



## Memorandum

**Date:** April 1, 2022  
**To:** Nick Pappani, Raney Planning & Management  
**From:** Robert Del Rio, T.E., Luis Descanzo  
**Subject:** Trip Generation and Operations Analysis for the Proposed Catalyst Kids Center Development in Morgan Hill, California

Hexagon Transportation Consultants, Inc. has completed a trip generation and operations analysis for the proposed Catalyst Kids Center development project located at 0 Barrett Avenue (APN 817-30-080) in Morgan Hill, California (see Figure 1). The project as proposed would consist of an 8,420 square foot (s.f.) daycare center to serve up to 100 children. Vehicular access would be provided via a proposed access easement to an existing driveway located at the north approach of the Caputo Drive/Barrett Avenue intersection. No improvements to the existing driveway are proposed. The methodology, results, and recommendations of the analysis are discussed below.

### Scope of Study

The current General Plan, *Morgan Hill 2035 General Plan*, adopted in July 2016 uses Level of Service (LOS) as its primary metric for the evaluation of the projected operation of the City’s roadway system. Therefore, this traffic operations analysis which includes a peak hour intersection level of service analysis is included for consistency with the General Plan goals and policies. The traffic operations analysis supplements the California Environmental Quality Act (CEQA) required VMT analysis provided in a separate memorandum. However, the determination of project impacts per CEQA requirements is based solely on the VMT analysis.

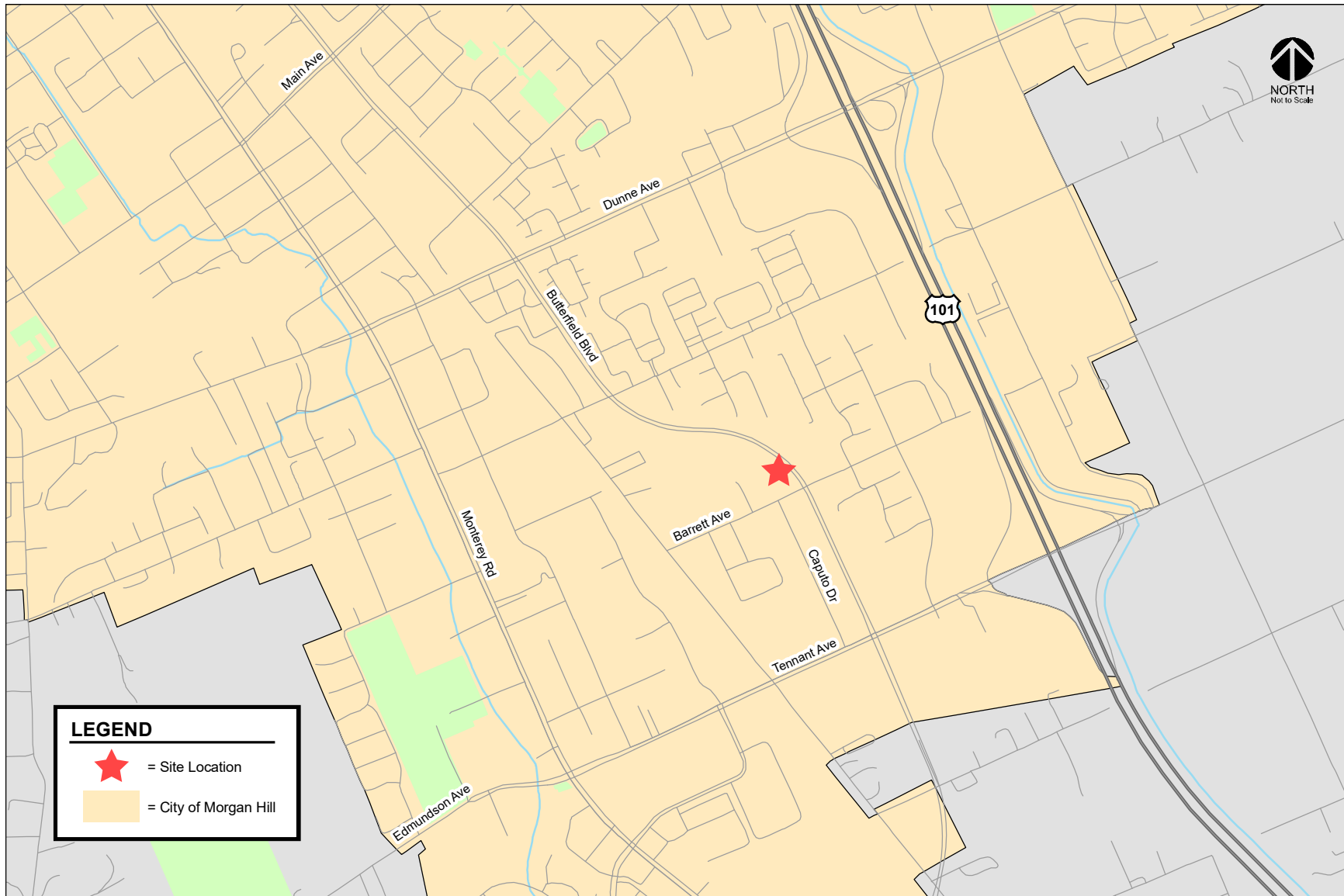
The purposes of the trip generation and operations analysis is to evaluate the magnitude of traffic that would be added to the roadway system due to the proposed project and to determine whether a comprehensive traffic study is required for the proposed project. The analysis consists of an estimation of project trip generation and evaluation peak-hour intersection level of service analysis at intersections in the immediate vicinity of the project site. Traffic conditions were evaluated for the scenarios listed below.

**Existing Conditions.** Existing conditions represent the existing peak-hour traffic volumes on the existing roadway network. Existing traffic volumes were represented by traffic counts collected in March 2022 at the study intersections.

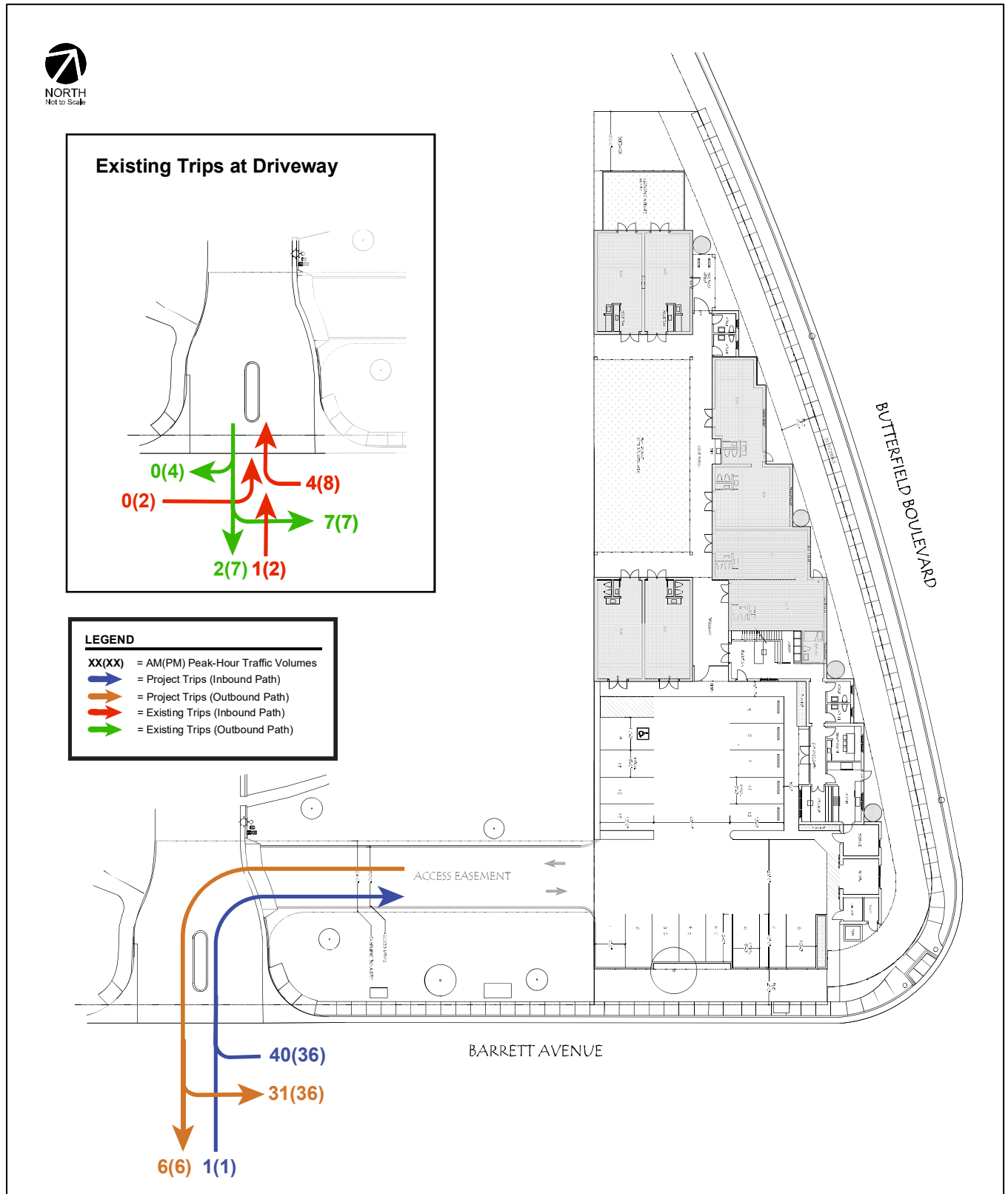
**Existing Plus Project Conditions.** Existing plus project peak-hour traffic volumes were estimated by adding to the existing traffic volumes the additional traffic that would be generated by the proposed project. Existing plus project conditions were evaluated relative to existing conditions in order to determine the effects of the proposed project on existing traffic conditions.

**Year 2025 Cumulative Conditions.** Year 2025 Cumulative conditions represent future traffic volumes on the future transportation network. Year 2025 Cumulative conditions include traffic

**Figure 1**  
**Site Location**



**Figure 2**  
**Site Plan and Project Trips at Driveway**



growth projected to occur in the Year 2025 without the proposed project, including the proposed Lillian Commons (Rosewood) medical campus facility.

**Year 2025 Cumulative with Project Conditions.** Year 2025 Cumulative with project conditions consists of Year 2025 Cumulative traffic conditions with the addition of project traffic.

## Project Trip Generation Estimates and Assignment

In determining the project trip generation, the magnitude of traffic entering and existing the site is estimated for the AM and PM peak hours. Through empirical research, data have been collected that quantify the amount of traffic produced by many types of land uses. The research is compiled in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual, 10th Edition (2017)*. The standard trip generation rates can be applied to help predict the future traffic increases that would result from a new development. Trip generation rates for "Day Care Center" (ITE Land Use 565) were used to estimate the trips generated by the proposed daycare facility. Based on the trip generation rates and the project size, it is estimated that the proposed daycare center will generate 78 new vehicle trips (41 inbound and 37 outbound) during the AM peak hour and 79 vehicle trips (37 inbound and 42 outbound) during the PM peak hour (see Table 1).

**Table 1  
Trip Generation Summary**

Land Use	ITE Land Use Code <sup>1</sup>	Size	Daily		AM Peak Hour					PM Peak Hour						
			Rate	Trip	Pk-Hr Rate	Split		Trip			Pk-Hr Rate	Split		Trip		
						In	Out	In	Out	Total		In	Out	In	Out	Total
<b>Proposed Land Use</b>																
Day Care Center	565	100 children	4.09	409	0.78	53%	47%	41	37	78	0.79	47%	53%	37	42	79
Notes: <sup>1</sup> Source: ITE <i>Trip Generation Manual</i> , 11th Edition 2021.																

The directional distribution of site-generated traffic to and from the project site was estimated based on the existing travel patterns on the surrounding roadway network that reflect typical weekday AM and PM peak commute patterns, the location of the project driveways, freeway access points, and the locations of complimentary land uses. The peak-hour project trips associated with the proposed project were added to the transportation network in accordance with the distribution pattern. The project trip distribution pattern and assignment of project trips at the study intersections under existing plus project conditions are shown on Figure 3.

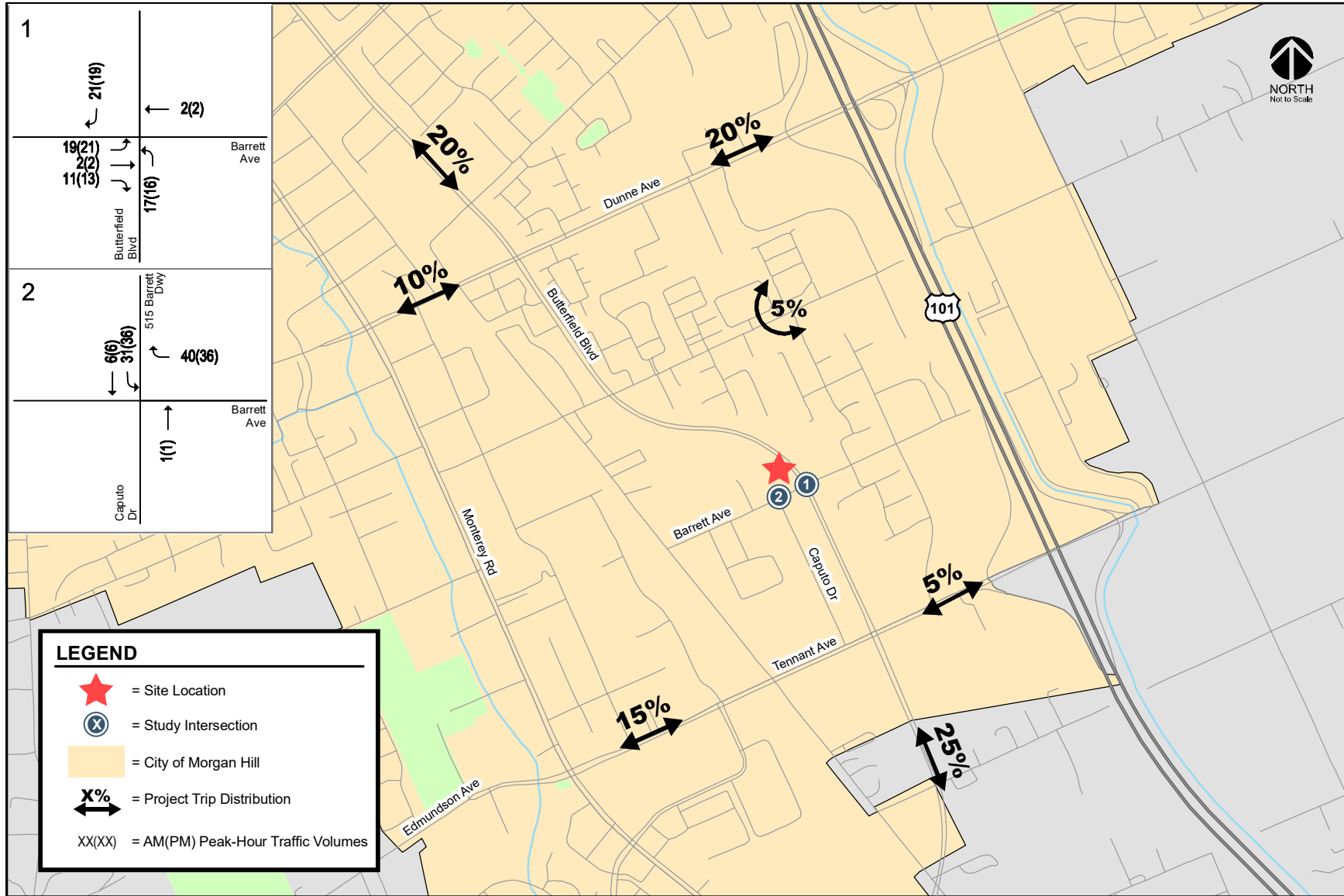
## Intersection Level of Service Analysis

Traffic conditions at the intersection of Butterfield Boulevard/Barret Avenue and Caputo Drive/Barrett Avenue were analyzed for the weekday AM and PM peak hours of traffic. Other intersections in the project area were not studied because the addition of project trips will be minimal, less than 10 peak hour trips per lane. The weekday AM peak hour of traffic generally falls within the 7:00 AM to 9:00 AM period and the weekday PM peak hour is typically in the 4:00 PM to 6:00 PM period. It is during these times that the most congested traffic conditions occur on a typical weekday.

## Signalized Intersection Analysis

Signalized study intersections are subject to the City of Morgan Hill's level of service standards. The City of Morgan Hill's level of service methodology is TRAFFIX, which is based on the 2000 *Highway Capacity Manual* (HCM) method for signalized intersections. TRAFFIX evaluates signalized

**Figure 3**  
**Project Trip Distribution and Project Trip Assignment**



intersections operations based on average delay time for all vehicles at the intersection. Since TRAFFIX is also the CMP-designated intersection level of service methodology, the City of Morgan Hill methodology employs the CMP defaults values for the analysis parameters, which include adjusted saturation flow rates to reflect conditions in Santa Clara County. All intersections within the City of Morgan Hill are required to meet the City's LOS standard of LOS D, with the exception of the following:

- **LOS F** for Downtown intersections and segments including at Main/Monterey, along Monterey Road between Main and Fifth Street, and along Depot Street at First through Fifth Street;
- **LOS E** for the following intersections and freeway zones:
  - Main Avenue and Del Monte Avenue
  - Main Avenue and Depot Street
  - Dunne Avenue and Del Monte Avenue
  - Dunne Avenue and Monterey Avenue
  - Dunne Avenue and Church Street
  - Dunne Avenue and Depot Street
  - Cochrane Road and Monterey Road
  - Tennant Avenue and Monterey Road
  - Tennant Avenue and Butterfield Boulevard
  - Cochrane Road Freeway Zone: from Madrone Parkway/Cochrane Plaza to Cochrane Road/DePaul Drive
  - Dunne Avenue Freeway Zone: from Walnut Grove Drive/East Dunne Avenue to Condit Road/East Dunne Avenue
  - Tennant Avenue Freeway Zone: from Butterfield Boulevard/Tennant Avenue to Condit Road/Tennant Avenue

According to the City of Morgan Hill level of service guidelines, a development is said to create a significant adverse effect on traffic conditions at a signalized intersection if for either peak hour:

1. The level of service at the intersection degrades from an acceptable level (LOS D or LOS E as identified above) under no project conditions to an unacceptable level (LOS E or F) under project conditions, or
2. The level of service at the intersection is an unacceptable level (LOS E or F as identified above) under no project conditions and the addition of project trips causes the average critical delay to increase by four (4) or more seconds *and* the volume-to-capacity ratio (V/C) to increase by 0.01.

An exception to this rule applies when the addition of project traffic reduces the amount of average delay for critical movements (i.e., the change in average delay for critical movements is negative). In this case, the threshold of significance is an increase in the critical V/C value by 0.01 or more.

### Unsignalized Intersections

The methodology used to determine the level of service for unsignalized intersections is also TRAFFIX and the 2000 HCM methodology for unsignalized intersection analysis. This method is applicable for both two-way and all-way stop-controlled intersections. For the analysis of stop-controlled intersections, the 2000 HCM methodology evaluates intersection operations on the basis of average control delay time for all vehicles on the stop-controlled approaches. For the purpose of reporting level of service for one- and two-way stop-controlled intersections, the delay and corresponding level of service for the stop-controlled minor street approach with the highest delay is reported. For all-way stop-controlled intersections, the reported average delay and corresponding level of service is the average for all approaches at the intersection. The City uses a minimum acceptable level of service standard of LOS D for unsignalized intersections, in accordance with its adopted threshold of significance in its Guidelines for Preparation of Transportation Impact Reports.



## **Signal Warrants**

The level of service analysis at unsignalized intersections is supplemented with an assessment of the need for signalization of the intersection. The need for signalization of unsignalized intersections is assessed based on the Peak Hour Volume Warrant (Warrant 3) described in the *California Manual on Uniform Traffic Control Devices for Streets and Highways (CA MUTCD)*, Part 4, Highway Traffic Signals, 2014. This method makes no evaluation of intersection level of service, but simply provides an indication whether vehicular peak hour traffic volumes are, or would be, sufficient to justify installation of a traffic signal. The decision to install a traffic signal should not be based purely on the warrants alone. Instead, the installation of a signal should be considered and further analysis performed when one or more of the warrants are met. Additionally, engineering judgment is exercised on a case-by-case basis to evaluate the effect a traffic signal will have on certain types of accidents and traffic conditions at the subject intersection as well as at adjacent intersections. Intersections that meet the peak hour warrant are subject to further analysis before determining that a traffic signal is necessary. Other options such as traffic control devices, signage, or geometric changes may be preferable based on existing field conditions.

## **Level of Service Results**

The results of the intersection level of service analysis show that the study intersections of Butterfield Boulevard/Barret Avenue and Caputo Drive/Barrett Avenue currently operate and are projected to continue to operate at an acceptable LOS B or better conditions under Year 2025 Cumulative conditions, and the addition of project traffic would not result in the degradation of the study intersections' levels of service during the AM and PM peak hours. Additionally, peak-hour volumes at the unsignalized intersection of Caputo Drive/Barrett Avenue would not meet signal warrant thresholds.

Based on the results of the intersection level of service analysis, the project would not have an adverse effect on operations at the study intersections. The results of level of service analysis are summarized in Table 2.

## **Site Access**

The evaluation of site access is based on the site plan prepared by Casey Trudeau Design dated September 2021. Site access was evaluated to determine the adequacy of the site's access points with regard to the following: traffic volume, geometric design, and sight distance. Site access was evaluated in accordance with generally accepted traffic engineering standards and transportation planning principles.

As shown on Figure 2, vehicular access to the project site would be provided via a proposed access easement to an existing driveway located at the north approach of the Caputo Drive/Barrett Avenue intersection. No improvements to the existing driveway are proposed.

## **Driveway Operations**

Based on the project trip generation and trip assignment, it is estimated that a maximum of 41 inbound trips (AM peak-hour) and 42 outbound trips (PM peak-hour) would enter and exit the site. Figure 2 shows the estimated project trips at the project driveway, as well as existing traffic based on turning movement counts collected on March 22, 2022. Based on the relatively low traffic volumes on Barrett Avenue and at the existing driveway, operational issues are not expected to occur at the proposed shared driveway.

**Table 2**  
**Intersection Level of Service Summary**

Int. #	Intersection	Existing Control	Year 2025 Control	LOS Standard	Peak Hour	Count Date	Existing			Existing + Project				2025 Cumulative No Project			2025 Cumulative Plus Project					
							Warrant Met?	Delay <sup>1</sup>	LOS	Warrant Met?	Delay <sup>1</sup>	LOS	Incr. In Crit. Delay	Incr. In Crit. V/C	Warrant Met?	Delay <sup>1</sup>	LOS	Warrant Met?	Delay <sup>1</sup>	LOS	Incr. In Crit. Delay	Incr. In Crit. V/C
1	Barrett Avenue and Butterfield Boulevard	Signal	Signal	D	AM	03/22/22	--	10.9	B	--	11.2	B	0.0	0.000	--	12.9	B	--	13.1	B	0.0	0.000
					PM	03/22/22	--	9.9	A	--	10.3	B	0.3	0.014	--	11.5	B	--	11.7	B	0.2	0.011
2	Caputo Drive/515 Barrett Ave Driveway and Barrett Avenue	TWSC	TWSC	D	AM	03/22/22	No	9.4	A	No	9.7	A	N/A	N/A	No	9.7	A	No	10.1	B	N/A	N/A
					PM	03/22/22	No	9.5	A	No	10.0	A	N/A	N/A	No	9.8	A	No	10.5	B	N/A	N/A

Notes:  
<sup>1</sup>The reported delay and corresponding level of service for signalized and all-way stop-controlled intersections represent the average delay for all approaches at the intersection.  
 The reported delay and corresponding level of service for one- and two-way stop-controlled intersections are based on the stop-controlled approach with the highest delay.



## Sight Distance

The project driveway should be free and clear of any obstructions to provide adequate sight distance, thereby ensuring that exiting vehicles can see pedestrians on the sidewalk and other vehicles traveling on Barrett Avenue. Landscaping and signage should be located in such a way to ensure an unobstructed view for drivers exiting the site. Sight distance generally should be provided in accordance with Caltrans standards. The minimum acceptable sight distance is most often the stopping sight distance.

Barrett Avenue has a posted speed limit of 30 mph. For a design speed of 30 mph, the recommended Caltrans' stopping sight distance is 200 feet. Based on the project site plan and observations in the field, the proposed shared driveway has adequate sight distance along westbound and eastbound Barrett Avenue.

## On-Site Circulation

The project proposes to install a 20-foot wide access easement drive aisle, approximately 50 feet north of the existing driveway on Barrett Avenue. The easement drive aisle would lead to a surface parking lot with space for 17 vehicles. Drive aisles within the parking lot would measure at least 25 feet wide. It should be noted that the parking lot does not have looped drive aisles. Therefore, all entering vehicles must park or turn around within the drive aisles to exit the parking lot.

Passenger loading areas (for drop-off and pick-up) are not indicated on the site plan. Therefore, it is expected that parents will park and accompany their child into and out of classrooms. Based on the trip generation, it is estimated that approximately 41 inbound vehicles will enter during the AM peak-hour. Excessive queueing on-site is not anticipated, assuming that arrivals are spread throughout the AM drop-off period and that most parents will not stay after dropping-off their child. In the event that the parking lot becomes temporarily full, the easement drive aisle would have space for approximately 5 vehicles before the queue reaches the shared driveway.

To ensure that parents are able to park and depart parking spaces, the daycare center should place staff along the easement drive aisle to facilitate entry and exit of the parking lot during peak drop-off/pick-up periods. Ideally staff at the drive aisle would communicate with staff within the facility as parents arrive to efficiently manage the drop-off/pick-up operations. The use of staff during peak drop-off/pick-up periods also would minimize queues that may extend out of the easement drive aisle and block the Barrett Avenue drive aisle.

Given the limited number of parking spaces, the daycare also should consider staggered drop-off/pick-up times to minimize the number of vehicles on-site. An example of a staggered schedule would require half of the student body to be dropped off/picked-up 20 minutes ahead of the other half of the student body.

## Transit, Pedestrian, and Bicycle Facility Evaluation

The nearest VTA bus routes in the project area run along Monterey Road. Frequent Route 68 and Rapid Route 568 (Gilroy Transit Center to San Jose Diridon Transit Center) serve bus stops at the intersection of Monterey Avenue and Tennant Avenue, approximately 0.9-mile walking distance from the project site.

In the vicinity of the project site, there are sidewalks along most roadways and crosswalks provided at signalized intersections. There are missing sidewalks along Barrett Avenue located west of the project site. However, the area west of the project site consists of only industrial uses.

There are bike lanes in the project area along Butterfield Boulevard (including along the project frontage), Tennant Avenue, and Monterey Road. The project is not expected to generate a significant amount of bicycle trips. The demand generated by the proposed project could be accommodated by the existing bicycle facilities in the vicinity of the project site.

## Traffic Study Requirements

The need for the preparation of a comprehensive traffic impact analysis for a particular development is based on its estimated trip generation and its effect on surrounding transportation facilities. The City of Morgan Hill requires the completion of a full traffic impact analysis if one of the following criteria are met:

1. Generates 100 or more net new peak hour trips; except that projects located in the 14-block Downtown Core area are exempt from this requirement. Net new peak hour trips are defined as the number of trips generated by the proposed development minus trips generated by existing development on the project site. (This threshold is consistent with the Valley Transportation Authority (VTA) policy.)
2. Adds 50 to 99 net new peak hour trips to the roadway system where nearby intersections are currently operating at or below the City's LOS standard, or projected to operate at or below the City's LOS standard with traffic added by approved developments; except that projects located in the 14-block Downtown Core area are exempt from this requirement. Adjacent or nearby intersections are defined as intersections to which the proposed development or proposed land use change adds 10 or more vehicle peak hour trips per lane.
3. Creates a transportation issue that City staff requests to have analyzed.

The proposed project will result in the addition of 78 net new AM peak-hour trips and 79 net new PM peak-hour trips to the roadway system under existing plus project conditions.

The results of the intersection level of service analysis show that the two study intersections are currently operating at better than the City's LOS standard and the addition of project traffic would not result in the degradation of the study intersections' levels of service during the AM and PM peak hours.

Therefore, the evaluation of trip generation and intersection operations concludes that the proposed project will not result in an adverse effect on operations to intersections in the project area and is consistent with the *Morgan Hill 2035 General Plan* goals and policies. However, City staff ultimately determines the need for traffic studies for new developments.