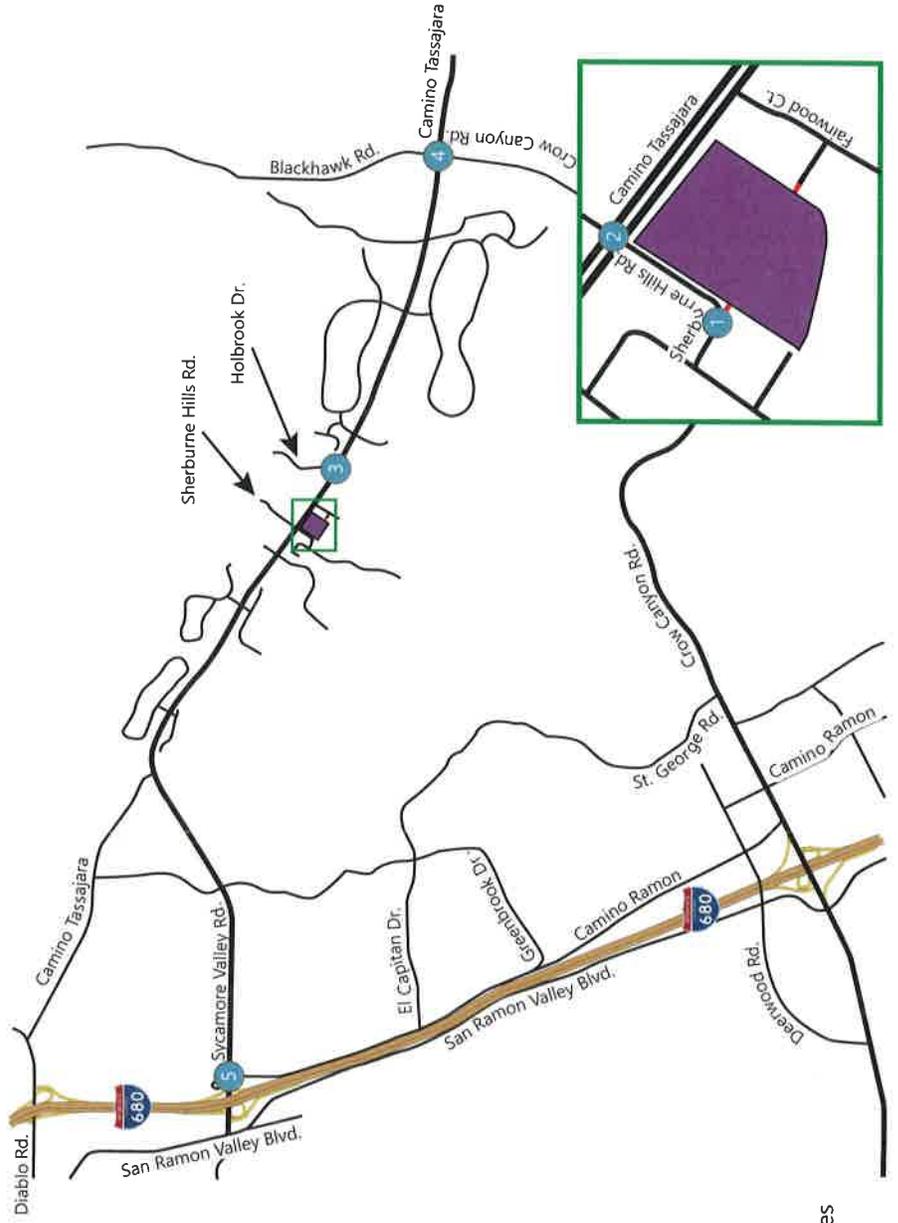
LEGEND

-  Project Site
-  Study Intersections
- XX AM Peak Hour Volumes
- (XX) School Peak Hour Volumes
- [XX] PM Peak Hour Volumes



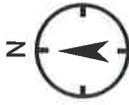
Existing Conditions Peak Hour Traffic Volumes

Intersection #1 Project Entrance & Sherburne Hills Rd.	Intersection #2 Camino Tassajara & Sherburne Hills Rd.	Intersection #3 Camino Tassajara & Holbrook Dr. / Creekside Ave.	Intersection #4 Camino Tassajara & Crow Canyon Rd. / Blackhawk Rd.	Intersection #5 Sycamore Valley Rd. & Camino Ramon
<p> Sherburne Hills Rd. → 10(20)[20] / ← 0(3)[3] Project Entrance → 0(0)[0] / ← 0(0)[0] 24(13)[18] / 0(0)[0] </p>	<p> Sherburne Hills Rd. → 61(67)[43] / ← 40(65)[45] Camino Tassajara → 3(16)[7] / ← 0(0)[2] 35(50)[43] / 606(829)[1,099] 8(10)[17] / 17(12)[11] </p>	<p> Holbrook Dr. → 58(77)[44] / ← 37(57)[49] Camino Tassajara → 7(15)[26] / ← 6(3)[2] 84(72)[57] / 546(785)[1,051] 11(23)[32] / 3(16)[18] </p>	<p> Blackhawk Rd. → 152(187)[202] / ← 555(672)[403] Camino Tassajara → 601(641)[307] / ← 264(379)[454] 144(168)[151] / 337(277)[304] 105(150)[203] / 293(313)[403] </p>	<p> Camino Ramon → 13(8)[6] / ← 72(91)[127] Sycamore Valley Rd. → 1,292(882)[602] / ← 8(3)[6] 25(19)[93] / 10(1)[22] / 7(2)[32] 23(21)[30] / 650(963)[1,210] 306(361)[514] / 456(414)[437] </p>



LEGEND

-  Project Site
-  Study Intersections
- XX AM Peak Hour Volumes
- (XX) School Peak Hour Volumes
- [XX] PM Peak Hour Volumes



4.0 EXISTING PLUS PROJECT CONDITIONS

This analysis scenario presents the impacts of the proposed project at the study intersections and surrounding roadway system. This scenario is similar to Existing Conditions, but with the addition of traffic from the proposed project. The project would extend Fieldstone Drive west from Fairwood Court, to connect with Sherburne Hills Road. The Town has indicated that the existing connection between Fairwood Court and Camino Tassajara would be closed, and all existing trips from these homes would be reassigned. The closure of Fairwood Court would conform to the General Plan goal to limit access points along arterial streets. Existing and project trips were assigned based on the project alternative with one project access point on Sherburne Hills Road. At the direction of Town of Danville staff, the proposed project was analyzed with a full build-out size of 20 single-family detached units with 10 secondary dwelling units.

4.1 PROJECT TRIP GENERATION

TJKM developed estimated project trip generation for the proposed project based on Town of Danville trip generation rates for single family homes and single family homes with secondary dwellings, as follows:

- Single Family – Daily Rate: 10.20
- Single Family with Second Dwelling – Daily Rate: 12.17
- AM Peak Hour – 1.4
- School PM Peak Hour – 1.25
- PM Peak Hour – 1.02

The proportions of inbound and outbound trips during each peak period were based on the published trip generation rates from the ITE publication *Trip Generation (10th Edition)* for the land use Single Family Detached Housing (ITE Code 210). **Table 4** shows the trips expected to be generated by the proposed project. The proposed project is expected to generate 224 daily trips, including 28 a.m. peak hour trips (eight in, 20 out), 26 school peak hour (16 in, ten out), and 20 p.m. peak hour trips (12 in, eight out). **Table 5** shows the estimated trips generated by the 17 existing homes that would be reassigned to Sherburne Hills Road.

Table 4: Project Trip Generation

Land Use ¹	Size ²	Daily		AM Peak		School PM Peak		PM Peak										
		Rate	Trips	Rate	In:Out ³	In	Out	Rate	In:Out ³	In	Out	Rate	In:Out ³	In	Out	Total		
Single-Family Detached Housing	10 DU	10.20	102	1.40	25:75	4	10	14	1.25	63:37	8	5	13	1.02	63:37	6	4	10
Single-Family Detached Housing with Second Dwelling	10 DU	12.17	122	1.40	25:75	4	10	14	1.25	63:37	8	5	13	1.02	63:37	6	4	10
Total Trips			224		8	20	28			16	10	26			12	8	20	

Notes

¹ Source: Town of Danville

² DU – Dwelling Units

³ Institute of Transportation Engineers (ITE), *Trip Generation Manual, 10th Edition* (2017)

Table 5: Fairwood Court Existing Homes Trip Generation

Land Use ¹	Size ²	Daily		AM Peak		School PM Peak		PM Peak										
		Rate	Trips	Rate	In:Out ³	In	Out	Rate	In:Out ³	In	Out	Total						
Single-Family Detached Housing	17 DU	10.20	173	1.40	25:75	6	18	24	1.25	63:37	13	8	21	1.02	63:37	11	6	17

Notes

¹ Source: Town of Danville

² DU – Dwelling Units

³ Institute of Transportation Engineers (ITE), *Trip Generation Manual, 10th Edition* (2017)

4.2 PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

Trip distribution is a process that determines in what proportion vehicles would be expected to travel between the project site and various destinations outside the project study area. Trip assignment also determines the various routes that vehicles would take from the project site to each destination using the calculated trip distribution. Trip distribution assumptions for the proposed project were developed based on existing travel patterns and knowledge of the study area.

The distribution assumptions are as follows:

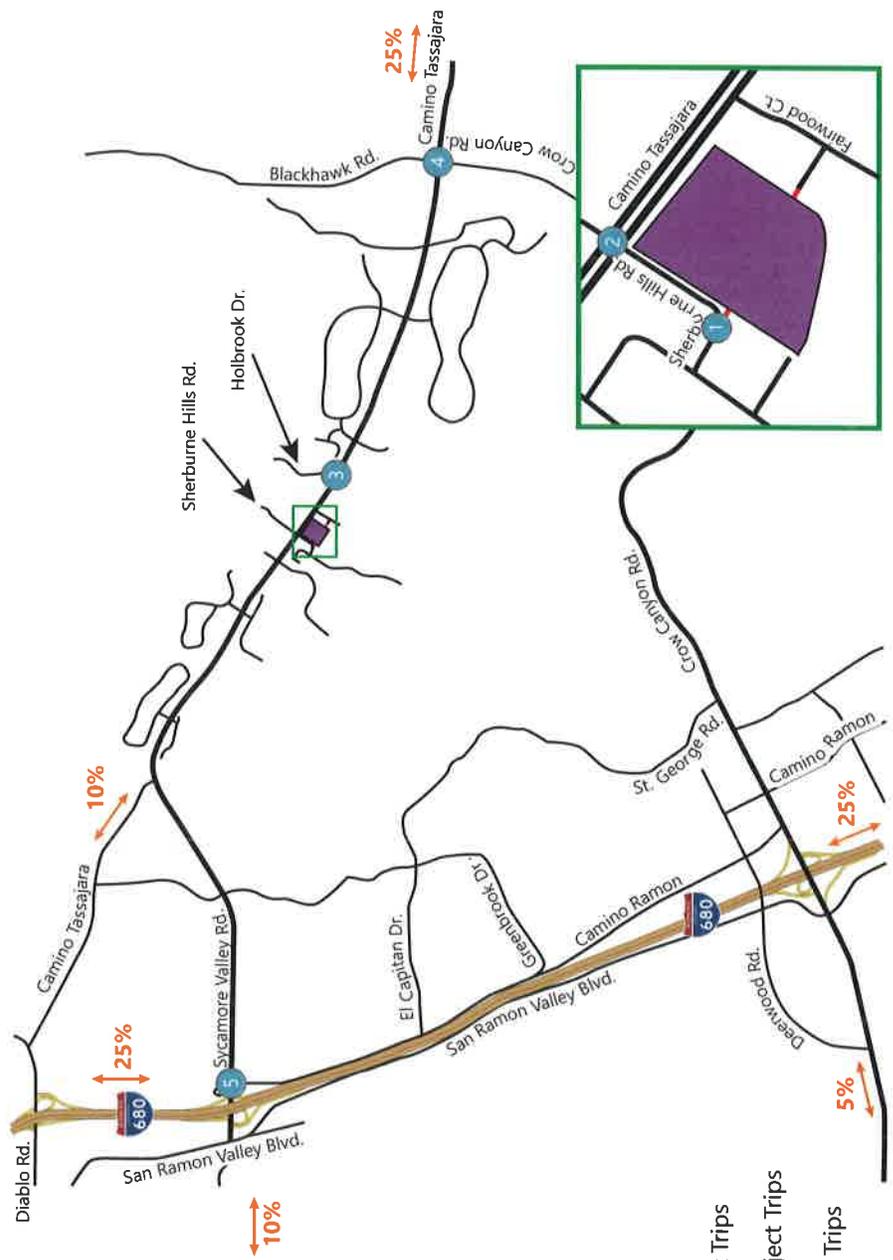
- 25 percent to/from I-680 to the north
- 25 percent to/from I-680 to the south
- 25 percent to/from Camino Tassajara east of Crow Canyon Road
- Ten percent to/from Camino Tassajara northwest of Sycamore Valley Road
- Ten percent to/from Sycamore Valley Road west of I-680
- Five percent to/from Crow Canyon Road west of I-680

As shown on the site plan shown in **Figure 2**, the project site would have a secondary access to Camino Tassajara via an alley. Closing the existing connection from Fairwood Court to Camino Tassajara is currently planned. For a conservative analysis, all project trips were assigned to the project access point on Sherburne Hills Road. Reassignment of trips generated by the existing homes on Fairwood Court assumed the same distribution. For existing outbound trips that would be expected to go west, this involved reducing eastbound left/U-turn volumes at Camino Tassajara & Holbrook Drive/Creekside Avenue.

Figure 6 illustrates the trip distribution percentages and trip assignment project volumes developed for the proposed project under each project alternative. The assigned project trips and reassigned existing home trips were then added to traffic volumes under Existing Conditions to generate Existing plus Project Conditions traffic volumes.

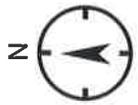
Project Trip Distribution and Assignment

Intersection #1 Project Entrance & Sherburne Hills Rd.	Intersection #2 Camino Tassajara & Sherburne Hills Rd.	Intersection #3 Camino Tassajara & Holbrook Dr. / Creekside Ave.	Intersection #4 Camino Tassajara & Crow Canyon Rd. / Blackhawk Rd.	Intersection #5 Sycamore Valley Rd. & Camino Ramon



LEGEND

- Project Site
- Study Intersections
- XX AM Peak Hour Project Trips
- (XX) School Peak Hour Project Trips
- [XX] PM Peak Hour Project Trips
- XXX% Trip Distribution



4.3 INTERSECTION LEVEL OF SERVICE ANALYSIS – EXISTING PLUS PROJECT CONDITIONS

Intersection levels of service were calculated with the new traffic added by each proposed project alternative to evaluate the operating conditions of the intersections and identify potential impacts to the roadway system. The results of the intersection level of service calculations for Existing plus Project Conditions are presented in **Table 6**. The results for Existing Conditions are included for comparison purpose, along with the projected increases in average delay. The changes in delay between Existing and each Existing plus Project Conditions are used to identify potential significant impacts. **Figure 7** shows projected turning movement volumes at all the study intersections for Existing plus Project Conditions under each project alternative. At the project entrance on Sherburne Hills Road, only the westbound approach would be stop controlled. Due to limitations in HCM methodology for evaluating unsignalized intersections, this intersection was analyzed under all-way stop control.

Under Existing plus Project conditions, all intersections would continue to operate at LOS C or better during all peak periods. The addition of project traffic would increase average delay by no more than 0.6 seconds at all study intersections during all peak periods. Due to reassignment of existing Fairwood Court trips, level of service at the intersection of Camino Tassajara & Holbrook Drive/Creekside Avenue would slightly improve. **Appendix C** contains the corresponding calculation sheets. Based on the Town of Danville impact criteria, the project is expected to have a **less-than-significant** impact.

Table 6: Intersection Level of Service Analysis – Existing plus Project Conditions

ID	Intersections	Control Type	Peak Hour ¹	Existing Conditions		Existing plus Project Conditions		
				Average Delay	LOS ²	Average Delay	LOS ²	Change in Ave. Delay
1	Project Entrance & Sherburne Hills Rd.	All-Way Stop Control	AM	-	-	7.0	A	-
			School	-	-	7.1	A	-
			PM	-	-	7.0	A	-
2	Camino Tassajara & Sherburne Hills Rd.	Signal	AM	8.7	A	9.0	A	0.3
			School	9.8	A	10.4	B	0.6
3	Camino Tassajara & Holbrook Dr./ Creekside Ave.	Signal	PM	7.8	A	8.0	A	0.2
			AM	16.7	B	16.2	B	-0.5
			School	17.0	B	16.8	B	-0.2
4	Camino Tassajara & Crow Canyon Rd./ Blackhawk Rd.	Signal	PM	14.4	B	14.3	B	-0.1
			AM	31.8	C	31.9	C	0.1
			School	28.6	C	28.7	C	0.1
5	Sycamore Valley Rd. & Camino Ramon	Signal	PM	33.9	C	33.9	C	0.0
			AM	29.3	C	29.3	C	0.0
			School	25.7	C	25.7	C	0.0
			PM	34.7	C	34.7	C	0.0

Notes:

¹AM – morning peak hour (between 7 and 9 a.m.), School – afternoon school-related peak hour (between 2 and 4 p.m.), PM – afternoon peak hour (between 4 and 6 p.m.)

²LOS – Level of Service calculations conducted using the Synchro 10 level of service analysis software package, which applies the methodology described in the 2000 HCM.

Bold text indicates intersection operates at a deficient Level of Service.

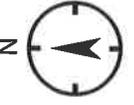
Existing plus Project Conditions Peak Hour Traffic Volumes

Intersection #1 Project Entrance & Sherburne Hills Rd.	Intersection #2 Camino Tassajara & Sherburne Hills Rd.	Intersection #3 Camino Tassajara & Holbrook Dr. / Creedside Ave.	Intersection #4 Camino Tassajara & Crow Canyon Rd. / Blackhawk Rd.	Intersection #5 Sycamore Valley Rd. & Camino Ramon
<p> Sherburne Hills Rd: 10(20)[20] (left), 15(32)[26] (right) Project Entrance: 38(18)[14] (left), 0(0)[0] (right) Sherburne Hills Rd: 24(13)[18] (left), 0(0)[0] (right) </p>	<p> Sherburne Hills Rd: 61(67)[43] (left), 40(65)[45] (right) Camino Tassajara: 601(819)[1,091] (left), 19(31)[33] (right) </p>	<p> Holbrook Dr: 70(44)[67] (left), 37(57)[49] (right) Camino Tassajara: 71(66)[52] (left), 552(786)[1,053] (right) Creedside Ave: 31(16)[18] (left), 6(3)[2] (right), 24(8)[10] (right) </p>	<p> Blackhawk Rd: 152(187)[202] (left), 105(150)[203] (right) Camino Tassajara: 151(166)[173] (left), 330(465)[628] (right), 208(177)[200] (right) </p>	<p> Camino Ramon: 25(19)[93] (left), 7(2)[32] (right) Sycamore Valley Rd: 23(21)[30] (left), 655(972)[1,217] (right), 306(361)[514] (right) </p>



LEGEND

-  Project Site
-  Study Intersections
- XX AM Peak Hour Volumes
- (XX) School Peak Hour Volumes
- [XX] PM Peak Hour Volumes



5.0 CUMULATIVE CONDITIONS

This scenario evaluates projected traffic in the project vicinity for a horizon year of 2035. Cumulative Conditions traffic volumes are based on Existing Conditions traffic volumes, increased with an annual growth rate of 0.42 percent. This growth rate was calculated based on the 2014 output from the Contra Costa Transportation Authority's Travel Demand Model.

5.1 INTERSECTION LEVEL OF SERVICE ANALYSIS – CUMULATIVE CONDITIONS

Intersection levels of service were calculated with expected traffic volumes, using existing lane geometry and intersection control. **Figure 8** shows projected turning movement volumes at all study intersections for Cumulative Conditions. The results of the intersection level of service calculations for Cumulative Conditions are presented in **Table 7**. Under this scenario, all study intersections operate at acceptable LOS D or better during all peak periods. **Appendix D** contains the corresponding calculation sheets.

Table 7: Intersection Level of Service Analysis – Cumulative Conditions

ID	Intersections	Peak Hour ¹	Cumulative Conditions	
			Average Delay	LOS ²
1	Project Entrance & Sherburne Hills Rd.	AM	-	-
		School	-	-
		PM	-	-
2	Camino Tassajara & Sherburne Hills Rd.	AM	9.1	A
		School	9.1	A
		PM	8.3	A
3	Camino Tassajara & Holbrook Dr./ Creekside Ave.	AM	18.1	B
		School	17.5	B
		PM	15.3	B
4	Camino Tassajara & Crow Canyon Rd./ Blackhawk Rd.	AM	34.3	C
		School	30.4	C
		PM	36.5	D
5	Sycamore Valley Rd. & Camino Ramon	AM	30.2	C
		School	26.4	C
		PM	35.6	D

Notes:

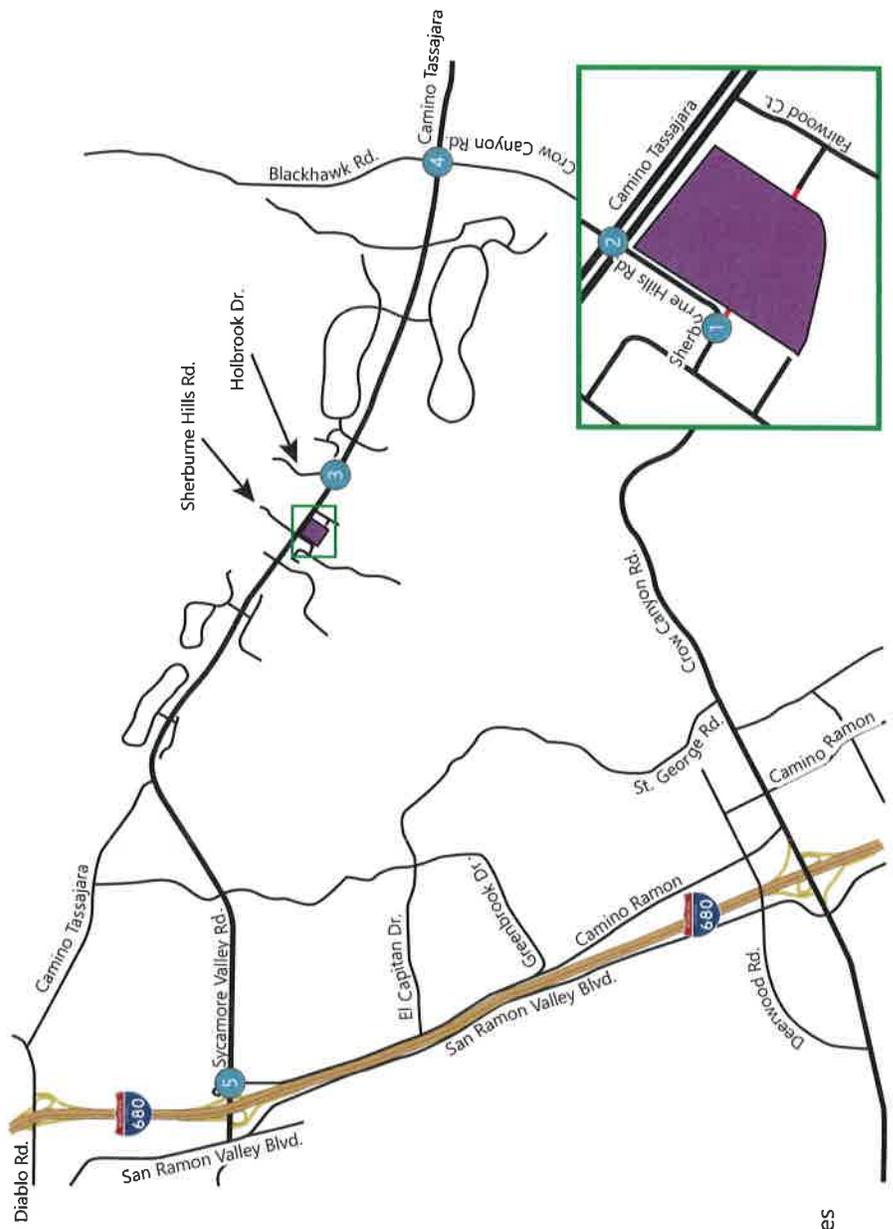
¹AM – morning peak hour (between 7 and 9 a.m.), School – afternoon school-related peak hour (between 2 and 4 p.m.), PM – afternoon peak hour (between 4 and 6 p.m.)

²LOS – Level of Service calculations conducted using the Synchro 10 level of service analysis software package, which applies the methodology described in the 2000 HCM.

Bold text indicates intersection operates at a deficient Level of Service.

Cumulative Conditions Peak Hour Traffic Volumes

Intersection #1 Project Entrance & Sherburne Hills Rd.	Intersection #2 Camino Tassajara & Sherburne Hills Rd.	Intersection #3 Camino Tassajara & Holbrook Dr. / Creedside Ave.	Intersection #4 Camino Tassajara & Crow Canyon Rd. / Blackhawk Rd.	Intersection #5 Sycamore Valley Rd. & Camino Ramon
<p> Sherburne Hills Rd. → 1(21) [21] / ← 1(3) [3] Project Entrance → 0(0) [0] / ← 0(0) [0] Sherburne Hills Rd. → 26(14) [19] / ← 0(0) [0] </p>	<p> Sherburne Hills Rd. → 66(69) [45] / ← 2(1) [0] / ← 43(70) [48] Camino Tassajara → 18(13) [12] / ← 0(0) [2] / ← 6(6) [6] Camino Tassajara → 38(54) [49] / ← 651(890) [1,180] / ← 9(1) [1] </p>	<p> Holbrook Dr. → 62(83) [47] / ← 1(2) [1] / ← 40(61) [53] Camino Tassajara → 90(77) [61] / ← 586(841) [1,129] / ← 12(25) [34] Camino Tassajara → 33(17) [19] / ← 6(3) [2] / ← 26(9) [11] </p>	<p> Blackhawk Rd. → 155(180) [162] / ← 362(297) [326] / ← 113(161) [218] Crow Canyon Rd. → 162(178) [186] / ← 349(497) [672] / ← 222(189) [215] Camino Tassajara → 315(336) [432] / ← 283(407) [488] / ← 227(318) [450] </p>	<p> Sycamore Valley Rd. → 27(20) [100] / ← 11(1) [24] / ← 8(2) [34] Camino Ramon → 490(445) [469] / ← 9(3) [6] / ← 77(98) [136] Sycamore Valley Rd. → 25(23) [32] / ← 698(1,034) [1,299] / ← 326(388) [552] </p>



LEGEND

- Project Site
- Study Intersections
- XX AM Peak Hour Volumes
- (XX) School Peak Hour Volumes
- [XX] PM Peak Hour Volumes

6.0 CUMULATIVE PLUS PROJECT CONDITIONS

This scenario evaluates projected traffic in the project vicinity for a horizon year of 2035. Cumulative Conditions traffic volumes are based on Existing Conditions traffic volumes, increased with an annual growth rate of 0.42 percent. This scenario is similar to Cumulative Conditions, but with the addition of traffic from the proposed project and reassignment of existing Fairwood Court trips.

6.1 INTERSECTION LEVEL OF SERVICE ANALYSIS – CUMULATIVE PLUS PROJECT CONDITIONS

Intersection levels of service were calculated with expected traffic volumes, using Existing plus Project lane geometry and intersection control. **Figure 9** shows projected turning movement volumes at all study intersections for Cumulative plus Project Conditions. The results of the intersection level of service calculations for Cumulative plus Project Conditions are presented in **Table 8**. The results for Cumulative Conditions and changes in delay are included for comparison purposes. Under this scenario, all study intersections would continue to operate at acceptable LOS D or better during all peak periods. Due to reassignment of existing Fairwood Court trips, level of service at the intersection of Camino Tassajara & Holbrook Drive/Creekside Avenue would slightly improve. **Appendix E** contains the corresponding calculation sheets. Based on the Town of Danville impact criteria, the project is expected to have a **less-than-significant** impact.

Table 8: Intersection Level of Service Analysis – Cumulative plus Project Conditions

ID	Intersections	Peak Hour ¹	Cumulative Conditions		Cumulative plus Project Conditions		
			Average Delay	LOS ²	Average Delay	LOS ²	Change in Ave. Delay
1	Project Entrance & Sherburne Hills Rd.	AM	-	-	7.0	A	-
		School	-	-	7.1	A	-
		PM	-	-	7.0	A	-
2	Camino Tassajara & Sherburne Hills Rd.	AM	9.1	A	9.4	A	0.3
		School	9.1	A	9.6	A	0.5
		PM	8.3	A	8.4	A	0.1
3	Camino Tassajara & Holbrook Dr./ Creekside Ave.	AM	18.1	B	17.5	B	-0.6
		School	17.5	B	17.4	B	-0.1
		PM	15.3	B	15.2	B	-0.1
4	Camino Tassajara & Crow Canyon Rd./ Blackhawk Rd.	AM	34.3	C	34.3	C	0.0
		School	30.4	C	30.5	C	0.1
		PM	36.5	D	36.5	D	0.0
5	Sycamore Valley Rd. & Camino Ramon	AM	30.2	C	30.2	C	0.0
		School	26.4	C	26.4	C	0.0
		PM	35.6	D	35.6	D	0.0

Notes:

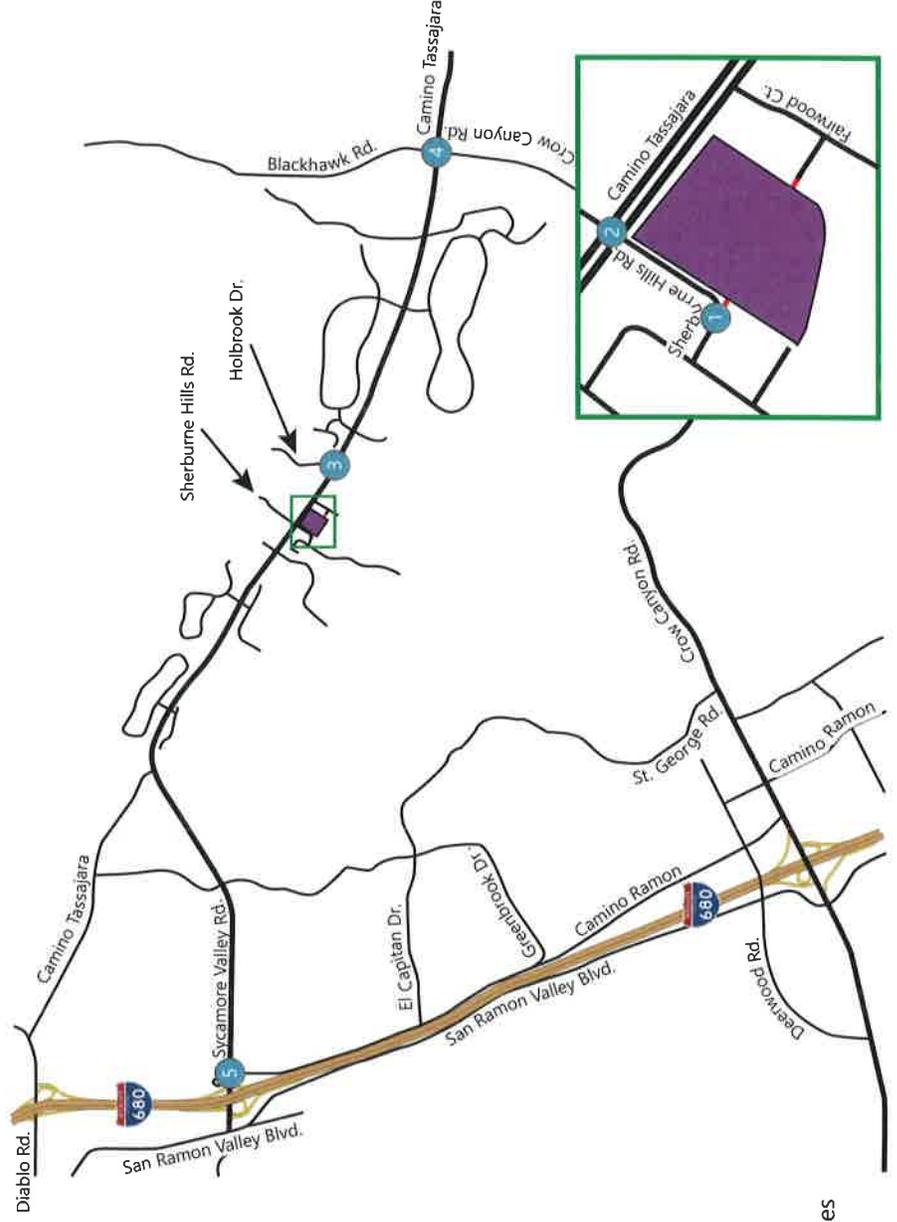
¹AM – morning peak hour (between 7 and 9 a.m.), School – afternoon school-related peak hour (between 2 and 4 p.m.), PM – afternoon peak hour (between 4 and 6 p.m.)

²LOS – Level of Service calculations conducted using the Synchro 10 level of service analysis software package, which applies the methodology described in the 2000 HCM.

Bold text indicates intersection operates at a deficient Level of Service.

Cumulative plus Project Peak Hour Traffic Volumes

Intersection #1	Intersection #2	Intersection #3	Intersection #4	Intersection #5
<p>Project Entrance & Sherburne Hills Rd.</p>	<p>Camino Tassajara & Sherburne Hills Rd.</p>	<p>Camino Tassajara & Holbrook Dr. / Creedside Ave.</p>	<p>Camino Tassajara & Crow Canyon Rd. / Blackhawk Rd.</p>	<p>Sycamore Valley Rd. & Camino Ramon</p>



LEGEND

- Project Site
- Study Intersections
- XX AM Peak Hour Volumes
- (XX) School Peak Hour Volumes
- [XX] PM Peak Hour Volumes

7.0 SITE ACCESS AND ON-SITE CIRCULATION AND OTHER IMPACTS

The following sections provide additional analyses of other transportation issues associated with the project site, including:

1. Proposed site access
2. Alternative access scenarios
3. Onsite circulation;
4. Parking analysis.

7.1 PROPOSED SITE ACCESS

This section analyzes site access and for vehicles, pedestrians and bicycles based on the site plan presented in **Figure 2**, dated December 2018. Primary access to the project site will be via one entrance on Sherburne Hills Road at the point where the roadway currently turns a corner, on the west side of the project site. Secondary access would be provided by an alley shown in the site plan, where an access easement currently exists for an existing single family home to the south of the project site. The extension of Fieldstone Drive on the east side of the project site would replace an existing connection between Fairwood Court and Camino Tassajara, such that residents of the existing homes would utilize Sherburne Hills Road to access Camino Tassajara. Currently, Fieldstone Drive can be accessed from Camino Tassajara via Fairwood Court but does not connect to the access easement. For vehicles entering the site from eastbound Camino Tassajara, access at the alley would allow drivers to avoid making a left turn into the development from Sherburne Hills Drive. It is expected that some inbound and outbound vehicles traveling eastbound on Camino Tassajara would utilize the alley connection. However, intersection impacts were evaluated based on the conservative assumption that all traffic would use Sherburne Hills Drive.

Pedestrian and bicycle access to the site would be provided via the same access points as vehicles. New sidewalks would be constructed on the east side of Sherburne Hills Drive and the north side of the Fieldstone Drive extension. There is no transit access to the project site, as no bus lines currently serve the study area. Site access for vehicles, pedestrians, and bicycles would be **adequate**. The project is not expected to produce conflicts with existing pedestrian or bicycle plans and would thus have a **less-than-significant impact** on existing pedestrian and bicycle facilities.

7.2 ALTERNATIVE ACCESS SCENARIOS

In addition to considering access from project traffic alone, five alternative Existing plus Project scenarios were considered, which take into account access for both project trips and existing trips generated by the single family homes located directly to the south and east of the project. In addition to the single family home with an access easement to reach Camino Tassajara, 16 single family homes are located on Fairwood Court and the existing portion of Fieldstone Drive. Both Fairwood Court and the existing easement are right-in/right-out only due to the presence of a raised median on Camino Tassajara. Fieldstone Drive currently terminates at the property line of the project site and does not connect to the existing easement. Closing the connection from Fairwood Court to Camino Tassajara is currently planned

by the Town of Danville, with existing homes using Sherburne Hills Road as assumed under Existing plus Project Conditions. The existing access easement would either be closed, or realigned as an alley in the proposed project, providing a secondary access point to Camino Tassajara. It is expected that traffic from single family homes to the west of Sherburne Hills Road will continue to utilize Sherburne Hills Road exclusively under all scenarios, so these trips were not included in the analysis.

As discussed in Section 4.1 and shown in **Table 5**, trips generated by the 17 existing single family homes east of the project site were estimated using the same rates as the proposed project and distributed using the same trip distribution as project trips. Existing and project trips were reassigned to the study intersections, existing easement, and Fairwood Court, according to the most convenient routes to their destinations for each access alternative. Among the study intersections, project trip assignment and existing trip reassignment would only differ at the project entrance on Sherburne Hills Road and at the intersections of Camino Tassajara & Sherburne Hills Road and Camino Tassajara & Holbrook Drive/Creekside Avenue. Alternatives 7.2.3 and 7.2.4 would have identical project and existing trip assignments as alternative 7.2.2, as the only changes would be at the existing easement/proposed alley and at Fairwood Court. Alternative 7.2.5 would reassign trips from only one existing home and thus would only differ from alternative 7.2.1 by one trip. As such, only alternatives 7.2.1 and 7.2.2 required further level of service analysis. These alternatives were analyzed in Synchro 10 to identify any significant impacts due to traffic reassignment.

The operational characteristics and level of service results for each scenario are as follows:

7.2.1 New homes have access to Sherburne Hills Road only, other access unchanged

Under this scenario, the existing single family home south of the project site would retain an exclusive easement to access Camino Tassajara, and homes on Fairwood Court would retain their access to Camino Tassajara. Project trips would only have access to Sherburne Hills Road. Project trip assignment would be the same as **Figure 6**, but no trips from existing homes would be reassigned. Under this scenario, level of service at intersections 1-3 would be similar to Existing plus Project Conditions. Average delay at both intersections on Sherburne Hills Road would remain the same or fall by up to 0.1 seconds under each peak hour. Average delay at Camino Tassajara & Holbrook Drive/Creekside Avenue would be identical to Existing Conditions, as some existing outbound trips would still involve left or U-turns. Project trips alone would have no impact on average delay.

7.2.2 All homes have access to Sherburne Hills Road, Fairwood Court, and the proposed alley

Under this scenario, both existing and proposed homes would have access to Camino Tassajara via Sherburne Hills Road, the alley, and Fairwood Court. As shown in **Figure 2**, Fieldstone Drive would connect Sherburne Hills Road to Fairwood Court. Outbound project trips to the east and inbound project trips from the west would have the option to use the alley instead of accessing the project from Sherburne Hills Road. For analysis purposes, all of these trips were assigned to the alley. Outbound existing residential traffic to the west would be reassigned to Sherburne Hills Road to avoid U-turns but would otherwise continue to use the easement and Fairwood Court. Under this scenario, average delay at both intersections on Sherburne Hills Road would improve compared to Existing plus Project Conditions, due to fewer existing trips being reassigned and fewer project trips being assigned to Sherburne Hills

Road. Average delay at the intersection of Camino Tassajara & Holbrook Drive/Creekside Avenue would improve compared to Existing Conditions, as the eastbound left/U-turn traffic volume would be reduced.

7.2.3 All homes have access to Sherburne Hills Road and alley, Fairwood Court closed

For project traffic, this is identical to the previous scenario, alternative 7.2.2. For existing traffic, all trips using Fairwood Court and the alley under the previous scenario would be combined to use the easement only. Assignment of project and existing residential trips at all study intersections would be identical to alternative 7.2.2.

7.2.4 All homes have access to Sherburne Hills Road and Fairwood Court, alley closed

Trip assignment for this scenario is nearly identical to the previous scenario, but with traffic using the alley shifting to Fairwood Court instead. With the alley closed, the existing single family home that currently uses the existing easement would instead use either Sherburne Hills Road or Fairwood Court to access Camino Tassajara. As with alternative 7.2.3, assignment of project and existing residential trips at all study intersections would be identical to alternative 7.2.2.

7.2.5. Fieldstone Drive ends at the property line, alley closed

This scenario assumes that the existing easement connecting the single family home to the south of the project site would connect to Fieldstone Drive but that the realignment as a proposed alley would be closed off from Camino Tassajara. In this scenario, the single family home currently using the access easement would utilize Sherburne Hills Road. Project traffic would continue to use Sherburne Hills Road, and the other existing homes would continue to use Fairwood Court as they do currently. This scenario would reassign approximately one outbound trip in the a.m. peak hour and one inbound trip in the school and p.m. peak hours. Trip assignment would differ from alternative 7.2.1 by only one trip during any peak hour and is not expected to produce different results from that scenario.

For all scenarios, Level of Service results at both intersections on Sherburne Hills Road were identical to the Existing plus Project Conditions analyzed in section 4.3. There were minimal changes in average delay of no more than 0.1 seconds relative to Existing plus Project Conditions. The intersection of Camino Tassajara & Holbrook Drive/Creekside Avenue would operate with the same level of service and delay as either Existing or Existing plus Project Conditions, depending on the alternative. The quality of traffic operations at study intersections would therefore be virtually identical regardless of access changes at Fairwood Court and the existing access easement. Extending Fieldstone Drive to Sherburne Hills Road and leaving Fairwood Court or the easement/alley open would provide the most flexible route options for residents of both the existing and proposed homes. Level of service calculation sheets for alternatives 7.2.1 and 7.2.2 are included in **Appendix C**.

7.3 ON-SITE CIRCULATION

As shown in **Figure 2**, Fieldstone Drive and all three internal alleys would be 30 feet wide, with two travel lanes. Each street would provide parallel parking on one side, leaving adequate space for fire vehicle access. The longest alley, located on the northwest portion of the project site would provide a 131-foot firetruck turnaround. The alley along the east side of the site would connect to Camino Tassajara. Internal streets extend far enough past all driveways to allow for vehicles to maneuver and turn around. The

roadway widths and turning radii are sufficient to provide adequate circulation for emergency vehicles and garbage trucks. Parallel parking spaces near Sherburne Hills Road and Camino Tassajara are separated from these cross streets by at least 50 feet of open curb, with no parking permitted. Appropriate signage and striping will be provided for stop control, fire lanes, street names, and streets without outlets. Town of Danville staff reviewed a preliminary site plan dated July 2018 and provided detailed feedback regarding site layout, signing, and striping, which was included in the December 2018 site plan found in **Figure 2**. A detailed list of staff feedback is provided in **Appendix F**. Overall, the proposed on-site vehicle circulation is **adequate** and should not result in any significant impacts either on-site or on public streets.

7.4 PARKING

The Town of Danville Municipal Code specifies the minimum parking requirements for single family residential developments. Each single family lot is required to provide two off-street parking spaces in an enclosed garage. The site plan shows attached two car garages and driveway aprons on each lot. The site plan also shows a total of 37 on-street parking spaces. Based on the proposed parking to be provided on site, no parking impacts are projected on public streets.

8.0 CONCLUSIONS

- The proposed residential development is expected to generate 224 daily trips, including 28 a.m. peak hour trips (eight in, 20 out), 26 school peak hour (16 in, ten out), and 20 p.m. peak hour trips (12 in, eight out).
- Under Existing Conditions, all study intersections operate at acceptable LOS C or better during all peak periods.
- Under Existing plus Project Conditions, all intersections would continue to operate at acceptable LOS C or better during all peak periods. Based on the Town of Danville impact criteria the project is expected to have a **less-than-significant impact** at all study intersections under Existing plus Project Conditions.
- Under Cumulative Conditions, all study intersections would continue to operate at acceptable LOS D or better during all peak periods.
- Under Cumulative plus Project Conditions, all intersections would continue to operate at acceptable LOS D or better during all peak periods. Based on the Town of Danville impact criteria the project is expected to have a **less-than-significant impact** at all study intersections under Cumulative plus Project Conditions.
- The project site would be accessed via two connections to existing roadways at Sherburne Drive and a private alley on Camino Tassajara. The extension of Fieldstone Drive and all internal alleys would be 30 feet wide. Together these would provide **adequate** access and circulation for vehicles, emergency vehicles, and garbage trucks.
- Closure of Fairwood Court and/or the access easement on the east side of the project site would produce virtually no operational changes at study intersections. The Town of Danville intends to close the Fairwood Court connection to conform to General Plan goals.
- Each single family home would provide the required two parking spaces in enclosed garages, and the site plan shows a total of 37 on-street parking spaces. The project is expected to produce a **less than significant impact** either on-site or on public streets.