CITYGATE ASSOCIATES, LLC
PUBLIC SAFETY SERVICES

STANDARDS OF COVERAGE ASSESSMENT

VOLUME 1 OF 2: TECHNICAL REPORT

CITY OF GILROY
CITY OF MORGAN HILL
SOUTH SANTA CLARA COUNTY FIRE DISTRICT

NOVEMBER 14, 2019

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gilroy
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VOLUME 2 of 2 – Map Atlas (separately bound)

EXECUTIVE SUMMARY

The Cities of Gilroy and Morgan Hill (Cities) and the South Santa Clara County Fire District (Fire District), collectively referred to as the "Departments," jointly retained Citygate Associates, LLC (Citygate) to conduct a comprehensive Standards of Coverage (SOC) assessment to provide a foundation for future local and regional fire service planning. The goal of this assessment is to identify both current services and desired service levels and then to assess the partner fire agencies' ability to provide them. After understanding any possible gaps in operations and resources, Citygate has provided recommendations to improve regional operations and services over time.

This assessment is presented in several parts, including this Executive Summary outlining the most significant findings and recommendations, and the fire station/crew deployment analysis supported by maps and response statistics. A separate Map Atlas (**Volume 2**) contains all the maps referenced throughout this report. Overall, there are 40 findings and 10 specific action recommendations.

POLICY CHOICES FRAMEWORK

There are no mandatory federal or state regulations directing the level of fire service staffing, response times, or outcomes. Thus, the level of fire protection services provided is a *local policy decision.* Communities have the level of fire services that they can afford, which may not always be the level desired. However, if services are provided at all, local, state, and federal regulations relating to firefighter and citizen safety must be followed.

OVERALL DEPLOYMENT SUMMARY

Citygate finds that the three Departments are well organized to accomplish their mission to serve their respective populations over a varied land use pattern.

Simply stated, fire service deployment is about the *speed* and *weight* of the response. *Speed* refers to initial response (first-due) of all-risk intervention resources (engines, trucks, and/or ambulances) strategically deployed across a jurisdiction for response to emergencies within a time interval to achieve desired outcomes. *Weight* refers to multiple-unit responses (Effective Response Force (ERF) also commonly called a First Alarm) for more serious emergencies such as building fires, multiple-patient medical emergencies, vehicle collisions with extrication required, or technical rescue incidents. In these situations, enough firefighters must be assembled within a reasonable time interval to safely control the emergency and prevent it from escalating into a more serious event.

If desired outcomes include limiting building fire damage to only part of the inside of an affected building and/or minimizing permanent impairment resulting from a medical emergency, then

initial units should arrive within 7:30 minutes from 9-1-1 notification, and a multiple-unit ERF should arrive within 11:30 minutes of 9-1-1 dispatch center notification, all at 90 percent or better reliability. Total response time to emergency incidents includes three distinct components: (1) 9-1-1 call processing/dispatch; (2) crew turnout; and (3) travel. Recommended best practices for these response components are 1:30 minutes, 2:00 minutes, and 4:00/8:00 minutes respectively for first-due and multiple-unit ERF responses in urban areas.

Table 1 shows overall 90th percentile call-to-arrival performance for 2016–2018 by station. As Table 1 shows, none of the station response areas receive service close to the 7:30-minute best practice goal for urban/suburban population densities; however, the Fire District's Masten and Gilroy Gardens stations meet Citygate's best practice goal of 14:00 minutes or less for rural population densities.

Table 1—Call-to-Arrival Performance – 2016–2018 (Taken from Table 20)

Station	90th Percentile Performance
Overall	**9:15**
SC1 – Morgan Hill	9:25
SC2 – Masten[1]	12:34
SC3 – Gilroy Gardens[1]	14:06
MH4 – El Toro	8:31
MH5 – Dunne Hill	9:51
GY7 – Chestnut	8:55
GY8 – Las Animas	8:11
GY9 – Sunrise	8:34
GYSTR – Glen Loma	10:51

Source: Fire Departments' incident records
[1] 14:00-minute call-to-arrival goal for rural response areas

Call processing/dispatch performance is *excellent* for Morgan Hill and the Fire District; however, Gilroy's dispatch performance is about 1:00 minute (66 percent) *slower* than the best practice goal of 90 seconds or less at 90 percent or better reliability. The times in Table 1 also reflect a slower *travel* time than the preferred 4:00 minutes for 90 percent of the incidents in an urban population density, as summarized in Table 2.

Table 2—First-Due Travel Time Performance – 2016–2018 (Taken from Table 19)

Station	90th Percentile Performance
Overall	**6:08**
SC1 – Morgan Hill	6:26
SC2 – Masten[1]	8:50
SC3 – Gilroy Gardens[1]	11:24
MH4 – El Toro	6:01
MH5 – Dunne Hill	7:25
GY7 – Chestnut	5:37
GY8 – Las Animas	5:06
GY9 – Sunrise	5:09
GYSTR – Glen Loma	7:39

Source: Fire Departments' incident records
[1] 10:30-minute travel time goal for rural response areas

The region-wide call-to-arrival response time of 9:15 minutes from 9-1-1 call answer is *significantly slower* than Citygate's recommendation of 7:30 minutes, due to multiple response time challenges in many of the fire station areas.

Overall, Citygate finds that the study partners are facing three primary challenges in the provision of fire services as follows:

Challenge #1—Daily Staffing Capacity

While Citygate considers the three jurisdictions' physical response resources appropriate to protect against the hazards likely to impact each respective jurisdiction, the daily staffing level in each City of 10–12 response personnel provides a total response force only minimally sufficient for a single emerging fire incident or a one- to three-patient emergency medical services (EMS) incident. Even with automatic aid from the Fire District, daily staffing in both Cities barely meets the recommended minimum of 15 personnel including at least one Chief Officer for incident command and safety. A major shopping holiday at the outlet mall or a downtown community event can significantly affect service demand. When high service demand occurs or incident needs require more than the 10–12 on-duty personnel, the Cities are *dependent* on the Fire District to provide both first-due and ERF response staffing capacity. Similarly, the Fire District is *dependent* on one or both Cities for first-due and ERF staffing capacity.

Given increasing annual service demand and the Cities' continuing growth, Citygate is concerned about overall daily staffing and the Cities' ability to respond with more *weight of response* and to

also have sufficient capacity for concurrent incidents. Thus, in Citygate's opinion, both Cities are *understaffed* to provide a suitable *weight of response* and capacity for concurrent incidents, and Citygate recommends that each City construct and staff an additional station as soon as fiscally feasible.

CHALLENGE #2—FIRE STATION LOCATIONS

Overall longer-than-desired first-due *travel* times shown in Table 2 are due to current fire station spacing, the non-grid street network design in some areas of each jurisdiction, gated/limited access communities, topography, natural and built barriers (hills and the highways), simultaneous incidents at peak hours of the day, and traffic congestion.

If desired outcomes include limiting building fire damage to only part of the inside of an affected building and/or minimizing permanent impairment resulting from a medical emergency, then both Cities should have travel time coverage to provide a Citygate-recommended *total* response time goal of 7:30 minutes or less for the first-due unit, and 11:30 minutes or less for a multiple-unit ERF response, all from 9-1-1 dispatch notification at 90 percent or better reliability. As the geographic mapping discussed in Section 2.6.1 shows, the stations are appropriately located in all major neighborhoods; however, they are spaced too far apart to provide the desired first-due and ERF travel time coverage. Thus, in Citygate's opinion, the two Cities have grown past their current station spacing, and quicker dispatch processing and turnout times cannot resolve the longer-than-desired travel times and traffic congestion—only an additional fire station in each City can.

Gilroy has implemented a pilot Alternative Service Model (ASM) study that provides a two-person Type-1 ambulance or Type-6 wildland fire engine for EMS calls in the newly developing Glen Loma area of the City. Citygate recommends that the ASM be continued until the City constructs and staffs a permanent fourth fire station in that area as soon as fiscally feasible.

Citygate also recommends that Morgan Hill construct and staff a third fire station in the central section of the City as soon as fiscally feasible. Potential interim steps to this goal include staffing the truck with three additional personnel daily as a third City unit, and/or dynamic deployment of a two-person Type-6[1] all-risk unit in central Morgan Hill during peak service demand hours.

The Fire District's Station #3 at Gilroy Gardens is poorly located within the City of Gilroy to serve its primary first-due response area along the west Highway 152 corridor and northwest generally along the Watsonville Road corridor. Should the District decide to relocate this station to a more suitable location further west or northwest of Gilroy, it would significantly impact first-due and ERF capacity and travel time coverage for Gilroy. Because of this, Citygate strongly encourages

[1] 18,000- to 20,000-pound GVW truck chassis with utility body, fire pump, water tank, and hose. May also be equipped to provide ALS/BLS EMS and initial rescue services.

the District and City to collaborate on future service delivery in this area of the City and District, including evaluating potential shared service opportunities such as cost-sharing a fire station to serve both jurisdictions similar to an arrangement between Morgan Hill and the Fire District.

While the Fire District's Masten station provides good first-due and ERF travel time coverage in all directions, an alternate location in the vicinity of the South Santa Clara County Airport would provide improved response time to the airport, San Martin, and Morgan Hill; however, it would increase response times into Gilroy and Fire District areas east of Gilroy. Any consideration to relocate this station should thus include both Cities.

Challenge #3—Mutual Aid Isolation

While the three fire agencies have automatic aid agreements that provide for the dispatch of the closest first-due and ERF response resource(s) regardless of jurisdiction, they are poorly located geographically for prompt additional mutual aid. Thus, mutual aid cannot realistically be provided in a timely manner by Watsonville or the Pajaro Valley Fire District from the west, Hollister or the Aromas Tri-County Fire District from the south, CAL FIRE (when available) from the east, or San Jose from the north unless southern San Jose units are available and do not encounter traffic congestion on southbound U.S. 101. The three jurisdictions are essentially self- or co-reliant to provide the resources needed to resolve all but the most catastrophic emergencies without outside assistance. Such physical isolation, combined with fiscal realities that prevent any one jurisdiction from being able to afford a service level providing enough resources and staffing to handle all calls for service without assistance, makes a cooperative service delivery model that maximizes utilization of the combined resources to provide optimal operational and fiscal effectiveness and efficiency the best long-term alternative for all three jurisdictions.

Key Findings and Recommendations

Following are the key findings and all recommendations from this study. This is not a comprehensive list of each finding throughout the report, thus the finding numbers in this section are not continuous. A full list of all findings and recommendations can be found in Section 4 of this report.

Finding #14: First unit travel time for Gilroy is about 1:00 minute (25 percent) *slower* than a recommended best practice goal of 4:00 minutes or less for urban population densities, but only slightly (11–22 percent) slower than the Department's current 4:30-minute goal except for the Glen Loma / Santa Teresa area, where travel time is more than 3:00 minutes (67 percent) *slower* than the current 4:30-minute goal, and more than 3:30 minutes (87 percent) *slower* than the recommended 4:00-minute goal.

Finding #15: First unit travel time for Morgan Hill is 2:00–3:25 minutes (50–87 percent) *slower* than a recommended best practice goal of 4:00 minutes or less for urban population densities.

Finding #16: First unit travel time from the Fire District's Masten station meets a Citygate-recommended goal of 10:30 minutes or less for rural zones and is 1:00 minute (10 percent) *slower* than the goal from the Gilroy Gardens station. First unit travel time from the Morgan Hill station is 2:26 minutes (62 percent) *slower* than the 4:00-minute goal for urban/suburban population densities.

Finding #17: Call-to-arrival response performance in Gilroy, Morgan Hill, and the Fire District's Morgan Hill station is nine percent to 45 percent *slower* than Citygate's recommended 7:30-minute goal for urban/suburban response zones. Call-to-arrival performance from the Fire District's Masten and Gilroy Gardens stations *meets* Citygate's recommended 14:00-minute goal for rural areas.

Finding #18: Effective Response Force (ERF or First Alarm) call-to-arrival performance is *significantly slower* than the Citygate-recommended goal of 11:30 minutes for urban/suburban areas, except in the Glen Loma station area in Gilroy which is 9:38 minutes. Also, ERF performance *meets* the Citygate-recommended *rural* response goal of 19:30 minutes for the Fire District's Masten station response area.

Finding #19: Gilroy and Morgan Hill do not deploy enough firefighters daily to safely resolve even a single serious fire or EMS incident, nor to provide adequate capacity for simultaneous incidents.

Finding #20: Gilroy and Morgan Hill are dependent on Fire District resources to achieve a minimal Effective Response Force staffing of 14 personnel.

Finding #21: Gilroy and the Fire District receive mutual benefit from their current automatic aid agreement.

Finding #22: Morgan Hill and the Fire District receive mutual benefit from their current cost-shared engine and automatic aid agreement.

Finding #23: The three jurisdictions are poorly located geographically for prompt mutual aid other than from each other.

Finding #24: The three jurisdictions are essentially self- or co-reliant to provide the response resources to resolve all but the most catastrophic emergencies without outside assistance.

Finding #28: Citygate projects service demand will continue to increase approximately 2–5 percent annually over the next 16–21 years (2035–2040), with EMS service demand increasing at a slightly higher 3–6 percent annually and comprising an increasing percentage of total service demand.

Finding #29: The City of Gilroy is geographically too large to effectively provide recommended service levels from its three existing fire stations and Fire District Station #3 at Gilroy Gardens.

Finding #30: A fourth fire station in southwest Gilroy would improve five deployment needs including first-due travel time coverage, daily Citywide staffing, multiple-unit Effective Response Force (ERF) staffing, travel time coverage during traffic congestion periods, and reduced dependence on the Fire District's Station #3 at Gilroy Gardens for first-due and ERF capacity and staffing.

Finding #31: If the Fire District relocates the Gilroy Gardens station further west, it will impact first-due and Effective Response Force capacity, staffing, and travel time coverage for Gilroy.

Finding #32: The City of Morgan Hill is geographically too large to effectively provide recommended service levels from its two existing fire stations and shared Fire District Station #1.

Finding #33: The risks in Morgan Hill, combined with projected future growth, justify a dedicated minimum daily City staffing level of nine personnel, with 12 total personnel daily including the Fire District's Morgan Hill engine.

Finding #34: A third fire station in central Morgan Hill would improve Citywide daily staffing capacity and both first-due and Effective Response Force travel time coverage.

Finding #37: Relocation of the Fire District's Masten station would result in both advantages and disadvantages relative to first-due and Effective Response Force response performance and automatic aid.

Finding #38: Relocation of the Fire District's Gilroy Gardens station would result in both advantages and disadvantages relative to first-due and Effective Response Force response performance and automatic aid.

Finding #39: A cooperative fire service model that maximizes utilization of the combined three fire agency jurisdictions' resources is the best alternative going forward for efficient and cost-effective delivery of fire services in south Santa Clara County.

Finding #40: Close collaboration between Gilroy, Morgan Hill, and the Fire District is critical to establishing and maintaining a cooperative regional fire service delivery model that maximizes utilization of the combined jurisdictions' resources to provide long-term operational and fiscal efficiencies.

Recommendation #1: **Adopt Updated Deployment Policies:** The Departments' elected officials should adopt *updated*, complete performance measures to aid deployment planning and to monitor performance. The measures of time should be designed to deliver outcomes that will save patients when possible upon arrival and to keep small but serious fires from becoming more serious. With this is mind, Citygate recommends the following measures:

1.1 Distribution of Fire Stations: In *urban/suburban* population density areas, to treat pre-hospital medical emergencies and control small fires, the first-due unit should arrive within 7:30 minutes, 90 percent of the time from the receipt of the 9-1-1 call at fire dispatch. This equates to a 90-second dispatch time, a 2:00-minute company turnout time, and a 4:00-minute travel time.

In rural population density areas, the first-due unit should arrive within 14:00 minutes from the receipt of the 9-1-1 call at fire dispatch at 80 percent or better reliability. This equates to a 90-second dispatch time, a 2:00-minute company turnout time, and a 10:30-minute travel time.

1.2 Multiple-Unit Effective Response Force (ERF) for Serious Emergencies: In *urban/suburban* population density areas, to confine building fires near the room of origin, keep vegetation fires under one acre in size, and treat multiple medical patients at a single incident, a multiple-unit ERF of at least 17 personnel, including two Battalion Chiefs, should arrive within 11:30 minutes from the time of 9-1-1 call receipt at fire dispatch 90 percent of the time. This equates to a 90-second dispatch time, a 2:00-minute company turnout time, and an 8:00-minute travel time.

For *rural* population density areas, a multiple-unit ERF of at least 13 personnel, including at least one Battalion Chief, should arrive within 19:30 minutes from the time of 9-1-1 call receipt at fire dispatch 80 percent of the time. This equates to a 90-second

dispatch time, a 2:00-minute crew turnout time, and a 16:00-minute travel time.

1.3 Hazardous Materials Response: Provide hazardous materials response designed to protect the communities from the hazards associated with uncontrolled release of hazardous and toxic materials. The fundamental mission of the Departments' response is to isolate the hazard, deny entry into the hazard zone, and notify appropriate officials/resources to minimize impacts on the community. This can be achieved with a first-due total response time of 7:30 minutes or less to provide initial hazard evaluation and/or mitigation actions. After the initial evaluation is completed, a determination can be made whether to request additional resources from the regional hazardous materials team.

1.4 Technical Rescue: Respond to technical rescue emergencies as efficiently and effectively as possible with enough trained personnel to facilitate a successful rescue with a first-due total response time of 7:30 minutes or less to evaluate the situation and/or initiate rescue actions. Following the initial evaluation, assemble additional resources as needed within a total response time of 11:30 minutes to safely complete rescue/extrication and delivery of the victim to the appropriate emergency medical care facility.

Recommendation #2: Gilroy needs to work to substantially lower dispatch processing times, and Morgan Hill and the Fire District need to work to lower crew turnout times.

Recommendation #3: The City of Gilroy should construct a fourth fire station in the southwest Glen Loma area of the City, and staff it with a full-time three-person crew as soon as fiscally feasible.

Recommendation #4: The City of Gilroy should continue the current pilot Alternative Service Model until such time as the Glen Loma station is constructed and staffed with a full-time crew.

Recommendation #5: The City of Gilroy and the Fire District should continue to provide shared services wherever feasible to enhance fire and EMS service delivery in both jurisdictions.

Recommendation #6: The City of Morgan Hill should construct and staff a third fire station in the central section of the City as soon as fiscally feasible; or incrementally staff the truck with three personnel as a fourth unit, or dynamically deploy a two-person Peak Activity Unit during peak service demand periods.

Recommendation #7: Morgan Hill and the Fire District should continue to collaborate to provide shared services wherever feasible to enhance fire and EMS service delivery in both jurisdictions.

Recommendation #8: The Fire District should collaborate closely with both Cities relative to any potential station relocations.

Recommendation #9: Gilroy, Morgan Hill, and Fire District leadership should establish desire and intent as soon as possible to provide cooperative fire services for many decades, perhaps through a formal Memorandum of Understanding.

Recommendation #10: Given the desire and intent to jointly provide cooperative fire services for many decades, the three jurisdictions should establish a joint strategic planning team with policy-level direction to evaluate potential cooperative service elements for approval by the respective policy bodies, and then to conduct the detailed implementation planning necessary.

NEXT STEPS

Citygate's recommended immediate next steps for Gilroy, Morgan Hill, and the Fire District are:

- Review and absorb the content, findings, and recommendations of this study
- Prepare a staff report and draft Resolution for each City Council and the Fire District Board of Commissioners to adopt the included recommended response performance goals
- Determine interest and intent to provide long-term joint cooperative fire services in south Santa Clara County
  - Consider a Memorandum of Understanding to memorialize such intent.

Recommended intermediate-term next steps include:

- Monitor response performance and unit workload at least annually

- Establish a joint agency strategic planning team with policy-level direction to evaluate potential cooperative service opportunities, including, but not limited to, fire crew staffing, deployment, cost sharing, and fire dispatch services, with the intent to develop a mutually beneficial long-term commitment and solution that optimizes the use of all three jurisdictions' resources to provide efficient and cost-effective fire services in south Santa Clara County.

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SECTION 1—INTRODUCTION AND BACKGROUND

The Cities of Gilroy and Morgan Hill (Cities) and the South Santa Clara County Fire District (Fire District), jointly retained Citygate Associates, LLC (Citygate) to conduct a comprehensive Standards of Coverage (SOC) assessment to provide a foundation for future fire service planning. The goal of this assessment is to identify both current services and desired service levels, and then to assess the partner agencies' abilities to provide them. Citygate's scope of work and corresponding Work Plan were developed consistent with Citygate's Project Team members' experience in fire administration and deployment. Citygate utilizes various National Fire Protection Association (NFPA) and Insurance Services Office (ISO) publications as best practice guidelines, along with the self-assessment criteria of the Commission on Fire Accreditation International (CFAI).

1.1 REPORT ORGANIZATION

This report is organized into the following sections. **Volume 2** (Map Atlas) is separately bound.

Executive Summary: A summary of current services and significant future challenges, key findings and recommendations, and next steps.

Section 1 **Introduction and Background:** An introduction to the study and background facts about the three jurisdictions.

Section 2 **Standards of Coverage Assessment:** An overview of the SOC process and detailed analysis of existing deployment policies, outcome expectations, critical tasks, distribution and concentration effectiveness, reliability and historical response effectiveness, and overall deployment evaluation.

Section 3 **Future Service Needs and Alternative Service Models:** Quantification of future service demand and related service needs based on projected community growth and development, and identification and evaluation of potential alternative service delivery models.

Section 4 **Findings and Recommendations:** A comprehensive list of all findings and recommendations in this report.

Section 5 **Next Steps:** Recommended immediate and intermediate-term next steps.

Appendix A **Community Risk Assessment:** A comprehensive assessment of hazards likely to impact the community, probability of a hazard occurrence, likely impact severity resulting from a hazard occurrence, and overall risk by hazard type.

1.1.1 Goals of the Report

This report cites findings and makes recommendations, as appropriate, related to each finding. Findings and recommendations throughout this report are sequentially numbered. A complete list of these findings and recommendations is provided in Section 4.

This document provides technical information about how fire services are provided and legally regulated and how the three study partner agencies currently operate. This information is presented in the form of recommendations and policy choices for consideration by each respective City Council and the Fire District Board of Commissioners.

The result is a solid technical foundation upon which to understand the advantages and disadvantages of the choices facing the Cities' and Fire District's leadership regarding the best way to provide fire services and, more specifically, at what level of desired outcome and expense.

1.1.2 Limitations of Report

In the United States, there are no federal or state regulations requiring a specific minimum level of fire services. Each community, through the public policy process, is expected to understand the local fire and non-fire risks and its ability to pay, and then choose its level of fire services. *If* fire services are provided, federal and state regulations specify how to safely provide them for the public and for the personnel providing the services.

While this report and technical explanation can provide a framework for a discussion of how to best provide fire services in south Santa Clara County, neither this report nor the Citygate team can make the final decisions, nor can they cost out every possible alternative in detail. Once final strategic choices receive policy approval, City and Fire District staff can conduct any final costing and fiscal analyses as typically completed in their normal operating and capital budget preparation cycle.

1.2 Project Approach and Scope of Work

1.2.1 Project Approach and Research Methods

Citygate utilized multiple sources to gather, understand, and model information about the Cities and the Fire District. Citygate initially requested a large amount of background data and information to better understand current costs, service levels, history of service level decisions, and other prior studies.

In subsequent site visits, Citygate performed focused interviews of the project team members and other project stakeholders. Citygate reviewed demographic information about the Cities and Fire District, including the potential for future growth and development. Citygate also obtained map and response data from which to model current and projected fire service deployment with the goal

to identify the location(s) of stations and crew quantities required to best serve the Cities and Fire District as they currently exist and to facilitate future deployment planning.

Once Citygate gained an understanding of the three service areas and their fire and non-fire risks, the Citygate team developed a model of fire services that was tested against the travel time mapping and prior response data to ensure an appropriate fit. Citygate also evaluated future growth potential and service demand by risk type and evaluated potential alternative emergency service delivery models. This resulted in Citygate proposing an approach to address current and long-range needs with effective and efficient use of existing resources. The result is a framework for enhancing fire services while meeting reasonable community expectations and fiscal realities.

1.2.2 Project Scope of Work

Citygate's approach to this SOC assessment involved:

- Reviewing information provided by the three jurisdictions and conducting listening sessions with project stakeholders
- Utilizing FireView™, a geographic mapping software program, to model fire station travel time coverage
- Using StatsFD™, an incident response time analysis program, to review the statistics of prior incident performance and plot the results on graphs and geographic mapping exhibits
- Identifying and evaluating future population and related development growth
- Identifying and evaluating potential alternative service delivery models
- Recommending appropriate risk-specific response performance goals.

1.3 STUDY AREA OVERVIEW

The City of Gilroy, which incorporated as a charter city in March 1870, is located 70 miles south of San Francisco at the southern end of Santa Clara County. Best known as the Garlic Capital of the World and home to the annual Garlic Festival each July, the City encompasses 16 square miles with a 2017 population of just over 54,000, which is projected to grow by up to 10 percent over the next five years. While the City's economy has historically centered on agricultural products and processing, Silicon Valley technology has more recently expanded south to Gilroy. The City is also home to more than 145 Premium Outlet stores, as well as Gavilan Community College.[2]

[2] Reference: City of Gilroy website and 2020 General Plan

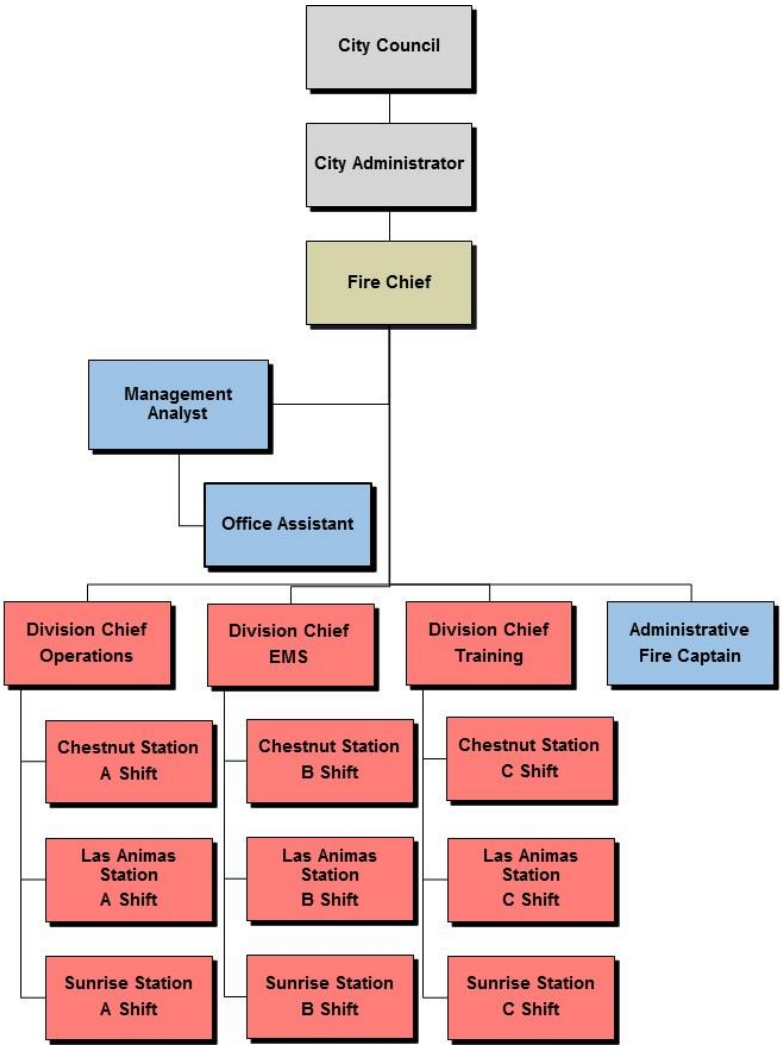
The City of Morgan Hill, incorporated in 1906, is located 12 miles north of Gilroy and 22 miles south of San Jose along U.S. 101. Known as one of the last communities in the region with a charming small-town atmosphere, Morgan Hill encompasses nearly 13 square miles with a 2017 population of just over 43,000 residents. The City's economy began transitioning in the 1950s from an agricultural center to more of a suburban residential community, although several technology companies as well as research and development firms and other industries are based in Morgan Hill.

The South County Fire Protection District of Santa Clara County, generally known as the South Santa Clara County Fire District, was formed in 1980 through consolidation of the Gilroy and Morgan Hill Rural Fire Districts. Encompassing approximately 432 square miles of unincorporated Santa Clara County in the areas of Gilroy, Morgan Hill, and San Martin, the Fire District serves a suburban/rural population of approximately 40,300. The Fire District is a dependent District of the County governed by the Board of Supervisors as the District Board of Directors, and a seven-member Board of Commissioners appointed by the Santa Clara County District 1 Supervisor.

1.4 Fire Agencies Overview

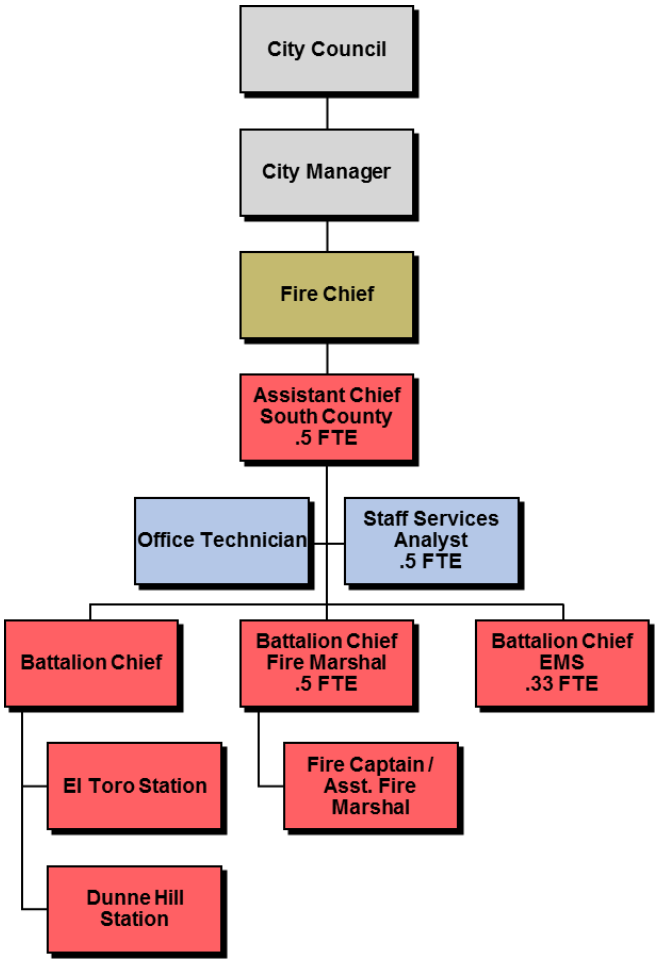
The Gilroy Fire Department, operating under authority of the Gilroy City Charter, provides all-risk fire, rescue, and Advanced Life Support (ALS) pre-hospital emergency medical services with a staff of 42 personnel, including a daily response force of nine personnel staffing three Type-1 structural fire engines and one Division Chief from the City's three fire stations. The Department's administrative staff consists of seven personnel including the Fire Chief, three Division Chiefs, an Administrative Fire Captain, a Management Analyst, and an Office Assistant as summarized in Figure 1.

Figure 1—Gilroy Fire Department



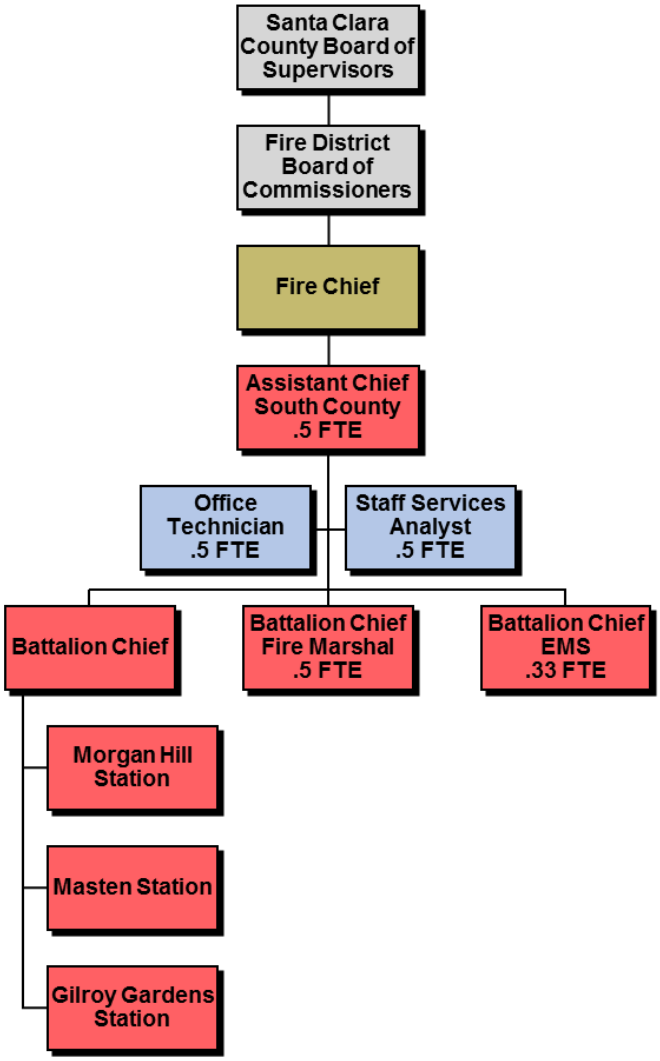
The City of Morgan Hill contracts with the California Department of Forestry and Fire Protection (CAL FIRE) to staff and operate its Fire Department. Operating under authority of California Government Code Section 38611, the Morgan Hill Fire Department provides all-risk fire, rescue, and ALS pre-hospital emergency medical services with a staff of 27.33 personnel, including a daily response force of six personnel staffing two Type-1 structural fire engines and one Battalion Chief from the City's two fire stations. The Department's administrative staff consists of five personnel including a shared CAL FIRE Assistant Chief, one CAL FIRE Battalion Chief, a shared Battalion Chief/Fire Marshal, one Office Technician, and a shared Staff Services Analyst as summarized in Figure 2.

Figure 2—Morgan Hill Fire Department



The Fire District also contracts with the California Department of Forestry and Fire Protection (CAL FIRE) to staff and manage Fire District facilities and functions. Operating under authority of California Health and Safety Code Section 13800, known as the Fire Protection District Law of 1987, the Fire District provides all-risk fire, rescue, and ALS pre-hospital emergency medical services with a staff of 25.83 personnel, including a daily response force of nine personnel staffing three Type-1 structural fire engines and one Battalion Chief from the Fire District's three fire stations. The Fire District's administrative staff consists of five personnel including a shared CAL FIRE Assistant Chief, one CAL FIRE Battalion Chief, a shared Battalion Chief/Fire Marshal, one Office Technician, and a shared Staff Services Analyst as summarized in Figure 3.

Figure 3—South Santa Clara County Fire District



Response personnel for all three agencies are trained to either the Emergency Medical Technician (EMT) level capable of providing Basic Life Support (BLS) pre-hospital emergency medical care, or the EMT-Paramedic (Paramedic) level capable of providing ALS pre-hospital emergency medical care. Ground Paramedic ambulance service is provided by Santa Clara County Ambulance, now a division of American Medical Response (AMR) (previously Rural/Metro), a private-sector ambulance provider operating under a non-exclusive operating area contract administered by the Santa Clara County Emergency Medical Services Agency. Air ambulance services, when needed, are provided by CALSTAR (Gilroy) and Life Flight (Palo Alto). Four area hospitals provide emergency medical services, including Saint Louise Regional Hospital in Gilroy, two in San Jose, and one in Palo Alto, all of which have trauma centers.

Response personnel are also trained to the U. S. Department of Transportation Hazardous Material First Responder Operational (FRO) level to provide initial hazardous material incident assessment, hazard isolation, and support for a regional hazardous material response team available to all three jurisdictions from the City of San Jose or Central Santa Clara County Fire District through mutual aid. Gilroy can also deploy a hazardous materials decontamination unit as needed in support of the regional Hazardous Materials Response Team.

Response personnel from all three Departments are further trained to Confined Space Awareness level, and the Fire District can deploy a Type-2 Urban Search and Rescue (USAR) Team from its Gilroy Gardens station as needed or requested through the County mutual aid system.

Table 3 summarizes total budgeted personnel by agency and function.

Table 3—Budgeted Personnel by Agency

Function	Budgeted Personnel			
	Gilroy	Morgan Hill[1]	Fire District[1]	Total
Administration	7.0	3.83	3.33	**14.16**
Operations	35.0	22.0	22.0	**79.0**
Fire Prevention	0	1.5	.5	**2.0**
Total	**42.0**	**27.33**	**25.83**	**95.16**

Source: Fire agencies
[1] Does not include state-funded Unit/Fire Chief

Gilroy personnel work a 48/96-hour shift schedule of two consecutive 24-hour days on duty, followed by four consecutive days off. Morgan Hill and Fire District personnel work a 72/96 schedule of three consecutive 24-hour days on duty, followed by four consecutive days off.

SECTION 2—STANDARDS OF COVERAGE ASSESSMENT

This section provides a detailed analysis of the three fire agencies' current ability to deploy and mitigate emergency risks within their service area. The response analysis uses prior response statistics and geographic mapping to help each agency and the community visualize what the current response system can and cannot deliver.

2.1 STANDARDS OF COVERAGE PROCESS OVERVIEW

The core methodology used by Citygate in the scope of its deployment analysis work is *Standards of Cover*, fifth and sixth editions, which is a systems-based approach to fire department deployment published by the Commission on Fire Accreditation International (CFAI). This approach uses local risk and demographics to determine the level of protection best fitting a community's needs.

The Standards of Coverage (SOC) method evaluates deployment as part of a fire agency's self-assessment process. This approach uses risk and community expectations on outcomes to help elected officials make informed decisions on fire and emergency medical services deployment levels. Citygate has adopted this multiple-part systems approach as a comprehensive tool to evaluate fire station locations. Depending on the needs of the study, the depth of the components may vary.

Such a systems approach to deployment, rather than a one-size-fits-all prescriptive formula, allows for local determination. In this comprehensive approach, each agency can match local needs (risks and expectations) with the costs of various levels of service. In an informed public policy debate, a governing board "purchases" the fire and emergency medical service levels the community needs and can afford.

While working with multiple components to conduct a deployment analysis is admittedly more work, it yields a much better result than using only a singular component. For instance, if only travel time is considered, and frequency of multiple calls is not, the analysis could miss over-worked companies. If a risk assessment for deployment is not considered, and deployment is based only on travel time, a community could under-deploy to incidents.

Table 4 describes the eight elements of the SOC process.

Table 4—Standards of Coverage Process Elements

SOC Element		Description
1	Existing Deployment Policies	A review of the deployment goals/policies the agency has in place today.
2	Community Outcome Expectations	A review of the expectations of the community for responses to emergencies.
3	Community Risk Assessment	A review of the values to be protected from hazards in the community. (For this report, see Appendix A—Community Risk Assessment.)
4	Critical Task Analysis	A review of the tasks that must be performed and the personnel required to deliver the stated outcome expectation for the Effective Response Force.
5	Distribution Analysis	A review of the spacing of first-due response resources (typically engines) to control routine emergencies.
6	Concentration Analysis	A review of the spacing of fire stations so that more complex emergencies can receive sufficient resources in a timely manner (First Alarm Assignment or the ERF).
7	Reliability and Historical Response Effectiveness Analysis	An evaluation of prior response statistics to determine the percent of compliance the existing system delivers.
8	Overall Evaluation	Proposed Standard of Coverage statements by risk type, as necessary.

Source: CFAI *Standards of Cover*, Fifth Edition

Simply summarized, fire service deployment is about the *speed* and *weight* of the response. *Speed* refers to initial response (first-due), all-risk intervention resources (engines, trucks, and/or ambulances) strategically deployed across a jurisdiction for response to emergencies within a specified time interval to control routine to moderate emergencies without the incident escalating to greater size or severity. *Weight* refers to multiple-unit responses for more serious emergencies, such as building fires, multiple-patient medical emergencies, vehicle collisions with extrication required, or technical rescue incidents. In these situations, an adequate number of firefighters must be assembled within a reasonable time interval to safely control the emergency and prevent it from escalating into a more serious event. Table 5 illustrates this deployment paradigm.

Table 5—Fire Service Deployment Paradigm

Element	Description	Purpose
Speed of Response	Travel time of initial response all-risk intervention units strategically located across a jurisdiction	To control routine to moderate emergencies without the incident escalating in size or complexity
Weight of Response	The number of firefighters in a multiple-unit response for serious emergencies	To assemble enough firefighters within a reasonable time frame to safely control a more complex emergency without escalation

Smaller fires and less complex emergencies require a single-unit or two-unit response (engine and/or specialty resource) within a relatively short response time. Larger or more complex incidents require more units and personnel to control. In either case, if the crews arrive too late or the total number of personnel is too few for the emergency, they are drawn into an escalating and more dangerous situation. The science of fire crew deployment is to spread crews out across a community or jurisdiction for quick response to keep emergencies small with positive outcomes, without spreading resources so far apart that they cannot assemble quickly enough to effectively control more serious emergencies.

2.2 CURRENT DEPLOYMENT

SOC ELEMENT 1 OF 8
EXISTING DEPLOYMENT POLICIES

Nationally recognized standards and best practices suggest using several incremental measurements to define response time. Ideally, the clock start time is when the 9-1-1 dispatcher receives the emergency call. In some cases, the call must then be transferred to a separate fire dispatch center. In this setting, the response time clock starts when the fire center receives the 9-1-1 call into its computer-aided dispatch (CAD) system. Response time increments include dispatch center call processing, crew alerting and response unit boarding (commonly called turnout time), and actual driving (travel) time.

At the time of this study, each agency's response time goals included:

2.2.1 City of Gilroy

> Chapter 7 of the City's General Plan 2020 states in *Policy 18.01 Standards of Service*, *"Continue to provide and maintain police and fire services that are adequate in manpower, equipment, and resources to respond to localized emergencies and calls for service within the City. The departments' current levels of service should be maintained or improved as the City continues to grow, with*

average emergency response times for police services of approximately 4.5 minutes and average emergency response times for fire services of less than 5.0 minutes."

Other City documents reflect general wording about acceptable risk but do not really define what that means for various types of fire, medical, and technical emergencies. One of the City Council's 2018 Strategic Goals is to "Enhance Public Safety Capabilities."

The Gilroy Fire Department has operating goals to:

- Respond to emergency calls for service within 5:00 minutes 75 percent of the time
- Contain building fires to the room of origin 70 percent of the time
- Provide an effective response force (First Alarm) of 12–15 personnel within 10:00 minutes of initial dispatch for 95 percent of fires to contain the escalation of the emergency
- Have crew turnout time after notification be 60–80 seconds based on protective clothing needed and time of day

2.2.2 City of Morgan Hill

Chapter 9 of the City's General Plan states:

- *Goal SSI-11 Efficient police, fire and emergency medical response services, and access to local medical facilities*
- *Policy SSI-11.1 Staffing. Provide police and fire staffing and facilities as necessary to provide adequate public safety protection.*
- *Other policies cover access and preparedness, although in very general terms*

The Fire Department has a policy for EMS to arrive in urban and suburban (as defined by census data) areas in 7:59 minutes or less, and in rural areas in 11:59 minutes or less 95 percent of the time. These two measures come from the County's EMS system and ambulance provider plans.

For structural fires, the Department should deploy 12 firefighters plus two Chief Officers within 14:00 minutes 90 percent of the time.

2.2.3 South Santa Clara County Fire District

The Fire District has a policy for EMS to arrive in urban and suburban (as defined by census data) areas in 7:59 minutes or less, and in rural areas in 11:59 minutes or less 95 percent of the time. These two measures come from the County's EMS system and ambulance provider goals.

For structural fires, the Fire District should deploy 12 firefighters plus two Chief Officers within 14:00 minutes 90 percent of the time.

None of these goals begin the time measure from the receipt of the 9-1-1 call, nor do they separate crew turnout time from actual driving time, which is a current best practice. They also do not address response performance to other risks within the jurisdictions, such as hazardous materials and technical rescue, as recommended by the CFAI. The three agencies do have a few goals and service-level histories that can be documented in response times, number of response companies, and minimum staffing. However, departmental goals are not adopted elected official policy direction as recommended by CFAI.

Currently, NFPA Standard 1710, a recommended deployment standard for *career* fire departments in urban/suburban areas, recommends initial (first-due) intervention units' arrival within a 4:00-minute travel time and recommends arrival of all the resources comprising the multiple-unit First Alarm within 8:00 minutes, at 90 percent or better reliability.[3]

The most recent published best practices by the NFPA for dispatching have increased the dispatch processing time up to 90 seconds and, if there are language barriers, 120 seconds. Further, for crew turnout time, 60–80 seconds is recommended, depending on the type of protective clothing that must be donned.

If the travel time measures recommended by the NFPA (and Citygate) are added to dispatch processing and crew turnout times recommended by Citygate and best practices, then a realistic 90 percent first unit arrival goal is now 7:30 minutes from the time of fire dispatch receiving the call. This is comprised of 90 seconds dispatch, 2:00 minutes crew turnout, and 4:00 minutes travel.

Finding #1:	None of the three agencies have elected-official-approved response performance objectives meeting all best practice elements for time and desired outcomes. Some of the departmental policies have a portion of the elements of best practices-based response time and outcomes desired policies.
Finding #2:	All three agencies have, over the last decade or more, completed a fire master plan, Standards of Response Cover assessment, or a contract for services agreement, yet the elected officials have not clearly adopted the response time policies as recommended in prior studies.

[3] NFPA 1710 – Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments (2016 Edition).

2.2.4 Current Deployment Model

Resources and Staffing

Table 6 summarizes the current fire services deployment model in the joint south County service area:

Table 6—Agency Facilities and Response Resources

Station	Address	Assigned Apparatus	Minimum Staffing
South Santa Clara Fire District			**10**
Morgan Hill 1	15670 Monterey Road, Morgan Hill	**Engine 67** **Battalion Chief[1]**	**3** **1**
Masten 2	10810 No Name Uno, Gilroy	**Engine 68**	**3**
Gilroy Gardens 3	3050 Hecker Pass Hwy., Gilroy	**Engine 69**	**3**
City of Morgan Hill			**6**
El Toro 4	18300 Old Monterey Road	**Engine 57** **Truck 57**	**3**
Dunne Hill 5	2100 E. Dunne Avenue	**Engine 58**	**3**
City of Gilroy			**10**
Chestnut 7	7070 Chestnut Street	**Engine 47** **Division Chief**	**3** **1**
Las Animas 8	8383 Wren Avenue	**Engine 48**	**3**
Sunrise 9	880 Sunrise Drive	**Engine 49**	**3**

Source: South Santa Clara County fire agencies
[1] Battalion Chief is co-funded by the City of Morgan Hill and the Fire District

The three agencies have automatic mutual aid agreements with all other Santa Clara County fire agencies and are also signatories to the County and State of California mutual aid agreements.

Response Plan

The three agencies provide all-risk first response services to the people and facilities they protect including fire suppression; pre-hospital Paramedic (ALS) or Basic Life Support (BLS) emergency medical services (EMS); hazardous material and technical rescue response; and other non-emergency services, including fire prevention, community safety education, and other related services.

Given the diverse set of emergency risks presented in the south County area, the agencies utilize a best practice-based tiered response plan calling for different types and numbers of resources

depending on incident/risk type. The two fire dispatch centers (Gilroy and CAL FIRE) select and dispatch the closest and most appropriate resource types pursuant to the three Departments' joint response plan, as shown in Table 7.

Table 7—Response Plan by Major Incident Type

Incident Type	Resources Dispatched	Total Personnel
Single-Patient EMS	1 Engine + 1 County Paramedic Ambulance	**5**
Vehicle Fire	1 Engine	**3**
Residential Building Fire	4 Engines, 2 Battalion Chiefs (Add Morgan Hill Ladder Truck if Commercial Building in Morgan Hill or Fire District Areas)	**14**
Wildland Fire (Medium)	4 Engines, 1 Water Tender, 1 Battalion Chief	**14**
Rescue	2 Engines, 1 Battalion Chief	**7**
Hazardous Material	2 Engines, 1 Battalion Chief	**7**

Source: Fire Departments

Finding #3: The three fire agencies have a standard response plan that considers risk and establishes an appropriate initial response for each incident type. Each type of call for service receives the combination of engines, trucks, specialty units, and command officers customarily needed to effectively control that type of incident based on each agency's experience.

2.3 Outcome Expectations

SOC Element 2 of 8
Community Outcome Expectations

The Standards of Coverage process begins by reviewing existing emergency services outcome expectations. This includes determining for what purpose the response system exists and whether the governing body has adopted any response performance measures. If it has, the time measures used must be understood and sound data must be available.

Current national best practice is to measure percent completion of a goal (e.g., 90 percent of responses) instead of an average measure. Mathematically, this is called a fractile measure.[4] This is because measuring the average only identifies the central or middle point of response time

[4] A *fractile* is that point below which a stated fraction of the values lie. The fraction is often given in percent; the term percentile may then be used.

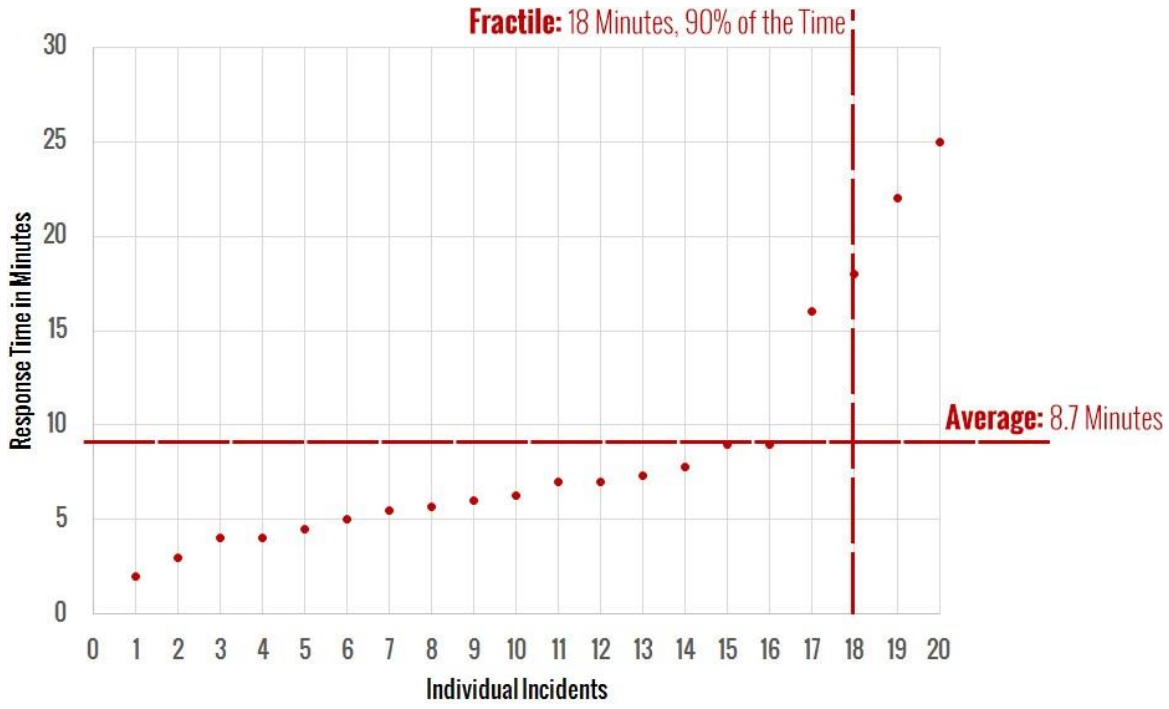
performance for all calls for service in the data set. Using an average makes it impossible to know how many incidents had response times that were far above the average or just above.

For example, Figure 4 shows response times for a fictitious fire department. This agency is small and receives 20 calls for service each month. Each response time has been plotted on the graph from shortest response time to longest response time.

Figure 4 shows that the average response time is 8.7 minutes. However, the average response time fails to properly account for four calls for service with response times far exceeding a threshold in which positive outcomes could be expected. In fact, it is evident in Figure 4 that 20 percent of responses are far too slow and that this jurisdiction has a potential life-threatening service delivery problem. Average response time as a measurement tool for fire services is simply not sufficient. This is a significant issue in larger cities if hundreds or thousands of calls are answered far beyond the average point.

By using the fractile measurement with 90 percent of responses in mind, this small jurisdiction has a response time of 18:00 minutes, 90 percent of the time. This fractile measurement is far more accurate at reflecting the service delivery situation of this small agency.

Figure 4—Fractile versus Average Response Time Measurements



More importantly, within the SOC process, positive outcomes are the goal. From that, crew size and response time can be calculated to allow appropriate fire station spacing (distribution and concentration). Emergency medical incidents include situations with the most severe time

constraints. The brain can only survive 4:00–6:00 minutes without oxygen. Cardiac arrest and other events can cause oxygen deprivation to the brain. While cardiac arrests make up a small percentage, drowning, choking, trauma constrictions, or other similar events have the same effect. In a building fire, a small incipient fire can grow to involve the entire room in a 6:00- to 8:00-minute time frame. If fire service response is to achieve positive outcomes in severe emergency medical situations and incipient fire situations, *all* responding crews must arrive, assess the situation, and deploy effective measures before brain death occurs or the fire spreads beyond the room of origin.

Thus, from the time of 9-1-1 receiving the call, an effective deployment system is *beginning* to manage the problem within a 7:00- to 8:00-minute total response time. This is right at the point that brain death is becoming irreversible and the fire has grown to the point of leaving the room of origin and becoming very serious. Thus, the City needs a *first-due* response goal that is within a range to give the situation hope for a positive outcome. It is important to note that the fire or medical emergency continues to deteriorate from the time of inception, not from the time the fire engine starts to drive the response route. Ideally, the emergency is noticed immediately and the 9-1-1 system is activated promptly. This step of awareness—calling 9-1-1 and giving the dispatcher accurate information—takes, in the best of circumstances, 1:00 minute. Crew notification and travel time take additional minutes. Upon arrival, the crew must approach the patient or emergency, assess the situation, and appropriately deploy its skills and tools. Even in easy-to-access situations, this step can take 2:00 minutes or more. This time frame may be increased considerably due to long driveways, apartment buildings with limited access, multiple-story apartments or office complexes, or shopping center buildings.

Unfortunately, there are times when the emergency has become too severe, even before the 9-1-1 notification and/or fire department response, for the responding crew to reverse. However, when an appropriate response time policy is combined with a well-designed deployment system, only anomalies like bad weather, poor traffic conditions, or multiple emergencies slow down the response system. Consequently, a properly designed system will give citizens the hope of a positive outcome for their tax dollar expenditure.

For this report, total response time is the sum of the agency's fire dispatch center's dispatch processing, crew turnout, and road travel time. This is consistent with CFAI best practice recommendations.

2.4 COMMUNITY RISK ASSESSMENT

SOC ELEMENT 3 OF 8
COMMUNITY RISK ASSESSMENT

The third element of the SOC process is a community risk assessment. Within the context of an SOC study, the objectives of a community risk assessment are to:

- Identify the values at risk to be protected within the community or service area.
- Identify the specific hazards with the potential to adversely impact the community or service area.
- Quantify the overall risk associated with each hazard.
- Establish a foundation for current/future deployment decisions and risk-reduction/hazard mitigation planning and evaluation.

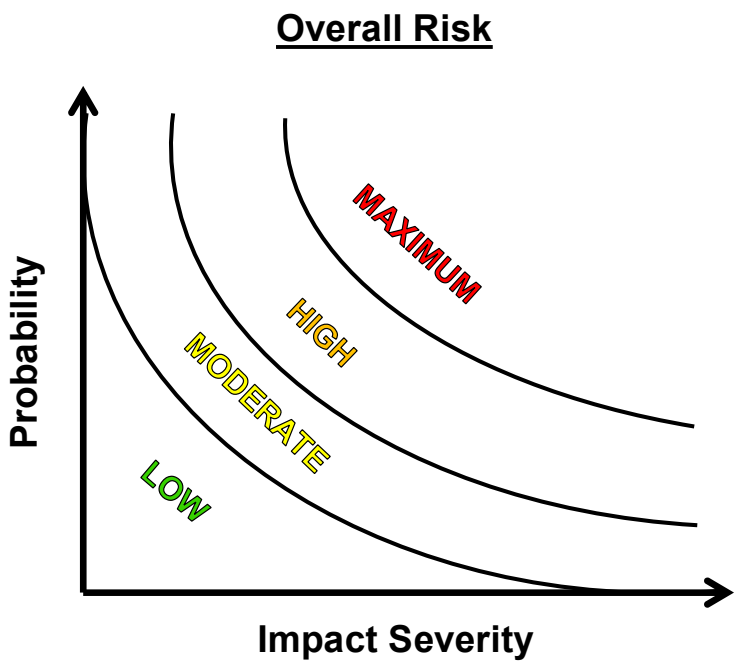
A *hazard* is broadly defined as a situation or condition that can cause or contribute to harm. Examples include fire, medical emergency, vehicle collision, earthquake, flood, etc. *Risk* is broadly defined as the *probability of hazard occurrence* in combination with the *likely severity of resultant impacts* to people, property, and the community as a whole.

2.4.1 Risk Assessment Methodology

The methodology employed by Citygate to assess community risks as an integral element of an SOC study incorporates the following elements:

- Identification of geographic planning sub-zones (risk zones) appropriate to the community or jurisdiction.
- Identification and quantification (to the extent data is available) of the specific values at risk to various hazards within the community or service area.
- Identification of the fire and non-fire hazards to be evaluated.
- Determination of the probability of occurrence for each hazard.
- Identification and evaluation of multiple, relevant impact severity factors for each hazard by planning zone, using agency/jurisdiction-specific data and information.
- Quantification of overall risk for each hazard based on probability of occurrence in combination with probable impact severity as shown in Figure 5.

Figure 5—Overall Risk



2.4.2 Values at Risk to Be Protected

Broadly defined, *values at risk* are those tangibles of significant importance or value to the community or jurisdiction that are potentially at risk of harm or damage from a hazard occurrence. Values at risk typically include people, critical facilities/infrastructure, buildings, and key economic, cultural, historic, and/or natural resources.

People

Residents, employees, visitors, and travelers through a community or jurisdiction are vulnerable to harm from a hazard occurrence. Particularly vulnerable are specific at-risk populations, including those unable to care for themselves or self-evacuate in the event of an emergency. At-risk populations typically include children younger than 10 years of age, the elderly, people housed in institutional settings, those requiring special access, and/or those who have functional needs. Key demographic data for each of the three service areas is contained in **Appendix A—Community Risk Assessment**.

Critical Infrastructure / Key Resources

The U.S. Department of Homeland Security defines Critical Infrastructure / Key Resources as those physical assets essential to the public health and safety, economic vitality, and resilience of a community, such as lifeline utilities infrastructure, telecommunications infrastructure, essential government services facilities, public safety facilities, schools, hospitals, airports, etc. The 2017

Santa Clara County Operational Area Hazard Mitigation Plan (Volume 2) identifies critical facilities and infrastructure within the two Cities and the unincorporated Fire District areas. A hazard occurrence with significant impact severity affecting one or more of these facilities would likely adversely impact critical public or community services.

Buildings

The three-jurisdiction service area includes thousands of housing units and hundreds more non-residential occupancies, including office, research, professional services, and retail sales buildings; restaurants/bars; motels; churches; schools; government facilities; healthcare facilities; and other non-residential uses as described in **Appendix A**.

2.4.3 Hazard Identification

Citygate utilizes prior risk studies where available, fire and non-fire hazards as identified by the CFAI, and data and information specific to the agency/jurisdiction to identify the hazards to be evaluated for this report.

Following an evaluation of the hazards identified in all three agencies' fire and non-fire hazards as identified by the CFAI as they relate to services provided by the Departments, Citygate evaluated the following five hazards for this risk assessment:

- Building Fire
- Vegetation/Wildland Fire
- Medical Emergency
- Hazardous Material Release/Spill
- Technical Rescue

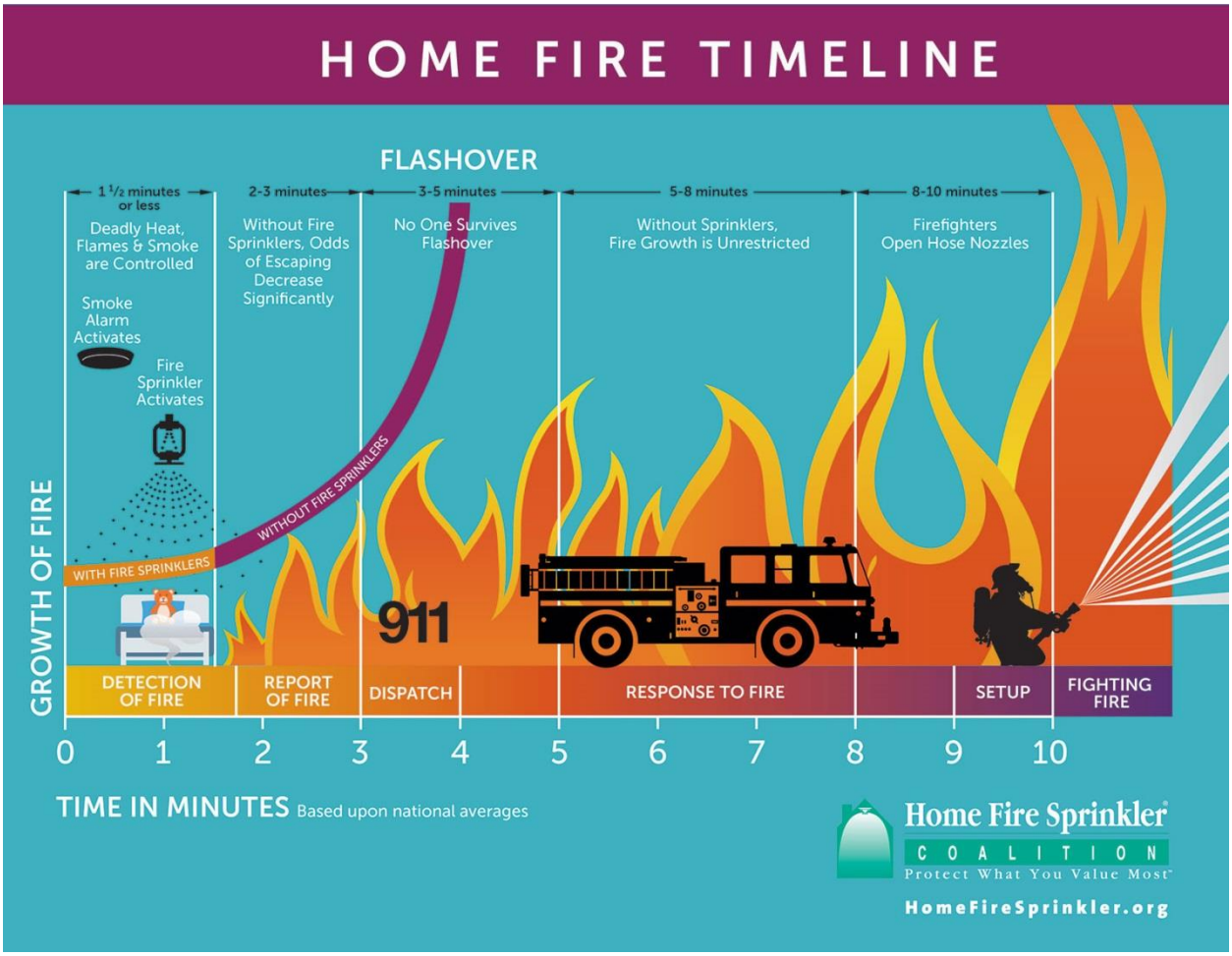
Because building fires and medical emergencies have the most severe time constraints if positive outcomes are to be achieved. Following is a brief overview of building fire and medical emergency risk. **Appendix A** contains the full risk assessment for all five hazards.

Building Fire Risk

One of the primary hazards in any community is building fire. Building fire risk factors include building density, size, age, occupancy, and construction materials and methods, as well as the number of stories, the required fire flow, the proximity to other buildings, built-in fire protection/alarm systems, an available fire suppression water supply, building fire service capacity, fire suppression resource deployment (distribution/concentration), staffing, and response time.

Figure 6 illustrates the building fire progression timeline and shows that flashover, which is the point at which the entire room erupts into fire after all the combustible objects in that room reach their ignition temperature, can occur as early as 3:00–5:00 minutes from the initial ignition. Human survival in a room after flashover is extremely improbable.

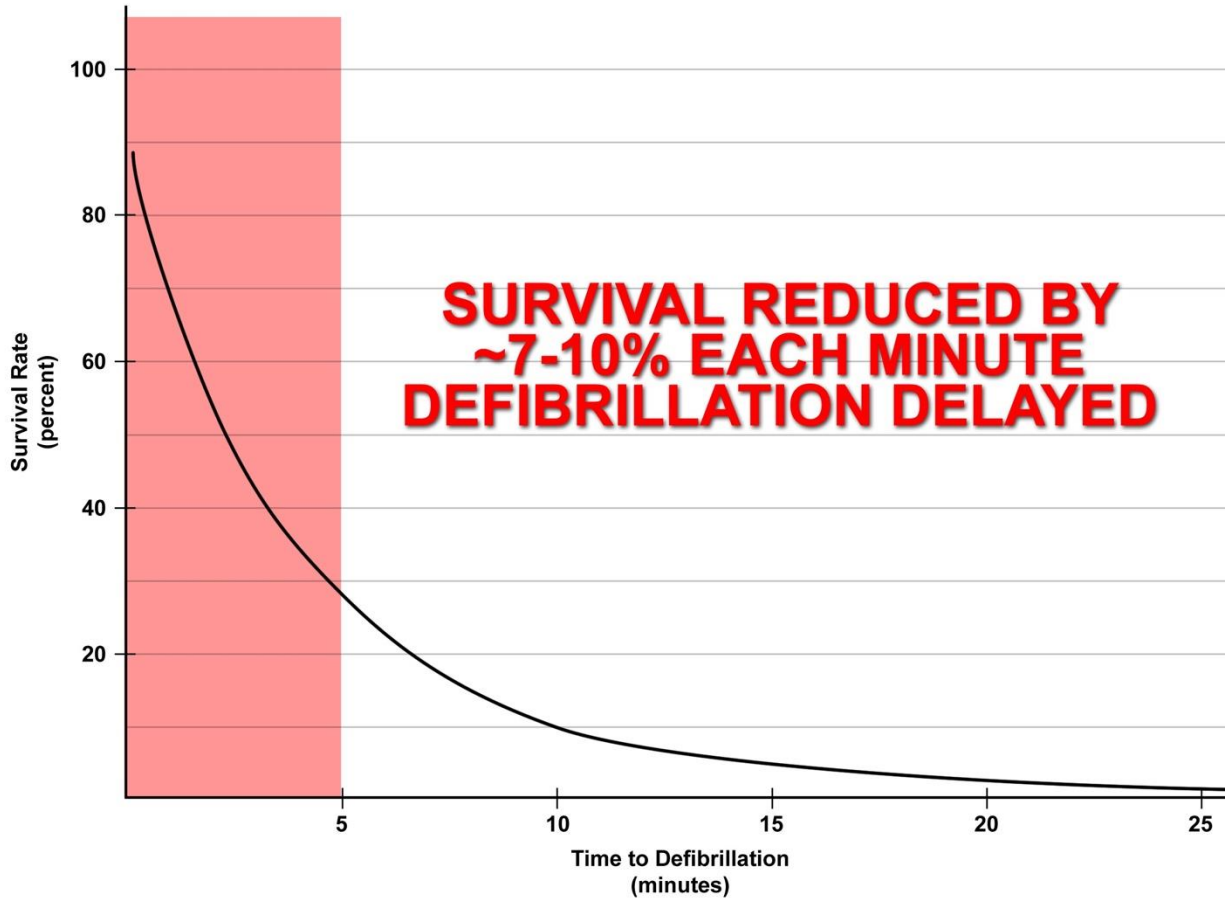
Figure 6—Building Fire Progression Timeline



Medical Emergency Risk

Fire agency service demand in most jurisdictions is predominantly for medical emergencies. Figure 7 illustrates the reduced survivability of a cardiac arrest victim as time to defibrillation increases.

Figure 7—Survival Rate versus Time to Defibrillation



Source: www.suddencardiacarrest.org

The three fire agencies currently provide first responder ALS or BLS pre-hospital emergency medical services, with operational personnel trained to the EMT or EMT-Paramedic level.

2.4.4 Risk Assessment Summary

Citygate's assessment of the values at risk and hazards likely to impact the three-agency service area yields the following overall risk ranging from ***Low*** to ***High*** for the five hazards, as summarized in the following table by fire station area planning zone. See **Appendix A** for the full risk assessment.

Table 8—Overall Risk by Hazard

Hazard	Risk Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Building Fire	*Moderate*	*Low*	*Low*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Low*
Vegetation/Wildland Fire	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Low*	*Low*	*Low*	*Moderate*	*Moderate*
Medical Emergency	*High*	*High*	*High*	*High*	*High*	*High*	*High*	*High*	*High*
Hazardous Material	*Moderate*	*Moderate*	*Low*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*
Technical Rescue	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*

2.5 Critical Task Time Measures—What Must Be Done over What Time Frame to Achieve the Stated Outcome Expectation?

SOC Element 4 of 8
Critical Task Time Study

SOC studies use critical task information to determine the number of firefighters needed within a timeframe to achieve desired objectives on fire and emergency medical incidents. Table 9 and Table 10 illustrate critical tasks typical of building fire and medical emergency incidents, including the minimum number of personnel required to complete each task. These tables are composites from Citygate clients in urban/suburban departments similar to the three fire agencies, with units staffed with three personnel per engine or ladder truck. It is important to understand the following relative to these tables:

- It can take considerable time after a task is ordered by command to complete the task and arrive at the desired outcome.
- Task completion time is usually a function of the number of personnel that are *simultaneously* available. The fewer firefighters available, the longer some tasks will take to complete. Conversely, with more firefighters available, some tasks are completed concurrently.
- Some tasks must be conducted by a minimum of two firefighters to comply with safety regulations. For example, two firefighters are required to search a smoke-filled room for a victim.
- These issues are important as the three population centers with their fire stations are all not immediately adjacent to one another. For serious fire staffing, either City needs the District crews to be immediately available and/or needs U.S. 101 to be open and clear for one city to get to the other quickly.

2.5.1 Critical Firefighting Tasks

Table 9 illustrates the critical tasks required to control a typical single-family dwelling fire with five response units (four engines/trucks and two Chief Officers) from the three Departments, for a total Effective Response Force (ERF) of **14** personnel. These tasks are taken from typical fire departments' operational procedures, which are consistent with the customary findings of other agencies using the SOC process. No conditions exist to override the Occupational Safety and Health Administration (OSHA) two-in/two-out safety policy, which requires that firefighters enter atmospheres that are immediately dangerous to life and health, such as building fires, in teams of two while two more firefighters are outside and immediately ready to rescue them should trouble arise.

Scenario: *Simulated approximately 2,000 square-foot, two-story, residential fire with unknown rescue situation. Responding companies receive dispatch information typical for a witnessed fire. Upon arrival, they find approximately 50 percent of the second floor involved in fire.*

Table 9—First Alarm Residential Fire Critical Tasks—14 Personnel

Critical Task Description		Personnel Required
First-Due Engine (Three Personnel)		
1	Conditions report	1
2	Establish supply line to hydrant.	2
3	Deploy initial fire attack line to point of building access.	1–2
4	Operate pump and charge attack line.	1
5	Establish incident command.	1
6	Conduct primary search.	2
Second-Due Engine (Three Personnel)		
7	If necessary, establish supply line to hydrant.	1–2
8	Deploy a backup attack line.	1–2
9	Establish Initial Rapid Intervention Crew.	2
Third-Due Engine or Truck (Three Personnel)		
10	Conduct initial search and rescue, if not already completed.	2
11	Deploy ground ladders to roof.	1–2
12	Establish horizontal or vertical building ventilation.	1–2
13	Open concealed spaces as required	2
Chief Officers (Two)		
14	Transfer of incident command.	1
15	Establish exterior command and scene safety.	1
Fourth-Due Engine (Three Personnel)		
16	Establish Initial Rapid Intervention Crew.	3
17	Secure utilities.	2
18	Deploy second attack line as needed.	2
19	Conduct secondary search.	2

Grouped together, the duties in Table 9 form an Effective Response Force, or First Alarm Assignment. These distinct tasks must be performed to effectively achieve the desired outcome; arriving on scene does not stop the emergency from escalating. While firefighters accomplish these tasks, the incident progression clock keeps running.

Fire in a building can double in size during its free-burn period before fire suppression is initiated. Many studies have shown that a small fire can spread to engulf an entire room in fewer than 4:00–5:00 minutes after free burning has started. Once the room is completely superheated and involved

in fire (known as flashover), the fire will spread quickly throughout the structure and into the attic and walls. For this reason, it is imperative that fire suppression and search/rescue operations commence before the flashover point occurs *if* the outcome goal is to keep the fire damage in or near the room of origin. In addition, flashover presents a life-threatening situation to both firefighters and any occupants of the building.

2.5.2 Critical Medical Emergency Tasks

The Departments respond to thousands of EMS incidents annually, including vehicle accidents, strokes, heart attacks, difficulty breathing, falls, childbirths, and other medical emergencies.

For comparison, Table 10 summarizes the critical tasks required for a cardiac arrest patient.

Table 10—Cardiac Arrest Critical Tasks—3–4 Engine Personnel + ALS Ambulance

Critical Task		Personnel Required	Critical Task Description
1	Chest compressions	2	Compression of chest to circulate blood
2	Ventilate/oxygenate	1–2	Mouth-to-mouth, bag-valve-mask, apply O_2
3	Airway control	1–2	Manual techniques/intubation/cricothyroidotomy
4	Defibrillate	1–2	Electrical defibrillation of dysrhythmia
5	Establish I.V.	1–2	Peripheral or central intravenous access
6	Control hemorrhage	1–2	Direct pressure, pressure bandage, tourniquet
7	Splint fractures	2–3	Manual, board splint, HARE traction, spine
8	Interpret ECG	2	Identify type and treat dysrhythmia
9	Administer drugs	2	Administer appropriate pharmacological agents
10	Spinal immobilization	2–5	Prevent or limit paralysis to extremities
11	Extricate patient	3–5	Remove patient from vehicle, entrapment
12	Patient charting	1–2	Record vitals, treatments administered, etc.
13	Hospital communication	1–2	Receive treatment orders from physician
14	Treat en route to hospital	2–4	Continue to treat/monitor/transport patient

2.5.3 Critical Task Analysis and Effective Response Force Size

A critical task analysis reveals that the time required to complete the critical tasks necessary to stop the escalation of an emergency (as shown in Table 9 and Table 10) must be compared to outcomes. As shown in nationally published fire service time versus temperature tables, after approximately 4:00 to 5:00 minutes of free burning a room, fire will escalate to the point of flashover. At this point, the entire room is engulfed in fire, the entire building becomes threatened,

and human survival near or in the room of fire origin becomes impossible. Additionally, brain death begins to occur within 4:00 to 6:00 minutes of the heart stopping. Thus, the ERF must arrive in time to prevent these emergency events from becoming worse.

The agencies' daily staffing plus automatic aid is sufficient to deliver a *single* ERF of **12** firefighters and two Chief Officers to a building fire totaling 14, if they can arrive in time, which the statistical analysis of this report will discuss in depth. Mitigating an emergency event is a *team* effort once the units have arrived. This refers to the *weight* of response analogy; if too few personnel arrive too slowly, the emergency will escalate instead of improve. The outcome times, of course, will be longer and yield less desirable results if the arriving force is later or smaller.

The quantity of staffing and the arrival time frame can be critical in a serious fire. Fires in older and/or multiple-story buildings could well require the initial firefighters to rescue trapped or immobile occupants. If the ERF is too small, rescue *and* firefighting operations *cannot* be conducted simultaneously.

Fires and complex medical incidents require that additional units arrive in time to complete an effective intervention. Time is one factor that comes from *proper station placement*. Good performance also comes from *adequate staffing* and training. But where fire stations are spaced too far apart, and one unit must cover another unit's area or multiple units are needed, these units can be too far away, and the emergency will escalate and/or result in less-than-desirable outcome.

Previous critical task studies conducted by Citygate and NFPA Standard 1710 find that all units need to arrive with **15** firefighters plus at least one Chief Officer within 11:30 minutes (from the time of 9-1-1 call) at a building fire to be able to *simultaneously and effectively* perform the tasks of rescue, fire suppression, and ventilation.

If fewer firefighters arrive, most likely, the search team would be delayed, as would ventilation. The attack lines would only consist of two firefighters, which does not allow for rapid movement of the hose line above the first floor in a multiple-story building. Rescue is conducted with at least two-person teams; thus, when rescue is essential, other tasks are not completed in a simultaneous, timely manner. Effective deployment is about the **speed** *(travel time)* and the **weight** *(number of firefighters)* of the response.

Fifteen initial firefighters plus a command chief could handle a moderate-risk, confined residential fire. However, even an ERF of 16 personnel will be seriously slowed if the fire is above the first floor in a low-rise apartment building or commercial/industrial building. This is where the capability to add additional personnel and resources to the standard response becomes critical.

Given that the three agencies' ERF plan delivers 14 personnel to a moderate-risk building fire, it reflects a goal to confine serious building fires inside the building of origin, *but not inside the compartment of origin* and to prevent the spread of fire to adjoining buildings. This is a typical desired outcome in less populated suburban areas.

The agencies' current physical response to building fires is, in effect, its de-facto deployment measure to more densely populated urban areas—*if those areas are within a reasonable travel time from multiple fire stations*. Thus, this becomes the baseline policy for the deployment of firefighters.

2.6 Distribution and Concentration Studies—How the Location of First-Due and First Alarm Resources Affects Emergency Incident Outcomes

SOC Element 5 of 8
Distribution Study

SOC Element 6 of 8
Concentration Study

The combined South Santa Clara County area is served today by three agencies deploying eight engine companies, one cross-staffed aerial ladder truck, and one Chief Officer per agency as the duty Incident Commander from eight fire stations. It is appropriate to understand, using geographic mapping tools, what the existing stations do and do not cover within specific travel time goals, if there are any coverage gaps needing one or more stations, and what, if anything, to do about those gaps.

In brief, there are two geographic perspectives to fire station deployment:

- **Distribution**—the spacing of first-due all-risk intervention units to control routine emergencies before they escalate and require additional resources.
- **Concentration**—the spacing of fire stations sufficiently close to each other so that more complex emergency incidents can quickly receive sufficient resources from multiple fire stations. As indicated, this is known as the **Effective Response Force** (ERF), or more commonly, the First Alarm Assignment, which is the collection of a sufficient number of firefighters on scene, delivered within the concentration time goal to stop the escalation of the problem.

To analyze first-due fire unit travel time coverage, Citygate used FireView™, a geographic mapping tool that can measure theoretical travel time over a street network. For this calculation, the modeling tool calibrates the uncongested travel speeds by correcting speed limits to the actual speeds fire apparatus are traveling by roadway type, such as prime arterial, collector, or local neighborhood to simulate real-world travel time coverage. Using these tools, Citygate ran several deployment tests and measured their impact on various parts of the Departments' service areas.

A second travel time model was also constructed using traffic congestion data to slow the fire unit travel times according to the congestion present on various types of streets during commute periods. This data is not from social media sources, but from GIS vendors that mine extensive public and private data sources.

A 4:00-minute travel time goal for the neighborhood first responder is a nationally recommended best practice for urban areas. The City of Gilroy has been using 4:30 minutes as being reflective of both urban and edge area lighter population density neighborhoods. Given the Fire District and Morgan Hill do not have prior policy level response time goals and that their neighborhoods are reflective of Gilroy's, this study utilized Gilroy's goals. None of the three agencies have a multiple-unit response (First Alarm) time goal, so this study used a best practices-based measure of 8:00 minutes travel time for the last-arriving unit.

Most of the maps are provided in two views showing northern and southern areas of the joint study area so that fire unit travel time coverage can be seen at the neighborhood level.

2.6.1 Deployment Coverage Baselines

Map #1a/1b—General Geography, Station Locations, and Response Resource Types

Map set #1 shows the agency boundaries and fire station locations. This is a reference map for other maps that follow. Station symbols denote the type of staffed resources at each station. The staffing per resource varies and is explained in Table 6.

Maps #1a and #1b additionally show, by different colors, the primary service area for each fire station, including the proposed fire station location at Glen Loma. These areas also serve to tabulate and identify the risks to be protected in each zone.

Map #2a/2b—Risk Assessment: Population Density

Map set #2 shows the population density across the service areas for *resident* populations. Community General Plan land use and zoning determine population capacity. People drive EMS demand, and the highest population density areas are typically also the highest EMS demand areas.

Map #3a/3b—Distribution: 4:30-Minute First-Due Travel Time Coverage – Congested vs. Non-Congested

Map set #3 shows first-due travel time coverage from the agencies' current fire station locations, with green indicating the current road network that a fire engine should be expected to reach within 4:30 minutes, assuming it is in station and encounters *no traffic congestion*. The red road segments indicate the coverage as impacted by traffic congestion. Thus, the outer green areas are the maximum expected coverage (red + green = total minutes).

The purpose of response time modeling is to determine response time coverage across a jurisdiction's geography and station locations. This geo-mapping design is then validated against dispatch time data to reflect actual response times. There should be some overlap between station areas so that a second-due unit can have a chance of an acceptable response time when it responds to a call in a different station's first-due response area.

As can be seen, severe traffic congestion can hamper fire unit travel time, even with traffic signal preemption technology. The impact is the largest in the more travelled major road and commercial corridors. Also, the neighboring fire agency stations are too far away to be the primary provider in lieu of one of the three fire agencies' primary fire stations.

As can be seen, the non-congested coverage is adequate for the most developed (populated) areas. The small edge areas that do not receive *non-congested* coverage in both Morgan Hill and Gilroy are due to street design or topography and thus are not large enough to warrant a fire station move or addition from strictly a travel time perspective.

Finding #4:	During traffic congestion periods, there are multiple underserved core areas in Morgan Hill, suggesting the three stations are spaced too far apart. In Gilroy, the edge areas and new development beyond the current *non-congested* coverage area also suggests the need for an additional station.
Finding #5:	Given that only nine firefighters are on-duty in each City, if *both* Cities added a fourth fire station, raising daily staffing to 12, they would be less dependent on the Fire District's staffing for serious emergencies requiring a multiple-unit response.
Finding #6:	The Fire District's Station #3 in west Gilroy serves mostly Gilroy within its 4:30-minute first-due travel coverage. It would provide better rural area coverage if moved northwest of its current location.

The purpose of computer response mapping is to determine response time coverage across a community's geography and balance station locations to provide appropriate station distribution and concentration. This geo-mapping design is then validated against historical response data to reflect actual travel times. There should be some overlap between station areas so that a second-due unit has a chance of an adequate response time when it covers a call in another station's first-due area.

As detailed later in this section, the *travel* time to 90 percent of the fire and EMS incidents is 6:08 minutes across all three jurisdictions. This finding supports the GIS model coverage showing that 4:30-minute coverage does not extend out to all areas, with or without traffic congestion.

Map #4a/4b—Insurance Services Office 1.5-Mile Coverage Areas

Map set #4 displays the Insurance Services Office (ISO) recommendation that urban stations cover a 1.5-mile *distance* response area. Depending on a jurisdiction's road network, the 1.5-mile measure usually equates to a 3:30- to 4:00-minute travel time and is thus conservative. However,

a 1.5-mile measure is a reasonable indicator of station spacing and overlap. As can be seen, the 1.5-mile ISO coverage is much smaller than the 4:30-minute first-due coverage in Map #3. This suggests the stations are too few and/or too far apart.

Map #5a/5b/5c/5d—Concentration: Effective Response Force 8:00-Minute Travel Time Coverage – Congested vs. Non-Congested

Map Series #5 shows, with and without travel congestion, the streets where all three agencies' current response plans *should* deliver the initial ERF (First Alarm) within 8:00 minutes travel time. On Maps #5a and #5b, ERF consists of four engines responding anywhere in the service area. On Maps #5c and #5d, ERF consists of responses in the north of three engines, the Morgan Hill ladder truck, and one Chief Officer. The uncongested coverage shown in Map #5b is only adequate at 8:00 minutes from southern Morgan Hill through central Gilroy where there are multiple fire stations. Traffic congestion has the largest impact on this measure in the outer edge areas of all three jurisdictions.

> **Finding #7:** Even if all three agencies' fire stations are available, neither north Morgan Hill nor south and eastern Gilroy can receive a minimum multiple-unit Effective Response Force of 12 firefighters within 8:00 minutes travel time.

Map #6a/b—8:00-Minute Ladder Truck Travel Time Coverage – Congested vs. Non-Congested

Map set #6 shows 8:00-minute travel time coverage for the Morgan Hill ladder truck with and *without* traffic congestion. As can be seen, this specialized resource is typically only staffed in Morgan Hill, so the coverage is limited to the northern extent of the joint study area.

Map #7—Chief Officer 8:00-Minute Travel Time Coverage

Map #7 displays 8:00-minute travel time coverage for a Chief Officer from Morgan Hill and Gilroy.

Map #8—All Incident Locations

Map #8 shows the location of all incidents from January 2016 through December 2018. It is apparent that incidents occur in not only the most populated areas, but across the three-year study period, most suburban and rural areas also received emergency response services.

The more rural to remote incident locations also illustrate why a single response time policy for these agencies is not useful. The service area patterns show the need for at least an urban and a rural response time goal so that the rural incident response times do not overly mask adequate response times in the core populated areas.

Map #9—Emergency Medical Services and Rescue Incident Locations

Map #9 illustrates only the emergency medical and rescue incident locations. With the majority of the calls for service being medical emergencies, virtually the entire joint service area needs pre-hospital emergency medical services.

Map #10—All Fire Locations

Map #10 identifies the location of all fires within the joint service area over the past three years, including *any* type of fire call, from vehicle to dumpster to building. There are obviously fewer fires than medical or rescue calls. Even given this fact, it is evident that fires occur in all fire station areas.

Map #11—Structure Fire Locations

Map #11 displays the locations of the structure fire incidents over the past three years. While the number of structure fires is a smaller subset of total fires, there are two meaningful findings from this map. First, there are structure fires in every fire station area. Second, there are a relatively small number of building fires in Morgan Hill compared to Gilroy.

Additional Map Scenarios

Additional map scenarios are also found in **Volume 2** and represent proposed station locations for each fire agency that are described in Section 3.3.

2.6.2 Road Mile Coverage Measures

In addition to the visual displays of coverage that maps provide, the GIS software allows the miles of public streets covered at 4:30 or 8:00 minutes to be measured. The following table provides these metrics for the coverage with and without the impacts of traffic congestion.

Table 11—Service Area Road Mile Coverage Comparison (No Mutual Aid)

Travel Time Measure	Total Public Road Miles	Non-Congested Miles Covered	Non-Congested Percent of Total Miles	Congested Miles Covered	Congested Percent of Total Miles	Congested vs. Non-Congested Difference (Miles)
4:30 Minutes First-Due	**881.2**	579.75	**65.79%**	461.9	**52.41%**	117.85
8:00 Minutes ERF (4 Engines)	**881.2**	420.82	**47.75%**	303.55	**34.44%**	116.45
8:00 Minutes ERF (3/1/1)[1]	**881.2**	258.19	**29.29%**	160.25	**18.18%**	97.94
8:00 Minutes BC/DC[2]	**881.2**	637.63	**72.35%**	501	**56.85%**	136.63
8:00 Minutes Truck (MH 4)[3]	**881.2**	302.06	**34.27%**	228.23	**25.89%**	73.83

[1] 3/1/1 = three engines, one truck, and one Battalion Chief
[2] BC/DC = one Battalion Chief or Division Chief
[3] MH 4 = one truck from Station #4 in Morgan Hill

As can be seen, the existing 4:30-minute first-due travel coverage is reduced by 13.4 percent during traffic congestion periods. While there is an impact, it is not terrible. Elsewhere in the metropolitan areas of Santa Cara County, Citygate has measured 25–30 percent coverage reductions. If a desirable travel time goal is 4:30 minutes, and prior data shows the agencies' 90th percentile travel performance is 6:08 minutes, then traffic congestion is effectively adding to travel time as there are more incidents at peak traffic hours when human activity is the highest. The 8:00-minute ERF travel coverage shows a similar level of traffic congestion impact.

2.7 Statistical Analysis

SOC Element 7 of 8
Reliability & Historical Response Effectiveness Studies

The map sets described in Section 2.6 and presented in **Volume 2** show predicted response travel times under both normal and congested traffic conditions. Examination of the actual response data provides a picture of actual response performance with simultaneous calls, rush hour traffic congestion, units out of position, and delayed travel time for events such as severe weather.

The following subsections provide summary statistical information regarding the agencies and their services. While this combined study measures service demand and response performance of all three agencies as a single operational entity, demand and performance within each jurisdiction can be determined by examining individual station data as follows:

- South Santa Clara County Fire District—Stations SC1, SC2, and SC3

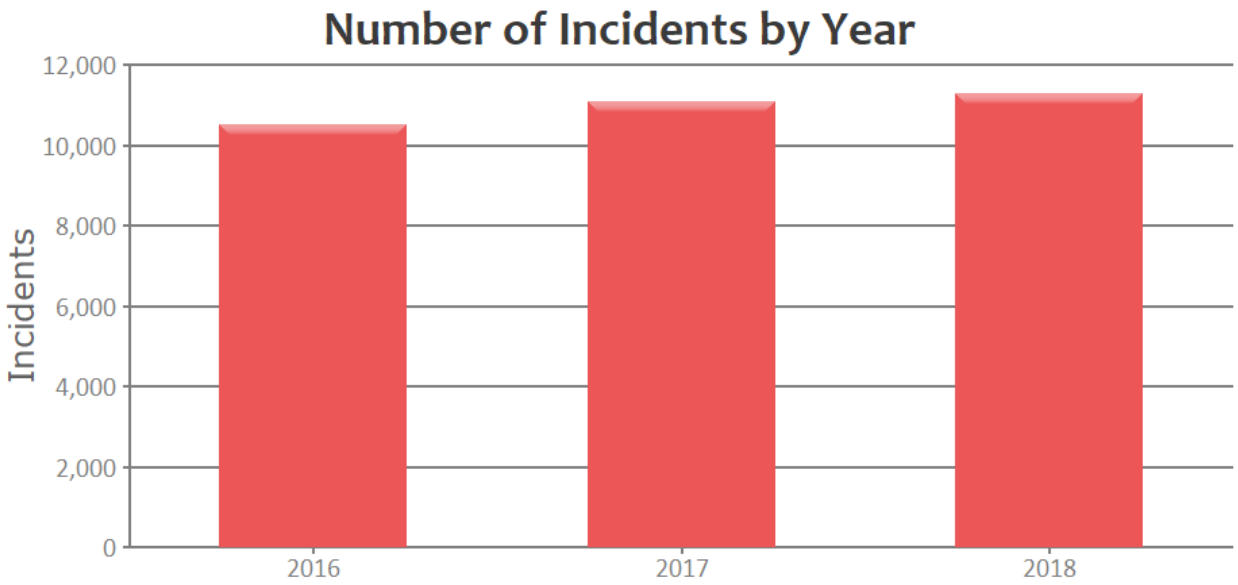
- Morgan Hill Fire Department—Stations MH4 and MH5
- Gilroy Fire Department—Stations GY7, GY8, and GY9 (plus proposed station area "GYSTR")[5]

2.7.1 Service Demand

In 2018, the Departments responded to 11,289 incidents. During this period, the Departments had a daily demand of 30.93 incidents. During this same period, there were 16,514 apparatus responses for an average of 1.46 apparatus responses per incident.

In 2018, the percentage of fire incidents was 4.4 percent, EMS incidents was 68.06 percent, and other types was 27.54 percent. The Departments experienced a slight increase in the number of incidents from 2016 through 2018 as illustrated in the following figure.

Figure 8—Number of Incidents by Year – 2016–2018



The following figure illustrates the number of incidents by NFIRS 5 incident type. While fire and EMS incidents grew, there was a very slight decline in other incident types in 2018.

[5] GYSTR is a defined geographic area of southwest Gilroy to be served by a future fourth fire station.

Figure 9—Number of Incidents by Year by Incident Type – 2016–2018

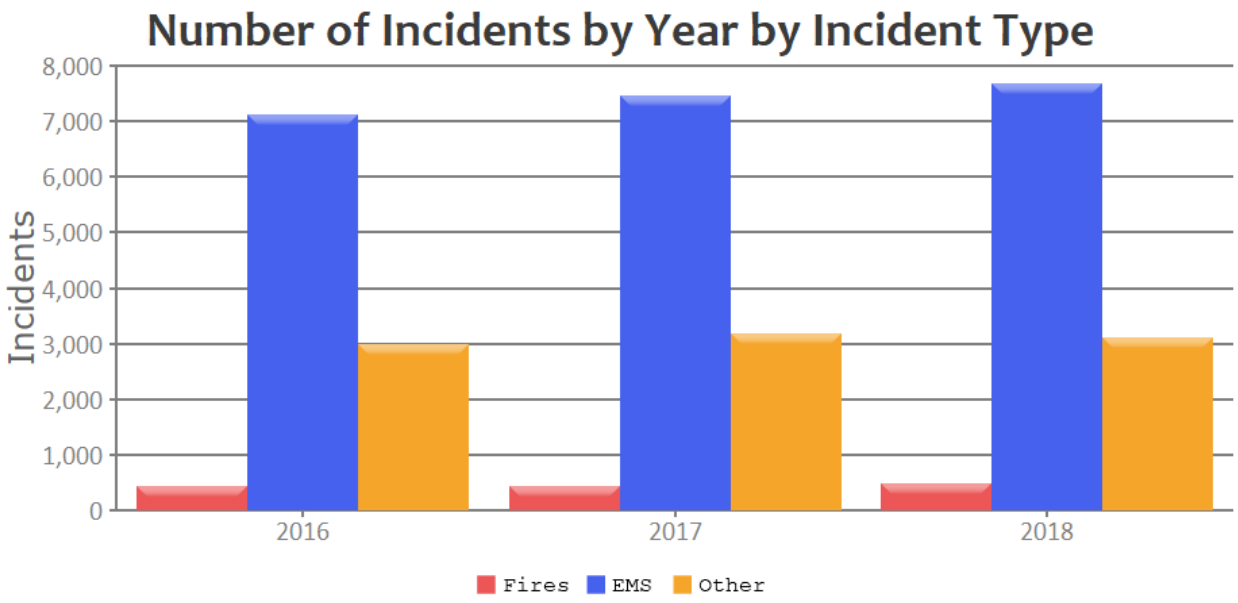
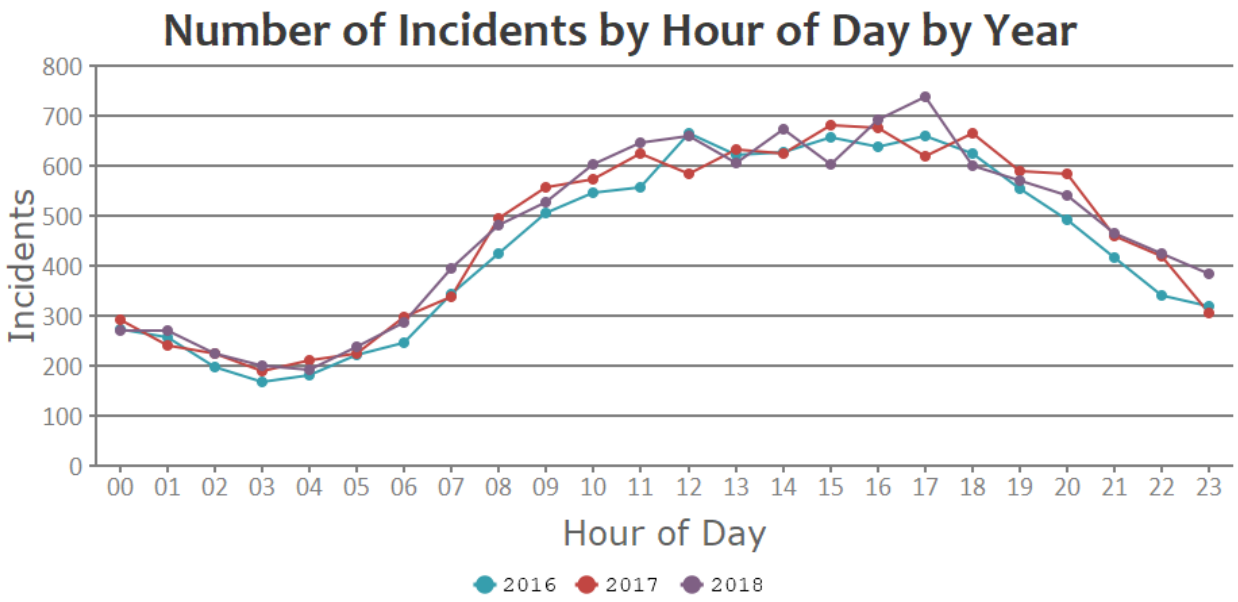


Figure 10 shows service demand by hour of day, illustrating that calls for service occur at every hour of the day and night, requiring fire and EMS response capability 24 hours per day, every day of the year.

Figure 10—Number of Incidents by Hour of Day and Year – 2016–2018



Finding #8:	Service demand occurs across all hours of the day, indicating the need for a 24-hours-per-day, seven-days-per-week fire and EMS emergency response system.

Figure 11 illustrates the number of incidents by station area in 2016–2018. Station GY8 in Gilroy had the highest volume of activity. Station SC3 in the Fire District had the lowest volume.

Figure 11—Number of Incidents by Station – 2016–2018

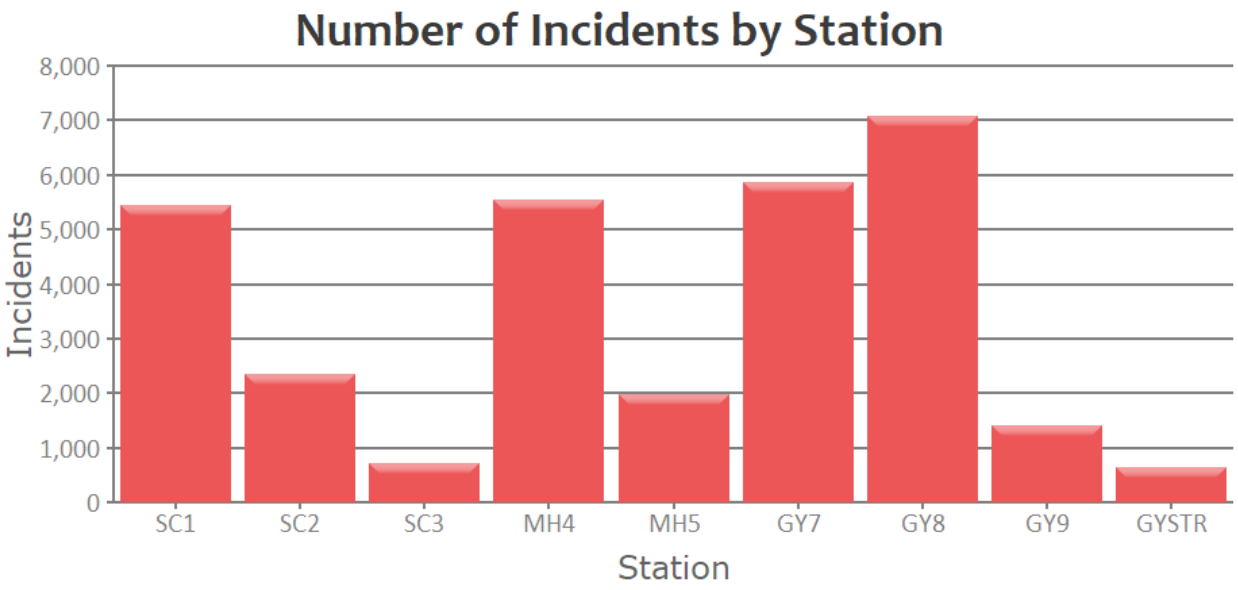


Figure 12 breaks down service demand by station by year. Station GY8 shows the highest activity with a steady increase in overall annual service demand.

Figure 12—Annual Number of Incidents by Station – 2016–2018

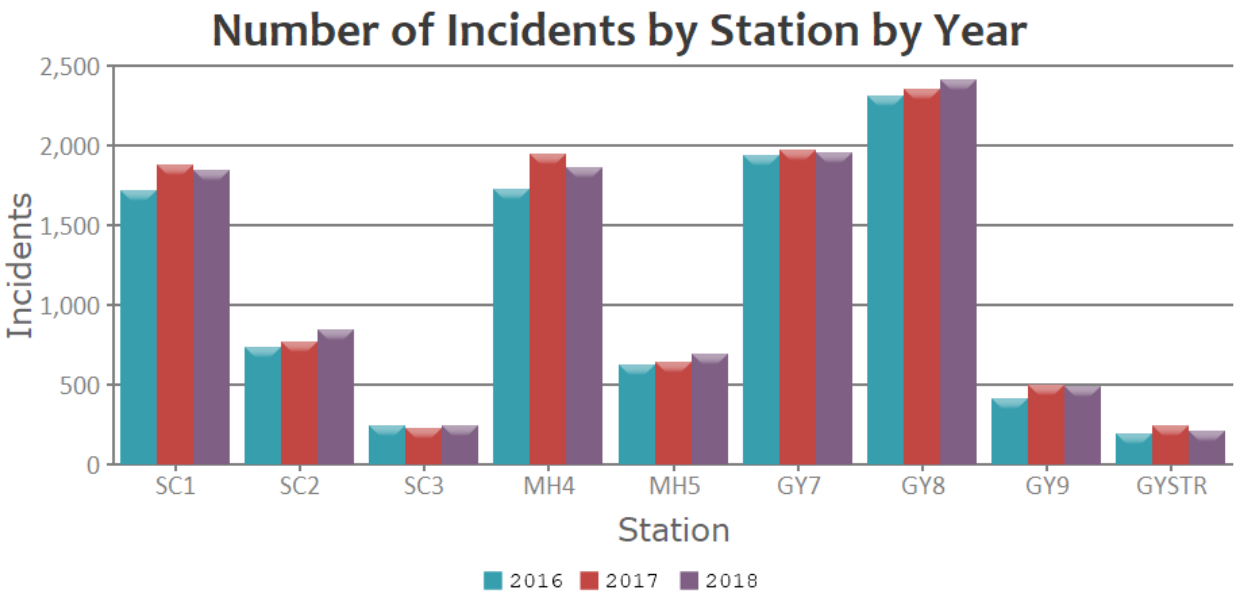


Table 12 lists the rankings of incidents by type for 2018. Only those incident types with more than 50 occurrences are shown. Note the strong ranking for EMS-related incidents.

Table 12—Number of Incidents by Incident Type – 2018

Incident Type	Number of Incidents
321 EMS call, excluding vehicle accident with injury	6,144
611 Dispatched and canceled en route	1,049
322 Vehicle accident with injuries	581
700 False alarm or false call, other	479
311 Medical assist, assist EMS crew	451
324 Motor vehicle accident no injuries	277
554 Assist invalid	156
320 Emergency medical service, other	130
553 Public service	105
600 Good intent call, other	105
550 Public service assistance, other	97
510 Person in distress, other	89
551 Assist police or other governmental agency	83
143 Grass fire	67
111 Building fire	64
622 No incident found on arrival of incident address	64
743 Smoke detector activation, no fire – unintentional	64
531 Smoke or odor removal	58
500 Service call, other	56
131 Passenger vehicle fire	53
733 Smoke detector activation due to malfunction	53

Reference: Fire agencies incident records

Table 13 illustrates the number of incidents by property type. The highest service demand by property type is for residential dwellings. Only those property types with 50 or more incidents are shown.

Table 13—Number of Incidents by Property Type – 2018

Property Type	Number of Incidents
419 1 or 2 family dwelling	4,353
961 Highway or divided highway	895
429 Multifamily dwellings	818
960 Street, other	610
311 24-hour care nursing homes, 4 or more persons	594
963 Street or road in commercial area	311
965 Vehicle parking area	285
962 Residential street, road or residential driveway	262
519 Food and beverage sales, grocery store	170
500 Mercantile, business, other	155
449 Hotel/motel, commercial	133
931 Open land or field	130
340 Clinics, doctors' offices, hemodialysis centers	106
215 High school/junior high school/middle school	85
213 Elementary school, including kindergarten	70
700 Manufacturing, processing	66
321 Mental retardation/development disability facility	66
549 Specialty shop	64
161 Restaurant or cafeteria	63
459 Residential board and care	63
900 Outside or special property, other	55
365 Police station	54
936 Vacant lot	54

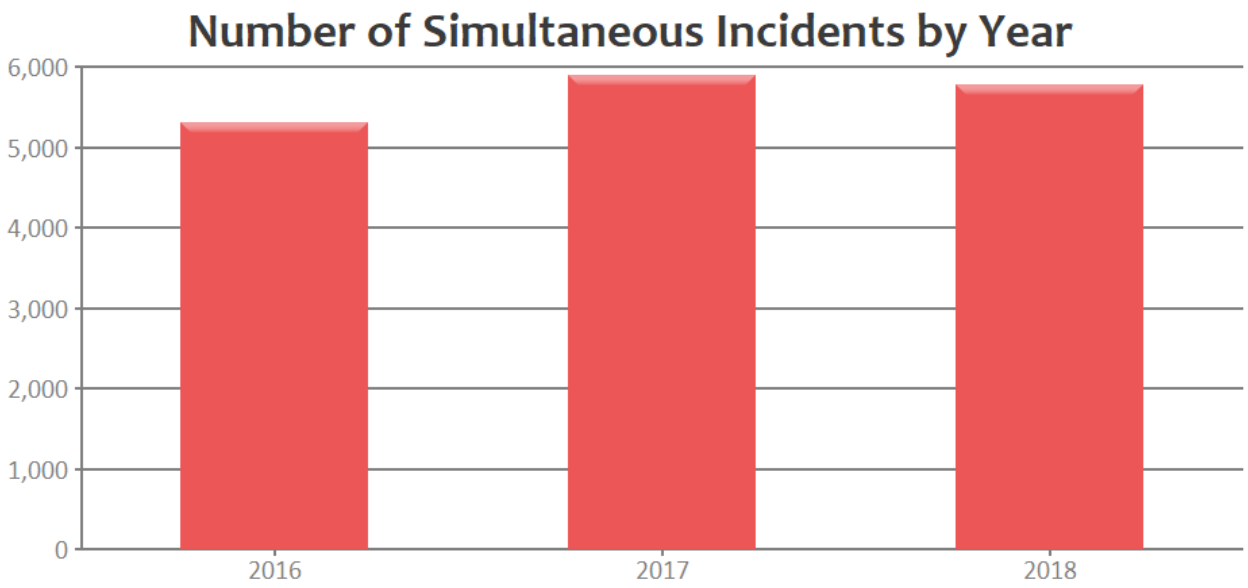
2.7.2 Simultaneous Incident Activity

Simultaneous incidents occur when other incidents are underway at the time. As Table 14 and Figure 13 show, more than 51 percent of incidents occurred while one or more other incidents were underway, while slightly more than 19 percent of incidents occurred while two or more other incidents were underway.

Table 14—Overall Simultaneous Incident Activity – 2018

Number of Simultaneous Incidents	Percentage
1 or more simultaneous incidents	51.28%
2 or more simultaneous incidents	19.35%
3 or more simultaneous incidents	06.22%
4 or more simultaneous incidents	02.06%
5 or more simultaneous incidents	00.78%

Figure 13—Number of Simultaneous Incidents by Year – 2016–2018



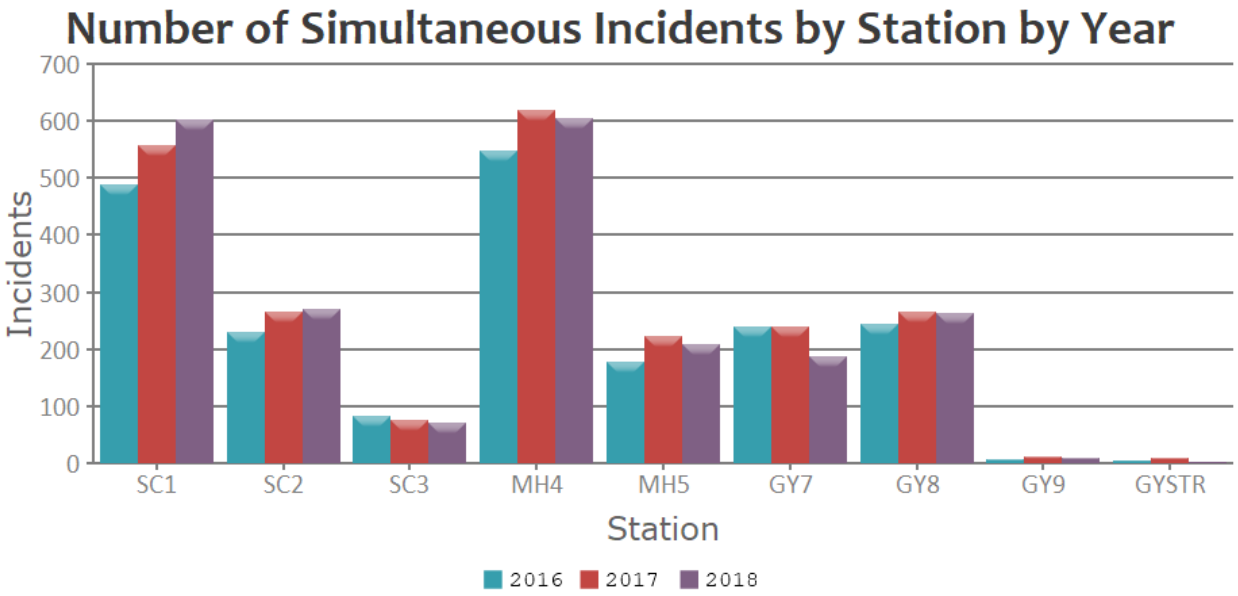
Finding #9: Although the occurrence of simultaneous incidents varies over the three-year study period, a significant percentage of the collective agencies' service demand involves two or more incidents occurring at the same time.

In a larger jurisdiction, simultaneous incidents in different station areas have very little operational consequence. However, when simultaneous incidents occur within a single station area there can be significant delays in response times.

The following figure illustrates the number of single-station simultaneous incidents by station area by year. Station MH4 has the highest number of same-station simultaneous incidents. Closely

following Station MH4 is Station SC1, which is experiencing steady year-to-year growth in simultaneous activity. Station GY9 and proposed station GYSTR have insignificant same-station simultaneous activity.

Figure 14—Same-Station Simultaneous Incident Activity by Year – 2016–2018



Finding #10: Approximately 10 percent of the three Fire District and two Morgan Hill stations' calls for service involve simultaneous incidents within those same station response areas, resulting in a slower response for the second or subsequent incident from another station. Same-station simultaneous incident activity in Gilroy is 3.5 percent or less.

2.7.3 Unit Hour Utilization

Another view of unit workload is the percent of each hour a unit spends annually committed to emergency responses. The utilization percentage for apparatus is calculated by two primary factors, the number of responses and the duration of responses.

For a firefighting unit, during a nine-hour daytime work period, when crews on a 24-hour shift must also pay attention to apparatus checkout, station duties, training, fire prevention inspections, public education, and paperwork, plus required physical training and meal breaks, Citygate believes the maximum unit-hour utilization (UHU) per hour across the workday *should not exceed 30* percent. Beyond that, the most important duties most likely to suffer will be training and fire prevention inspections.

For a dedicated unit, such as an ambulance or low-acuity squad working less than a 24-hour shift, UHU can increase to a maximum of 40–50 percent. At that UHU level, peak-hour squads must have additional duty days for training only, on which they are not responding to incidents, to meet their annual requirements for continuing education and training hours.

Table 15 shows the 2018 utilization summary for engines, with the busiest units listed first, and Table 16 shows the UHU for the Morgan Hill ladder truck.

Table 15—Unit Hour Utilization – Engines – 2018

Hour	GY E48	GY E47	SC E67	SC E68	GY E49	MH E58	MH E57	SC E69
00:00	5.85%	5.14%	6.94%	2.99%	2.51%	4.52%	1.93%	0.70%
01:00	7.01%	5.64%	5.25%	2.59%	3.10%	2.51%	1.51%	1.09%
02:00	6.88%	5.22%	5.02%	1.97%	2.17%	2.55%	1.26%	0.97%
03:00	3.97%	4.44%	10.88%	6.10%	2.38%	3.52%	2.62%	2.05%
04:00	4.94%	4.97%	3.19%	2.63%	2.64%	2.36%	0.76%	1.70%
05:00	4.93%	5.03%	5.53%	3.73%	1.13%	3.90%	1.96%	1.02%
06:00	9.42%	7.69%	5.89%	3.51%	5.20%	3.21%	2.90%	3.52%
07:00	10.59%	9.40%	8.34%	6.26%	3.14%	3.45%	4.33%	1.89%
08:00	9.32%	9.67%	12.64%	6.71%	5.26%	5.59%	5.27%	3.07%
09:00	11.56%	9.31%	12.28%	5.74%	5.72%	5.61%	6.29%	3.14%
10:00	15.06%	18.46%	13.05%	9.16%	9.73%	9.59%	5.20%	4.23%
11:00	15.12%	16.85%	13.64%	7.78%	9.56%	6.86%	3.30%	4.70%
12:00	13.77%	15.41%	14.80%	16.95%	11.14%	9.16%	6.03%	4.74%
13:00	12.36%	11.63%	16.10%	8.58%	4.39%	7.13%	4.52%	2.45%
14:00	17.48%	17.84%	13.44%	12.09%	10.82%	10.11%	4.71%	6.75%
15:00	15.02%	17.46%	10.79%	8.71%	7.16%	7.66%	5.36%	5.58%
16:00	14.17%	15.76%	22.66%	15.30%	12.89%	7.61%	8.14%	4.16%
17:00	19.20%	22.95%	18.06%	12.42%	10.57%	11.74%	6.78%	4.99%
18:00	16.65%	12.22%	12.06%	10.86%	7.66%	7.58%	3.79%	5.10%
19:00	14.22%	13.51%	13.29%	7.62%	8.19%	7.41%	11.11%	5.22%
20:00	14.10%	11.76%	10.89%	7.51%	7.74%	5.86%	3.14%	4.06%
21:00	9.47%	8.14%	11.17%	6.64%	6.76%	6.68%	5.47%	4.83%
22:00	10.66%	9.92%	6.56%	5.19%	6.00%	3.53%	3.86%	4.09%
23:00	8.12%	10.21%	7.12%	4.39%	3.82%	2.35%	2.46%	3.53%

While engine UHU rates have not yet reached the 30 percent per hour saturation rate over multiple hours, Gilroy Engines 47 and 48, and Fire District Engine 67 are very busy in the late afternoon, and their workload should be closely monitored to provide sufficient lead time to plan for a Peak Activity Unit (PAU) or alternative relief solution once the 30 percent threshold is exceeded.

Table 16—Unit Hour Utilization – Morgan Hill Ladder Truck – 2016

Hour	MH TK57
00:00	2.49%
01:00	3.27%
02:00	3.59%
03:00	4.05%
04:00	2.86%
05:00	3.20%
06:00	5.24%
07:00	6.28%
08:00	6.20%
09:00	8.12%
10:00	5.22%
11:00	9.18%
12:00	8.09%
13:00	7.45%
14:00	8.53%
15:00	7.95%
16:00	6.70%
17:00	11.26%
18:00	9.07%
19:00	6.50%
20:00	9.32%
21:00	6.97%
22:00	5.09%
23:00	4.71%

Finding #11: The agencies need to monitor unit hour utilization and simultaneous incident rates of the busiest units on a quarterly basis.

2.7.4 Operational Performance

This section reports performance for the first apparatus to arrive on the scene of *emergency* incidents as the number of minutes and seconds necessary for 90 percent completion of the following components:

- Call processing
- Turnout
- Travel
- Dispatch to arrival
- Call to arrival

Call Processing Performance

Call processing measures the time from the first incident time stamp from the two fire dispatch centers until response crews are notified of the request for assistance. The best practice goal for this measure is 90 seconds with 90 percent or better reliability where there is not a language or location description barrier. Table 17 shows 90th percentile call processing/dispatch performance to fire and EMS incidents over the three-year study period.

Table 17—Call Processing /Dispatch Performance – 2016–2018

Station	90th Percentile Performance
Overall	**2:15**
SC1 – Morgan Hill	1:13
SC2 – Masten	1:33
SC3 – Gilroy Gardens	1:37
MH4 – El Toro	0:56
MH5 – Dunne Hill	0:59
GY7 – Chestnut	2:41
GY8 – Las Animas	2:33
GY9 – Sunrise	2:20
GYSTR – Glen Loma	2:37

Source: Fire Departments' incident records

Finding #12: Across all three agencies, 90th percentile call processing is more than 2:00 minutes. Call processing for Morgan Hill and Fire District incidents *meets* the current NFPA 1221 90-second recommendation, while call processing for Gilroy is about 1:00 minute (67 percent) *slower*.

Crew Turnout Performance

Turnout time measures the time from dispatch notification until the response apparatus starts traveling to the emergency. Given that Citygate finds the NFPA and CFAI recommendations of 60–80 seconds impossible to meet given current safety standards and station designs, a 2:00-minute goal is used for this measurement. Table 18 shows 90th percentile crew turnout performance to fire and EMS incidents over the three-year study period.

Table 18—Crew Turnout Performance – 2016–2018

Station	90th Percentile Performance
Overall	**2:41**
SC1 – Morgan Hill	3:11
SC2 – Masten	3:38
SC3 – Gilroy Gardens	3:25
MH4 – El Toro	2:53
MH5 – Dunne Hill	2:58
GY7 – Chestnut	2:00
GY8 – Las Animas	1:58
GY9 – Sunrise	1:57
GYSTR – Glen Loma	2:00

Source: Fire Departments' incident records

Finding #13: Gilroy's crew turnout performance *meets* a Citygate-recommended goal of 2:00 minutes or less, while Morgan Hill's performance is about 1:00 minute (50 percent) *slower*, and the Fire District's is about 1:30 minutes (75 percent) *slower.*

Travel Time Performance

Travel time measures time for the first-arriving response apparatus to travel to the scene of the emergency. In most urban and suburban fire departments, a 4:00-minute travel time at 90 percent or better reliability would be considered highly desirable. For this study, a travel time of 4:30 minutes is used as the benchmark goal for urban/suburban zones, and 10:30 minutes for rural zones (SC2 and SC3). Table 19 shows 90th percentile first-due travel performance over the three-year study period.

Table 19—First-Due Travel Performance – 2016–2018

Station	90th Percentile Performance
Overall	**6:08**
SC1 – Morgan Hill	6:26
SC2 – Masten[1]	8:50
SC3 – Gilroy Gardens[1]	11:24
MH4 – El Toro	6:01
MH5 – Dunne Hill	7:25
GY7 – Chestnut	5:37
GY8 – Las Animas	5:06
GY9 – Sunrise	5:09
GYSTR – Glen Loma	7:39

Source: Fire Departments' incident records
[1] 10:30-minute travel time goal for rural response areas

Finding #14: First unit travel time for Gilroy is about 1:00 minute (25 percent) *slower* than a recommended best practice goal of 4:00 minutes or less for urban population densities, but only slightly (11–22 percent) slower than the Department's current 4:30-minute goal except for the Glen Loma / Santa Teresa area, where travel time is more than 3:00 minutes (67 percent) *slower* than the current 4:30-minute goal, and more than 3:30 minutes (87 percent) *slower* than the recommended 4:00-minute goal.

Finding #15: First unit travel time for Morgan Hill is 2:00–3:25 minutes (50–87 percent) *slower* than a recommended best practice goal of 4:00 minutes or less for urban population densities.

Finding #16: First unit travel time from the Fire District's Masten station *meets* a Citygate-recommended goal of 10:30 minutes or less for rural zones and is 1:00 minute (10 percent) *slower* than the goal from the Gilroy Gardens station. First unit travel time from the Morgan Hill station is 2:26 minutes (62 percent) *slower* than the 4:00-minute goal for urban/suburban population densities.

Call-to-Arrival Performance

Call to arrival measures time from receipt of the 9-1-1 request for assistance until the apparatus arrives. Citygate's recommended goal for urban/suburban response zones is 7:30 minutes or less at 90 percent reliability, which includes 1:30-minute call processing, 2:00-minute turnout, and 4:00-minute travel. For this study, an additional 30 seconds is added to travel time based on Gilroy's current response policy. Table 20 shows call-to-arrival performance to fire and EMS incidents over the three-year study period.

Table 20—Call-to-Arrival Performance – 2016–2018

Station	90th Percentile Performance
Overall	**9:15**
SC1 – Morgan Hill	9:25
SC2 – Masten[1]	12:34
SC3 – Gilroy Gardens[1]	14:06
MH4 – El Toro	8:31
MH5 – Dunne Hill	9:51
GY7 – Chestnut	8:55
GY8 – Las Animas	8:11
GY9 – Sunrise	8:34
GYSTR – Glen Loma	10:51

Source: Fire Departments' incident records
[1] 14:00-minute call-to-arrival goal for rural response areas

Finding #17: Call-to-arrival response performance in Gilroy, Morgan Hill, and the Fire District's Morgan Hill station is nine percent to 45 percent *slower* than Citygate's recommended 7:30-minute goal for urban/suburban response zones. Call-to-arrival performance from the Fire District's Masten and Gilroy Gardens stations *meets* Citygate's recommended 14:00-minute goal for rural areas.

Effective Response Force (First Alarm) Performance

The three agencies' Effective Response Force (ERF) for a building fire is four engines or three engines and one ladder truck, and one Battalion or Division Chief for a total of 14 personnel. Table 21 shows the number of incidents where all dispatched units arrived at the incident. It is important to note that measurements based on 20 or fewer incidents can be very volatile. Citygate's recommended ERF performance goal is 11:30 minutes or less at 90 percent reliability for urban/suburban areas, including 1:30 minutes for call processing, 2:00 minutes for crew turnout, and 8:00 minutes travel time.

Table 21—Effective Response Force Call-to-Arrival Performance – 2016–2018

Station	ERF Performance	No. of Incidents
Overall	**17:07**	**25**
SC1 – Morgan Hill	14:03	7
SC2 – Masten[1]	16:29	7
SC3 – Gilroy Gardens[1]	N/A	0
MH4 – El Toro	19:17	3
MH5 – Dunne Hill	15:56	2
GY7 – Chestnut	17:04	1
GY8 – Las Animas	14:01	4
GY9 – Sunrise	N/A	0
GYSTR – Glen Loma	9:38	1

Source: Fire Departments' incident records
[1] 19:30-minute call-to-arrival goal for rural response areas

Finding #18: Effective Response Force (ERF or First Alarm) call-to-arrival performance is *significantly slower* than the Citygate-recommended goal of 11:30 minutes for urban/suburban areas, except in the Glen Loma station area in Gilroy which is 9:38 minutes. Also, ERF performance *meets* the Citygate-recommended *rural* response goal of 19:30 minutes for the Fire District's Masten station response area.

2.8 OVERALL EVALUATION

SOC ELEMENT 8 OF 8
OVERALL EVALUATION

The Departments collectively serve a diverse urban to rural population with a mixed residential and non-residential land use pattern typical for south Bay Area communities.

While the state fire code now requires fire sprinklers even in residential dwellings, it will be many more decades before the majority of homes are replaced or remodeled with automatic fire sprinklers. If desired outcomes include limiting building fire damage to only part of the inside of an affected building and/or minimizing permanent impairment resulting from a medical emergency, then all three agencies will need both first-due unit and multiple-unit ERF coverage in all *urban/suburban* neighborhoods consistent with a Citygate response performance recommendation of first-due arrival within 7:30 minutes from 9-1-1 dispatch notification and ERF arrival within 11:30 minutes of 9-1-1 notification, all at 90 percent or better reliability.

Call processing and crew turnout performance are longer than recommended best practices in some cases, and when combined with fire stations spaced too far apart, traffic congestion, and simultaneous incidents, the result is significantly longer-than-desirable total response times for first-due and ERF multiple-unit events.

Although Citygate finds the three Departments' resources to be appropriate to protect the respective jurisdictions against the hazards likely to impact their service area, the collective daily staffing of 26 personnel only provides a minimum total response force sufficient for a single emerging to serious fire incident, as discussed in Section 2.2.4, as well as a single one- to five-patient EMS incident. While the three agencies have automatic aid agreements that provide for the dispatch of the closest first-due and ERF response resource(s) regardless of jurisdiction, they are poorly located geographically for prompt additional mutual aid, which cannot realistically be provided from the west, east, or south in a timely manner, and from the north only if southern San Jose units are available and do not encounter traffic congestion on southbound U.S. 101. The three jurisdictions are thus essentially self- or co-reliant to provide the resources needed to resolve all but the most catastrophic emergencies without outside assistance. Citygate further notes that many cities the size of Gilroy and Morgan Hill have more than nine firefighters on duty daily, and that Morgan Hill and the Fire District receive mutual benefit from the cost-shared engine at the Fire District's Morgan Hill station that serves both jurisdictions.

Finding #19: Gilroy and Morgan Hill do not deploy enough firefighters daily to safely resolve even a single serious fire or EMS incident, nor to provide adequate capacity for simultaneous incidents.

Finding #20: Gilroy and Morgan Hill are dependent on Fire District resources to achieve a minimal Effective Response Force staffing of 14 personnel.

Finding #21: Gilroy and the Fire District receive mutual benefit from their current automatic aid agreement.

Finding #22: Morgan Hill and the Fire District receive mutual benefit from their current cost-shared engine and automatic aid agreement.

Finding #23: The three jurisdictions are poorly located geographically for prompt mutual aid other than from each other.

Finding #24: The three jurisdictions are essentially self- or co-reliant to provide the response resources to resolve all but the most catastrophic emergencies without outside assistance.

As the geographic mapping indicates, while the stations are appropriately located in all the major neighborhoods, they are spaced too far apart. The overall longer-than-desired first-due unit travel times are *partially* the result of a lack of fire stations. Other causes are the non-grid street network design in some areas, topography, natural and built barriers (hills and the highways), simultaneous incidents at peak hours of the day, and traffic congestion.

In terms of emergency incident workload per unit, no single fire unit or station area is approaching workload saturation; however, across the entire study area, during peak hours of the day there is a significant simultaneous incident rate of at least three incidents at once 19 percent of the time. When this occurs, 33 percent of the area's fire engines are committed, and should a building fire occur at that point, the Departments would depend on mutual aid assistance from San Jose.

Given increasing service demand and the fact that the area's population is still evolving, Citygate is concerned that the overall staffing per day in the two Cities limits those Departments' abilities to respond with more "weight of attack."

The two Cities are growing past their station spacing, while continuing to be very co-dependent on the Fire District, CAL FIRE, and San Jose. Lowering dispatch processing and turnout time cannot completely negate the long travel times and traffic congestion—only an additional fire station in each City can.

2.8.1 Deployment Recommendations

Based on the technical analysis and findings contained in this SOC assessment, Citygate offers the following deployment recommendations:

Recommendation #1: **Adopt Updated Deployment Policies:** The Departments' elected officials should adopt *updated*, complete performance measures to aid deployment planning and to monitor performance. The measures of time should be designed to deliver outcomes that will save patients when possible upon arrival and to keep small but serious fires from becoming more serious. With this is mind, Citygate recommends the following measures:

1.1 Distribution of Fire Stations: In *urban/suburban* population density areas, to treat pre-hospital medical emergencies and control small fires, the first-due unit should arrive within 7:30 minutes, 90 percent of the time from the receipt of the 9-1-1 call at fire dispatch. This equates to a 90-second dispatch time, a 2:00-minute company turnout time, and a 4:00-minute travel time.

In rural population density areas, the first-due unit should arrive within 14:00 minutes from the receipt of the 9-1-1 call at fire dispatch at 80 percent or better reliability. This equates to a 90-second dispatch time, a 2:00-minute company turnout time, and a 10:30-minute travel time.

1.2 Multiple-Unit Effective Response Force (ERF) for Serious Emergencies: In *urban/suburban* population density areas, to confine building fires near the room of origin, keep vegetation fires under one acre in size, and treat multiple medical patients at a single incident, a multiple-unit ERF of at least 17 personnel, including two Battalion Chiefs, should arrive within 11:30 minutes from the time of 9-1-1 call receipt at fire dispatch 90 percent of the time. This equates to a 90-second dispatch time, a 2:00-minute company turnout time, and an 8:00-minute travel time.

For *rural* population density areas, a multiple-unit ERF of at least 13 personnel, including at least one Battalion Chief, should arrive within 19:30 minutes from the time of 9-1-1 call receipt at fire dispatch 80 percent of the time. This equates to a 90-second dispatch time, a 2:00-minute crew turnout time, and a 16:00-minute travel time.

1.3 Hazardous Materials Response: Provide hazardous materials response designed to protect the communities from the hazards associated with uncontrolled release of hazardous and toxic materials. The fundamental mission of the Departments' response is to isolate the hazard, deny entry into the hazard zone, and notify appropriate officials/resources to minimize impacts on the community. This can be achieved with a first-due total response time of 7:30 minutes or less to provide initial hazard evaluation and/or mitigation actions. After the initial evaluation is completed, a determination can be made whether to request additional resources from the regional hazardous materials team.

1.4 Technical Rescue: Respond to technical rescue emergencies as efficiently and effectively as possible with enough trained personnel to facilitate a successful rescue with a first-due total response time of 7:30 minutes or less to evaluate the situation and/or initiate rescue actions. Following the initial evaluation, assemble additional resources as needed within a total response time of 11:30 minutes to safely complete rescue/extrication and delivery of the victim to the appropriate emergency medical care facility.

Recommendation #2: Gilroy needs to work to substantially lower dispatch processing times, and Morgan Hill and the Fire District need to work to lower crew turnout times.

SECTION 3—FUTURE SERVICE NEEDS AND ALTERNATIVE SERVICE MODELS

This section contains Citygate's evaluation of projected future population growth and related development within the three fire agency jurisdictions, projected future service demand, and potential alternative fire service models. It should be noted that recent state legislation, which overrides local growth measures, could increase near-term and longer-term growth and related service demand in all three jurisdictions.

3.1 FUTURE GROWTH

3.1.1 City of Gilroy

According to Gilroy's 2040 General Plan Alternatives Report,[6] the Association of Bay Area Governments (ABAG) projects the City's population to grow to 61,000 by 2040, for a relatively slow annual growth rate of 0.8 percent. ABAG's projection, however, is based on regional policies and does not consider projected market demand. Gilroy's Economic Consultant, ADE, produced a range of population growth scenarios based on projected market demand, which range from 69,249 to 79,317 by the year 2040 for an average annual growth rate ranging from 1.5 to 2.2 percent. ADE's median projection calls for a 2040 population of approximately 74,000, which reflects an average annualized growth rate of 1.9 percent. The report further projects 5,600 to more than 9,000 additional housing units over the same period based on the low and high population projections. Citygate further assumes a relatively similar growth in non-residential occupancies to support the growing population of residents, non-residents in the workforce, and daily transients.

Santa Clara County land use policies[7] that promote future growth within existing urban service areas, and long-term voter-approved Urban Growth Boundaries (UGBs), will limit the City's physical expansion through at least 2040, and any population growth will be accommodated through infill and land use intensification within the UGBs. Recent state legislation, which overrides local growth measures, could increase near-term and longer-term growth and related service demand in the City.

3.1.2 City of Morgan Hill

The City of Morgan Hill's 2035 General Plan projects the City's population to increase 35 percent to 58,200 by the year 2035, for an average annualized growth rate of approximately 2.2 percent.[8]

[6] Reference: Gilroy General Plan Alternatives Report (2015) – Table 3-10
[7] Reference: Santa Clara County General Plan (1995–2010), Growth and Development
[8] Reference: City of Morgan Hill 2035 General Plan

The General Plan Housing Element further identifies 1,378 potential additional housing units based on available vacant land and current land use and zoning policies.

Although recent state legislation overrides local growth control measures, local land use policies encourage population growth to be accommodated through infill and land use intensification.

3.1.3 South Santa Clara County Fire District

Given Santa Clara County land use policies, Citygate does not expect the Fire District's population or land use to change significantly over the next 20 years.

Finding #25: Population in the two Cities is projected to increase 1.5 to 2.2 percent annually over the next 16–21 years; population in the Fire District is not expected to change significantly as a result of County land use policies focusing future growth within existing urban service areas.

Finding #26: Projected population growth in Gilroy and Morgan Hill will be accommodated through infill and land use intensification within the existing Urban Growth Boundaries through at least 2040.

3.2 FUTURE SERVICE DEMAND

Table 22 summarizes total service demand over the three-year study period by jurisdiction.

Table 22—Total Service Demand – 2016–2018

Year	Jurisdiction						Total	Percent Change
	Gilroy	Percent Change	Morgan Hill	Percent Change	Fire District	Percent Change		
2016	4,865	n/a	2,361	n/a	2,699	n/a	9,925	n/a
2017	5,079	**4.4%**	2,592	**9.8%**	2,880	**6.7%**	10,551	**6.3%**
2018	5,067	**-.2%**	2,557	**-1.4%**	2,942	**2.2%**	10,556	**.05%**
Total	**15,011**	**4.2%**	**7,510**	**8.3%**	**8,521**	**9.0%**	**31,042**	**6.3%**

As Table 22 illustrates, aggregate total service demand increased 6.3 percent over the three-year period for an average annual increase of 3.2 percent. During that same period, EMS demand, which comprised 68 percent of total aggregate service demand, increased 7.3 percent for an average annual increase of 3.65 percent.

As discussed in Section A.1.12 (**Appendix A—Risk Assessment**), medical emergency service demand in most communities is predominantly a function of population density, demographics, violence, health insurance coverage, and vehicle traffic. In addition, medical emergency risk tends to be higher among older, poorer, less educated, and uninsured populations. According to the U.S. Census Bureau, 10 to 13 percent of the population in the two Cities is 65 and older; 7 to 12 percent is at or below poverty level; 10 to 30 percent over 24 years of age has less than a high school diploma or equivalent; and only 5 to 8 percent do not have health insurance coverage.[9] Given these demographics and the projected population growth discussed in Section 3.1, Citygate projects that overall service demand will increase approximately 2–4 percent annually over the next 15–20 years, with EMS demand projected to increase at a slightly higher rate of 3–6 percent annually.

Finding #27: Annual service demand increased 6.3 percent over the three-year study period.

Finding #28: Citygate projects service demand will continue to increase approximately 2–5 percent annually over the next 16–21 years (2035–2040), with EMS service demand increasing at a slightly higher 3–6 percent annually and comprising an increasing percentage of total service demand.

3.3 Future Facility, Resource, and Staffing Needs

While the three fire agencies' resources are appropriate to protect against the hazards likely to impact their service areas, the collective daily on-duty staffing of 26 personnel only provides a minimum total response force sufficient for a single emerging to serious fire incident, as discussed in Section 2.2.4, as well as a single one- to five-patient EMS incident. Many cities the size of Gilroy and Morgan Hill have more than nine firefighters on duty daily. The two Cities are very dependent on the Fire District's resources for both first-due and ERF capacity and staffing.

As discussed in Section 2.8, although the City stations are appropriately located in all the major neighborhoods, they are spaced too far apart to provide first-due travel times to achieve desirable outcomes in combination with the non-grid street network design in some areas, topography, natural and built barriers (hills and the highways), simultaneous incidents at peak hours of the day, and traffic congestion. Given the projected population and service demand growth discussed previously, Citygate believes that both Cities will require at least one additional fire station in the near future.

[9] Source: U.S. Census Bureau (2016)

3.3.1 Fire Station Siting Guidelines

Over more than a decade of assisting clients in determining where to best site or relocate fire stations, Citygate has developed the following fire station siting guidelines:

1. Serve the most people in the shortest travel time possible
2. Provide a 360-degree first-due service area
3. Avoid political, natural, and human-built barriers within the first-due travel time goal[10]
4. Provide direct access to primary travel routes in all cardinal directions.

3.3.2 City of Gilroy

As discussed in Section 2, Citygate's recommended best practice for total *first-due* response time to achieve desirable outcomes, from receipt of a 9-1-1 call in urban population areas such as Gilroy, is 7:30 minutes or less at 90 percent or better reliability, which includes 1:30 minutes for call processing/dispatch time, 2:00 minutes for crew turnout time, and 4:00 minutes for travel time. More serious emergencies requiring a multiple-unit ERF of at least 17 personnel to achieve desirable outcomes, should arrive within 11:30 minutes or less at 90 percent or better reliability.

Gilroy's three current fire stations, in combination with the Fire District's Station #3 at Gilroy Gardens, provide a daily staffing level of 13 total response personnel, four personnel short of the minimum recommended ERF staffing level for even a single moderate emergency incident. Assuming a 4:00-minute travel time goal to achieve desirable emergency incident outcomes, geographic mapping conducted for a concurrent Gilroy Fire Master Plan Update shows a significant 4:00-minute travel time coverage gap in the southwestern Glen Loma / Eagle Ridge area of the City where new residential development is occurring. Citygate evaluated two sites for a future fire station in this area and recommended a City-owned site at Miller Avenue and West Luchessa Avenue as the preferred alternative, as shown in Map Scenario #1 (**Volume 2—Map Atlas**).

The City implemented the pilot Alternative Service Model (ASM) study in the Glen Loma Ranch area on July 1, 2019, staffing either a Type-1 ambulance or a Type-6 wildland fire engine with two personnel on overtime status daily from 8:00 a.m. to 8:00 p.m. While this ASM pilot study was implemented primarily to provide ALS pre-hospital emergency medical services to this newly developing area of the City beyond 4:00-minute first-due travel time from other existing fire stations, it also provides additional critical Citywide first-due and ERF staffing capacity during peak service demand hours. Although this pilot study is only funded through June 30, 2020, Citygate has recommended that the City continue the ASM, absent any unforeseen adverse

[10] This guideline may not apply in auto-aid or "boundary drop" situations.

impacts, until such time as the City can allocate the funds to construct a station and staff a full-time three-person crew in that area of the City.

As discussed in more detail below, the Fire District is also considering its future options, which could include the relocation of one or more of its existing stations. Should the District decide to relocate the Gilroy Gardens station, it would impact first-due and ERF capacity, staffing, and travel time coverage for the City. Should the District exercise this option, the City should consider relocating the Las Animas station further west toward First Street and Santa Teresa Boulevard, which would in turn create a first-due and ERF coverage gap in the northeast quadrant of the City, potentially requiring a fifth station in that area to ensure equitable delivery of fire and pre-hospital EMS to all areas of the City.

Finding #29: The City of Gilroy is geographically too large to effectively provide recommended service levels from its three existing fire stations and Fire District Station #3 at Gilroy Gardens.

Finding #30: A fourth fire station in southwest Gilroy would improve five deployment needs including first-due travel time coverage, daily Citywide staffing, multiple-unit Effective Response Force (ERF) staffing, travel time coverage during traffic congestion periods, and reduced dependence on the Fire District's Station #3 at Gilroy Gardens for first-due and ERF capacity and staffing.

Finding #31: If the Fire District relocates the Gilroy Gardens station further west, it will impact first-due and Effective Response Force capacity, staffing, and travel time coverage for Gilroy.

Recommendation #3: The City of Gilroy should construct a fourth fire station in the southwest Glen Loma area of the City, and staff it with a full-time three-person crew as soon as fiscally feasible.

Recommendation #4: The City of Gilroy should continue the current pilot Alternative Service Model until such time as the Glen Loma station is constructed and staffed with a full-time crew.

Recommendation #5:	The City of Gilroy and the Fire District should continue to provide shared services wherever feasible to enhance fire and EMS service delivery in both jurisdictions.

3.3.3 City of Morgan Hill

The City of Morgan Hill's two existing fire stations, with a third cost-shared engine[11] stationed at the Fire District Headquarters on Monterey Road in Morgan Hill, provide a combined daily staffing level of 10 response personnel. As discussed in Section 2.8, the City is understaffed to achieve even minimal ERF staffing and is heavily reliant on Fire District and/or mutual aid resources to safely resolve even a single serious fire or EMS incident, or to provide adequate capacity for simultaneous incidents. In Citygate's opinion, the risks within the City, combined with projected future growth, justify a minimum daily staffing level of nine City personnel (12 including shared Fire District Station #1) providing all-risk fire/EMS from three City fire stations plus shared Fire District Station #1. Potential incremental steps to achieve a fully staffed third City station include staffing the truck with three personnel as a third City unit, and/or dynamic deployment of a two-person Type-6[12] all-risk unit in central Morgan Hill during peak service demand hours.

Finding #32:	The City of Morgan Hill is geographically too large to effectively provide recommended service levels from its two existing fire stations and shared Fire District Station #1.
Finding #33:	The risks in Morgan Hill, combined with projected future growth, justify a dedicated minimum daily City staffing level of nine personnel, with 12 total personnel daily including the Fire District's Morgan Hill engine.

[11] Engine crew costs are equally shared between the City of Morgan Hill and the South Santa Clara County Fire District

[12] 18,000–20,000-pound GVW truck chassis with utility body, fire pump, water tank, and hose. May also be equipped to provide ALS/BLS EMS and initial rescue services.

Recommendation #6:	The City of Morgan Hill should construct and staff a third fire station in the central section of the City as soon as fiscally feasible; or incrementally staff the truck with three personnel as a fourth unit, or dynamically deploy a two-person Peak Activity Unit during peak service demand periods.

Assuming a 4:00-minute first-due travel time goal to achieve desirable emergency incident outcomes, geographic mapping shows that only 75 percent of the City's public road network is reachable within 4:00 minutes travel time *without* traffic congestion as summarized in Table 23.

Table 23—Travel Time Coverage – Morgan Hill

Travel Time Measure	Total Public Road Miles	Non-Congested Miles Covered	Non-Congested Percent of Total Miles
4:00-Minute First Due Existing Stations[1]	193.5	144.6	**74.73%**
4:00-Minute First Due with Butterfield Station[1]	193.5	158.7	**82.02%**
8:00-Minute ERF with Existing Stations[1]	193.5	55.8	**28.84%**
8:00-Minute ERF with Butterfield Station[1]	193.5	177.3	**91.63%**

[1] Including shared Fire District Station #1 in Morgan Hill

Citygate evaluated travel time coverage from a potential future third City fire station at Butterfield Boulevard and Diana Avenue at the Department's request. As Map Scenario #2 (**Volume 2—Map Atlas**) and Table 23 show, this location would improve 4:00-minute first-due travel time coverage by approximately 7 percent to 82 percent of total City public road miles, which in Citygate's opinion is good first-due coverage. As Table 23 also shows, a third City station at this location would improve 8:00-minute ERF travel time coverage by nearly 63 percent to more than 91 percent of total public road miles, as shown in Map Scenario #2a, which is excellent coverage.

Finding #34:	A third fire station in central Morgan Hill would improve Citywide daily staffing capacity and both first-due and Effective Response Force travel time coverage.

Recommendation #7:	Morgan Hill and the Fire District should continue to collaborate to provide shared services wherever feasible to enhance fire and EMS service delivery in both jurisdictions.

Citygate was also asked to review travel time coverage from the City's El Toro station. As Map Scenario #2 (**Volume 2—Map Atlas**) and Table 23 show, there is a significant 4:00-minute first-due travel time coverage gap in the northeast section of the City even with the recommended third fire station at Butterfield Boulevard and Diana Avenue. Although the scope of work for this study did not include geographic mapping of an alternative El Toro station site, relocation of that station further east to the Cochrane Road corridor would certainly improve 4:00-minute first-due travel time coverage into that northeastern gap area; however, it would reduce first-due travel time coverage to the northwestern Llagas Road neighborhoods. In Citygate's opinion, relocation of the El Toro station would have no to very minimal impact on current 8:00-minute ERF travel time coverage.

Finding #35:	Relocating the Morgan Hill El Toro station east to the Cochrane Road corridor would improve 4:00-minute first-due travel time coverage in the northeast section of the City; however, it would concurrently reduce first-due travel time coverage in the northwestern Llagas Road neighborhoods.
Finding #36:	Relocating the El Toro station east to the Cochrane Road corridor would have no to very minimal impact on current 8:00-minute Effective Response Force travel time coverage.

3.3.4 South Santa Clara County Fire District

Although Santa Clara County land use policies promote future growth within existing urban service areas, there are areas within the Fire District's 306 square mile service area, including San Martin and the unincorporated areas just outside the City of Morgan Hill, with population densities approaching 1,000 per square mile. In addition, western areas of the District along Watsonville Road, and areas east of U.S. 101, have a higher population density than the more rural areas of the District.

Because of these varied population densities, Citygate utilized two response performance expectations for this study: 7:30-minute first-due call-to-arrival and 11:30-minute ERF call-to-arrival goal for the Morgan Hill station given the predominantly urban/suburban population density served by that station, and a 14:00-minute rural first-due call-to-arrival goal for the Masten

and Gilroy Gardens stations given the more suburban/rural population densities served by those stations.

Although response performance for the Masten and Gilroy Gardens stations meets the Citygate-recommended 14:00-minute call-to-arrival goal for rural response zones, District executive staff asked Citygate to identify and evaluate potential alternate sites for these two stations that could enhance first-due and overall regional response performance.

The Masten station, centrally located between Gilroy and Morgan Hill on the east side frontage road of U.S. 101 just south of Masten Avenue, provides relatively good access to east- and west-bound Masten Avenue, as well as northbound U.S. 101. Access to southbound U.S. 101, however, is slower due to the onramp location on the west side of the Masten Avenue overpass.

Considering Citygate's fire station siting guidelines in Section 3.3.1, the only other suitable location for this station in Citygate's opinion is in the vicinity of the U.S. 101 / San Martin Avenue interchange, approximately two miles north of its current location, as shown in Map Scenario #3 (**Volume 2—Map Atlas**). Given the pending closure of Reed Airport in San Jose which is anticipated to increase general aviation activity significantly at the South Santa Clara County Airport in San Martin, a station sited on the north end of the runway with direct access to Murphy Avenue would provide improved response time to the airport, San Martin, and Morgan Hill. However, it would increase response times into Gilroy and Fire District areas east of Gilroy. While there are both advantages and disadvantages to this potential station location, it is ultimately a policy and fiscal decision for consideration by the Fire District Board of Commissioners, ideally in collaboration with the Cities of Gilroy and Morgan Hill.

> **Finding #37:** Relocation of the Fire District's Masten station would result in both advantages and disadvantages relative to first-due and Effective Response Force response performance and automatic aid.

The Gilroy Gardens station is located on the south side of Highway 152 at the entrance to the Gilroy Gardens Family Theme Park on the western edge of Gilroy. While this location provides immediate first-due and ERF coverage into the City, nearly all this station's primary first-due response area lies to the west along Highway 152 and northwest. In Citygate's opinion, considering the fire station siting guidelines in Section 3.3.1, a more suitable location for this station would be in the vicinity of Watsonville Road and Day Road to provide quicker first-due travel time coverage of the more populated portions of its primary response area, as well as good access to the north, south, and east to Santa Teresa Boulevard. As shown in Map Scenario #4 (**Volume 2—Map Atlas**), relocation of this station would also have a significant impact on first-due and ERF capacity and travel time coverage for Gilroy.

Finding #38: Relocation of the Fire District's Gilroy Gardens station would result in both advantages and disadvantages relative to first-due and Effective Response Force response performance and automatic aid.

Recommendation #8: The Fire District should collaborate closely with both Cities relative to any potential station relocations.

3.4 ALTERNATIVE SERVICE MODELS

As discussed in Section 2.8 and this section, Gilroy and Morgan Hill do not, in Citygate's opinion, deploy a sufficient number of firefighters daily to safely resolve even a single serious fire or EMS incident, or to provide adequate capacity for simultaneous incidents, and are thus dependent on Fire District resources to achieve a minimal ERF staffing of 14 personnel. In addition, while the three agencies have automatic aid agreements that send the closest first-due and ERF resources regardless of jurisdiction, they are poorly located geographically for prompt mutual aid other than from each other, and are thus essentially self- or co-reliant to provide the response resources to resolve all but the most catastrophic emergencies without outside assistance.

Given the fact that few if any jurisdictions can afford a service level that provides enough resources to handle *all* calls for service, including concurrent calls, cooperative solutions between the three jurisdictions that maximize utilization of their combined resources are the best pathway forward for efficient and cost-effective delivery of fire services. The existing automatic aid agreements that provide for closest first-due and ERF unit response are an excellent first step in this direction, as is Morgan Hill and the Fire District's cost sharing of a fire engine and some administrative support staff to serve both jurisdictions.

As the jurisdiction physically located between the two Cities, the Fire District is *the* key partner to any cooperative fire service solution in south Santa Clara County. In addition to its current cooperative shared services with Morgan Hill, the Fire District and Gilroy could consider similar shared services, including cost-shared or co-located response resource(s), and/or administrative support staff to serve both jurisdictions.

Finding #39: A cooperative fire service model that maximizes utilization of the combined three fire agency jurisdictions' resources is the best alternative going forward for efficient and cost-effective delivery of fire services in south Santa Clara County.

3.5 FUTURE NEEDS SUMMARY

Projected future growth and development in south Santa Clara County will not alter Gilroy, Morgan Hill, and the Fire District's physical isolation from other regional fire service providers, thus continuing to make them self- or co-reliant for many decades for the resources to resolve all but the most catastrophic emergencies without outside assistance. Such physical isolation, in combination with fiscal realities that prevent any one jurisdiction from being able to afford a service level providing enough resources and staffing to handle all calls for service without outside assistance, makes cooperative solution(s) critical that maximize utilization of the combined resources of all three jurisdictions to provide optimal operational and fiscal effectiveness and efficiency going forward.

Given the growth currently occurring in southwestern Gilroy, and the City's current planning for a future fourth fire station in that area, it is essential that the Fire District determine its long-term plans relative to the Gilroy Gardens station as soon as possible given the potential impacts to the City if that station is closed or relocated. Equally important, in Citygate's opinion, is for the Cities' and Fire District's leadership to engage as soon as possible: to (1) establish desire and intent to provide cooperative fire services for many decades, perhaps through a formal Memorandum of Understanding (MOU); and (2) to establish a joint planning team to work through the detailed planning for such future cooperative services for consideration by each jurisdiction's policy-making body.

Finding #40: Close collaboration between Gilroy, Morgan Hill, and the Fire District is critical to establishing and maintaining a cooperative regional fire service delivery model that maximizes utilization of the combined jurisdictions' resources to provide long-term operational and fiscal efficiencies.

Recommendation #9: Gilroy, Morgan Hill, and Fire District leadership should establish desire and intent as soon as possible to provide cooperative fire services for many decades, perhaps through a formal Memorandum of Understanding.

Recommendation #10:	Given the desire and intent to jointly provide cooperative fire services for many decades, the three jurisdictions should establish a joint strategic planning team with policy-level direction to evaluate potential cooperative service elements for approval by the respective policy bodies, and then to conduct the detailed implementation planning necessary.

SECTION 4—FINDINGS AND RECOMMENDATIONS

This section contains all the findings and recommendations found throughout this report in sequential order.

4.1 FINDINGS

Finding #1: None of the three agencies have elected-official-approved response performance objectives meeting all best practice elements for time and desired outcomes. Some of the departmental policies have a portion of the elements of best practices-based response time and outcomes desired policies.

Finding #2: All three agencies have, over the last decade or more, completed a fire master plan, Standards of Response Cover assessment, or a contract for services agreement, yet the elected officials have not clearly adopted the response time policies as recommended in prior studies.

Finding #3: The three fire agencies have a standard response plan that considers risk and establishes an appropriate initial response for each incident type. Each type of call for service receives the combination of engines, trucks, specialty units, and command officers customarily needed to effectively control that type of incident based on each agency's experience.

Finding #4: During traffic congestion periods, there are multiple underserved core areas in Morgan Hill, suggesting the three stations are spaced too far apart. In Gilroy, the edge areas and new development beyond the current *non-congested* coverage area also suggests the need for an additional station.

Finding #5: Given that only nine firefighters are on-duty in each City, if *both* Cities added a fourth fire station, raising daily staffing to 12, they would be less dependent on the Fire District's staffing for serious emergencies requiring a multiple-unit response.

Finding #6: The Fire District's Station #3 in west Gilroy serves mostly Gilroy within its 4:30-minute first-due travel coverage. It would provide better rural area coverage if moved northwest of its current location.

Finding #7: Even if all three agencies' fire stations are available, neither north Morgan Hill nor south and eastern Gilroy can receive a minimum multiple-unit Effective Response Force of 12 firefighters within 8:00 minutes travel time.

Finding #8: Service demand occurs across all hours of the day, indicating the need for a 24-hours-per-day, seven-days-per-week fire and EMS emergency response system.

Finding #9: Although the occurrence of simultaneous incidents varies over the three-year study period, a significant percentage of the collective agencies' service demand involves two or more incidents occurring at the same time.

Finding #10: Approximately 10 percent of the three Fire District and two Morgan Hill stations' calls for service involve simultaneous incidents within those same station response areas, resulting in a slower response for the second or subsequent incident from another station. Same-station simultaneous incident activity in Gilroy is 3.5 percent or less.

Finding #11: The agencies need to monitor unit hour utilization and simultaneous incident rates of the busiest units on a quarterly basis.

Finding #12: Across all three agencies, 90th percentile call processing is more than 2:00 minutes. Call processing for Morgan Hill and Fire District incidents *meets* the current NFPA 1221 90-second recommendation, while call processing for Gilroy is about 1:00 minute (67 percent) *slower*.

Finding #13: Gilroy's crew turnout performance *meets* a Citygate-recommended goal of 2:00 minutes or less, while Morgan Hill's performance is about 1:00 minute (50 percent) *slower*, and the Fire District's is about 1:30 minutes (75 percent) *slower*.

Finding #14: First unit travel time for Gilroy is about 1:00 minute (25 percent) *slower* than a recommended best practice goal of 4:00 minutes or less for urban population densities, but only slightly (11–22 percent) slower than the Department's current 4:30-minute goal except for the Glen Loma / Santa Teresa area, where travel time is more than 3:00 minutes (67 percent) *slower* than the current 4:30-minute goal, and more than 3:30 minutes (87 percent) *slower* than the recommended 4:00-minute goal.

Finding #15: First unit travel time for Morgan Hill is 2:00–3:25 minutes (50–87 percent) *slower* than a recommended best practice goal of 4:00 minutes or less for urban population densities.

Finding #16: First unit travel time from the Fire District's Masten station *meets* a Citygate-recommended goal of 10:30 minutes or less for rural zones and is 1:00 minute (10 percent) *slower* than the goal from the Gilroy Gardens station. First unit travel time

from the Morgan Hill station is 2:26 minutes (62 percent) *slower* than the 4:00-minute goal for urban/suburban population densities.

Finding #17: Call-to-arrival response performance in Gilroy, Morgan Hill, and the Fire District's Morgan Hill station is nine percent to 45 percent *slower* than Citygate's recommended 7:30-minute goal for urban/suburban response zones. Call-to-arrival performance from the Fire District's Masten and Gilroy Gardens stations *meets* Citygate's recommended 14:00-minute goal for rural areas.

Finding #18: Effective Response Force (ERF or First Alarm) call-to-arrival performance is *significantly slower* than the Citygate-recommended goal of 11:30 minutes for urban/suburban areas, except in the Glen Loma station area in Gilroy which is 9:38 minutes. Also, ERF performance *meets* the Citygate-recommended *rural* response goal of 19:30 minutes for the Fire District's Masten station response area.

Finding #19: Gilroy and Morgan Hill do not deploy enough firefighters daily to safely resolve even a single serious fire or EMS incident, nor to provide adequate capacity for simultaneous incidents.

Finding #20: Gilroy and Morgan Hill are dependent on Fire District resources to achieve a minimal Effective Response Force staffing of 14 personnel.

Finding #21: Gilroy and the Fire District receive mutual benefit from their current automatic aid agreement.

Finding #22: Morgan Hill and the Fire District receive mutual benefit from their current cost-shared engine and automatic aid agreement.

Finding #23: The three jurisdictions are poorly located geographically for prompt mutual aid other than from each other.

Finding #24: The three jurisdictions are essentially self- or co-reliant to provide the response resources to resolve all but the most catastrophic emergencies without outside assistance.

Finding #25: Population in the two Cities is projected to increase 1.5 to 2.2 percent annually over the next 16–21 years; population in the Fire District is not expected to change significantly as a result of County land use policies focusing future growth within existing urban service areas.

Finding #26: Projected population growth in Gilroy and Morgan Hill will be accommodated through infill and land use intensification within the existing Urban Growth Boundaries through at least 2040.

Finding #27: Annual service demand increased 6.3 percent over the three-year study period.

Finding #28: Citygate projects service demand will continue to increase approximately 2–5 percent annually over the next 16–21 years (2035–2040), with EMS service demand increasing at a slightly higher 3–6 percent annually and comprising an increasing percentage of total service demand.

Finding #29: The City of Gilroy is geographically too large to effectively provide recommended service levels from its three existing fire stations and Fire District Station #3 at Gilroy Gardens.

Finding #30: A fourth fire station in southwest Gilroy would improve five deployment needs including first-due travel time coverage, daily Citywide staffing, multiple-unit Effective Response Force (ERF) staffing, travel time coverage during traffic congestion periods, and reduced dependence on the Fire District's Station #3 at Gilroy Gardens for first-due and ERF capacity and staffing.

Finding #31: If the Fire District relocates the Gilroy Gardens station further west, it will impact first-due and Effective Response Force capacity, staffing, and travel time coverage for Gilroy.

Finding #32: The City of Morgan Hill is geographically too large to effectively provide recommended service levels from its two existing fire stations and shared Fire District Station #1.

Finding #33: The risks in Morgan Hill, combined with projected future growth, justify a dedicated minimum daily City staffing level of nine personnel, with 12 total personnel daily including the Fire District's Morgan Hill engine.

Finding #34: A third fire station in central Morgan Hill would improve Citywide daily staffing capacity and both first-due and Effective Response Force travel time coverage.

Finding #35: Relocating the Morgan Hill El Toro station east to the Cochrane Road corridor would improve 4:00-minute first-due travel time coverage in the northeast section of the City; however, it would concurrently reduce first-due travel time coverage in the northwestern Llagas Road neighborhoods.

Finding #36: Relocating the El Toro station east to the Cochrane Road corridor would have no to very minimal impact on current 8:00-minute Effective Response Force travel time coverage.

Finding #37: Relocation of the Fire District's Masten station would result in both advantages and disadvantages relative to first-due and Effective Response Force response performance and automatic aid.

Finding #38: Relocation of the Fire District's Gilroy Gardens station would result in both advantages and disadvantages relative to first-due and Effective Response Force response performance and automatic aid.

Finding #39: A cooperative fire service model that maximizes utilization of the combined three fire agency jurisdictions' resources is the best alternative going forward for efficient and cost-effective delivery of fire services in south Santa Clara County.

Finding #40: Close collaboration between Gilroy, Morgan Hill, and the Fire District is critical to establishing and maintaining a cooperative regional fire service delivery model that maximizes utilization of the combined jurisdictions' resources to provide long-term operational and fiscal efficiencies.

4.2 RECOMMENDATIONS

Recommendation #1: **Adopt Updated Deployment Policies:** The Departments' elected officials should adopt *updated*, complete performance measures to aid deployment planning and to monitor performance. The measures of time should be designed to deliver outcomes that will save patients when possible upon arrival and to keep small but serious fires from becoming more serious. With this is mind, Citygate recommends the following measures:

1.1 Distribution of Fire Stations: In *urban/suburban* population density areas, to treat pre-hospital medical emergencies and control small fires, the first-due unit should arrive within 7:30 minutes, 90 percent of the time from the receipt of the 9-1-1 call at fire dispatch. This equates to a 90-second dispatch time, a 2:00-minute company turnout time, and a 4:00-minute travel time.

In rural population density areas, the first-due unit should arrive within 14:00 minutes from the receipt of the 9-1-1 call at fire dispatch at 80 percent or better reliability. This equates to a 90-

second dispatch time, a 2:00-minute company turnout time, and a 10:30-minute travel time.

1.2 Multiple-Unit Effective Response Force (ERF) for Serious Emergencies: In *urban/suburban* population density areas, to confine building fires near the room of origin, keep vegetation fires under one acre in size, and treat multiple medical patients at a single incident, a multiple-unit ERF of at least 17 personnel, including two Battalion Chiefs, should arrive within 11:30 minutes from the time of 9-1-1 call receipt at fire dispatch 90 percent of the time. This equates to a 90-second dispatch time, 2:00-minute company turnout time, and 8:00-minute travel time.

For *rural* population density areas, a multiple-unit ERF of at least 13 personnel, including at least one Battalion Chief, should arrive within 19:30 minutes from the time of 9-1-1 call receipt at fire dispatch 80 percent of the time. This equates to a 90-second dispatch time, 2:00-minute crew turnout time, and 16:00-minute travel time.

1.3 Hazardous Materials Response: Provide hazardous materials response designed to protect the communities from the hazards associated with uncontrolled release of hazardous and toxic materials. The fundamental mission of the Departments' response is to isolate the hazard, deny entry into the hazard zone, and notify appropriate officials/resources to minimize impacts on the community. This can be achieved with a first-due total response time of 7:30 minutes or less to provide initial hazard evaluation and/or mitigation actions. After the initial evaluation is completed, a determination can be made whether to request additional resources from the regional hazardous materials team.

1.4 Technical Rescue: Respond to technical rescue emergencies as efficiently and effectively as possible with enough trained personnel to facilitate a successful rescue with a first-due total response time of 7:30 minutes or less to evaluate the situation and/or initiate rescue actions. Following the initial evaluation, assemble additional resources as needed within a total response time of 11:30 minutes to safely complete rescue/extrication and delivery of the victim to the appropriate emergency medical care facility.

Recommendation #2: Gilroy needs to work to substantially lower dispatch processing times, and Morgan Hill and the Fire District need to work to lower crew turnout times.

Recommendation #3: The City of Gilroy should construct a fourth fire station in the southwest Glen Loma area of the City, and staff it with a full-time three-person crew as soon as fiscally feasible.

Recommendation #4: The City of Gilroy should continue the current pilot Alternative Service Model until such time as the Glen Loma station is constructed and staffed with a full-time crew.

Recommendation #5: The City of Gilroy and the Fire District should continue to provide shared services wherever feasible to enhance fire and EMS service delivery in both jurisdictions.

Recommendation #6: The City of Morgan Hill should construct and staff a third fire station in the central section of the City as soon as fiscally feasible; or incrementally staff the truck with three personnel as a fourth unit, or dynamically deploy a two-person Peak Activity Unit during peak service demand periods.

Recommendation #7: Morgan Hill and the Fire District should continue to collaborate to provide shared services wherever feasible to enhance fire and EMS service delivery in both jurisdictions.

Recommendation #8: The Fire District should collaborate closely with both Cities relative to any potential station relocations.

Recommendation #9: Gilroy, Morgan Hill, and Fire District leadership should establish desire and intent as soon as possible to provide cooperative fire services for many decades, perhaps through a formal Memorandum of Understanding.

Recommendation #10: Given the desire and intent to jointly provide cooperative fire services for many decades, the three jurisdictions should establish a joint strategic planning team with policy-level direction to evaluate potential cooperative service elements for approval by the respective policy bodies, and then to conduct the detailed implementation planning necessary.

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SECTION 5—NEXT STEPS

Citygate's recommended immediate next steps for Gilroy, Morgan Hill, and the Fire District are:

- Review and absorb the content, findings, and recommendations of this study
- Prepare a staff report and draft Resolution for each City Council and the Fire District Board of Commissioners to adopt the included recommended response performance goals
- Determine interest and intent to provide long-term joint cooperative fire services in south Santa Clara County
  - Consider a Memorandum of Understanding to memorialize such intent.

Recommended intermediate-term next steps include:

- Monitor response performance and unit workload at least annually
- Establish a joint agency strategic planning team with policy-level direction to evaluate potential cooperative service opportunities, including, but not limited to, fire crew staffing, deployment, cost sharing, and fire dispatch services, with the intent to develop a mutually beneficial long-term commitment and solution that optimizes the use of all three jurisdictions' resources to provide efficient and cost-effective fire services in south Santa Clara County.

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APPENDIX A—COMMUNITY RISK ASSESSMENT

A.1 COMMUNITY RISK ASSESSMENT

SOC ELEMENT 3 OF 8
COMMUNITY RISK ASSESSMENT

The third element of the Standards of Coverage (SOC) process is a community risk assessment. Within the context of an SOC study, the objectives of a community risk assessment are to:

1. Identify the values at risk to be protected within the community or service area.
2. Identify the hazards with potential to adversely impact the community or service area.
3. Quantify the overall risk associated with each hazard.
4. Establish a foundation for current/future deployment decisions and risk-reduction/hazard mitigation planning and evaluation.

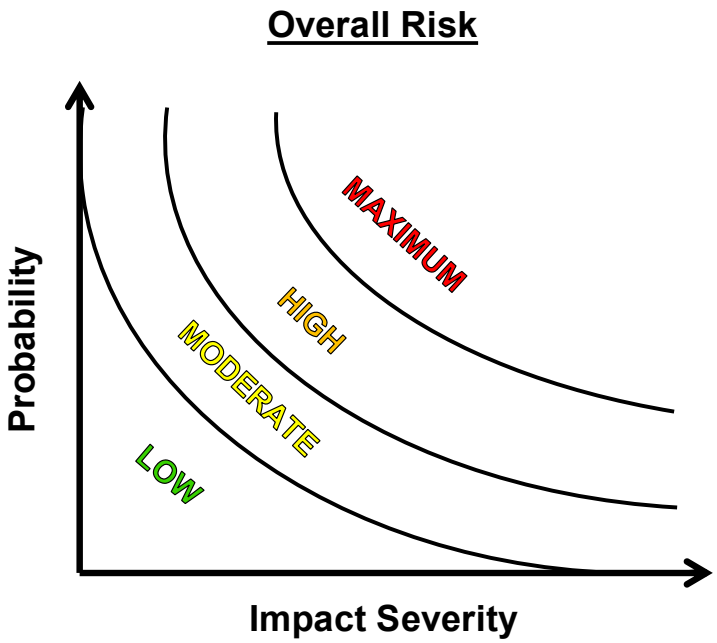
A *hazard* is a situation or condition that can cause or contribute to harm. Examples include fire, medical emergency, vehicle collision, earthquake, flood, etc. *Risk* is the *probability of hazard occurrence* in combination with the *likely severity of resultant impacts* to people, property, and the community as a whole.

A.1.1 Risk Assessment Methodology

The methodology employed by Citygate to assess community risks as an integral element of an SOC study incorporates the following elements:

- Identification of geographic risk planning sub-zones appropriate to the community or jurisdiction.
- Identification and quantification, to the extent data is available, of the specific values at risk to various hazards within the community or service area.
- Identification of the fire and non-fire hazards to be evaluated.
- Determination of the probability of occurrence for each hazard based on recent historical service demand by hazard type.
- Identification and evaluation of multiple relevant impact severity factors for each hazard by planning zone using agency/jurisdiction-specific data and information.
- Quantification of overall risk for each hazard based on probability of occurrence in combination with probable impact severity, as shown in Figure 15.

Figure 15—Overall Risk



Source: Commission on Fire Accreditation International (CFAI): *Community Risk Assessment: Standards of Cover (Sixth Edition)*

Citygate referenced multiple data sources for this study to understand the hazards and values to be protected within the three South Santa Clara County jurisdictions as follows:

- U.S. Census Bureau population and demographic data
- Fire agency data and information, including geographical information systems (GIS) data
- City and Santa Clara County data and information, including General Plan and zoning information
- 2017 Santa Clara County Operational Area Hazard Mitigation Plan

Although not utilized for this study to ensure equitable assessment of risk across all three agency jurisdictions, Citygate acknowledges that the City of Gilroy Fire Department has implemented a Citywide risk assessment of all non-single-family residential buildings using a two-factor life safety and community risk scoring scale. Citygate commends the Department for this innovative program that identifies specific higher-risk buildings and occupancies within the City, which also provides information to modify emergency responses to these buildings to mitigate additional risk. Citygate suggests that the Department consider modifying the scoring scales to allow a finer differentiation of the risk factors and resultant overall risk scores and category, and to also

potentially consider other risk factors such as occupancy classification, built-in fire protection and alarm systems, required fire flow, historic service demand, and ERF response capacity.

A.1.2 Risk Assessment Summary

Citygate's evaluation of the values at risk and hazards likely to impact the three study jurisdictions yields the following:

- The study area has a diverse urban/suburban population density, with rural population densities in the outlying areas.
- The three jurisdictions have a mix of residential, office, commercial, light industrial, and other non-residential building occupancies.
- The study area includes economic and natural resource values to be protected, as identified in this assessment.
- There are varying probabilities of occurrence and probable resultant impact severity associated with the following five hazards relating to services provided by the three fire agencies:
  - Building Fire
  - Vegetation/Wildland Fire
  - Medical Emergency
  - Hazardous Materials Release/Spill
  - Technical Rescue
- Overall risk for the five hazards ranges from ***Low*** to ***High***, as summarized in Table 24 by planning zone.

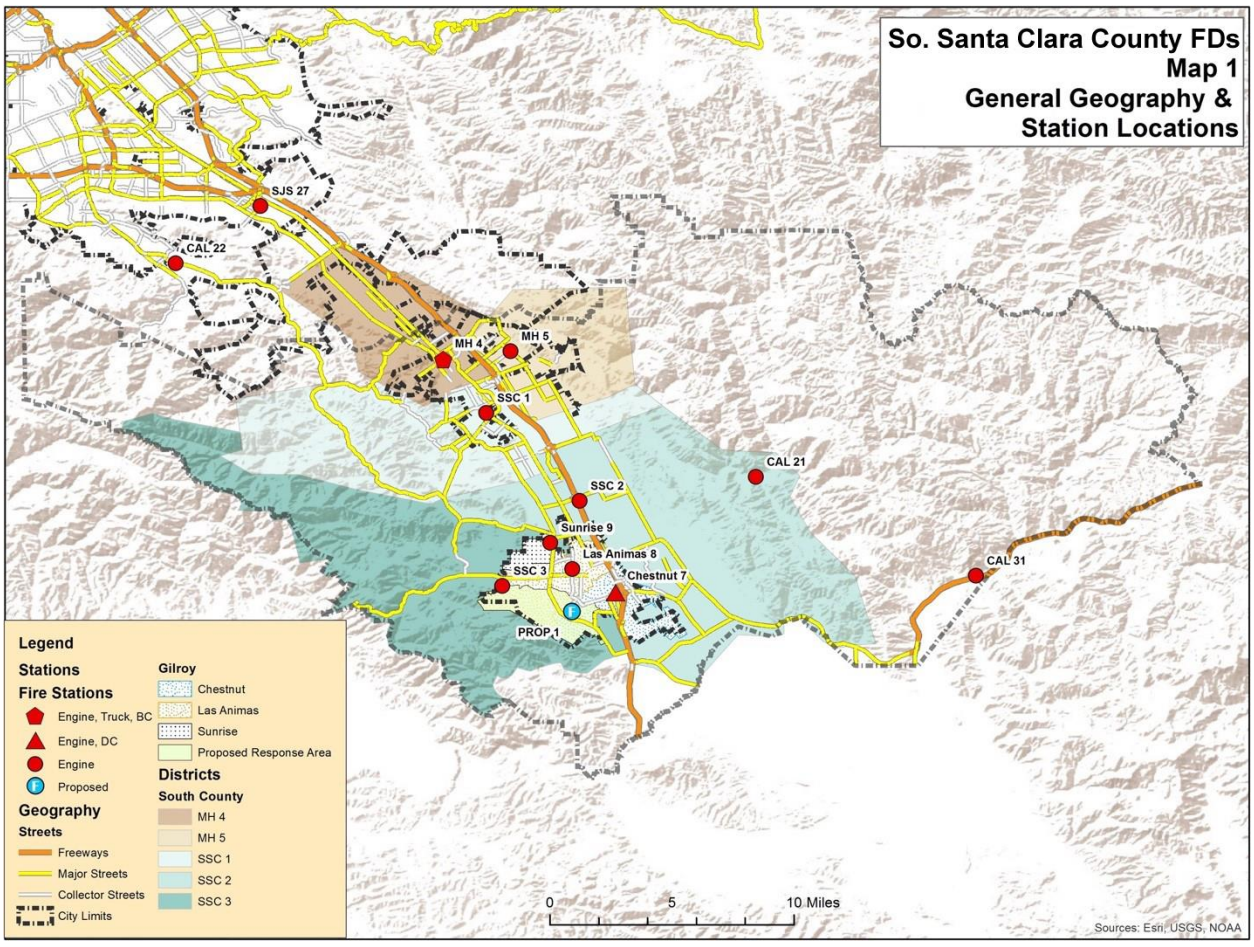
Table 24—Overall Risk by Hazard

Hazard	Risk Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Building Fire	*Moderate*	*Low*	*Low*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Low*
Vegetation/Wildland Fire	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Low*	*Low*	*Low*	*Moderate*	*Moderate*
Medical Emergency	*High*	*High*	*High*	*High*	*High*	*High*	*High*	*High*	*High*
Hazardous Material	*Moderate*	*Moderate*	*Low*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*
Technical Rescue	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*

A.1.3 Risk Planning Zones

The Commission on Fire Accreditation International (CFAI) recommends that jurisdictions establish geographic planning zones to better understand risk at a sub-jurisdictional level. For example, portions of a jurisdiction may contain predominantly moderate-risk building occupancies, such as detached single-family residences, while other areas contain high- or maximum-risk occupancies, such as commercial and industrial buildings with a high hazard fire load. If risk were to be evaluated on a jurisdiction-wide basis, the predominant moderate risk could outweigh the high or maximum risk and may not be a significant factor in an overall assessment of risk. If, however, those high- or maximum-risk occupancies are a larger percentage of the risk in a smaller planning zone, then it becomes a more significant risk factor. Another consideration in establishing risk planning zones is that the jurisdiction's record management system must also track the specific zone for each incident to be able to appropriately evaluate service demand and response performance relative to each specific zone. For this assessment, Citygate utilized nine risk planning zones corresponding to each fire agency's first-due response areas, as shown in Figure 16.

Figure 16—Risk Planning Zones



A.1.4 Values at Risk to Be Protected

Broadly defined, *values at risk* are tangibles of significant importance or value to the community or jurisdiction potentially at risk of harm or damage from a hazard occurrence. Values at risk typically include people, critical facilities/infrastructure, buildings, and key economic, cultural, historic, and/or natural resources.

People

Residents, employees, visitors, and travelers through a community or jurisdiction are vulnerable to harm from a hazard occurrence. Particularly vulnerable are specific at-risk populations, including those unable to care for themselves or self-evacuate in the event of an emergency. At-risk populations typically include children younger than 10 years of age, the elderly, and people housed in institutional settings. Key demographic data for Gilroy and Morgan Hill is summarized in Table 25 and Table 26. *No separate demographic data was available for just the South Santa Clara County Fire District's service area.*

Table 25—Key Demographic Data – City of Gilroy

Demographic	2017	Percentage
Population	**54,159**	
Under 10 years	7,936	**14.65%**
10–19 years	9,355	**17.27%**
20–64 years	31,572	**58.30%**
65–74 years	3,012	**5.56%**
75 years and older	2,284	**4.22%**
Median age	**34.1**	**N/A**
Housing Units	**16,145**	
Owner-Occupied	9,201	**56.99%**
Renter-Occupied	6,673	**41.33%**
Average Household Size	**3.41**	**N/A**
Ethnicity		
Caucasian (includes White and Hispanic/Latino)	41,964	**77.48%**
Hispanic/Latino	32,820	**60.60%**
Asian	4,856	**8.97%**
Black / African American	1,187	**2.19%**
Other	6,152	**11.36%**
Education (population over 24 years of age)	**33,185**	**61.27%**
High School Graduate	26,150	**78.80%**
Undergraduate Degree	5,617	**16.93%**
Graduate/Professional Degree	2,921	**8.80%**
Employment (population over 15 years of age)	**40,279**	**74.37%**
In Labor Force	28,441	**70.61%**
Unemployed	1,746	**6.14%**
Population below Poverty Level	6,445	**11.90%**
Population without Health Insurance Coverage	4,560	**8.42%**

Source: US Census Bureau (2017 data)

Of note from Table 25 is:

- More than 24 percent of the City's population is under 10 or over 65 years of age.
- The City's population is predominantly Hispanic (61 percent), followed by White (16.9 percent), Asian (9 percent), Black / African American (2 percent), and Other ethnic origins (11 percent).
- Of the City population over 24 years of age, nearly 79 percent has completed high school or higher.
- Of the City population over 24 years of age, nearly 26 percent has an undergraduate, graduate, or professional degree.
- Nearly 71 percent of the City population 16 years of age or older is in the workforce; of those, slightly more than 6 percent are unemployed.
- The total City population below the federal poverty level is nearly 12 percent.
- Just less than 8.5 percent of the City population does not have health insurance coverage.

According to Gilroy's 2040 General Plan Alternatives Report,[13] the Association of Bay Area Governments (ABAG) projects the City's population to grow to 61,000 by 2040, for a relatively slow annual growth rate of 0.8 percent. ABAG's projection, however, is based on regional policies and does not consider projected market demand. Gilroy's Economic Consultant, ADE, produced a range of population growth scenarios based on projected market demand, which range from 69,249 to 79,317 by the year 2040 for average annual growth rate ranging from 1.5 to 2.2 percent. ADE's median projection calls for a 2040 population of approximately 74,000, which reflects an average annualized growth rate of 1.9 percent.

[13] Reference: Gilroy General Plan Alternatives Report (2015) – Table 3-10

Table 26—Key Demographic Data – City of Morgan Hill

Demographic	2017	Percentage
Population	**43,136**	
Under 10 years	6,295	**14.59%**
10–19 years	6,292	**14.59%**
20–64 years	25,099	**58.19%**
65–74 years	3,335	**7.73%**
75 years and older	2,115	**4.90%**
Median age	**38.4**	**N/A**
Housing Units	**14,516**	
Owner-Occupied	10,257	**70.66%**
Renter-Occupied	3,948	**27.20%**
Average Household Size	**3.05**	**N/A**
Ethnicity		
Caucasian (includes White and Hispanic/Latino)	33,225	**77.02%**
Asian	6,344	**14.71%**
Black / African American	1,290	**2.99%**
Other	2,277	**5.28%**
Education (population over 24 years of age)	**28,033**	**64.99%**
High School Graduate	25,286	**90.20%**
Undergraduate Degree	7,400	**26.40%**
Graduate/Professional Degree	3,958	**14.12%**
Employment (population over 15 years of age)	**32,772**	**75.97%**
In Labor Force	22,103	**67.44%**
Unemployed	1,046	**4.73%**
Population below Poverty Level	2,847	**6.60%**
Population without Health Insurance Coverage	2,269	**5.26%**

Source: US Census Bureau (2017 data)

Of note from Table 26 is:

- More than 27 percent of the City population is under 10 or over 65 years of age.
- The City's population is predominantly Caucasian (77 percent), followed by Asian (15 percent), Black / African American (3 percent), and Other ethnic origins (5 percent).

- Of the City population over 24 years of age, 90 percent has completed high school or higher.
- Of the City population over 24 years of age, slightly more than 40 percent has an undergraduate, graduate, or professional degree.
- More than 67 percent of the City population 16 years of age or older is in the workforce; of those, nearly 5 percent are unemployed.
- The total City population below the federal poverty level is 6.6 percent.
- Slightly more than 5 percent of the City population does not have health insurance coverage.

In addition, over the next 16 years, the City of Morgan Hill is projected to grow by nearly 13 percent to nearly 48,500 by 2035, or an average annualized growth rate of 0.8 percent. Housing units are projected to increase 6.9 percent over the same period to 15,500, for an average annualized rate of 0.4 percent.[14]

Buildings

The study area contains a large inventory of housing units and non-residential occupancies, including office, professional services, retail/wholesale sales, restaurants/bars, hotels/motels, churches, schools, government facilities, healthcare facilities, and other non-residential uses.

Building Occupancy Risk Categories

The CFAI identifies four risk categories that relate to building occupancy as follows:

Low Risk – includes detached garages, storage sheds, outbuildings, and similar building occupancies that pose a relatively low risk of harm to humans or the community if damaged or destroyed by fire.

Moderate Risk – includes detached single-family or two-family dwellings; mobile homes; commercial and industrial buildings less than 10,000 square feet without a high hazard fire load; aircraft; railroad facilities; and similar building occupancies where loss of life or property damage is limited to the single building.

High Risk – includes apartment/condominium buildings; commercial and industrial buildings more than 10,000 square feet without a high hazard fire load; low-occupant load buildings with high fuel loading or hazardous materials; and similar occupancies with potential for substantial loss of life or unusual property damage or financial impact.

[14] Reference: City of Morgan Hill General Plan, Housing Element, Table 1-1

Maximum Risk – includes buildings or facilities with unusually high risk requiring an Effective Response Force involving a significant augmentation of resources and personnel and where a fire would pose the potential for a catastrophic event involving large loss of life and/or significant economic impact to the community.

Critical Facilities

Critical facilities typically include structures or other improvements, both public and private, that, due to function, size, service area, or uniqueness, have the potential to cause serious bodily harm, extensive property damage, or disruption of vital socioeconomic activities if damaged or destroyed, or if their functionality is significantly impaired. Critical facilities may include, but are not limited to, health and public safety facilities, utilities, government facilities, hazardous materials sites, or vital community economic facilities.

The 2017 Santa Clara County Operational Area Hazard Mitigation Plan (HMP) identifies 187 critical facilities for Gilroy and Morgan Hill, a Fire District staff identified 71 similar facilities within the District as summarized in Table 27. A hazard occurrence with significant impact severity affecting one or more of these facilities would likely adversely impact critical public or community services.

Table 27—Critical Facilities

Jurisdiction	Facility Category					Total
	Emergency Response / Public Health & Safety	Infrastructure Lifeline	Recovery Facilities	Socio-Economic	Hazardous Materials	
City of Gilroy	15	45	1	50	7	**118**
City of Morgan Hill	9	14	0	39	7	**69**
Fire District	4	19	8	29	11	**71**
Total	**28**	**78**	**9**	**118**	**25**	**258**

Source: 2017 Santa Clara County Operational Area Hazard Mitigation Plan, Table 4-4, and Fire District staff

Economic Resources

Gilroy:

Key economic resources within the City of Gilroy include:

- Gilroy Premium Outlets (145 retail stores)
- Olam Spices and Vegetables
- Costco

- Auto dealerships
- Walmart
- Christopher Ranch Foods

Morgan Hill:

Key economic resources within the City of Morgan Hill include:

- Anritsu
- Cal Door & Drawer
- NxEdge
- Paramit Corporation
- Specialized Bicycle Components
- Lusamerica Foods
- Mission Bell Manufacturing
- Toray Advanced Composites
- Infineon Technologies
- Safeway
- Velodyne LiDAR

Natural Resources

Natural resources within the study area include Debell Uvas Creek Preserve, Coyote Lake, Coyote Lake Harvey Bear Ranch County Park, Anderson Lake, Anderson Lake County Park, Uvas Canyon County Park, Chesbro Reservoir, Pajaro River watershed, Uvas Reservoir, and multiple neighborhood parks and open spaces.

Cultural/Historic Resources

There are numerous cultural and historic resources to be protected throughout the three-agency service area.

A.1.5 Hazard Identification

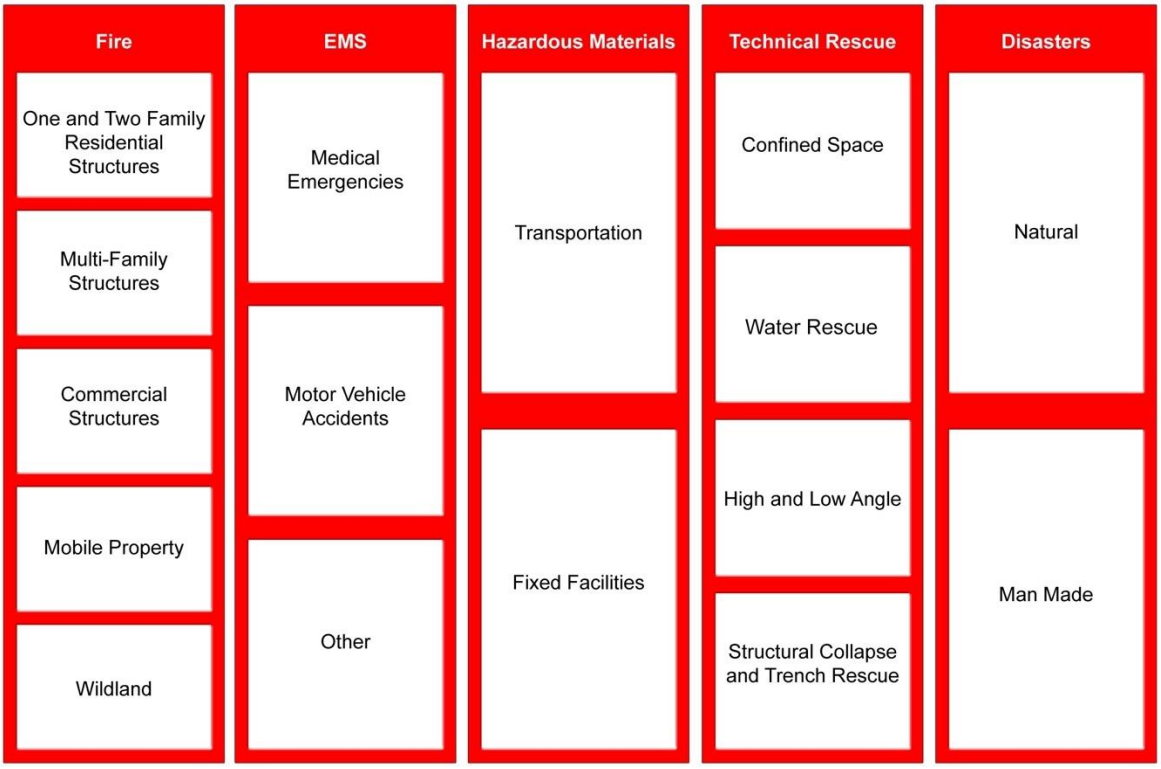
Citygate utilizes prior risk studies where available, fire and non-fire hazards as identified by the CFAI, and agency/jurisdiction-specific data and information to identify the hazards to be evaluated for this study. The 2017 Santa Clara County Operational Area Hazard Mitigation Plan identifies the following nine hazards of concern:

1. Climate change / sea level rise
2. Dam/levee failure
3. Drought
4. Earthquake
5. Flood
6. Landslide
7. Severe weather
8. Tsunami
9. Wildfire

Although the three fire agencies have no legal authority or responsibility to mitigate any of these hazards other than perhaps wildfire, they all provide services related to each of these hazards, including fire suppression, emergency medical services, technical rescue, and hazardous materials response.

The CFAI groups hazards into fire and non-fire categories, as shown in Figure 17. Identification, qualification, and quantification of the various fire and non-fire hazards are important factors in evaluating how resources are or can be deployed to mitigate those risks.

Figure 17—CFAI Hazard Categories



Source: CFAI *Standards of Cover* (Fifth Edition)

Subsequent to evaluation of the hazards identified in the Santa Clara County HMP, and the fire and non-fire hazards as identified by the CFAI as they relate to services provided by the three fire agencies, Citygate evaluated the following five hazards for this risk assessment:

1. Building Fire
2. Vegetation/Wildland Fire
3. Medical Emergency
4. Hazardous Materials Release/Spill
5. Technical Rescue

A.1.6 Service Capacity

Service capacity refers to an agency's available response force; the size, types, and condition of its response fleet and any specialized equipment; core and specialized performance capabilities and competencies; resource distribution and concentration; availability of automatic and/or mutual aid; and any other agency-specific factors influencing the agency's ability to meet current and prospective future service demand relative to the risks to be protected.

The City of Gilroy's service capacity for building fire, vegetation/wildland fire, medical emergency, hazardous material, and technical rescue risk consists of a minimum daily on-duty response force of nine personnel staffing three Type-1 fire engines, and one Division Chief, from the Department's three fire stations. The City of Morgan Hill's service capacity for the same five risks consists of a minimum daily on-duty response force of nine personnel staffing three Type-1 fire engines, and one Battalion Chief, from the Department's three fire stations.[15] South Santa Clara County Fire District's service capacity for those same five risks consists of a minimum daily on-duty response force of nine personnel staffing three Type-1 fire engines, and one Battalion Chief, from the District's three fire stations. The three agencies have a boundary drop automatic mutual aid agreement that provides a minimum Effective Response Force (ERF) of 12 personnel staffing four apparatus, plus one Chief Officer, for more serious emergencies.

All three agency response personnel are trained and certified to either the Emergency Medical Technician (EMT) level to provide Basic Life Support (BLS) pre-hospital emergency medical care or to the EMT-Paramedic (Paramedic) level to provide Advanced Life Support (ALS) pre-hospital emergency medical care. All staffed response apparatus include at least one Paramedic. Ground paramedic ambulance service is provided by Rural/Metro/AMR Ambulance of Northern California, a private-sector ambulance provider operating under a non-exclusive agreement administered by the Santa Clara County Emergency Medical Services Agency. In addition, the Gilroy Fire Department has a Type-1 ambulance that can be cross-staffed as needed for BLS or ALS ground transportation. Air ambulance services, when needed, are provided by CALSTAR/Reach Air Medical Services (Gilroy) or Life Flight (Palo Alto). There are four hospitals with emergency services within the region, including Saint Louise Regional Hospital in Gilroy, two in San Jose, and one in Palo Alto, all of which are also trauma centers.

All response personnel are further trained to the U.S. Department of Transportation Hazardous Material First Responder Operational (FRO) level to provide initial hazardous material incident assessment, hazard isolation, and support for a hazardous material response team. The Gilroy Fire Department cross-staffs a Hazardous Materials Decontamination Unit as needed from the Sunrise station to support the City of San Jose Hazardous Materials Response Team.

Response personnel are also trained to the Confined Space Awareness level as required by Cal/OSHA. In addition, South Santa Clara County Fire District cross-staffs a Type-2 technical rescue trailer from its Gilroy Gardens station as needed. This resource is also available to other regional agencies/jurisdictions through the County mutual aid system.

[15] The Type-1 engine at the South Santa Clara County Fire District headquarters in Morgan Hill is cost-shared between the City of Morgan Hill and the Fire District, and serves both jurisdictions.

A.1.7 Probability of Occurrence

Probability of occurrence refers to the likelihood of a future hazard occurrence during a specific period. Because the CFAI agency accreditation process requires annual review of an agency's risk assessment and baseline performance measures, Citygate recommends using the 12 months following completion of an SOC study as an appropriate period for the probability of occurrence evaluation. Table 28 describes the five probability of occurrence categories and related scoring criteria used for this analysis.

Table 28—Probability of Occurrence Scoring Criteria

Score	Probable Occurrence	Description	General Criteria	Average Frequency
0–1.0	***Very Low***	**Improbable**	Hazard occurrence is ***unlikely***	Annually or less
1.1–2.0	***Low***	**Rare**	Hazard ***could occur***	1-4 times per year
2.1–3.0	***Moderate***	**Infrequent**	Hazard ***should occur*** infrequently	Bi-monthly to monthly
3.1–4.0	***High***	**Likely**	Hazard is ***likely to occur*** regularly	Bi-weekly to weekly
4.1–5.0	***Very High***	**Frequent**	Hazard is ***expected*** to occur frequently	Several times per week or more

Citygate's SOC assessments use recent multiple-year hazard response data to determine the probability of hazard occurrence for the ensuing 12-month period.

A.1.8 Impact Severity

Impact severity refers to the extent a hazard occurrence impacts people, buildings, lifeline services, the environment, and the community as a whole. Table 29 describes the five impact severity categories and related scoring criteria used for this analysis.

Table 29—Impact Severity Scoring Criteria

Score	Impact Severity	General Criteria
0–1.0	Insignificant	• No serious injuries or fatalities • Few persons displaced for only a short duration • No or inconsequential damage • No or very minimal disruption to community • No measurable environmental impacts • Little or no financial loss
1.25–2.0	Minor	• Some minor injuries; no fatalities expected • Some persons displaced for less than 24 hours • Some minor damage • Minor community disruption; no loss of lifeline services • Minimal environmental impacts with no lasting effects • Minor financial loss
2.25–3.0	Moderate	• Some hospitalizations; some fatalities expected • Localized displacement of persons for up to 24 hours • Localized damage • Normal community functioning with some inconvenience • Minor loss of lifeline services • Some environmental impacts with no lasting effects, or small environmental impact with long-term effect • Moderate financial loss
3.25–4.0	Major	• Extensive serious injuries; significant number of persons hospitalized • Many fatalities expected • Significant displacement of many people for more than 24 hours • Significant damage requiring external resources • Community services disrupted; some lifeline services potentially unavailable • Some environmental impacts with long-term effects • Major financial loss
4.25–5.0	Catastrophic	• Large number of severe injuries and fatalities • Local/regional hospitals impacted • Large number of persons displaced for an extended duration • Extensive damage • Widespread loss of critical lifeline services • Community unable to function without significant support • Significant environmental impacts and/or permanent environmental damage • Catastrophic financial loss

A.1.9 Overall Risk

Overall hazard risk is determined by multiplying the *probability of occurrence score* by the *impact severity score*. The resultant total score determines the overall *risk ranking*, as described in Table 30.

Table 30—Overall Risk Score and Rating

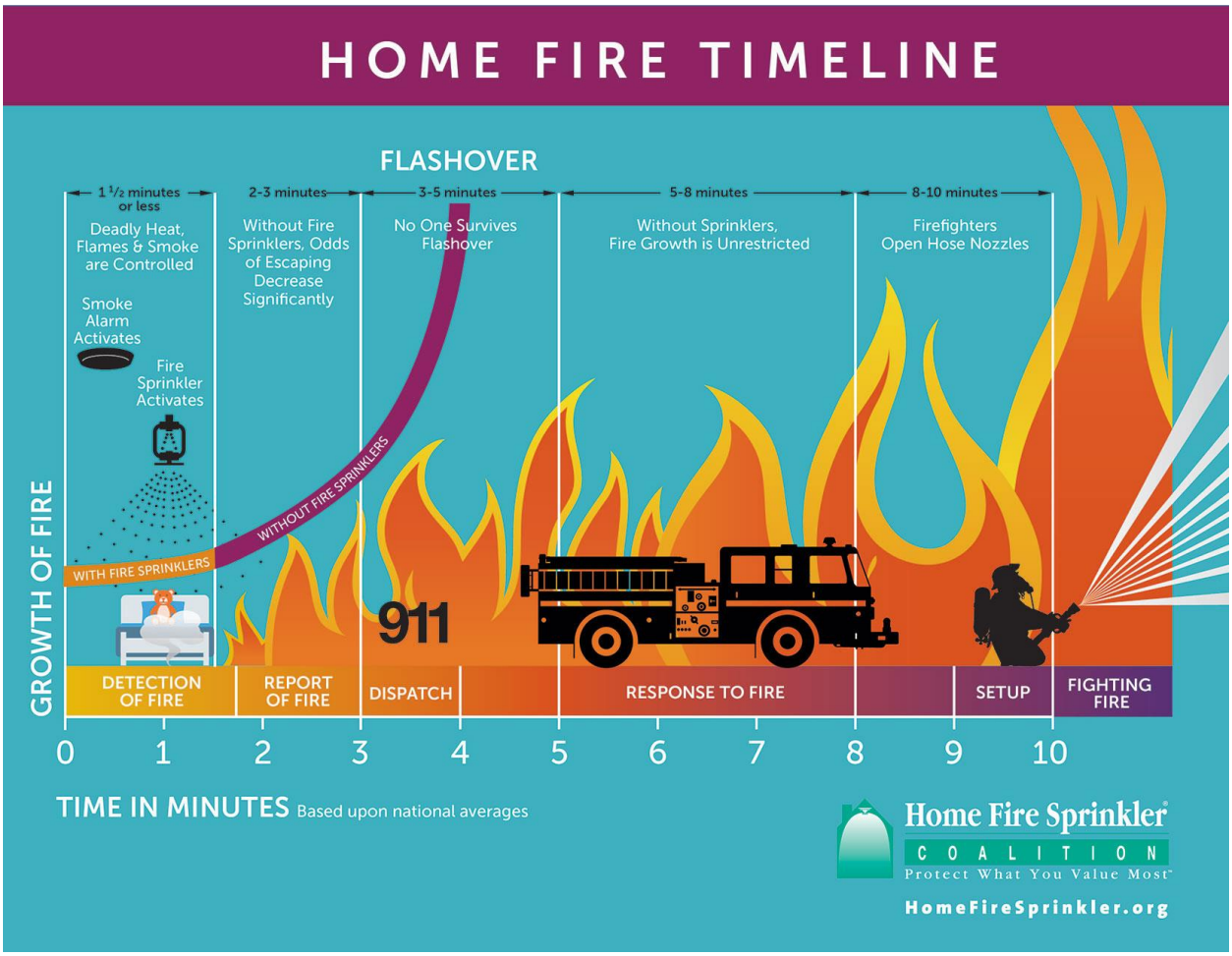
Overall Risk Score	Overall Risk Rating
0–5.99	LOW
6.0–11.99	MODERATE
12.0–19.99	HIGH
20.0–25	MAXIMUM

A.1.10 Building Fire Risk

One of the primary hazards in any community is building fire. Building fire risk factors include building size, density, age, occupancy, and construction materials and methods, as well as the number of stories, required fire flow, proximity to other buildings, built-in fire protection/alarm systems, available fire suppression water supply, building fire service capacity, fire suppression resource deployment (distribution/concentration), staffing, and response time. Citygate used available data from the three agencies and the U.S. Census Bureau to assist in determining each jurisdiction's building fire risk.

Figure 18 illustrates the building fire progression timeline and shows that flashover, which is the point at which an entire room erupts into fire after all the combustible objects in that room reach their ignition temperature, can occur as early as three to five minutes from the initial ignition. Human survival in a room after flashover is extremely improbable.

Figure 18—Building Fire Progression Timeline

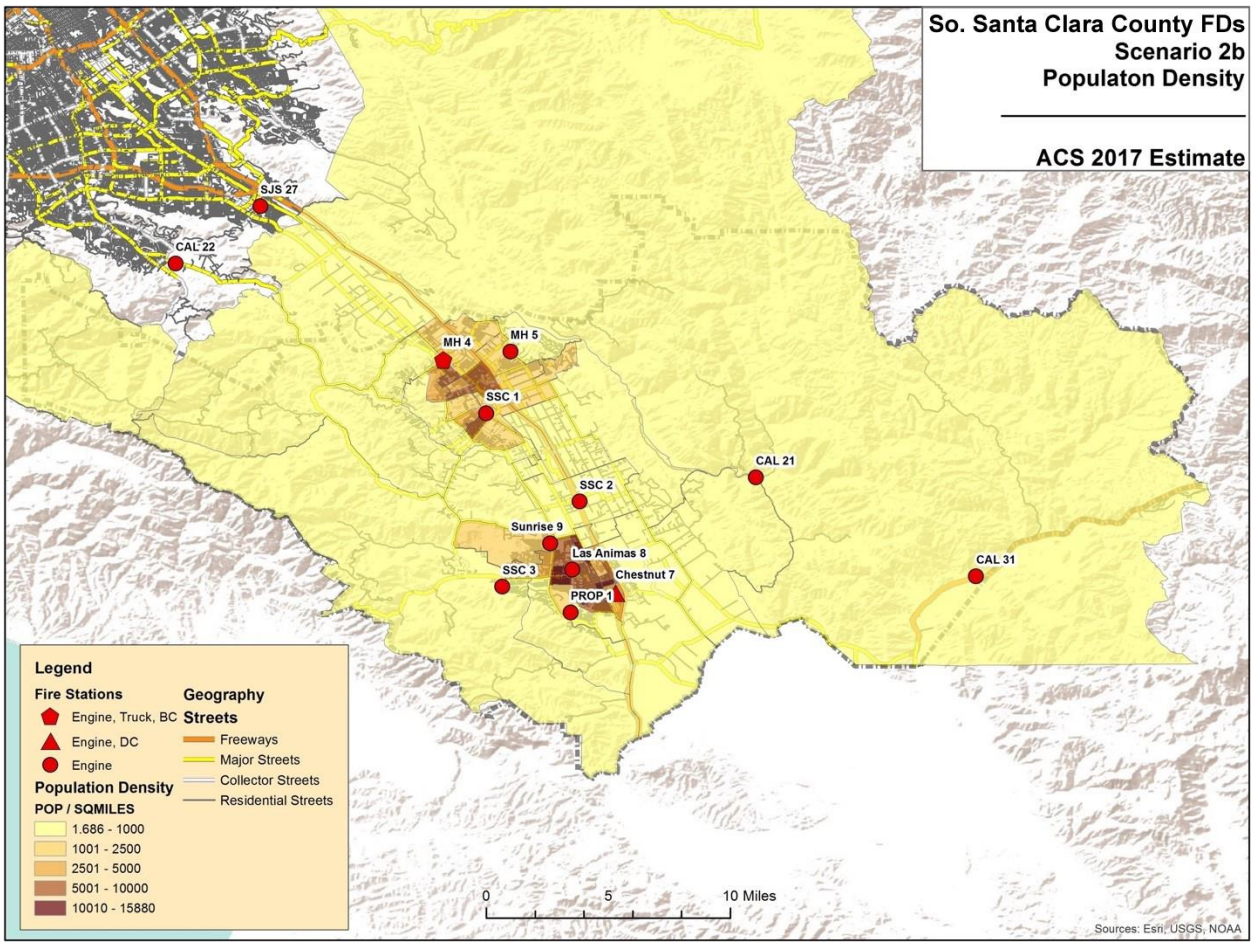


Source: http://www.firesprinklerassoc.org

Population Density

Population density within each agency's service area ranges from less than 1,000 to more than 15,000 people per square mile, as illustrated in Figure 19. Although risk analysis across a wide spectrum of other Citygate clients shows no direct correlation between population density and building fire *occurrence*, it is reasonable to conclude that building fire *risk* relative to potential impact on human life is greater as population density increases, particularly in areas with high density, multiple-story buildings.

Figure 19—Population Density



Water Supply

A reliable public water system providing adequate volume, pressure, and flow duration near all buildings is a critical factor in mitigating the potential impact severity of a community's building fire risk. The Cities of Gilroy and Morgan Hill each provide their own water service and, according to Fire Department staff, available fire flow is adequate throughout each City. Water service in the Fire District is provided by multiple water districts and private wells. According to District staff, available fire flow is inadequate throughout most of the service area.

Building Fire Service Demand

Table 31, Table 32, and Table 33 summarize building fire service demand by jurisdiction for the three-year period from January 1, 2016, through December 31, 2018.

Table 31—Building Fire Service Demand – Gilroy

Risk	Year	Planning Zone				Total
		Chestnut	Glen Loma	Las Animas	Sunrise	
Building Fire	2016	45	2	38	5	90
	2017	21	3	28	6	58
	2018	33	3	25	10	71
	Total	99	8	91	21	219
Percent of Total Service Demand		1.69%	1.22%	1.28%	1.50%	1.46%

Source: Gilroy FD incident data

Table 32—Building Fire Service Demand – Morgan Hill

Risk	Year	Planning Zone		Total
		Morgan Hill 1	Morgan Hill 2	
Building Fire	2016	8	8	16
	2017	11	3	14
	2018	8	2	10
	Total	27	13	40
Percent of Total Service Demand		0.49%	0.66%	0.53%

Source: Morgan Hill FD incident data

Table 33—Building Fire Service Demand – Fire District

Risk	Year	Planning Zone			Total
		SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	
Building Fire	2016	7	15	12	34
	2017	13	14	7	34
	2018	13	11	4	28
	Total	33	40	23	96
Percent of Total Service Demand		0.61%	1.70%	3.18%	1.13%

Source: South Santa Clara County Fire District incident data

As these tables show, building fire service demand varies by jurisdiction and has been relatively consistent in each jurisdiction over the three-year study period, ranging from 0.5 percent of total service demand in Morgan Hill to 1.5 percent in Gilroy. Overall, building fire service demand is low for all three agencies, which is typical of other Citygate client jurisdictions of similar size and demographics.

Probability of Building Fire Occurrence

Table 34 summarizes Citygate's scoring of building fire probability by planning zone based on recent historic building fire service demand from Table 31, Table 32, and Table 33

Table 34—Building Fire Probability Scoring

Building Fire	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Probability	3.0	2.25	2.25	2.5	2.25	3.5	3.5	2.5	2.25

Building Fire Impact Severity

Table 35 summarizes Citygate's scoring of the probable building fire impact severity by planning zone.

Table 35—Building Fire Impact Severity Scoring

Building Fire	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Impact Severity	2.5	2.5	2.5	3.0	3.0	3.0	3.0	2.75	2.25

Overall Building Fire Risk

Table 36 summarizes overall building fire risk by planning zone.

Table 36—Overall Building Fire Risk

Building Fire	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Total Risk Score	7.5	5.625	5.625	7.5	6.75	10.5	10.5	6.875	5.063
Risk Rating	*Moderate*	*Low*	*Low*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Low*

A.1.11 Vegetation/Wildland Fire Risk

Factors influencing vegetation/wildland fire risk include vegetative fuel features, weather, topography, fire history, service capacity, water supply, and vegetation/wildland fire service demand.

Vegetative Fuels

Vegetative fuel factors influencing fire intensity and spread include fuel type (vegetation species), height, arrangement, density, and moisture. Vegetative fuels within the three jurisdictions consist of a mix of annual grasses and weeds, brush, and deciduous and conifer tree species. Once ignited, vegetation/wildland fires can burn intensely and contribute to rapid fire spread under the right fuel, weather, and topographic conditions.

Weather

Weather elements, including temperature, relative humidity, wind, and lightning, also affect vegetation/wildland fire potential and behavior. High temperatures and low relative humidity dry out vegetative fuels, creating a situation where fuels will ignite more readily and burn more intensely. Wind is the most significant weather factor influencing vegetation/wildland fire behavior, and the predominant diurnal winds in the Santa Clara Valley tend to cause elevated speed and spread on the valley floor and wind exposed foothills during the summer afternoons when sea breezes are strongest. With summer temperatures averaging in the 80s and reaching into the 100s, and annual rainfall averaging approximately 15 inches, weather factors are conducive to vegetation/wildland fires from about May through October.

Topography

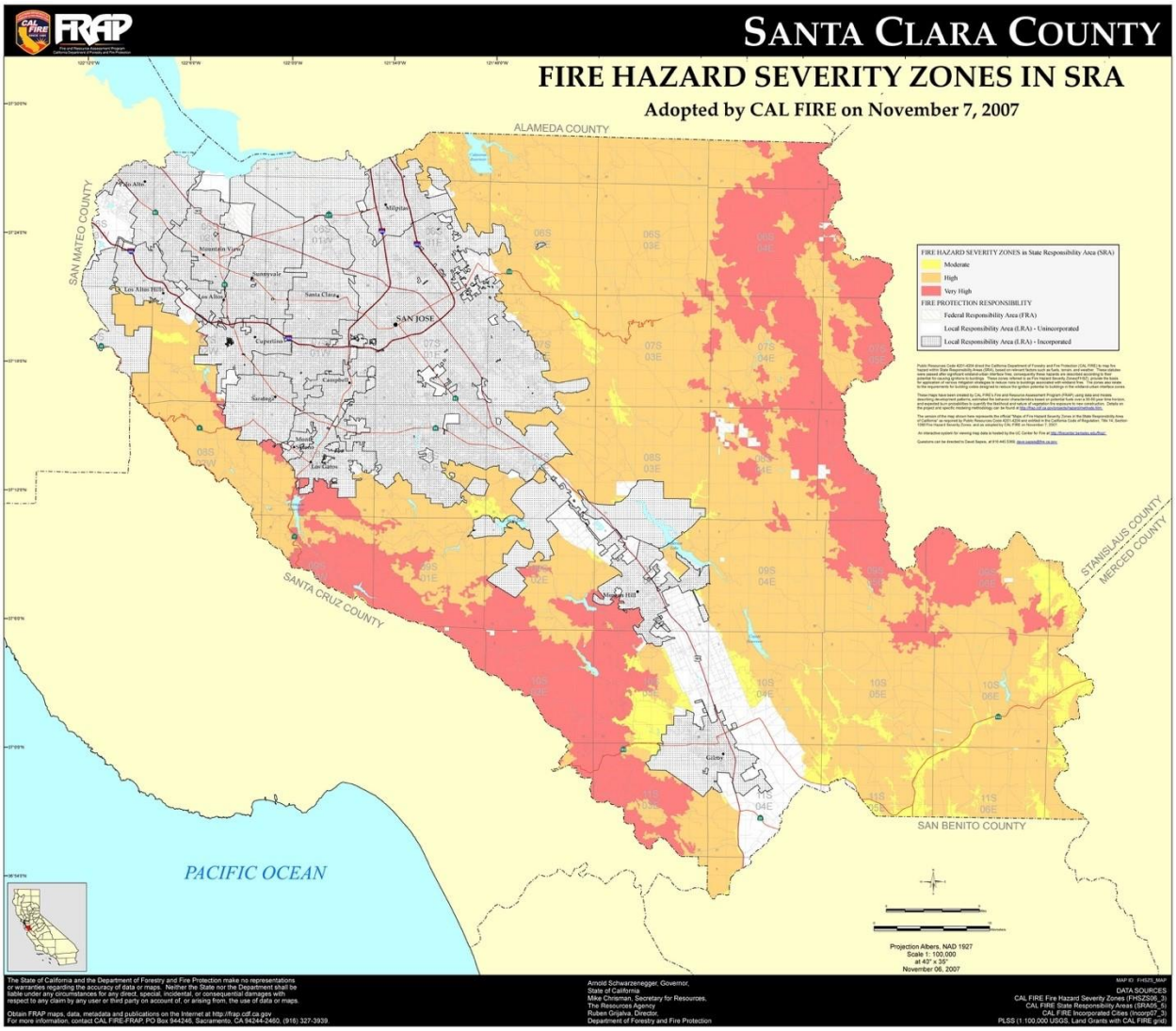
The study area's topography can significantly influence vegetation/wildland fire behavior and spread in those areas beyond the flat Santa Clara Valley floor, as fires tend to burn more intensely

and spread faster when burning uphill and up-canyon, except for a wind-driven downhill or down-canyon fire.

Wildland Fire Hazard Severity Zones

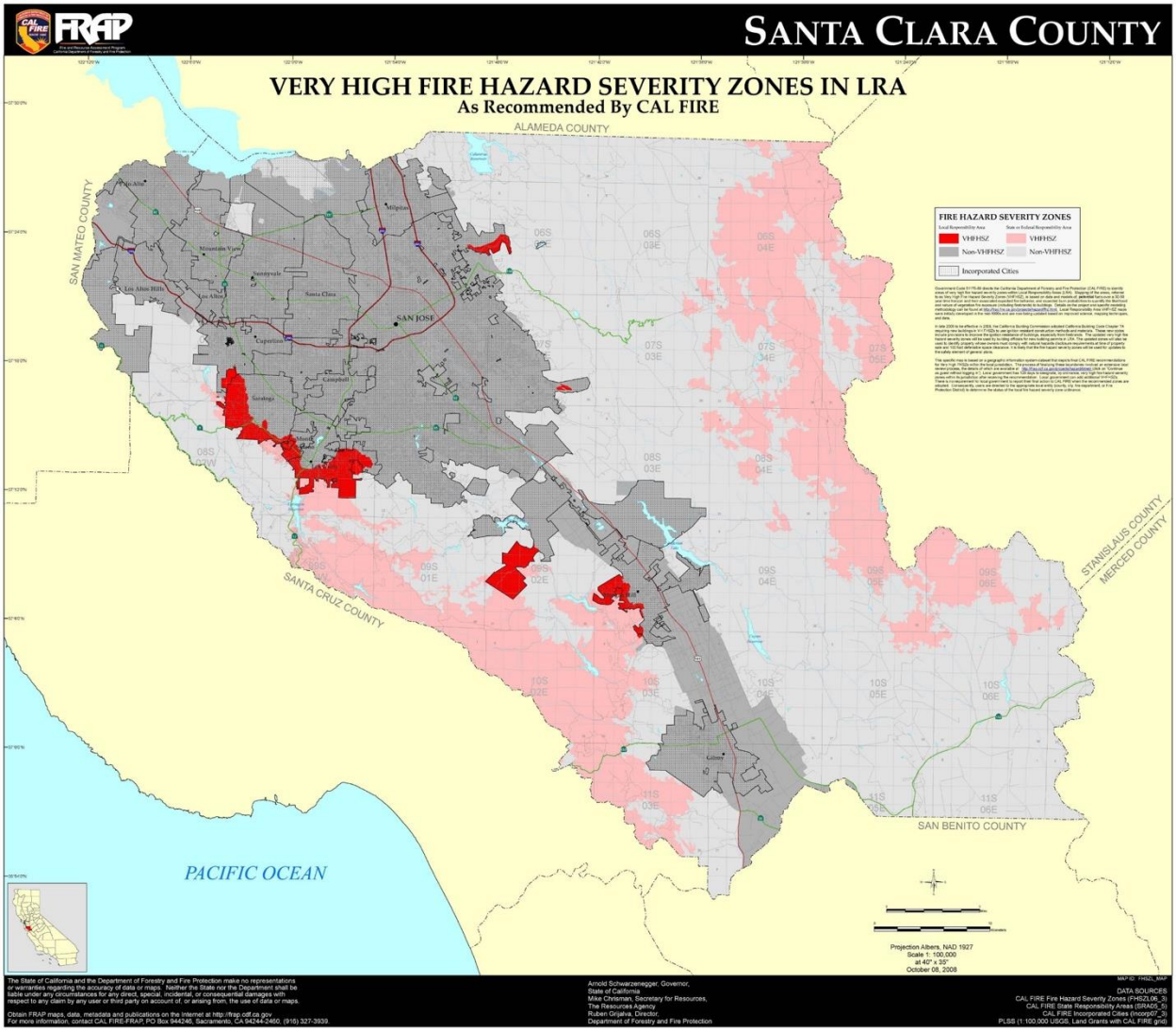
The California Department of Forestry and Fire Protection (CAL FIRE) designates wildland Fire Hazard Severity Zones (FHSZ) throughout the State based on analysis of multiple wildland fire hazard factors and modeling of potential wildland fire behavior. For State Responsibility Areas (SRAs) where CAL FIRE has fiscal responsibility for wildland fire protection, CAL FIRE designates **Moderate**, **High**, and **Very High** FHSZs by county, as shown in Figure 20 for Santa Clara County. Note particularly the *Moderate*, *High*, and *Very High* FHSZs in the vicinity of the three study jurisdictions west of U.S. Route 101, and the *Moderate* and *High* FHSZs east of U.S. 101.

Figure 20—SRA Fire Hazard Severity Zones – Santa Clara County



CAL FIRE also identifies recommended Very High FHSZs for Local Responsibility Areas (LRAs), where a local jurisdiction bears the fiscal responsibility for wildland fire protection, including incorporated cities, as shown in Figure 21. Note particularly the *Very High* FHSZ on the west side of Morgan Hill.

Figure 21—LRA Fire Hazard Severity Zones – Santa Clara County

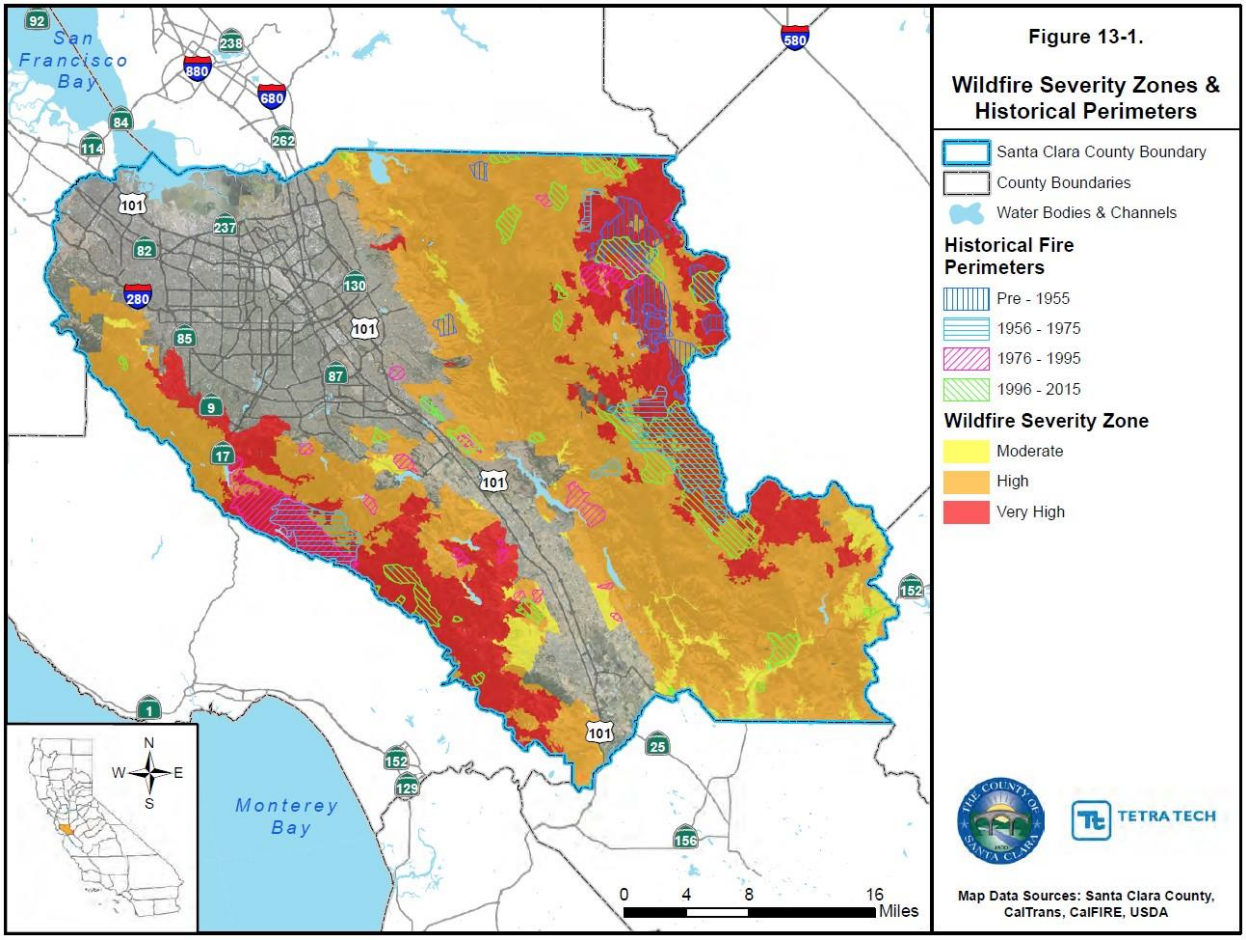


Wildland Fire History

Santa Clara County has a history of significant wildland fires as illustrated in Figure 22.[16]

[16] Reference: 2017 Santa Clara County Operational Area Hazard Mitigation Plan

Figure 22—Wildland Fires – Santa Clara County



Water Supply

Another vegetation/wildland fire impact severity factor is water supply immediately available for fire suppression in areas where vegetation fires are likely to occur. According to fire agency staff, adequate fire flow is available throughout the Cities of Gilroy and Morgan Hill but is inadequate throughout most of the Fire District.

Vegetation/Wildland Fire Service Demand

Table 37, Table 38, and Table 39 summarize vegetation/wildland fire service demand by jurisdiction for the three-year study period.

Table 37—Vegetation/Wildland Fire Service Demand – Gilroy

Risk	Year	Planning Zone				Total
		Chestnut	Glen Loma	Las Animas	Sunrise	
Vegetation/Wildland Fire	2016	25	7	12	5	49
	2017	17	8	6	9	40
	2018	29	3	15	9	56
	Total	71	18	33	23	145
Percent of Total Service Demand		1.21%	2.75%	0.47%	1.64%	0.97%

Source: Gilroy FD incident data

Table 38—Vegetation/Wildland Fire Service Demand – Morgan Hill

Risk	Year	Planning Zone		Total
		Morgan Hill 1	Morgan Hill 2	
Vegetation/Wildland Fire	2016	10	4	14
	2017	14	7	21
	2018	4	6	10
	Total	28	17	45
Percent of Total Service Demand		0.51%	0.86%	0.60%

Source: Morgan Hill FD incident data

Table 39—Vegetation/Wildland Fire Service Demand – Fire District

Risk	Year	Planning Zone			Total
		SSCCFD Morgan Hill	SSCCFD Masten	SSCCFD Gilroy Gardens	
Vegetation/Wildland Fire	2016	15	23	4	42
	2017	22	15	3	40
	2018	12	22	2	36
	Total	49	60	9	118
Percent of Total Service Demand		0.90%	2.55%	1.24%	1.38%

Source: South Santa Clara County Fire District incident data

As these tables illustrate, vegetation/wildland fire service demand varies by jurisdiction and has been relatively consistent in each jurisdiction over the three-year study period, ranging from 0.6 percent of total service demand in Morgan Hill to 1.4 percent in the Fire District. Overall, vegetation/wildland fire service demand is low for all three agencies, which is typical of other Citygate client jurisdictions of similar size and demographics.

Probability of Vegetation/Wildland Fire Occurrence

Table 40 summarizes Citygate's scoring of vegetation/wildland fire probability by planning zone based on recent historic vegetation/wildland service demand from Table 37, Table 38, and Table 39.

Table 40—Vegetation/Wildland Fire Probability Scoring

Vegetation / Wildland Fire	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Probability	**3.0**	**3.25**	**2.25**	**2.5**	**2.25**	**3.25**	**2.75**	**2.5**	**2.25**

Vegetation/Wildland Fire Impact Severity

Table 41 summarizes Citygate's scoring of probable vegetation/wildland impact severity by planning zone.

Table 41—Vegetation/Wildland Fire Impact Severity Scoring

Vegetation / Wildland Fire	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Impact Severity	**3.25**	**3.0**	**3.25**	**3.0**	**2.25**	**1.0**	**1.0**	**2.5**	**3.0**

Overall Vegetation/Wildland Fire Risk

Table 42 summarizes overall vegetation/wildland fire risk by planning zone.

Table 42—Overall Vegetation/Wildland Fire Risk

Vegetation / Wildland Fire	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Total Risk Score	9.75	9.75	7.3125	7.5	5.063	3.25	2.75	6.25	6.75
Risk Rating	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Low*	*Low*	*Low*	*Moderate*	*Moderate*

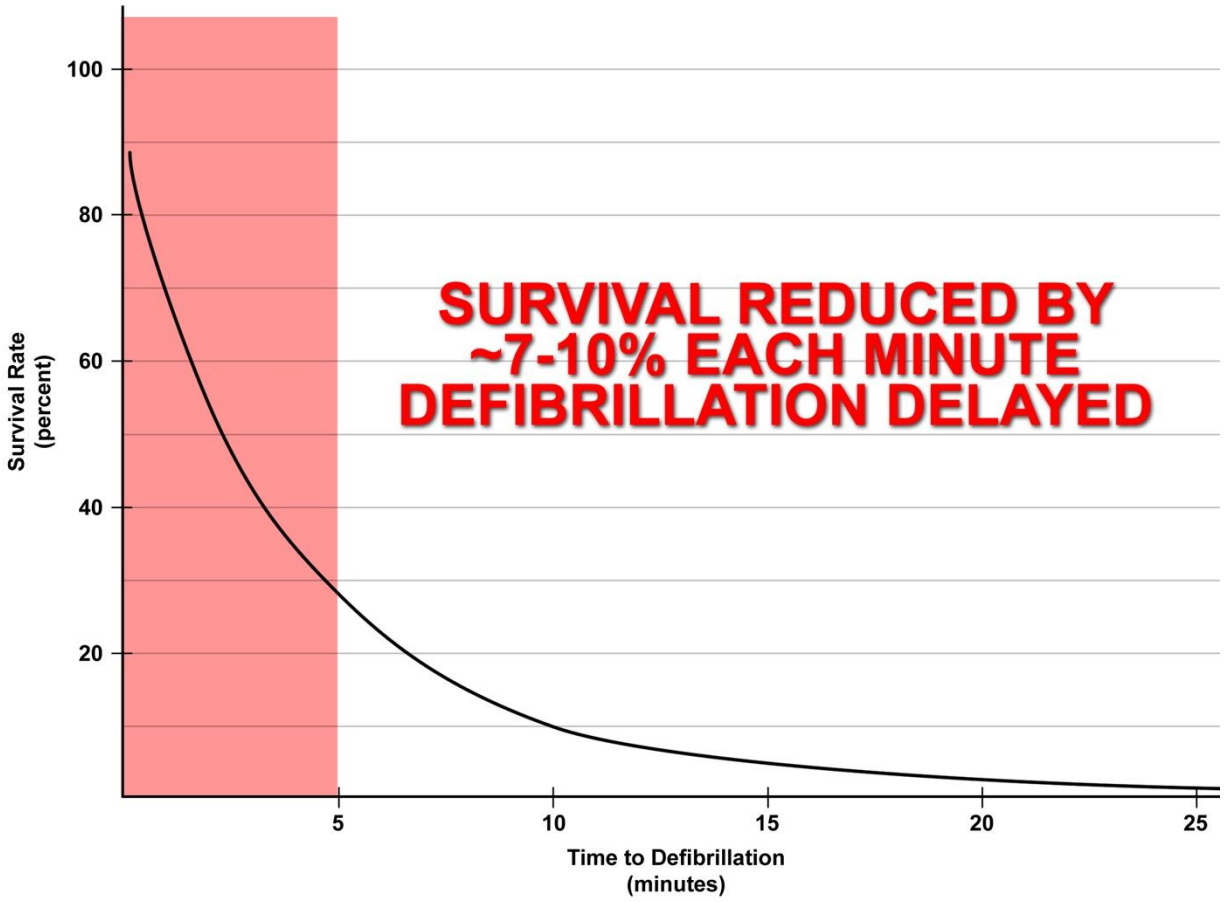
A.1.12 Medical Emergency Risk

Medical emergency risk in most communities is predominantly a function of population density, demographics, violence, health insurance coverage, and vehicle traffic.

Medical emergency risk can also be categorized either as a medical emergency resulting from a health-related condition or event or as a traumatic injury. One serious medical emergency is cardiac arrest or some other event where there is an interruption or blockage of oxygen to the brain.

Figure 23 illustrates the reduced survivability of a cardiac arrest victim as time to defibrillation increases. While early defibrillation is one factor in cardiac arrest survivability, other factors can influence survivability as well, such as early CPR and pre-hospital advanced life support interventions.

Figure 23—Survival Rate versus Time of Defibrillation



Source: www.suddencardiacarrest.com

Population Density

Because medical emergencies involve people, it seems logical that higher population densities generate higher medical emergency service demand than lower population densities. In Citygate's experience, this is particularly true for urban population densities. As illustrated in Figure 19, population density in the study area ranges from less than 1,000 per square mile to more than 15,000 per square mile.

Demographics

Medical emergency risk tends to be higher among older, poorer, less-educated, and uninsured populations. According to the U.S. Census Bureau, 10 to 13 percent of the population in the two Cities is 65 and older; 7 to 12 percent is at or below poverty level; 10 to 30 percent over 24 years

of age has less than a high school diploma or equivalent; and 5 to 8 percent do not have health insurance coverage.[17]

Vehicle Traffic

Medical emergency risk tends to be higher in those areas of a community with high daily vehicle traffic volume, particularly those areas with high traffic volume traveling at high speeds. The transportation network in the study area includes State Routes 25 and 152 and U.S. Route 101, which carry an aggregate annual average daily traffic volume of 164,000 vehicles, with more than 14,000 at peak hour traffic.[18]

Medical Emergency Service Demand

Table 43, Table 44, and Table 45 summarize medical emergency service demand by jurisdiction for the three-year study period.

Table 43—Medical Emergency Service Demand – Gilroy

Risk	Year	Planning Zone				Total
		Chestnut	Glen Loma	Las Animas	Sunrise	
Medical Emergency	2016	1,289	140	1,640	223	3,292
	2017	1,352	136	1,717	269	3,474
	2018	1,298	161	1,819	275	3,553
	Total	3,939	437	5,176	767	10,319
Percent of Total Service Demand		67.10%	66.82%	73.05%	54.75%	68.74%

Source: Gilroy FD incident data

[17] Source: U.S. Census Bureau (2016)

[18] Source: California Department of Transportation (2017 data)

Table 44—Medical Emergency Service Demand – Morgan Hill

Risk	Year	Planning Zone		Total
		Morgan Hill 1	Morgan Hill 2	
Medical Emergency	2016	1,242	451	1,693
	2017	1,352	423	1,775
	2018	1,318	464	1,782
	Total	3,912	1,338	5,250
Percent of Total Service Demand		70.61%	67.92%	69.91%

Source: Morgan Hill FD incident data

Table 45—Medical Emergency Service Demand – Fire District

Risk	Year	Planning Zone			Total
		SSCCFD Morgan Hill	SSCCFD Masten	SSCCFD Gilroy Gardens	
Medical Emergency	2016	1,211	439	125	1,775
	2017	1,297	471	102	1,870
	2018	1,272	521	125	1,918
	Total	3,780	1,431	352	5,563
Percent of Total Service Demand		69.40%	60.87%	48.69%	65.29%

Source: South Santa Clara County Fire District incident data

As these tables show, medical emergency service demand varies significantly by planning zone, increasing annually an average of approximately 2.5 to 4 percent. Overall, medical emergencies represent the largest percentage of all calls for service, which is typical of other jurisdictions of similar size and demographics.

Probability of Medical Emergency Occurrence

Table 46 summarizes Citygate's scoring of medical emergency probability by planning zone based on recent medical emergency service demand history from Table 43,Table 44, and Table 45.

Table 46—Medical Emergency Probability Scoring

Medical Emergency	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Probability	5.0	4.5	4.0	5.0	4.5	5.0	5.0	4.25	4.0

Medical Emergency Impact Severity

Table 47 summarizes Citygate's scoring of probable medical emergency impact severity by planning zone.

Table 47—Medical Emergency Impact Severity Scoring

Medical Emergency	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Impact Severity	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

Overall Medical Emergency Risk

Table 48 summarizes overall medical emergency risk scores and ratings by planning zone.

Table 48—Overall Medical Emergency Risk

Medical Emergency	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Total Risk Score	15.0	13.5	12.0	15.0	13.5	15.0	15.0	12.75	12.0
Risk Rating	*High*	*High*	*High*	*High*	*High*	*High*	*High*	*High*	*High*

A.1.13Hazardous Material Risk

Hazardous material risk factors include fixed facilities that store, use, or produce hazardous chemicals or waste; underground pipelines conveying hazardous materials; aviation, railroad,

maritime, and vehicle transportation of hazardous materials into or through a jurisdiction; vulnerable populations; emergency evacuation planning and related training; and specialized hazardous material service capacity.

The Santa Clara County Department of Environmental Health, serving as the State-designated Certified Unified Program Agency for the County, identified 682 facilities within the study area requiring a State or County hazardous material operating permit or Hazardous Materials Business Plan, as summarized in Table 49.

Table 49—Fixed Hazardous Materials Facilities

Risk	Jurisdiction			Total
	Gilroy	Morgan Hill	Fire District	
Fixed Hazardous Materials Facilities	104	484	94	682

Source: Santa Clara County Department of Environmental Health

High-pressure natural gas transmission pipelines are also located along the eastern edge of Santa Clara Valley extending west into the major population centers, including the Cities of Gilroy, Morgan Hill, and San Martin.

Transportation-related hazardous material risk includes vehicles and/or trains transporting hazardous materials into, from, or through a jurisdiction. Southern Santa Clara County highways carry more than 11,500 trucks daily, many transporting hazardous materials, as summarized in Table 50.

Table 50—Average Annual Truck Traffic Volume

Highway	Crossing	AADT[1]
Hwy. 25	Junction Hwy. 101	1,549
U.S. 101	Junction Hwy. 152	7,360
Hwy. 152	Junction Hwy. 101	2,699
Total		**11,608**

Source: California Department of Transportation (2017 data)

In addition, Union Pacific railroad tracks run north/south through the three jurisdictions, with more than 12 train movements daily,[19] many transporting hazardous materials.

Population Density

Because hazardous material emergencies have the potential to adversely impact human health, it is logical that the higher the population density, the greater the potential population exposed to a hazardous material release or spill. As illustrated in Figure 19, population density ranges from less than 1,000 per square mile to more than 15,000 per square mile in the study area.

Vulnerable Populations

Persons vulnerable to a hazardous material release/spill include those individuals or groups unable to self-evacuate, generally including children under the age of 10, the elderly, and persons confined to an institution or other setting where they are either physically unable to or otherwise prevented from self-evacuating. Nearly 25 percent of the population is under age 10 or is 65 years of age and older in the City of Gilroy; in the City of Morgan Hill, these age groups constitute just over 27 percent.

Emergency Evacuation Planning, Training, Implementation, and Effectiveness

Another significant hazardous material impact severity factor is a jurisdiction's shelter-in-place / emergency evacuation planning and training. In the event of a hazardous material release or spill, time can be a critical factor in notifying potentially affected persons, particularly at-risk populations, to either shelter-in-place or evacuate to a safe location. Essential to this process is an effective emergency plan that incorporates one or more mass emergency notification capabilities, as well as pre-established evacuation procedures. It is also essential to conduct regular, periodic exercises involving these two emergency plan elements to evaluate readiness and to identify and remediate any planning and/or training gaps to ensure ongoing emergency incident readiness and effectiveness.

Although neither City has a formal written emergency evacuation plan, both are members of the Santa Clara County Alert System (AlertSCC) administered and operated by the Santa Clara County Office of Emergency Services. AlertSCC is a free, subscription-based, mass emergency notification system that can provide emergency alerts, notifications, and other emergency information to email accounts, cell phones, smartphones, tablets, and landline telephones. Within either City, AlertSCC notifications can be initiated by designated Fire or Police Department personnel.

[19] Reference: U.S. Department of Transportation, Federal Railroad Administration (2016 data)

Hazardous Material Service Demand

Table 51, Table 52, and Table 53 summarize hazardous material service demand by jurisdiction over the three-year study period.

Table 51—Hazardous Material Service Demand – Gilroy

Risk	Year	Planning Zone				Total
		Chestnut	Glen Loma	Las Animas	Sunrise	
Hazardous Materials	2016	11	2	17	4	34
	2017	9	2	25	6	42
	2018	5	2	14	4	25
	Total	25	6	56	14	101
Percent of Total Service Demand		0.43%	0.92%	0.79%	1.00%	0.67%

Source: Gilroy FD incident data

Table 52—Hazardous Materials Service Demand – Morgan Hill

Risk	Year	Planning Zone		Total
		Morgan Hill 1	Morgan Hill 2	
Hazardous Materials	2016	11	1	12
	2017	13	5	18
	2018	7	8	15
	Total	31	14	45
Percent of Total Service Demand		0.56%	0.71%	0.60%

Source: Morgan Hill FD incident data

Table 53—Hazardous Materials Service Demand – Fire District

Risk	Year	Planning Zone			Total
		SSCCFD Morgan Hill	SSCCFD Masten	SSCCFD Gilroy Gardens	
Hazardous Materials	2016	10	1	1	12
	2017	19	4	1	24
	2018	15	6	0	21
	Total	44	11	2	57
Percent of Total Service Demand		0.81%	0.47%	0.28%	0.67%

Source: South Santa Clara County Fire District incident data

As these tables illustrate, hazardous material service demand varies by planning zone and has been consistent in each jurisdiction over the three-year study period. Overall, hazardous material service demand is very low in all three jurisdictions.

Probability of Hazardous Material Occurrence

Table 54 summarizes Citygate's scoring of hazardous materials probability by planning zone based on recent hazardous material service demand from Table 51, Table 52, and Table 53.

Table 54—Hazardous Material Probability Scoring

Hazardous Materials	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Probability	3.0	2.25	1.25	2.75	2.25	2.5	3.0	2.25	2.0

Hazardous Material Impact Severity

Table 55 summarizes Citygate's scoring of probable hazardous material impact severity by planning zone.

Table 55—Hazardous Material Impact Severity Scoring

Hazardous Materials	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Impact Severity	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

Overall Hazardous Material Risk

Table 56 summarizes overall hazardous material risk scores and ratings by planning zone.

Table 56—Overall Hazardous Material Risk

Hazardous Materials	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Total Risk Score	9.0	6.75	3.75	8.25	6.75	7.5	9.0	6.75	6.0
Risk Rating	*Moderate*	*Moderate*	*Low*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*	*Moderate*

A.1.14Technical Rescue Risk

Technical rescue risk factors include active construction projects; structural collapse potential; confined spaces, such as tanks and underground vaults; bodies of water and rivers or streams; industrial machinery; transportation volume; and earthquake, flood, and landslide potential.

Construction Activity

There is ongoing residential, commercial, industrial, and/or infrastructure construction activity occurring within the three jurisdictions.

Confined Spaces

There are multiple confined spaces within the study area, including tanks, vaults, open trenches, etc.

Waterways and Bodies of Water

There are multiple waterways and bodies of water within the study area, including Anderson and Coyote Lakes, Chesbro and Uvas Reservoirs, and numerous creeks and smaller bodies of water.

Transportation Volume

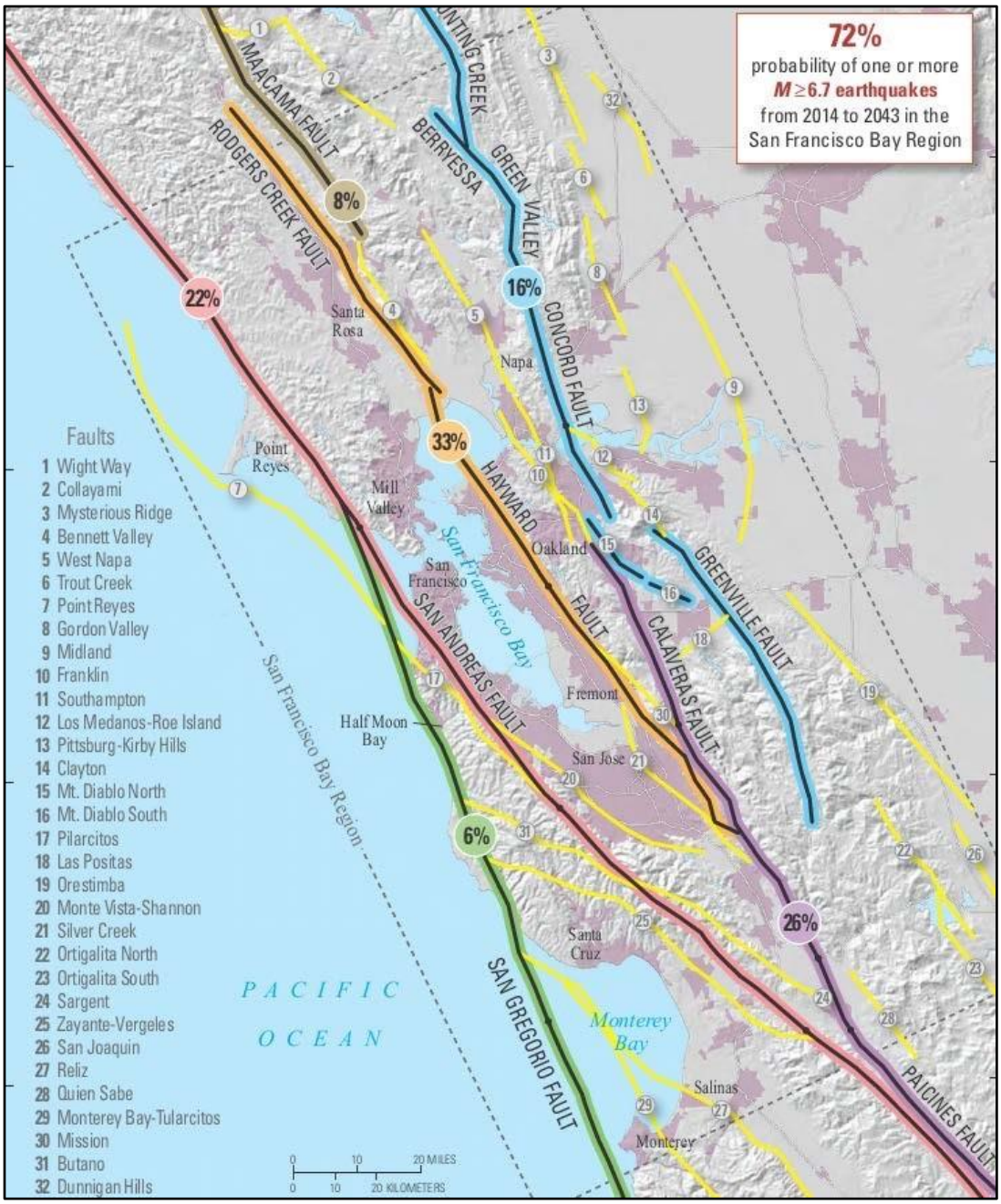
Another factor is transportation-related incidents requiring technical rescue. This risk factor is primarily a function of vehicle, railway, maritime, and aviation traffic. Vehicle traffic volume is the greatest of these factors within the study area, with U.S. 101 and State Routes 25 and 152 carrying an aggregate average of 164,000 vehicles daily. Railway traffic includes more than 12 train movements daily. General aviation traffic, into and from the San Martin Airport, is an additional risk factor.

Earthquake Risk[20]

Three major seismic faults within the region have the potential to impact the study area, including the Calaveras, Hayward, and San Andreas Faults. Significant historical seismic activity includes 14 earthquakes with a magnitude of 5.0 or greater within 100 miles of Santa Clara County since 1985. According to the U.S.G.S., there is a 72 percent probability of a magnitude 6.7 or greater earthquake in the San Francisco Bay Area region within the next 25 years. Figure 24 shows the location of the various Bay Area seismic faults.

[20] Reference: 2017 Santa Clara County Operational Area Hazard Mitigation Plan, Section 8

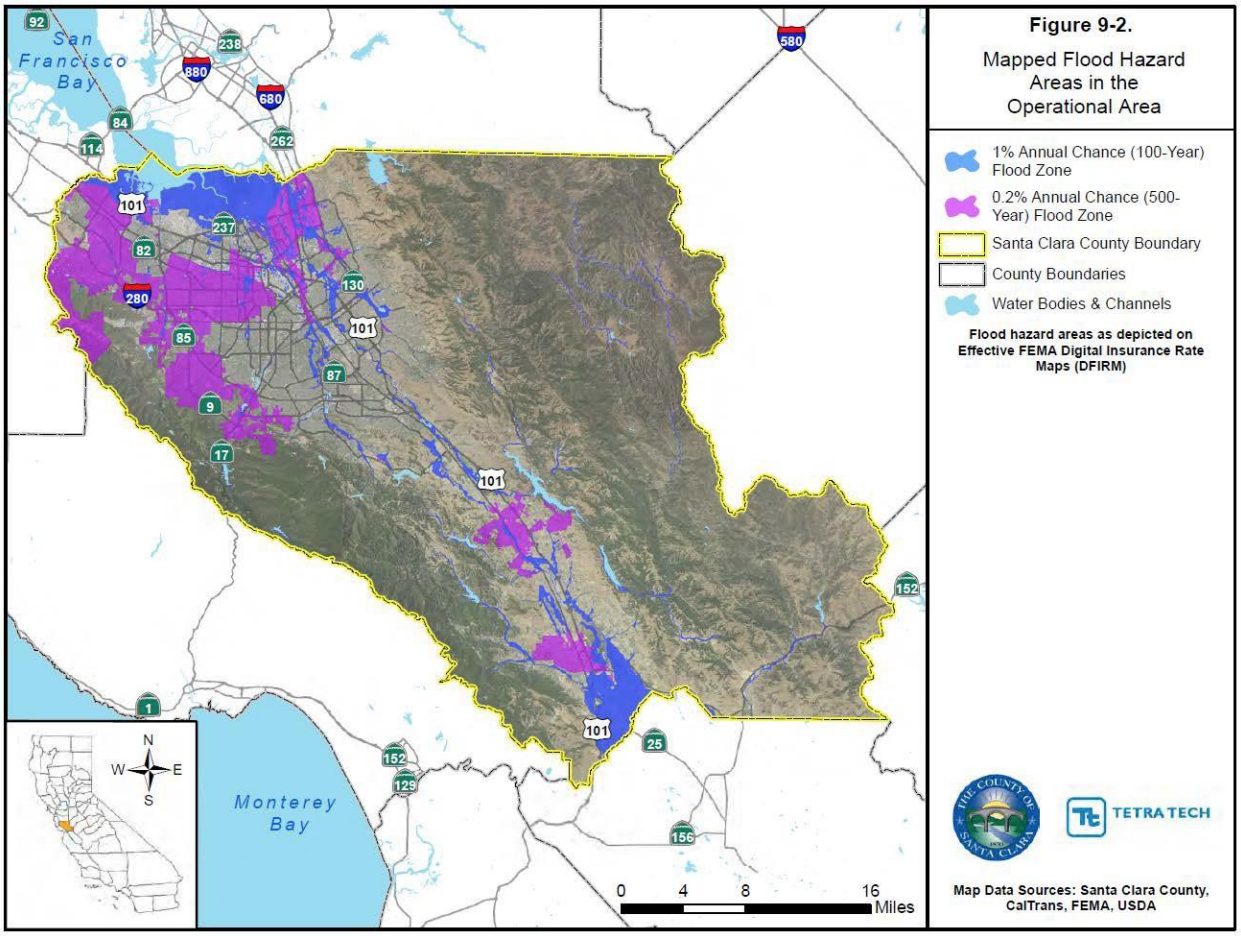
Figure 24—Earthquake Faults



Flood Risk[21]

Figure 25 shows the flood hazard areas for Santa Clara County as identified by the Federal Emergency Management Agency.

Figure 25—Flood Hazard Areas – Santa Clara County



Technical Rescue Service Demand

Table 57, Table 58, and Table 59 summarize technical rescue service demand by jurisdiction over the three-year study period.

[21] Reference: 2017 Santa Clara County Operational Area Hazard Mitigation Plan, Section 9

Table 57—Technical Rescue Service Demand – Gilroy

Risk	Year	Planning Zone				Total
		Chestnut	Glen Loma	Las Animas	Sunrise	
Technical Rescue	2016	2	0	0	0	2
	2017	3	0	0	0	3
	2018	1	1	0	0	2
	Total	6	1	0	0	7
Percent of Total Service Demand		0.10%	0.15%	0.00%	0.00%	0.05%

Source: Gilroy FD incident data

Table 58—Technical Rescue Service Demand – Morgan Hill

Risk	Year	Planning Zone		Total
		Morgan Hill 1	Morgan Hill 2	
Technical Rescue	2016	2	1	3
	2017	3	1	4
	2018	1	0	1
	Total	6	2	8
Percent of Total Service Demand		0.11%	0.10%	0.11%

Source: Morgan Hill FD incident data

Table 59—Technical Rescue Service Demand – Fire District

Risk	Year	Planning Zone			Total
		SSCCFD Morgan Hill	SSCCFD Masten	SSCCFD Gilroy Gardens	
Technical Rescue	2016	1	2	0	3
	2017	3	2	0	5
	2018	1	1	2	4
	Total	5	5	2	12
Percent of Total Service Demand		0.09%	0.21%	0.28%	0.14%

Source: South Santa Clara County Fire District incident data

As these tables show, technical rescue service demand is very low and relatively consistent across all three jurisdictions over the three-year study period.

Probability of Technical Rescue Occurrence

Table 60 summarizes Citygate's technical rescue probability scoring by planning zone based on recent technical rescue service demand history from Table 57, Table 58, and Table 59.

Table 60—Technical Rescue Probability Scoring

Technical Rescue	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Probability	1.5	1.5	1.25	1.5	1.25	1.5	1.25	1.25	1.25

Technical Rescue Impact Severity

Table 61 summarizes Citygate's scoring of probable technical rescue impact severity by planning zone.

Table 61—Technical Rescue Impact Severity Scoring

Technical Rescue	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Impact Severity	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

Overall Technical Rescue Risk

Table 62 summarizes overall technical rescue risk scores and ratings by planning zone.

Table 62—Overall Technical Rescue Risk

Technical Rescue	Planning Zone								
	SSCCFD 1 Morgan Hill	SSCCFD 2 Masten	SSCCFD 3 Gilroy Gardens	Morgan Hill 4 El Toro	Morgan Hill 5 Dunne Hill	Gilroy 7 Chestnut	Gilroy 8 Las Animas	Gilroy 9 Sunrise	Gilroy Glen Loma
Total Risk Score	3.75	3.75	3.125	3.75	3.125	3.75	3.125	3.125	3.125
Risk Rating	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*