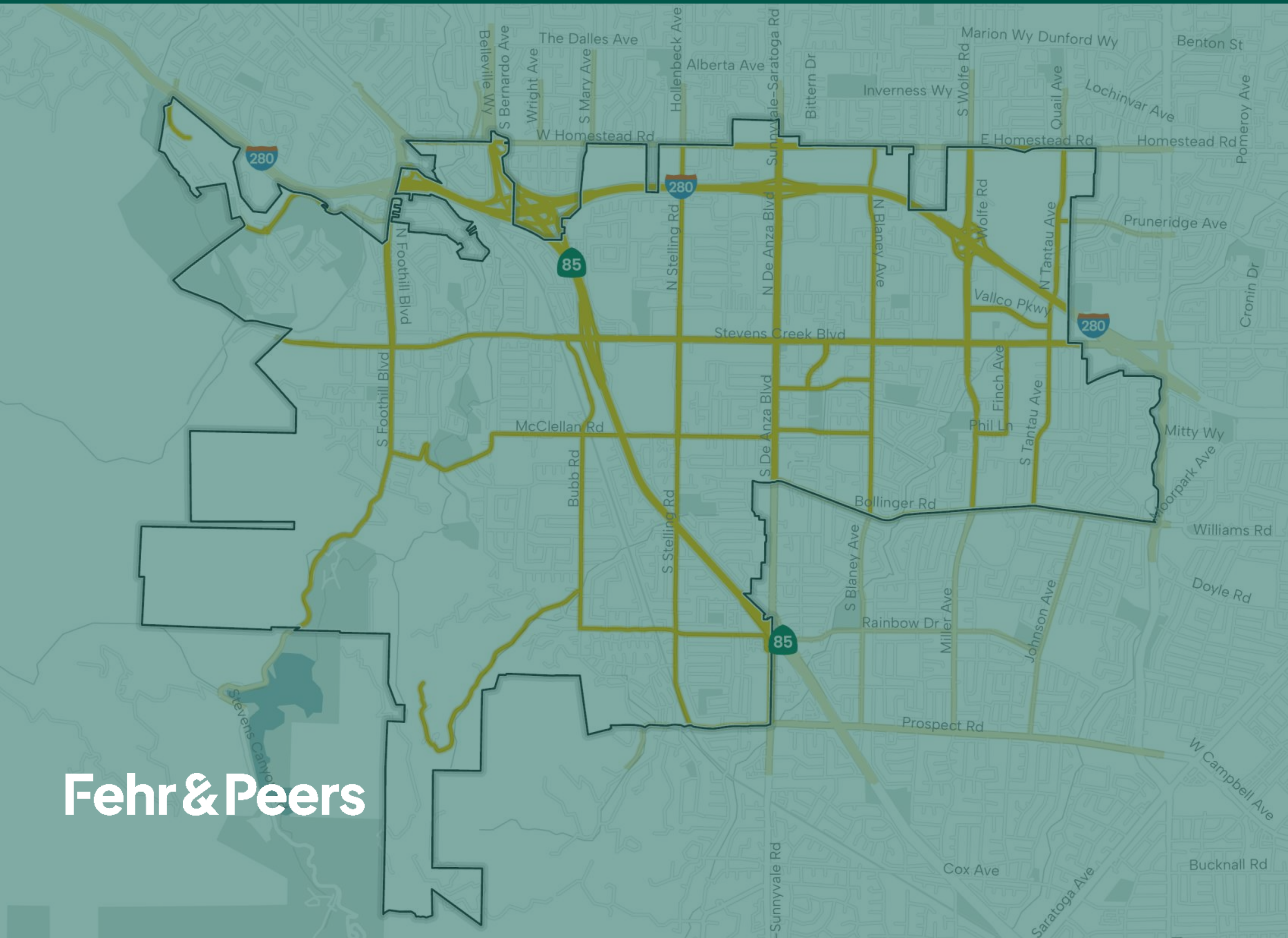
Cupertino Evacuation Route Capacity Assessment

Submitted to:
City of Cupertino

Submitted in:
October 2025



Fehr & Peers

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1. Introduction

The City of Cupertino's comprehensive planning efforts make it appropriate to assess evacuation route capacity while simultaneously updating the General Plan and Emergency Operations Plan.

This assessment provides the City of Cupertino with emergency evacuation event information and is consistent with requirements outlined in Assembly Bill (AB) 747 (2019) and AB 1409 (2021), which specifically require local agencies to evaluate evacuation routes capacity and identify evacuation locations. This supplements the analysis that was prepared for the *Draft Health and Safety Element Update* (March 2025) regarding residential street accessibility to identify parcels in hazard areas with limited egress routes as required by Senate Bill (SB) 99.

1.1 Study Purpose

The following is a summary of the purpose of this evacuation study:

- Identify major evacuation routes and shelter locations/gateways;
- Inform development of evacuation strategies and conduct evacuation route capacity assessment of wildfire evacuation scenarios with other hazards that could limit evacuation route capacity;
- Identify bottlenecks on major evacuation routes based on the evacuation route capacity assessment results;
- Identify evacuation strategies to improve performance of the road network during evacuations; and
- Identify potential future/ongoing efforts for a detailed Evacuation Plan.

1.2 Study Context

This assessment evaluates roadway capacity under certain described scenarios and should not be considered an evacuation plan. Emergency evacuations can be triggered by a number of events, and natural and man-made disasters can be as unpredictable as individual behavior related to evacuation events. As such, this assessment is intended to provide the City of Cupertino with a broad “planning level” assessment of transportation system capacity during worst case evacuation scenarios; it does not provide system adequacy guarantees, nor does it guarantee the findings are applicable to all situations. This assessment will help the City develop policies to prioritize evacuation routes and centers based on the findings of this analysis.

Moreover, because emergency evacuation assessment is an emerging field, there is no established standard methodology. We have utilized existing methods in transportation planning that, in our knowledge and experience, we believe offer the most appropriate planning level understanding of roadway capacity for evacuation events. Nevertheless, such methods are limited by the budgetary and time constraints in our scope of work, by the current state of the practice, and of our knowledge.

The City of Cupertino has requested this study to aid in planning and implementing potential evacuation plans/scenarios. This assessment should help the city be better prepared for those events; however, in no way can Fehr & Peers guarantee the efficacy of the information used in this assessment, as such would be beyond our professional duty and capability.

1.3 Natural Hazards

The *Health and Safety Element Background Report* (July 23, 2025) described the following potential natural hazards. For this assessment, we considered various natural hazards in the preparation of evacuation scenarios. The natural hazards are described

1.3.1 Flood and Inundation Hazards

Flooding is the rising and overflowing of water onto normally dry land. Floods are one of the most frequent natural hazards impacting Santa Clara County and among the costliest natural disasters in terms of human hardship and economic loss nationwide, causing substantial damage to structures, landscapes, and utilities, as well as life-safety issues. Flooding can be extremely dangerous; even six inches of moving water can knock a person over. Floodwaters can transport large objects downstream, damaging or removing stationary structures, such as dam spillways. Ground saturation can result in instability, collapse, or other damage that breaks utility lines and interrupts services. Objects can also be buried or destroyed through sediment deposition from heavy flooding. Standing water can cause damage to roads, foundations, and electrical circuits, as well as spread vector-borne illnesses. Other problems connected with flooding and stormwater runoff include erosion, degradation of water quality, and losses of environmental resources.

Floods are usually caused by large amounts of stormwater, either from a period of very intense rainfall or a long period of steady rain. Historically, Cupertino has been at risk of flooding primarily during the winter and spring when stream systems swell with heavy rain. This type of flood results from prolonged, heavy rainfall and typically occurs due to high peak flows of moderate duration and a large volume of runoff. Flooding is more severe when prior rainfall has saturated the ground. The watersheds in the Santa Cruz Mountains feed into four major streambeds that traverse the city, Permanente Creek, Stevens Creek, Regnart Creek, and Calabazas Creek. These creeks collect surface runoff and drain into channels leading to the San Francisco Bay. During heavy rainfall, these creeks create a potential flooding risk in the city as water levels may exceed the top of the creekbank.

Occasionally, flash flooding from short-duration, high-intensity precipitation events (often during atmospheric river events) may occur. Atmospheric rivers are a relatively common weather pattern that brings southwest winds and heavy rain to California. Atmospheric rivers are long, narrow regions in the atmosphere that transport water vapor carried away from the tropics. These columns of vapor move with the weather, carrying large amounts of water vapor and strong winds. When the atmospheric rivers make landfall, they often release this water vapor in the form of rain or snow, often causing heavy rains that can lead to flooding and mudslide events. Flash floods can occur even during a drought. Such events can tear out trees, undermine buildings and bridges, and scour creek channels. In urban areas, flash flooding is an increasingly serious problem due to removing vegetation and replacing groundcover with impermeable surfaces such as roads, driveways, and parking lots. The greatest risk from flash floods is occurrence with little to no warning.

1.3.1.1 Dam and Pipeline Failure

A dam failure is an uncontrolled release of water from a reservoir through a dam because of structural failures or deficiencies in the dam, usually associated with intense rainfall or prolonged flooding. Water pipeline or aqueduct failures can create a similar sudden flood. Dam and pipeline failures can range from minor to catastrophic, potentially harming human life and property downstream from the failure. In addition, ecosystems and habitats can be destroyed by fast-moving floodwaters, debris, and sedimentation from inundation. Although dam and pipeline failures are very rare, these events are not unprecedented. There are four major causes of failures:

- **Overtopping**: These failures occur when a reservoir fills too high with water, especially in times of heavy rainfall, leaving water to rush over the top of the dam. Other causes of this type of failure include settling of the crest of the dam or spillway blockage.
- **Foundation defects**: These failures occur as a result of settling in the foundation of the dam, instability of slopes surrounding the dam, uplift pressures, and seepage around the foundation. All these failures result in structural instability and potential dam failure.
- **Piping and seepage failures**: These failures occur as a result of internal erosion caused by seepage and erosion along hydraulic structures, such as the spillways of a dam, or failures in the walls of a water pipeline. Animal burrows and cracks in the dam structure may also cause erosion.
- **Conduit and valve failure**: These failures occur as a result of problems with valves and conduits in a dam or pipeline's systems.

Many dam and pipeline failures are also the secondary result of other natural disasters, such as earthquakes, landslides, and extreme storms. Other causes include equipment malfunction, structural damage, and sabotage. Dams are constructed with safety features known as "spillways" that allow water to overtop the dam if the reservoir fills too quickly. Spillway overflow events, often referred to as "design failures", result in increased discharges downstream and increased flooding potential. In a dam failure scenario, the greatest threat to life and property typically occurs in those areas immediately below the dam since flood depths and discharges generally decrease as the flood wave moves downstream. The primary danger associated with dam failure is the high-velocity flooding downstream of the dam and limited warning times for evacuation.

1.3.2 Seismic And Geologic Hazards

Seismic and geologic hazards are risks caused by the movement of different parts of the earth's crust or surface. Seismic hazards include earthquakes and hazardous events caused by them. Geologic hazards are other hazards involving land movements that are not linked to seismic activity and can inflict harm to people or property. Additional information about seismic and geologic hazards in Cupertino, including development review coordination is in General Plan Appendix E, Geologic and Seismic Hazards.

1.3.2.1 Seismic Hazards

Seismic activity occurs along boundaries in the earth's crust, called faults. Pressure along the faults builds over time and is ultimately released, resulting in ground shaking commonly referred to as an earthquake. Earthquakes can also trigger other hazards, including surface rupture (cracks in the ground surface), liquefaction (causing loose soil to lose its strength), landslides, and subsidence (sinking of the ground surface). Earthquakes and other seismic hazards often damage or destroy property and public infrastructure, including utility lines, and falling objects or structures pose a risk of injury or death.

1.3.2.1.1 EARTHQUAKES

While Cupertino is at risk from many natural and human-caused hazards, the event with the greatest potential for loss of life or property and economic damage is an earthquake. This risk is true for most of the San Francisco Bay Area region since damaging earthquakes affect widespread areas and trigger many secondary effects that can overwhelm the ability of local jurisdictions to respond.

Earthquakes in the Bay Area result from strain energy constantly accumulating across the region because of the motion of the Pacific Plate, relative to the North American Plate.

Earthquake risk is very high in Santa Clara County, including the City of Cupertino, due to the presence of three major active faults[1] in the region, the Hayward Fault, Calaveras Fault, and San Andreas Fault. Both the San Andreas and the Hayward Faults have the potential for experiencing major to great events.

1.3.2.1.2 OTHER SEISMIC HAZARDS

In addition to the direct physical damage that can result from the motion of an earthquake, damage can result from liquefaction. Liquefaction occurs primarily in saturated, loose, fine- to medium-grained soils in areas where the groundwater table is within approximately 50 feet of the surface. Shaking causes the soils to lose strength and behave as a liquid. Excess water pressure is vented upward through fissures and soil cracks and can result in a water-soil slurry flowing onto the ground surface. This subsurface process can lead to near-surface or surface ground failure that can result in property damage and structural failure. Groundwater that is less than 10 feet to the surface can cause the highest liquefaction susceptibility, with lower groundwater levels causing lower liquefaction risks.

1.3.2.2 Geologic Hazards

Landslides and rock falls may occur in sloped areas, especially areas with steep slopes, and usually in loose and fragmented soil areas. Slope stability depends on many factors and interrelationships, including rock type, pore water pressure, slope steepness, and natural or human-made undercutting. Landslides, rockfalls, and debris flows occur continuously on all slopes; some processes act very slowly, while others occur very suddenly, often with disastrous results.

Landslides are often triggered by other natural hazards, such as heavy rain, floods, or wildfires, so landslide frequency is often related to the frequency of these other hazards. In Santa Clara County, landslides typically occur during and after severe heavy rainfall, so the risk of landslides often rises during and after sequential severe storms that saturate steep, loose soils. Landslides and mudslides are a common occurrence and have caused damage to homes, public facilities, roads, parks, and sewer lines.

1.3.3 Fire Hazards

Fire hazards include both wildfires and urban fires. The combination of complex terrain, climate, vegetation and development patterns contribute to an elevated risk of wildfire. The Community Wildfire Protection Plan 2023 (CWPP) describes how each of these variables contributes to fire risk, and describes how fire risk varies throughout the city. Historically, the fire season extended from early summer through late fall of each year during the hotter, dryer months, although it is increasingly a hazard that can occur year-round. Fire conditions arise from a combination of high temperatures, low moisture content in the air and plant matter, an accumulation of vegetation, and high winds.

Three types of fires are of concern to Cupertino: (1) wildfires, (2) wildland-urban interface fires, and (3) structural fires.

[1] Active faults are defined by their current movement and deformation and their potential to cause earthquakes or other types of ground deformation in the future.

1.3.3.1 Wildfires

Wildfires occur on mountains, hillsides, and grasslands. Fuel, weather, and topography are primary factors that affect how wildland fires spread. In and around Cupertino, grassland and woodland habitat provide highly flammable fuel that is conducive to wildfires. These plant species are capable of regeneration after a fire, making periodic wildfires a natural part of the ecology of these areas. The climate of Cupertino and the surrounding area keeps the grass dry and more readily combustible during fire season.

Wildfire potential for Santa Clara County is typically greatest in the months of August, September, and October, when dry vegetation coexists with hot, dry winds. During these times, controlling a fire becomes far more difficult. Areas adjacent to the city that are susceptible to wildfires are also of concern as these conditions could exacerbate vulnerabilities within the city. Grassland fires are easily ignited, particularly in dry seasons. These fires are relatively easily controlled if they can be reached by fire equipment, although after a fire, the burned slopes are highly subject to erosion and gullying. While brushlands are naturally adapted to frequent light fires, fire suppression in recent decades has resulted in heavy fuel accumulation on the ground. Wildland fires, particularly near the end of the dry season, tend to burn fast and very hot, threatening homes and leading to serious destruction of vegetative cover. In woodland and forested areas, a wildland fire can generate a destructive crown fire, which is a fire that burns materials at the top of trees, spreading from treetop to treetop. They can be very intense and difficult to contain.

Because areas of the city with natural vegetation are extremely flammable during late summer and fall, wildfire is a serious hazard in undeveloped hillside areas in the western portion of the city, as well as open space areas adjacent to the city. These areas include State Responsibility Area (SRA) lands west of the city, such as the Rancho San Antonio Open Space, Picchette Ranch Open Space, Stevens Creek County Park, Saratoga Creek County Park, Sanborn County Park, Fremont Older Open Space, as well as Local Responsibility Area (LRA) lands in the hillsides of Saratoga.

1.3.4 Hazardous Waste And Materials

Hazardous materials are materials that pose a significant risk to public safety, or human and environmental health. These include toxic chemicals, flammable or corrosive materials, petroleum products, and unstable or dangerously reactive materials. They can be released through human error, malfunctioning or broken equipment, or as an indirect consequence of other emergencies (e.g., if a flood damages a hazardous material storage tank). Hazardous materials can also be released accidentally during transportation because of vehicle accidents.

The release or spill of bulk hazardous materials could result in fire, explosion, toxic cloud, or direct contamination of water, people, and property. The effects may involve a local site or many square miles. Health problems may be immediate, such as corrosive effects on the skin and lungs, or gradual, such as the development of cancer from a carcinogen. Property damage could range from immediate destruction by explosion to permanent contamination by a persistent hazardous material. Most hazardous materials in the region are transported on truck routes along major roadways, such as I-280 and SR-85 that pass through Cupertino. The most vulnerable areas along this route are considered the on-/off-ramps and interchanges. Since 1970, one reported roadway hazardous materials incident occurred in Cupertino.

2. Background

2.1 Legislative Requirements

Assembly Bill (AB) 747 (2019) and AB 1409 (2021) both mandate local jurisdictions to update their safety elements to include comprehensive evacuation planning.

- **AB 747 (2019)** adds California Government Code Section 65302.15, which requires the safety element to be reviewed and updated, upon the next update of a local hazard mitigation plan (LHMP) after January 1, 2022, to identify evacuation routes and their capacity, safety, and viability under a range of emergency scenarios.[2]
- **AB 1409 (2021)** adds evacuation locations to Section 65302.15 of the California Government Code and requires the safety element to be reviewed and updated to identify evacuation locations.

Accordingly, this report considers:

- **Identification of Evacuation Routes**: The study identifies all evacuation routes and assesses their capacity, safety, and viability under various emergency scenarios.
- **Capacity Assessment**: The study evaluates the capacity of evacuation routes to handle the expected volume of traffic and evacuees during an emergency.
- **Safety and Viability**: The study considers the safety and viability of the identified routes and centers for use during emergencies.
- **Mapping Evacuation Gateways**: This involves mapping evacuation centers and shelters and/or shortest path to evacuation gateways to ensure they are accessible and adequately equipped.
- **Policy Development**: Policies to prioritize evacuation routes and centers based on the findings.
- **Integration with Local Hazard Mitigation Plans (LHMP)**: Updates to the *Health and Safety Element* should be coordinated with the existing LHMP or other relevant emergency planning documents to ensure consistency and alignment.

2.2 Emergency Planning in Cupertino

This City of Cupertino maintains and publishes several emergency planning documents:[3]

> The **Emergency Operations Plan (2019)**[4] provides guidance on the City's response to the most likely and demanding emergency conditions. It outlines the incident management structure, legal compliance, whole community engagement, continuity of government, and other critical components.

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[2] The City of Cupertino participated in the Santa Clara County Multi-Jurisdictional Hazard Mitigation Plan which was approved by FEMA in February 2024 which triggered compliance with this requirement.

[3] https://www.cupertino.gov/files/assets/city/v/1/your-city/documents

[4] https://www.cupertino.gov/files/assets/city/v/1/your-city/documents/cupertino-emergency-operations-plan.pdf. Accessed August 28, 2025.

The **Health and Safety Element (last amended in 2005, with minor edits in 2015)**[5], a Chapter in the General Plan, describes local hazards and mitigation measures. It identifies that people in the foothills and mountains of Cupertino's planning area, covering approximately 16 square miles, are most at risk from fire. The City is currently updating the *Health and Safety Element*. The *Health and Safety Element Update* lists the following policies to prepare for and respond to disasters and emergencies:

- Policy HS-2.1: Building And Fire Code Compliance
- Policy HS-2.2: Promote Emergency Preparedness
- Policy HS-2.3: Emergency Operations And Training
- Policy HS-2.4: Volunteer Groups
- Policy HS-2.5: Emergency Public Information
- Policy HS-2.6: Fire Prevention And Emergency Preparedness
- Policy HS-2.7: Hazard Preparedness
- Policy HS-2.8: Educational And Outreach Materials
- Policy HS-2.9: Poor Air Quality Event Assistance
- Policy HS-2.10: Disaster Medical Response
- Policy HS-2.11: Evacuation Routes
- Policy HS-2.12: Evacuation Awareness
- Policy HS-2.13: Ingress And Egress
- Policy HS-2.14: Secondary Ingress And Egress.
- Policy HS-2.15: Emergency Access

The City's **Local Hazard Mitigation Plan (LHMP) (February 21, 2024)**[6] is an annex to the Santa Clara County Multijurisdictional Hazard Mitigation Plan. It assesses potential hazard risks as well as mitigation measures to prevent loss of life, injury, and property damage. It identifies earthquake, severe weather, flood, landslide, and wildfire as hazards of greatest concern. In the LHMP, Table 17 lists the actions that comprise the City's hazard mitigation action plan.

The **Community Wildfire Protection Plan (CWPP) (2023)**[7] describes projects from the Santa Clara County CWPP (2023). These plans are required to be updated every five years to remain eligible for funding implementation projects through the Fire Safe Councils and CAL FIRE.

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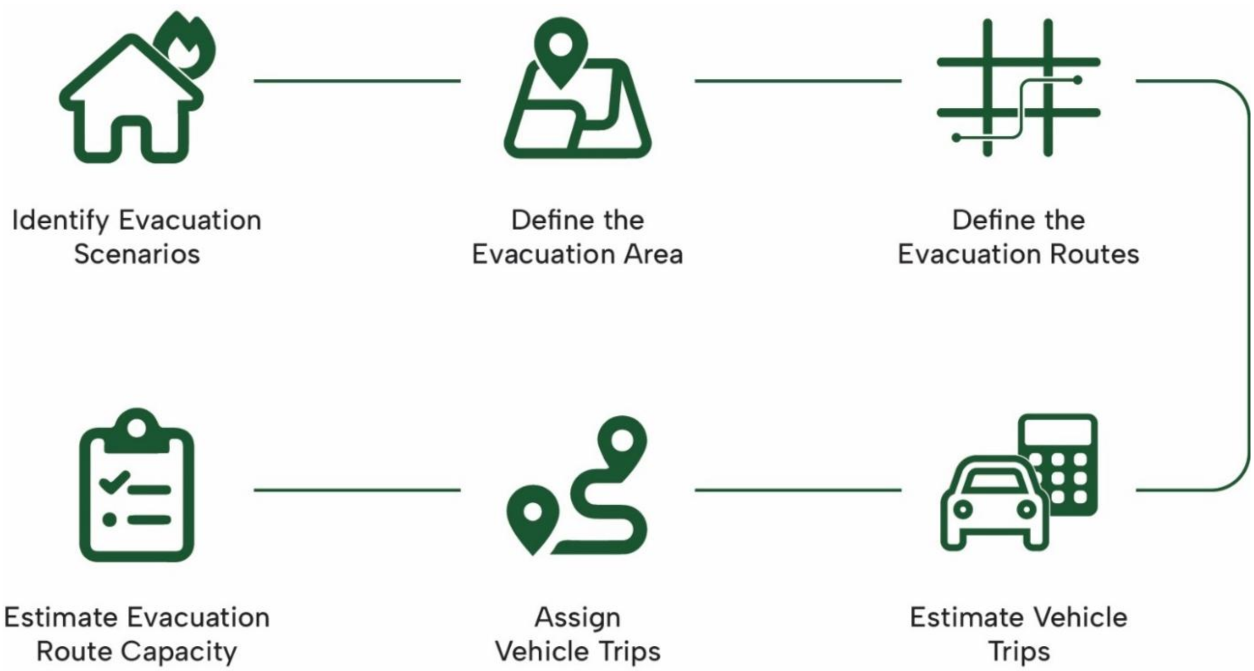
[5] https://www.cupertino.gov/files/assets/city/v/1/your-city/documents/gp-chap-06-health.pdf. Accessed August 28, 2025.

[6] https://oem.santaclaracounty.gov/multi-jurisdictional-hazard-mitigation-plan-mjhmp. Accessed October 24, 2025.

[7] https://www.sccfd.org/santa-clara-county-community-wildfire-protection-plan/. Accessed October 24, 2025.

3. Approach and Methods

This analysis focuses on the transportation system capacity during a wildfire evacuation event. The following flow chart illustrates the steps in the process.



3.1 Identify the Evacuation Scenarios

Fehr & Peers, City of Cupertino staff, the Santa Clara County Fire Department, and the Santa Clara County Sherriff's Office worked together to identify the hazard of highest concern for this assessment (wildfires in the Fire Hazard Severity Zone (FHSZ)) and three evacuation scenarios. In developing the evacuation scenarios, all hazards identified in **Section 1.3** were considered. The defined evacuation scenarios represent hazards with the greatest potential to generate the largest number of vehicles requiring evacuation. Consideration was given to wildfire vulnerability, as well as access limitations that may occur due to compounding hazards such as a landslide or flood damage along an evacuation route.

Table 1 defines the evacuation scenarios. **Scenarios A to C** reflect Existing Conditions in year 2025. This assessment conducted baseline analysis using existing socioeconomic conditions to establish current evacuation performance and identify potential constraints under present-day conditions. This provides a foundation for evaluating how future growth could affect evacuation route capacities. When considering cumulative conditions with projected buildout, increased evacuation population would likely exacerbate bottlenecks identified in the baseline analysis.

These scenarios assume no evacuation population will "shelter in place" within the hazard area or evacuation area. Instead, these scenarios evaluate evacuation from the evacuation area using the shortest path.

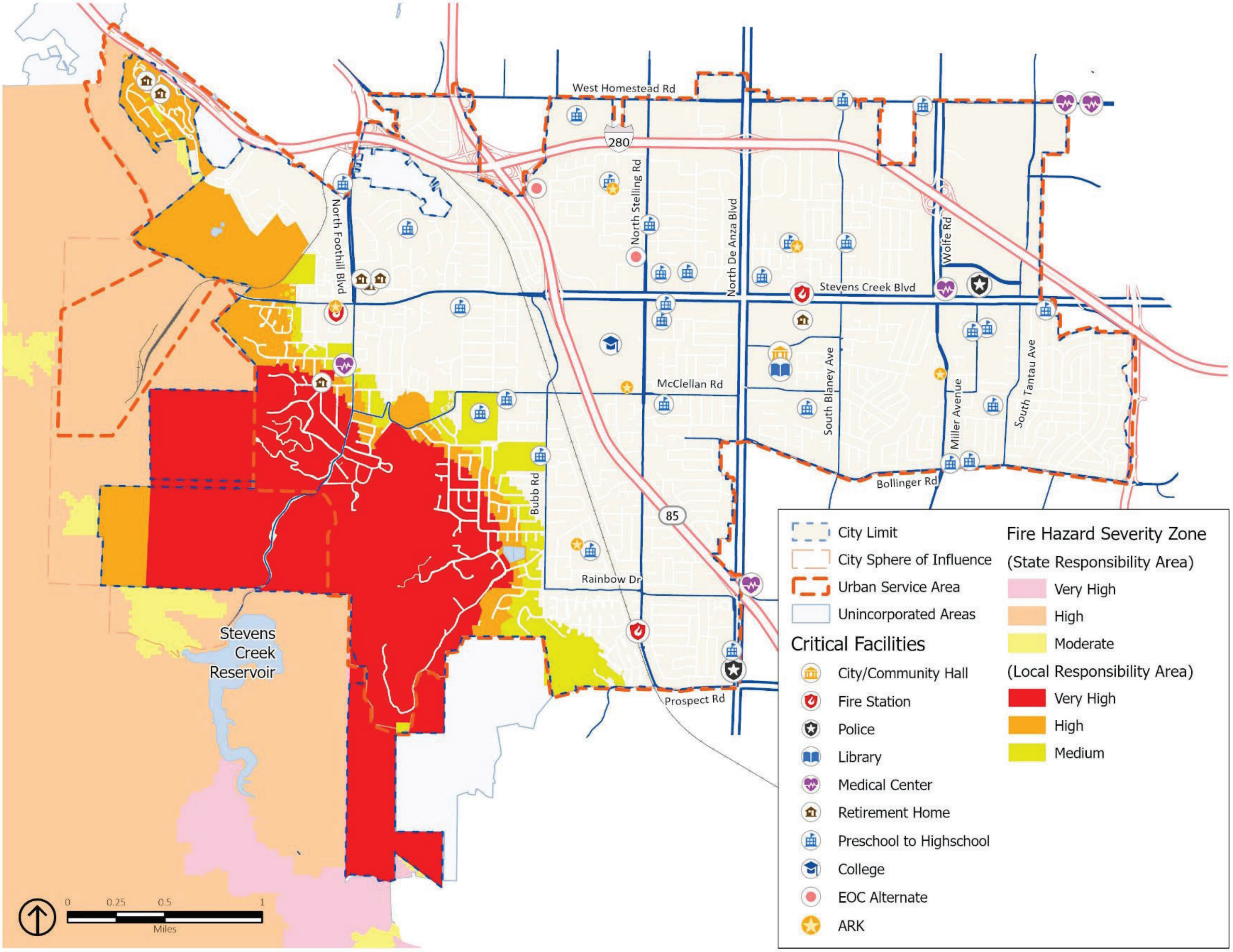
- **Scenario A** was assessed quantitatively. It assumes a wildfire-triggered evacuation within the evacuation area at 2 PM on a school day. All roadways are assumed to be accessible to evacuees, which include residents, employees, students, and visitors.
- **Scenario B** was assessed quantitatively. It assumes a wildfire-triggered evacuation following an earthquake at 6 AM, during a time when schools are not in session. McClellan Road at Club House Lane near the Deep Cliff Golf Course is assumed to be closed. Evacuees include residents and a small portion of employees.
- **Scenario C** was assessed qualitatively. It is based on **Scenario A** by assuming the same evacuation demand, but with additional roadway closures on Stevens Creek Boulevard at SR-85 and SR-85 Southbound Ramps at Stevens Creek Boulevard because of an earthquake causing the wildfire.

Table 1: Scenario Definitions

	Scenario A (Quantitative)	Scenario B (Quantitative)	Scenario C (Qualitative)
Hazard Type(s)	Wildfire	Wildfire after Earthquake	Wildfire after Earthquake
Scale of Emergency	Evacuation Area[1]	Evacuation Area[1]	Evacuation Area[1]
Time of Event	Fall 2 PM (School in session)	Summer 6 AM (School not in session)	Fall 2 PM (School in session)
Road Closures due to Hazard	All roadways open	McClellan Road at Club House Lane near the Deep Cliff Golf Course due to earthquake	• Stevens Creek Boulevard at SR-85 • SR-85 Southbound Ramps at Stevens Creek Boulevard
Type of Evacuees	Residents, employees, students, visitors	Residents, small portion of employees	Residents, employees, students, visitors

Notes:
1. The boundary of evacuation area is defined as the Genasys Protect zones within the fire hazard severity zone (FHSZ) lands in the western portions of the City and homes within the foothills of the Santa Cruz Mountains, shown in **Figure 1**.

Source: Fehr & Peers, 2025.



Source: City of Cupertino, 2023; Cal FIRE, 2022

Data Source: Health and Safety Element Background Report, July 23, 2025

FIGURE 1

Fire Hazard Severity Zones

3.2 Define the Evacuation Area

According to the Cupertino Municipal Code Chapter 16.74.020, "Wildland-Urban Interface (WUI) or Wildland-Urban Interface Fire Area (WUIFA) mean a geographical area identified by the state as a Fire Hazard Severity Zone in accordance with the Public Resources Code Sections 4201 through 4204 and Government Code Sections 51175 through 51189, or other areas designated by the enforcing agency to be at a significant risk from wildfires". The evacuation area is defined as the Genasys Protect[8] zones within the WUI, or the moderate to very high FHSZ in Cupertino. **Figure 1** illustrates the fire hazard severity zones included in the *Health and Safety Element Background Report*.

The safe area is established at SR-85 and I-280 and serves as the evacuation gateway, representing the boundary beyond which evacuees are considered to have exited the evacuation area, and are therefore no longer at immediate risk.

3.3 Define Evacuation Routes

This analysis uses the evacuation routes provided by the City of Cupertino in August 2025, developed as part of the City's ongoing effort to update its *Health and Safety Element*. The evacuation routes for the City of Cupertino and surrounding unincorporated areas are used to transport evacuees using their own vehicle and transit dependent evacuees to temporary shelter. This analysis assumes that routes that provide the most direct path to evacuate the community with the least exposure to risk will be used by evacuees. The major evacuation routes consider the location of critical facilities (i.e., safety and security, health and medical, and communications) as well as residential, employment, school, and recreational uses. **Figure 2** shows the evacuation routes provided by the City.

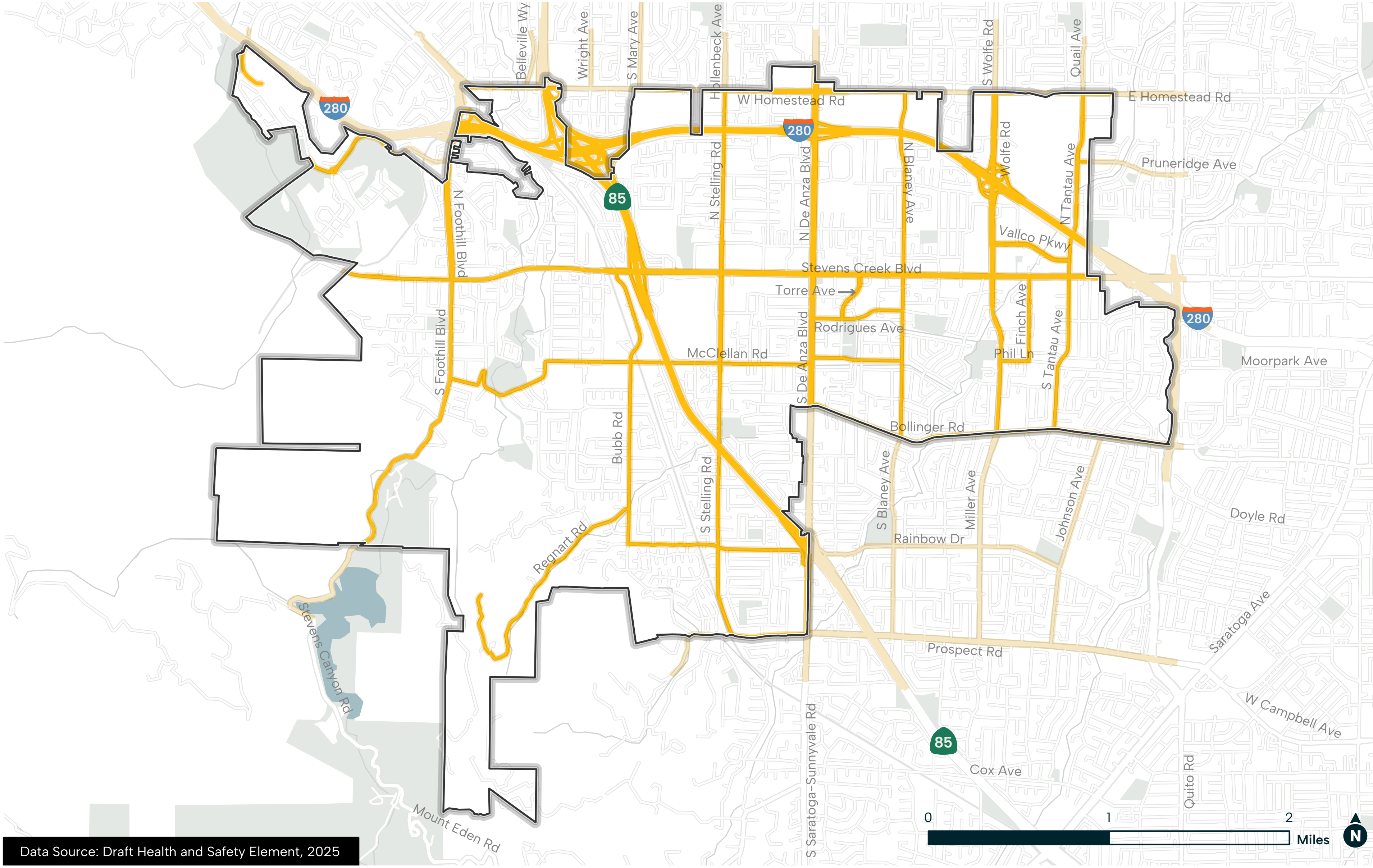
3.4 Estimate Vehicle Trips

The number of evacuation vehicle trips assigned to the roadway network are a combination of trips generated by residential households, employee trips, student trips, and visitor trips at the time of the evacuation. These trips include those generated by uses in the City as well as surrounding unincorporated areas including PG&E Trailhead, McClellan Ranch Preserve, Stevens Creek County Park, and Fremont Older Open Space Preserve.

Trips generated by residential households were informed by the most recent available data from the US Census Bureau and the California Department of Finance. This includes data on population, the number of households, persons per household, and vehicles per household. This data was cross-referenced with data in the Genasys Protect platform's designated evacuation zones. The household data was then used to estimate evacuation vehicle trips based on the number of households, persons per household, auto-ownership information, population, and other factors that could affect the number of vehicles per household used during an evacuation event.

[8] Genasys Protect is an evacuation management tool that helps communities and first responders plan, communicate, and conduct evacuations. It provides communications, situational awareness, and cross-agency coordination capabilities for emergency management. The platform delivers integrated hardware and software for proactive preparedness and multi-channel communication.

Table 2 describes data sources and equations used to estimate vehicle evacuation demand for residents, employees, students, and visitors. Data sources reviewed for this assessment include the 2023 American Community Survey (ACS) 5-year Estimates, Genasys Protect, Santa Clara Countywide VMT Estimation Tool, and the adopted Housing Element. These sources provide population, household, and employment estimates that are within a similar range.



Cupertino City Boundary

Evacuation Routes

Evacuation Route (in Cupertino)

Evacuation Route (outside of City Boundary)

FIGURE 2

Evacuation Routes

Fehr & Peers

Table 2: Vehicle Demand Calculations in the Evacuation Area

Evacuation Demand Variable	Data Source	Equation
1. Employment	Santa Clara Countywide VMT Estimation Tool	Data source provided value.
2. Residential Population	Genasys Protect*	Data source provided value.
3. Household	Genasys Protect*	Population / Household size
4. Household Vehicle Ownership Distribution	Census Tract	Number of households with 0, 1, 2, or 3+ vehicles / Total household
5. Household Vehicle Ownership	Steps 4 & 5	Household vehicle ownership distribution * Household
6. Student	Education Data Partnership	Data source provided value[1]
7. Visitor	Parking Spaces Available from Google Maps	Portion of parking spaces occupied[2]
8. Estimated Vehicle Evacuation Demand	Steps 1 & 6	Residents: 1 * zero-vehicle household + 1 * one-vehicle household + 2 * two-vehicle household + 2.5 * three-or-more vehicle household
		Employees: 0.99 * employment
		Students: 1 * drive-alone student + 0.5 * carpooling student + 1 * student picked up/dropped off
		Visitors: 0.5 * visitor

Notes: Raw data is presented in **Appendix A**.

1. Educational Data Partnership shows school enrollment data for the following schools considered in the evacuation area: Abraham Lincoln Elementary School, Tessellations Elementary School, John F Kennedy Middle School, and Monta Vista High School.
2. Visitor presence considered at recreational attractions located within the evacuation area: PG&E Trailhead (50% of the Rancho San Antonio County Park parking spaces), Deep Cliff Golf Course (20% of the Linda Vista Park parking spaces), Rim Trail (45% of the Stevens Creek County Park Chestnut and Villa Maria parking lots), and Parker Ranch Trailhead (40% of the Fremont Older Open Space Preserve Prospect and Saratoga Country Club parking spaces).

Source: 2023 American Community Survey (ACS) 5-year Estimates; Genasys Protect; Santa Clara Countywide VMT Estimation Tool; Educational Data Partnership; and Google Maps, Fehr & Peers, 2025.

3.5 Assign Vehicle Trips

The total resident, employee, student, and visitor evacuation trips are disaggregated into 14 different geographically designated evacuation zones in the Genasys Protect platform. Trips are routed from each zone to the nearest evacuation route. Once on a major evacuation route, trips are assigned to the most efficient path toward either SR-85 or I-280. The city limit is used as the evacuation gateways because it represents the boundary beyond which evacuees are considered to have exited the hazard area and the evacuation area, and are therefore no longer at immediate risk.

3.6 Evacuation Route Assessment

An evacuation route assessment can be completed in a variety of ways to determine the capacity and viability of key evacuation routes. An assessment, like this project, can use volume to capacity ratios under typical non-congested conditions. Under more constrained and congested conditions, higher effort studies may involve modeled analysis of evacuation scenarios using dynamic traffic assignment to simulate traffic flow and evacuation times when street and freeway networks are at capacity. This evacuation route capacity divides the vehicle demand volumes by the roadway evacuation capacity to estimate the volume to capacity ratio during an evacuation event. Furthermore, the evacuation route assessment measures the distance evacuees have to travel to reach evacuation gateways.

3.6.1 Assessing Evacuation Route Capacity

This analysis uses planning level roadway capacities based on the roadway cross section (e.g., two, four, or six travel lanes) with adjustments for the hilly nature of the evacuation routes in the evacuation area and anticipated lower visibility conditions present during an evacuation. These planning level roadway capacities are consistent with the level of planning for this AB 747/AB 1409 evacuation capacity analysis where the desired outcome is a list of policies and programs to integrate into the *Health and Safety Element*. **Table 3** lists the peak one-hour planning capacity for each roadway type. These evacuation capacities do not incorporate contraflow, as the opposing direction is reserved for emergency responders.

Table 3: Planning Level Roadway Capacity per Hour per Lane

Roadway Type	Planning Capacity[1] (Typical Day)	Planning Capacity (Low Visibility)
Freeway	2,020	1,780
Divided Arterial	940	830
Undivided Arterial	890	780
Collector/Local	650	570

Notes:
1. Roadway planning capacity from *Highway Capacity Manual* (2000).
Source: *Highway Capacity Manual*, 2000; Fehr & Peers, 2025.

Additionally, during a fire or other emergency event, roadways typically operate at lower capacities due to changes in driver behavior and the presence of hazards such as low visibility due to smoke. Baseline capacities for all evacuation roadways were reduced by 12 percent to account for these hazards, based on recommended capacity reductions due to low visibility (due to weather) provided by the Federal Highway Administration (FHWA) Road Weather Management Program.[9]

[9] How weather events impact roadways? https://ops.fhwa.dot.gov/weather/q1_roadimpact.htm#:~:text=Speed%20variance%20can%20fall%20by,12%20percent%20in%20low%20visibility, accessed April 2025.

Table 4 presents the roadway types and total evacuation route capacity at designated screenlines and a few additional roadway segments. A screenline is an imaginary line on a map to evaluate the evacuation route capacity (see **Figure 3** and **Figure 4**). This analysis uses a screenline east of the evacuation area, and another at SR-85 and I-280, which represent the defined evacuation gateways.

Table 4: Evacuation Route Capacity

Roadway Name	Roadway Type[1]	Outbound Lanes	Evacuation Route Capacity	Adjusted Evacuation Route Capacity[2]
1. East of the Evacuation Area Screenline				
Cristo Rey Drive west of Foothills Boulevard	Collector	1	650	570
Foothill Boulevard north of Alpine Drive	Local	1	650	570
Stevens Creek Boulevard east of Cupertino Road	Collector	1	650	570
McClellan Road east of Imperial Avenue	Collector	1	650	570
Bubb Road north of Hyannisport Drive	Local	1	650	570
Rainbow Drive west of Seven Springs Lane	Local	1	650	570
Prospect Road east of Parker Ranch Trailhead	Local	1	650	570
2. West of SR 85 Screenline				
Foothill Boulevard south of I-280	Undivided Arterial	2	1,780	1,560
Stevens Creek Boulevard west of SR-85	Undivided Arterial	2	1,780	1,560
Bubb Road south of Stevens Creek Boulevard	Collector	1	650	570
McClellan Road east of Bubb Road	Collector	1	650	570
Stelling Road north of Orion Lane	Collector	1	650	570
South De Anza Boulevard north of SR-85	Divided Arterial	3	2,820	2,490
Prospect Road east of S De Anza Boulevard	Collector	2	1,300	1,140

Notes:
1. Roadway type determined by City of Cupertino *Circulation Element* (2025).
2. Vehicles per hour. Rounded to nearest 10.

Source: *Circulation Element*, 2025; Fehr & Peers, 2025.

3.6.2 Distance to Evacuation Gateway

For this analysis, evacuation population groups are considered to be evacuated when they have either accessed gateways to the east of SR-85 or north of I-280. To assist with identifying potentially vulnerable communities during an evacuation event it is also helpful to identify City neighborhoods that need to travel the furthest and thus are potentially the most exposed in an evacuation event. This analysis measures the distances from each point along the roadway network to designated evacuation gateways. Up to two best routes from each point to the gateways are included in this assessment.

4. Evacuation Route Assessment

This chapter evaluates the evacuation route capacity during a wildfire evacuation event for the evacuation area and routes identified in **Chapter 3**. This section also analyzes the distances from each point along the roadway network to designated evacuation gateways to help identify City neighborhoods that need to travel the furthest and thus are potentially the most exposed in an evacuation event.

4.1 Estimate Evacuation Vehicle Trips

Based on the identified scenarios, the areas requiring evacuation include the FHSZ since these areas are most vulnerable to wildfire hazards. The trips assigned to the transportation system are estimated based on household and employer demographics along with student and visitor population and assist with estimating evacuation demand during an evacuation event.

Table 5 lists the composition of evacuees for each quantitative scenario. Note that **Scenario C** is a qualitative assessment, which builds on **Scenario A** and, therefore, has the same evacuation demand as **Scenario A**.

Table 5: Composition of Evacuees by Scenario

Type of Evacuees	Scenario A (Quantitative)	Scenario B (Quantitative)	Scenario C (Qualitative)
Residents	46%	100%	46%
Employees	100%	2%	100%
Students	100%	0%	100%
Visitors	100%	0%	100%

Source: Fehr & Peers, 2025.

4.1.1 Resident and Employee Population

A worst-case condition was estimated where all residents, and retail and restaurant (estimated to be half of all employees in the area) in the evacuation area would need to be evacuated. The number of residents, anticipated vehicle ownership per household, employees, students in schools, and visitors in the evacuation area were used to estimate the number of evacuee vehicles. Because the raw data for households, population, and employment cover geographic areas that differ from the evacuation area, the data were adjusted to estimate land use and evacuation demand. **Table A-1** to **Table A-3** provide raw socioeconomic data.

Table 6 to **Table 10** present the resident, employee, student, and visitor land uses and estimated evacuation demand in the evacuation area. As shown in **Table 6**, approximately one percent of households does not have access to a vehicle and would potentially confront mobility constraints during an evacuation event.

This assessment uses zero-vehicle households as a proxy to provide an estimate of persons with mobility constraints that may need evacuation assistance. These zero-vehicle households would require outside assistance. Although outside the scope of this assessment, the City may want to consider a program that ensures a more accurate accounting of households needing assistance and programs to facilitate their evacuation. This estimate also assumes employment centers would provide evacuation assistance to employees without access to a vehicle. Additionally, it was assumed that some households with more than two vehicles likely would not be able to utilize all of their vehicles during an evacuation event (e.g., homes with three or more vehicles but with only two licensed drivers).

Table 6: Resident Population and Evacuation Demand Vehicle Trips of the Evacuation Area

Population[1]	Households[2]	Household Vehicle Ownership[2]				Estimated Evacuation Demand[3,4,5]		
		0	1	2	3+	Scenario A	Scenario B	Scenario C
12,636	4,355	48	604	2,400	1,303	4,050	8,710	4,050
		1%	14%	55%	30%			

Notes:
1. The estimated population is obtained from Genasys Protect data provided by the City staff on July 25, 2025.
2. The estimated number of households and household vehicle ownership is derived from 2023 American Community Survey (ACS) 5-Year Estimates and adjusted according to the estimated population.
3. Assumption of number of vehicles that will evacuate: zero-vehicle household: 1 vehicle; one-vehicle household: 1 vehicle; two-vehicle household: 2 vehicles; three-or-more vehicle household: 2.5 vehicles.
4. Assume that daytime population from Genasys Protect consists of residents, employees, students, and visitors. Calculated as (daytime population - employees - students - visitors) / residents * 100%, The residents present in the evacuation area were estimated to be 46% and 100% of the population for Scenarios A and B respectively.
5. It should be noted that this information does not constitute a specific analysis of households with mobility challenges as it does not specifically account for people who have mobility impairments that preclude them from using a vehicle; it also does not specifically account for households that own one or more vehicles, but where not all members of the household may necessarily have access to them at all times (for example, a household with one vehicle which a household member drives to work, leaving other members of the household at home with no vehicle available).

Source: 2023 ACS 5-Year Estimates; Genasys Protect; Santa Clara Countywide VMT Estimation Tool; Fehr & Peers, 2025.

Table 7: Employee Population and Evacuation Demand Vehicle Trips of the Evacuation Area

Employment (A)[1]	Estimated Evacuation Demand[2]		
	Scenario A	Scenario B	Scenario C
556	550	10	550

Notes:
1. The estimated employment is obtained from the Santa Clara Countywide VMT Evaluation Tool, using 2025 as the baseline year.
2. Assumes that all the employees will evacuate with 0.99 vehicles per employee (one percent of evacuation area households are zero-vehicle households).

Source: Fehr & Peers, 2025.

4.1.2 Student Population

Within the designated evacuation area, several schools serve a substantial student population that would require timely evacuation in the event of an emergency at working hours. Schools located within the evacuation area include Abraham Lincoln Elementary School, Tessellations Elementary School, John F. Kennedy Middle School, and Monta Vista High School. **Table 8** presents the estimated number of student evacuation trips during Scenario A. **Table A-4** and **Table A-5** show the school enrollment data and estimated student evacuation trips, categorized by mode of travel, including pick-up/drop-off by parents, carpooling, and individual student drivers.

Table 8: Student Population and Evacuation Demand Vehicle Trips of the Evacuation Area

School Enrollment	Estimated Evacuation Demand Vehicle Trips		
	Scenario A	Scenario B	Scenario C
3,560	3,120	0	3,120

Source: Fehr & Peers, 2025.

4.1.3 Visitor Population

Table 9 presents the estimated number of visitor trips generated by recreational land uses that would require evacuation during an emergency. Additional details on how these visitor trip estimates were developed can be found in **Table A-6**.

Table 9: Visitor Land Use and Evacuation Demand of the Evacuation Area

Visitors	Estimated Evacuation Demand Vehicle Trips		
	Scenario A	Scenario B	Scenario C
355	180	0	180

Source: Fehr & Peers, 2025.

4.1.4 Total Estimated Evacuation Demand

Considering the estimated trips generated in the evacuation area from all employees, residents, students and visitors, the total number of estimated trips during an evacuation event can be estimated. The total evacuation demand is 7,900 and 8,720 during **Scenario A** and **Scenario B** respectively, as shown in **Table 10**.

Table 10: Total Estimated Evacuation Demand Vehicle Trips for the Evacuation Area

Type of Evacuees	Scenario A	Scenario B	Scenario C
Residents	4,050	8,710	4,050
Employees	550	10	550
Students	3,120	-	3,120
Visitors	180	-	180
Total	**7,900**	**8,720**	**7,900**

Source: Fehr & Peers, 2025.

Figure 3 shows the distribution of the evacuation demand across two screenlines. These screenlines represent the edge of the hazard area (screenline 1) and the estimated evacuation edge (screenline 2).

4.2 Evaluating Evacuation Route Capacity

4.2.1 Scenario A (Quantitative Analysis)

The total estimated evacuation demand was distributed across the roadway network in proportion to the combined resident, employee, student, and visitor population data for each Genasys Protect zone[10] within the evacuation area. Detailed percent trips assigned for each roadway can be found in **Table B-1**. The distance to evacuation gateways map (see **Figure 5**) was used to identify primary routes likely to be used by evacuees.

Traffic volume data for the roadway segments on the evacuation area were collected in July 2025. These counts, combined with estimated demand, were used to calculate the total evacuation vehicle demand. StreetLight data from the same period in 2024 were collected and compared with data from October 2024 to evaluate the impact of school sessions versus non-school periods. For **Scenario A**, representing a typical Fall weekday at 2 PM, a factor of 1.2 was applied to account for the increased traffic associated with schools being in session.

Evacuation route capacity was assessed by dividing vehicle demand volumes by roadway evacuation capacity to calculate the volume-to-capacity (V/C) ratio. As shown in **Table 11**, the results of the evacuation capacity assessment indicate that all evacuation routes have V/C ratios greater than 1 near the evacuation area except for Prospect Road. This indicates that these roads would require more than one hour to accommodate the evacuation demand from the hillside, making them bottlenecks during an evacuation.

Foothill Boulevard, **Stevens Creek Boulevard** and **McClellan Road** are the most critical bottlenecks with V/C ratio greater than 2. **Prospect Road** and **Stelling Road** have V/C ratios of 1, suggesting they are at capacity and should be prioritized for evacuation demand and supply strategies.

It is also important to note that emergency scenarios are often unpredictable (as well as driver behavior during the evacuation time period) and it is anticipated that evacuees would vacate at a rate that more closely resembles a bell curve from the time the evacuation order is issued. These are conditions which would affect the total estimated evacuation time in our assessment and are beyond the scope and budget of our assessment. There is also general unpredictability in operational issues, such as power issues that would trigger traffic signals to operate in “red flash mode” in which traffic would need to proceed through intersections in an all-way stop configuration.

[10] A Genasys Protect zone is a predefined geographic area used during emergencies to streamline response efforts, reduce confusion, and optimize traffic flow.

FIGURE 3

Trip Distribution for Scenario A

Fehr & Peers

Table 11: Evacuation Route Link Capacity Analysis (Scenario A)

Evacuation Route Link	Evacuation Travel Demand[1]	Existing Hourly Traffic	Total Evacuation Demand	Adjusted Evacuation Route Capacity	V/C Ratio[2]
1. East of the Evacuation Area Screenline					
Cristo Rey Drive west of Foothills Boulevard	400	239	639	570	**1.1**
Foothill Boulevard north of Alpine Drive	1,420	883	2,303	570	**4.0**
Stevens Creek Boulevard east of Cupertino Road	1,660	417	2,077	570	**3.6**
McClellan Road east of Imperial Avenue	1,110	100	1,210	570	**2.1**
Bubb Road north of Hyannisport Drive	1,110	234	1,344	570	**2.4**
Rainbow Drive west of Seven Springs Lane	1,740	20	1,760	570	**3.1**
Prospect Road east of Parker Ranch Trailhead	470	116	586	570	1.0
2. West of SR 85 Screenline					
Foothill Boulevard south of I-280	1,820	883	2,703	1,560	**1.7**
Stevens Creek Boulevard west of SR-85	1,660	719	2,379	1,560	**1.5**
Bubb Road south of Stevens Creek Boulevard	320	550	870	570	**1.5**
McClellan Road east of Bubb Road	1,900	506	2,406	570	**4.2**
Stelling Road north of Orion Lane	400	196	596	570	1.0
South De Anza Boulevard north of SR-85	1,340	1,578	2,918	2,490	**1.2**
Prospect Road east of S De Anza Boulevard	470	912	1,382	1,140	**1.2**

Note: **Bolded** text indicates roadways over one-hour evacuation capacity.
1. Rounded to nearest 10.
2. Total evacuation demand divided by adjusted outbound capacity.

Source: Fehr & Peers, 2025.

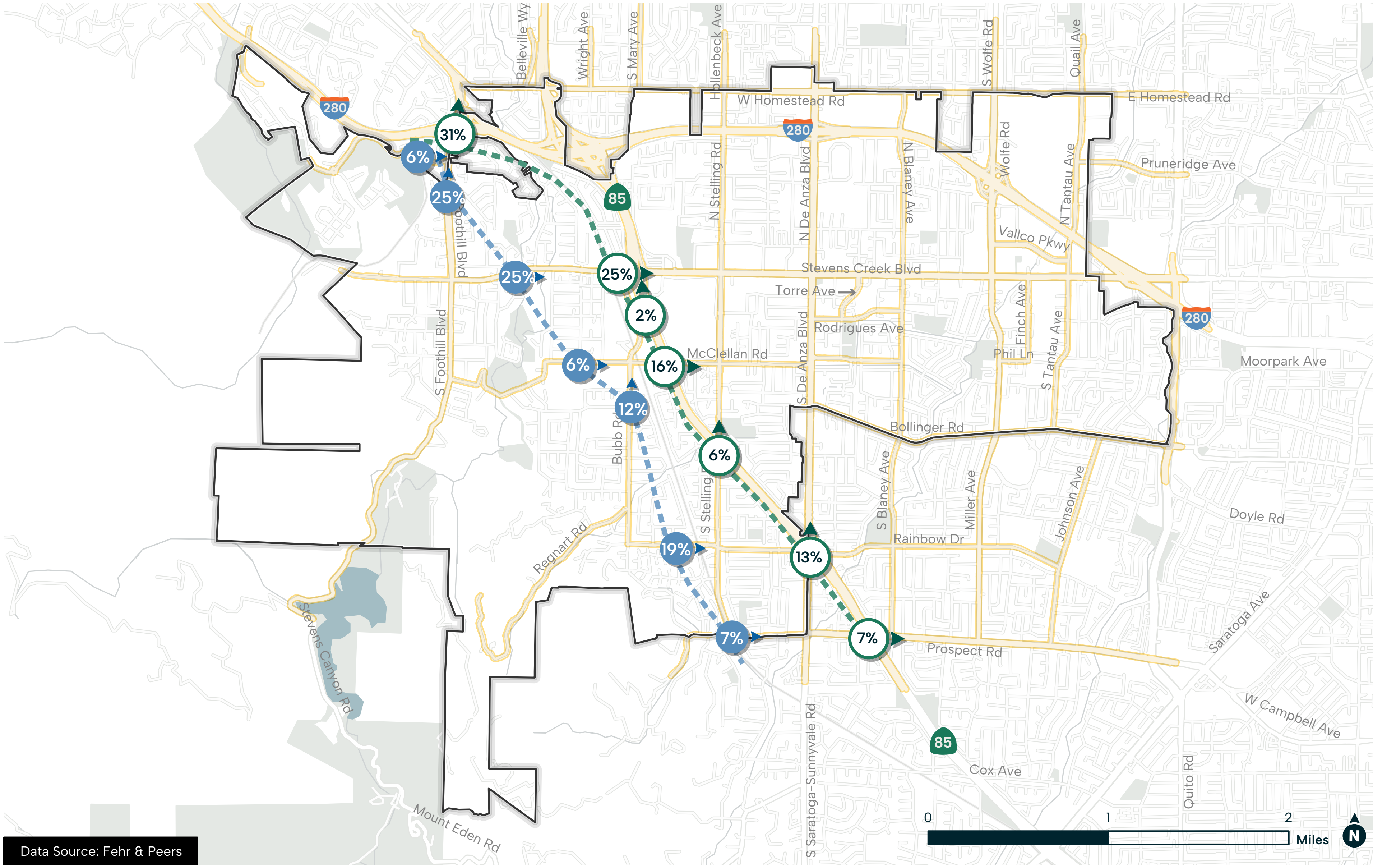
4.2.2 Scenario B (Quantitative Analysis)

Scenario B assumes a wildfire-triggered evacuation following an earthquake at 6 AM, during a time when schools are not in session. The total estimated evacuation demand was distributed across the roadway network in proportion to the combined population, and employment population data for each Genasys Protect zone[11] within the evacuation area. Detailed percent trips assigned for each roadway can be found in **Table B-2**. The distance to evacuation gateways map (see **Figure 5**) was used to identify primary routes likely to be used by evacuees.

The results of the evacuation capacity assessment in **Table 11** indicate that all the roadways near the evacuation area except for **Cristo Rey Drive**, **McClellan Road** and **Prospect Road** have V/C ratios greater than 2. This indicates that these roads would require more than one hour to accommodate the evacuation demand from the evacuation area, making them bottlenecks during an evacuation. This scenario is evaluated with a road closure on **McClellan Road** at Club House Lane near the Deep Cliff Golf Course, with schools not in session. When this segment of **McClellan Road** is closed, evacuees located east of Club House Lane can only travel eastbound along **McClellan Road**, while those west of the closure can only travel westbound. In other words, evacuees cannot cross the closed segment, which results in separate evacuation routes for areas on either side of the closure. Under these conditions, evacuation demand on **McClellan Road** would decrease, with some trips shifted to **Foothill Boulevard** and **Stevens Creek Boulevard**. As a result, **McClellan Road** would experience a lower V/C ratio.

Under **Scenario B**, evacuation demand is higher than under **Scenario A**, as summarized in **Table 10**. However, because existing hourly traffic is lower at 6 AM under **Scenario B**, the total evacuation demand (i.e., the sum of evacuation travel demand and existing hourly traffic) on some roadways is lower under **Scenario B** than under **Scenario A**. A morning evacuation (6:00 AM) reflects conditions when most residents are at home, resulting in higher residential evacuation demand but relatively low existing traffic volumes on the roadways. In contrast, an afternoon evacuation (2:00 PM) occurs when many residents are at work or school, leading to lower residential evacuation demand but higher levels of existing traffic associated with general daytime travel activity. **Scenario B** has higher evacuation travel demand but lower existing traffic, resulting in a lower total evacuation demand on some roadways than **Scenario A**. As a result, these roadways show lower V/C ratios under **Scenario B** despite the higher evacuation travel demand.

[11] A Genasys Protect zone is a predefined geographic area used during emergencies to streamline response efforts, reduce confusion, and optimize traffic flow.



Cupertino City Boundary

Evacuation Routes

West of SR-85 Screenline

East of the WUI Screenline

Trip Distribution | Scenario B

SR-85 Trip Distribution %

Wildland-Urban Interface (WUI) Trip Distribution %

FIGURE 4

Trip Distribution for Scenario B

Table 12: Evacuation Route Link Capacity Analysis (Scenario B)

Evacuation Route Link	Evacuation Travel Demand[1]	Existing Hourly Traffic	Total Evacuation Demand	Adjusted Evacuation Route Capacity	V/C Ratio[2]
1. East of the Evacuation Area Screenline					
Cristo Rey Drive west of Foothills Boulevard	520	31	551	570	1.0
Foothill Boulevard north of Alpine Drive	2,180	283	2,463	570	**4.3**
Stevens Creek Boulevard east of Cupertino Road	2,180	31	2,211	570	**3.9**
McClellan Road east of Imperial Avenue	520	13	533	570	0.9
Bubb Road north of Hyannisport Drive	1,050	64	1,114	570	**2.0**
Rainbow Drive west of Seven Springs Lane	1,660	85	1,745	570	**3.1**
Prospect Road east of Parker Ranch Trailhead	610	23	633	570	**1.1**
2. West of SR 85 Screenline					
Foothill Boulevard south of I-280	2,700	283	2,983	1,560	**1.9**
Stevens Creek Boulevard west of SR-85	2,180	142	2,322	1,560	**1.5**
Bubb Road south of Stevens Creek Boulevard	170	86	256	570	0.4
McClellan Road east of Bubb Road	1,400	31	1,431	570	**2.5**
Stelling Road north of Orion Lane	520	28	548	570	1.0
South De Anza Boulevard north of SR-85	1,130	362	1,492	2,490	0.6
Prospect Road east of S De Anza Boulevard	610	144	754	1,140	0.7

Note: **Bolded** text indicates roadways over one-hour evacuation capacity.
1. Rounded to nearest 10.
2. Total evacuation demand divided by adjusted outbound capacity.
Source: Fehr & Peers, 2025.

4.2.3 Scenario C (Qualitative Analysis)

Scenario C assumes a wildfire-triggered evacuation following an earthquake at 2 PM on a school day. **Scenario C** demonstrates the worst-case evacuation condition in which an earthquake initiates wildfire. **Scenario C** builds on **Scenario A** by assuming the same evacuation demand, but with additional roadway closures at the following roadways because of an earthquake causing wildfire:

- Stevens Creek Boulevard at SR-85
- SR-85 Southbound Ramps at Stevens Creek Boulevard

Due to the results of the baseline scenario, no further quantification was conducted for Scenario C. However, in addition to the capacity constraints identified in **Scenario A**, the following evacuation route capacity issues have been noted:

- The closure on **Stevens Creek Boulevard** and **SR-85 Southbound Ramps** would divert 2,378 evacuees assigned to Stevens Creek Boulevard (refer to **Table 11**) to the adjacent routes. The updated trip distribution is shown in **Table B-3**. These alternative routes include **Foothill Boulevard**, **McClellan Road**, and **De Anza Boulevard**. Since these routes are already bottlenecks in **Scenario A**, the added volume would result in further congestion and increase the severity of the bottleneck causing more delay and queuing.
- Stevens Creek Boulevard also serves the evacuees from the entire corridor east and west of the FHSZ. A portion of the rerouted evacuation demand from Stevens Creek Boulevard is expected to shift towards **Rainbow Drive** and to **Stelling Road** or **De Anza Boulevard**, which serve as one of the key evacuation corridors to SR-85.
- **Foothill Boulevard** is already identified as a critical bottleneck with a V/C ratio exceeding 4 in both the scenarios. The rerouted evacuation demand due to the roadway closures would further exacerbate congestion and significantly affect evacuation efficiency.

4.3 Analyzing Distance to Evacuation Gateways

Distance to evacuation gateways is mapped in **Figure 5**. The map illustrates the primary evacuation routes likely to be used by evacuees. The distance for all the evacuation routes ranges from 0.9 to 2.5 miles with most falling between 1.5 to 2 miles. From each start point, there is one or two best routes to reach the gateways with similar distances.

Routes A, B, E, and F (via Cristo Rey Drive, Stevens Creek Boulevard, Rainbow Drive, and Prospect Road, respectively) are within two miles of the nearest evacuation gateways. According to **Table 11** and **Table 12**, Cristo Rey Drive and Prospect Road are not expected to experience capacity constraints under **Scenarios A and B**. As a result, evacuees using these routes are expected to have relatively short evacuation times.

In contrast, Route D (via **Bubb Road**) is located 2 miles to the nearest evacuation gateway (Gateway 3), while Route C (via **Foothills Boulevard**) exceeds 2 miles in distance to the nearest gateway (Gateway 3). Given that **Foothills Boulevard** is projected to be over capacity (V/C > 4) under **Scenarios A and B**, and **Bubb Road** is over capacity (V/C > 2) under both scenarios, evacuees using these routes are likely to encounter significant traffic congestion and longer evacuation times.

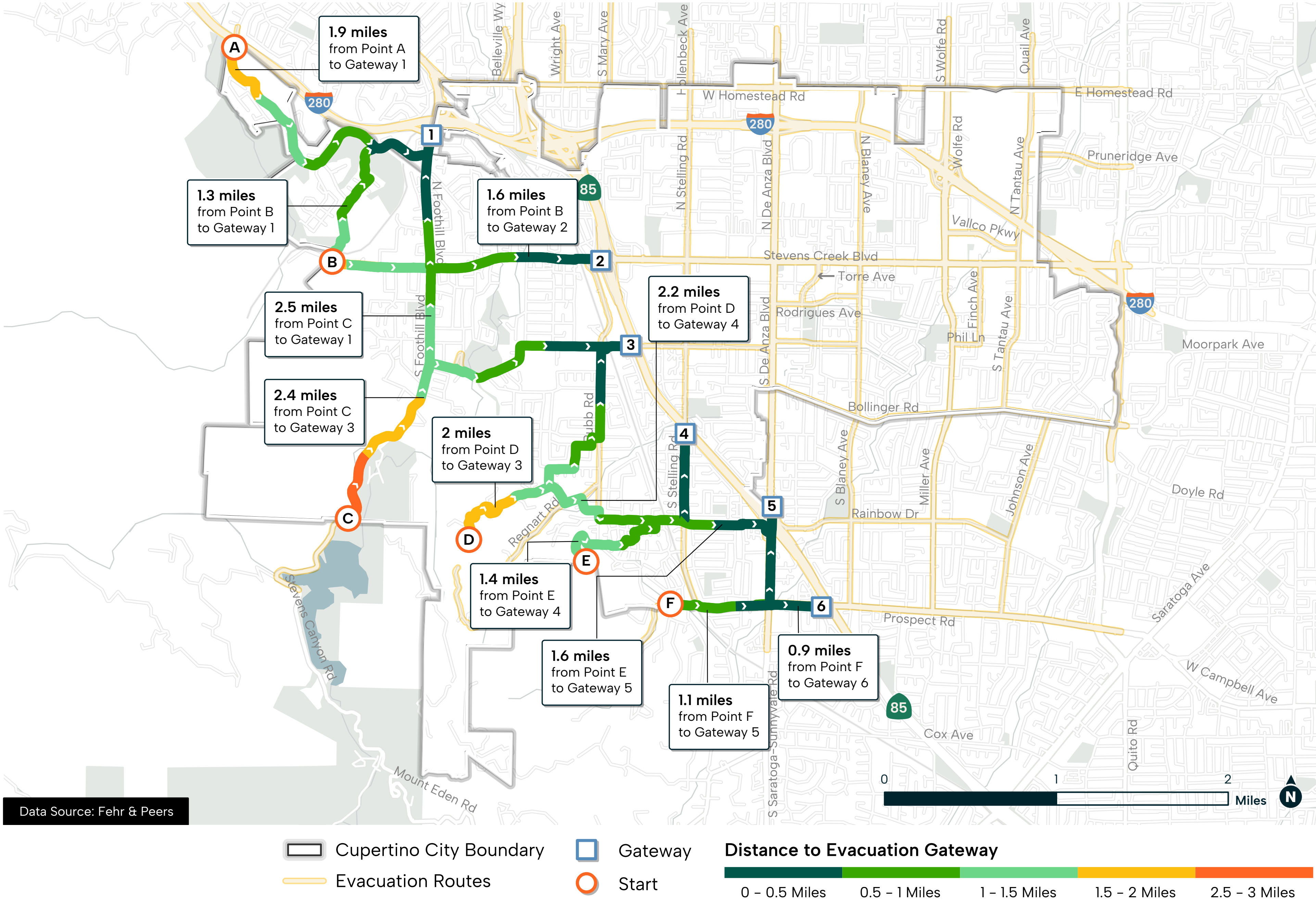


FIGURE 5

Distances to Evacuation Gateways

5. Recommendations

The City of Cupertino has already implemented several key strategies that support evacuation readiness and enhance emergency response capabilities. These existing measures provide a strong foundation for coordinated and effective action during wildfire or other disaster events:

- Established **multi-jurisdictional plans** that enable Fire and Sheriff departments to operate seamlessly under a **unified command structure**. This coordination ensures faster decision-making, effective resource deployment, and a cohesive response across different agencies and jurisdictions.
- **Traffic signals** within the evacuation network are equipped with **battery backup** systems, allowing them to remain operational during power outages for up to eight hours. This functionality helps maintain orderly traffic flow, reduces confusion at intersections, and supports safer, more efficient evacuations.
- **Strong coordination and communication** among key agencies including Fire, Sheriff, and Public Works—facilitate real-time updates and operational alignment. These communication protocols enable swift sharing of situational information, ensuring a collaborative response during rapidly evolving emergency situations.

In addition to the recommended policies (Policy HS-2.1 to Policy HS-2.15) included in the *Safety Element Update*, the following recommendations are listed as potential measures that can enhance the evacuation process through the supply side (increasing evacuation capacity), demand side (managing evacuation volumes), and information side (improving awareness and communication).

These recommendations will be incorporated into future updates of the *Emergency Operations Plan* (EOP), *Local Hazard Mitigation Plan* (LHMP), and *Health and Safety Element Update* to ensure consistency and alignment. Some recommendations can be implemented more readily through the EOP. Others may require additional coordination and formal adoption as part of the *Safety Element Update* or LHMP.

5.1 Supply-Side Strategies

Supply-side strategies aim to temporarily increase evacuation capacity at key bottleneck locations while balancing the everyday safety and function of the roadway system.

- Increasing capacity through the use of **contraflow lanes** or **dual purpose shoulder evacuation/protected bike lane widening** by changing future roadway design, especially in areas with less accessibility and located on key evacuation routes. These areas are primarily located on I-280, Foothills Boulevard, Stevens Creek Boulevard, Bubb Road, and SR-85 corridors. These routes should consider incorporating design treatments such as painted medians (instead of raised medians) or other treatments that could assist in creating reversible lanes, or a dual-purpose shoulder to facilitate additional capacity in an evacuation event scenario.
- **Extending water service** into evacuation corridors strengthens firefighting capacity and long-term water investment ensures reliable resources that sustain evacuation operations under emergency conditions.
- **Managed traffic control** during evacuation, including turn restrictions and route or ramp closures, to maximize outflows from evacuation areas.
- **Faster clearing of** fire-induced **road closures**.

- Plan for **street parking management** on high hazard days.

5.2 Demand-Side Strategies

- The City of Cupertino can support vehicle volume reduction during an evacuation by encouraging **carpooling** and use of **public transit**;
- Encouraging **a one car per household evacuation pledge** (for households that must have second vehicles, an alternative could involve early off-site placement of a second car when advance wildfire warnings or other hazard requiring evacuation are available);
- Identifying **shelter locations** within the City limits and outside the FHSZ to reduce demand on evacuation routes outside the FHSZ and **plan/implement shelter facilities**; and

5.3 Information-Side Strategies

The City of Cupertino can further support evacuation through the following measures:

- Enhance **community evacuation programs** to improve resident, employee, student, and visitor preparedness and familiarity with evacuation routes and processes.
- Strengthen coordination of **emergency response equipment** and resources between neighboring jurisdictions, allowing for **shared use** based on operational needs rather than ownership.
- Enhance **communication protocols** between cities and elected officials to support unified decision-making, real-time information sharing, and coordinated emergency response across jurisdictional boundaries.
- Explore and deploy **wildfire early detection systems** (i.e., wildfire video surveillance cameras, drones, etc.) especially for constrained access parcels.
- Use **real-time traffic management** tools to implement dynamic route guidance and monitoring to guide evacuees away from congested routes and encourage the use of secondary or tertiary routes to distribute traffic more evenly.
- Study a **phased evacuation** process where different groups or areas evacuate at different times to prevent congestion on main evacuation routes. This can be based on factors like proximity to danger, traffic volume, or priority of evacuation.
- Study and install **vehicle monitoring devices** and variable **message signs** to monitor evacuation programs and provide notification of any changes in evacuation routes or plans due to a change in the wildfire or incidents to motorists along the road.

5.4 Additional Considerations

This evacuation assessment includes trips generated by both employees and residents from the evacuation area and assumes all residents and employees will be evacuated using vehicles. A critical consideration for emergency personnel is to assist **individual residents and employees** who either do not have access to a vehicle or cannot drive, to ensure that compete evacuation is provided. The EOP includes provisions to coordinate with the VTA, Silicon Valley (SV) Hopper, and emergency services. Further research into strategies for evacuating people who do not have access to a vehicle is recommended. Options for assisting with evacuation in such situations could include, but not be limited to, the following:

- Neighborhood “buddy” program to link people needing assistance with people willing to assist.

- Partnership with transportation network companies (TNCs) like Uber and Lyft.

For **individual students and visitors** who do not have access to a vehicle, options for assisting with evacuation in such situations could include, but not be limited to, the following:

- Designated pick-up zones for TNCs or buses to ensure orderly evacuation.
- Provide dedicated shuttle, school vans, or charter bus service, if available.

Appendix A: Socioeconomic Data

Table A-1: Summary of Socioeconomic Data – Census[1]

Geographic Area	Households	Population	Employment	Household Vehicle Ownership			
				0	1	2	3+
Census Tract 5077.01	***1,216***	***4,092***	***1,526***	***90***	***217***	***515***	***394***
Block Group 1; Census Tract 5077.01	N/A	878	N/A	N/A	N/A	N/A	N/A
Block Group 2; Census Tract 5077.01	N/A	1,927	N/A	N/A	N/A	N/A	N/A
Census Tract 5077.02	***2,163***	***6,107***	***3,310***	***24***	***300***	***1,192***	***647***
Block Group 1; Census Tract 5077.02	N/A	2,052	N/A	N/A	N/A	N/A	N/A
Block Group 2; Census Tract 5077.02	N/A	1,704	N/A	N/A	N/A	N/A	N/A
Block Group 3; Census Tract 5077.02	N/A	2,351	N/A	N/A	N/A	N/A	N/A
Census Tract 5077.04	***1,214***	***3,466***	***1,453***	***150***	***299***	***457***	***308***
Block Group 1; Census Tract 5077.04	N/A	1,060	N/A	N/A	N/A	N/A	N/A
Block Group 2; Census Tract 5077.04	N/A	2,406	N/A	N/A	N/A	N/A	N/A
Census Tract 5077.05	***1,385***	***4,560***	***1,753***	***19***	***255***	***671***	***440***
Block Group 1; Census Tract 5077.05	N/A	1,952	N/A	N/A	N/A	N/A	N/A
Block Group 2; Census Tract 5077.05	N/A	1,373	N/A	N/A	N/A	N/A	N/A
Block Group 3; Census Tract 5077.05	N/A	1,235	N/A	N/A	N/A	N/A	N/A
Total	**5,978**	**35,613**	**8,042**	**283**	**1,071**	**2,835**	**1,789**

Notes:
1. Census block group and census tract locations are illustrated in **Figure A-1**.
Source: 2023 ACS 5-year Estimates; Fehr & Peers, 2025.

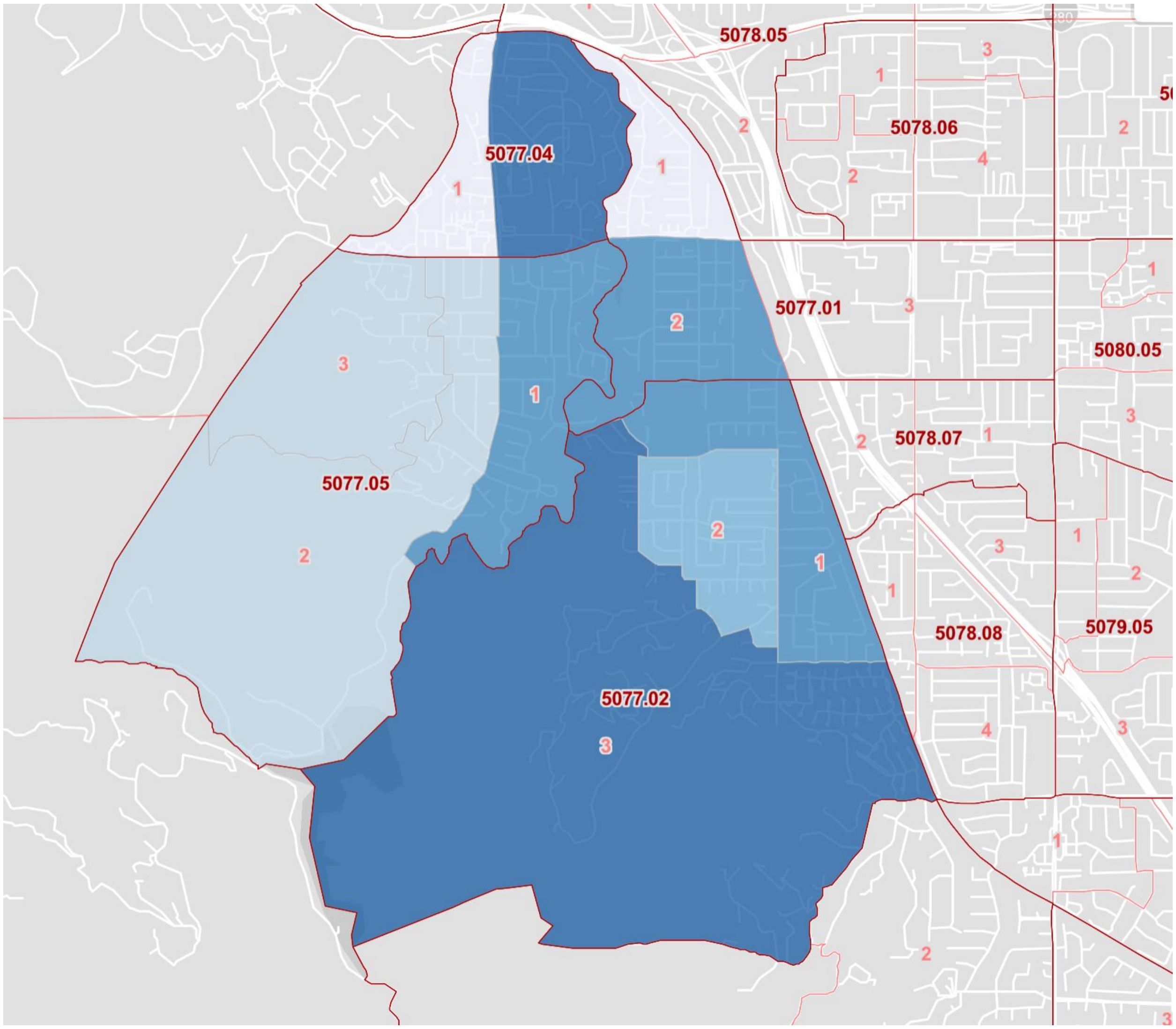


Figure A-1: Census Block Group and Census Tract Locations

Table A-2: Summary of Socioeconomic Data – Genasys Protect[1]

Geographic Area	Total Population	Total Daytime Population	Total Households
SCC-005	0	0	0
SCC-006	0	3	0
SCC-008	198	270	82
SCC-010	12	52	2
SCC-011	13	41	4
SCC-020	67	37	21
CUP-007	784	1,057	376
CUP-008	1,294	931	418
CUP-016	10	124	3
CUP-017	3,188	2,523	1,042
CUP-018	1,339	1,245	461
CUP-029	2,841	2,046	953
CUP-032	654	470	248
CUP-033	2,236	1,546	745
Total	**12,636**	**10,345**	**4,355**

Notes:
1. Genasys Protect zone locations are illustrated in **Figure A-2**.
Source: Genasys Protect; Fehr & Peers, 2025.

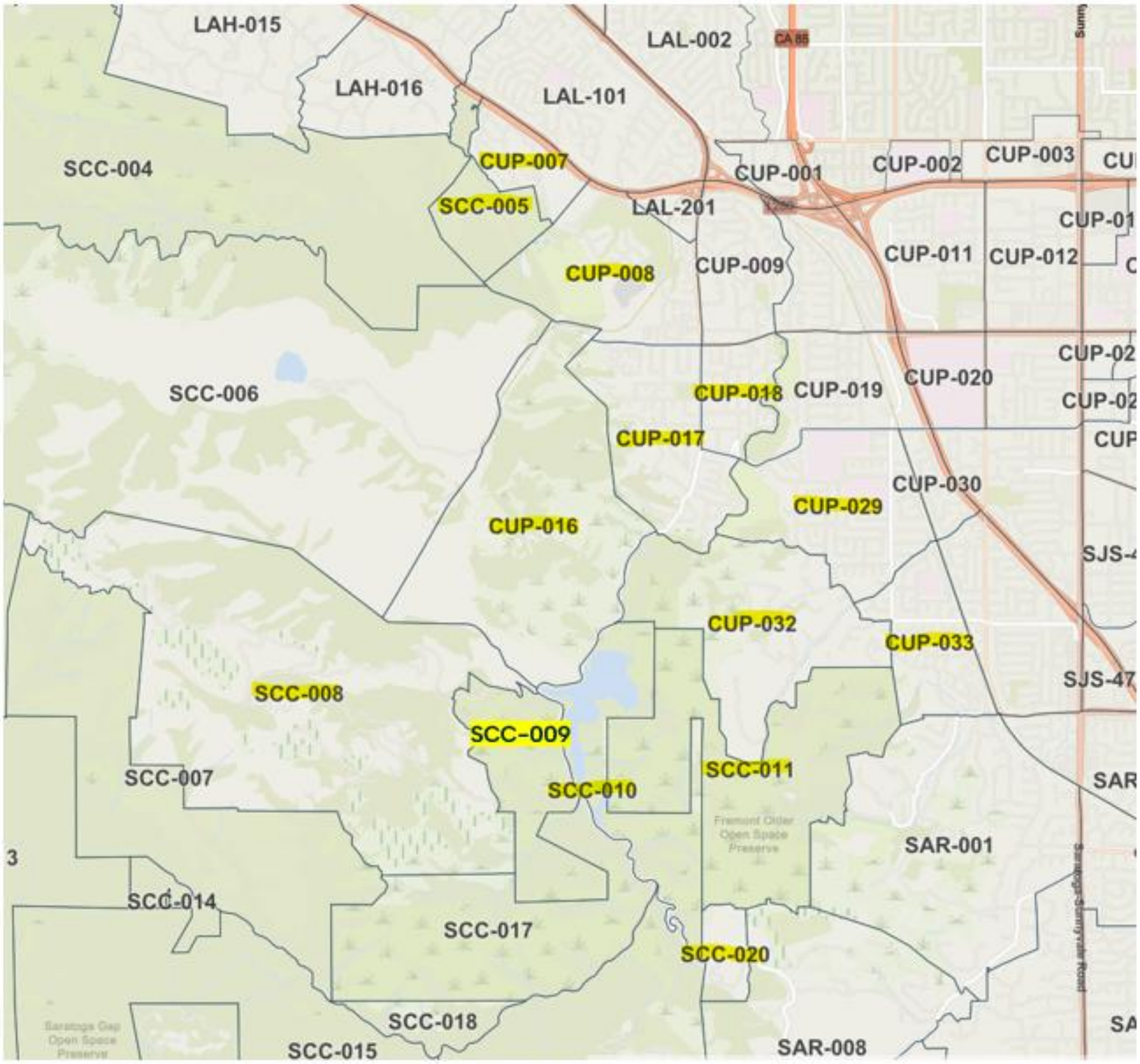


Figure A-2: Genasys Protect Zone Locations (highlighted numbers in study area)

Table A-3: Summary of Socioeconomic Data – Santa Clara County VMT Estimation Tool[1]

Geographic Area	Households	Population	Employment
TAZ 132	955	2,702	94
TAZ 130	0	0	0
TAZ 127	204	614	14
TAZ 128	231	693	25
TAZ 126	647	2,038	647
TAZ 103	193	530	77
TAZ 133	325	920	66
TAZ 102	278	749	55
TAZ 116	305	910	64
TAZ 115	1	3	1,448
TAZ 129	996	2,995	150
TAZ 105	413	1,240	5
TAZ 136	22	62	135
TAZ 122	328	1,033	0
TAZ 125	238	751	2
TAZ 131	273	822	5
TAZ 1334	661	1,880	55
TAZ 135	640	1,825	31
TAZ 134	677	1,916	7
TAZ 117	582	1,741	1,448
TAZ 123	466	1,472	0
Total	**8,435**	**24,896**	**4,328**

Notes:
1. TAZ locations are illustrated in **Figure A-3**.
Source: Santa Clara Countywide VMT Estimation Tool; Fehr & Peers, 2025.

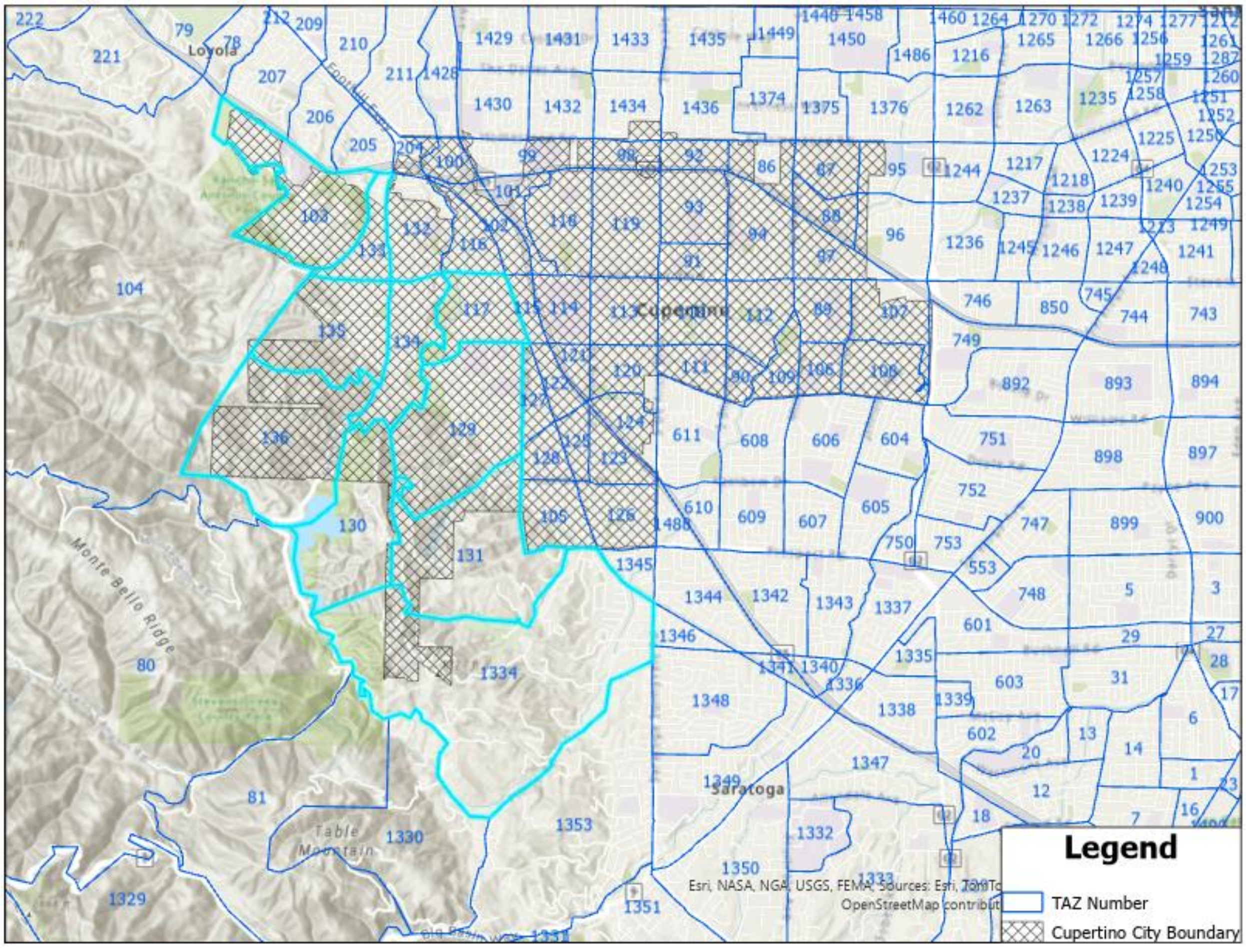


Figure A-3: Transportation Analysis Zone (TAZ) Locations (light blue indicates study area)

Table A-4: School Enrollment Data

School Name	School Enrollment
Abraham Lincoln Elementary	700
John F Kennedy Middle	930
Tessellations Elementary School	270
Total (non-driving students)	1,900[1]
Monta Vista High School (can drive)	1,660[2]
Total Students	**3,560**

Notes:
1. Elementary and middle school students are assumed to evacuate either by carpooling with another student (20%) or by being picked up/dropped off individually (80%).
2. High school students are assumed to be able to drive and are therefore assigned the following evacuation mode shares: drive alone (20%), carpool (30%), and pick-up/drop-off (50%).

Table A-5: Estimated Student Evacuation Trips

Driving Condition	Percent Estimates		Number of Students	Factor[1]	Estimated Student Evacuation Trips
	1,900 Students (Non- Driving)	1,660 Students (Can Drive)			
Drive Alone	0%	20%	330	1.0	330
Carpool	20%	30%	880	0.5	440
Drop-Off	80%	50%	2,350	1.0	2,350
		Total	**3,560**		**3,120**

Notes:
1. Drive Alone trips assume one person per vehicle; Carpool trips assume two passengers per vehicle, excluding the driver; and Drop-Off trips assume one passenger per vehicle, with the driver not counted.

Table A-6: Estimated Visitor Evacuation Trips

Recreational Attractions	Location	Number of Visitors[1]
PG&E Trailhead	East of Rancho San Antonio County Park	200
Deep Cliff Golf Course	North of Linda Vista Park	20
Rim Trail	North of Stevens Creek County Park	100
Parker Ranch Trailhead	East of Fremont Older Open Space Preserve	35
Total Visitors		355
Estimated Visitor Evacuation Trips[2]		**180**

Notes:
1. The number of visitors is based on the percentage of parking spaces assumed during the study period. (Refer to **Table 2** notes for the percentages assumed).
2. Visitors are assumed to carpool (two or more passengers per vehicle).

Appendix B: Trip Distribution

Table B-1: Trip Distribution Linked to Genasys Protect Zones (Scenario A)

Genasys Protect Zones[1]	Population	Population Distribution	Connected Roadways	Evacuation Trip Distribution
SCC-005[2]	0	0%	Foothills Boulevard	0%
SCC-006	0	0%	Foothills Boulevard	0%
SCC-008	198	1%	Foothills Boulevard	1%
SCC-010	12	0%	Foothills Boulevard	0%
SCC-011	13	0%	Prospect Road	0%
SCC-020	67	0%	Prospect Road	0%
CUP-007	784	5%	Cristo Rey Drive	5%
CUP-008	1,294	8%	Foothills Boulevard	5%
			Stevens Creek Boulevard	3%
CUP-016	10	0%	McClellan Road	0%
CUP-017	3,188	20%	Foothills Boulevard	9%
			Stevens Creek Boulevard	10%
			McClellan Road	1%
CUP-008	1,339	8%	Foothills Boulevard	5%
			Stevens Creek Boulevard	3%
CUP-029	2,841	38%	Stevens Creek Boulevard	4%
			McClellan Road	24%
			Rainbow Drive	10%
CUP-032	654	4%	McClellan Road	2%
			Rainbow Drive	2%
CUP-033	2,236	16%	Stelling Road	5%
			Rainbow Drive	5%
			Prospect Road	6%

Notes:
1. Genasys Protect zone locations are illustrated in **Figure A-2**.
2. SCC coded zones are located in Santa Clara County's FHSZ.

Source: Genasys Protect; Fehr & Peers, 2025.

Table B-2: Trip Distribution Linked to Genasys Protect Zones (Scenario B)

Genasys Protect Zones[1]	Population	Population Distribution	Connected Roadways	Evacuation Trip Distribution
SCC-005	0	0%	Foothills Boulevard	0%
SCC-006	0	0%	Foothills Boulevard	0%
SCC-008	198	2%	Foothills Boulevard	2%
SCC-010	12	0%	Foothills Boulevard	0%
SCC-011	13	0%	Prospect Road	0%
SCC-020	67	1%	Prospect Road	1%
CUP-007	784	6%	Cristo Rey Drive	6%
CUP-008	1,294	10%	Foothills Boulevard	7%
			Stevens Creek Boulevard	3%
CUP-016	10	0%	McClellan Road	0%
CUP-017	3,188	25%	Foothills Boulevard	10%
			Stevens Creek Boulevard	13%
			McClellan Road	2%
CUP-008	1,339	11%	Foothills Boulevard	8%
			Stevens Creek Boulevard	3%
CUP-029	2,841	22%	Stevens Creek Boulevard	2%
			McClellan Road	15%
			Rainbow Drive	5%
CUP-032	654	5%	McClellan Road	3%
			Rainbow Drive	2%
CUP-033	2,236	18%	Stelling Road	6%
			Rainbow Drive	6%
			Prospect Road	6%

Notes:

1. Genasys Protect zone locations are illustrated in **Figure A-2**.
2. SCC coded zones are located in Santa Clara County's FHSZ.

Source: Genasys Protect; Fehr & Peers, 2025.

Table B-3: Trip Distribution Linked to Genasys Protect Zones (Scenario C)

Genasys Protect Zones[1]	Population	Population Distribution	Connected Roadways	Evacuation Trip Distribution[2]
SCC-005[3]	0	0%	Foothills Boulevard	0%
SCC-006	0	0%	Foothills Boulevard	0%
SCC-008	198	1%	Foothills Boulevard	1%
SCC-010	12	0%	Foothills Boulevard	0%
SCC-011	13	0%	Prospect Road	0%
SCC-020	67	0%	Prospect Road	0%
CUP-007	784	5%	Cristo Rey Drive	5%
CUP-008	1,294	8%	Foothills Boulevard	8%
			Stevens Creek Boulevard	0%
CUP-016	10	0%	McClellan Road	0%
CUP-017	3,188	20%	Foothills Boulevard	15%
			Stevens Creek Boulevard	0%
			McClellan Road	5%
CUP-008	1,339	8%	Foothills Boulevard	8%
			Stevens Creek Boulevard	0%
CUP-029	2,841	38%	Stevens Creek Boulevard	0%
			McClellan Road	26%
			Rainbow Drive	12%
CUP-032	654	4%	McClellan Road	2%
			Rainbow Drive	2%
CUP-033	2,236	16%	Stelling Road	5%
			Rainbow Drive	5%
			Prospect Road	6%

Notes:

1. Genasys Protect zone locations are illustrated in Figure A-2.
2. For **Scenario C**, due to road closure at Stevens Creek Boulevard at SR-85, trips assigned to Stevens Creek Boulevard under **Scenario A** were shifted to alternative roadways.
3. SCC coded zones are located in Santa Clara County's FHSZ.

Source: Genasys Protect; Fehr & Peers, 2025.