Vista Fire Department

All-Hazards Community Risk Assessment and Standard of Cover

Prepared by

FireStats

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SECTION 1

Introduction and Methodology

Quantitative risk assessments have been developed in many different industries to determine the likelihood and consequences of various types of events. The fire service as an industry has adopted the routine performance of quantitative risk assessments as part of the quality-improvement process through the leadership and guidance of the Center for Public Safety Excellence (CPSE), an accrediting body for fire departments. Within its accreditation process, the CPSE has established an all-hazards quality-improvement model to ensure that fire and EMS departments continuously seek excellence in service delivery. A cornerstone of this model and self-assessment process is the quantitative risk assessment, which ensures that departments logically, systematically, and consistently classify and assess risk throughout their response jurisdictions.

As part of an initiative to assess risk in its service delivery area, the Vista Fire Department (VFD) has engaged in a process to analyze and evaluate the probability, consequence, and impact of multiple community hazards. This document describes the methods and variables used to quantitatively determine risk, utilizing the CPSE model for an all-hazards risk assessment. Part I: Variable Analysis describes the analysis of variables, based on historical service demands and trends. Part II: Quantitative Risk explains the data behind the calculated risk for structure fires, non-structure fires, wildland fires, EMS emergencies, technical rescue, hazardous materials (HazMat), and natural and human-made hazards and disasters.

Commission on Fire Accreditation International

Introduction

In December 1996, the International Association of Fire Chiefs (IAFC) and the International City/County Management Association (ICMA) jointly established the Commission on Fire Accreditation International (CFAI) under the supervision of the CPSE.

The primary objective of the CFAI is to develop a comprehensive system to assist local governments in evaluating risk management, setting performance goals, and integrating long-term strategic planning with the creation of a Standards of Cover document. This involves a thorough process, including conducting a community expectation assessment, self-assessment, and risk analysis; setting response goals; and developing a performance measurement system that is aligned with the agency's mission, vision, and service delivery expectations.

CPSE defines a fire department’s Standards of Cover as the "adopted written policies and procedures determining the distribution, concentration, and reliability of fixed and mobile response forces for fire, emergency medical services, hazardous materials, and other technical response forces." Despite numerous efforts to establish national or international consensus on firefighter and paramedic response standards, only a few have achieved widespread adoption. Notably, the National Fire Protection Association’s (NFPA’s) standard 1710, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments, is one such standard, aiming to regulate the organization and deployment of fire suppression and emergency medical operations by career fire departments. Although many communities theoretically embrace the staffing and response mandates outlined in NFPA 1710, achieving full compliance remains challenging for most.

The City of Vista began the process of earning international accreditation in 2007 by initiating the self-assessment process. The fire department is steadfast in its commitment to maintaining accredited status, demonstrating its capability to deliver superior service and pledging to submit all required documentation annually to uphold accreditation. The three essential components for consideration of initial accredited status include a strategic plan, a Community Risk Assessment/Standards of Cover (CRA/SOC) document, and a self-assessment.

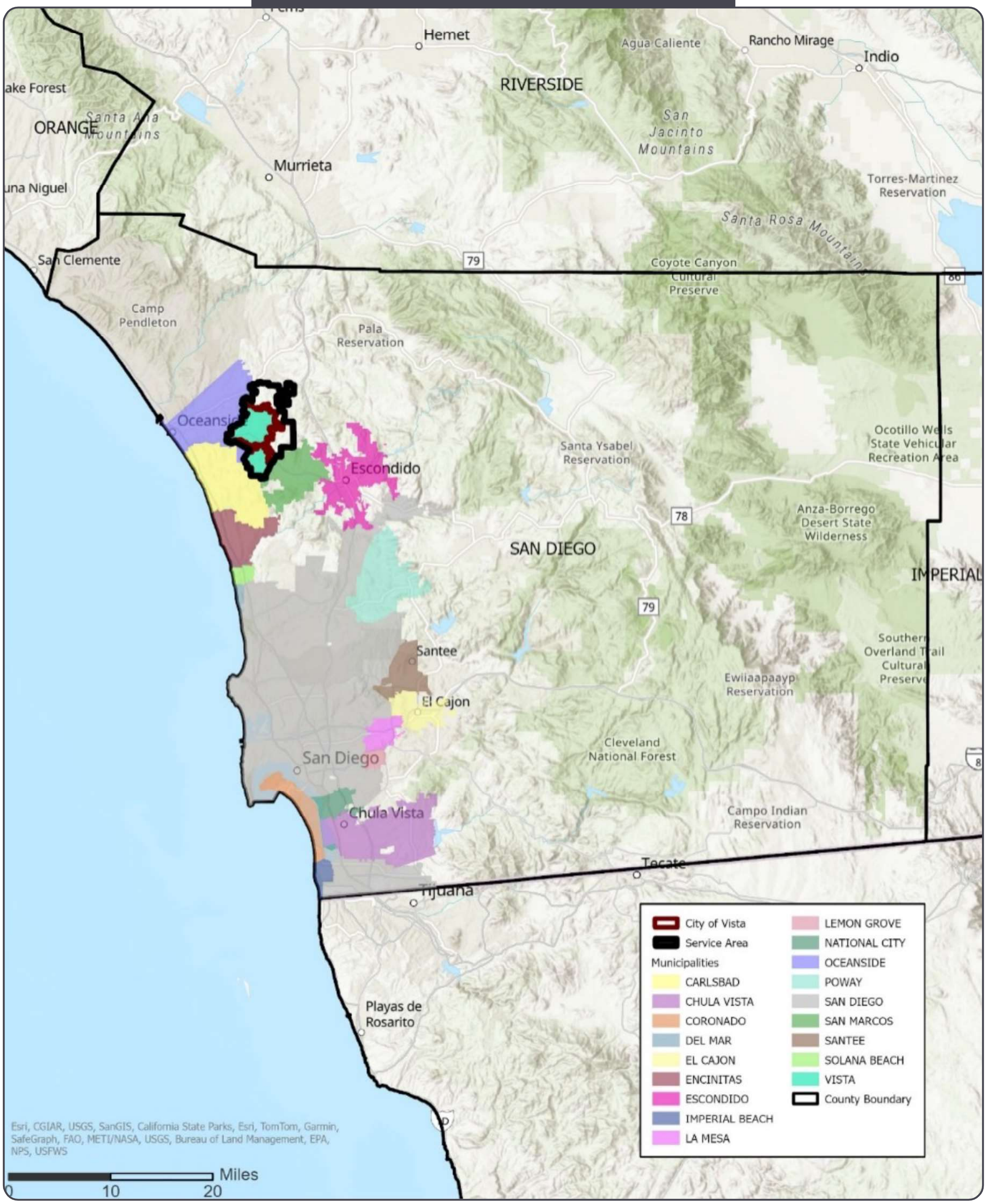
Accreditation milestones for the City of Vista include the initial achievement in 2010 and successful renewals in 2015 and 2021, showcasing the department's ongoing dedication to meeting and exceeding rigorous standards in fire and emergency response.

Community Boundaries and Topography

Located 7 miles inland from the Pacific Ocean in northern San Diego County, the City of Vista enjoys a mild Mediterranean climate and picturesque topography characterized by gently rolling hills and valleys, with elevations ranging from 400 to 1,200 feet above sea level. Initially flourishing as an agricultural community, Vista was once adorned with citrus and avocado groves that still influence its present-day road layout, which can pose unique challenges to travelers.

The City of Vista, in conjunction with the Vista Fire Protection District (VFPD), is bordered to the north and east by an expansive wildland-urban interface area (**Figure 1**). This terrain features undulating slopes and valleys abundant with the coastal shrubbery, scrub oak, and chaparral growth typical of Southern California. These interface zones constitute a significant portion of the high-hazard brush areas surrounding the city and district, adding complexity to the region's environmental dynamics and necessitating meticulous fire protection and management planning.

Figure 1. City of Vista in San Diego County



City Financial Overview

The VFD plays a crucial role within the City of Vista, and its financial policies and budget adoption fall under the purview of the Vista City Council. The city adheres to an annual budget cycle that runs from July 1 to June 30 each year.

The city's general fund derives its revenue from various sources, with property taxes accounting for approximately 30%, sales tax contributing approximately 22% (excluding Proposition L sales tax), and other service-related charges making up about 17%. Other taxes constitute approximately 12% of the revenue mix. The 2006 Proposition L sales tax (0.5%) is specifically allocated to service bond indebtedness for projects initiated under the city's 2006 Proposition L. This funding has supported critical developments, including the construction of two new fire stations, renovation of the headquarters fire station, expansion of fire safety personnel, establishment of a new civic center and emergency operations center/community room, and construction of a stage house for the Moonlight Amphitheatre and a new sports complex. Proposition L, a 30-year tax, will remain in effect until 2037.

The city recently adopted two one-year budgets that cover the period from July 1, 2023, to June 30, 2025. To ensure transparency and accountability, quarterly financial updates will be provided to the public and city council, with a mid-cycle review scheduled approximately 12 months after the initial adoption of the two-year budget. The total appropriation for all general fund city departments for fiscal year (FY) 2024, including debt and operating transfers to other funds, totals $115,283,305.

Over the past three years, the City of Vista has demonstrated consistent growth in the taxable value of its properties, against which property taxes are assessed. The city participates in the San Diego County "Teeter Plan," receiving the full tax assessment from the county while forgoing penalties and interest on late payments, which the county collects. For the fiscal year ending June 30, 2022, the City of Vista boasted an assessed valuation of approximately $14.7 billion, forming the basis for property tax revenue estimates. **Table 1** shows property valuations and tax collections from FY 2021 to budgeted FY 2025.

Table 1. City of Vista Property Valuations and Tax Collections, FY 2021–Budgeted FY 2025

Description	Actual 2020–2021	Actual 2021–2022	Revised Adopted Budget 2022–2023	Adopted Budget 2023–2024	Adopted Budget 2024–2025
Gross value	$12,912,011,373	$13,493,563,155	$14,857,042,188	$16,022,372,987	$16,538,209,672
Net taxable value	$12,827,844,063	$13,410,757,937	$14,774,064,158	$15,940,420,822	$16,456,257,507
Property tax collected	$12,247,835	$13,912,254	$14,892,378	$15,826,271	$16,367,989

The city's general fund revenues consist of the above property tax assessments, sales tax collections, and other significant sources, as outlined in **Table 2**. Property tax collections from **Table 1** are included in the taxes.

Table 2. City of Vista General Fund Revenue, Actual FY 2021–Budgeted FY 2025

Description	Actual 2020–2021	Actual 2021–2022	Revised Adopted Budget 2022–2023	Adopted Budget 2023–2024	Adopted Budget 2024–2025
Recurring Revenue					
Taxes	$69,681,712	$78,106,966	$77,390,158	$81,624,288	$83,657,647
Licenses and permits	$2,089,954	$2,318,667	$2,579,685	$2,726,870	$2,771,654
Charges for services	$13,954,513	$17,454,059	$15,874,020	$18,076,224	$18,651,898
Fines and forfeitures	$1,376,450	$1,364,270	$1,364,510	$1,393,210	$1,393,210
Use of money and property	$3,387,144	($3,069,871)	$1,917,223	$2,687,899	$3,109,182
Intergovernmental charges	$3,942,537	$2,395,565	$1,443,317	$1,873,655	$927,628
Other revenue	$960,849	$717,937	$671,155	$585,396	$618,196
Interdepartmental service charges	$3,553,917	$3,803,709	$4,203,709	$4,432,987	$4,432,746
Total Recurring Revenue	**$98,947,076**	**$103,091,302**	**$105,443,777**	**$113,400,529**	**$115,562,161**
Nonrecurring Revenue					
Operational transfer in	$498,117	$526,795	$509,909	$363,268	$362,559
Reserve use – operations			$3,078,936	$2,829,241	$1,081,019
Nonrecurring Revenue	**$498,117**	**$526,795**	**$3,588,845**	**$3,192,509**	**$1,443,578**
Revenue					
TOTAL REVENUE	**$99,445,193**	**$103,618,097**	**$109,032,622**	**$116,593,038**	**$117,005,739**

As shown in **Table 2**, the city anticipates a growth in recurring revenues, projecting an increase from the actual amounts recorded in fiscal year 2022 throughout the upcoming two-year budget cycle. In the FY 2023 – FY 2025 budget, nonrecurring revenue encompasses the use of reserves for operations. According to the budget document, these reserves represent funds set aside in previous FYs for specific future purchases.

Table 3 shows that, in FY 2023, the city expedited the acquisition of capital outlay for public safety, allocating an additional $6 million beyond the original budget. There was an increase in general government expenditures due to the receipt of grant funds, with corresponding budget allocations for expenditures associated with those grants. The FY 2024 budget accommodates the hiring of 12 new emergency medical technicians (EMTs).

Importantly, the recurring revenue consistently surpasses recurring expenditures for all years this report covers. This financial position empowers the city to augment its general fund reserve and establish a safeguard against potential economic downturns and unforeseen emergencies in the future.

Table 3. City of Vista General Fund Expenditures, Actual FY 2021–Adopted Budgeted FY 2025

Description	Actual 2020–2021	Actual 2021–2022	Revised Adopted Budget 2022–2023	Adopted Budget 2023–2024	Adopted Budget 2024–2025
Recurring Revenue					
General government	$9,185,749	$11,313,514	$15,688,684	$10,623,905	$11,056,736
Public safety	$50,906,598	$53,002,066	$64,404,163	$63,538,360	$64,618,779
Community development	$7,322,074	$6,923,959	$11,319,284	$10,945,857	$10,196,950
Public works	$3,335,944	$3,674,436	$4,614,167	$4,469,144	$4,574,004
Recreation and community services	$3,548,084	$6,958,962	$8,419,023	$8,154,119	$8,315,926
Total Recurring Expenditures	**$74,298,449**	**$81,872,937**	**$104,445,321**	**$97,731,385**	**$98,762,395**
Nonrecurring Revenue					
Transfer out — other funds	$4,092,969	$4,546,685	$5,639,905	$1,543,763	$1,466,533
Transfer out — Proposition L debt service	$6,473,281	$6,647,051	$6,470,750	$7,028,500	$7,227,000
Transfer out — CIP	$1,546,170	$7,658,985	$3,948,639	$600,000	$600,000
Transfer out — 115 Trust		$12,000,000			
Transfer out — reserves			$1,273,133	$2,059,149	$2,099,730
Transfer out - Proposition L reserve			$3,693,975	$2,533,604	$2,533,604
Designated excess cannabis				$3,786,904	$3,839,977
Total nonrecurring expenditures	**$12,112,420**	**$30,852,721**	**$21,026,402**	**$17,551,920**	**$17,766,844**
TOTAL EXPENDITURES	**$86,410,869**	**$112,725,658**	**$125,471,723**	**$115,283,305**	**$116,829,239**

As outlined in **Table 4,** Proposition L is projected to generate significant revenues to cover a portion of fire operating expenses and debt service for projects pledged to the voters. Proposition L revenue and expenditures are reported in the general fund, but a schedule is maintained to ensure the funds are used according to the city residents' votes.

Table 4. Proposition L — Budgeted Revenues and Expenditures, FY 2023–FY 2025

Description	Adopted Budget 2022–2023	Adopted Budget 2023–2024	Adopted Budget 2024–2025
Proposition L sales tax revenue	$12,115,389	$12,020,425	$12,271,998
Fire suppression	($1,205,021)	($1,205,021)	($1,205,021)
Net debt service	($6,470,750)	($7,028,500)	($7,227,000)
Fiscal year net	$4,439,618	$3,786,904	$3,839,977
Proposition L beginning reserve	$15,810,593	$20,250,211	$24,037,115
PROPOSITION L ENDING RESERVE	**$20,250,211**	**$24,037,115**	**$27,877,092**

Since FY 1987-1988, the city has been awarded the Certificate of Achievement for Excellence in Financial Reporting from the Government Finance Officers Association (GFOA) for its Comprehensive Annual Financial Reports. The city has received this prestigious award for each of the following 32 consecutive years.

Baseline Organizational Assessment

The following section represents a baseline assessment of various organizational elements of the City of Vista Fire Department.

Overview of the Vista Fire Department

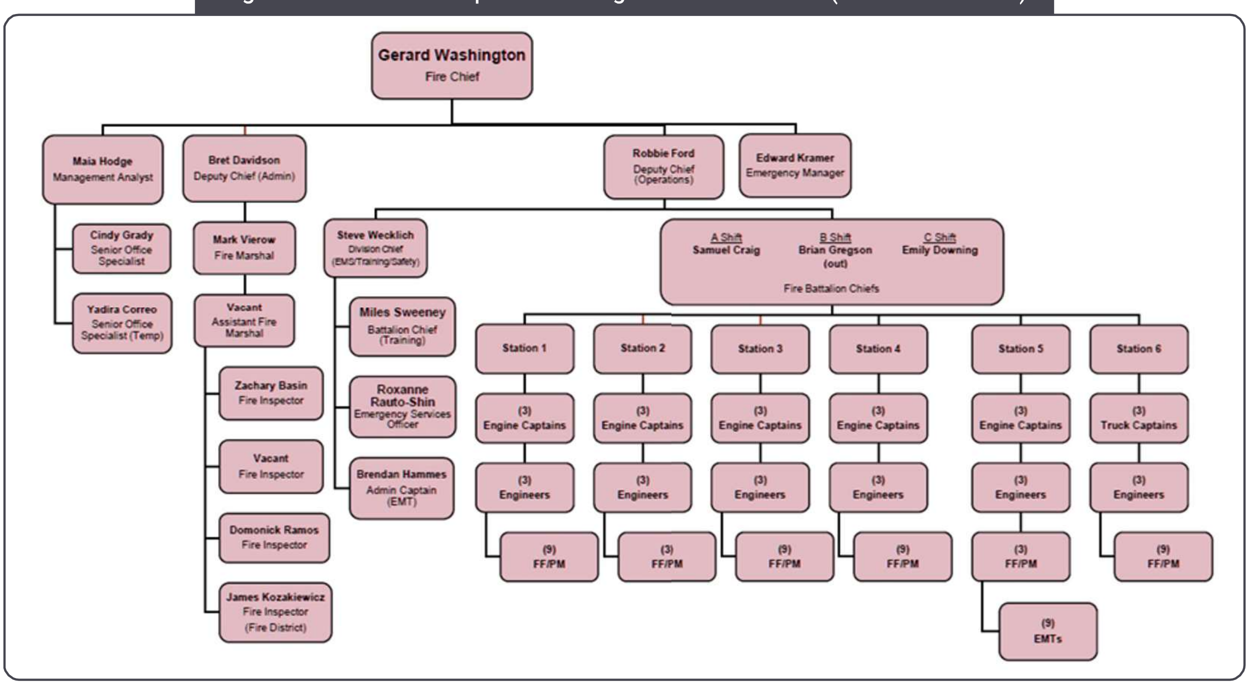
The VFD has a storied history dating back to its inception in 1927 as a volunteer organization. Since then, it has transformed into an all-hazards department, marking a significant milestone in 1945 with the hiring of its first career firefighters. Today, the VFD comprises a dedicated team of 93 professionals, both sworn and non-sworn personnel, who deliver essential services across an area spanning approximately 36.5 square miles. This coverage extends over the City of Vista and the VFPD, with services to the latter facilitated through a contractual agreement.

In 2020, the VFD achieved a notable Public Protection Classification (PPC) score of 2 from the Insurance Services Office (ISO), highlighting its steadfast commitment to ensuring public safety. Serving a residential population exceeding 124,000, the department plays a crucial role in safeguarding the community.

Governance and Authority

The City of Vista functions within an organizational framework based on a council-manager form of government in which the fire chief is accountable to the city manager. The department's current organizational structure is illustrated in **Figure 2**, demonstrating a clear hierarchy, with the fire chief overseeing two deputy chiefs, an emergency manager, and a management analyst. This structure underscores the VFD's commitment to effective management and coordinated response strategies aimed at safeguarding the residents of Vista.

Figure 2. Vista Fire Department Organizational Chart (December 2023)



The VFD has developed a comprehensive 2025 vision statement:

Vision Statement

The Vista Fire Department will continue to be known as an internationally accredited, mission-focused organization that strives for excellence. We will always commit to personifying our values as we serve our community.

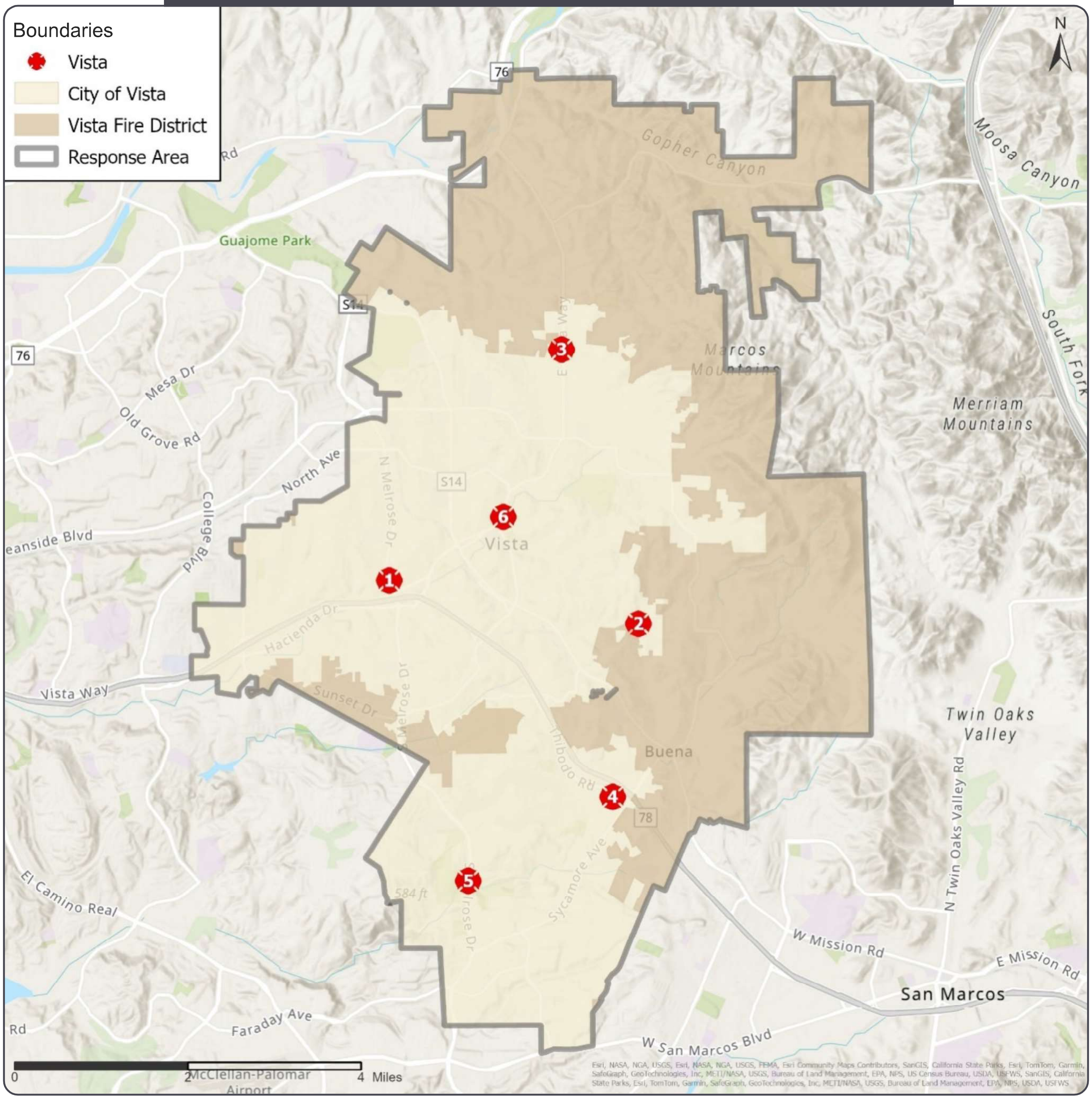
Our future will ensure we focus on the wellness of our members to provide a healthy workforce that is effective while being innovatively recruited, trained, and developed to answer any challenge. We will strive for greater effectiveness as a department by managing our physical resources and service delivery to provide a quality return for the people of Vista. We will realize true efficacies as we enhance our prevention delivery and build new communication methods. All the while, we will remain good stewards of what we are entrusted with.

Services Provided by VFD

The VFD operates from six fully staffed fire stations strategically positioned to ensure comprehensive coverage across its jurisdiction. As an all-hazards fire department, the VFD provides a range of services, including traditional fire protection, swift response to wildland fires, and advanced life support (ALS) medical first response. The department is well-equipped to handle various emergency scenarios, such as low-angle rope rescue at the operational level (LARO), confined space rescue, and HazMat response at the operational level.

In addition to its emergency response capabilities, the VFD is committed to proactive measures, including fire inspections, rigorous code enforcement, thorough plan reviews, and meticulous fire, arson investigations and emergency operations planning. Demonstrating a holistic approach to community safety, the department also takes a proactive stance through robust public education, prevention, and risk reduction programs. This comprehensive suite of services reflects the VFD's dedication to responding effectively to emergencies and fostering a safe environment through preventive measures and community engagement. **Figure 3** illustrates the service area of the VFD and the VFPD.

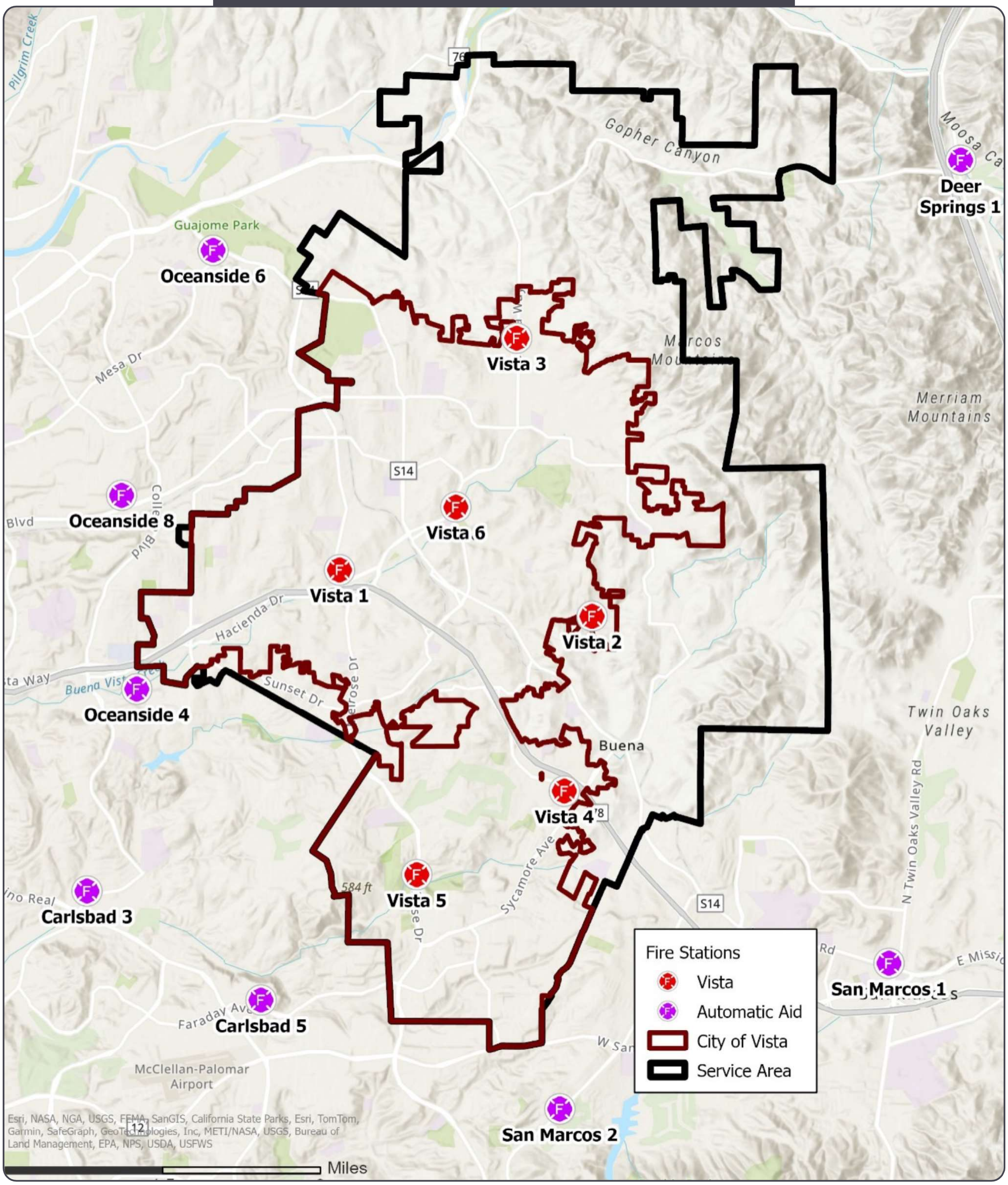
Figure 3. Vista Fire Department and Vista Fire Protection District Boundaries



Mutual- and Automatic-Aid Providers

At least five other fire departments are available for mutual- and automatic-aid responses throughout Northern San Diego County. **Figure 4** shows the locations of automatic and mutual-aid provider agencies for the VFD.

Figure 4. Vista Fire Department and Automatic Aid Agencies



Staffing and Personnel

An organization's most valuable asset is its workforce, and managing human resources represents a significant financial investment. Therefore, effective personnel management is crucial for achieving optimal productivity and maintaining high levels of employee satisfaction. This effort involves implementing consistent management practices, fostering a safe working environment, ensuring fair treatment, providing opportunities for employee input, and recognizing and rewarding achievements.

The size and structure of an organization's staff depend on its specific needs, which should align with both the community's requirements and the available revenue. A staffing structure effective for one entity might not be suitable for another. Several national organizations provide staffing guidance and recommendations, including the Occupational Safety and Health Administration (OSHA), the NFPA, and the CPSE. This section offers an overview of the VFD's staffing configuration and management practices.

The department's staff can be categorized into two distinct groups. The first group, the administrative section, works behind the scenes to support the operational personnel and ensure effective emergency response. The second group, commonly recognized by citizens, is the operations unit, which comprises emergency response personnel.

Administrative and Support Staffing

The administration of the fire department plays a pivotal role in maintaining fiscal responsibility and ensuring alignment with established policies that support strategic goals and objectives, as well as compliance with citywide regulations and municipal codes. A high-functioning administration and support services system serves as the backbone of the department's overall efficiency.

The specific responsibilities of the administration and support staff encompass a spectrum of activities, including planning, organizing, directing, coordinating, and evaluating all programs within the department. It is important to note that this list is not exhaustive, and additional functions can be necessary to reflect the dynamic nature of the department's needs. The intricate nature of these functions is characterized by their nonlinear and often overlapping nature.

Similar to other components of a municipal fire department, administration and support services require adequate resources for effective operation. A detailed analysis of the positions is instrumental in establishing a shared understanding of the allocated resources and allowing for a meaningful comparison with industry best practices and similar organizations. Striking a balance between administration, support, operational resources, and service levels is paramount to ensuring the department's ability to successfully fulfill its mission. **Table 5** illustrates the administrative and support staffing structure for VFD.

Position	Number of Staff Members
Fire chief	1
Deputy chief	2
Fire marshal	1
Assistant fire marshal	1
Fire inspector	4
Division chief	1
Battalion chief training	1
Captain — administration	1
Emergency manager	1
Emergency services officer	1
Management analyst	1
Senior office specialist	3
TOTAL ADMINISTRATIVE STAFF	**18**

Table 5. Vista Fire Department Administrative and Support Staff

Disaster Preparedness Program

The City of Vista's Emergency Management Program, overseen by the VFD, is highly integrated, featuring a dedicated, full-time emergency manager who reports to both the fire chief and city manager. The program prioritizes annual training plans and drills, ensuring that Emergency Operations Center (EOC) staff are well-prepared and compliant with National Incident Management System (NIMS) standards and certification requirements.

In disaster response and recovery, specific roles are assigned, supported by proactive measures, such as shelter worker/manager training and cost recovery workshops. The active involvement of each EOC department fosters a comprehensive approach to addressing all hazards.

The Emergency Management Program also actively engages in regional and city planning, maintaining current protocols such as the Regional Hazard Mitigation Plan, Emergency Operations Plan, Damage Assessment Plans, Recovery Plans, and Notification Plans. Collaboration is emphasized in the San Diego region, and there is a monthly North Zone Emergency Managers meeting to enhance EOC coordination.

The program's activation levels align with the California Governor's Office of Emergency Services (Cal OES), underscoring a commitment to responsive emergency management practices.

Fire Prevention Program

Typical fire prevention functions include conducting building plan reviews, carrying out inspections, managing weed abatement, engaging in community outreach, and implementing vegetation management. A robust risk management program, supported by proactive fire and life safety services, is the ideal approach for a fire department to reduce losses and mitigate the human toll associated with fires and other community hazards.

> ***The National Fire Protection Association recommends a multifaceted, coordinated risk reduction process at the community level to address local risks. This requires engaging all community segments, identifying the highest priority risks, and then developing and implementing strategies designed to mitigate the risks.[1]***

A fire department must recognize and emphasize the importance of fire prevention and public education, understanding its crucial role in the community planning process across various zoning areas, including residential, commercial, and industrial properties. The essential components of an effective fire prevention program are outlined in **Table 6**, along with the necessary elements required to address each component.

Table 6. Essential Components and Necessary Elements of Effective Fire Prevention Programs

Program Components	Necessary Elements
Fire code enforcement inspections and investigations	• Proposed construction and plans review • New construction inspections • Existing structure/occupancy inspections • Internal protection systems design review • Storage and handling of HazMat
Public fire and life safety education	• Public education • Specialized education • Juvenile fire setter intervention • Prevention information dissemination
Fire cause investigations	• Fire cause and origin determination • Fire death investigation • Arson investigation and prosecution

[1] *NFPA Standard 1730: Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations, 2019 Edition.*

Fire and Life Safety Code Enforcement, Inspections, and Investigations

The most effective strategy for fire management is prevention. A comprehensive fire prevention program, tailored to address locally identified risks and in accordance with applicable codes and ordinances, can significantly decrease property loss, save lives, and mitigate the potentially severe economic impact of fire on a community. **Table 7** provides insights into the new construction and fire protection system plan review programs, as well as supplementary programs that are typically incorporated into comprehensive fire prevention initiatives.

Table 7. New Construction Inspections and Involvement

Program Elements	Vista Fire Department
Fire department consulted on proposed new construction?	Yes
Fire department consulted on proposed occupancy changes/tenant improvements?	Yes
Perform fire and life-safety plan reviews?	Yes
Charges for inspections or reviews?	Yes
Special risk inspections?	Yes
Storage tank inspections?	Yes
Is a key-box entry program in place?	Yes
Hydrant flow records maintained?	Yes, every 2 years

The VFD Fire Prevention Bureau is overseen by a battalion chief/fire marshal and supported by an assistant fire marshal and four fire prevention inspectors. Their duties include inspecting businesses, schools, and apartments in the city and VFPD to identify life safety hazards, hazardous materials, and potential harm to occupants or the environment. Additionally, fire prevention personnel conduct annual assessments of parcels in the city and VFPD for overgrown vegetation, notifying residents and parcel owners to clear their parcels within a specified time frame to avoid enforcement actions. Although this process is time-consuming, extending over several months from initial notices to completion, the program has proven beneficial and decreased the number of vegetation fires in the area.

In addition to conducting fire and life safety inspections, all team members rotate duty investigator responsibilities. These investigators are responsible for determining the origin and cause of incidents within both the city and the VFPD.

Fire and Life Safety Public Education Program

The goal of providing fire and life safety education to the public is to reduce the number of emergency events and train the community to respond effectively during crises. Public education is a crucial component of a comprehensive fire and life safety program. These initiatives offer the best opportunity for minimizing the impact of fire, injury, and illness on the community.

Public education and outreach are implemented through diverse methods in each fire department. **Table 8** summarizes the programs typically provided by fire departments in the area.

Table 8. Fire and Life Safety Public Education Programs and Services

Programs and Services	Description	Vista Fire Department
Public information officer/public educator	This individual often works with the community to identify and eliminate fire and life safety risks.	Yes
9-1-1 Education Program	This program works to reduce the number of unnecessary 9-1-1 calls and educates the public on available services.	Yes
Exit Drills in the Home (EDITH) Program	This program is typically offered to elementary school-aged children during annual school visits.	Yes
Smoke alarm installation	Often, residents are encouraged to notify their fire departments when they need assistance replacing alarms and alarm batteries.	Yes
Carbon monoxide alarm installation	Some departments assist residents in carbon monoxide alarm installation.	No
Bike Helmet Program	This program provides information on bicycle helmet use to school-aged children.	Yes
Home Safety Program and inspections	This program aims to reduce fire and safety hazards in households by conducting inspections.	Yes
CPR/first aid courses	These courses offer training in CPR and first aid to citizen groups, city employees, and individuals.	Yes
Blood pressure checks	Blood pressure checks can often be offered at fire stations for any resident on a walk-in basis.	Yes
Fire extinguisher classes	Hands-on training is provided to business employees and citizens on properly selecting and using fire extinguishers.	Yes
K-12 fire prevention curriculum delivery in schools	Fire prevention classes are designed for school-aged children to reduce burns and fires in the home and are offered in schools.	Yes
Wildfire defensible space education	Education is offered to neighborhood associations and individuals on proper wildfire mitigation efforts around residential and commercial structures.	Yes
Water Safety Program	This program includes pool safety, swimming classes, and information on how to safely rescue an individual in the water.	Yes
Safety fairs	Fairs attract large groups of individuals with the intention of offering numerous public safety classes at one location.	Yes

Community Risk Reduction Program

In recent years, fire departments in the United States have recognized the need to expand their focus beyond traditional fire prevention measures by adopting community risk reduction (CRR) programs. Some departments have even rebranded their "Fire Prevention" divisions as "Community Risk Reduction Divisions." Regardless of the name, it is imperative for fire departments to accurately identify potential community risks before designing prevention programs. This shift of focus does not reduce the emphasis on addressing fire-related issues; rather, it provides an opportunity to identify and mitigate additional community risks through targeted prevention activities.

The first step in developing an effective CRR plan involves conducting a comprehensive community risk assessment to identify risks that are unique to the specific community. A crucial aspect of this assessment involves collecting and analyzing incident data. Furthermore, the firsthand experiences of firefighters, officers, and inspectors contribute valuable anecdotal information regar-ding the risks present within their respective response areas.

CRR planning is a cyclical process, that involves six steps, as shown in **Figure 5.**

Figure 5. Six Steps of Community Risk Reduction (CRR) Planning

Operational Staffing

The operational staff serves as the primary interface between the public and the fire service organization, given its extensive engagement with the communities served. This group is deeply involved in nearly every aspect of the organization's functions. The responsibilities of the VFD operational staff encompass a broad spectrum, including fire suppression, emergency medical response, technical rescue, fire investigations, public education, pre-incident planning, and participation in a regional HazMat team. Recognizing the critical importance of staffing, several national organizations advocate for standards in this area.

Key recommendations concerning operational staffing stem from governing bodies such as OSHA via CFR 1910.134, Section (g)(4) Respiratory Protection Standard; the NFPA Standard 1710, which outlines standards for the organization and deployment of fire suppression operations, emergency medical operations, and special operations by career fire departments; and the CPSE, which publishes benchmarks for the recommended number of personnel at emergency scenes across various risk levels.

As of the date of this report, the VFD has employed a dedicated team of 96 full-time shift personnel to effectively serve the jurisdiction. To ensure comprehensive emergency response coverage, career firefighters work in 24-hour shifts, ensuring a minimum of 29 personnel on duty at all times. Each shift is led by a battalion chief, who is responsible for incident command and overseeing company officers during multi-company emergencies and complex incidents.

The department strategically assigns staff to five engines, each consisting of a captain, engineer, and firefighter. Additionally, a truck company is equipped with a captain, engineer, and firefighter. The department operates six ambulances to provide emergency medical services, each of which is staffed with two firefighters, firefighters/paramedics, and/or non-safety EMTs. One of the VFD's ambulances is staffed with personnel from North County Fire Protection District, but the department is in the process of transitioning to instead staff it with VFD personnel. **Table 9** outlines VFD operational personnel by rank as of December 2023.

Table 9. Vista Fire Department Operational Response Personnel by Rank (December 2023)

Position	Staff Members
Battalion chief	3
Fire captain	18
Fire engineer	18
Firefighter or firefighter/paramedic	51
Non-safety EMT	6
TOTAL OPERATIONAL PERSONNEL	**96**

The VFD's shift operations are effectively managed through a three-platoon system, in which personnel work 48-hour shift rotations for an average 56-hour workweek. This system ensures continuous coverage, with a minimum staffing goal of 29 personnel responding from six strategically located fire stations over a 24-hour period.

Effectively and efficiently responding to emergency incidents, particularly in fire suppression operations, requires having appropriate units and an adequate number of responders. This principle is not only a best practice, but it is mandated by safety regulations from organizations such as OSHA. For example, OSHA's CFR 1910.120 regulation stipulates that personnel entering a building involved in a fire must operate in pairs. Before entry is permitted, a minimum of two additional firefighters must be on scene and assigned to conduct search and rescue in the event the initial crew becomes trapped (i.e., the "two-in, two-out rule"). This rule serves as a critical safety measure in fire suppression scenarios.

Resources as Currently Deployed

Tables 10 and 11 provide basic information on each of the city's core services, its general resource capability, and staff resources for each service.

Table 10. Vista Fire Department Operational Response Personnel by Rank

Service	General Resource/Asset Capability	Basic Staffing Capability per Shift
Fire suppression	• 5 staffed engines • 1 staffed truck • 4 rescue ambulances • 1 command response unit • Additional automatic- and mutual-aid engines, aerials, and support units are available.	• 29 suppression-trained personnel • Additional automatic- and mutual-aid firefighters are available
Emergency medical services	• 5 engines—ALS equipped • 1 truck—ALS equipped • 4 rescue ambulances—ALS equipped • 2 basic life support (BLS) ambulances	• 12 certified EMTs • 87 certified paramedics
Vehicle extrication	• 1 truck equipped with hydraulic rescue tools, hand tools, airbags, stabilization cribbing, and combination cutter-spreader hydraulic rescue tool • 5 engines with basic extrication equipment, including combination hydraulic spreaders/cutters	• All firefighters are vehicle rescue trained • 29 per shift
Swift-water rescue	• All engines and trucks are equipped with throw bags, personal floatation devices, and helmets	• All personnel are trained to the shore-based level • 29 per shift
Confined space and technical rescue	• 1 truck equipped with cribbing, pneumatic shores, air-monitoring equipment, basket stretchers, and rescue-rated rope	• All personnel are trained in confined space awareness or operations level
HazMat response		• All personnel are trained at the First Responder Operations. All battalion chiefs and captains are trained to the incident commander level.

Table 11. Vista Fire Department Station Staffing

Station	Apparatus	Minimum On-duty Staffing
Station 1 **N. Melrose Drive**	Engine 121	3
	Rescue Ambulance 121	2
	Battalion Chief 121	1
Station 2 **Valley Drive**	Engine 122	3
Station 3 **Old Taylor Street**	Engine 123	3
	Rescue Ambulance 123	2
Station 4 **Thibodo Road**	Engine 124	3
	Rescue Ambulance 124	2
Station 5 **S. Melrose Drive**	Engine 125	3
	BLS Ambulance 125	2
Station 6 **E. Vista Way**	Truck 126	3
	Rescue Ambulance 126	2
TOTAL MINIMUM DAILY STAFFING	**5 Engines, 1 Truck, 1 Battalion Chief, 4 Rescue Ambulances, and 1 BLS Ambulance**	**29**

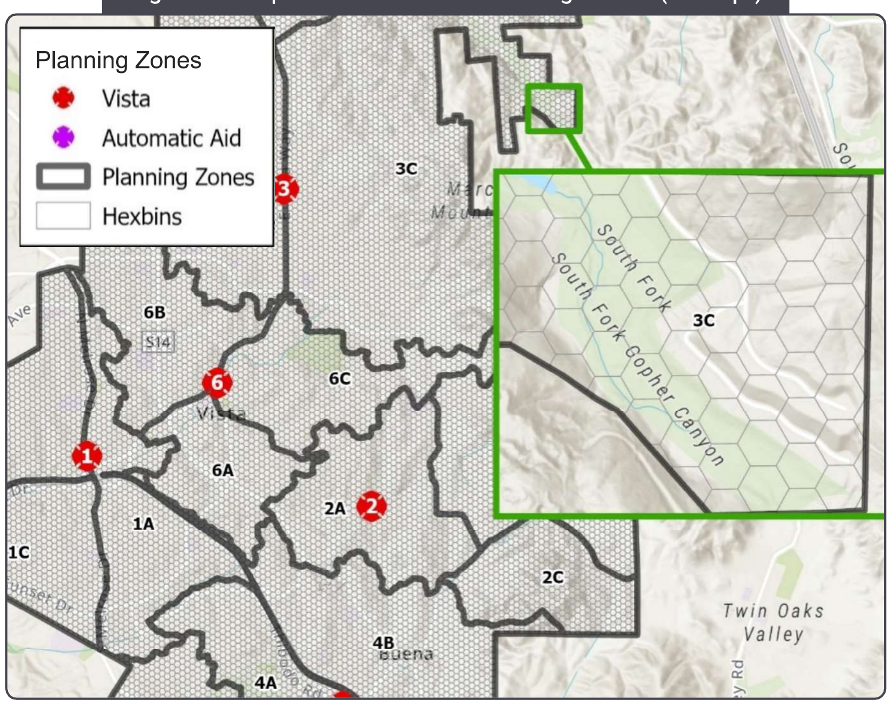
Methodology

The CPSE offers two models for performing risk analyses: a two-axis evaluation of probability and consequence, and a three-axis evaluation of probability, consequence, and impact. The three-axis risk-scoring method was used to quantitatively assign risk to the VFD's hazards. Community characteristics, known as variables, were analyzed tabularly and geographically. Each variable was classified by its contribution to probability, consequence, and/or impact. These variables were then mapped across the jurisdiction and applied into hexagonal grid cells, or hexbins, which were developed to ensure a consistent method of evaluating the variables in relation to the service area's geography. Data were normalized, and variable scores were calculated for each hexbin and then aggregated into planning zones (i.e., larger logical groupings of geography used for the accreditation process) to calculate the final results.

The hexbins were used as a base uniform geographic unit to ensure and maintain a repeatable process, as larger planning zone boundaries can change over time. Hexbins were created based on an analysis of parcel data within the VFD service region. Using the average parcel size of approximately 1.37 acres, a total of 29,760 hexbin cells were established to cover the entire VFD service area. Planning zones were then developed using station response areas in combination with the road network to ensure planning zone boundaries were logically structured for risk categorization and to reduce variability within larger station areas to smaller, more geographically homogenous areas. Approximately 58% of the hexbins (17,229 hexbins) were aggregated into the VFD planning zones and used in the final risk analysis process.

Figure 6 illustrates the hexbins and the larger planning zone boundaries. These grid cells serve as the foundation for classifying the community characteristics/variables geographically.

Figure 6. Map of Hexbins and Planning Zones (Excerpt)



SECTION 2

PART I

Variable Analysis

To clearly define community risk, it is necessary to understand the service area's characteristics. First, these characteristics, or variables, were identified. They were then analyzed for their relationship to probability (of occurrence), consequence (to the community), and/or impact (to the VFD).

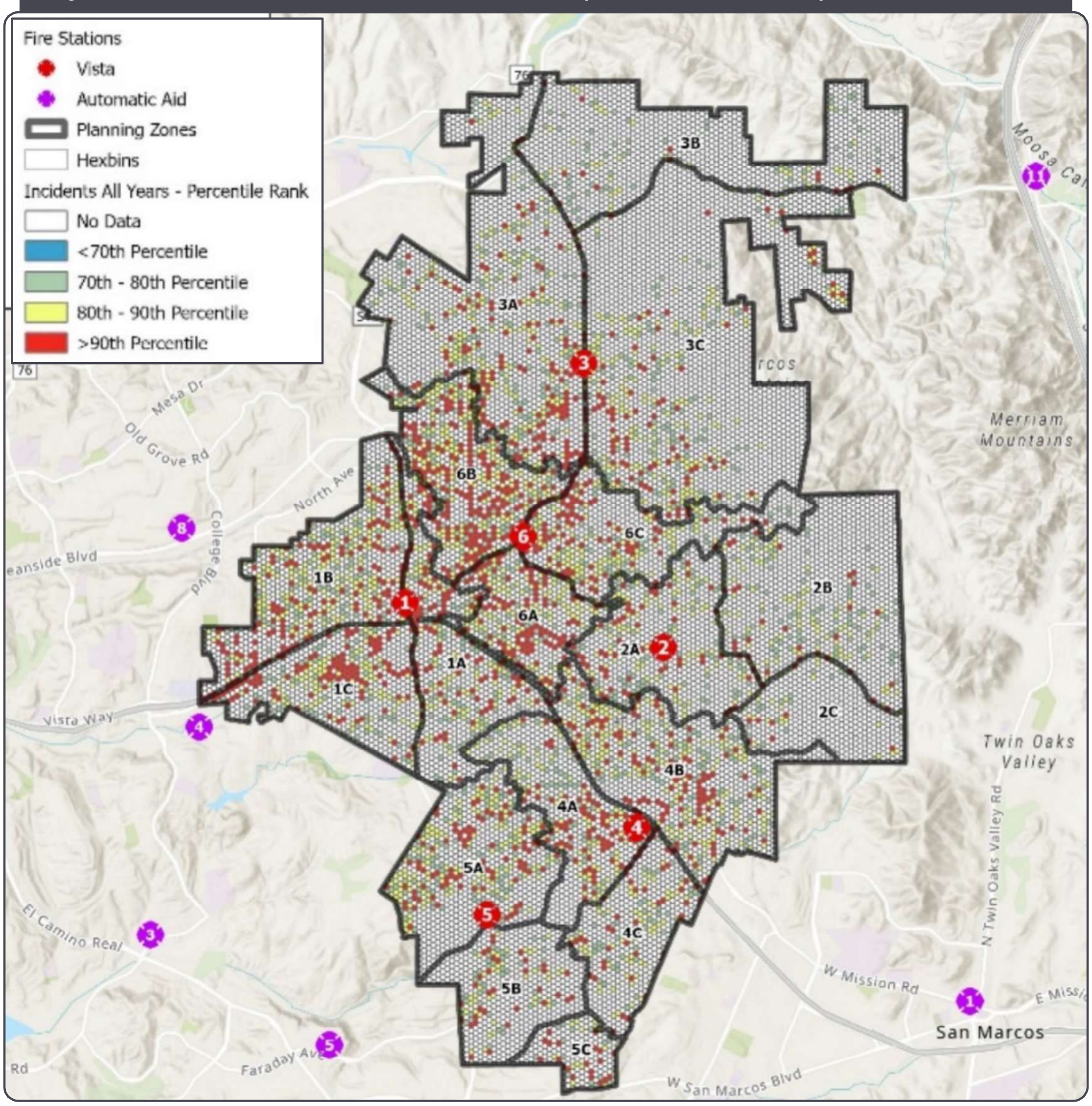
Variable datasets were evaluated for data quality; in some cases, multiple datasets needed to be merged to create a complete dataset. Each variable was distributed across the geographic service area into the hexbins to understand spatial characteristics and relationships. Each variable was also analyzed for its relationship to each risk or hazard type (i.e., structure fires, non-structure fires, EMS, technical rescue, HazMat, and natural and human-made hazards and disasters). A systematic rank-scoring method was used to classify and categorize variables, and weights were derived for specific variables and risks. The jurisdiction was reviewed by the development of 18 planning zones based on risk, historical call data, major infrastructure, and road network.

The following sections of this report describe the evaluation and analysis of each variable, how it was analyzed, and whether it was included in the final risk-scoring process. It is important to note that, of the variables evaluated for inclusion in the quantitative scoring, many were determined to be ineligible for use in the final calculations. Of these, the reason for omission was most often poor data quality; however, some variables were considered ineligible because they would have overvalued community characteristics that were already accounted for in other variables. Regardless of inclusion in the quantitative scoring, a key aspect of the CPSE quality improvement model is reviewing all variables to ensure that all risks are recognized, and the department can perform meaningful risk reduction planning to avoid inefficiencies and deliver the highest quality of service to the community.

Historical Incidents

A review of historical experience is key to predicting many of the hazards in a service area. For this assessment, incident data were analyzed to determine the probability of specific risks/hazards and evaluate trends. Overall incidents were found to be concentrated within 29% percent of the geographic region. Each incident location was summarized into the hexbins, by year, by risk type, and across all years. Percentile rank was calculated, and scores for each of the hexbins were applied. Using the percentile rank, hexbins that scored in the 95th percentile were given a score of 10, and hexbins in the lowest 10th percentile were scored with a 1. Throughout the service area, each hexbin was then scored accordingly to the percentile rank scale. **Figure 7** shows the percent rank scores by hexbin for all incidents responded to by the VFD within the analysis period.

Figure 7. Percent Rank Scores for All Vista Fire Department Incidents, by Hexbin, 2018–2023



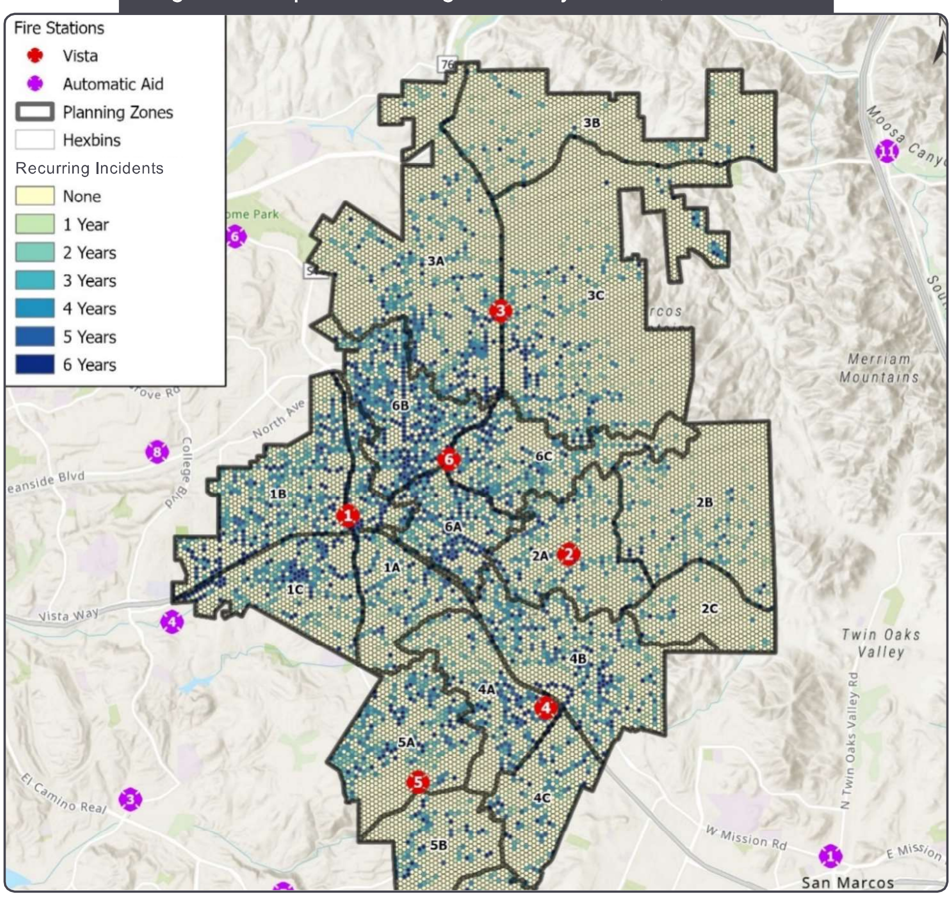
Recurring Events

Historical service demands were also used to identify any geographic "hotspots," or areas with a higher probability of incidents, due to recurring events, as measured by the number of years out of six (2018–2023) in which the events occurred within the same hexbin. Approximately 71% of the hexbins had no incidents during the years analyzed. However, 4.8% of the areas had recurring incidents across six years of incident response data. **Table 12** outlines the recurring events and rank scores by hexbin over the years analyzed. **Figure 8** displays the information geographically; areas with incidents in six consecutive years were scored with a 10, and hexbins with no incidents were scored with a zero.

Table 12. Recurring Events and Rank Scores by Hexbin, 2018–2023

Repeated Years	Percent	Rank Score
0	71.1%	0.0
1	6.8%	1.7
2	5.1%	3.3
3	4.6%	5.0
4	4.1%	6.7
5	3.6%	8.3
6	4.8%	10.0

Figure 8. Map of Recurring Events by Hexbin, 2018–2023



Recurring Fire and EMS Incident Locations

Locations with repeated fires and EMS events were also evaluated. However, less than 1% of fires occurred in a repeated location, so it was not included as a variable within the risk scoring. In regard to EMS events, approximately 12% of the events occurred in the same location in more than one year. After analysis of the locations, it was determined that factors such as land use and population were more likely to contribute to the recurring incident, so no additional score was assigned to locations with either recurring fires or recurring EMS emergencies. The complete maps for these additional analyses are available in the appendix.

NFIRS Incident Types

Service demands were analyzed by risk type using historical incident data. National Fire Incident Reporting System (NFIRS) codes were used as a weighting factor within the scoring process. The most frequently occurring incident was an EMS event; therefore, a score of 10 was applied for rescue and EMS incidents as the most frequently occurring events. All other risk/hazard scores were normalized based on their frequency relative to EMS. **Table 13** shows the scores by each type of NFRIS code.

Table 13. Scores by NFIRS Incident Code

NFIRS Code	Score	Rounded Score
100 Fires	0.24674788	0.25
200 Overpressure Rupture, Explosion, Overheat	0.00619451	0.01
300 Rescue and Emergency Medical Service Incident	10	10
400 Hazardous Condition (No Fire)	0.07192512	0.07
500 Service Call	1.03998899	1.04
600 Good Intent	2.31089545	2.31
700 False Alarm and False Call	0.38509189	0.39
800 Severe Weather and Natural Disaster	0.00137656	0
900 Special Incident Type	0.00412967	0

Using a grouping of NFIRS codes, a subset score was calculated for specific types of risks to represent the percentage of non-structure fires, outside/vegetation fires, and technical rescue incidents, as shown in **Table 14**. These scores were used in conjunction with the overall NFIRS category when assigning weight to the probability calculations for specific hazards, such as technical rescue, non-structure fires, and wildland/vegetation fires.

Table 14. Subset Scores by NFIRS Sub-Incident Type and Code

NFIRS Sub-Incident Type	Codes	Percent of Series
Technical rescue (includes searches for lost persons, extrications, water, ice, and electrical rescues)	340–370	<1%
Structure fire (includes structure fires and fires in mobile properties used as fixed structures)	111–118, 120–123	15.2%
Non-structure fire (includes vehicle fires and outside rubbish fires)	130–139, 150–159	78.0%
Outside/vegetation fires (includes natural vegetation fires, special outside fires, and cultivated vegetation or crop fires)	140–149, 160–169, 170–174	6.8%

Fire Loss

As part of the risk analysis, historical fire loss was evaluated for inclusion in the consequence scores. The expected consequence was acquired from the National Fire Protection Association (NFPA) survey data that the VFD submits annually. **Table 15** shows a summary of fire loss values from the NFPA submission data from 2020 through 2022.

Table 15. Fire Loss by Year, 2020–2022

Year	2020	2021	2022
Total Fire Loss	**$1,292,215**	**$5,168,173**	**$2,390,737**

Although property loss was reported and available for a subset of the analysis period, this data could not be used alone. Therefore, further analysis was performed to determine how best to use the historical data. Using the locations of the known fires and the property values of the parcels where those fires occurred, a rate of loss was determined. Data showed that property loss was approximately 2.6% of total property values, so a weighting factor of 2.6 was applied across all property values within the consequence calculation when evaluating structure fires.

2.6%

Fire Loss
Structure Fires

Deaths and Injuries from Fire

Loss of life and injuries were additional variables used for quantifying consequence. Deaths and injuries were reviewed across all hazards and then specifically for fires and EMS events. In a review of the data, there were two civilian deaths or injuries due to fire during the analysis period reported within the NFRIS data. The loss of life is a consequence that, even with a low probability, should be quantified and approximated as part of the risk assessment process. Using national statistics, a consequence figure was added into the calculations. According to the U.S. Fire Administration (USFA), the rate of death from fires was approximately 13 per 1 million people in 2021, and special populations were more vulnerable than others. The USFA reported: "The trend in the fire death rate per million population for older adults (aged 65 and over) increased 16% from 2012 to 2021." The USFA further stated that the older adult population faces the greatest relative risk of dying in a fire – specifically 2.6 times higher than that of the general population[2]. Using these national statistics, a general consequence factor was applied, using population figures within the risk calculations.

Emergency Medical Services Incidents

Historical EMS data, such as patient primary impressions, patient demographics, the number of cardiac arrests, and percent return of spontaneous circulation (ROSC) can increase the accuracy of the risk-scoring process by providing variables that can be used for both probability and consequence. In 2023, the VFD had a ROSC survivability of 10.8%, and 10% had public use of an automatic external defibrillator (AED). 23.3% of all cardiac arrests were witnessed, and over 50% had bystander CPR performed prior to the department's arrival. Certain variables, such as age and demographics, relate to the probability of events, whereas patient outcomes can be used to approximate consequence. A review and analysis of the National Emergency Medical Services Information System (NEMSIS), VFD PCR data, and Cardiac Arrest Registry to Enhance Survival (CARES) data sources were used for probability weighting and scoring. **Table 16** incorporates data from the 2022 NEMSIS National EMS Data Report[3]. Using census population data, the percentage of patients encountered by fire and EMS by age demographics were weighted as shown.

Table 16. Percentage of Fire and EMS Encounters by Age

Age Distribution	Percentage of Encounters
0–10 yrs.	2.8%
11–17 yrs.	2.8%
18–20 yrs.	2.6%
21–30 yrs.	10.1%
31–40 yrs.	10.9%
41–50 yrs.	10.2%
51–60 yrs.	13.7%
61–70 yrs.	15.9%
71–80 yrs.	15.4%
81–90 yrs.	11.7%
91+ yrs.	3.9%

[2] https://www.usfa.fema.gov/statistics/deaths-injuries/older-adults.html
[3] Data from 2022 NEMSIS National EMS Data Report.

EMS Consequence

To approximate consequence in the risk-scoring process, NEMSIS data were also used to understand patient dispositions. Patient dispositions from the NEMSIS dataset, such as" Patient Dead at Scene-Resuscitation Attempted" and "Patient Treated, Transported by EMS," can help approximate the number of events that have an adverse outcome in a jurisdiction. According to the 2022 NEMSIS data report, a patient was found dead at the scene in less than 5% of EMS incidents **(Table 17)**.

The percent values from "Patient Dead at Scene-No Resuscitation Attempted (Without Transport)," "Patient Dead at Scene-Resuscitation Attempted (Without Transport)," "Patient Dead at Scene-No Resuscitation Attempted (With Transport)," and "Patient Dead at Scene-Resuscitation Attempted (With Transport)" were used as a weighting factor in EMS risk-scoring calculations for EMS consequence[4].

Table 17. Top 20 Causes of Injury

Incident/Patient Disposition Name	Count of Events	Percent of Total
Patient Treated, Transported by EMS	24,401,373	57.7%
Canceled (Prior to Arrival At Scene)	2,716,275	6.4%
Patient Treated, Transferred Care to Another EMS Professional	2,585,542	6.1%
Patient Refused Evaluation/Care (Without Transport)	2,488,982	5.9%
Patient Treated, Released (AMA)	2,127,742	5.0%
Canceled on Scene (No Patient Contact)	1,800,859	4.3%
Canceled on Scene (No Patient Found)	1,354,482	3.2%
Patient Evaluated, No Treatment/Transport Required	1,131,573	2.7%
Patient Treated, Released (per protocol)	950,522	2.2%
Assist, Unit	763,221	1.8%
Assist, Public	487,296	1.2%
Assist, Agency	413,704	1.0%
Standby-Public Safety, Fire, or EMS Operational Support Provided	328,154	0.8%
Patient Dead at Scene-No Resuscitation Attempted (Without Transport)	322,213	0.8%
Patient Dead at Scene-Resuscitation Attempted (Without Transport)	138,301	0.3%
Standby-No Services or Support Provided	136,804	0.3%
Patient Treated, Transported by Private Vehicle	64,481	0.2%
Patient Treated, Transported by Law Enforcement	51,324	0.1%
Patient Refused Evaluation/ Care (With Transport)	24,951|	0.1%
Patient Dead at Scene-No Resuscitation Attempted (With Transport)	7,979	0.02%
Patient Dead at Scene-Resuscitation Attempted (With Transport)	4,170	0.01%
Transport Non-Patient, Organs, etc.	2,410	<0.01%

Additionally, the percent of EMS encounters that resulted in transport was used in the consequence risk calculations. According to national statistics, 57.7% of patients are treated and transported by EMS, so that figure was used within the consequence calculations.

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[4] *Table from National EMS Information System (NEMSIS), (2023) NHTSA Office of EMS, Department of Transportation, 2022 Data Report. Inclusion criteria: 911 initiated and patient contact was made. Values that were marked Not Applicable or Not Recorded are removed.*

Fire Containment

To ensure an accurate approximation for consequence related to fires, historical incident data were analyzed to understand fire spread/confinement. Using the NFIRS data and the NFPA summary, the number of fires and percent of fires that were confined were calculated and used as a weight in the scoring process **(Table 18)**.

Table 18. Fire Spread/Confinement Scores by Year, 2020–2022

Fire Type	2020	2021	2022	3-yr Avg	Score
Confined Fires	41.38%	15.09%	27.27%	27.92%	2.8
Nonconfined Fires	58.62%	84.91%	72.73%	72.08%	7.2

Data were used in two ways for consequence scoring: First, the percent of nonconfined fires was used as a weight with property values. Second, fire confinement was used as a static score throughout the service area; it was not stratified geographically, either as risk reduction (2.8) or consequence (7.2).

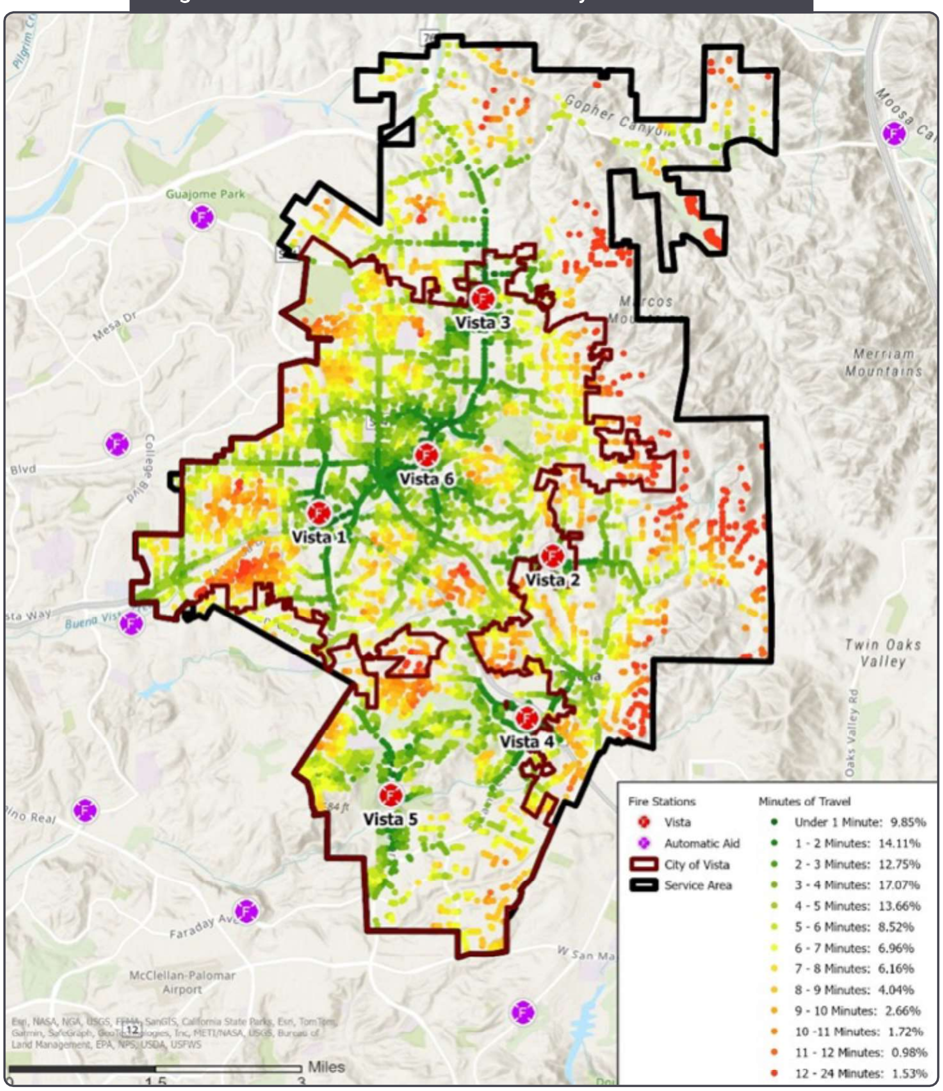
Historical System Performance

Distribution and Concentration Factors

A comprehensive assessment was conducted to evaluate resource distribution within the VFD's service area, which comprises 18 planning zones. This analysis involved a geospatial examination of drive times, integrating both the VFD's current performance metrics and nationally recommended best practices. Drive times were calculated from each existing, fixed fire station, factoring in road miles and historical data, indicating a 4-minute arrival time for the first unit.

The results of this analysis indicate that the majority of the jurisdiction can be reached within an 8-minute time frame, particularly in areas with a higher concentration of risk. Although the geographic analysis serves as a valuable surrogate measure, the intricacies of the roadway system and variations in time of day can challenge these estimations. **Figure 9** shows the distribution of resources by minute of travel. Detailed maps showing the estimated drive time from each fire station at one-minute intervals are included in the appendix.

Figure 9. Distribution of Resources by Minute of Travel



The term *concentration* refers to the strategic spacing of multiple resources to ensure that an initial effective response force (ERF) can arrive on a scene within specified time frames, as outlined in the on-scene performance expectations. This approach ensures that resources are arranged in such a way that the ERF can be assembled promptly to meet total response time benchmarks. The composition of the ERF is determined for each incident type based on the critical tasks required to mitigate the incident and prevent further loss.

The goal of an initial ERF is to effectively manage and potentially halt the escalation of an emergency in a specific risk area. Even when the initial ERF is sufficient to address the emergency, including in high-risk areas, it might not encompass the total number of units or personnel required if the emergency escalates. In such cases, additional resources can be requested through mutual aid to assist in incident mitigation and maintain response coverage.

The concentration of emergency response units in the jurisdiction reflects the demand for service. Providing an initial ERF is crucial, as it can often prevent the escalation of emergencies, whether they involve fires or medical crises. The distribution of service delivery resources is optimized by categorizing risk types and ensuring that high-risk areas receive second and third-due units within shorter time frames than typical or low-risk areas. This approach allows the department to manage responses to all hazards in a systematic and effective manner.

Current Station Configurations With Automatic Aid for First Units

Table 19 below outlines the distribution of incidents across the six existing VFD fire stations over the almost five-year period of January 2019 through October 2023. It includes automatic aid from the department's neighbors. The distribution is based on travel times from quarters, with the presumption that all units are in quarters at the time of dispatch.

Table 19. Distribution of Incidents, Vista Fire Department and Automatic Aid, 2018–2023

Station	Count	%	Max	Min	Mean
Vista Fire Department					
1	16,524	24.21%	14.1	0.04	4.35
2	2,786	4.08%	23.9	0.47	6.64
3	11,885	17.42%	23.5	0.15	3.92
4	11,916	17.46%	18.1	0.09	4.31
5	5,192	7.61%	13.2	0.02	4.56
6	15,945	23.37%	19.9	0.02	3.63
TOTAL VISTA	**64,248**	**94.15%**	**23.9**	**0.02**	**4.20**
Automatic Aid					
Deer Springs 11	535	0.78%	24.0	2.72	11.06
NCF 5	224	0.33%	13.1	3.74	5.70
Oceanside 4	2,226	3.26%	13.3	1.43	4.57
Oceanside 6	531	0.78%	11.7	2.72	6.41
Oceanside 8	401	0.59%	10.8	3.44	5.86
San Marcos 1	4	0.01%	23.9	18.77	22.20
San Marcos 2	71	0.10%	9.6	6.62	8.08
TOTAL AUTOMATIC AID	**3,992**	**5.85%**	**24.0**	**1.43**	**5.96**
TOTAL	**68,240**	**100.00%**	**24.0**	**0.02**	**4.30**

Impact of Automatic and Mutual Aid

VFD relies upon aid from adjacent agencies during structure fires and other incidents when needed. Automatic- and mutual-aid agreements are very important because they enable the department to ensure it has sufficient staff and apparatus to fight fires and manage complex incidents. VFD has agreements with the following adjacent agencies:

- Oceanside
- San Marcos
- Deer Springs
- North County

VFD reciprocates by providing aid to these agencies when requested. The goal of automatic-aid agreements is for each agency to provide similar services and a comparable number of time on incidents in each jurisdiction. **Table 20** shows automatic and mutual aid responses in 2019-2023.

Table 20. Automatic and Mutual Aid, 2019–2023

	2019	2020	2021	2022	2023
Automatic and mutual aid given					
Count of commit comply	4602	4528	5614	5642	5977
Sum of commit comply	2585:42:03	2629:00:24	3228:58:51	3483:44:57	3737:36:08
Automatic aid received					
Count of commit comply	3735	3568	3872	5221	5854
Sum of commit comply	1896:05:52	1874:58:16	2215:56:12	3419:56:58	4341:19:57
Difference					
Difference in commitments	**867**	**960**	**1742**	**421**	**123**
Difference in hours	**689:36:11**	**754:02:08**	**1013:02:39**	**63:47:59**	**603:43:49**

In 2023, autoaid given and received were equal, with 5,977 incidents providing aid and 5,854 receiving.

Current Station Configurations with Automatic Aid for Type III Engines Responding to Vegetation Fires

Table 21 below shows the distribution of vegetation fire incidents across the four fire stations which have wildland response apparatus in Vista over the almost five-year period of January 2019 through October 2023 and includes automatic aid from the department's neighbors. The distribution is based on travel times from quarters with the presumption that all units are in quarters at the time of dispatch, and the Type III unit assigned to that station is the first-arriving Type III.

Table 21. Distribution of Vegetation Fire incidents, 1st Arriving Type III Unit Summary, 2019–2023

Station	1st	%	Mean Travel	2nd	%	Mean Travel
Vista Fire Department						
2	1,529	32.18%	9.55	72	1.52%	14.94
3	1,860	39.15%	8.98	44	0.93%	11.30
5	1,243	26.16%	5.16	0	0.00%	
6	102	2.15%	11.64	3,217	67.71%	12.93
TOTAL VISTA	**4,734**	**99.64%**	**8.22**	**3,333**	**70.15%**	**12.96**
Automatic Aid						
Oceanside 6	0	0.00%		309	6.50%	8.87
Oceanside 7	0	0.00%		0	0.00%	
San Marcos 1	17	0.36%	16.97	643	13.53%	15.42
San Marcos 2	0	0.00%		466	9.81%	12.59
TOTAL AUTOMATIC AID	**17**	**0.36%**	**16.97**	**1,418**	**29.85%**	**13.07**
TOTAL	**4,751**	**100.00%**	**8.25**	**4,751**	**100.00%**	**12.99**

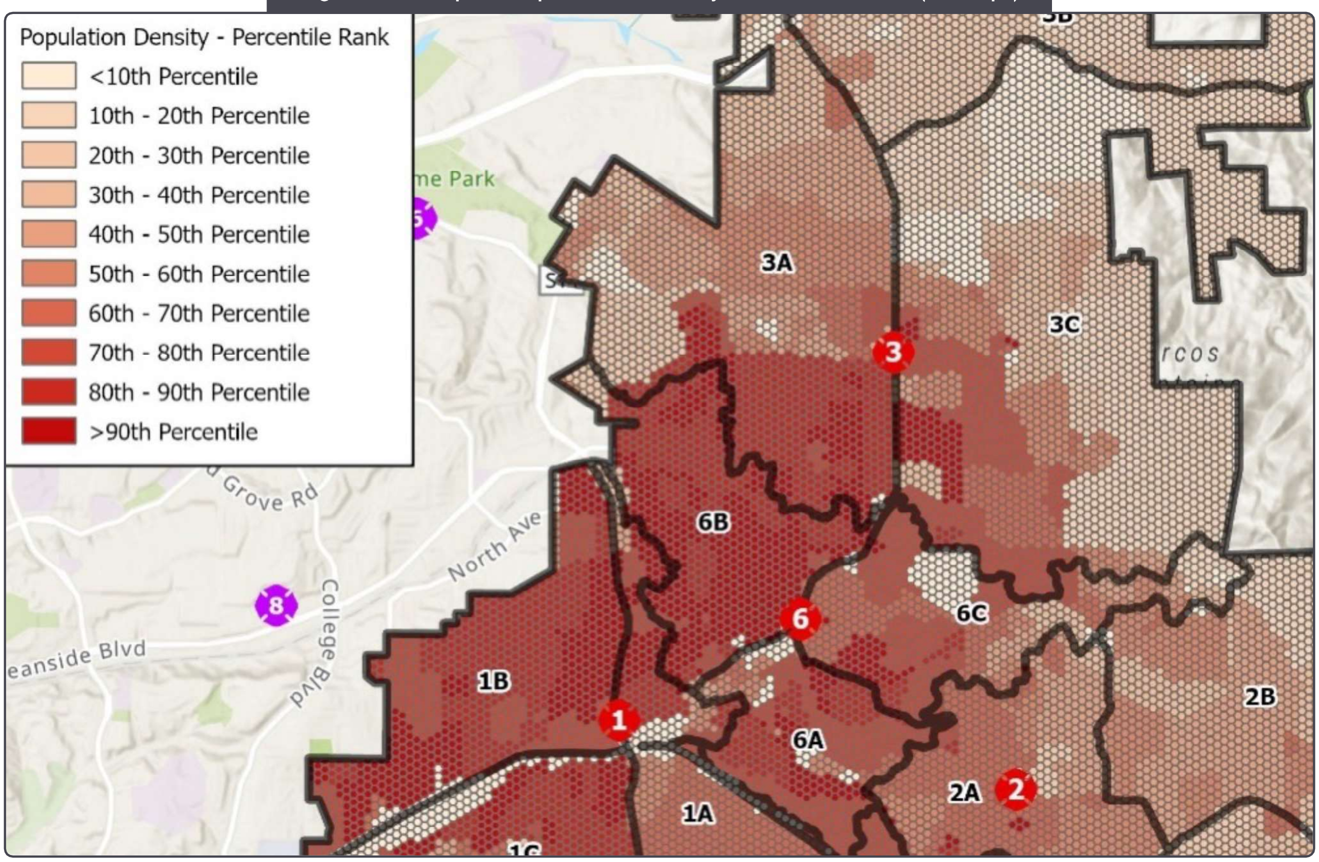
Community Characteristics

Population

Population impacts on risk in several ways, and population factors can affect the probability of events occurring, as well as consequence to the community. Population data were acquired from several sources, including the U.S. Census[5], American Community Survey[6], and the Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry (CDC/ATSDR) Social Vulnerability Index (SVI)[7], and analyzed to determine the most appropriate population data source for inclusion in the quantitative risk assessment.

Given that population density has a known relationship to a variety of hazards that require emergency response mitigation, census data were used to calculate population density across the VFD's geographic area. Population density was ranked similarly to the other variables, and the rank score was used in the risk calculations. **Figure 10** is an excerpt of the map of population density percentile rank. The complete map is provided in the appendix.

Figure 10. Map of Population Density Percentile Rank (Excerpt)

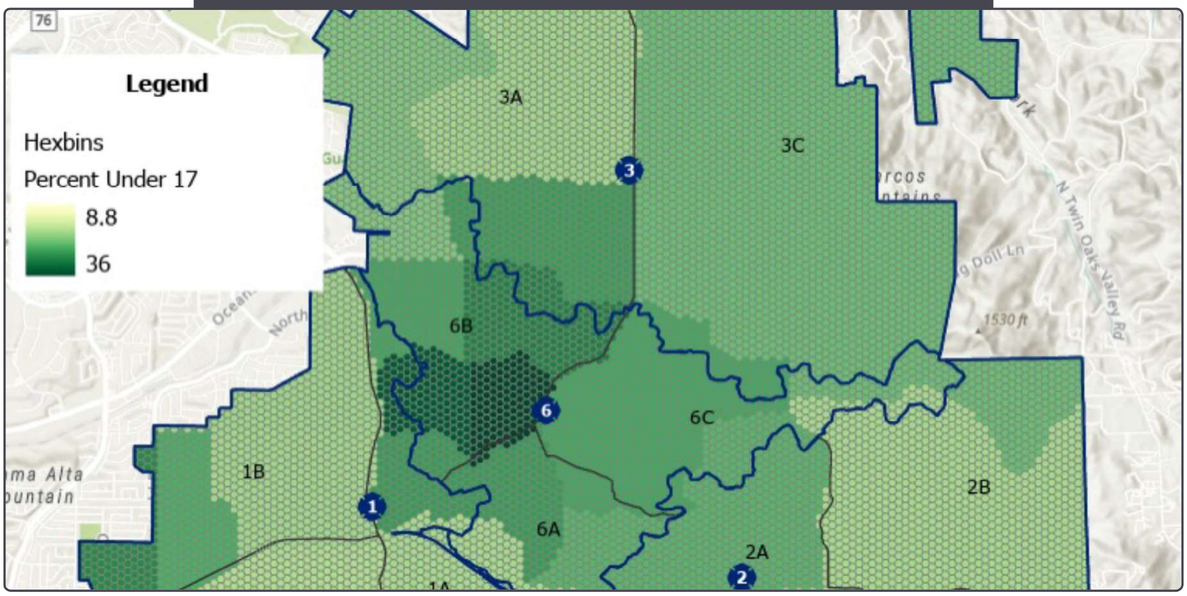


5 https://www.census.gov/data.html
6 https://www.census.gov/programs-surveys/acs/
7 https://www.atsdr.cdc.gov/placeandhealth/svi/index.html

Age Demographics

As explained in the EMS section above, the relationship between EMS events and specific populations was examined to determine if weighting should be based on population characteristics. The weighting from the EMS data were applied to the population figures gleaned from the census data. Characteristics such as the percent of population under aged 17 and the percent of population over aged 65 were used in the risk scoring in conjunction with the weighted values. An excerpt of the map of the percent of population aged under 17 by hexbin appears in **Figure 11.**

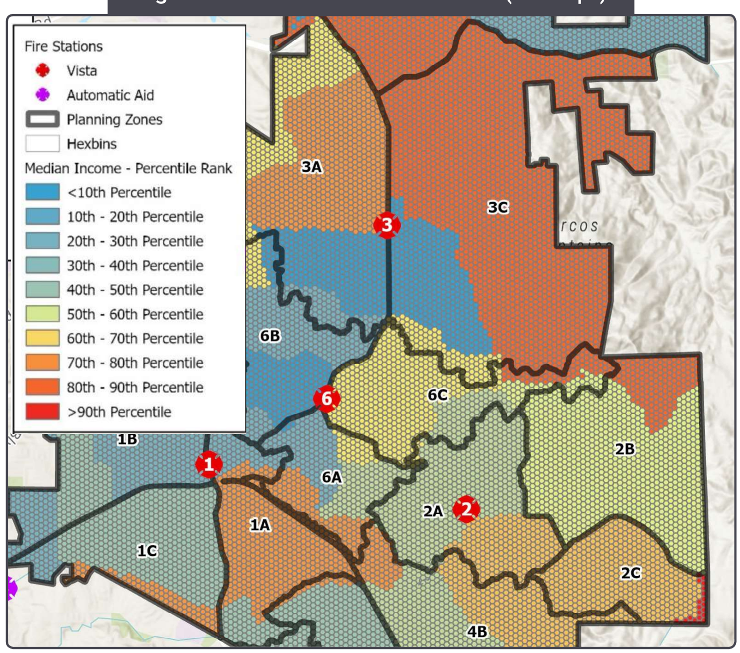
Figure 11. Map of Percent of Population Aged Under 17 (Excerpt)



Median Income

Median income can be used to determine consequence and understand if undue hardship from an emergency event could affect different populations based on income levels. In addition to overall population characteristics, median income was evaluated and ranked within the jurisdiction. In the review and analysis of median income data, the SVI was found to take a more comprehensive geographical approach to socioeconomic vulnerabilities, so median income was not overtly used in any risk calculation. **Figure 12** is an excerpt of the map showing median income rank. A complete map is available in the appendix.

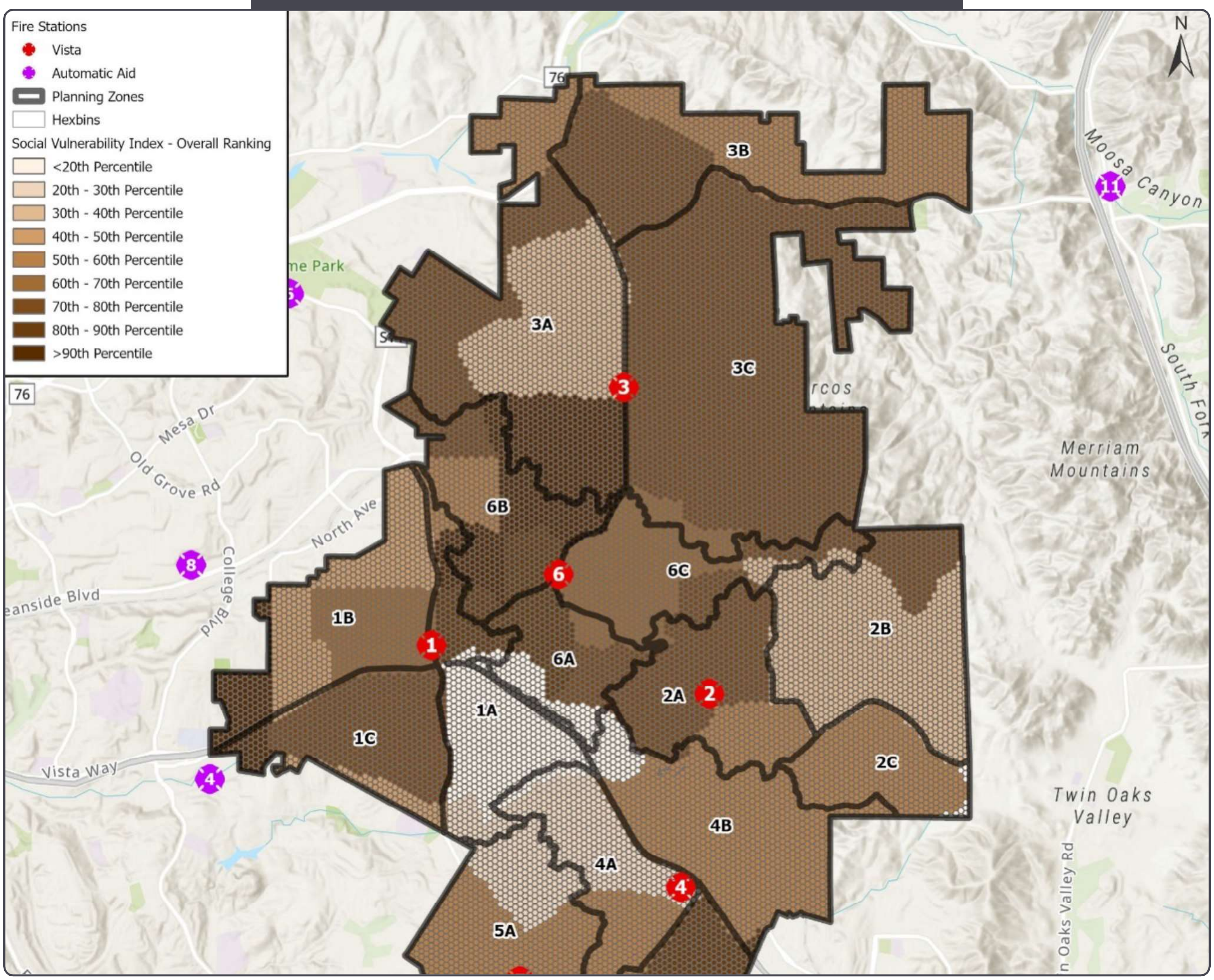
Figure 12. Median Income Rank (Excerpt)



Social Vulnerabilities

When evaluating consequence, population data can also be used to determine if certain populations could be more adversely affected by events than others. The CDC/ATSDR SVI[8] was created to quantify the degree to which a community exhibits certain social conditions, including high poverty, low percentage of vehicle access, and crowded households, that could affect that community's ability to prevent human suffering and financial loss in the event of disaster. For the risk assessment scoring, the SVI was reviewed and determined to be a reliable indicator for population-related consequence. This index was developed by the CDC's Geospatial Research, Analysis, and Services Program (GRASP) to help public health officials and emergency response planners identify and map the communities that will most likely need support before, during, and after a hazardous event. The SVI uses census and American Community Survey data to create these index scores. The index comprises four topic area scores and an overall score within each census block group. These scores were ranked for inclusion in the risk scoring. **Figure 13** is a map of the overall SVI ranking.

Figure 13. Map of Overall Ranking per Social Vulnerability Index



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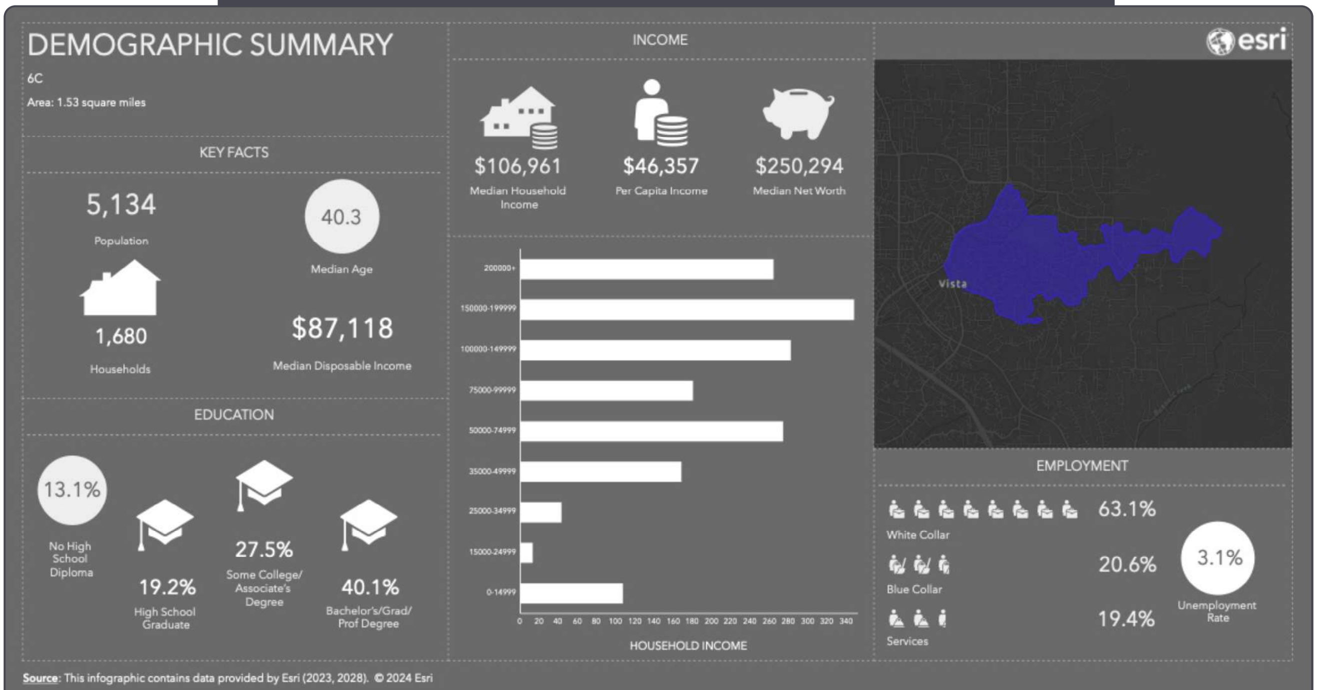
8 *Data downloaded from CDC website see weblink for more information on the social vulnerability index, see* [CDC/ATSDR SVI Data and Documentation Download | Place and Health | ATSDR]

Figure 14 shows the Environmental Systems Research Institute (ESRI) demographic information for Vista's Zone 6C. The statistics for all 18 of the city's zones appear in the appendix.

Figure 14. ESRI Demographic Summary of City of Vista Planning Zone 6C



AREA	1.53 square miles

INCOME BY HOUSEHOLD (HH)	
2023 HH Income <$15,000	107
2023 HH Income $15,000-$24,999	13
2023 HH Income $25,000-$34,999	43
2023 HH Income $35,000-$49,999	168
2023 HH Income $50,000-$74,999	274
2023 HH Income $75,000-$99,999	180
2023 HH Income $100,000-$149,999	282
2023 HH Income $150,000-$199,999	348
2023 HH Income $200,000+	264
MEDIAN INCOME	
2023 Median HH Income	$106,961
2023 Per Capita Income	$46,357
2023 Median Net Worth	$250,294

KEY FACTS	
2023 Total Population	5,134
2023 Median Age	40.3
2023 Total Hhs	1,680
2023 Median Disposable Income	$87,118
EDUCATION	
No High School Diploma	13.1%
High School Graduate	19.2%
Some College/Associate's Degree	27.5%
Bachelor's/Grad/Prof Degree	40.1%
EMPLOYMENT	
White Collar	63.1%
Blue Collar	20.6%
Services	19.4%
2023 Unemployment Rate	3.1%

Additional maps provided in the appendix illustrate each of the following SVI themes: socioeconomic status, household characteristics, racial and ethnic minority status, housing type, and transportation systems. In review of the data, many census population factors are incorporated in the SVI **(Table 22)**; in each theme category in a scientific analysis and the data were therefore determined to be a reliable measure for inclusion in many of the risk calculations.

Table 22. Social Vulnerability Index Themes and Associated CDC Population Variables

Social Vulnerability Index Theme	CDC Population Variables
Socioeconomic status	• Below 150% of federal poverty level • Unemployed • Housing cost burden • No high school diploma • No health insurance
Household characteristics	• Aged 65 and older • Aged 17 and younger • Civilian with a disability • Single-parent household • English language proficiency
Racial and ethnic minority status	• Hispanic or Latino (of any race) • Black and African American* • American Indian and Alaska Native* • Asian* • Native Hawaiian and Other Pacific Islander* • Two or more races, Other Races*
Housing type and transportation systems	• Multi-unit structure • Mobile home • Crowding • No vehicle • Group quarters

** Not Hispanic or Latino*

Area Characteristics

For the risk assessment to clearly define community risk, every relevant aspect of the community and service area must be considered. Historical data is very important, as explained in the previous sections; however, the unique characteristics and geography must also be analyzed to determine how they should be incorporated into the quantitative risk assessment. The following sections outline specific service area characteristics and how they were incorporated into the risk assessment.

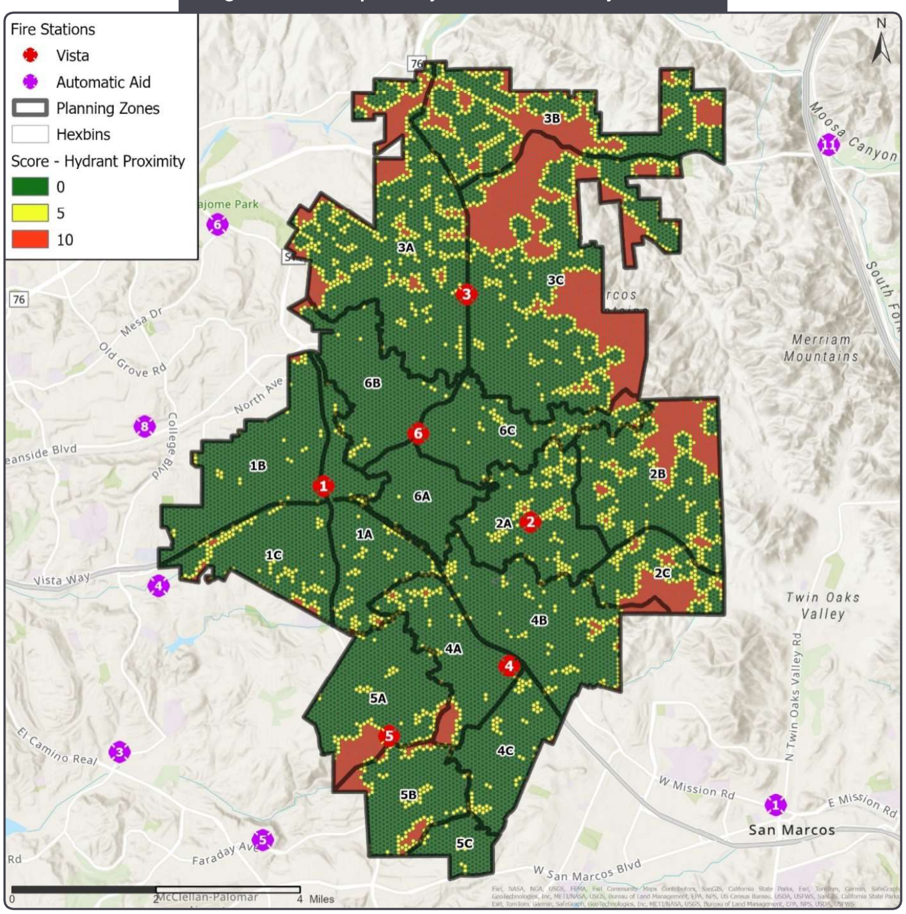
Water Supply (Hydrants)

Most of the VFD's service area has water supply coverage, which supports the department's ability to mitigate risks associated with fires. Approximately 87% of the service area lies within 500 feet of a hydrant. Considering the length of hose carried on a standard engine area, a buffer zone was created to enable scoring of areas where risk might be higher due to lack of water supply. **Table 23** displays the percent of the area within each buffer zone, and **Figure 15** illustrates the scores applied to areas outside of the buffer zones.

Table 23. Hydrant Proximity and Percent of Service Area Within Buffer Zone

Hydrant Proximity	Number of Hexbins	Percent of Service Area
Within 250 feet	12,352	71.7%
Within 500 feet	2,625	15.2%
Outside hydrant range	2,252	13.1%

Figure 15. Map of Hydrant Proximity Scores



Fire Station Proximity and Travel Time Distances

Another important variable when analyzing risk is the proximity of emergency services vehicles to population within the jurisdiction. Although automatic vehicle location (AVL) technology is in place, fire station proximity data are used in consequence scoring to consider the travel times and distance of resources to mitigate emergencies, because units are most often in quarters when summoned to an incident. Based on an analysis of the road network, travel time polygons were created to predict the travel time from fire stations to any given point in the jurisdiction. Approximately 50% of the service area is within 5 minutes travel time of a fire station. For risk calculations, any distance of 13 minutes or greater was scored with a 10, and all other scores were assigned relative to the maximum distance. **Figure 16** is an excerpt of a map showing minutes of travel from fire stations in the jurisdiction. **Table 24** outlines these distances and consequence scores.

Figure 16. Map of Travel Time from Fire Station (Excerpt)

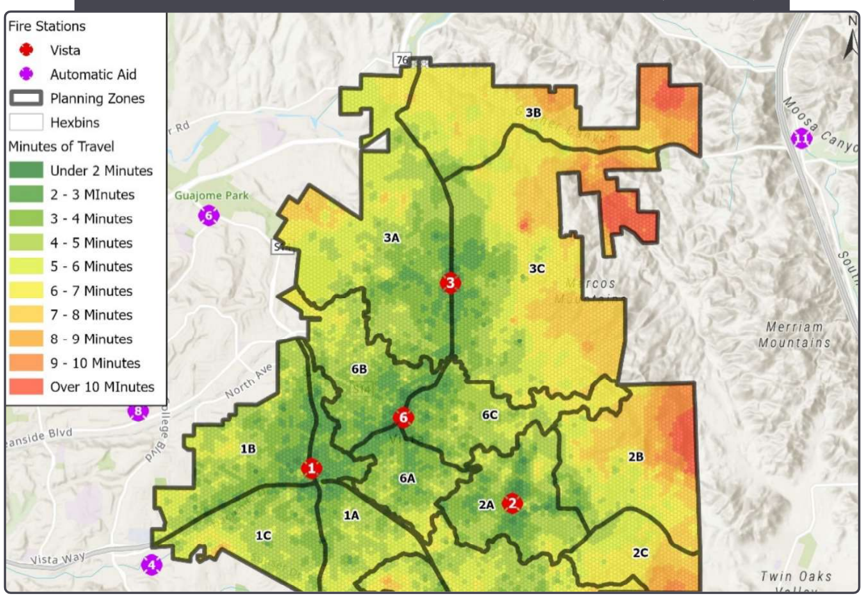


Table 24. Travel Time and Consequence Score as Percent of Service Area

Distance from Station (min)	Percent of Service Area	Cumulative Percent	Score
1	0.01%	0.0%	0.769
2	0.96%	1.0%	1.538
3	6.95%	7.9%	2.308
4	17.89%	25.8%	3.077
5	23.23%	49.0%	3.846
6	19.82%	68.9%	4.615
7	12.57%	81.4%	5.385
8	8.13%	89.6%	6.154
9	5.28%	94.8%	6.923
10	3.23%	98.1%	7.692
11	1.28%	99.4%	8.462
12	0.46%	99.8%	9.231
13+	0.20%	100.0%	10.000

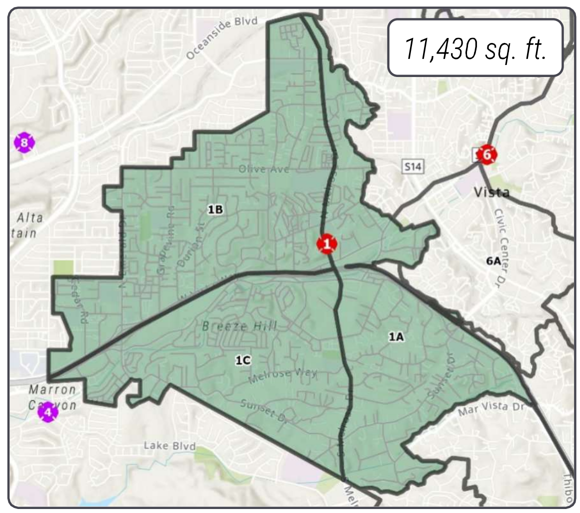
Fire Station Coverage

A critical component of developing Standards of Cover is conducting a thorough assessment of the entire system to ensure it aligns with established service-level objectives. Fire and EMS responses within specific geographic zones are closely tied to the first-response areas of strategically located fire stations throughout the city. This approach allows the fire department to analyze workload and evaluate station performance against the defined service-level objectives. This analytical method is instrumental in identifying any areas of vulnerability, highlighting the potential need for additional stations or the deployment of extra companies based on workload assessments.

Below is a detailed breakdown of each VFD station, encompassing the station's address, the equipment housed within, and staffing. This analysis provides a nuanced understanding of the operational dynamics of each station, facilitating strategic decisions that will enhance overall system effectiveness.

Fire Station 1 – Fire Headquarters

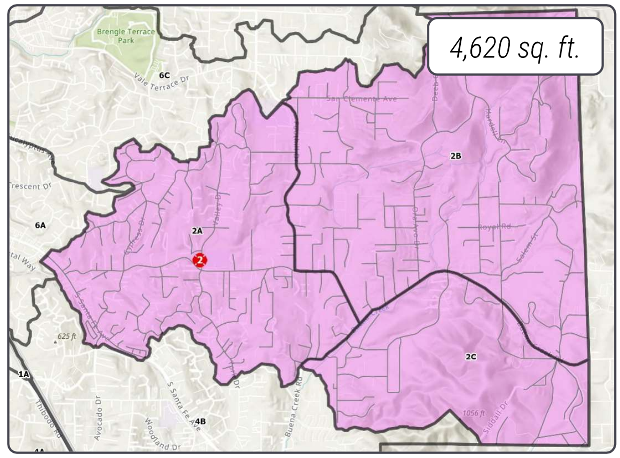
175 N. Melrose Drive



Apparatus ID	Apparatus Type	Year	Staff Positions	Number
Battalion 121	SUV		Battalion chief	1
Engine 121	Pierce Engine		Fire captain, engineer, and firefighter	3
Rescue Ambulance 121	Ford Lifeline		Firefighter/paramedics	2
TOTAL DAILY STAFFING				**6**

Fire Station 2

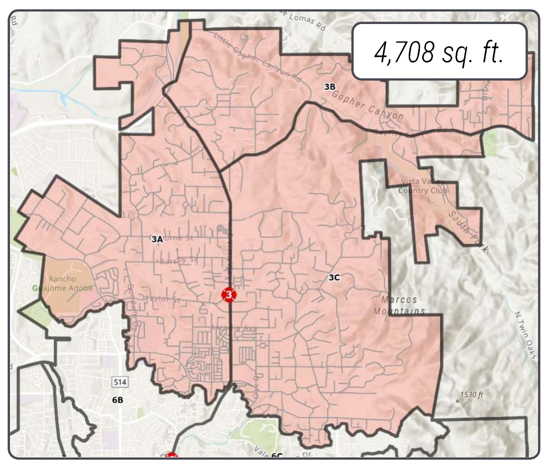
1050 Valley Drive



Apparatus ID	Apparatus Type	Year	Staff Positions	Number
Engine 122	Pierce engine		Fire captain, engineer, and firefighter	3
Brush 122	International		Cross-staffed	
OES 408	Type I		Cross-staffed	
TOTAL DAILY STAFFING				**3**

Fire Station 3

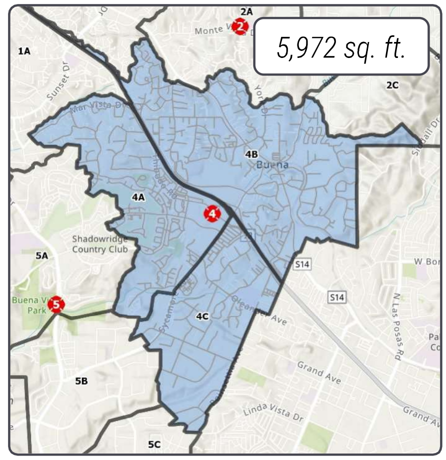
1070 Old Taylor Street



Apparatus ID	Apparatus Type	Year	Staff Positions	Number
Engine 123	Pierce engine		Fire captain, engineer, and firefighter	3
Rescue Ambulance 123	Ford Lifeline		Firefighter/paramedics	2
TOTAL DAILY STAFFING				**5**

Fire Station 4

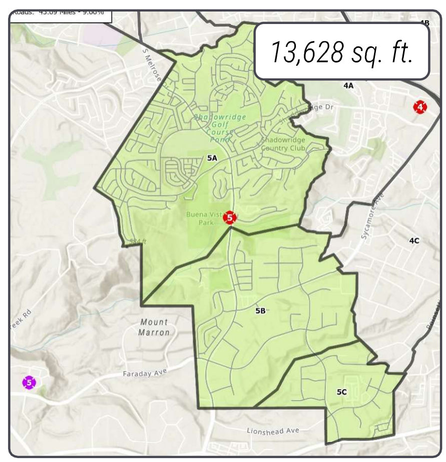
2121 Thibodo Road



Apparatus ID	Apparatus Type	Year	Staff Positions	Number
Engine 124	Pierce engine		Fire captain, engineer, and firefighter	3
Rescue Ambulance 124	Ford Lifeline		Firefighter/paramedics	2
Light Air 124			Cross-staffed	
TOTAL DAILY STAFFING				**5**

Fire Station 5

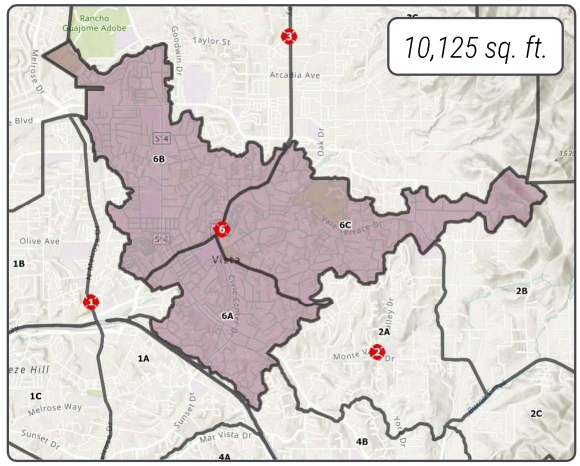
2009 S. Melrose Drive



Apparatus ID	Apparatus Type	Year	Staff Positions	Number
Engine 125	Pierce engine		Fire captain, engineer, and firefighter	3
Ambulance 125			Non-sworn EMT	2
Brush 125	International		Cross-staffed	
TOTAL DAILY STAFFING				**5**

Fire Station 6

651 E. Vista Way

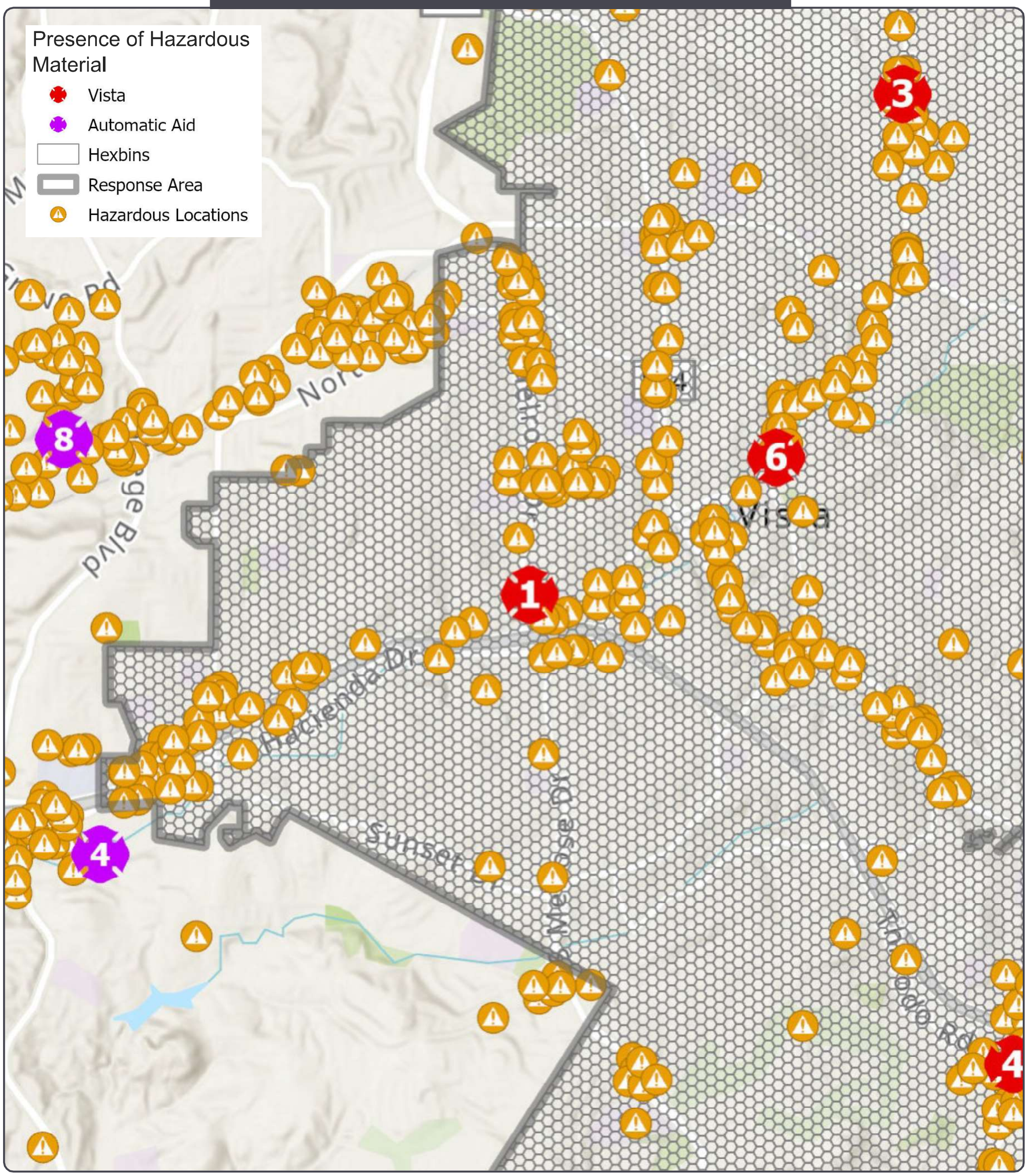


Apparatus ID	Apparatus Type	Year	Staff Positions	Number
Truck 126	Pierce ladder truck		Fire captain, engineer, and firefighter	3
Brush 126	International		Cross-staffed	
Rescue Ambulance 126			Fighter/paramedic	2
Ambulance 116	BLS		Staffed by North County Fire non-sworn EMT	2
TOTAL DAILY STAFFING				**7**

Facilities Containing Hazardous Materials

The number and locations of hazardous materials (HazMat) within a response jurisdiction contributes to both the probability and consequence of several risks. The presence of HazMat can lead to the probability of a HazMat event and contribute to consequence and impact when another risk type occurs within that location. All facilities containing HazMat were analyzed and included in the risk-scoring process as either a presence or absence factor. **Figure 17** is an excerpt of the map illustrating hexbins in which a HazMat facility was documented as being present.

Figure 17. Map of HazMat Facility Locations (Excerpt)



Building and Land Characteristics

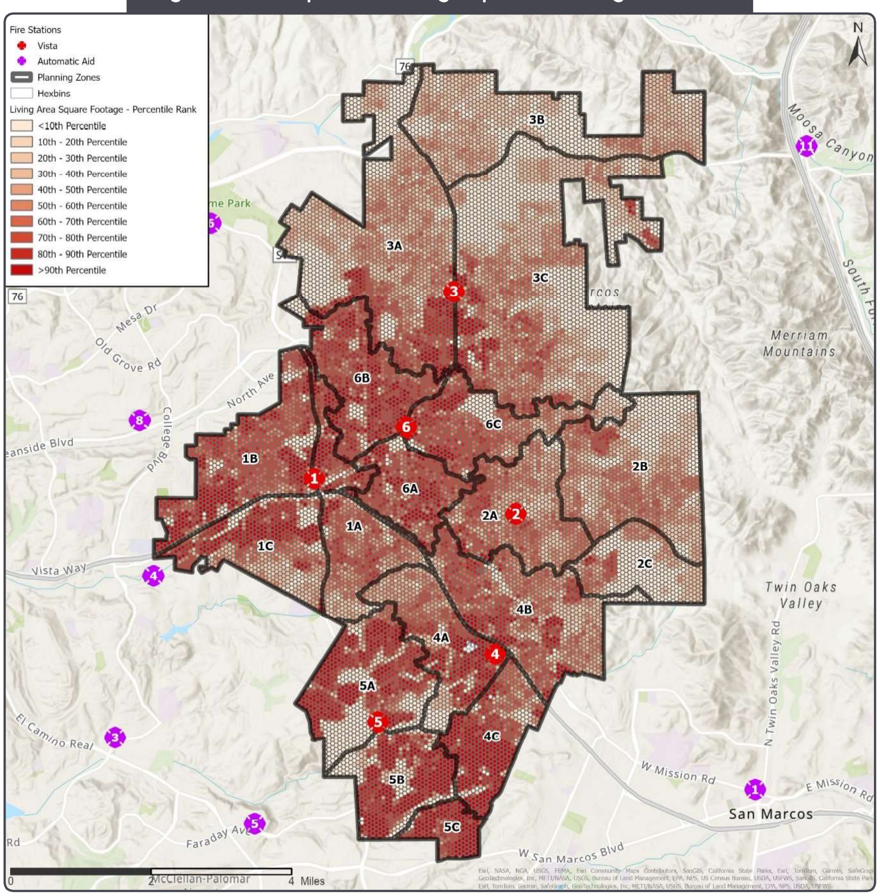
Urban and Rural Zones

Designations for urban and rural land zones, available from the California Department of Transportation (Caltrans), were incorporated into the risk analysis to identify areas that are more remote and could be more difficult to access. Approximately 83% of the service area is considered urban, and 16.6% percent is considered rural. These designations were scored and included in only specific risks, as noted in the calculated risk section in Part II of this document.

Building Characteristics and Addresses

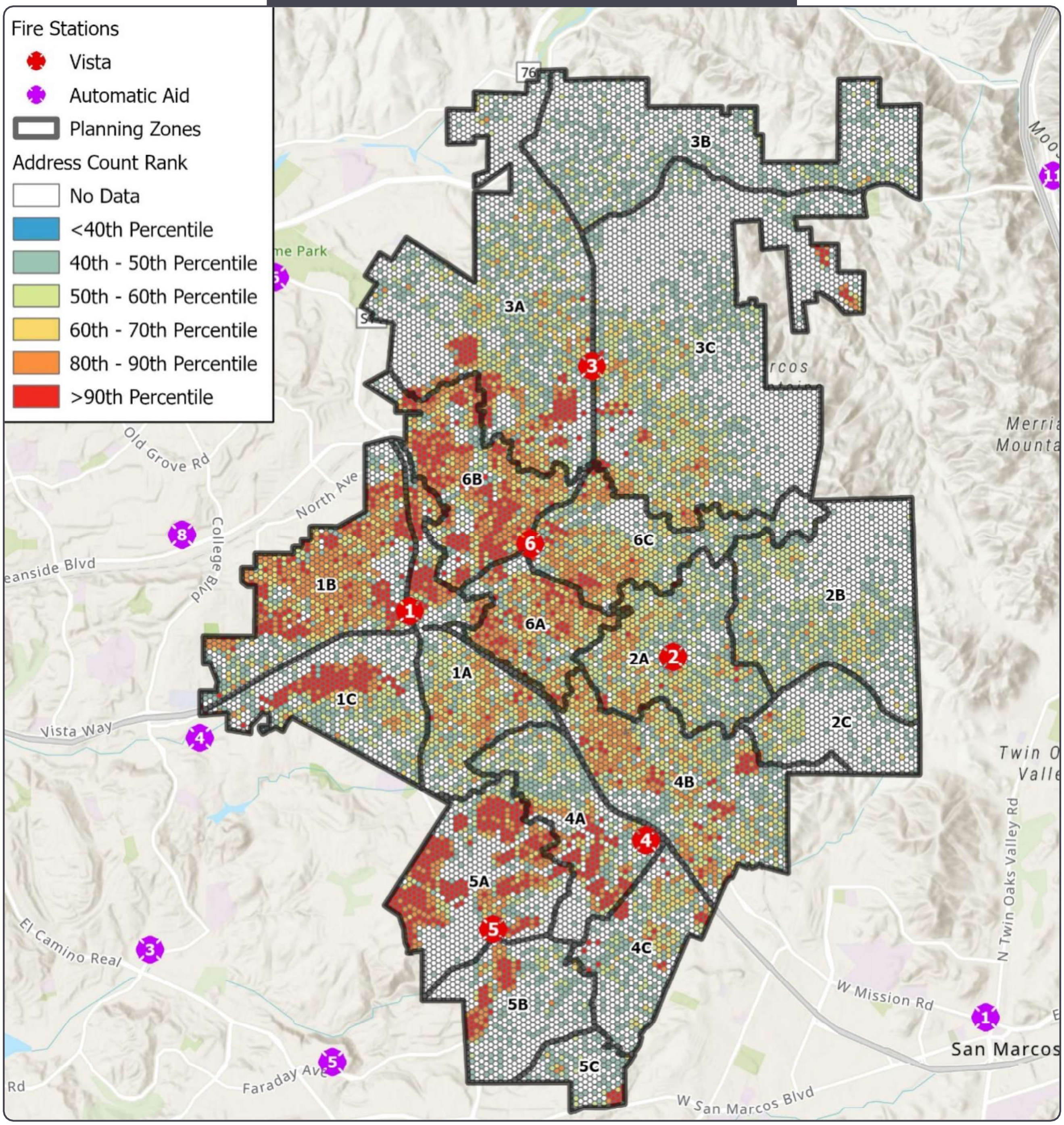
In addition to community and area characteristics, the structures (or buildings), addresses, and characteristics of the buildings all play a role when assessing risk. Data for buildings from parcel data were analyzed and reviewed for inclusion in the risk-scoring process. Characteristics such as the number of floors in a building, presence of a swimming pool, square footage, and building values were analyzed. Ideally the building data would include value, which could be incorporated into the quantitative risk assessment; however, less than 5% of the parcels included reliable data on building values. As shown in **Figure 18**, square footage data were more complete, so the square footage of the buildings was ranked and mapped across the VFD service area.

Figure 18. Map of Building Square Footage Ranked



Additionally, the number of address points was summarized into each hexbin. Addresses and building values were ranked according to the same percent rank methodology used for the other variables. **Figure 19** is a map of address points by hexbin ranked.

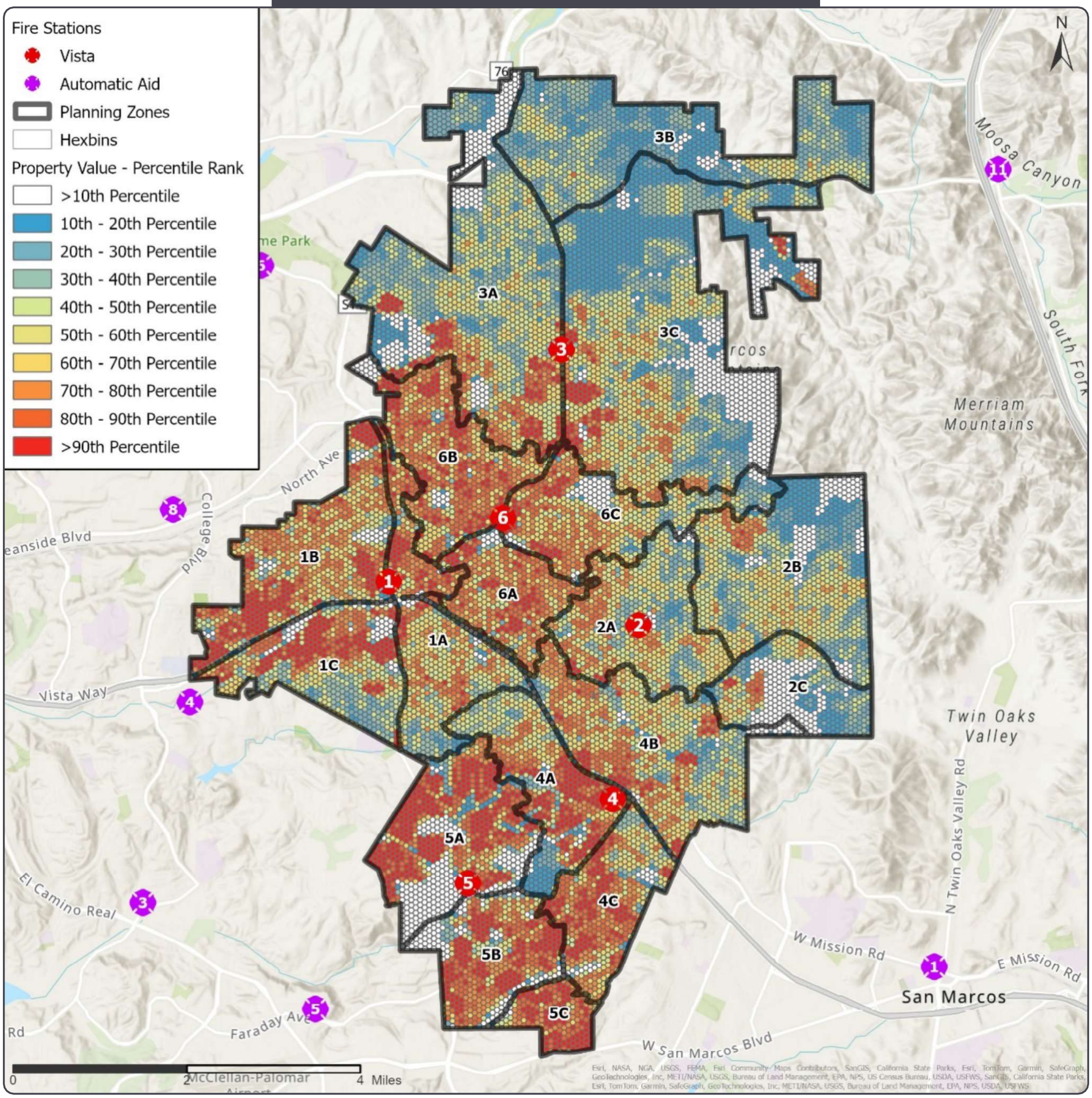
Figure 19. Map of Address Points Per Hexbin Ranked



Property Values

The value of properties can affect the risk from a consequence perspective. Part of the fire service's mission is to protect the lives and property of its community. Parcel data were analyzed and used to evaluate property values, using the rank-scoring method. As explained previously, the property value rank was used in conjunction with a weighting variable that was derived from historical experience and data (such as property loss). Rank scores of property values are illustrated in **Figure 20.**

Figure 20. Map of Property Values by Hexbin Ranked



Land Use and Zoning

The relationship between incidents and land use data was also analyzed for incorporation in the risk scores. There were several land use data sources available for analysis from the City of Vista's geographic information system (GIS) and other open data sources. As part of the variable assessment, land use data were analyzed from both parcel data and available planned land use data. The property type where an incident occurs is documented within the NFIRS data, and locational land use/zoning data were used to determine the frequency of different incidents by land use types. **Figure 21** shows the percent frequency of specific incidents by land use/zoning type during the analysis period.

Figure 21. Percent Frequency of Incidents by Land Use/Zoning Type, 2018–2023

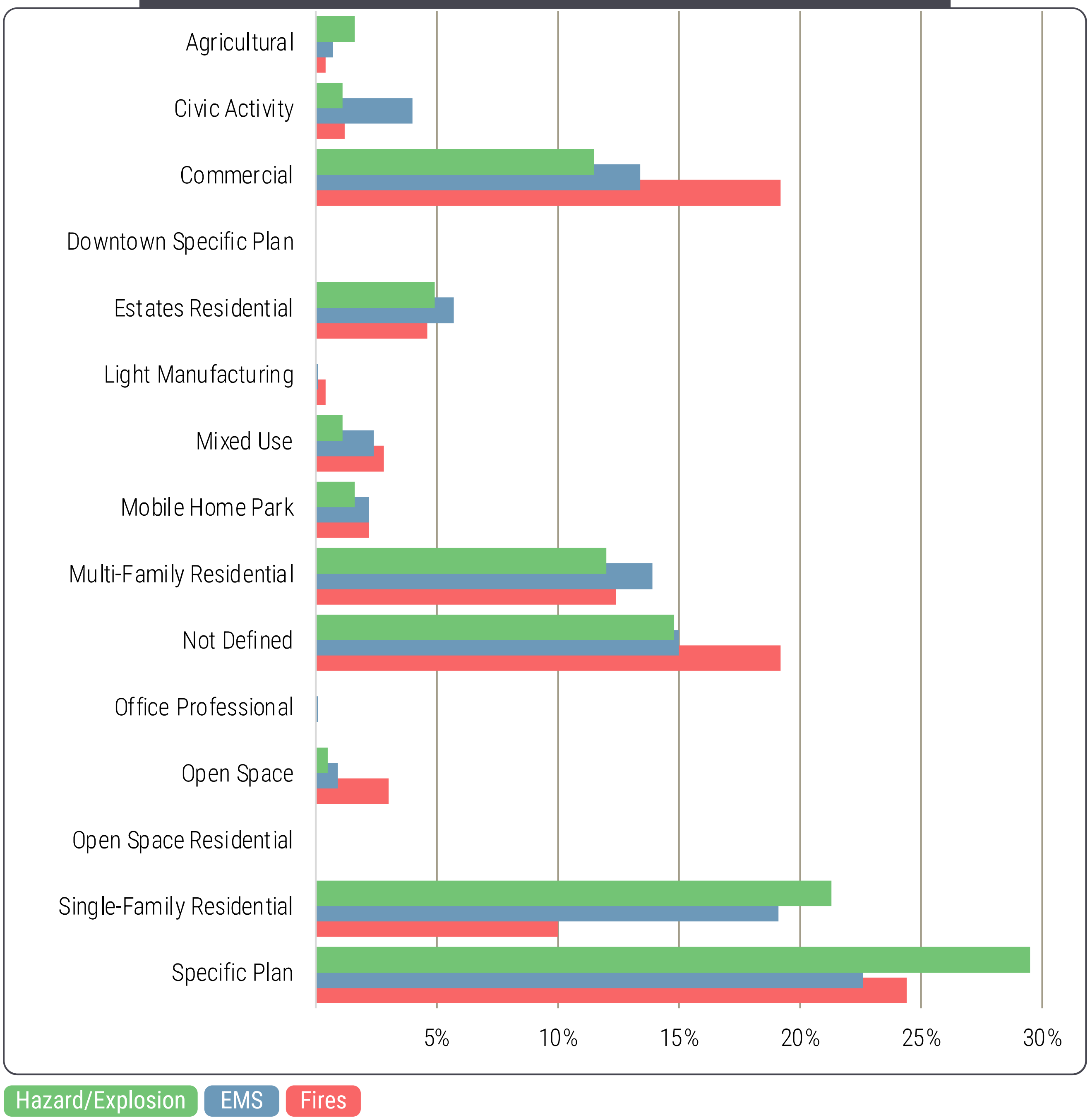


Table 25 represents the values associated with the graph in Figure 21.

Table 25. Percent Frequency of Incidents by Land Use/Zoning Type, 2018–2023

Land Use/Zoning Type	All Incidents	Fire	EMS	HazMat/Explosion
Agricultural	0.7%	0.4%	0.7%	1.6%
Civic activity	3.3%	1.2%	4.0%	1.1%
Commercial	14.9%	19.2%	13.4%	11.5%
Downtown specific plan	0.0%	0.0%	0.0%	0.0%
Estates residential	5.1%	4.6%	5.7%	4.9%
Light manufacturing	0.1%	0.4%	0.1%	0.0%
Mixed use	2.4%	2.8%	2.4%	1.1%
Mobile home park	2.3%	2.2%	2.2%	1.6%
Multi-family residential	12.9%	12.4%	13.9%	12.0%
Not defined	15.5%	19.2%	15.0%	14.8%
Office professional	0.0%	0.0%	0.1%	0.0%
Open space	1.1%	3.0%	0.9%	0.5%
Open space residential	0.0%	0.0%	0.0%	0.0%
Single-family residential	18.5%	10.0%	19.1%	21.3%
Specific plan implementation	23.3%	24.4%	22.6%	29.5%

Using the frequency of incidents by land use/zoning types, scores were derived and then used in the final risk calculations according to **Table 26** by hazard type.

Table 26. Scores by Land Use/Zoning Type

Land Use/Zoning Type	All Incidents	Fire	EMS	HazMat/Explosion
Agricultural	0.312	0.164	0.293	0.556
Civic activity	1.397	0.492	1.756	0.370
Commercial	6.388	7.869	5.922	3.889
Downtown specific plan	0.001	0.000	0.002	0.000
Estates residential	2.191	1.885	2.538	1.667
Light manufacturing	0.039	0.164	0.052	0.000
Mixed use	1.021	1.148	1.057	0.370
Mobile home park	0.968	0.902	0.973	0.556
Multi-family residential	5.544	5.082	6.136	4.074
Not defined	6.662	7.869	6.635	5.000
Office professional	0.020	0.000	0.024	0.000
Open space	0.492	1.230	0.408	0.185
Open space residential	0.002	0.000	0.003	0.000
Single-family residential	7.952	4.098	8.456	7.222
Specific plan implementation	10.000	10.000	10.000	10.000

Critical Infrastructure

Any risk assessment must contain a review and assessment of critical infrastructure, which is important for understanding consequence and effects in several risk categories. In addition, critical infrastructure locations can become targets or hazards in human-caused emergencies, such as terrorism. The following section outlines the many variables and critical infrastructure elements that were reviewed as part of the risk assessment. Most of these variables were included in the risk scoring as a presence or absence factor. Hexbins containing one or more of the critical infrastructure facilities were scored with 10, and hexbins that did not contain any critical infrastructure were scored with a zero.

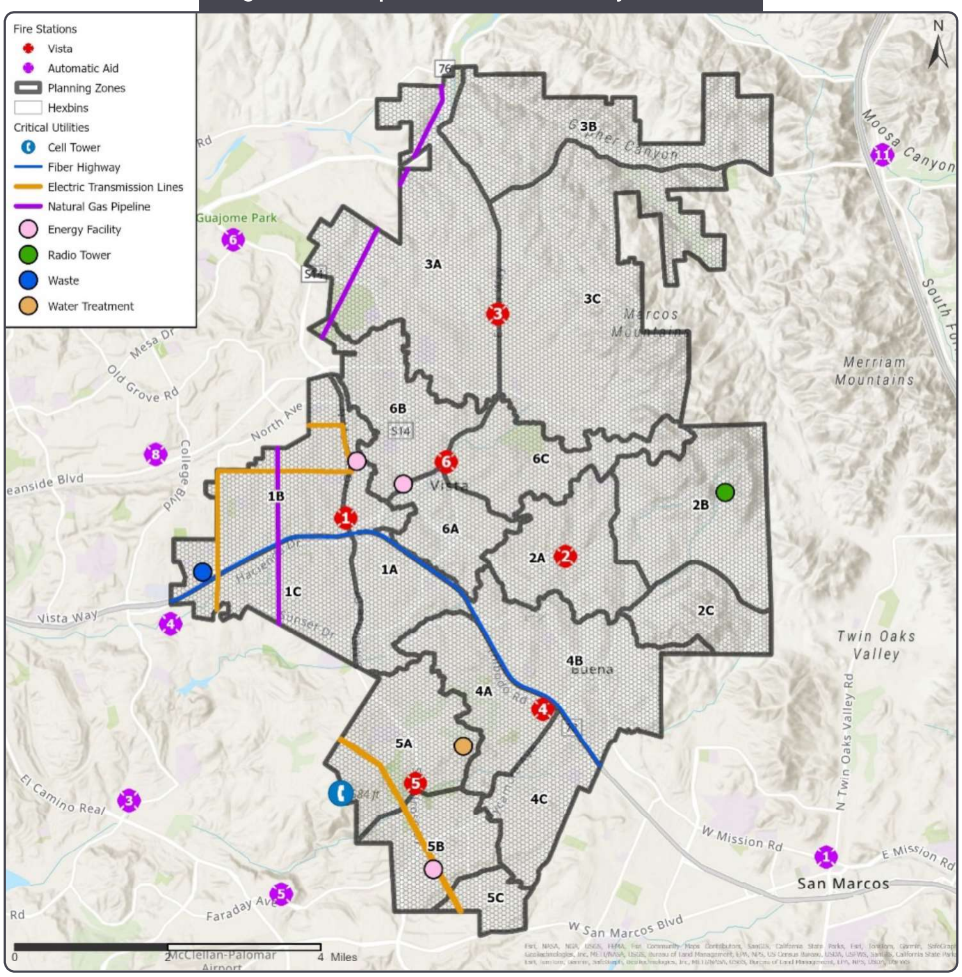
Major Utilities

Major utilities, such as power plants, communication towers, water treatment centers, transmission lines, and gas and natural pipelines were reviewed and identified in the service area. **Table 27** outlines the number of hexbins that had a major utility within their boundaries. **Figure 22** is a map showing the locations of these major utilities. A complete map is provided in the appendix.

Table 27. Hexbins Containing Major Utilities

Major Utility	Number of Hexbins with Presence
Cellular tower	1
Fiber highway	150
Electricity transmission lines	183
Natural gas pipeline	133
Power plant/energy facility	3
Radio communication tower	1
Wastewater treatment facility	1
Water treatment facility	1

Figure 22. Map of Locations of Major Utilities



Other Special Locations

Across the VFD service area, there are many special locations that affect both probability and consequence. Population and census data primarily enable analysis and risk scoring of some factors based on residential data in fixed locations – without considering that population moves throughout the day. Special locations, such as schools and other educational facilities, childcare centers, adult and child day care facilities, community centers, recreation facilities, entertainment facilities, continuing care facilities[9], and government facilities, were incorporated into the risk analysis for consequence to account for assembly and other locations that might not be covered within the population analysis. These special locations were mapped and assigned a score based on presence or absence. **Figures 23–25** are excerpts of maps illustrating some of the variables included, and complete maps are included in the appendix.

Figure 23. Map of Continuing Care Facility Locations (Excerpt)

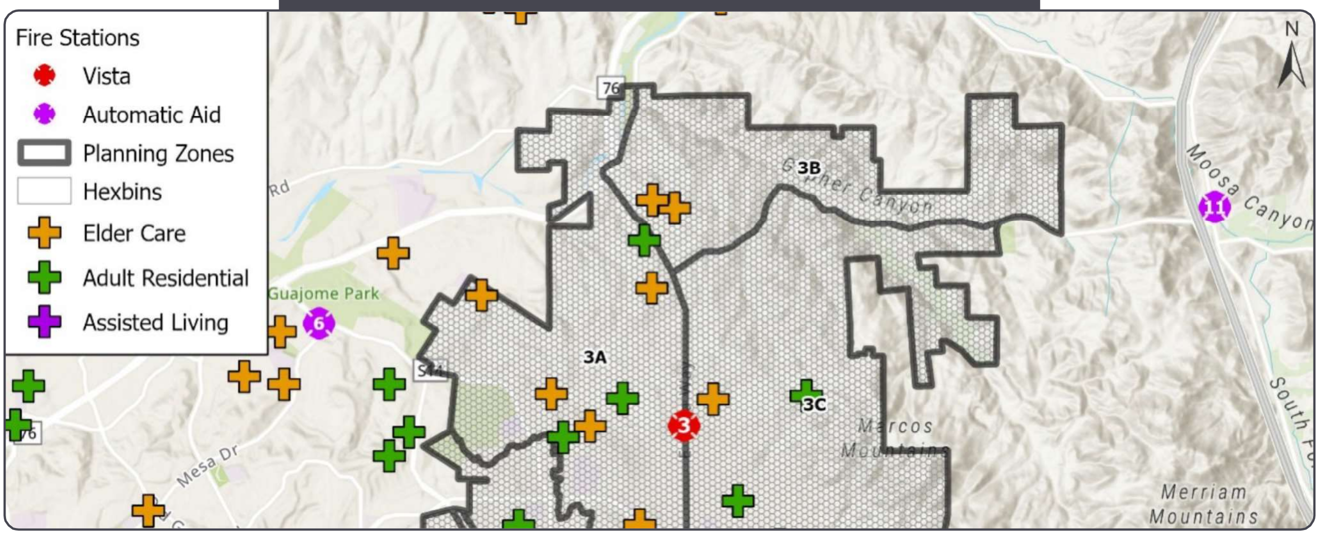
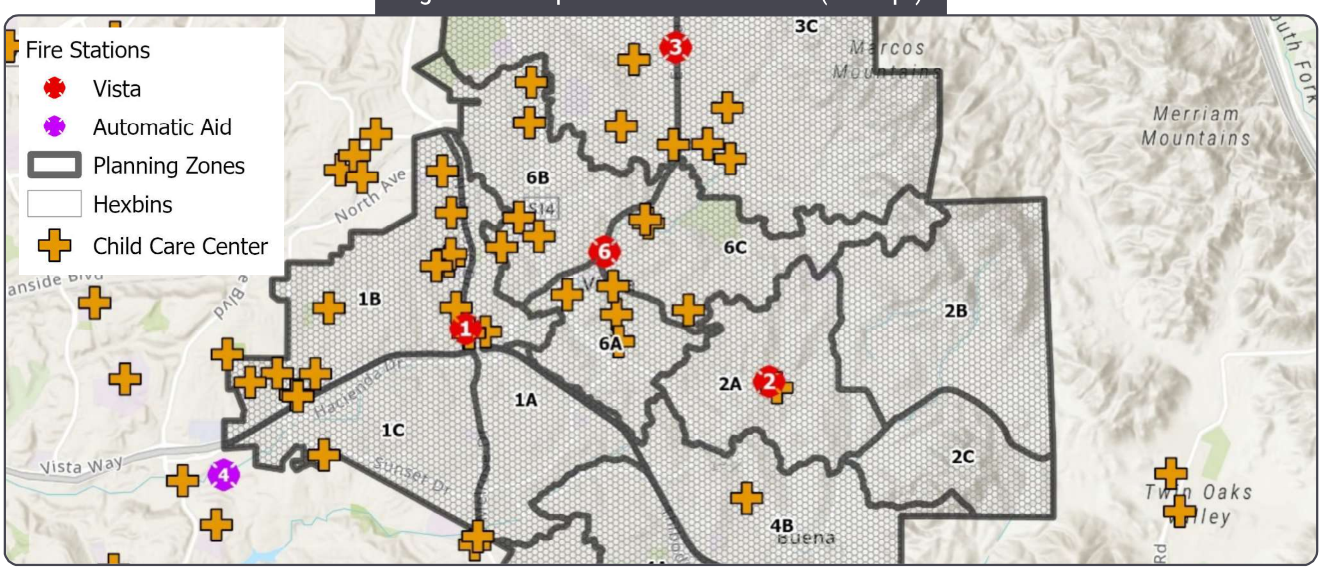
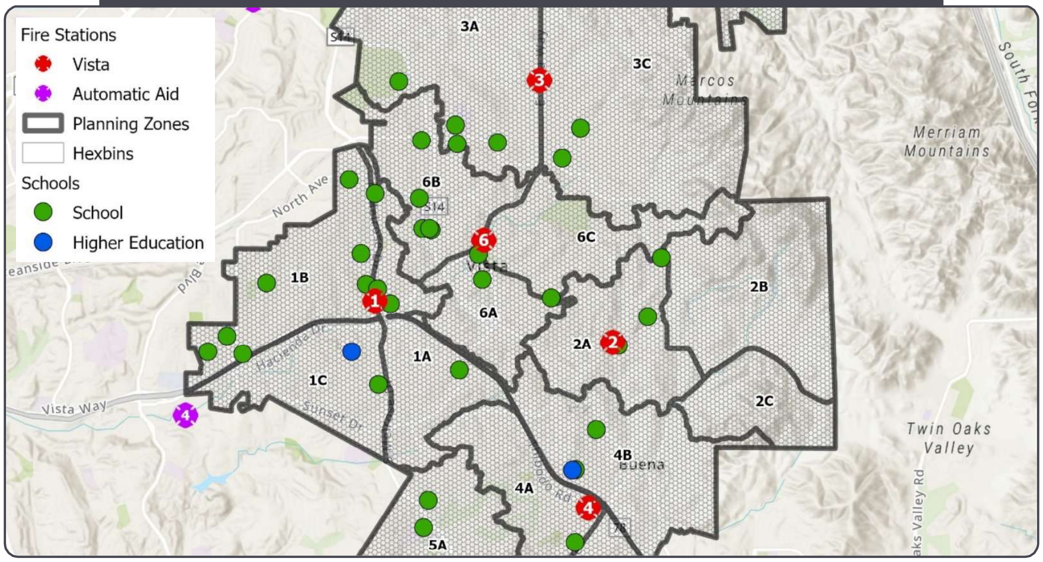


Figure 24. Map of Childcare Centers (Excerpt)



[9] *The term continuing care facility is used to represent temporary and permanent, physical and mental health facilities that serve individuals across the lifespan.*

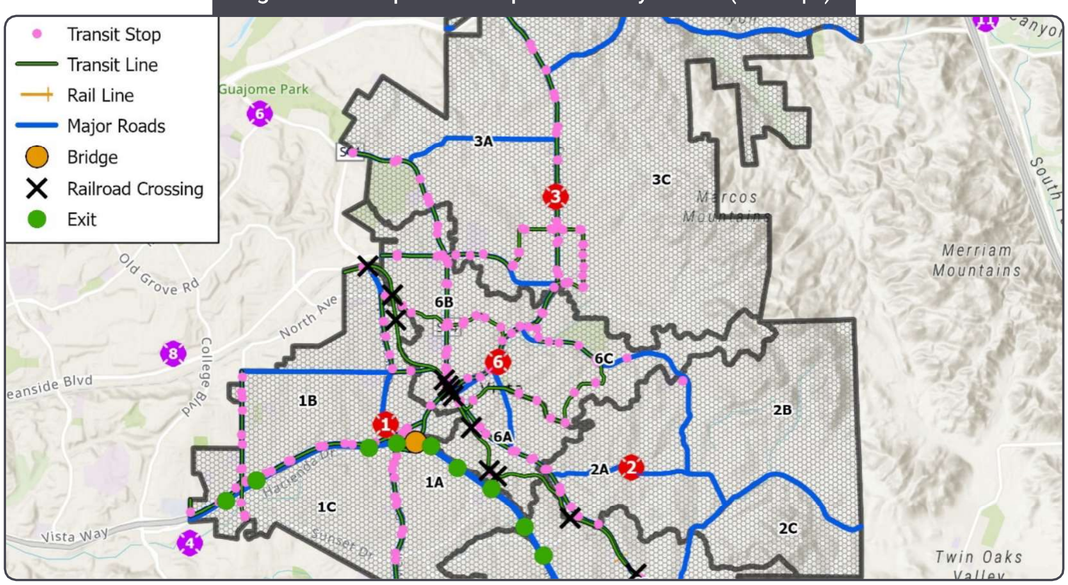
Figure 25. Map of Schools and Other Educational Facilities (Excerpt)



Major Roads and Transportation Systems

Major roads and transportation systems affect risk in several ways. The presence and speed of vehicles on major roadways were included as probability factors when considering the risk for technical rescue events such as entrapments due to motor vehicle accidents. The presence of railroads, major highways, and transit systems also can be important when factoring consequence if they are affected by a specific risk, such as natural and human-made hazards and disasters. All major roads and transportation systems were mapped and incorporated into each risk score as relevant to the risk being analyzed. **Figure 26** is an excerpt of a map showing the locations of transit stops, transit lines, rail lines, major roads, bridges, railroad crossings, and roadway access and egress. A complete map is included in the appendix.

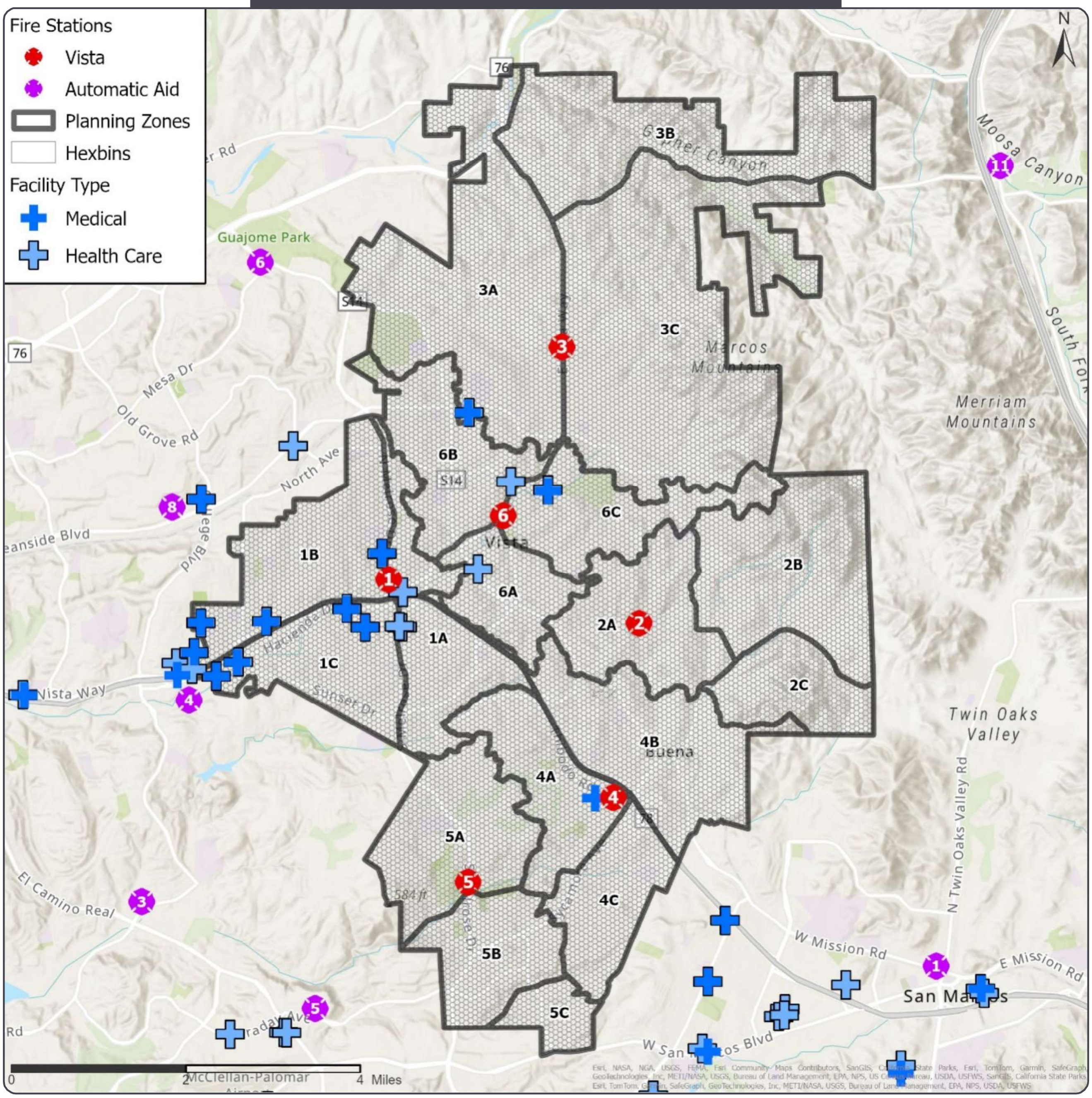
Figure 26. Map of Transportation Systems (Excerpt)



Medical and Other Healthcare Facilities

An important part of understanding the community for the risk assessment involves identifying, mapping, and evaluating the locations of medical and other healthcare facilities. Analysis of this data facilitates proper planning of responses, should any of the risks impact on locations where people seek medical treatment. Medical and other healthcare facilities were included in the risk-scoring process as a presence or absence factor. **Figure 27** illustrates the locations of these facilities.

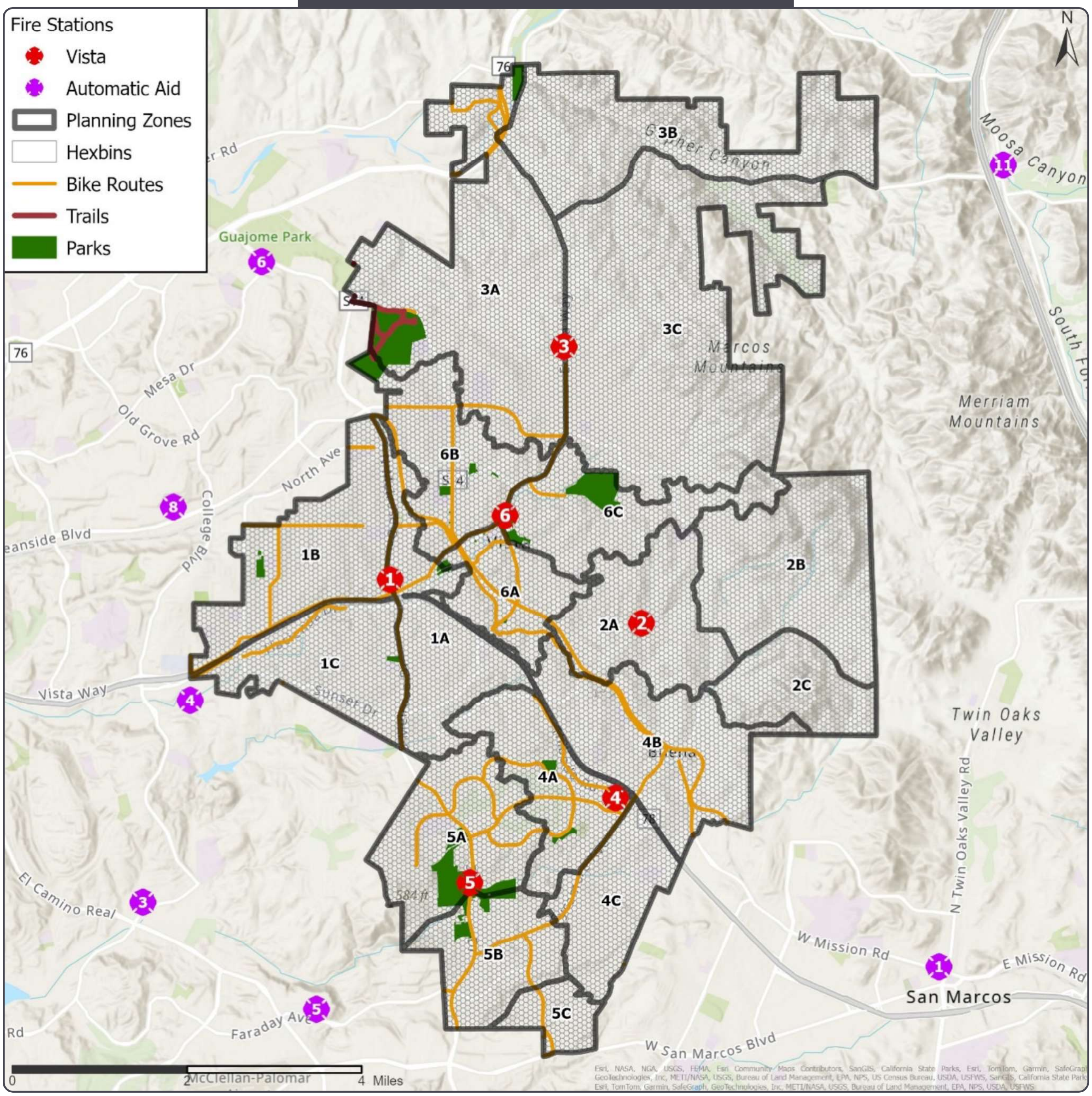
Figure 27. Map of Medical and Other Healthcare Facilities



Trails, Bike Routes, and Parks

The Vista community offers several parks and bike routes that enrich the community in many ways, but these features can also serve as variables that potentially affect risk. The trails, bike routes, and parks within the VFD's service area were analyzed and mapped as variables **(Figure 28)**. Locations with parks and trails were scored if present when considering some EMS and technical rescue risks.

Figure 28. Map of Bike Routes, Trails, and Parks



Topography, Geography, Climate, and Physiography

As part of the risk analysis, naturally occurring characteristics of the jurisdiction were analyzed, and quantitative data were collected and incorporated into the risk-scoring process. The following sections outline the data and variables used to address naturally occurring characteristics of the community.

Natural Hazards

Natural hazards, such as drought, hurricanes, heat waves, earthquakes, and landslides, can be difficult to quantify and predict without significant historical analysis and data. The Federal Emergency Management Agency (FEMA) developed a National Risk Index (NRI)[10] based on sound historical data that classifies the potential risk levels for 18 different natural hazards. The NRI is intended to help users better understand the natural hazard risks of their communities. This index was incorporated as a variable for the VFD community by mapping the overall NRI risk rating (from very high to very low). Risk ratings were then assigned a score, with 10 being the highest for each of the different natural hazard groupings, according to **Table 28.**

NRI scores for earthquakes, heat waves, landslides, river floods, and wildfires were each incorporated into the risk scoring. **Figure 29** is an excerpt of a map showing NRI earthquake scores, and **Figure 30** is an excerpt of a map showing NRI Landslide scores. Complete maps are included in the appendix.

Table 28. Natural Hazard Risk Scores and Percent of Hexbins

NRI Risk Rating Category	Percent of Hexbins	Score
Very High	4.58%	10
Relatively High	12.95%	8
Relatively Moderate	23.74%	6
Relatively Low	51.19%	4
Very Low	7.53%	2

Figure 29. Map of NRI Earthquake Scores (Excerpt)

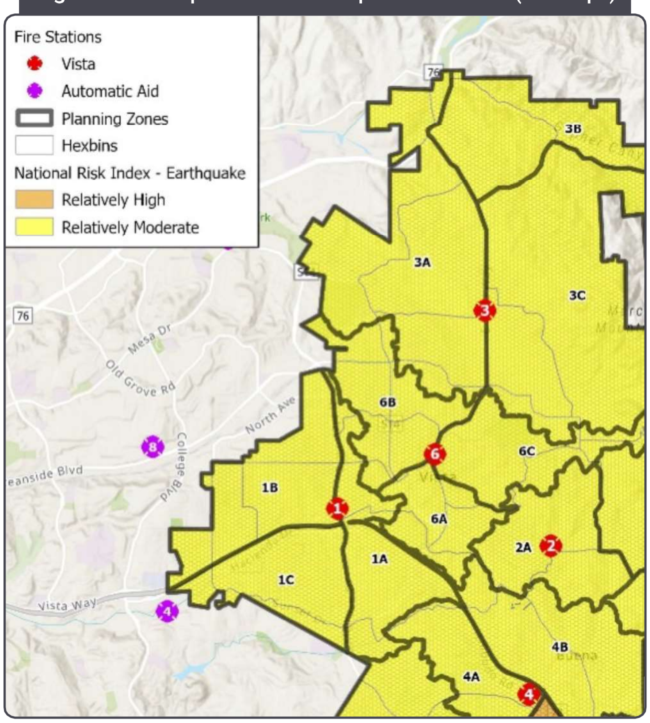
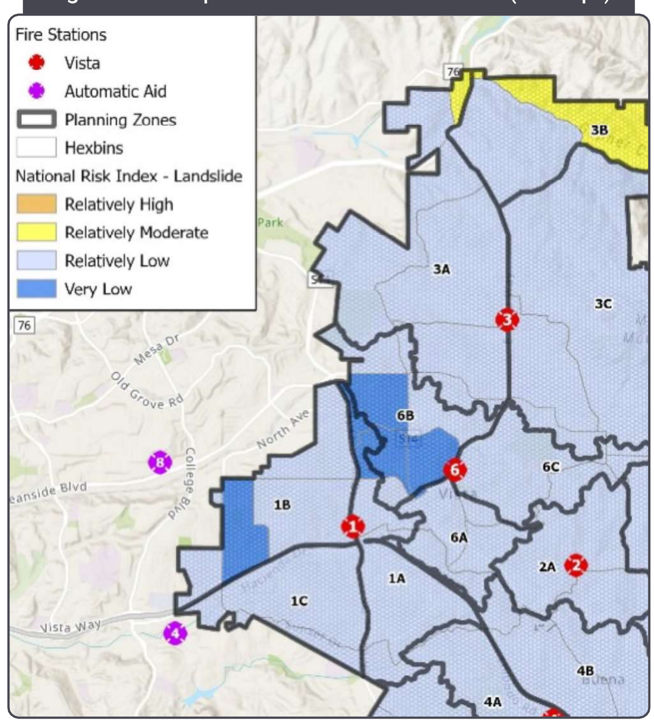


Figure 30. Map of NRI Landslide Scores (Excerpt)



10 https://hazards.fema.gov/nri/

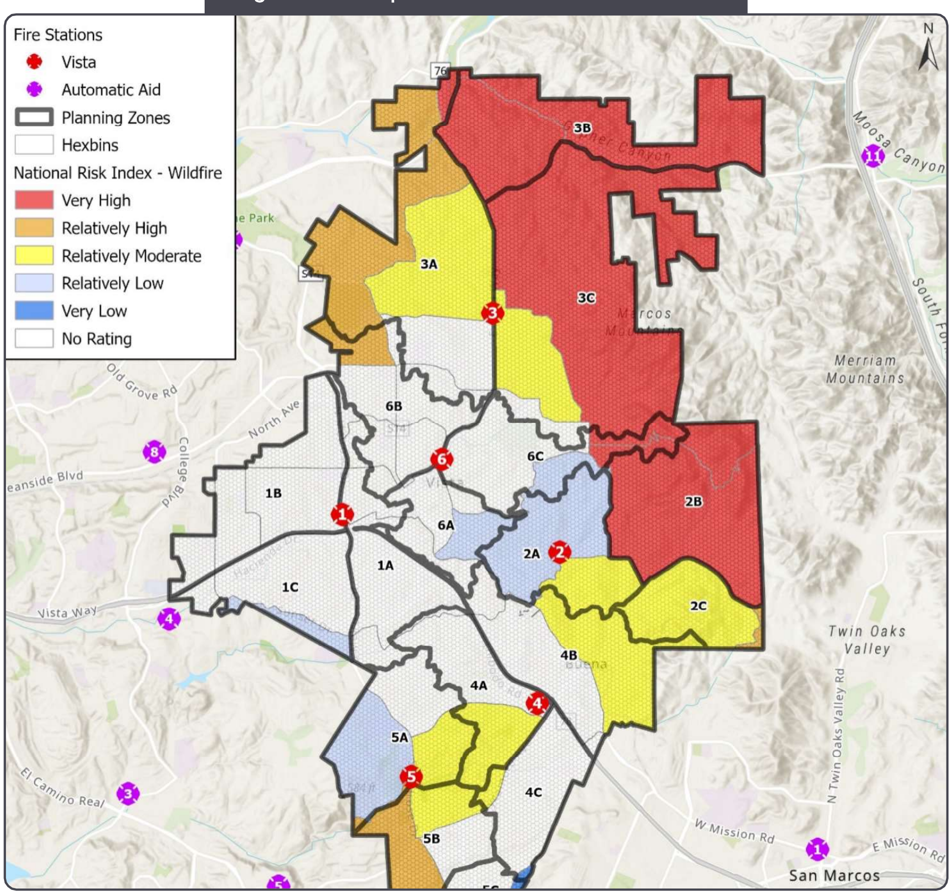
Fire Severity and Fire

The fire severity data from the California Department of Forestry and Fire Protection (CAL FIRE) was incorporated into the risk analysis as a scoring variable for wildland fire risk. Several GIS layers were used, as well as the NRI risk index for wildfire and CAL FIRE's California fire severity data. Areas identified as being at very high risk in the local or state fire hazard severity zones were scored with a 10, and each lower classification of score was calculated relative to the highest score. The scores in **Table 29** represent the percent of the VFD's service area that was classified within each level of NRI wildfire risk. **Figure 31** is a map of NRI wildfire risk by hexbin in the jurisdiction.

Table 29. Service Area Scores by NRI Wildfire Risk Ratings and Hexbins

NRI Wildfire Risk Category	# of Hexbins	% of Hexbins	Score
No Rating	6,484	37.63%	1.667
Very Low	95	0.55%	3.333
Relatively Low	1,375	7.98%	5.000
Relatively Moderate	2,965	17.21%	6.667
Relatively High	1,394	8.09%	8.333
Very High	4,916	28.53%	10.000

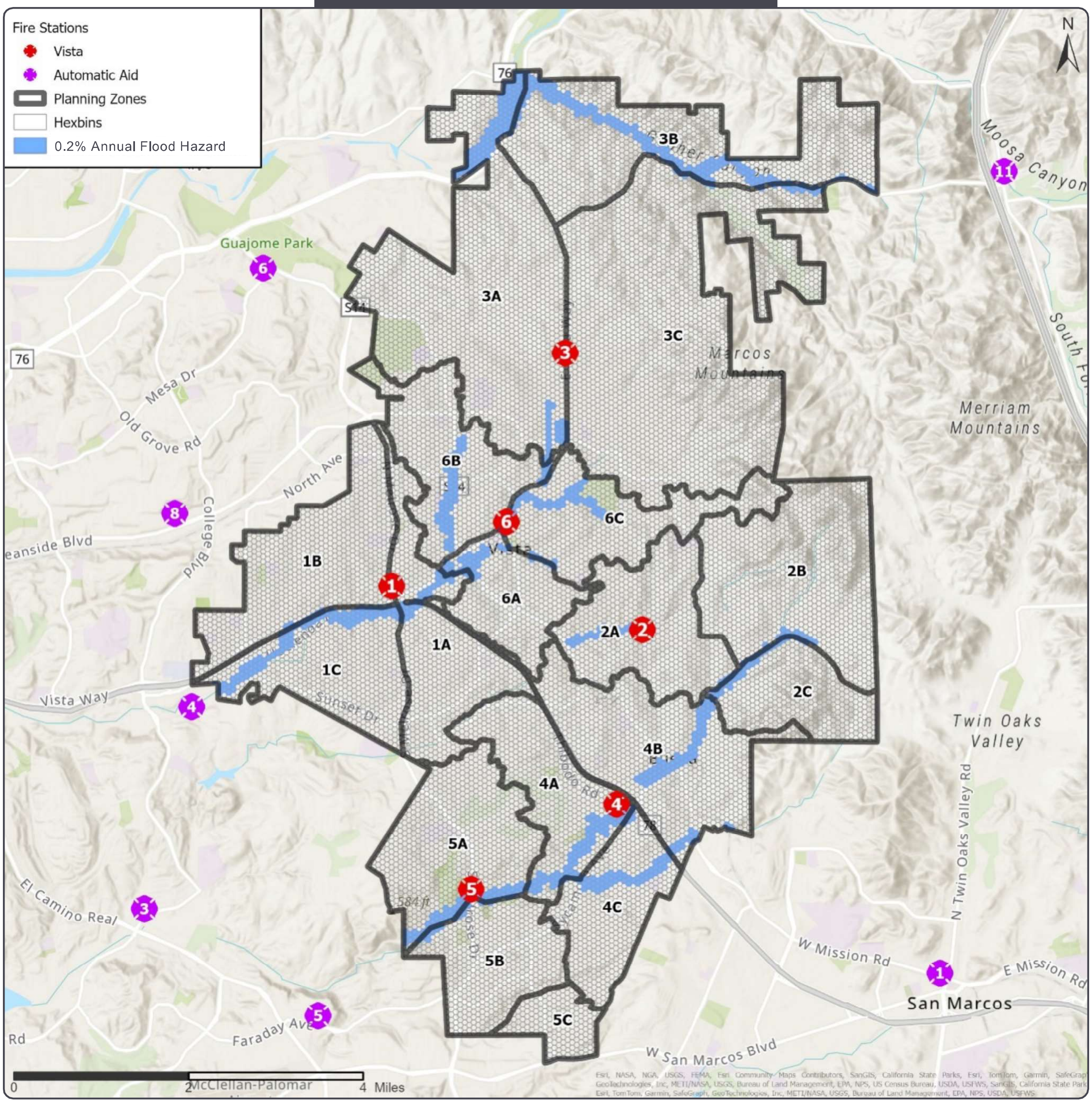
Figure 31. Map of NRI Wildfire Risk Scores



Floods and Flooding

Flood risk and flood zone data from the NRI and FEMA were used within the risk-scoring process for probability, due to the probability of water rescue events. Flood zones were scored with a presence or absence factor based on the type of categorical hazard as 0.01% or 0.02% annual chance of flood. Additionally, NRI flood risk rating data were incorporated into the analysis, using a 10 score for very high risk of flood and a 1.667 score for no risk rating within the geographical area. **Figure 32** is a map of 0.2% annual flood hazard risk in the jurisdiction.

Figure 32. Map of 0.2% Annual Flood Hazard



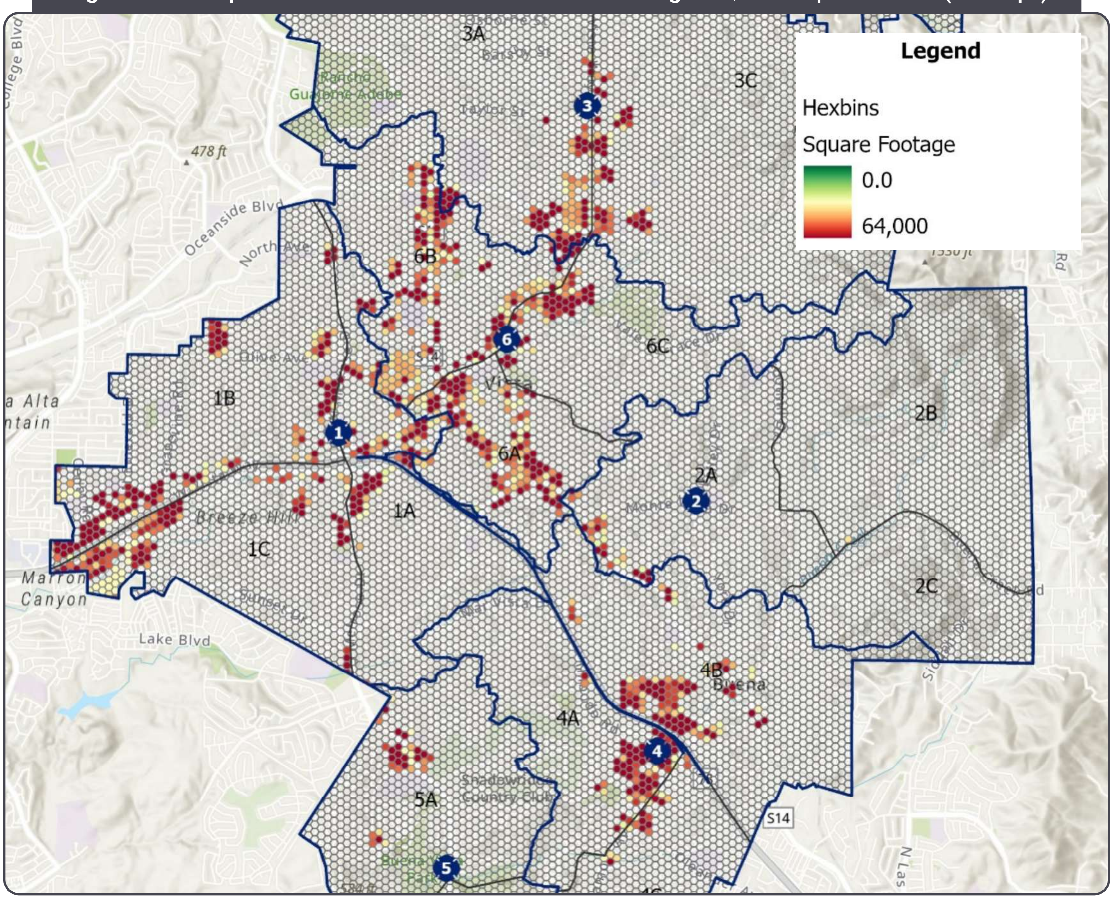
Risk Reduction

The variables outlined thus far primarily address probability and consequence in an additive scoring direction; however, there are additional variables that should quantitatively be assessed and included in the risk analysis to account for risk-reduction activities performed by the VFD. Activities and elements that are considered to be risk-reduction factors include, but are not limited to:

- Inspections of commercial properties
- Code enforcement activities
- Life safety education activities
- Presence of public access to automatic external defibrillators

In order to include these risk-reduction activities in the scoring, reliable data must be available to review. As part of the VFD's self-assessment process, the lack of access to high-quality inspection data was identified as an area for improvement. Although no specific geographical risk reduction data were available, a review of process and inspection activities determined that approximately 75% of commercial buildings over 5,000 square feet are reliably equipped with sprinklers by code regulation. The map in **Figure 33** illustrates locations of commercial buildings over 5,000 square feet in size.

Figure 33. Map of locations of Commercial Buildings >5,000 Square Feet (excerpt)



Although more risk reduction data could not be incorporated into the risk assessment, it is important to note that the VFD does engage in risk reduction activities. Examples of the types and volume of these activities from the 2022 annual report include:

55
Fire Investigator Responses

2,256
Weed Abatement Inspections

372
Construction Inspections

218
Plan Checks

982
Fire and Life Safety Inspections

3,179
People Educated through the Public Education/Fire Safety Department

53
Customer Service Calls Requesting Field Visit

Impact

The CPSE provides guidance on a third risk axis, which enables measurement beyond probability and consequence with the introduction of impact. Impact relates to the impact a hazard or event can have on the responding jurisdiction, specifically, the effect on the community's standard of deployment and coverage capacity when an emergency event occurs. A community's threat of injury and loss increases as fire and emergency resources become depleted and are not available for emergency incident mitigation. To analyze this threat and provide a quantitative score, impact was measured by evaluating the variables described in this section.

Deployment and Effective Response Force

Impact is evaluated by considering what response is necessary for each type of hazard and how unit drawdown affects unit availability. The VFD has six fire stations and a minimal daily staffing of five engines, one truck, one battalion chief, four rescue ambulances, and one basic life support (BLS) ambulance. Each unit is staffed according to the matrix in **Table 30.**

Table 30. Vista Fire Department Staffing and Apparatus by Station

Station	Apparatus	Minimum On-duty Staffing
Station 1 N. Melrose Drive	Engine 121	3
	Rescue Ambulance 121	2
	Battalion Chief 121	1
Station 2 Valley Drive	Engine 122	3
Station 3 Old Taylor Street	Engine 123	3
	Rescue Ambulance 123	2
Station 4 Thibodo Road	Engine 124	3
	Rescue Ambulance 124	2
Station 5 S. Melrose Drive	Engine 125	3
	BLS Ambulance 125	2
Station 6 E. Vista Way	Truck 126	3
	Rescue Ambulance 126	2
	BLS Ambulance 116	2

To quantitatively determine the necessary response as part of impact scoring, daily operational staffing data were used to predict the impact to the organization based on critical tasking needs. The deployment models from the standard response plan matrix were reviewed as part of the Standards of Cover/Community Risk Assessment process, and a rank scoring was used to incorporate the deployment of units into the impact score. The deployment model was ranked such that a score of 10 indicated the highest impact in terms of units and staffing, and a score of 1 represented the lowest impact to the organization. **Table 31** shows the ranking based on actual responses/impact.

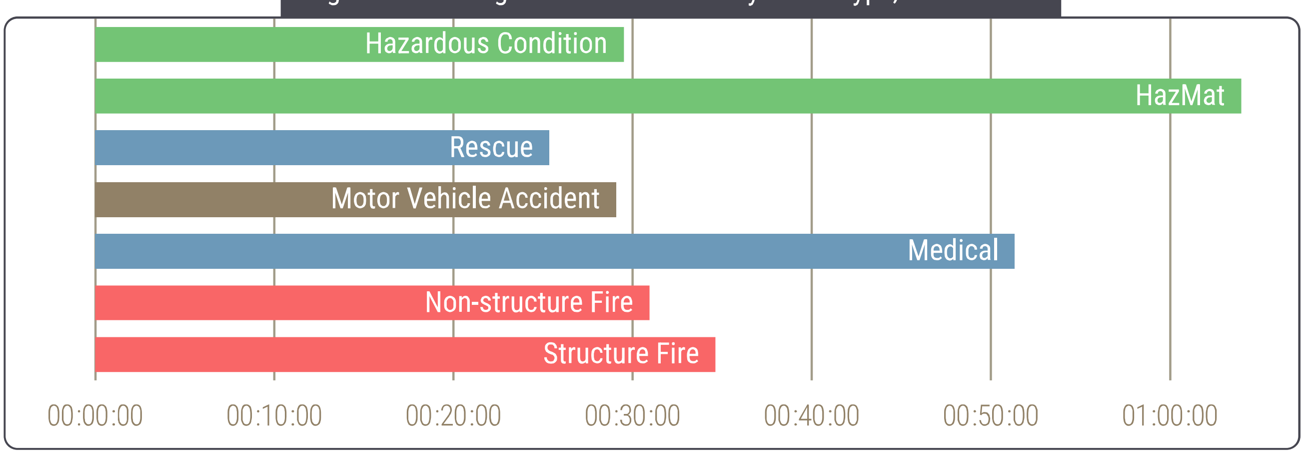
Table 31. Average Unit Deployment and Scoring by Event Type

Event Type	Average Unit Deployment	Score
Non-structure fire	9.28%	3.467
EMS	9.27%	3.463
Hazardous condition	11.59%	4.333
Structure fire	25.00%	9.344
Technical rescue	26.76%	10.00
Vegetation fire	20.00%	7.475
Target hazard	19.57%	7.313
Investigation	4.35%	1.625
Motor vehicle accident	10.87%	4.063
Alarm	7.83%	2.925
Service call	4.35%	1.625

Commitment Times and Incident Durations

Quantifying how unit drawdown affects the availability of units for the purpose of risk scoring requires analysis of historical incident data to understand the amount of time units were committed to events and therefore unavailable for service. Commitment times overall and by type of event are key variables in calculating a quantitative impact score. The following statistics were analyzed from historical response data, and the graph in **Figure 34** illustrates the average incident duration by event type.

Figure 34. Average Incident Duration by Event Type, 2018–2023



Using the time committed to specific event types, scores were derived and used within the risk-scoring process to approximate impact for the various risks. **Table 32** summarizes the impact scores by hazard type.

Table 32. Impact Scores by Event Type

Event Type	Impact Score
Structure fire	5.411
Non-structure fire	4.835
Medical	8.025
Motor vehicle accident	4.546
Rescue	3.961
HazMat	10.000
Hazardous condition	4.610

Variable Summary

The preceding sections described several variables that were evaluated for potential inclusion in the quantitative risk analysis. Variable datasets were evaluated for quality, mapped across the jurisdiction, and scored with a relative rank-scoring method to normalize and scale the data. These variables were identified and analyzed for their relationships to probability (of occurrence), consequence (to the community), and/or impact (to the agency). In some situations, variables were analyzed, ranked, and scored, but intentionally not included in the final risk-scoring calculations, because other variables were determined to be more accurate indicators. If those variables had been included, certain characteristics might carry an unintended weight. The specific variables included in each score are outlined in the quantitative scoring described in Part II of this document.

SECTION 2

PART II

Quantitative Risk

The following sections explain specifically how each variable in Part I of the analysis was calculated into the probability, consequence, and impact scores for each hazard. Each of the next seven sections briefly describes the variables included in the three-axis method of calculating the risk score. Risk is classified for the following seven hazard categories based on the services the VFD provides to the community:

1. **Structure fires**
2. **Non-structure fires**
3. **Wildland fires**
4. **EMS**
5. **Technical rescue**
6. **HazMat**
7. **Natural and human-made hazards and disasters**

Technical Methods

ArcGIS software was used to aggregate variables into the hexbins, and data were loaded into a structured query language (SQL) database. Queries were written in SQL Server Management Studio to calculate probability, consequence, and impact independently for each service line. Then the three scores were input into the CFAI's three-axis formula below to determine the total risk score:

Risk Score

$$= \sqrt{\frac{(Probability * Consequence)^2}{2} + \frac{(Consequence * Impact)^2}{2} + \frac{(Impact * Probability)^2}{2}}$$

Calculated Risk: Structure Fires

Using the analysis of each variable, as described in Part I, structure fire risk was calculated by using relevant variables in each hexbin to calculate probability, consequence, and impact. **Table 33** summarizes which variables from the variable analysis were included in the final calculations for structure fire risk.

Table 33. Probability, Consequence, and Impact Variables for Structure Fires

Structure Fire Probability Variables
Historical incidents weighted by the score derived from historical fires
Incidents weighted by subset score derived from historical structure fires
Score derived from population density of location
The presence of commercial buildings in a hexbin weighted by score derived from historical structure fires
Score derived from the percent rank of the number of addresses in a hexbin
Score derived from the percent of population living in poverty, as defined by social vulnerability index (SVI)
Score derived from the percent rank of crowding in a hexbin, as defined by SVI
Land use score derived from relationship between land use type and historical structure fires
Structure Fire Consequence Variables
Score derived from overall SVI score to account for populations and demographics where greater consequence might be encountered
Score derived from socioeconomic vulnerability within the geography
Score derived from the percent rank of disabled population present in a hexbin
Score derived from property value weighted by the percent of non-confined fires (to estimate consequence of property loss)
Score derived from expected travel time distance
Scores derived from the presence of critical infrastructure and special locations, as described in Part I
Risk reduction: A reduction factor to reduce scores, derived from the presence of commercial buildings over 5,000 square feet in a hexbin, weighted by a reduction factor score based on an estimate of 75% of commercial building inspections.
Structure Fire Impact Variables
Hydrant zone score derived from the locations outside the hydrant buffer zones
Commitment score derived from incident duration and unit commitment times for structure fire incidents
Deployment score based on critical tasking and effective response force expected for structure fires
Score derived from suppression unit coverage within the hexbin

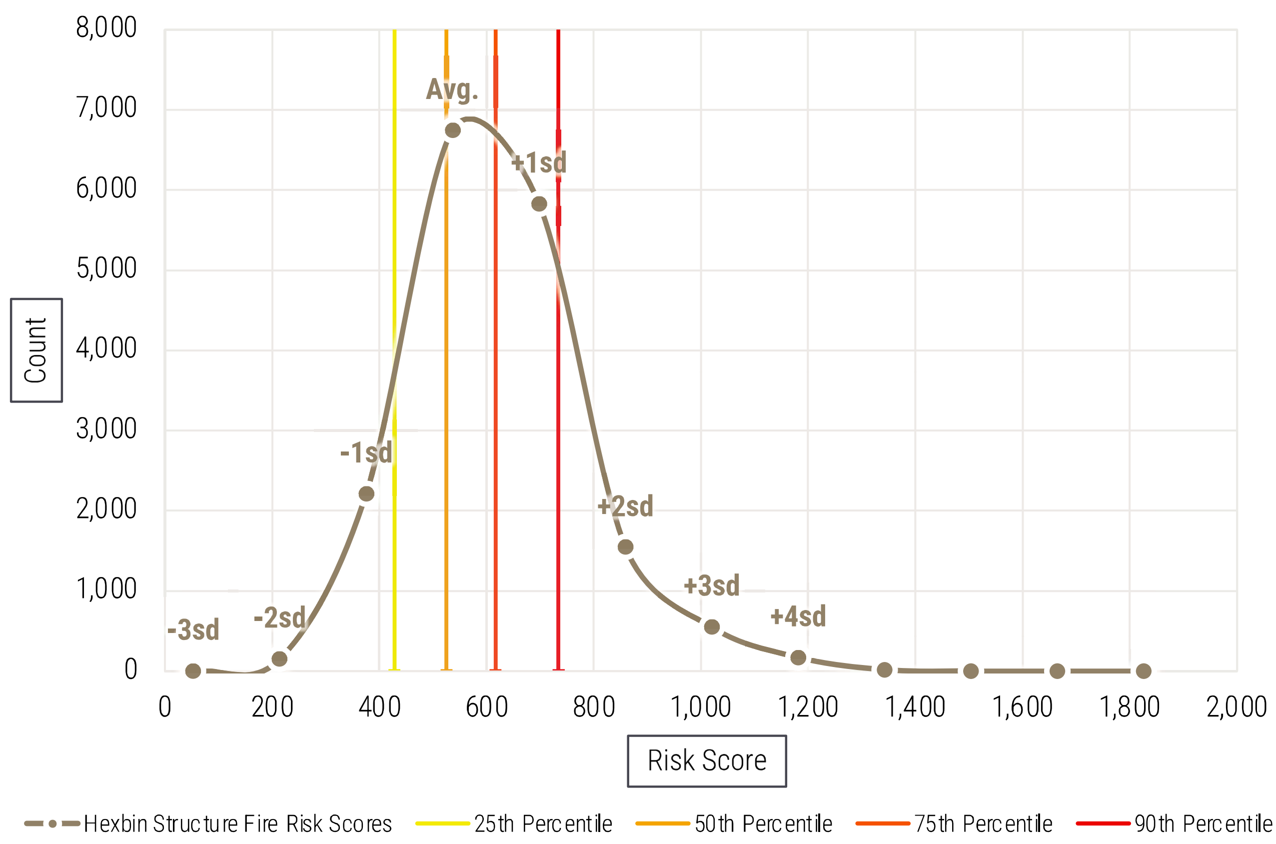
After scores were calculated in each hexbin, analysis was performed throughout the hexbins prior to aggregation into the larger planning zones. Summary statistics were prepared, and the analysis allowed for a determination of what scores comprise low, moderate, high, and maximum structure fire categorical risk. **Table 34** shows the summary statistics for structure fire risk in all hexbins:

Table 34. Summary Statistics: Structure Fire Risk

Average	Standard Deviation	Maximum	Minimum	Interquartile Range	Range
536.559	161.242	1,675.063	101.399	188.42	1,573.665

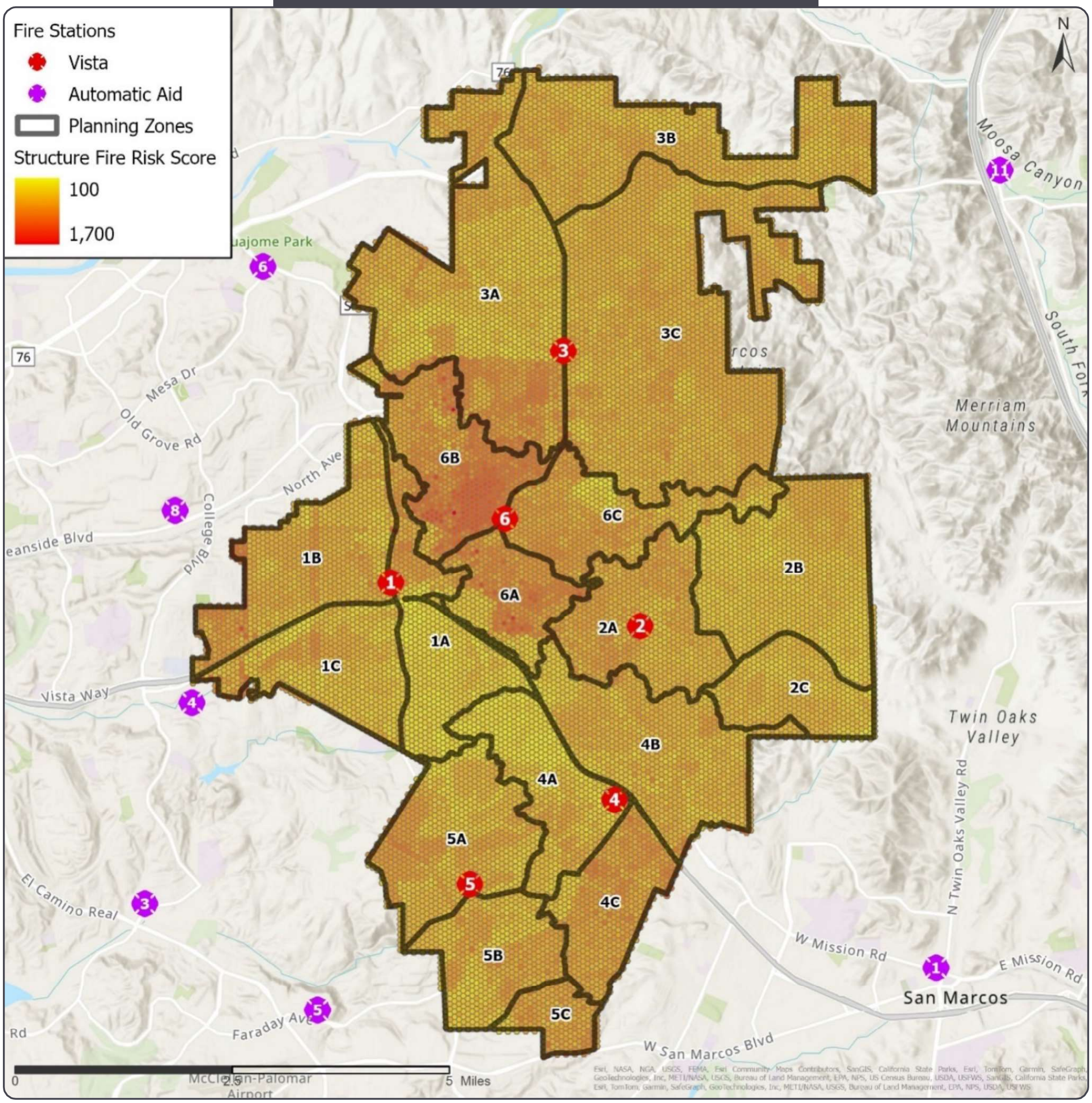
Figure 35 displays the distribution of structure fire risk scores by plotting the average and standard deviations. Percentile line indicators were also plotted to illustrate non-normal distributions and skewness.

Figure 35. Structure Fire Risk Scores: Hexbin Distribution



The structure fire risk scores across all hexbins are illustrated in **Figure 36,** using an unclassed scale from lowest to highest to show the granularity and variability of scores by planning zone area.

Figure 36. Hexbins: Map of Structure Fire Risk Scores



After the hexbins were aggregated into a planning zone, average scores were calculated, and categorical risk was assigned based on percentile, as shown in **Table 35.**

Table 35. Structure Fire Risk Category and Score Ranges by Percentile

Risk Category	Percentile	Score Range
Low	Less than 50th percentile	X < 525.447
Moderate	50th to 75th percentile	525.447 ≤ X < 616.626
High	75th to 90th percentile	616.626 ≤ X < 734.506
Maximum	Above 90th percentile	734.506 ≤ X

Figure 37. Planning Zones: Map of Structure Fire Risk Scores

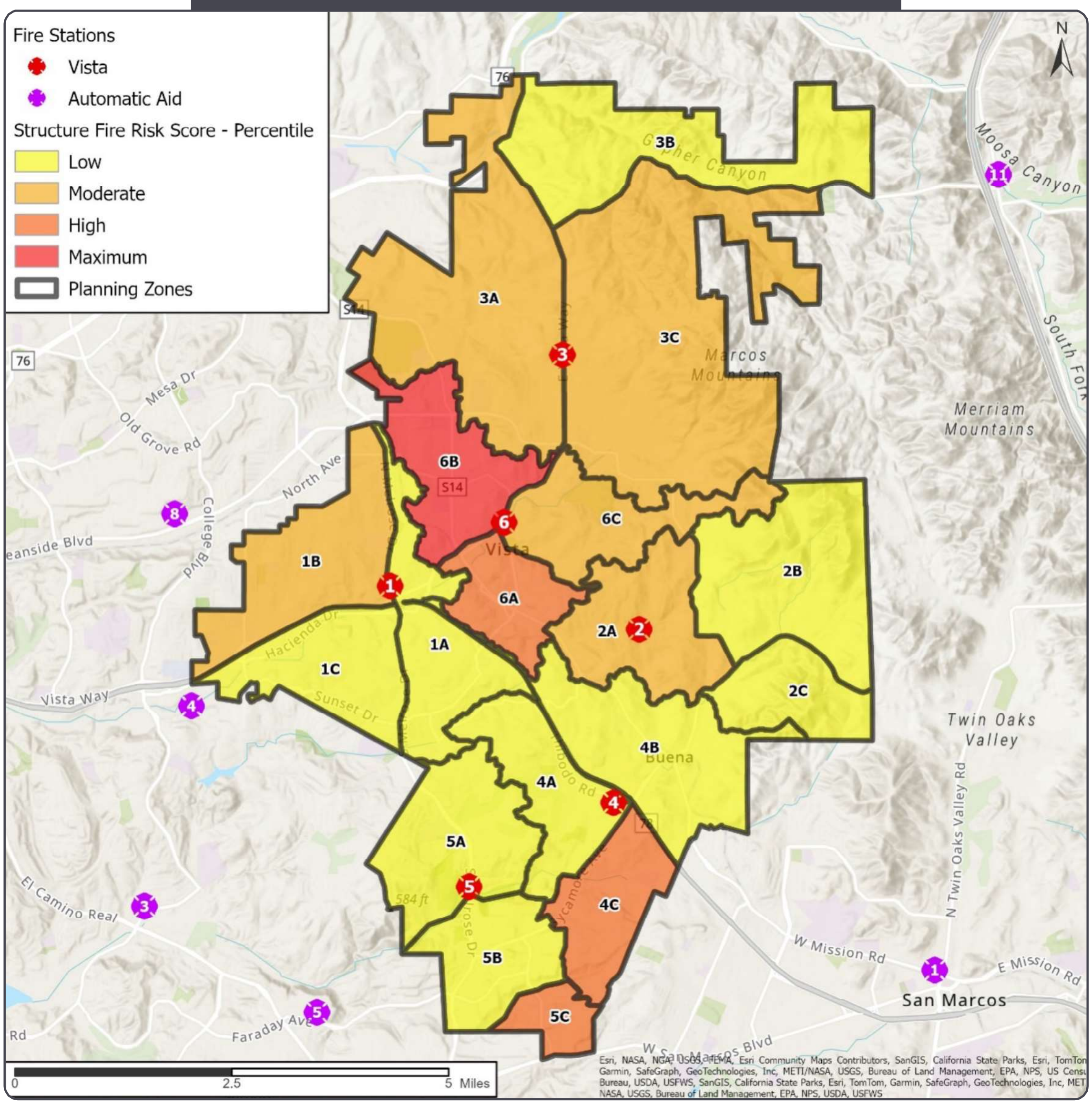


Figure 37 illustrates structure fire categorical risk based on average hexbin scores in each planning zone. It represents the average scores in each planning zone and the structure fire categorical risk assigned to each area. The details of the scores in each planning zone are summarized in **Table 36.**

Table 36. Structure Fire Risk Scores by Station and Planning Zone

Station Area	Planning Zone	Minimum Score	Maximum Score	Average Score	Risk Category
1	1A	101.399	1,252.873	400.453	Low
	1B	234.091	1,237.838	568.053	Moderate
	1C	194.083	1,143.281	477.211	Low
2	2A	288.082	971.213	568.520	Moderate
	2B	203.627	739.175	438.746	Low
	2C	222.818	704.937	456.904	Low
3	3A	202.426	1,198.364	540.779	Moderate
	3B	317.658	773.664	516.811	Low
	3C	277.292	961.243	546.134	Moderate
4	4A	143.290	710.732	375.556	Low
	4B	140.691	970.340	499.748	Low
	4C	280.427	1,106.591	649.842	High
5	5A	192.051	928.548	520.449	Low
	5B	288.299	1,113.200	515.787	Low
	5C	308.354	1,006.564	630.997	High
6	6A	227.895	1,384.169	699.380	High
	6B	312.077	1,675.063	826.818	Maximum
	6B	212.286	1,232.711	578.173	Moderate

The quantitative scores reveal that one-half of the planning zones are categorized as low risk for structure fires, and only one planning zone is categorized as maximum risk. Using quantitative scoring and data, these scores approximate the probability consequence and impact. Note it is possible that higher quality data and the availability of new variable data relevant to structure fires could change these scores in the future.

Calculated Risk: Non-Structure Fires

Non-structure fires include events such as vehicle fires, rubbish fires, and outside fires. Using the analysis of each variable, as described in Part I, non-structure fire risk was calculated by using relevant variables in each hexbin to calculate probability, consequence, and impact. **Table 37** summarizes which variables were included in the final calculations for non-structure fire risk.

Table 37. Probability, Consequence, and Impact Variables for Non-Structure Fires

Non-Structure Fire Probability Variables
All incidents weighted by the score derived from historical non-structure fires
Land use score derived from the relationship between zoning data and non-structure fires for relevant land use zone types, including open space and agricultural
Score based on presence of freeways and roadways (as proxy for location of vehicle fires)
Score based on presence of major roadway (as additional proxy for location of vehicle fires)
Score based on presence of schools (as proxy for juvenile-set fires and school rubbish fires)
Score based on presence of bus route (as proxy for location of vehicle fires)
Non-Structure Fire Consequence Variables
Transportation burden SVI
Population in agricultural or open space
Presence of critical infrastructure, as described in Part I and including major roads and freeways
Travel time
Local and state fire hazard severity zones
Presence of special locations, as described in Part I
Non-Structure Fire Impact Variables
Hydrant proximity
Commitment times for non-structure fires
Deployment scores
Travel time of suppression unit within 4 min

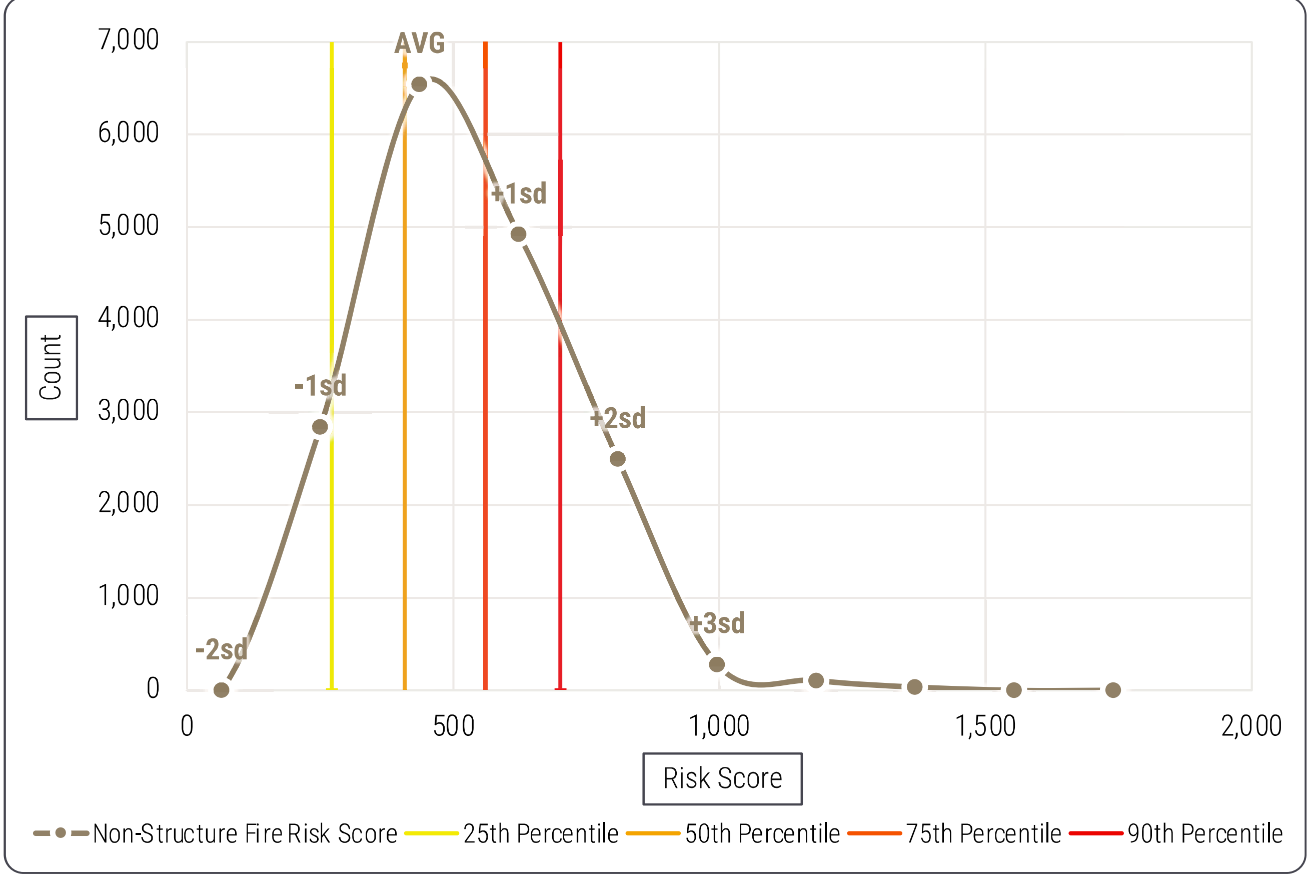
After scores were calculated in each hexbin, analysis was performed throughout the hexbins prior to aggregation into the larger planning zones. Summary statistics were prepared, and the hexbin analysis allowed for a determination of what scores comprise low, moderate, high, and maximum non-structure fire categorical risk. **Table 38** shows the summary statistics for non-structure fire risk in all hexbins.

Table 38. Summary Statistics: Non-structure Fire Risk

Average	Standard Deviation	Maximum	Minimum	Interquartile Range	Range
436.918	186.221	1,436.113	89.514	151.992	1,346.60

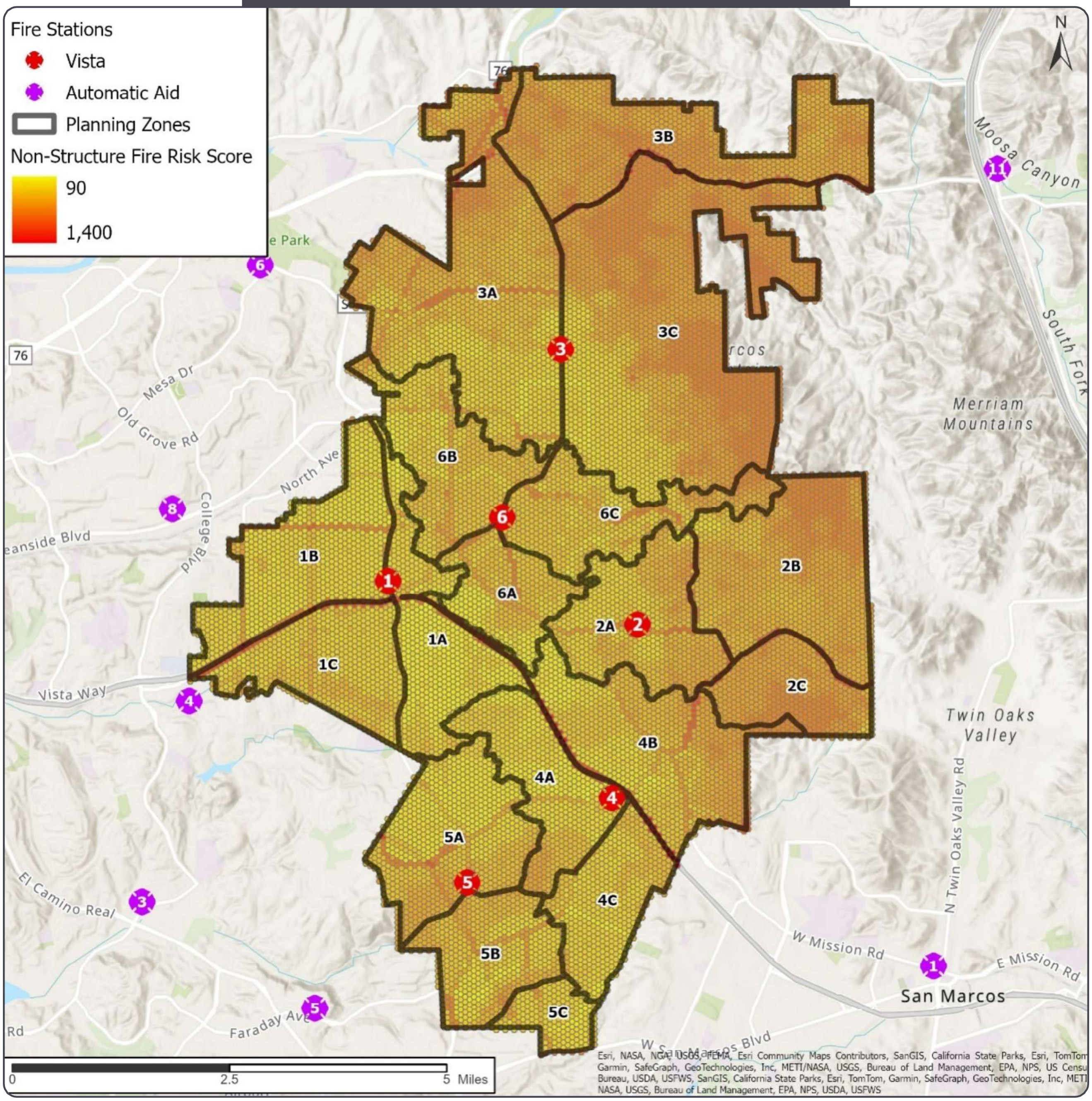
Figure 38 displays the distribution of non-structure fire risk scores by plotting the average and standard deviations. Percentile line indicators were also plotted to illustrate non-normal distributions and skewness.

Figure 38. Non-Structure Fire Risk Scores: Hexbin Distribution



The non-structure fire risk scores across all hexbins are illustrated in **Figure 39,** using an unclassed scale from lowest to highest to show the granularity and variability of scores by planning zone area.

Figure 39. Hexbins: Map of Non-Structure Fire Risk Scores



After the hexbins were aggregated into a planning zone, average scores were calculated, and categorical risk was assigned based on percentile, as shown in **Table 39.**

Table 39. Non-Structure Fire Risk Category and Score Ranges by Percentile

Risk Category	Percentile	Score Range
Low	Less than 50th percentile	X < 408.937
Moderate	50th to 75th percentile	408.937 ≤ X < 560.929
High	75th to 90th percentile	560.929 ≤ X < 701.530
Maximum	Above 90th percentile	701.530 ≤ X

Figure 40 illustrates non-structure fire categorical risk based on average hexbin scores in each planning zone.

Figure 40. Planning Zones: Map of Non-Structure Fire Risk Scores

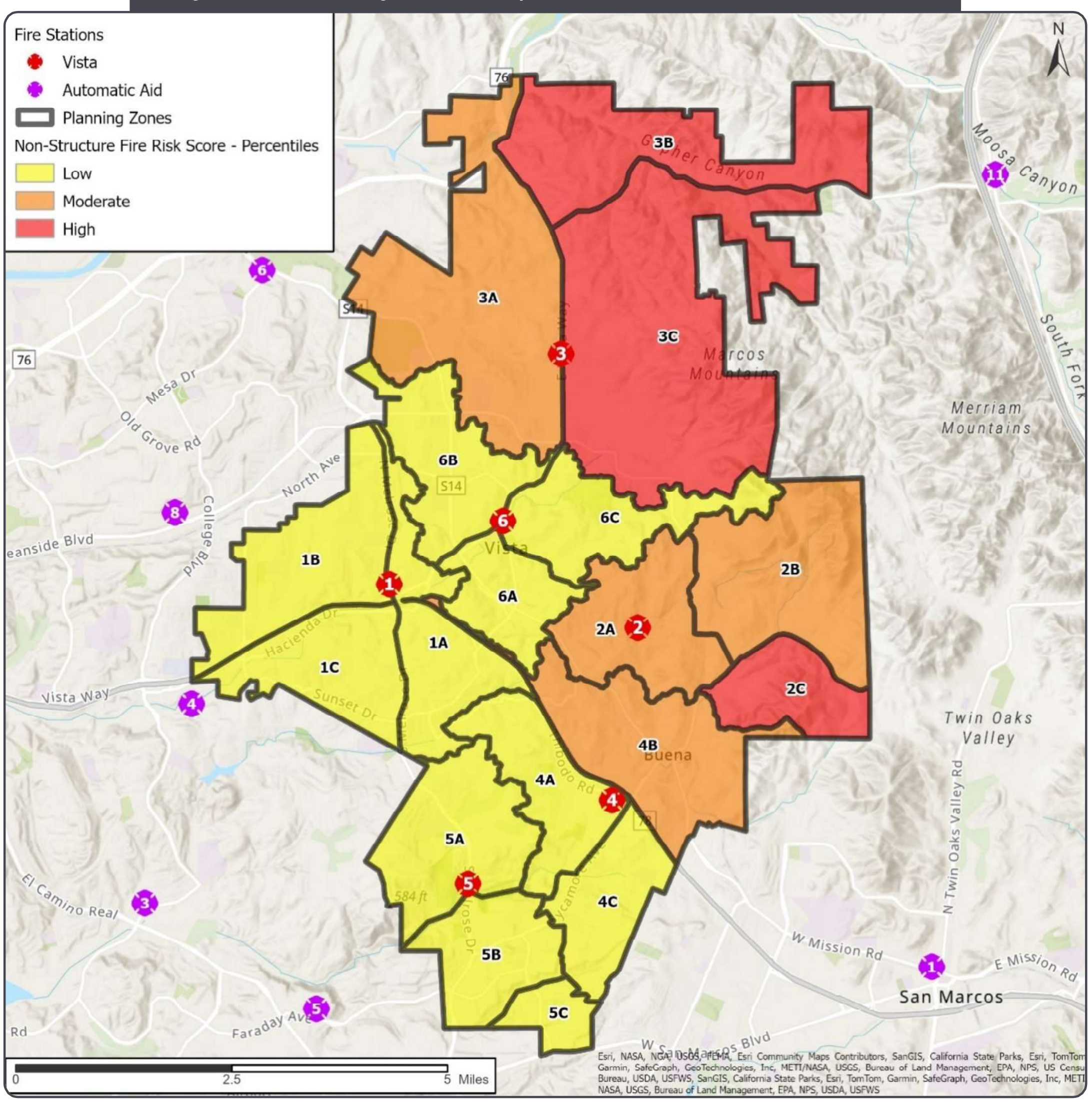


Figure 40 represents the average scores in each planning zone and the categorical non-structure fire risk assigned to each area. The details of the scores in each planning zone are summarized in **Table 40.**

Table 40. Non-Structure Fire Risk Scores by Station and Planning Zone

Station Area	Planning Zone	Minimum Score	Maximum Score	Average Score	Risk Category
1	1A	109.595	1,088.793	254.827	Low
	1B	125.812	1,305.151	302.222	Low
	1C	151.386	1,240.922	368.672	Low
2	2A	89.514	974.589	409.511	Moderate
	2B	215.068	958.762	541.869	Moderate
	2C	309.408	1,046.015	610.840	High
3	3A	94.960	1,180.660	444.193	Moderate
	3B	394.325	1,182.925	589.351	High
	3C	135.685	1,190.867	563.100	High
4	4A	93.700	1,091.052	304.147	Low
	4B	92.195	1,362.610	447.294	Moderate
	4C	142.218	1,436.113	331.686	Low
5	5A	114.471	1,035.406	340.438	Low
	5B	126.251	754.777	377.659	Low
	5C	132.523	771.228	318.116	Low
6	6A	142.604	853.030	341.582	Low
	6B	109.595	739.283	349.597	Low
	6B	142.604	823.917	397.983	Low

The quantitative scores reveal that approximately 60% of VFD's service area is categorized as low risk for non-structure fires. Using quantitative scoring and data, these scores approximate the probability consequence and impact. Note it is possible that higher quality data and the availability of new variable data relevant to non-structure fires could change these scores in the future.

Calculated Risk: Wildland Fires

Using the analysis of each variable, as described in Part I, wildland fire risk was calculated by using relevant variables in each hexbin to calculate probability, consequence, and impact. **Table 41** summarizes which variables from the variable analysis in Part I were included in the final calculations.

Table 41. Probability, Consequence, and Impact Variables for Wildland Fires

Wildland Fire Probability Variables
All historical incidents weighted by the score derived from historical vegetation, crop, and brush fires
NFIRS fire score weighted by subset score derived from historical wildland, vegetation, and brush fires
Rural location score
NRI score derived for risk of drought
NRI score derived for risk of strong winds
NRI score derived for wildland fire risk
Wildland Fire Consequence Variables
Score derived from overall SVI values
Score derived from property values
Population density for rural and open space land use zone
Score derived from percent rank of population that is disabled
Score derived from travel time distance from fixed station location
Score derived from the presence of a fire hazard severity zone
Scores derived from the presence of several critical infrastructure, utilities, and special locations, as defined in Part I
Wildland Fire Impact Variables
Score derived from hydrant proximity
Commitment score derived from units' historical commitment duration on wildland fire incidents
Deployment score based on critical tasking and effective response force expected for wildland fires
Score derived from suppression unit coverage within the hexbin

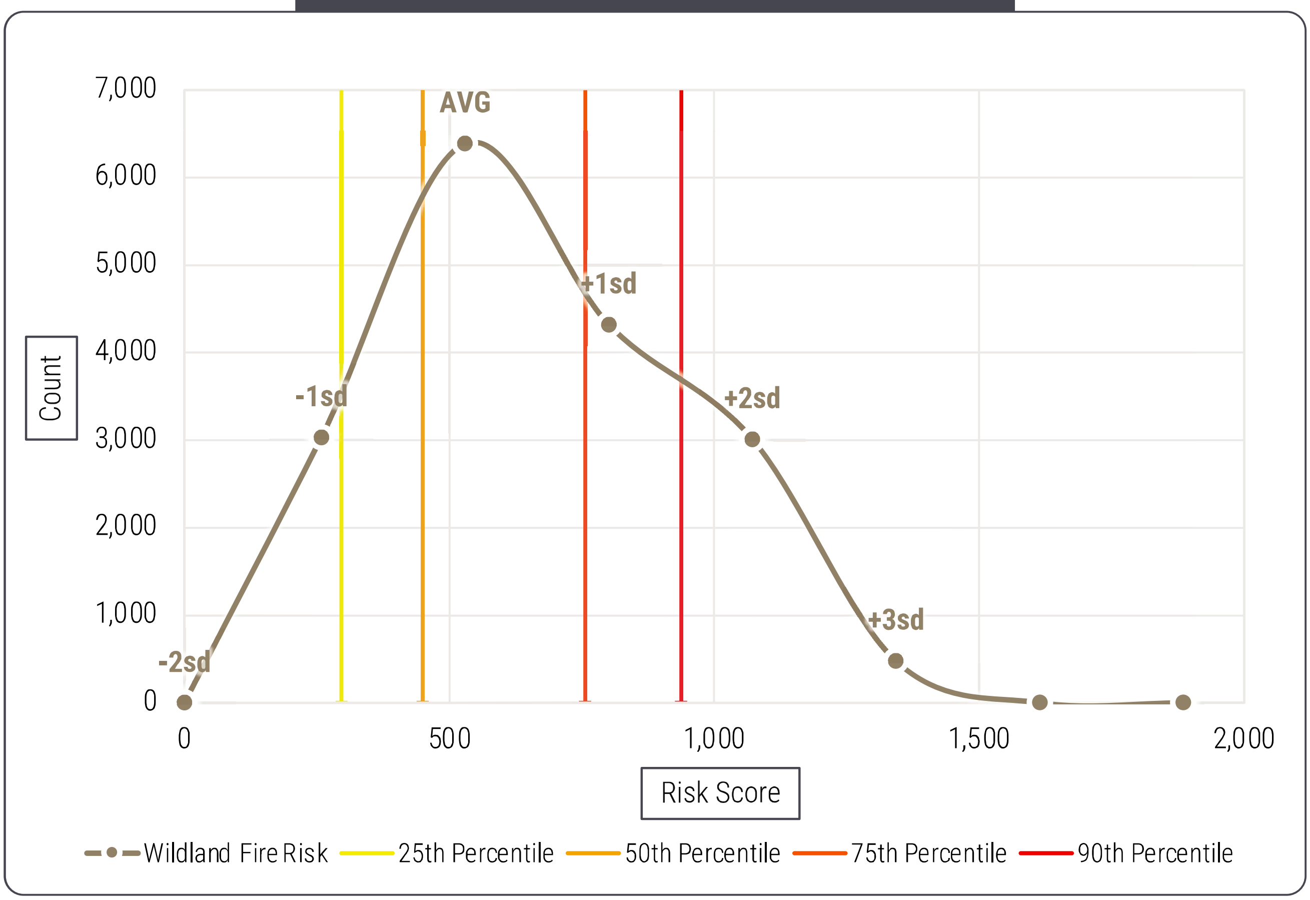
After scores were calculated in each hexbin, analysis was performed throughout the hexbins prior to aggregation into the larger planning zones. Summary statistics were prepared, and the hexbin analysis allowed for a determination of what risk scores comprise low, moderate, high, and maximum wildland fire categorical risk. **Table 42** shows the summary statistics for wildland fire risk in all hexbins.

Table 42. Summary Statistics: Wildland Fire Risk

Average	Standard Deviation	Maximum	Minimum	Interquartile Range	Range
529.695	271.109	1,319.270	121.053	459.397	1,198.217

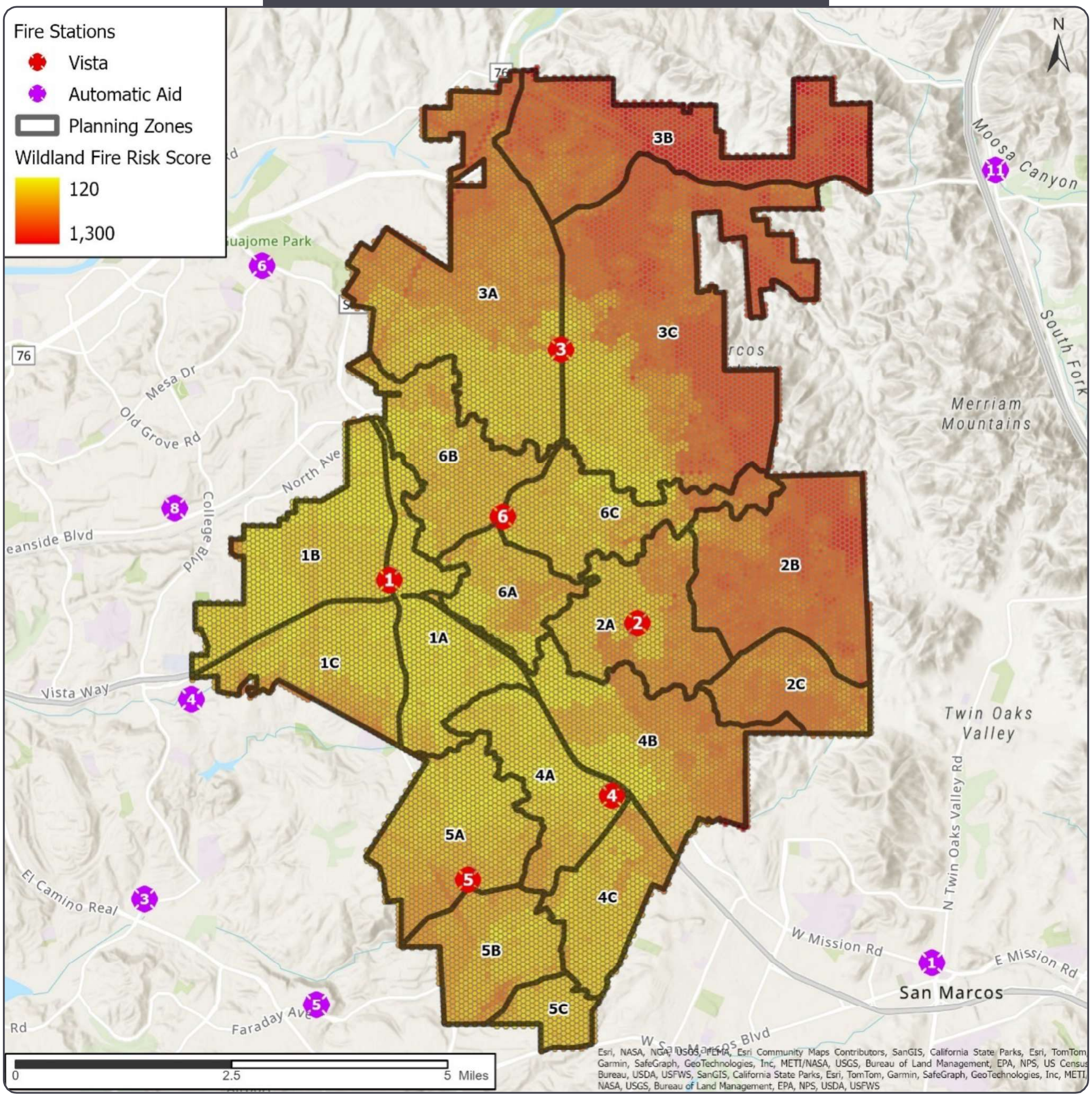
Figure 41 displays the distribution of wildland fire risk scores by plotting the average and standard deviations. Percentile line indicators were also plotted to illustrate non-normal distributions and skewness.

Figure 41. Wildland Fire Risk Scores: Hexbin Distribution



The wildland fire risk scores across all hexbins are illustrated in **Figure 42,** using an unclassed scale from lowest to highest to show the granularity and variability of scores by planning zone area.

Figure 42. Hexbins: Map of Wildland Fire Risk Scores



After the hexbins were aggregated into a planning zone, average scores were calculated, and categorical wildland fire risk was assigned based on percentile, as shown in **Table 43.**

Table 43. Wildland Fire Risk Category and Score Ranges by Percentile

Risk Category	Percentile	Score Range
Low	Less than 50th percentile	X < 449.701
Moderate	50th to 75th percentile	449.701 ≤ X < 756.137
High	75th to 90th percentile	756.137 ≤ X < 937.255
Maximum	Above 90th percentile	937.255 ≤ X

Figure 43 illustrates wildland fire categorical risk based on average hexbin scores in each planning zone.

Figure 43. Planning Zones: Map of Wildland Fire Risk Scores

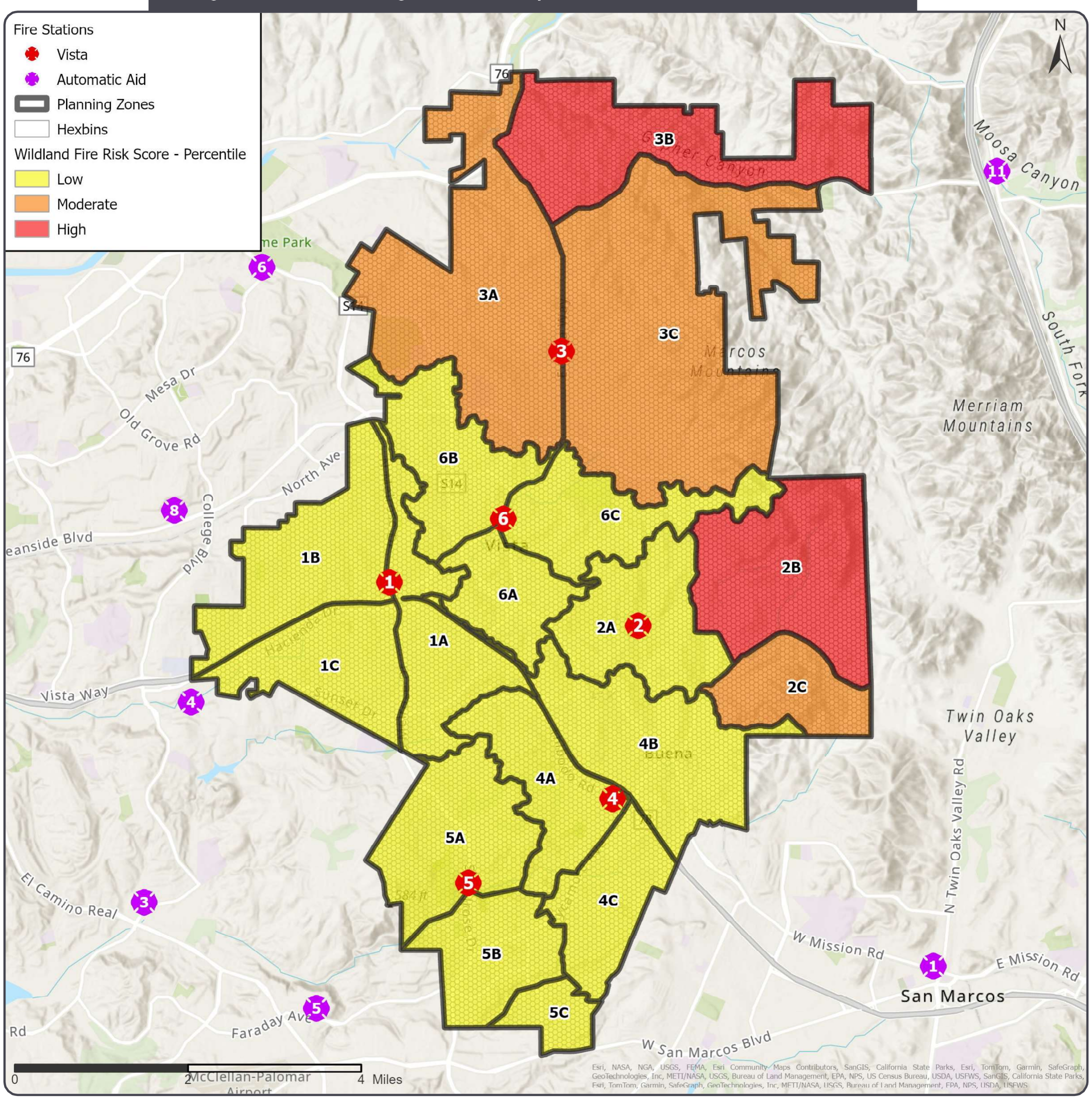


Figure 43 represents the average scores in each planning zone and the categorical wildland fire risk assigned to each area. The details of the scores in each planning zone are summarized in **Table 44.**

Table 44. Wildland Fire Risk Scores by Station and Planning Zone

Station Area	Planning Zone	Minimum Score	Maximum Score	Average Score	Risk Category
1	1A	121.471	536.443	229.394	Low
	1B	128.214	751.958	256.145	Low
	1C	121.053	919.171	326.654	Low
2	2A	202.206	928.339	488.964	Moderate
	2B	206.523	1130.295	804.956	High
	2C	384.138	868.771	659.272	Moderate
3	3A	193.600	1136.279	534.511	Moderate
	3B	561.013	1319.270	977.557	Maximum
	3C	177.345	1135.598	732.987	Moderate
4	4A	130.200	546.078	287.798	Low
	4B	125.153	1287.666	474.358	Moderate
	4C	167.071	786.941	362.972	Low
5	5A	158.201	770.942	364.112	Low
	5B	184.131	784.551	425.396	Low
	5C	227.789	689.359	358.910	Low
6	6A	162.027	733.860	357.686	Low
	6B	140.235	699.924	358.040	Low
	6B	152.480	992.504	409.329	Low

The quantitative scores reveal that most of the planning zones are categorized as low risk, and only one planning zone is categorized as maximum risk. Using quantitative scoring and data, these scores approximate the probability consequence and impact of wildland fire hazards. Note it is possible that higher quality data and the availability of new variable data relevant to wildland fires could change these scores in the future.

Calculated Risk: EMS Emergencies

EMS incidents include medical emergencies, traumatic injuries, and motor vehicle accidents. The spectrum of EMS events spans from critical, life-threatening events to low-acuity events, and the risks represented in the calculations consider the full spectrum of EMS risk. Using the analysis of each variable, as described in Part I, EMS emergencies risk was calculated by using relevant variables in each hexbin to calculate probability, consequence, and impact. **Table 45** summarizes which variables from the variable analysis were included in the final calculations.

Table 45. Probability, Consequence, and Impact Variables for EMS Emergencies

EMS Probability Variables
All historical incidents weighted by the score derived from historical EMS incidents
Score derived from population density of location
Score derived from the percent of population over 65 years weighted by EMS encounters of patients within the demographic age group
Score derived from the percent of population under 17 years weighted by EMS encounters of patients within the demographic age group
Score derived from recurring locations of all incidents weighted by EMS rank score
Score derived from percent of population uninsured
Land use score derived from historical relationship between EMS events and land use type
EMS Consequence Variables
Score derived from overall SVI score to account for populations and demographics where greater consequence might be encountered
Score derived from historical incidents weighted by EMS transports score
Score derived from population density rank score weighted by percent patient encounters when patient was dead on scene (with and without resuscitation attempted)
Score derived from socioeconomic status score from SVI
Score derived from percent of population disabled
Score derived from expected travel time distance
EMS Impact Variables
Commitment score derived from units' historical commitment duration on EMS calls
Score derived from EMS unit coverage within hexbin
Deployment score based on critical tasking and effective response force expected for EMS calls

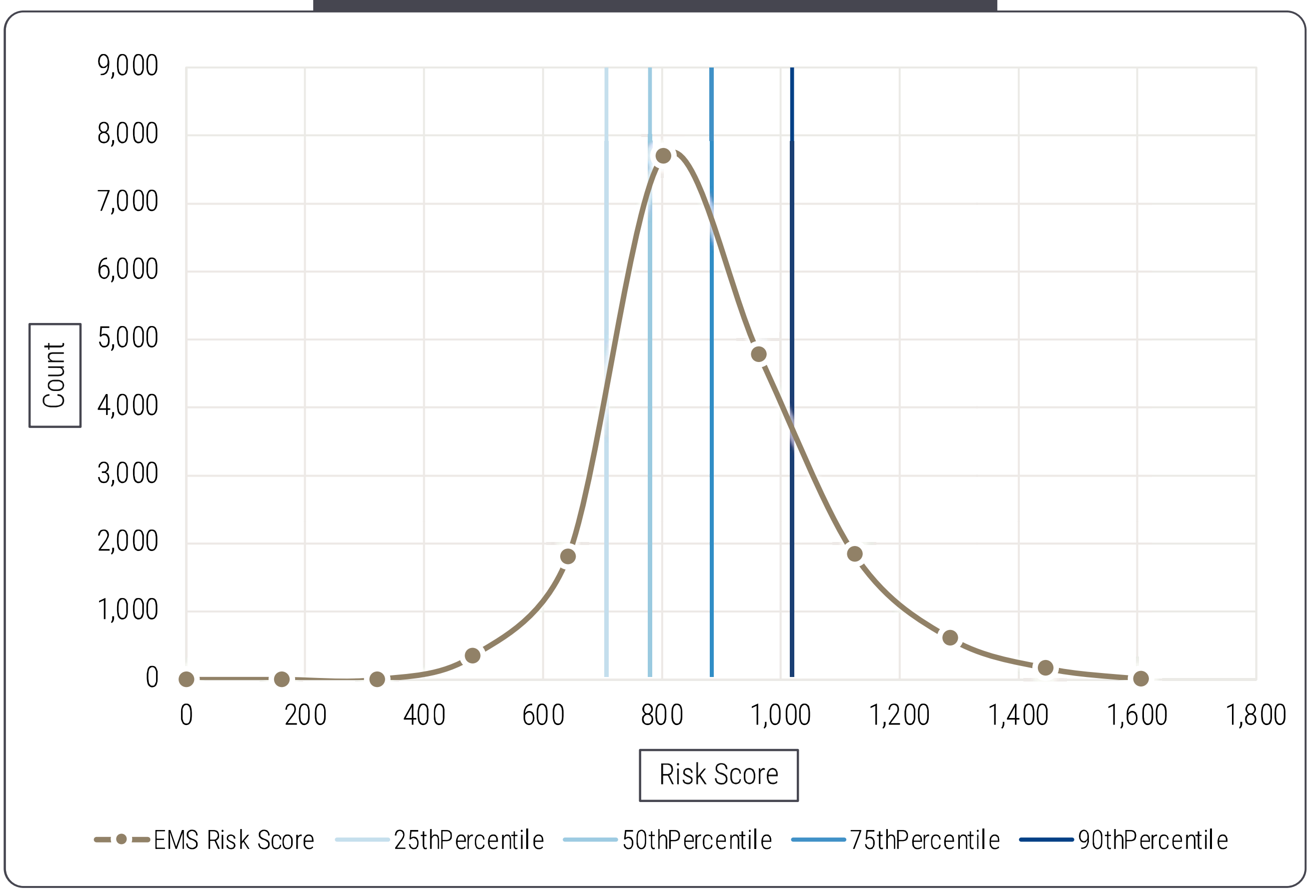
After scores were calculated in each hexbin, analysis was performed prior to aggregation into the larger planning zones. Summary statistics were prepared, and the hexbin analysis allowed for a determination of what scores comprise low, moderate, high, and maximum EMS risk. **Table 46** shows the summary statistics for EMS risk in all hexbins:

Table 46. Summary Statistics: EMS Risk

Average	Standard Deviation	Maximum	Minimum	Interquartile Range	Range
802.91	160.66	1,567.00	372.81	177.63	1,194.20

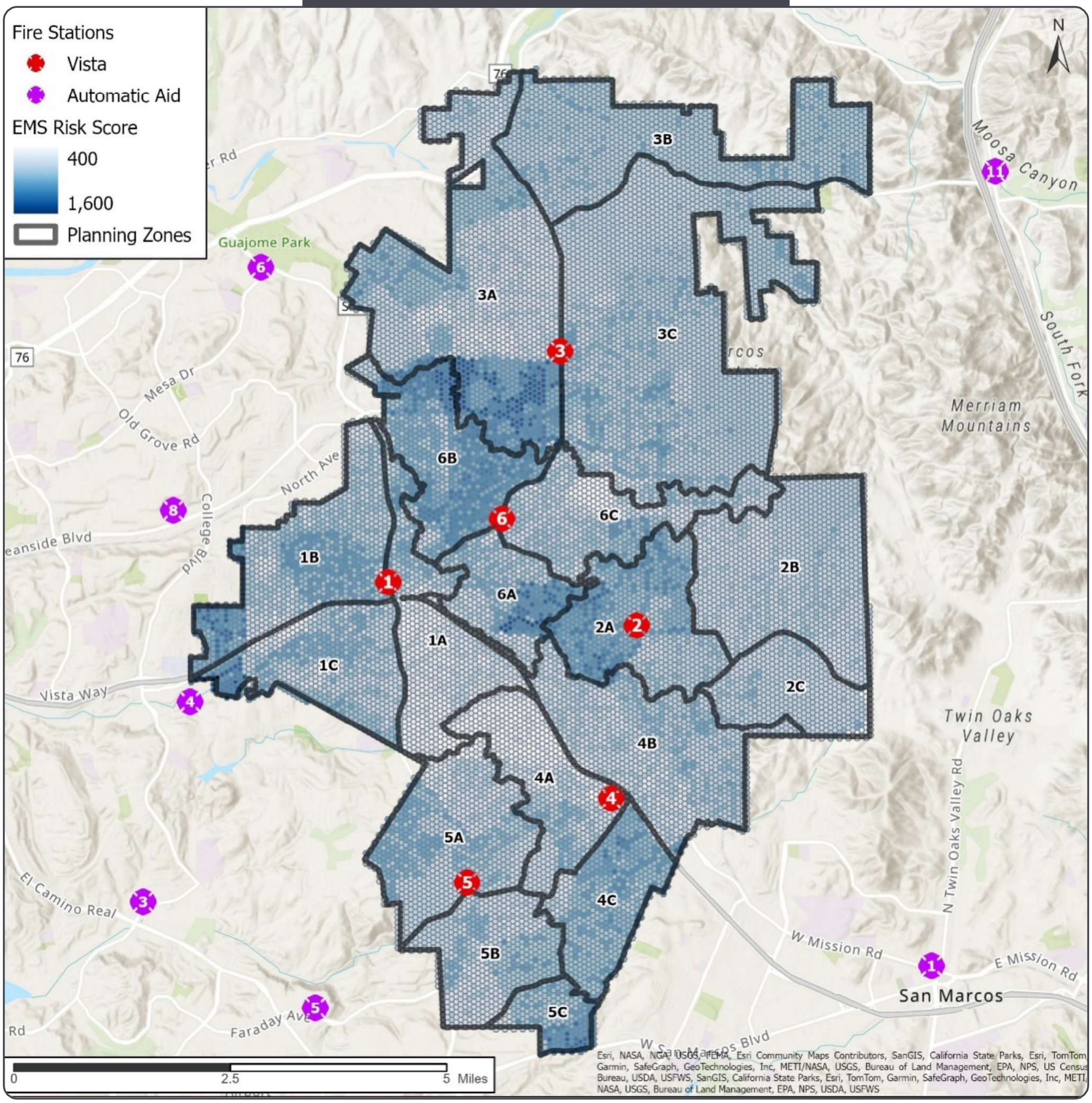
Figure 44 displays the hexbin distribution of EMS risk scores by plotting the average and standard deviations. Percentile line indicators were also plotted on the graph to illustrate non-normal distributions and skewness.

Figure 44. EMS Fire Risk Scores: Hexbin Distribution



The EMS risk scores across all hexbins are illustrated in **Figure 45,** using an unclassed scale from lowest to highest to show the granularity and variability of EMS scores by planning zone area.

Figure 45. Hexbins: Map of EMS Risk Scores



After the hexbins were aggregated into a planning zone, average scores were calculated, and categorical EMS risk was assigned based on a combination of percentiles and standard deviations, as shown in **Table 47.**

Table 47. EMS Risk Category and Score Ranges by Percentile

Risk Category	Percentile	Score Range
Low	Less than -1 standard deviation (SD)	X < 642.254
Moderate	-1SD to +1SD	642.254 ≤ X < 963.565
High	+1SD to 90th percentile	963.565 ≤ X < 1018.782
Maximum	Above 90th percentile	1018.782 ≤ X

Figure 46 illustrates EMS categorical risk based on average hexbin scores in each planning zone.

Figure 46. Planning Zones: Map of EMS Risk Scores

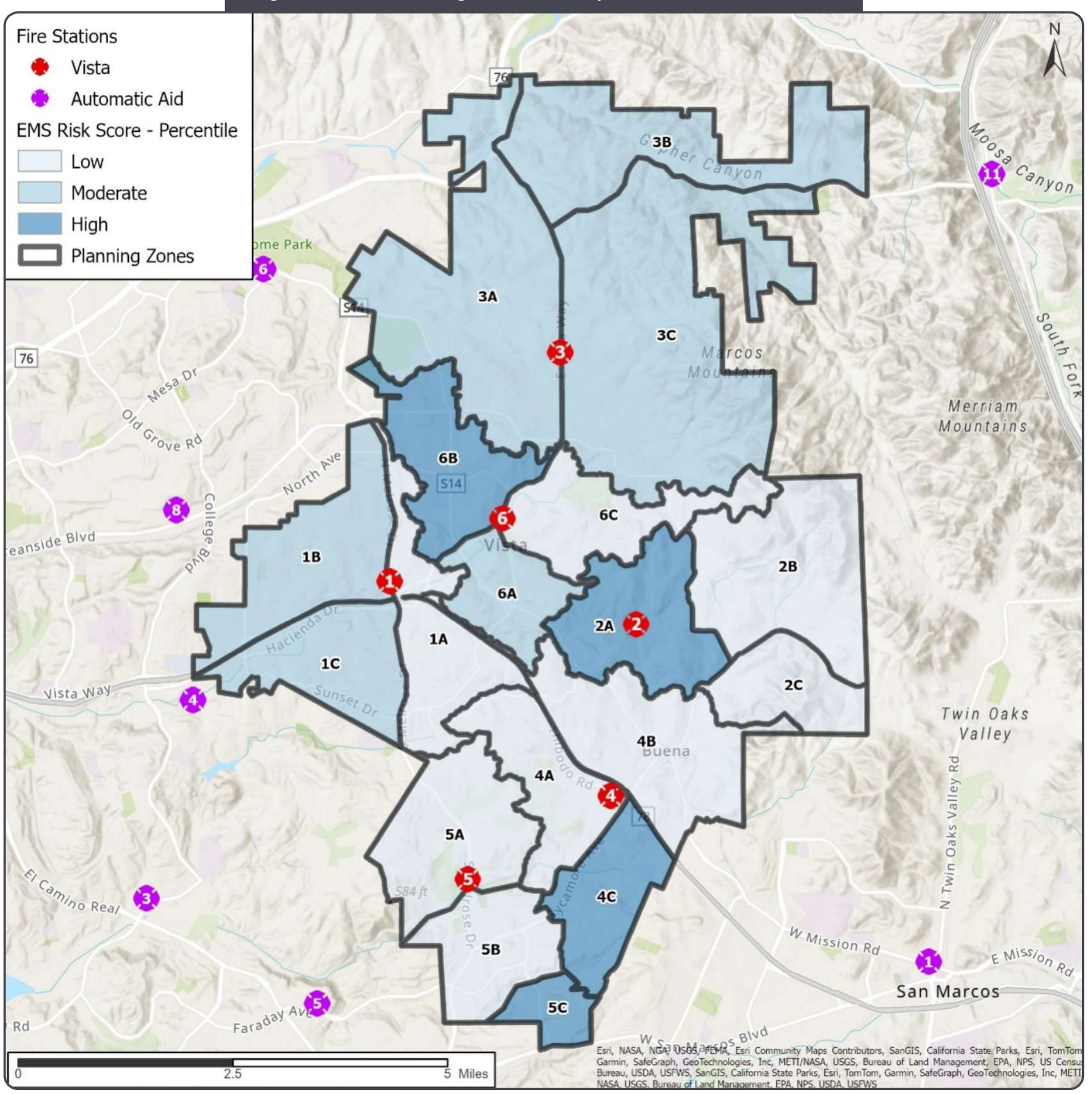


Figure 46 represents the average EMS risk scores in each planning zone and the categorical EMS risk assigned to each area. The details of the scores in each planning zone are summarized in **Table 48.**

Table 48. EMS Risk Scores by Station and Planning Zone

Station Area	Planning Zone	Minimum Score	Maximum Score	Average Score	Risk Category
1	1A	372.81	1131.52	659.87	Low
	1B	455.93	1310.51	879.33	Moderate
	1C	397.75	1567.00	836.30	Moderate
2	2A	620.56	1302.85	920.86	High
	2B	528.55	991.14	724.25	Low
	2C	420.95	969.71	719.13	Low
3	3A	472.23	1382.73	827.27	Moderate
	3B	581.67	1112.12	822.39	Moderate
	3C	534.13	1172.12	787.73	Moderate
4	4A	395.94	1013.26	628.19	Low
	4B	402.79	1261.34	744.74	Low
	4C	569.81	1239.65	915.54	High
5	5A	419.47	1050.35	773.99	Low
	5B	609.55	1090.34	760.29	Low
	5C	647.71	1313.78	944.62	High
6	6A	556.09	1382.16	881.97	Moderate
	6B	644.55	1407.65	1007.36	High
	6B	412.36	1170.53	746.25	Low

The quantitative scores reveal that EMS risk varies across the jurisdiction, with four planning zones (22%) categorized in the high-risk category. Using quantitative scoring and data, these scores approximate the probability consequence and impact of EMS hazards. Note it is possible that higher quality data and the availability of new variable data relevant to EMS hazards could change these scores in the future.

Calculated Risk: Technical Rescue

Technical rescue hazards include entrapments, confined-space incidents, trench rescues, water rescues, and other types of rescues. The presence of certain geographical factors (e.g., topography and vehicle access) and human-made factors (e.g., high-speed highways) are examples of variables that impact on the probability of technical rescue hazards. **Table 49** summarizes which variables from the analysis in Part 1 were included in the final technical rescue calculations:

Table 49. Probability, Consequence, and Impact Variables for Technical Rescue

Technical Rescue Probability Variables
All incidents weighted by score derived from historical rescue events
Score derived from the presences of major roads, freeways, and highways
Score derived from roadway speeds
Score derived from presence of trails, bridges, water reservoirs, railways, and canals
Score derived from presence of flooding risk areas
Land use score derived from historical relationship between rescue events and land use type
Technical Rescue Consequence Variables
Score derived from overall SVI score
Score derived from percent of mobile homes present in location
Score derived from predicted EMS transport rate
Score derived from population density rank score weighted by percent patient encounters when patient was dead on scene (with and without resuscitation attempted)
Score derived from percent of patients disabled
Score derived from travel time distance to account for longer response times
Technical Rescue Impact Variables
Commitment score derived from units' historical commitment duration on technical rescue events
Score derived from unit coverage with technical rescue capabilities
Deployment score based on critical tasking and effective response force expected for technical rescue calls

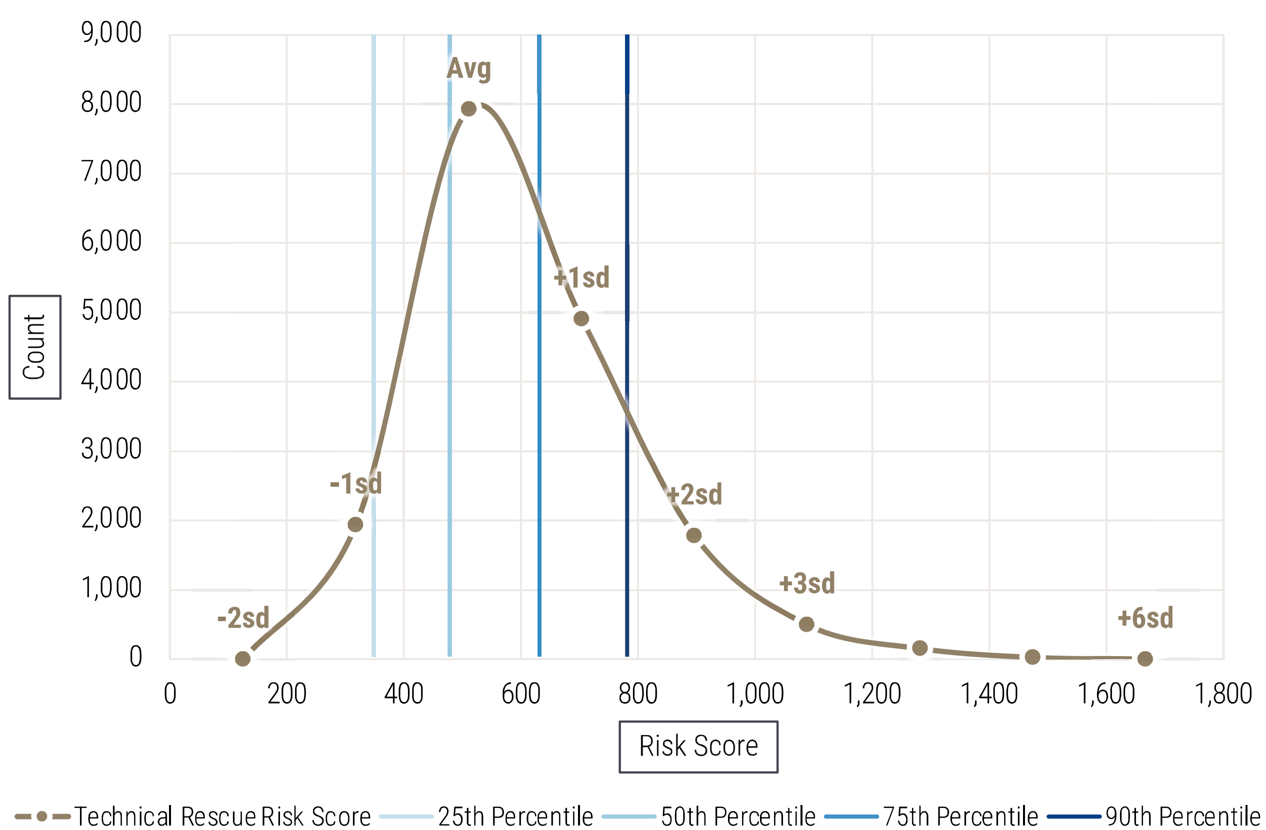
After scores were calculated in each hexbin, analysis was performed throughout the hexbins prior to aggregation into the larger planning zones. Summary statistics were prepared, and the hexbin analysis allowed for a determination of what scores comprise low, moderate, high, and maximum technical rescue categorical risk. **Table 50** shows the summary statistics for technical rescue risk in all hexbins.

Table 50. Summary Statistics: Technical Rescue Risk

Average	Standard Deviation	Maximum	Minimum	Interquartile Range	Range
510.690	192.742	1,570.899	185.298	283.534	1,385.601

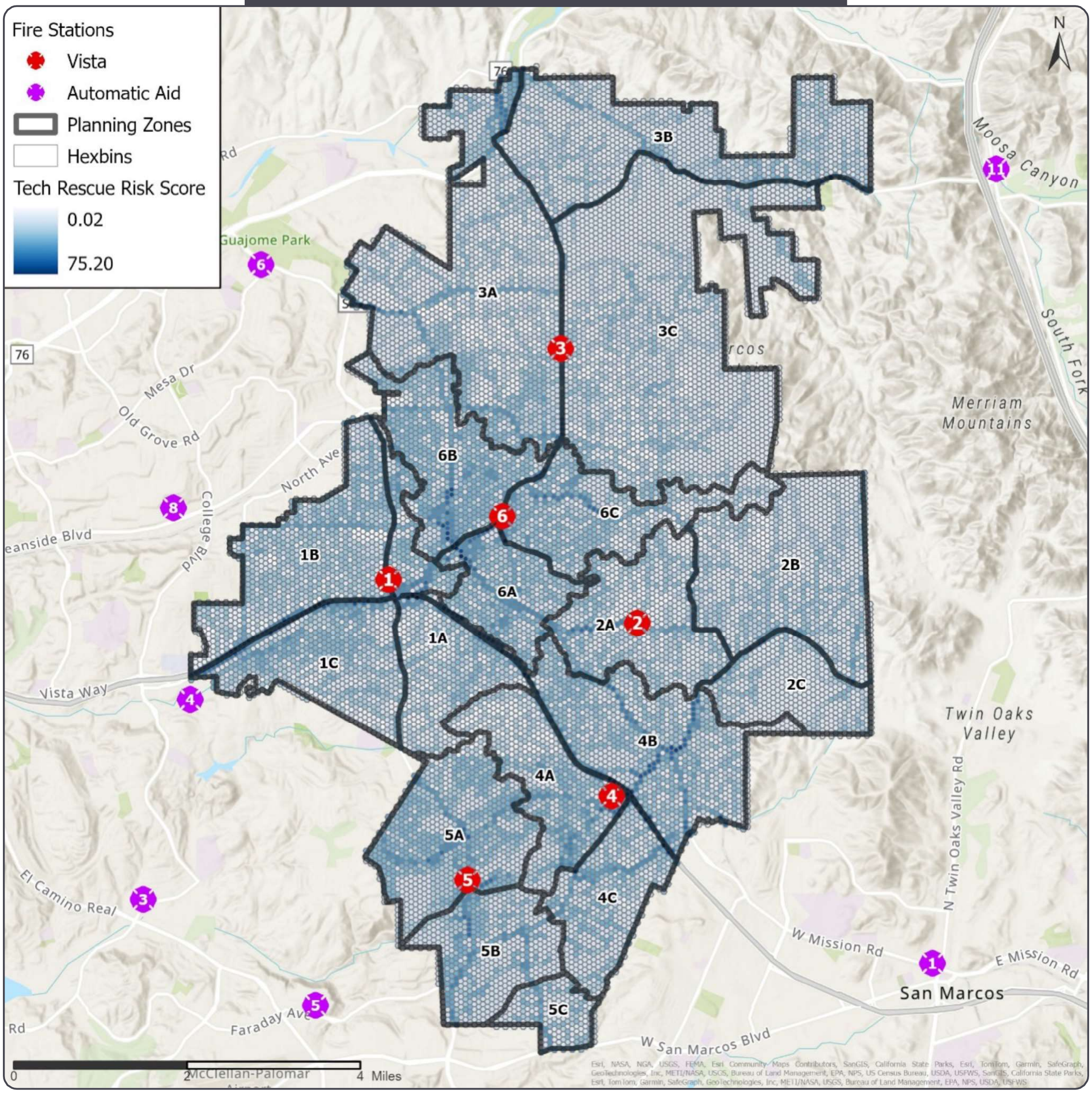
Figure 47 displays the distribution of technical rescue risk scores by plotting the average and standard deviations. Percentile line indicators were also plotted on the graph to illustrate non-normal distributions and skewness.

Figure 47. Technical Rescue Risk Scores: Hexbin Distribution



The technical rescue risk scores across all hexbins are illustrated in **Figure 48,** using an unclassed scale from lowest to highest to show the granularity and variability of scores by planning zone area.

Figure 48. Hexbins: Map of Technical Rescue Risk Scores



After the hexbins were aggregated into a planning zone, average scores were calculated, and categorical technical rescue risk was assigned based on percentile, as shown in **Table 51.**

Table 51. Technical Rescue Risk Category and Score Ranges by Percentile

Risk Category	Percentile	Score Range
Low	Less than 50th percentile	X < 478.230
Moderate	50th to 75th percentile	478.230 ≤ X < 631.515
High	75th to 90th percentile	631.515 ≤ X < 781.104
Maximum	Above 90th percentile	781.104 ≤ X

Figure 49 illustrates the technical rescue categorical risk based on average hexbin scores in each planning zone.

Figure 49. Planning Zones: Map of Technical Rescue Risk Scores

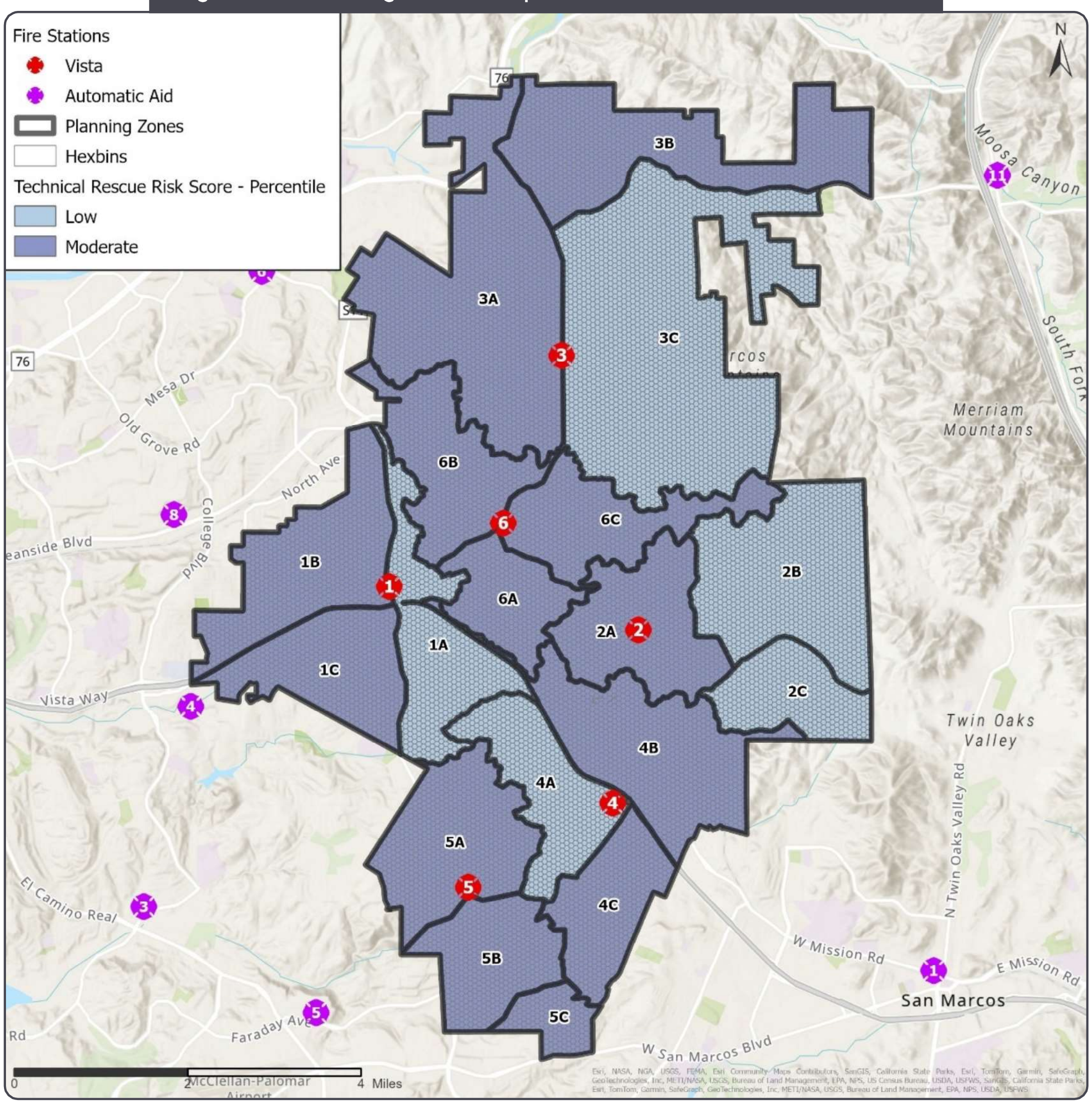


Figure 49 represents the average technical rescue risk scores in each planning zone and the categorical technical rescue risk assigned to each area. The details of the scores in each planning zone are summarized in **Table 52.**

Table 52. Technical Rescue Risk Scores by Station and Planning Zone

Station Area	Planning Zone	Minimum Score	Maximum Score	Average Score	Risk Category
1	1A	188.069	1,246.961	462.560	Low
	1B	185.298	1,384.391	520.841	Moderate
	1C	249.250	1,323.909	552.401	Moderate
2	2A	258.184	1,238.735	539.268	Moderate
	2B	280.250	1,102.103	455.501	Low
	2C	233.672	1,069.407	444.114	Low
3	3A	232.567	1,315.899	505.207	Moderate
	3B	297.783	1,570.899	545.587	Moderate
	3C	228.640	1,312.861	408.027	Low
4	4A	204.656	1,034.314	475.370	Low
	4B	241.258	1,351.332	533.050	Moderate
	4C	265.620	1,374.137	622.086	Moderate
5	5A	221.793	1,342.407	598.777	Moderate
	5B	328.524	1,217.291	571.024	Moderate
	5C	405.006	1,121.963	608.474	Moderate
6	6A	210.646	1,405.407	622.521	Moderate
	6B	216.112	1,256.108	593.971	Moderate
	6B	221.878	1,226.816	494.601	Moderate

The quantitative scores reveal that most of the planning zones were categorized as moderate risk for technical rescue, and no planning zones were categorized as high risk or maximum risk. Using quantitative scoring and data, these scores approximate the probability consequence and impact. Note it is possible that higher quality data and the availability of new variable data relevant to technical rescue could change these scores in the future.

Calculated Risk: HazMat

HazMat events can include a range of hazards, such as gasoline and other flammable liquid spills, radiation leaks, and toxic chemical releases. Using the analysis of each variable, as described in Part I, HazMat risk was calculated by using relevant variables in each hexbin to calculate probability, consequence, and impact. **Table 53** summarizes which variables from the variable analysis in Part 1 were included in the final calculations.

Table 53. Probability, Consequence, and Impact Variables for HazMat Events

HazMat Probability Variables
All incidents weighted by score derived from historical HazMat events
Score derived from historical HazMat events
Score derived from the presence of facilities containing Tier II chemicals
Score derived from the presence of the following special hazards: • Railways • Power plants • Gas stations • Natural gas pipelines
Land use score derived from historical relationship between HazMat events and land use type
HazMat Consequence Variables
Score derived from overall SVI score to account for populations and demographics where greater consequence might be encountered
Score derived from population density rank score from locations where specific hazards impact on probability, to include population density surrounding areas with power plants, railways, gas stations, and natural gas pipelines
Score derived from population density rank score weighted by percent patient encounters when patient was dead on scene (with and without resuscitation attempted)
Score derived from property values
Score derived from presence of special locations, as defined in Part I
HazMat Impact Variables
Commitment score derived from units' historical commitment duration on HazMat events
Score derived from unit coverage with HazMat capabilities
Deployment score based on critical tasking and effective response force expected for HazMat events

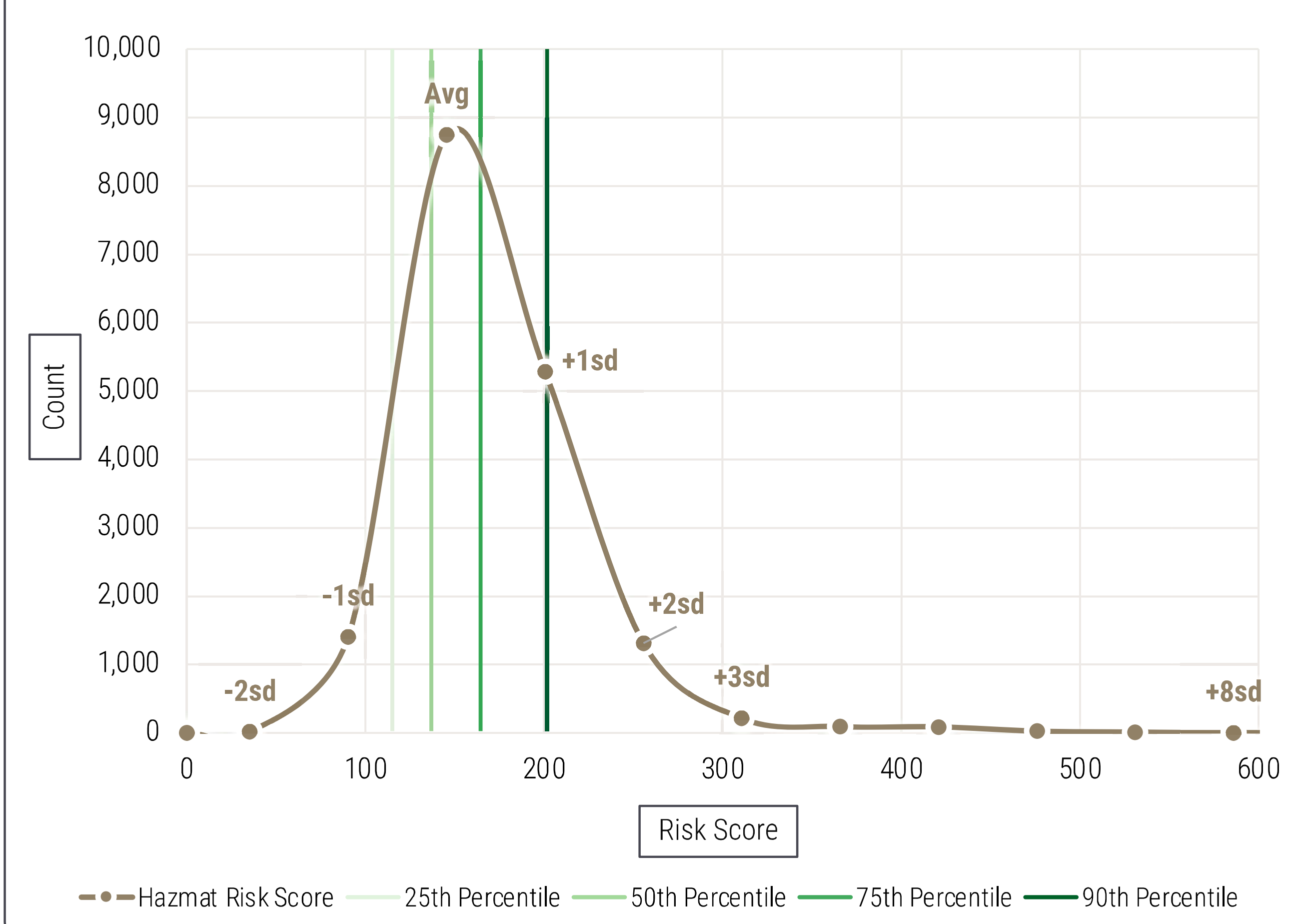
Summary statistics and analysis were performed throughout the grids prior to aggregation into the larger planning zones. This analysis allowed for a determination of what comprises low, moderate, high, and maximum HazMat risk. **Table 54** shows the summary statistics for HazMat risk in all hexbins.

Table 54. Summary Statistics: HazMat Risk

Average	Standard Deviation	Maximum	Minimum	Interquartile Range	Range
145.494	55.081	1,105.255	9.190	49.588	1,096.065

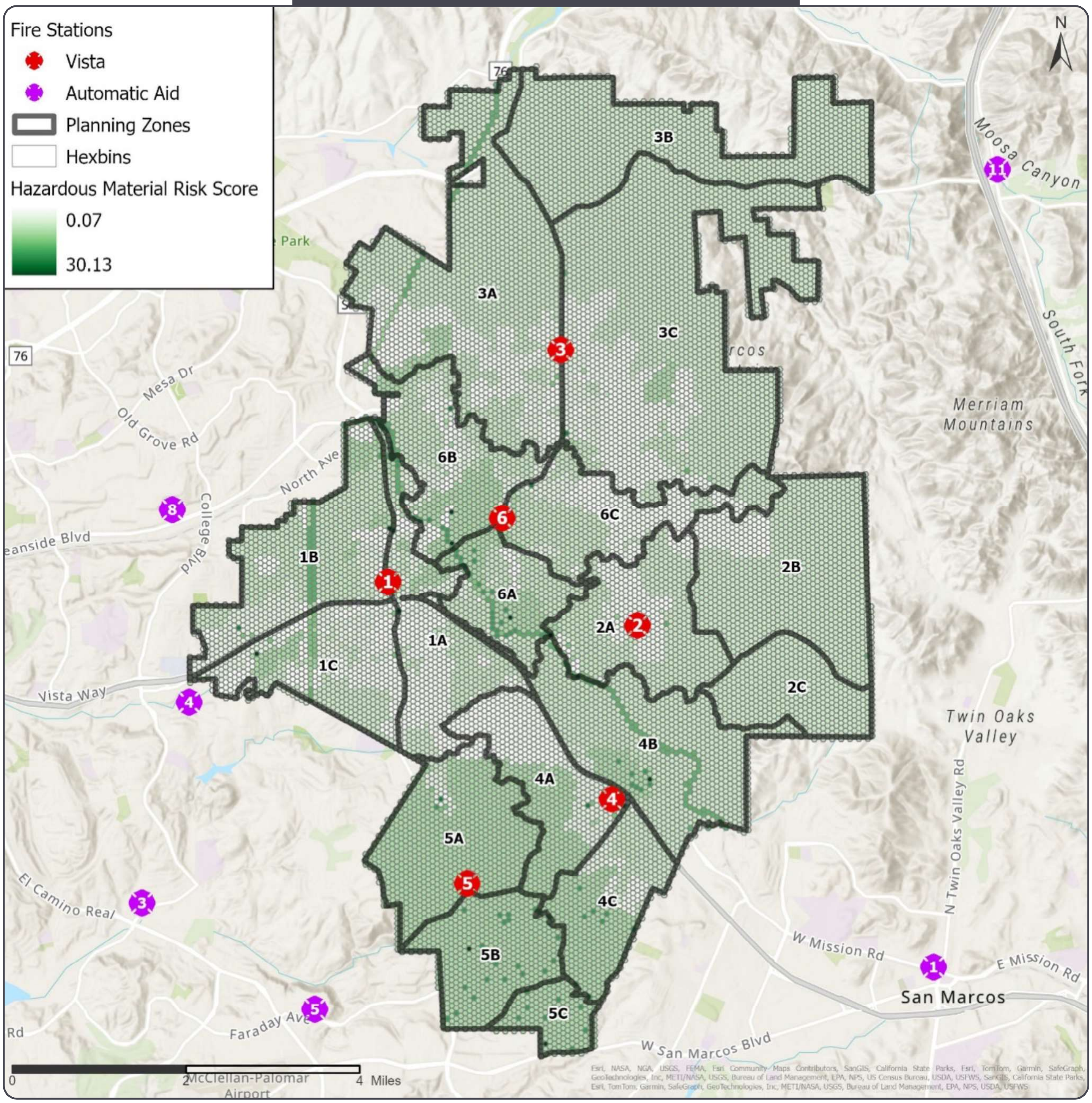
Figure 50 displays the distribution of HazMat risk scores by plotting the average and standard deviations. Percentile line indicators were also plotted to illustrate non-normal distributions and skewness.

Figure 50. HazMat Risk Scores: Hexbin Distribution



HazMat risk scores across all hexbins are illustrated in **Figure 51,** using an unclassed scale from lowest to highest to show the granularity and variability of scores by planning zone area.

Figure 51. Hexbins: Map of HazMat Risk Scores



After the hexbins were aggregated into a planning zone, average scores were calculated, and categorical HazMat risk was assigned based on percentile, as shown in **Table 55.**

Table 55. HazMat Risk Category and Score Ranges by Percentile

Risk Category	Percentile	Score Range
Low	Less than 50th percentile	X < 136.917
Moderate	50th to 75th percentile	136.917 ≤ X < 164.635
High	75th to 90th percentile	164.635 ≤ X < 201.650
Maximum	Above 90th percentile	201.650 ≤ X

Figure 52. Planning Zones: Map of HazMat Risk Scores

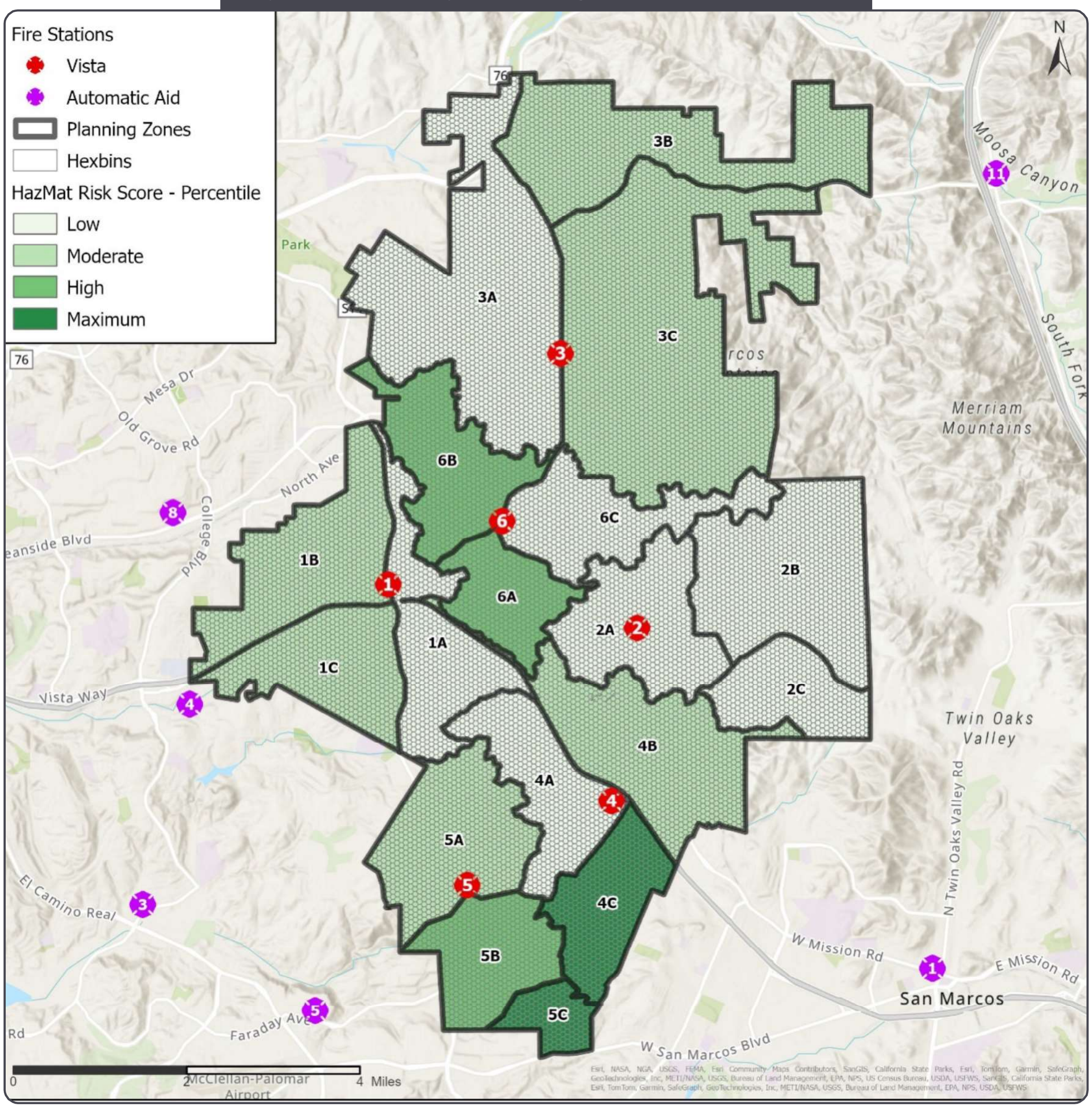


Figure 52 represents the average HazMat risk scores in each planning zone and the categorical risk assigned to each area. The details of the scores in each planning zone are summarized in **Table 56.**

Table 56. HazMat Risk Scores by Station and Planning Zone

Station Area	Planning Zone	Minimum Score	Maximum Score	Average Score	Risk Category
1	1A	9.190	833.509	115.864	Low
	1B	46.816	930.693	161.723	Moderate
	1C	38.853	509.739	151.902	Moderate
2	2A	59.980	794.396	136.497	Low
	2B	31.067	263.484	112.468	Low
	2C	76.358	260.656	116.381	Low
3	3A	38.407	705.694	130.814	Low
	3B	74.490	258.077	139.559	Moderate
	3C	68.371	533.774	140.264	Moderate
4	4A	20.517	767.831	114.867	Low
	4B	35.338	507.400	147.176	Moderate
	4C	58.546	578.055	202.603	Maximum
5	5A	37.955	753.062	152.815	Moderate
	5B	99.368	939.019	186.600	High
	5C	120.319	533.624	239.868	Maximum
6	6A	59.605	1105.255	192.264	High
	6B	57.705	1017.963	186.071	High
	6B	44.725	352.415	135.302	Low

The quantitative scores reveal that HazMat risk varies across the jurisdiction. Nearly 40% of the service area is considered low risk; however, 33% is moderate risk, and nearly 30% is high risk or maximum risk. Using quantitative scoring and data, these scores approximate the probability, consequence, and impact of HazMat events. Note it is possible that higher quality data and the availability of new variable data relevant to HazMat events could change these scores in the future.

Calculated Risk: Natural and Human-made Hazards and Disasters

Natural and human-made hazards and disasters can range from events that affect the whole geographic region, such as an earthquake, to more specific human-made events, such as an active shooter incident. Using the analysis of each variable, as described in Part I, natural and human-made hazard and disaster risks were calculated by using relevant variables in each hexbin to calculate probability, consequence, and impact. **Table 57** summarizes which variables from the variable analysis in Part I were included in the final calculations.

Table 57. Probability, Consequence, and Impact Variables for Natural and Human-made Hazards and Disasters

Natural and Human-made Hazard and Disaster Probability Variables
Score derived from population density rank of location
Score derived from historical severe weather and natural disaster incidents
Score derived for geographically classified urban areas
Score derived from overall NRI classification
Score derived from NRI drought classification
Score derived from NRI earthquake classification
Score derived from NRI heat wave classification
Score derived from NRI landslide classification
Score derived from NRI tornado classification
Scores derived from the presence of specific target hazards (e.g., water treatment centers, transit centers, communication towers, shopping centers, power plants, government facilities, police stations, places of worship, and radio towers)
Natural and Human-made Hazard and Disaster Consequence Variables
Score derived from overall SVI within the geography
Score derived from percent of mobile homes within the geography
Score derived from population density rank of location
Score derived from property value rank of location
Structure Fire Impact Variables
Score derived from incident duration and unit commitment times for EMS events as a proxy for natural and human-made hazards and disasters due to insufficient data points for time analysis
Score derived from expected travel times
Deployment score based on critical tasking and effective response force expected for disasters
Score derived from hydrant proximity (to account for alternate water supply need)

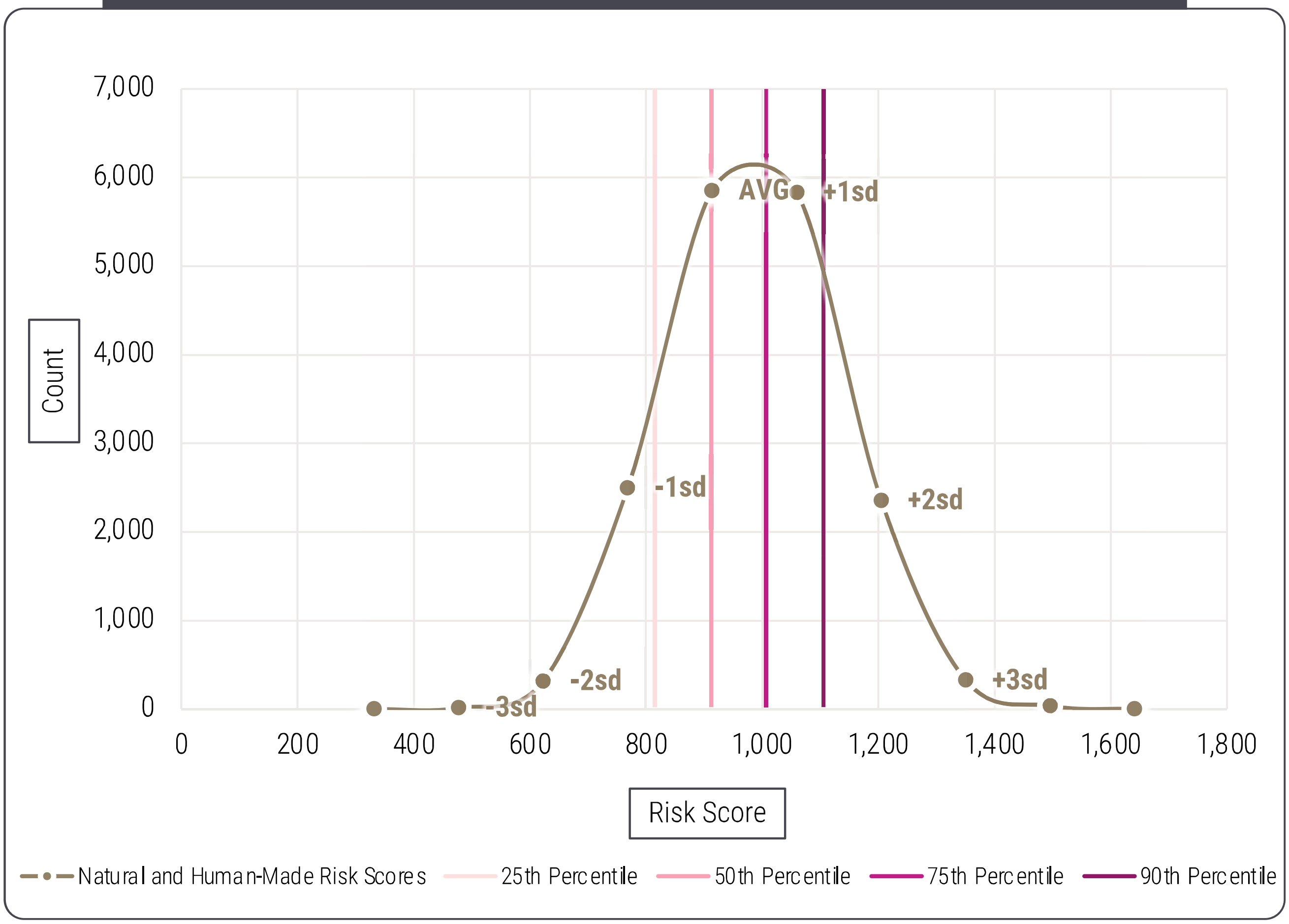
After scores were calculated in each hexbin, analysis was performed throughout the hexbins prior to aggregation into the larger planning zones. Summary statistics were prepared, and the hexbin analysis of natural and human-made disaster risk allowed for a determination of what scores comprise low, moderate, high, and maximum categorical risk. **Table 58** shows the summary statistics for natural and human-made hazard and disaster risk in all hexbins.

Table 58. Summary Statistics: Natural and Human-Made Hazard and Disaster Risk

Average	Standard Deviation	Maximum	Minimum	Interquartile Range	Range
913.827	145.504	1,483.043	418.977	192.266	1,064.065

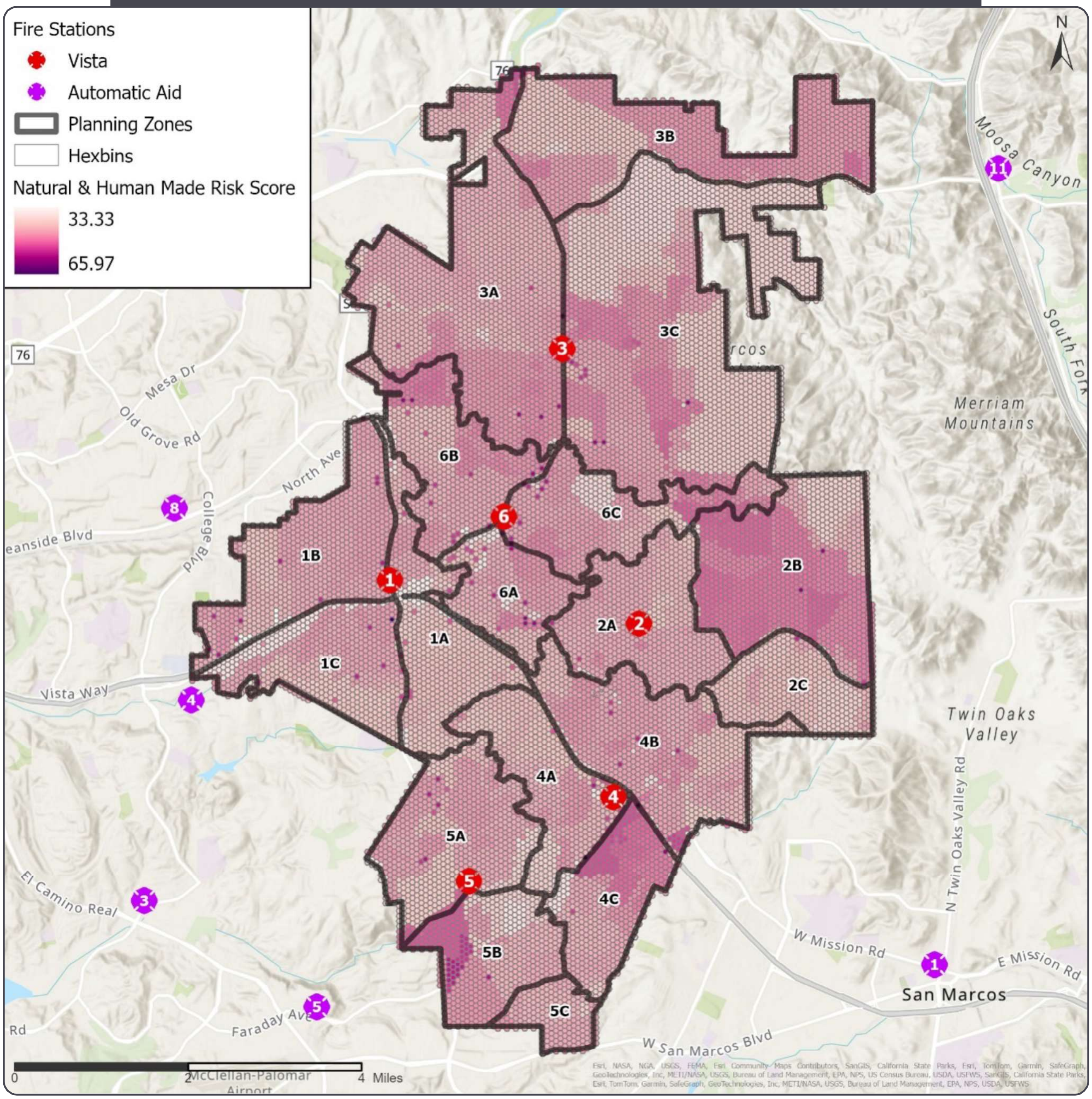
Figure 53 displays the distribution of natural and human-made hazard and disaster risk scores by plotting the average and standard deviations. Percentile line indicators were also plotted to illustrate non-normal distributions and skewness.

Figure 53. Natural and Human-Made Hazard and Disaster Risk Scores: Hexbin Distribution



The natural and human-made hazard and disaster risk scores across all hexbins are illustrated in **Figure 54,** using an unclassed scale from lowest to highest to show the granularity and variability of scores by planning zone area.

Figure 54. Hexbins: Map of Natural and Human-Made Hazard and Disaster Risk Scores



After the hexbins were aggregated into a planning zone, average scores were calculated, and categorical natural and human-made hazard and disaster risk was assigned based on percentile, as shown in **Table 59.**

Table 59. Natural and Human-Made Hazard and Disaster Risk Category and Score Ranges by Percentile

Risk Category	Percentile	Score Range
Low	Less than 50^{th} percentile	X < 912.112
Moderate	50^{th} to 75^{th} percentile	912.112 ≤ X < 1,007.168
High	75^{th} to 90^{th} percentile	1,007.168 ≤ X < 1,105.252
Maximum	Above 90^{th} percentile	1,105.252 ≤ X

Figure 55 illustrates the natural and human-made hazard and disaster categorical risk based on average hexbin scores in each planning zone.

Figure 55. Planning Zones: Map of Natural and Human-Made Hazard and Disaster Risk Scores

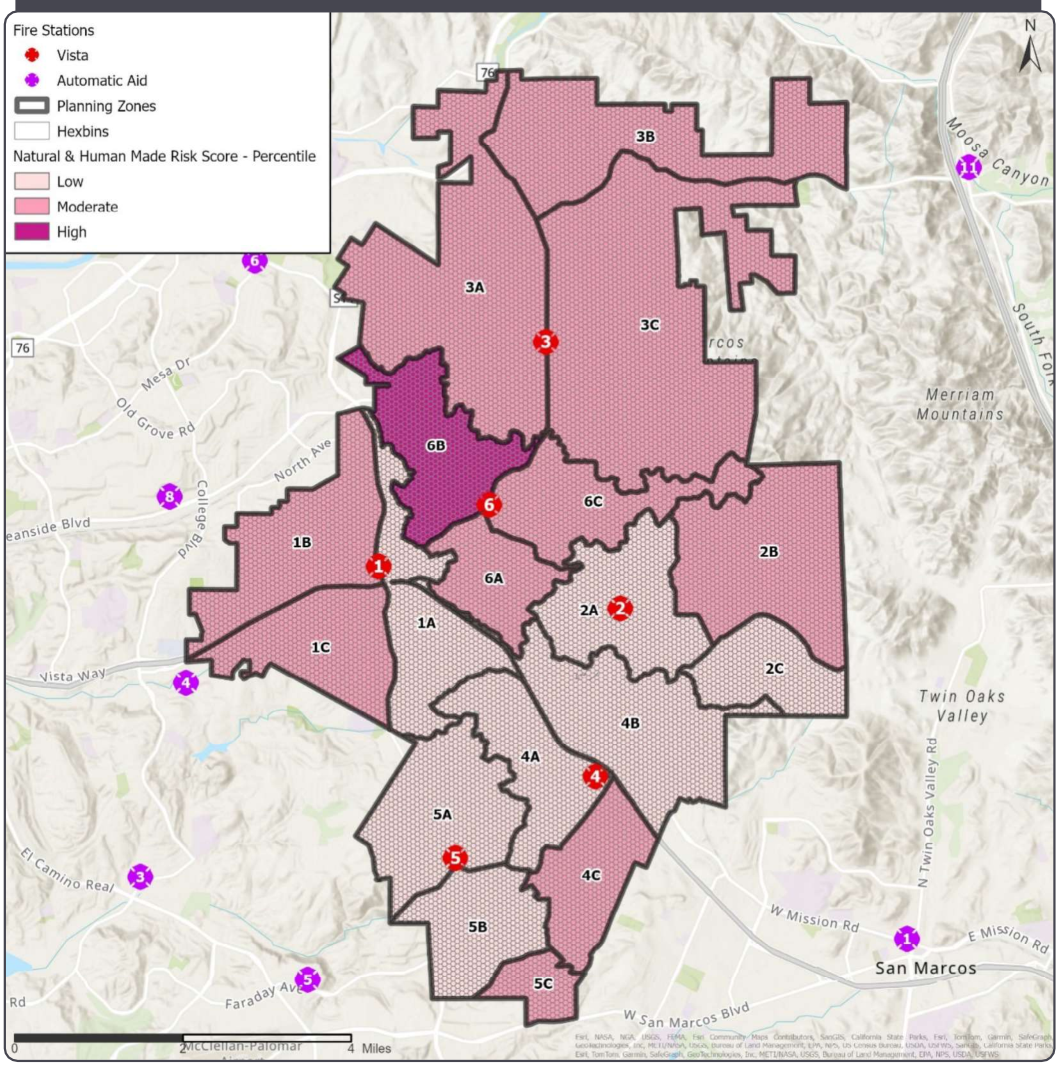


Figure 55 represents the average scores in each planning zone and the natural and human-made hazard and disaster categorical risk assigned to each area. The details of the scores in each planning zone are summarized in **Table 60.**

Table 60. Natural and Human-made Hazard and Disaster Risk Scores by Station and Planning Zone

Station Area	Planning Zone	Minimum Score	Maximum Score	Average Score	Risk Category
1	1A	418.977	1,205.023	799.835	Low
	1B	507.249	1,436.258	958.230	Moderate
	1C	478.560	1,364.598	920.018	Moderate
2	2A	555.265	1,192.348	879.458	Low
	2B	530.119	1,226.117	917.864	Moderate
	2C	586.615	1,077.524	828.988	Low
3	3A	595.810	1,469.064	922.390	Moderate
	3B	625.038	1,346.769	929.358	Moderate
	3C	594.774	1,366.648	927.181	Moderate
4	4A	513.179	1,226.634	809.224	Low
	4B	457.001	1,426.607	883.295	Low
	4C	567.307	1,483.043	983.757	Moderate
5	5A	539.021	1,276.109	894.171	Low
	5B	564.855	1,281.956	877.493	Low
	5C	657.101	1,223.245	931.783	Moderate
6	6A	497.248	1,378.337	944.147	Moderate
	6B	537.249	1,422.690	1062.558	High
	6B	535.919	1,205.714	914.435	Moderate

The quantitative scores reveal that approximately one-half of the planning zones are categorized as having moderate risk for natural and human-made hazards and disasters. This is an example of a situation in which a low-frequency event carries a high risk due to the consequence and impact associated with that event. Using quantitative scoring and data, these scores approximate the probability consequence and impact. Note it is possible that higher quality data and the availability of new variable data relevant to natural and human-made hazards and disasters could change these scores in the future.

Categorical Risk Summaries

Data show that risk varies in the jurisdiction across all service lines and response areas, illustrating the fact that all of the community characteristics play a role in estimating a quantitative score.

Table 61. Risk Across Planning Zones

Planning Zone	Structure Fire Risk	Non-Structure Fire Risk	Wildland Fire Risk	EMS Risk	Technical Rescue Risk	HazMat Risk	Natural and Human-Made Hazard and Disaster Risk
1A	Low	Low	Low	Low	Low	Low	Low
1B	Moderate	Low	Low	Moderate	Moderate	Moderate	Moderate
1C	Low	Low	Low	Moderate	Moderate	Moderate	Moderate
2A	Moderate	Moderate	Moderate	High	Moderate	Low	Low
2B	Low	Moderate	High	Low	Low	Low	Moderate
2C	Low	High	Moderate	Low	Low	Low	Low
3A	Moderate	Moderate	Moderate	Moderate	Moderate	Low	Moderate
3B	Low	High	Maximum	Moderate	Moderate	Moderate	Moderate
3C	Moderate	High	Moderate	Moderate	Low	Moderate	Moderate
4A	Low	Low	Low	Low	Low	Low	Low
4B	Low	Moderate	Moderate	Low	Moderate	Moderate	Low
4C	High	Low	Low	High	Moderate	Maximum	Moderate
5A	Low	Low	Low	Low	Moderate	Moderate	Low
5B	Low	Low	Low	Low	Moderate	High	Low
5C	High	Low	Low	High	Moderate	Maximum	Moderate
6A	High	Low	Low	Moderate	Moderate	High	Moderate
6B	Maximum	Low	Low	High	Moderate	High	High
6C	Moderate	Low	Low	Low	Moderate	Low	Moderate

Table 61 summarizes risk across planning zones for the VFD service area. The risk scores were derived from numerous specific data points, features, and characteristics of the VFD community. Certain datasets were desired and considered for inclusion in the quantitative scoring; however, they were not available or reliable enough for inclusion in the calculations. Regardless, a thorough analysis and review of many variables were used to estimate probability, consequence, and impact. Often, the probability of an event occurring can be viewed as the driving factor for overall risk. However, in this risk assessment, probability is only one element, and it can contradict what is anecdotally known about risks and hazards in certain areas of the community. It is important to note that this risk assessment is based on the quality of both geospatial and non-geospatial data, and changes in data quality can change the risk scoring results in future analyses.

SECTION 3

Critical Tasking and Benchmarks

Critical Tasking and Benchmarks

The VFD's service area is situated within a densely populated urban environment, characterized by a heightened concentration of risks in terms of both number and distribution. As the actual and potential risks escalate, there is a corresponding demand for an increased presence of personnel and apparatus. Each incident type, coupled with its associated level of risk, requires the execution of specific critical tasks. In alignment with these requirements, dispatching the appropriate numbers and types of apparatus is imperative to effectively address the evolving challenges posed by different scenarios.

Fire Suppression Capabilities

The department offers a wide range of responses to structure fires, including single-family dwellings, multi-family dwellings, high-rise buildings, and commercial and industrial occupancies. Additionally, it addresses high-hazard structures, such as institutional facilities, schools, continuing care facilities, and congregate housing. Other fire-related responses involve mobile property, such as passenger vehicles, road freight, rail freight, recreational vehicles, dumpster and rubbish fires, and heavy equipment fires.

Firefighters encounter a diverse array of conditions at each fire incident, ranging from early-stage outbreaks to fires that have engulfed an entire structure. This variability in conditions complicates efforts to compare the capabilities of different fire departments. To facilitate meaningful comparisons, a common reference point must be established, ensuring that assessments are conducted under equitable conditions. Within the realm of fire suppression, service-level objectives are designed to prevent the occurrence of flashover—a critical point in a fire's growth that significantly heightens its threat to life and property.

The tasks involved in fire suppression at a typical scene can vary significantly. The primary imperative is for fire companies to arrive on the scene swiftly and simultaneously, bringing adequate resources to save lives and limit property damage. Achieving this goal within a specific time frame is the focus of developing a comprehensive Standards of Cover.

Understanding the progression of a fire is essential, as virtually all structure fires evolve through four identifiable stages:

The Four Stages of Fire Progression

1. **Incipient Stage:** This initial stage commences when heat, oxygen, and a fuel source combine, resulting in ignition. Recognizing and responding to a fire at this stage offers the best chance for suppression and escape.
2. **Growth Stage:** During this stage, the structure's fire load and oxygen fuel the fire, and various factors influence its growth. The potential for a deadly flashover, which can trap and injure firefighters, is most significant at this stage.
3. **Fully Developed Stage:** At this point, the fire has reached its maximum intensity, with all combustible materials ignited. This phase poses the greatest danger to individuals trapped within, given the extreme heat.

4 **Decay Stage:** This final stage involves a decrease in oxygen or fuel, bringing the fire to an end. However, dangers persist, such as the risk of non-flaming combustibles causing new fires and the threat of a backdraft when oxygen is reintroduced to a confined space.

The frequency of fires being controlled before reaching flashover is influenced by the entire fire protection system, not solely by emergency response forces. Factors such as built-in fire protection, public education, citizen extinguishment efforts, and the type of fuel involved play crucial roles. Even when fires are not entirely extinguished, firefighting personnel provide essential services, from smoke removal to restoring built-in fire control systems. The overarching goal is to maintain all fire protection system components at a level that ensures adequate service, with periodic evaluations of their performance.

Flashover signifies a critical phase in fire growth and requires a sudden increase in water volume to reduce burning material below its ignition temperature. When a fire reaches flashover, saving individuals in the room of origin becomes highly challenging. Managing post-flashover fires requires more firefighters and larger hose streams to combat the intensified heat and rapid spread. This situation exacerbates search-and-rescue challenges throughout the structure, necessitating a coordinated effort to manage fire combat operations effectively.

Impact of Residential Fire Sprinklers

In January 2010, California joined 46 other states in adopting a residential sprinkler requirement for all new homes—a result of extensive scientific study and lobbying efforts by the National Fire Service and Building Industry. The VFD anticipates that the full impact of this requirement will unfold over several decades, necessitating reasonable assumptions in deployment analyses. However, misconceptions among the general public, media, elected officials, and others highlight the importance of the VFD providing continuous, accurate public information.

Residential fire sprinkler systems, unlike their commercial counterparts, do not cover entire structures and notably exclude attic spaces. While these systems are designed to contain fires, allowing occupants to exit safely, they do not fully extinguish fires, and a fire department response is still necessary. Installing both smoke alarms and a fire sprinkler system has been proven to reduce the risk of fire-related deaths by 82%[11], enhancing overall safety.

In addition to saving lives, sprinkler systems facilitate faster control and extinguishment by the fire department, reducing the time required for overhaul. However, it is crucial to note that these systems do not manage fires originating outside of homes. Over time, sprinkler systems contribute to lowering property loss due to fire, which positively affects residential fire insurance premiums citywide.

Sprinkler systems do not eliminate the need for fire stations, but they do reduce the requirement for multiple units to respond from the same station. The VFD's response and deployment standards align with urban population density, historical demand for services, and industry best practices. The critical tasks analysis considers both property and life risk, categorizing tasks into fire flow and life safety components.

Fire flow tasks involve getting water on the fire, which is contingent on building characteristics. Life safety tasks depend upon the number and location of occupants, their status, and their ability to self-preserve. Successful emergency response hinges on coordinated teamwork, addressing tasks such as

[9] https://nfsa.org/wp-content/uploads/2019/07/fire_safety_residential_sprinklers_point_counterpoint.pdf

fire attack, search and rescue, ventilation, backup lines, pump operation, water supply, command, and safety—all within a goal of 10 minutes after the arrival of the first-due unit.

The VFD's evaluation of historical data, existing time standards, and measured training exercises ensure the department's capability to accomplish critical tasks for various occupancies. This meticulous analysis and validation process underscores the department's commitment to positive incident outcomes and the safety of both the public and personnel. **Tables 62-64** outline the critical tasks, personnel, and apparatus necessary for low-risk, moderate-risk, and high-risk fire suppression.

Table 62. Critical Tasks and Resources: Low-Risk Fire Suppression

Critical tasks necessary at low-risk Fire incidents (e.g., dumpster, vehicle, and small grass fires)		
Task	**Personnel**	**Apparatus**
Command, pump, and attack line	3	1st fire engine or truck
TOTAL	**3 Fire Personnel**	**1 Fire Apparatus or Truck**

Table 63. Critical Tasks and Resources: Moderate-Risk Fire Suppression

Critical tasks necessary at moderate-risk fires (e.g., single-family residence)		
Task	**Personnel**	**Apparatus**
Attack line	2	1st fire engine
Pump operator	1	1st fire engine
Primary search and rescue	2	2nd fire engine
Water supply/sprinkler	1	2nd fire engine
Back-up attack line/utilities	2	3rd fire engine
Ventilation/forced entry	3	1st truck
Safety	1	3rd fire engine
Command	1	Battalion chief
EMS	2	Rescue ambulance
TOTAL	**15 Fire Personnel**	**3 Engines, 1 Truck, 1 Battalion Chief, and 1 Ambulance**

Based on information provided by the caller or through questions asked during call processing, most working structure fires are upgraded to high-risk.

Table 64. Critical Tasks and Resources: High-Risk Fire Suppression

Critical tasks necessary at high- or special-risk fire (e.g., multi-family residence or commercial structure)		
Task	**Personnel**	**Apparatus**
Attack lines (2)	4	1st and 5th fire engine
Pump operator	1	1st fire engine
Primary search and rescue	2	2nd fire engine
Water supply/sprinkler	1	2nd fire engine
Rapid intervention/utilities	2	3rd fire engine
Back-up attack line	2	4th fire engine
Ventilation/forced entry	3	1st truck
Safety	1	4th fire engine
Command	1	Battalion chief
EMS	2	Rescue ambulance
TOTAL	**19 Fire Personnel**	**4 Engines, 1 Truck, 1 Battalion Chief and 1 Ambulance**

Fire Suppression Benchmarks

The VFD's fire suppression benchmarks include: For 90% of all low-, moderate-, and high-risk fire-related incidents, the total response time for arrival of the first-due unit, staffed with a minimum of one officer, one engineer, and one firefighter, shall be within 8 minutes, 30 seconds (8:30) in urban and suburban areas, and 12 minutes, 30 seconds (12:30) in rural response zones. The first-due arriving unit shall carry a minimum of 500 gallons of water and be capable of producing 1,500 gallons per minute pumping capacity. The first-due unit shall establish command, declare scene priorities, establish an uninterrupted water supply, perform life-saving and property-saving interventions, and provide scene safety and accountability for the VFD members and citizenry.

Effective Response Force Capabilities

The ability of an effective response force (ERF) to promptly assemble with the necessary personnel, apparatus, and equipment is critical for effectively managing a significant structural fire event. Therefore, assessing the capability to assemble an ERF is crucial. While the distribution model in most fire departments generally performs satisfactorily, challenges in meeting the recommended assembly time frames are not uncommon.

Several factors influence the ability to assemble an ERF, including the number of fire stations, the number of units, and the number of personnel on each unit. Each of these factors should be considered in the context of the community's specific risks and its willingness to assume risk.

For 90% of **low-risk** fires, the minimum ERF staffing shall be three personnel who arrive within 8 minutes, 30 seconds (8:30) in urban and suburban areas, and 12 minutes, 30 seconds (12:30) in rural response zones. The ERF staffing shall be capable of safely controlling the incident in accordance with adopted VFD standard operating guidelines. ERF members shall be authorized to request additional resources to enhance safety and control of escalating incidents.

For 90% of **moderate-risk** fires, the minimum ERF staffing shall be 16 personnel who arrive within 10 minutes, 30 seconds (10:30) in urban and suburban areas, and 14 minutes, 30 seconds (14:30) in rural response zones. The ERF staffing shall be capable of safely controlling the incident in accordance with the adopted VFD standard operating guidelines. ERF members shall be authorized to request additional resources to enhance safety and control escalating incidents.

For 90% of **high-risk** fires, the minimum ERF staffing shall be 19 firefighters who arrive within 12 minutes, 30 seconds (12:30) in urban and suburban areas, and 16 minutes, 30 seconds (16:30) in rural response zones. The ERF staffing shall be capable of safely controlling the incident in accordance with the adopted VFD standard operating guidelines. ERF members shall be authorized to request additional resources to enhance safety and control escalating incidents.

Table 65 describes the percentage of single family fire incidents VFD assembled an ERF over the last five-year period of January 2019 through October 2023. The distribution is based on travel times from quarters, with the presumption that all units are in quarters at the time of dispatch and includes automatic aid.

Table 65. Effective Response Force Current Deployment With Automatic Aid, January 2019 – October 2023

Minutes	Covered Incidents	%	Minutes	Covered Incidents	%
1		0.00%	14	65,291	95.68%
2		0.00%	15	66,303	97.16%
3		0.00%	16	66,968	98.13%
4		0.00%	17	67,332	98.67%
5		0.00%	18	67,691	99.19%
6	2,805	4.11%	19	67,775	99.32%
7	13,182	19.32%	20	67,805	99.36%
8	25,859	37.89%	21	67,878	99.47%
9	36,862	54.02%	22	67,903	99.50%
10	47,776	70.01%	23	67,962	99.59%
11	54,264	79.52%	24	68,006	99.65%
12	60,012	87.94%	25	68,238	99.99%
13	63,375	92.87%	26	68,241	100.00%

The goal of the performance data charts and specifically the reporting at the 90th percentile is to provide a predictable expectation for service to your community. By tracking such data for 3 years for agencies seeking initial accreditation and for 5 years for agencies seeking reaccreditation, agencies will be able to identify baseline performance and ascertain if they are achieving quality improvement in striving for their benchmark.

Table 66 compares VFD's 90th percentile response times baseline performance for low-risk fire suppression calls from alarm through on-scene distribution with established benchmarks for January 2019–October 2023.

Table 66. Low-Risk Fire Suppression Calls Five-Year Benchmark Performance

Fire Suppression 90th Percentile Times Baseline Performance			2020–2023	2023	2022	2021	2020	Benchmark
Alarm handling	Pick-up to dispatch	Urban	1:13	1:13	1:18	1:12	1:09	1:00
		Rural	1:34	1:08	1:12	2:24	0:54	1:00
Turnout time	Turnout time 1st Unit	Urban	2:08	2:14	2:06	2:04	2:05	1:30
		Rural	1:34	1:43	1:56	1:12	0:57	1:30
Travel time	Travel time 1st unit distribution	Urban	7:19	7:21	6:54	7:46	7:09	6:00
		Rural	12:09	13:46	11:59	10:59	11:34	10:00
	Travel time ERF concentration	Urban	NA	NA	NA	NA	NA	NA
		Rural	NA	NA	NA	NA	NA	NA
Total response time	Total response time 1st unit on scene distribution	Urban	9:23	9:28	9:08	9:37	9:13	8:30
			n=2618	n=643	n=714	n=647	n=614	NA
		Rural	14:33	15:59	13:59	14:55	12:57	12:30
			n=33	n=6	n=7	n=8	n=12	NA
	Total response time ERF concentration	Urban	NA	NA	NA	NA	NA	NA
			n=0	n=0	n=0	n=0	n=0	NA
		Rural	NA	NA	NA	NA	NA	NA
			n=0	n=0	n=0	n=0	n=0	NA

Table 67 compares VFD's 90th percentile response times baseline performance for high-risk fire suppression calls from alarm through on-scene distribution with established benchmarks for January 2019 – October 2023.

Table 67. High-Risk Fire Suppression Calls Five-Year Benchmark Performance

Fire Suppression 90th Percentile Times Baseline Performance			2020–2023	2023	2022	2021	2020	Benchmark
Alarm handling	Pick-up to dispatch	Urban	1:04	1:12	0:58	1:05	0:59	1:00
		Rural	1:27	NA	NA	NA	1:27	1:00
Turnout time	Turnout time 1st unit	Urban	1:11	1:00	1:06	1:15	1:02	1:30
		Rural	0:35	NA	NA	NA	0:35	1:30
Travel time	Travel time 1st unit distribution	Urban	6:12	5:11	5:41	7:10	5:05	6:00
		Rural	6:48	NA	NA	NA	6:48	10:00
	Travel time ERF concentration	Urban	14:22	12:45	13:53	13:24	14:31	8:00
		Rural	14:31	NA	NA	NA	14:31	14:00
Total response time	Total response time 1st unit on scene distribution	Urban	7:54	7:08	7:54	9:02	7:37	8:30
			n=66	n=23	n=17	n=19	n=7	NA
		Rural	9:39	NA	NA	NA	9:39	12:30
			n=1	n=0	n=0	n=0	n=1	NA
	Total response time ERF concentration	Urban	16:43	16:58	14:49	16:24	17:08	10:30
			n=62	n=23	n=14	n=19	n=6	NA
		Rural	22:12	NA	NA	NA	22:12	16:30
			n=1	n=0	n=0	n=0	n=1	NA

Impact of Vegetation Fires

Calls for vegetation fires are categorized into low, high, and red flag dispatch levels based on the current weather conditions and seven-day fire potential from the National Geographical Area Coordination Center (GACC). Dispatch modes levels for wildland responses in the North Zone are defined as the following:

Low-Level Dispatch Mode:

This mode reflects a non-critical statewide/regional situation. Current and short-range predictions are for low to moderate fire danger. Local units have sufficient contingency resources available.

Weather Considerations:

- *Temperatures – 80 to 90 range*
- *Relative Humidity – (40%–60%)*
- *GACC 7-Day Fire Potential – Green or Yellow*

High-Level Dispatch Mode:

A high-level dispatch mode will be used when the following weather conditions or when the weather is predicted for a severe situation. All conditions listed below must be met for North Comm to initiate procedures for moving into a High Wildland

Weather Considerations:

- *Temperatures – 90 and above*
- *Wind Speed - > 15 MPH*
- *Relative Humidity – (15%–40%)*
- *GACC 7-Day Fire Potential – Orange, Red, or Brown*

Red Flag Level Dispatch Mode:

A red flag dispatch mode will be used when a red flag condition has been declared by the National Weather Service.

Weather Considerations: The following weather conditions have been established by the National Weather Service and must be met for the red flag criteria:

- *Relative Humidity ≤ 15%*
- *Sustained winds ≥ 25 MPH*
- *Wind gusts > 35 MPH for ≥ 6 hours*

Or

- *Existing dry lightning activity*

A higher dispatch mode based on current weather conditions indicates a more significant potential for hazardous fire conditions. In collaboration with neighboring jurisdictions and CAL FIRE, utilize weather conditions and seven-day predictive fire potential to determine the appropriate number of resources to dispatch during fire season, thus optimizing the response to potential threats.

Dispatch levels are determined relative to the North Zone vegetation dispatch modes **(Table 68)**:

Table 68. Vegetation Fire Risk and Resources

Level of Risk	Required Resources
Low risk	One engine
Moderate risk	2 Type 1 engines 2 Type 3 engines 1 Battalion chief
High risk	2 Type 1 engines 3 Type 3 engines Water tender 1 Battalion chief

Tables 69–71 outline the critical tasks, personnel, and apparatus necessary for low-risk, moderate-risk, and high-risk vegetation fires.

Table 69. Critical Tasks and Resources: Low-Risk Vegetation Fire

Critical tasks necessary at low-risk vegetation fires (e.g., dumpster, vehicle, and small grass fires)		
Task	**Personnel**	**Apparatus**
Command, pump, and attack line	3	1st engine or truck
TOTAL	**3 Fire Personnel**	**1 Fire Apparatus or Truck**

Table 70. Critical Tasks and Resources: Moderate-Risk Vegetation Fire

Critical tasks necessary at moderate-risk vegetation fires (CAD Veg - Low)		
Task	**Personnel**	**Apparatus**
Command	1	Battalion chief
Pump operator	1	1st engine
Primary flank line	3	1st brush engine
Water supply/pump operator	3	2nd engine
Second flank line	3	2nd brush engine
Safety/division	2	1st engine
TOTAL	**13 Fire Personnel**	**2 Engines, 2 Brush Engines, and 1 Battalion Chief**

Table 71. Critical Tasks and Resources: High-Risk Vegetation Fire

Critical tasks necessary at high-risk vegetation fires (CAD High Veg Dispatch)		
Task	**Personnel**	**Apparatus**
Command	1	1st battalion chief
Pump operator	2	1st fire engine
Primary flank line	3	1st brush engine
Pump operator/water supply	3	2nd fire engine
Back-up or secondary flank line	3	2nd brush engine
Backup / Flank attack line	3	3rd brush engine
Safety	1	1st fire engine
Water supply	1	Water tender
TOTAL	**17 Fire Personnel**	**2 Engines, 3 Brush Engines, 1 Water Tender, and 1 Battalion Chief**

Vegetation Fire Benchmarks

For 90% of **low-risk** vegetation fires, the minimum effective response force staffing shall be 3 firefighters that arrive within 8 minutes and 30 seconds (08:30) in urban and suburban areas, and 12 minutes and 30 seconds (12:30) in response zones.

For 90% of **moderate-risk** vegetation fires, the minimum effective response force staffing shall be 13 personnel that arrive within 10 minutes and 30 seconds (10:30) in the urban and suburban areas and 14 minutes and 30 seconds (14:30) in rural response zones.

For 90% of **high-risk** vegetation fires, the minimum effective response force staffing shall be 17 personnel that arrive within 16 minutes, 30 seconds (16:30) in the urban and suburban areas, and 20 minutes (20:00) in rural response zones.

Table 72 compares VFD's 90th percentile response times baseline performance for low-risk vegetation fires from alarm through on-scene distribution with established benchmarks for January 2019–October 2023.

Table 72. Low-Risk Vegetation Fires Five-Year Benchmark

Vegetation Fire 90th Percentile Times Baseline Performance			2020–2023	2023	2022	2021	2020	Benchmark
Alarm handling	Pick-up to dispatch	Urban	1:10	0:24	1:19	0:24	0:30	1:00
		Rural						
Turnout time	Turnout time 1st unit	Urban	2:46	0:34	3:05	0:55	0:51	1:30
		Rural						
Travel time	Travel time 1st unit distribution	Urban	6:47	4:59	7:07	5:44	4:40	6:00
		Rural						
	Travel time ERF concentration	Urban						
		Rural						
Total response time	Total response time 1st unit on scene distribution	Urban	9:59 n=16	5:57 n=1	9:52 n=12	16:59 n=2	6:01 n=1	8:30 NA
		Rural						
	Total response time ERF concentration	Urban	9:59 n=16	5:57 n=1	9:52 n=12	16:59 n=2	6:01 n=1	10:30 NA
		Rural						

Table 73 compares VFD's 90th percentile response times baseline performance for moderate-risk vegetation fire calls from alarm through on-scene distribution with established benchmarks for January 2019 – October 2023.

Table 73. Moderate-Risk Vegetation Five-Year Benchmark

Vegetation Fire 90th Percentile Times Baseline Performance			2020–2023	2023	2022	2021	2020	Benchmark
Alarm handling	Pick-up to dispatch	Urban	1:16	NA	NA	1:16	NA	1:00
		Rural						
Turnout time	Turnout time 1st unit	Urban	0:42	NA	NA	0:42	NA	1:30
		Rural						
Travel time	Travel time 1st unit distribution	Urban	7:51	NA	NA	7:51	NA	6:00
		Rural						
	Travel time ERF concentration	Urban	16:39	NA	NA	16:39	NA	
		Rural						
Total response time	Total response time 1st unit on scene distribution	Urban	10:09 n=3	NA n=0	NA n=0	10:09 n=3	NA n=0	8:30 NA
		Rural						
	Total response time ERF concentration	Urban	25:49 n=3	NA n=0	NA n=0	25:49 n=3	NA n=0	10:30 NA
		Rural						

EMS Deployment and Capabilities

The department effectively delivers first responder medical care at both basic life support (BLS) and advanced life support (ALS) service levels. EMS calls remain the predominant emergency call type within the jurisdiction. Each department member holds a minimum emergency medical technician (EMT) certification, with approximately 55 individuals additionally certified as state and/or nationally recognized paramedics.

To meet the diverse demands of fire, rescue, and EMS, the department strategically aligns member staffing, certifications, and equipment deployment. The fleet includes four ALS ambulances and two BLS ambulances, each staffed by a firefighter/EMT and a firefighter/paramedic. The department's five primary fire apparatus and one rescue truck function as full-time ALS units, fully equipped with advanced respiratory equipment, cardiac monitors, cardiac medications, and intravenous therapy supplies.

EMS services encompass a spectrum of activities, including first response, rescue, treatment, transportation, and reporting. The VFD manages approximately 18,800 EMS calls annually. Responses cover a wide range of medical emergencies, such as cardiac and respiratory issues, childbirth, cardiac arrest, stroke, and trauma.

The city's 9-1-1 primary public safety answering point (PSAP) collects basic medical information and forwards calls to the North County Dispatch Joint Powers Authority. Requests for EMS are categorized as either BLS or ALS, with all priority EMS requests receiving both a fire first responder ALS unit and a rescue ambulance. The VFD actively participates in the entire EMS delivery, maintaining six fire suppression units and five ambulances at full staffing, strategically deployed to meet service demands in alignment with the department's current performance goals.

Critical Task Analysis EMS

Moderate Risk: Medical responses including traumatic injury, CPR with an AED application, rescue breathing with a bag-valve-mask, uncontrolled bleeding, severe allergic reactions, severe respiratory distress, non-cooperative patients, and patients with altered mental status are considered moderate risk.

Tables 74 and 75 outline the critical tasks, personnel, and apparatus necessary for moderate-risk and high-risk EMS Calls.

Table 74. Critical Tasks and Resources: Moderate-Risk EMS Calls

Critical tasks necessary at moderate-risk EMS calls (i.e., alpha through echo calls)		
Task	**Personnel**	**Apparatus**
Command and patient assessment	3	1st engine or truck
ALS or BLS	2	1st ambulance
TOTAL	**5 Fire Personnel**	**1 Fire Apparatus and Ambulance**

High Risk: multi-casualty incidents with more than five patients. multi-casualty incidents with more than five patients.

Table 75. Critical Tasks and Resources: High-Risk EMS Calls

Critical tasks necessary at high-risk EMS calls (i.e., major and mass-casualty incidents)		
Task	**Personnel**	**Apparatus**
Command	1	Battalion chief
Medical supervisor	1	Battalion chief
Safety	1	1st engine or truck
Triage	5	1st and 2nd engine or truck
Treatment	9	3rd through 5th engines
Transport	10	1st through 5th ambulances
TOTAL	**27 Personnel**	**5 Fire Apparatus, 5 Ambulances and 2 Battalion Chiefs**

EMS Service Benchmark Goals

The VFD's EMS response and deployment standards are based on urban population density and historical demand for services within the community and region. The targeted service-level benchmark statements are based on industry standards, best practices, and historical response data.

For 90% of **low-risk** EMS calls, the minimum ERF staffing shall be either a 3-person paramedic assessment engine or a 2 personnel on an ambulance that is requested code 2 without lights and sirens within 30 minutes for Basic Life Support (BLS) ambulance. The first-due unit for all risk levels shall be capable of assessing scene safety, conducting an initial patient assessment, obtaining vital signs, taking patient's medical history, initiating mitigation efforts, and transporting to the hospital.

For 90% of **moderate-risk** EMS calls, the minimum ERF staffing shall be 5 personnel who arrive within 10 minutes, 30 seconds (10:30) in the urban and suburban areas, and 14 minutes, 30 seconds (14:30) in rural response zones. The ERF shall be capable of providing incident command, completing patient assessments on multiple patients, providing appropriate treatment, initiating CPR, performing EKGs and defibrillation, and assisting transport personnel with packaging patients.

For 90% of **high-risk** EMS calls, the minimum ERF staffing shall be 27 firefighters who arrive within 17 minutes (17:00) in urban and suburban areas and 19 minutes (19:00) in rural response zones. The increased ERF time is based on the longer response time for the required five ambulances.

Table 76 compares VFD's 90th percentile response times baseline performance for moderate-risk EMS calls from alarm through on-scene distribution with established benchmarks for January 2019 – October 2023.

Table 76. Moderate-Risk EMS Five-Year Benchmark

EMS Calls 90th Percentile Times Baseline Performance			2020–2023	2023	2022	2021	2020	Benchmark
Alarm handling	Pick-up to dispatch	Urban	1:40	1:05	2:05	1:27	0:53	1:30
		Rural	1:47	0:39	2:07	1:45	0:52	1:30
Turnout time	Turnout time 1st unit	Urban	1:37	1:50	1:43	1:33	1:32	1:00
		Rural	1:31	0:41	1:20	1:41	1:10	1:00
Travel time	Travel time 1st unit distribution	Urban	6:11	7:18	6:05	6:05	6:14	6:00
		Rural	10:48	9:26	10:05	10:28	11:01	10:00
	Travel time ERF concentration	Urban	9:01	10:42	9:23	8:45	8:40	8:00
		Rural	12:20	11:19	13:23	11:57	11:56	12:00
Total response time	Total response time 1st unit on scene distribution	Urban	8:43	9:49	9:11	8:28	8:16	8:30
			n=20,897	n=1520	n=6994	n=5973	n=6410	NA
		Rural	12:33	10:32	12:21	12:35	12:27	12:30
			n=151	n=6	n=54	n=45	n=46	NA
	Total response time ERF concentration	Urban	12:20	14:36	13:25	11:39	11:24	10:30
			n=20,843	n=1511	n=6979	n=5963	n=6390	NA
		Rural	14:55	12:16	16:25	14:41	14:04	14:30
			n=150	n=6	n=54	n=44	n=46	NA

HazMat Risk Assessment

The VFD faces significant HazMat risks stemming from both fixed facilities and transportation routes for material movement. The San Diego County Health & Human Services Agency serves as the administrator of the local Certified Unified Program Agency (CUPA). This agency conducts inspections of businesses and facilities that handle or store HazMat, generate and/or treat hazardous waste, own or operate underground storage tanks, store petroleum in above-ground tanks over state thresholds, or store federally regulated HazMat over state thresholds. These inspections are conducted to ensure compliance with the California Health & Safety Code, California Code of Regulations, and the Code of Federal Regulations.

The CUPA program employs various strategies to achieve compliance, including education, community and industry outreach, inspections, and enforcement. Vista conducted an assessment of the concentration and density of its special operations risk throughout its jurisdiction and identified areas of concern related to HazMat. The city is situated in an area with significant HazMat risk potential, necessitating diligent oversight and proactive measures to ensure public safety and environmental protection.

VFD utilizes a three-tiered system to respond to and mitigate HazMat incidents. All personnel are trained to the Hazardous Materials First Responder Operational (FRO) level for HazMat and decontamination, thus making the fire suppression force the first line of response for low-risk events. Low-risk events receive a response for early size-up and hazard abatement within the responders' level of training and resources. Moderate-risk events that require additional resources for identification of the hazard, entry, decontamination, and medical monitoring typically require the assistance of outside agencies. However, for high-risk and major events that require considerable duration and relief, VFD participates in and utilizes department personnel and a mutual/automatic-aid complement of HazMat resources, including personnel trained as specialists and technicians, to assemble the appropriate ERF.

HazMat release emergencies can be categorized as low-, medium-, and high-risk events within the VFD's dispatching matrix, with each category requiring a specific number of resources. The risk levels are defined as follows.

Low risk: Low-quantity spills that a person trained at the FRO level can mitigate with no assistance required of a specialist are considered to be low-risk events. Examples include automotive fluids released at a traffic accident, identified abandoned chemicals with their original container, and abandoned waste that does not pose an immediate release hazard (e.g., less than 1 gallon of spilled pool chlorine).

Moderate risk: A moderate-risk HazMat emergency involves confirmed spills or releases of "unknown" materials, with no patients involved, but contamination requires specialized equipment, personnel, testing, and possibly evacuation, depending on population density/proximity and type of materials identified.

High risk: A high-risk HazMat emergency involves large-quantity releases of known or unknown HazMat, incidents in which one or more patients require full-body decontamination from HazMat exposure, materials that produce a vapor cloud or other airborne hazard, and damaged chemical pipelines.

Tables 77 and 78 outline the critical tasks, personnel, and apparatus necessary for low-risk and moderate-risk HazMat emergencies.

Critical Task Analysis HazMat

Table 77. Critical Tasks and Resources: Low-Risk HazMat Emergencies

Critical tasks necessary at low-risk HazMat emergencies (e.g., fuel leak, odor, and CO_2)		
Task	**Personnel**	**Apparatus**
Command	1	1st engine or truck
Mitigation	2	1st engine or truck
TOTAL	**3 Fire Personnel**	**1 Fire Apparatus**

Table 78. Critical Tasks and Resources: Moderate-Risk HazMat Emergencies

Critical tasks necessary at moderate-risk HazMat emergencies (e.g., gas leak)		
Task	**Personnel**	**Apparatus**
Command	1	Battalion chief
Investigation	1	1st engine
Entry team	2	2nd engine
Back-up team	2	3rd engine
Decontamination team	4	2nd engine
Safety officer/HazMat assistant safety officer	3	2nd engine
ALS	2	1st Ambulance
TOTAL	**15 Fire Personnel**	**3 Fire Engines, 1 Truck, 1 Battalion Chief, and 1 Ambulance**

HazMat Benchmark Goals

For 90% of **low-risk** HazMat incidents, the minimum ERF staffing shall be 3 personnel trained to the FRO level who arrive within 8 minutes, 30 seconds (8:30) in the urban and suburban areas, and 12 minutes, 30 seconds (12:30) in rural response zones. The first-due unit for all risk levels shall be capable of isolating the area, providing emergency medical care to any patients, providing initial identification of the type and hazard of materials involved, and establishing incident command. These operations shall be done in accordance with departmental standard operating procedures while providing for the safety of responders and the general public.

For 90% of **moderate-risk** HazMat incidents, the minimum ERF staffing shall be 9 personnel who arrive within 10 minutes, 30 seconds (10:30) in the urban and suburban areas, and 16 minutes, 30 seconds (16:30) in rural response zones. The ERF for moderate-risk emergencies shall be capable of providing incident command and advanced life support, isolating the area and denying entry, and providing identification of the type and hazard of materials involved. These operations shall be done in accordance with departmental standard operating procedures while providing for the safety of responders and the general public.

90% of **high-risk** HazMat incidents require the regional Type I HazMat team and apparatus from the San Diego Fire-Rescue Department. This unit is not requested until an initial scene assessment is completed and a moderate-risk dispatch of units has occurred. Historically, the regional HazMat team has requested code 2 and is not categorized as an urgent response.

Table 79 compares VFD's 90th percentile response times baseline performance for low-risk HazMat emergencies from alarm through on-scene distribution with established benchmarks for January 2019–October 2023.

Table 79. Low-Risk HazMat Five-Year Benchmark

HazMat 90th Percentile Times Baseline Performance			2020–2023	2023	2022	2021	2020	Benchmark
Alarm handling	Pick-up to dispatch	Urban	1:20	1:27	1:15	1:01	1:14	1:00
		Rural	0:18	NA	NA	0:18	NA	1:00
Turnout time	Turnout time 1st unit	Urban	2:03	1:51	2:06	1:58	1:59	1:30
		Rural	1:18	NA	NA	1:18	NA	1:30
Travel time	Travel time 1st unit distribution	Urban	8:21	10:07	7:25	7:04	8:44	6:00
		Rural	12:28	NA	NA	12:28	NA	10:00
	Travel time ERF concentration	Urban	NA	NA	NA	NA	NA	8:00
		Rural	NA	NA	NA	NA	NA	14:00
Total response time	Total response Time 1st unit on scene distribution	Urban	9:55 n=149	13:08 n=43	8:41 n=35	8:42 n=34	11:01 n=37	8:30 NA
		Rural	14:04 n=1	NA n=0	NA n=0	14:04 n=1	NA n=0	12:30 NA
	Total response time ERF concentration	Urban	NA n=0	NA n=0	NA n=0	NA n=0	NA n=0	10:30 NA
		Rural	NA n=0	NA n=0	NA n=0	NA n=0	NA n=0	16:30 NA

Critical Task Analysis Technical Rescue

Tables 80-82 outline the critical tasks that need to occur within the first 5 to 15 minutes after arriving at a rescue emergency, based on the risk level.

Table 80. Critical Tasks and Resources: Low-Risk Technical Rescue

Critical tasks necessary at low-risk technical rescue incidents (e.g., MVA or traffic collision without entrapment, elevator rescue)		
Task	**Personnel**	**Apparatus**
Command	1	1st engine or truck
Rescue	2	1st engine or truck
ALS	2	1st ambulance
TOTAL	**5 Fire Personnel**	**1 Fire Apparatus and 1 Ambulance**

Table 81. Critical Tasks and Resources: Moderate-Risk Technical Rescue

Critical tasks necessary at medium-risk technical rescue incidents		
Task	**Personnel**	**Apparatus**
Command	1	Battalion chief
Patient care	2	1st engine
Rescue/extrication team	3	1st truck
Safety officer	1	1st truck
ALS	2	1st ambulance
TOTAL	**9 Fire Personnel**	**1 Fire Engine, 1 Truck, 1 Battalion Chief, and 1 Ambulance**

Table 82. Critical Tasks and Resources: High-Risk Technical Rescue

Critical tasks necessary at high-risk technical rescue incidents (technical, train, cliff)		
Task	**Personnel**	**Apparatus**
Command	1	Battalion chief
Patient care	2	1st engine
Rescue/extrication team	6	3rd engine
Back-up team	2	1st truck/rescue
Attendant	1	1st truck/rescue
Safety officer	1	1st engine
ALS	2	1st ambulance
TOTAL	**15 Fire Personnel**	**3 Fire Engines, 1 Truck, 1 Battalion Chief, and 1 Ambulance**

Technical Rescue Benchmark Goals

For 90% of **low-risk** technical rescue incidents, the minimum ERF staffing shall be 3 personnel trained to the FRO level and 2 personnel trained at the EMT or ALS level who arrive within 8 minutes, 30 seconds (8:30) in the urban and suburban areas, and 8 minutes, 30 seconds (8:30) in rural response zones. The first-due unit for all risk levels shall be capable of providing incident command, basic or advanced life support, and minor rescue services, such as extrication of a patient from a vehicle or removing victims trapped in a non-operational elevator.

For 90% of **moderate-risk** technical rescue incidents, the minimum ERF staffing shall be 9 personnel who arrive within 10 minutes, 30 seconds (10:30) in the urban and suburban areas, and 16 minutes, 30 seconds (16:30) in rural response zones. The ERF for moderate-risk rescues shall be capable of providing incident command, providing ALS, performing complex vehicle extrication, extricating patients from machinery, and fulfilling the position of safety officer.

For 90% of **high-risk** technical rescue incidents require the regional Type I Urban Search & Rescue (USAR) team and specialty apparatus from CAL FIRE. This unit is not requested until an initial scene assessment is completed and a moderate-risk dispatch of units has occurred. The ERF for high-risk incidents shall be capable of providing incident command, ALS, search of collapsed structures, shoring up of compromised structures, trench rescues, and fulfilling the position of safety officer.

Tables 83 and 84 compare VFD's 90th percentile response times baseline performance for low-risk and moderate-risk technical rescue incidents from alarm through on-scene distribution with established benchmarks for January 2019–October 2023.

Table 83. Low-Risk Technical Rescue Five-Year Benchmark

Technical Rescue 90th Percentile Times Baseline Performance			2020–2023	2023	2022	2021	2020	Benchmark
Alarm handling	Pick-up to dispatch	Urban	0:54	0:51	0:59	0:50	0:54	1:00
		Rural	0:58	1:16	1:15	0:38	0:42	1:00
Turnout time	Turnout time 1st unit	Urban	1:47	1:53	1:52	1:44	1:37	1:30
		Rural	1:48	1:39	1:58	1:27	1:39	1:30
Travel time	Travel time 1st unit distribution	Urban	6:21	6:22	6:29	6:31	5:56	6:00
		Rural	6:51	4:45	7:21	6:52	7:12	10:00
	Travel time ERF concentration	Urban	8:31	8:47	8:33	8:44	7:56	8:00
		Rural	9:35	6:21	9:22	9:51	8:35	14:00
Total response Time	Total response time 1st unit on scene distribution	Urban	8:19	8:18	8:35	8:31	7:39	8:30
			n=1787	n=474	n=457	n=469	n=387	NA
		Rural	9:18	7:57	10:07	7:42	8:50	12:30
			n=26	n=5	n=8	n=7	n=6	NA
	Total response time ERF concentration	Urban	10:43	11:16	10:39	11:12	9:58	10:30
			n=1781	n=472	n=457	n=468	n=384	NA
		Rural	12:14	8:04	16:08	10:59	10:21	16:30
			n=26	n=5	n=8	n=7	n=6	NA

Table 84. Moderate-Risk Technical Rescue Five-Year Benchmark

Technical Rescue 90th Percentile Times Baseline Performance			2020–2023	2023	2022	2021	2020	Benchmark
Alarm handling	Pick-up to dispatch	Urban	0:51	0:41	0:38	0:41	0:52	1:00
		Rural	0:14	NA	0:14	NA	NA	1:00
Turnout time	Turnout time 1st unit	Urban	1:34	1:37	1:25	1:33	1:39	1:30
		Rural	1:02	NA	1:02	NA	NA	1:30
Travel time	Travel time 1st unit distribution	Urban	6:44	6:20	6:40	5:28	5:05	6:00
		Rural	4:39	NA	4:39	NA	NA	10:00
	Travel time ERF concentration	Urban	11:42	8:33	11:47	9:33	10:59	8:00
		Rural	8:48	NA	8:48	NA	NA	14:00
Total response time	Total response time 1st unit on scene distribution	Urban	8:47	8:41	8:44	8:12	6:37	8:30
			n=45	n=11	n=21	n=9	n=4	NA
		Rural	6:15	NA	6:15	NA	NA	12:30
			n=1	n=0	n=1	n=0	n=0	NA
	Total response time ERF concentration	Urban	18:09	12:31	20:53	17:18	12:40	10:30
			n=42	n=10	n=20	n=8	n=4	NA
		Rural	9:21	NA	9:21	NA	NA	16:30
			n=1	n=0	n=1	n=0	n=0	NA

SECTION 4

Historical Response and Workload

To evaluate the VFD's service delivery and performance, the team reviewed incident and unit response data for calendar years 2019–2023. Due to a software change for incident reporting, the analysis for 2019 relied solely on unit response CAD data. It is important to note that the 2020 COVID-19 pandemic could have affected the data provided. However, a comprehensive understanding of the pandemic's impact on responses would require analysis over multiple study periods. VFD supplied data from its records management system (RMS) and dispatch center.

Service Demand

Table 85 shows the response workload by general type for the past five years. The total response workload has increased each year as the city's population grew. In 2020, as a result of COVID-19, the majority of emergency services systems nationwide experienced a reduction in demand. VFD experienced a reduction in 2020 and then a steady increase each following year. The call service demand increased by 11.1% over the five-year period. EMS calls comprised the vast majority of the total volume, increasing by 8.2%.

Table 85. VFD Call Service Demand by Incident Type, CYs 2019–2023

Incident Type	2019	2020	2021	2022	2023
Alarm	552	554	456	531	590
Assist/Service	475	553	436	325	296
Fire — Other	223	290	392	1,094	820
Fire — Structure	648	764	844	697	629
Fire — Vegetation	161	16	12	19	17
Fire — Vehicle	82	91	88	93	105
Hazardous Cond./HazMat	199	227	245	220	307
Ignore	297	616	518	3,001	1,695
Medical	17,465	16,558	19,205	17,896	18,811
Medical — Staged	1,749	1,839	1,725	1,595	1,340
Other	245	233	494	273	335
Rescue	13	6	20	12	23
Motor Vehicle Accident	1,994	1,751	1,868	1,892	2,304
TOTAL	**24,103**	**23,498**	**26,303**	**27,648**	**27,272**

Temporal Analysis

Data on response workload by the hour typically show fire department activity higher during daytime hours, correlating with the time of day during which people are most active. This principle proved true for VFD during the analysis period. In the City of Vista, the department's activity began to increase at 5 a.m. and reached its first peak at 11 a.m. This level was generally maintained until it gradually decreased at 7 p.m., when it began to decline more rapidly. **Figures 56 and 57** show ALS ambulance workload by hour of day, and Figure X shows engine and truck workload by hour.

Figure 56. ALS Ambulances. Sum of Hours Committed By Hour of Day

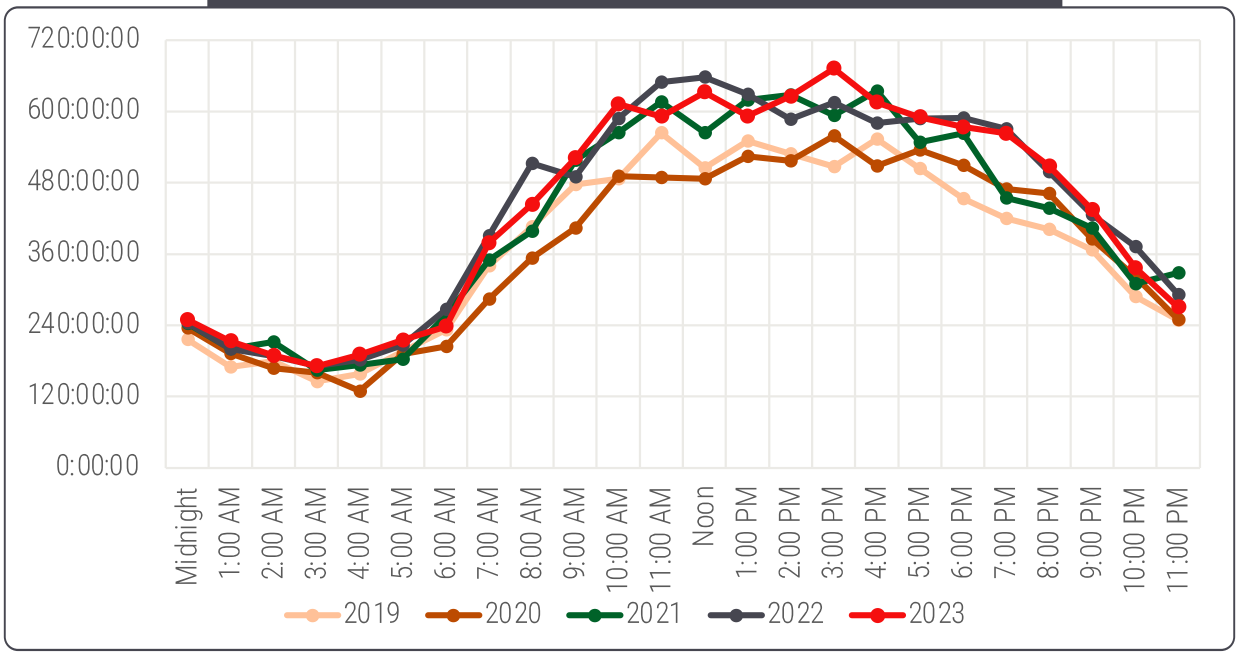


Figure 57. Engines and Trucks. Sum of Hours Committed By Hour of Day

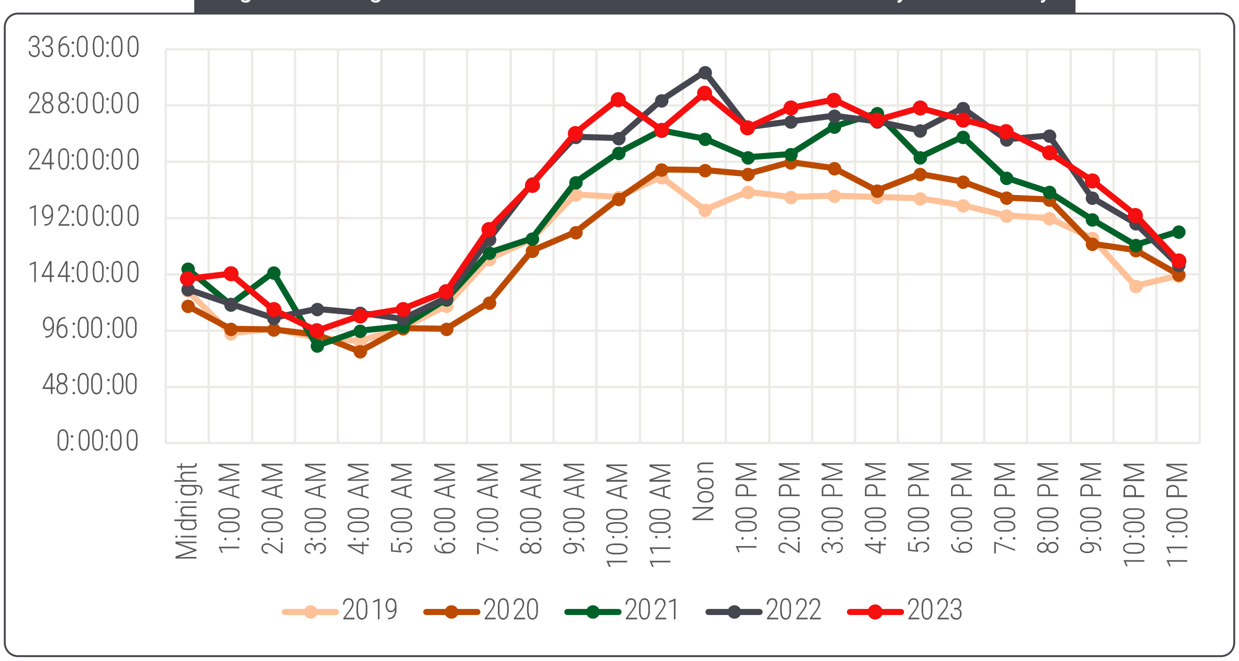


Table 86 shows how the fire department starts to get busier when residents are more active between the hours of 7:00 Am to 9:00 PM. The busiest hours for the VFD are in dark red and usually occur in the afternoon.

Table 86. VFD Fire Apparatus and Ambulances Total Committed Time by Hour and Day of the Week for 2023

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Midnight	48:00:30	30:19:41	34:49:45	38:20:11	24:45:54	33:59:43	39:16:56
1:00 AM	36:35:23	21:47:37	24:02:53	27:05:50	24:28:37	30:55:41	48:36:05
2:00 AM	33:19:47	28:29:02	34:32:47	22:04:50	22:19:55	20:42:56	27:54:36
3:00 AM	20:33:20	27:41:25	24:20:48	26:59:07	19:07:06	16:52:35	35:49:33
4:00 AM	31:56:40	23:28:33	35:36:30	25:31:02	21:54:51	23:12:25	29:14:42
5:00 AM	37:54:14	38:43:13	25:29:07	28:41:33	34:00:08	23:14:39	27:08:27
6:00 AM	32:06:05	35:31:21	30:05:30	37:27:33	42:09:20	20:40:25	40:28:36
7:00 AM	33:26:03	73:34:44	66:13:49	57:05:41	53:52:52	55:16:55	39:23:07
8:00 AM	47:06:40	52:43:41	65:12:08	73:02:44	74:01:20	64:14:05	67:03:32
9:00 AM	74:58:54	74:57:29	86:39:38	79:08:08	87:24:35	68:47:04	49:47:24
10:00 AM	87:16:18	93:55:01	89:11:20	93:37:22	87:56:40	98:22:19	62:06:32
11:00 AM	79:22:43	78:31:46	72:56:38	92:25:23	79:45:39	100:34:54	88:10:25
Noon	82:59:14	90:19:43	98:11:54	90:22:23	95:49:20	90:23:00	84:23:15
1:00 PM	87:14:38	93:09:01	91:15:46	77:43:58	78:35:50	102:09:18	62:07:23
2:00 PM	79:37:10	87:21:46	79:50:34	97:06:42	82:11:44	110:14:46	89:12:41
3:00 PM	77:37:24	101:02:32	90:35:55	97:28:22	113:41:06	107:27:01	84:27:23
4:00 PM	92:33:10	100:32:54	99:54:04	80:00:24	87:25:30	77:20:29	77:25:02
5:00 PM	82:52:07	87:54:19	84:49:33	76:56:29	70:24:43	104:37:07	83:04:44
6:00 PM	72:03:45	80:10:36	80:16:24	94:58:29	76:55:43	87:09:33	82:22:51
7:00 PM	79:54:40	77:10:07	76:37:47	73:16:30	61:12:24	97:00:52	98:06:17
8:00 PM	74:00:05	77:36:34	60:22:05	61:31:12	71:50:33	87:39:15	75:21:35
9:00 PM	48:23:54	68:41:21	56:39:26	53:29:35	78:51:08	63:27:29	65:14:55
10:00 PM	64:07:05	40:37:41	43:02:44	33:51:48	34:19:37	66:27:38	54:28:42
11:00 PM	33:58:18	39:30:41	37:07:23	41:05:22	29:00:41	36:06:23	53:33:17
TOTAL	**1437:58:07**	**1523:50:48**	**1487:54:28**	**1479:20:38**	**1452:05:16**	**1586:56:32**	**1464:48:00**

As shown in **Figure 58**, most of the structure fires occurred during the morning and early evening hours.

Figure 58. Structure Fires Responded to by Hour of Day — Five Year Aggregate, 2019–2023

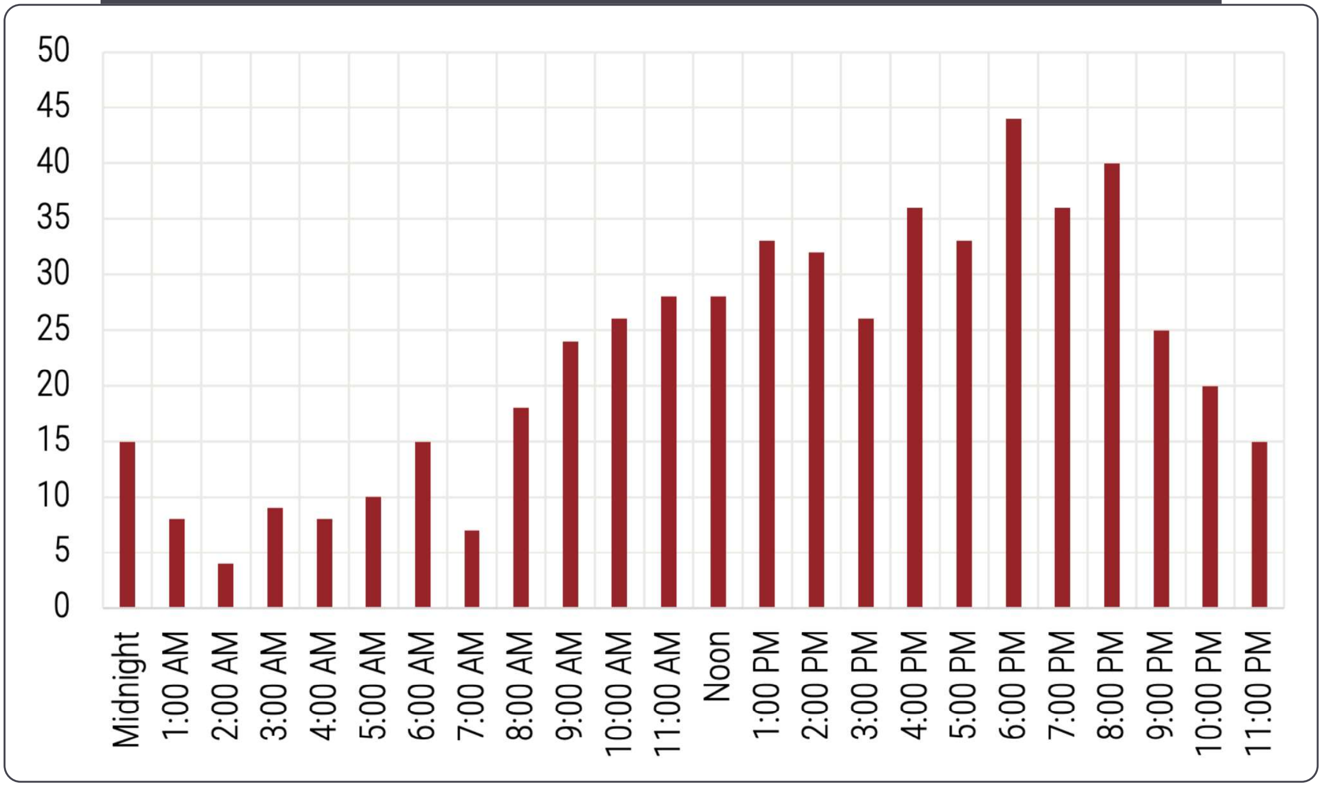


Table 87 outlines the addresses to which the VFD responded to calls most often during the study period.

Table 87. Addresses and Occupancy Types with Most Frequent Responses, 2019–2023

Rank	Address	Count	Occupancy Type
1	325 S Melrose Dr	1,381	Jail
2	1080 Arcadia Av	930	Continuing Care Facility
3	304 N Melrose Dr	629	Continuing Care Facility
4	2041 W Vista Wy	623	Continuing Care Facility
5	4500 Cannon Rd	595	Continuing Care Facility
6	247 E Bobier Dr	577	Continuing Care Facility
7	760 E Bobier Dr	572	Continuing Care Facility
8	718 Sycamore Av	558	Mobile Home Park
9	2000 Westwood Rd	435	Continuing Care Facility
10	1440 S Melrose Dr	417	Continuing Care Facility
11	1863 Devon Pl	398	Continuing Care Facility
12	1010 E Bobier Dr	395	Mobile Home Park
13	130 Cedar Rd	370	Urgent Care Facility
14	1510 S Melrose Dr	321	Apt Complex
15	101 Olive Av	318	Bus Station

Response Unit Workload

The amount of time spent on a scene can affect firefighters' workload and the availability of resources for the next, or any concurrent, incident. The response workloads for VFD ALS ambulances and engines are shown in **Figure 59 and Figure 60**.

Figure 59. Number of ALS Ambulance Responses by Year

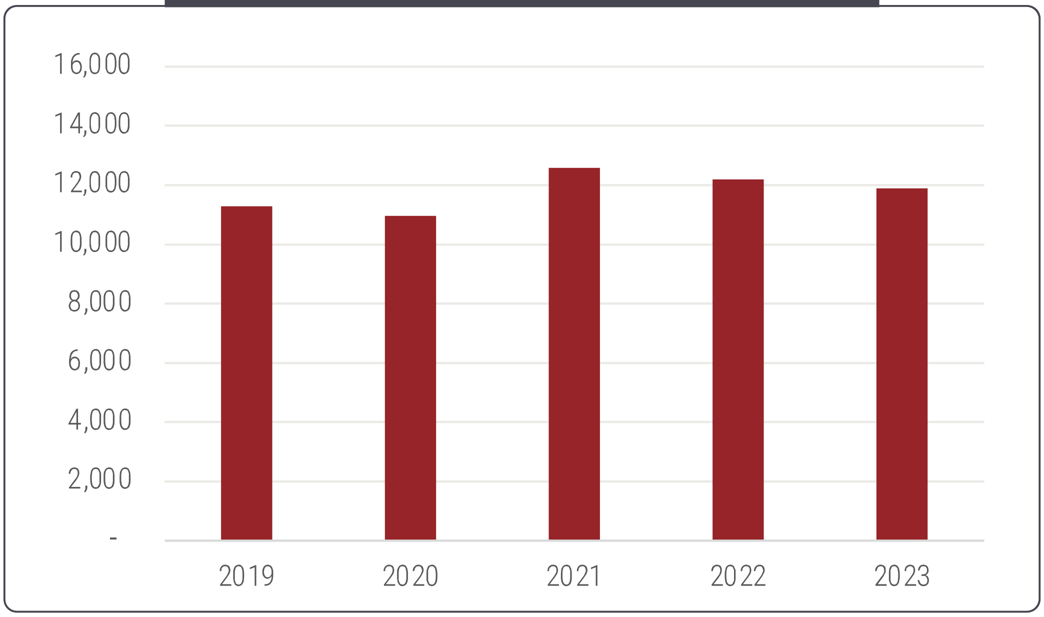
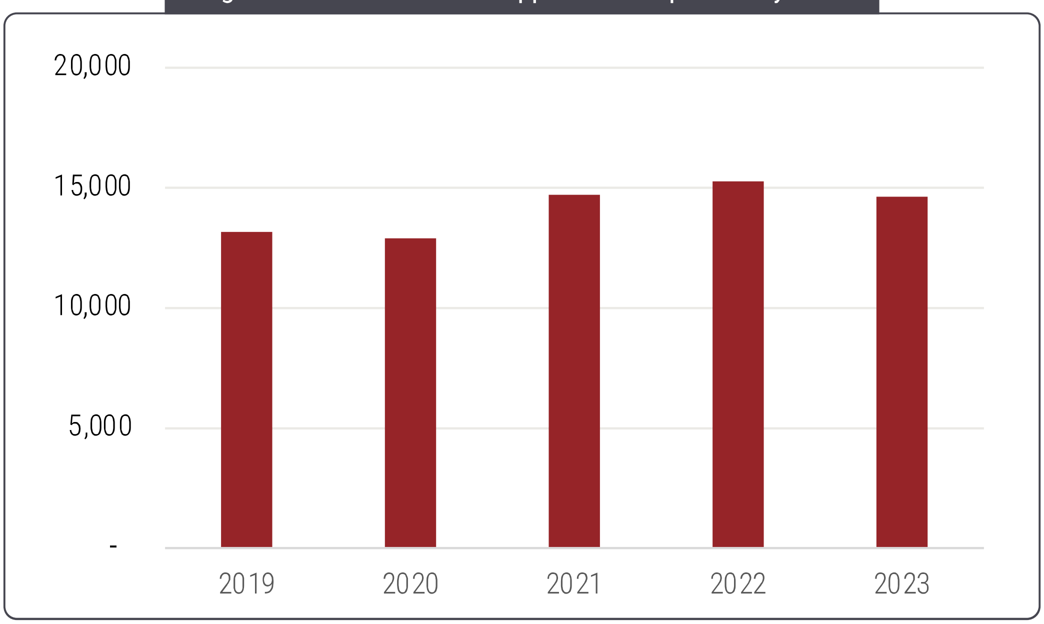


Figure 60. Number of Fire Apparatus Responses by Year



Resource Reliability

This section analyzes VFD workload at the unit level rather than at the department level, as previously shown. Unit-level workload analysis also provides further insights into the stress levels that firefighters and apparatus experience. For example, units are only effective if available within their station area; if they are already involved in an incident when another incident is reported, a unit must respond from a further distance, increasing response times.

Unit-hour utilization (UHU) represents the percentage of time a unit is not available for a response because it is committed to another incident during a calendar year. This data is important because, the higher the percentage, the more time the unit is not available to respond to another incident. Note that this analysis only measures responses to incidents; it does not include unmeasured activities in the dataset, such as training time and station duties. **Table 88** shows UHU for 2019–2023.

Table 88. Unit-hour Utilization of VFD ALS Ambulances and Engines/Trucks

	2019	2020	2021	2022	2023
ALS Ambulance					
RA121	30.6%	31.2%	34.5%	36.1%	35.2%
RA123	19.2%	19.3%	22.4%	25.0%	24.1%
RA124	25.1%	24.4%	28.4%	29.8%	29.0%
RA126	26.7%	26.1%	28.6%	28.9%	30.8%
AVERAGE ALS AMBULANCE	**25.4%**	**25.2%**	**28.4%**	**30.0%**	**29.8%**
Engine/Truck					
E121	10.2%	11.0%	11.7%	14.3%	13.7%
E122	4.1%	3.9%	4.6%	5.1%	5.1%
E123	7.2%	7.3%	8.8%	9.2%	9.3%
E124	8.6%	8.5%	9.9%	9.8%	10.3%
E125	3.1%	4.6%	8.4%	8.9%	9.7%
E126	9.2%	6.5%	1.3%	0.5%	0.6%
T125	3.3%	2.0%	0.0%	0.0%	0.0%
T126	0.0%	2.9%	8.7%	10.0%	10.1%
AVERAGE ENGINE/TRUCK	**7.6%**	**7.8%**	**8.9%**	**9.6%**	**9.8%**

Concurrency

One way to look at resource workload is to examine the number of times multiple incidents occur within the same time frame. Incidents during the study period were examined to determine the frequency of concurrent incidents. This is important because concurrent incidents can stretch available resources and delay responses to other emergencies, significantly affecting the jurisdiction's response times to emergencies.

Table 89 shows the number of hours when units were assigned to emergency calls during the study period.

Table 89. Number of Hours VFD Ambulances and Engines/Trucks Committed, 2023

	Sum of Committed Times	Percentage of Year
ALS Ambulancse Commited		
0	2827:43:21	32.3%
1	2884:55:39	32.9%
2	1868:42:44	21.3%
3	902:05:46	10.3%
4	276:03:51	3.2%
Engines/Trucks Commited		
0	4927:20:11	56.3%
1	2678:04:15	30.6%
2	833:22:11	9.5%
3	220:39:04	2.5%
4	58:33:15	0.7%
5	22:32:41	0.3%
6	13:00:46	0.1%
7	4:58:03	0.1%

How reliably a station crew responds within its assigned area is important, not only to its ability to handle incidents, but also its response time performance. When busier units are on assignment, other stations must handle incidents outside their response zones. This is especially true during fire events that require multiple units from several stations.

Operational Performance Standards

Incident and dispatch data for the period between January 1, 2019, and December 31, 2023, were evaluated in detail to determine VFD's current performance.

Only priority incidents occurring within the VFD service area were included in the analysis; non-emergency requests were excluded. Performance was based on the type of incident, as reported. Three categories were used to report performance for total response time:

- Call processing
- Turnout
- Travel

Each phase of the incident response sequence was evaluated to determine current performance. This approach allows an analysis of each phase to identify any opportunities for improvement.

The total incident response time continuum consists of several steps, beginning with initiation of the incident and concluding with its appropriate mitigation. The time required for each incident component varies, and VFD's policies and practices directly influence some of the steps.

VFD's response performance was compared with the national consensus standard for response performance, found in the National Fire Protection Association's (NFPA's) Standard 1710: *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*, 2020 Edition. In addition, the dispatch center's performance was compared with standards from NFPA's Standard 1221: *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*, 2019 Edition.

Event Detection

Event detection is the time it takes for an individual to discover an emergency and begin the process of activating the emergency response system. This process can involve, for example, dialing a personal cellular phone, driving to a location that has a fixed phone, or hiking out of the wilderness to find someone with a radio to notify EMS. Event detection begins with the inception of the emergency and ends when the emergency is detected. This phase is largely outside the fire department's control and not a part of the event sequence that is reliably measurable.

Notification

Notification is the time at which the communications center receives the alarm. This process could include, for example, walk-in citizens, phone calls, or radio reports. Over the past decade, the VFD community has experienced decreased reporting time on most alarms, due to the proliferation of cellular phones. Previously, reporting of an emergency could have been delayed because of a lack of communication options. Although cellular phones make reporting an emergency faster, the overall time for notification is approximately the same, because dispatchers now must verify the location of the caller. When the caller is unsure of their location, the communications center can attempt to ping the phone for general location, which escalates alarm processing times.

Call Processing

Call processing is the time interval beginning when the first notification was received and ending with the completion of dispatching the recommended units. The CAD system utilizes assists in recommending and assigning the closest units to an emergency incident. Most emergency incidents are reported to the 9-1-1 center by telephone (landline or cellphone). Call takers must quickly elicit accurate information about the incident's nature and location from the caller. Lay people who are well-trained in emergencies can reduce the time required for the call processing phase. The dispatcher must identify the correct units based on incident type and location, dispatch them to the emergency, and continue to collect and communicate information about the emergency while the units respond. NFPA 1221 standards recommend that the call processing phase occur within 60 seconds 90% of the time.

Emergency Medical Dispatching (EMD) protocols help to target the correct, most effective response force and provide instructions for EMS callers. Based on the nature of the call, EMD protocols contain a specific set of questions that dispatchers must ask the caller. However, this step can result in delaying the first unit dispatched to the incident. Many accredited agencies have discovered that there are competing interests when evaluating the usefulness of an EMD system. Using EMD, the NFPA-recommended call processing time is extended from 1 minute to 1 minute and 30 seconds. **Table 90** outlines call processing time by incident type.

Table 90. Call Processing Times by Incident Type

	Fire	Medical	Other	Rescue
Count	3,073	43,400	3,399	4,481
Average	0:00:53	0:00:49	0:00:44	0:00:39
90th Percentile	0:01:26	0:01:30	0:01:05	0:01:03

Turnout

Turnout time is the time interval from notification of a station or unit of the emergency to the assigned unit responding. VFD has the most control over this phase of emergency response. Station facilities are equipped with radio tone-alert activation. Turnout time is measured from the completion of alerting by dispatch to the vehicles clearing the stations and announcing "en route" on the radio or using mobile data computers. Personnel must have donned appropriate equipment, assembled on the response vehicle, and begun traveling to the incident. Proper training and fire station design can minimize the time required for the turnout phase.

Newer station designs have not explicitly focused on the time necessary to get from any part of the facility to the apparatus, which has affected turnout times. Increased emphasis on never removing a seatbelt while responding has raised levels of safety, but it has also impacted on turnout times when responding to calls.

The performance goal for turnout time is within 60 seconds 90% of the time for priority emergency incidents. **Table 91** outlines turnout time by incident type. Data show that turnout times for all incident types exceed NFPA standards. **Table 92** shows turnout times by service type.

Table 91. Turnout Times by Incident Type

	Fire	Medical	Other	Rescue
Count	2,929	42,990	3,066	4,918
Average	0:01:20	0:01:08	0:01:17	0:01:18
90th Percentile	0:02:07	0:01:52	0:02:07	0:02:06

Table 92. Turnout Times by Service Type

	Count	Average	90th Percentile
Ambulance	39,519	0:01:07	0:01:57
Engines/Trucks	46,253	0:01:15	0:02:03

Travel

Travel time is the time interval from the assigned unit reporting it is en route to an emergency until that unit's arrival at the emergency and report that it is "on-scene." This interval can be the longest of the response phases. The distance between a fire station and the location of an emergency has the greatest influence on response time. The quality and connectivity of streets, traffic, driver training, geography, and environmental conditions are also factors. Travel time and safety have been affected by the use of traffic calming measures and traffic control preemption devices. Preemption is utilized on each emergency response to reduce the delay at traffic signal-controlled intersections. Traffic calming devices, road design standards, and gated areas of the community have the opposite effect and actually slow travel time to emergencies. **Table 93** outlines travel times for all priority incidents by incident types. VFD's travel times exceeded its goal in all incident types. **Table 94** shows travel times for the first ambulance, and Table X outlines the travel times for the first engine/truck.

Table 93. Travel Times for All Apparatus, by Incident Type

	Fire	Medical	Other	Rescue
Count	1,976	33,289	2,184	3,272
Average	0:04:57	0:04:11	0:05:01	0:04:12
90th Percentile	0:07:56	0:06:13	0:07:37	0:06:27

Table 94. Travel Times for First Ambulance and First Engine/Truck by Incident Type

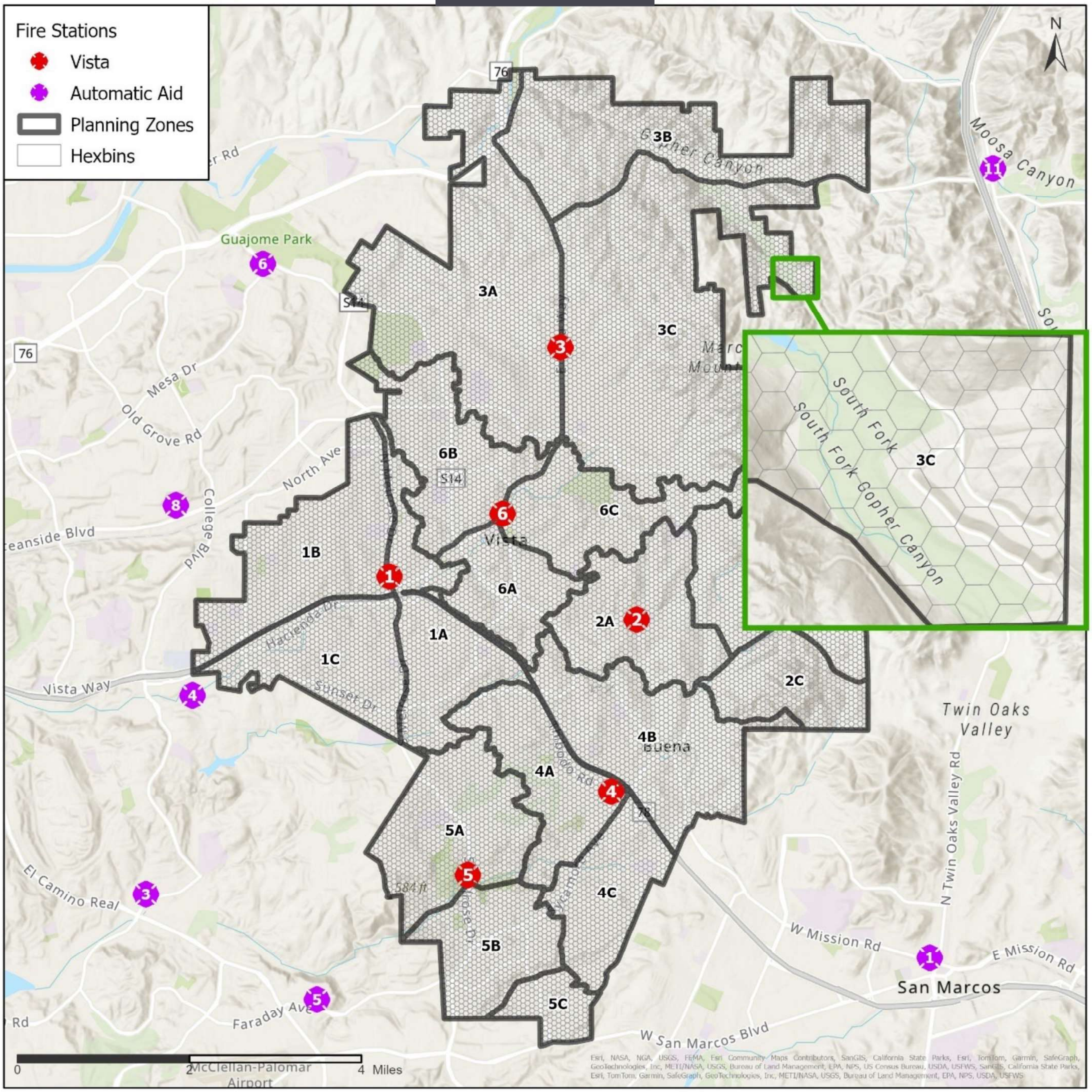
	Fire	Medical	Other	Rescue
First Ambulance Travel				
Count	407	30,761	77	2,681
Average	0:04:58	0:05:13	0:05:51	0:05:14
90th Percentile	0:07:41	0:08:20	0:09:05	0:08:04
First Engine/Truck Travel				
Count	1,869	24,078	2,163	2,584
Average	0:05:00	0:04:10	0:05:01	0:04:09
90th Percentile	0:08:02	0:06:11	0:07:38	0:06:22

Note: When evaluating performance by percentile, it is important to understand the sensitivity of small datasets to outlier positions. In this dataset, the 300 NFIRS category for rescue and EMS represents the highest number of incidents. This evaluation is likely to best represent overall performance. Conversely, fires represent only a very small fraction of the data. Therefore, when evaluating at the 90th percentile parsed into categories and then further reduced to only emergency responses, fire responses will appear elevated. Elevation occurs because slow responses and distant responses play a much larger role in the performance evaluation calculation.

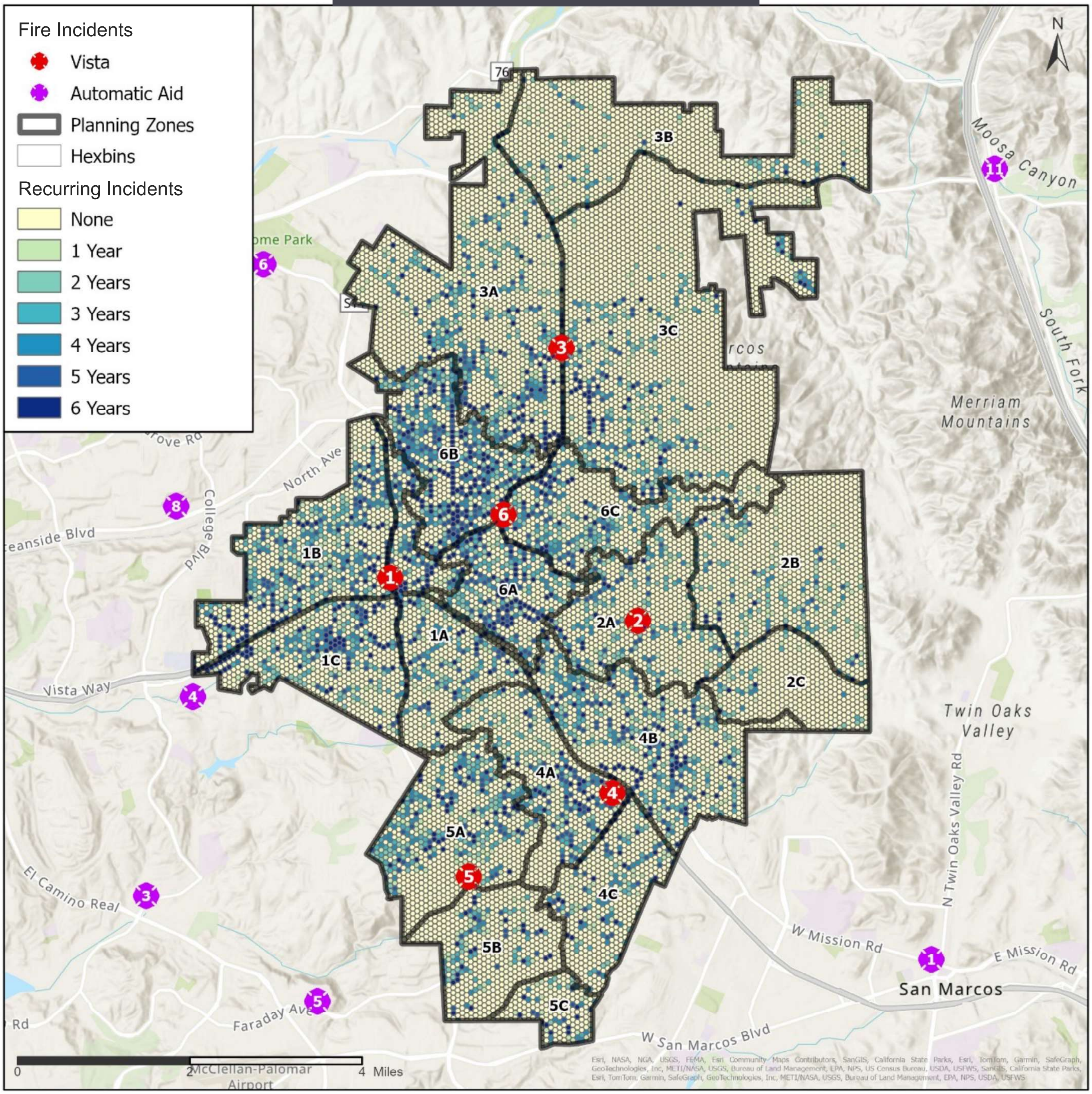
APPENDIX

Complete Maps

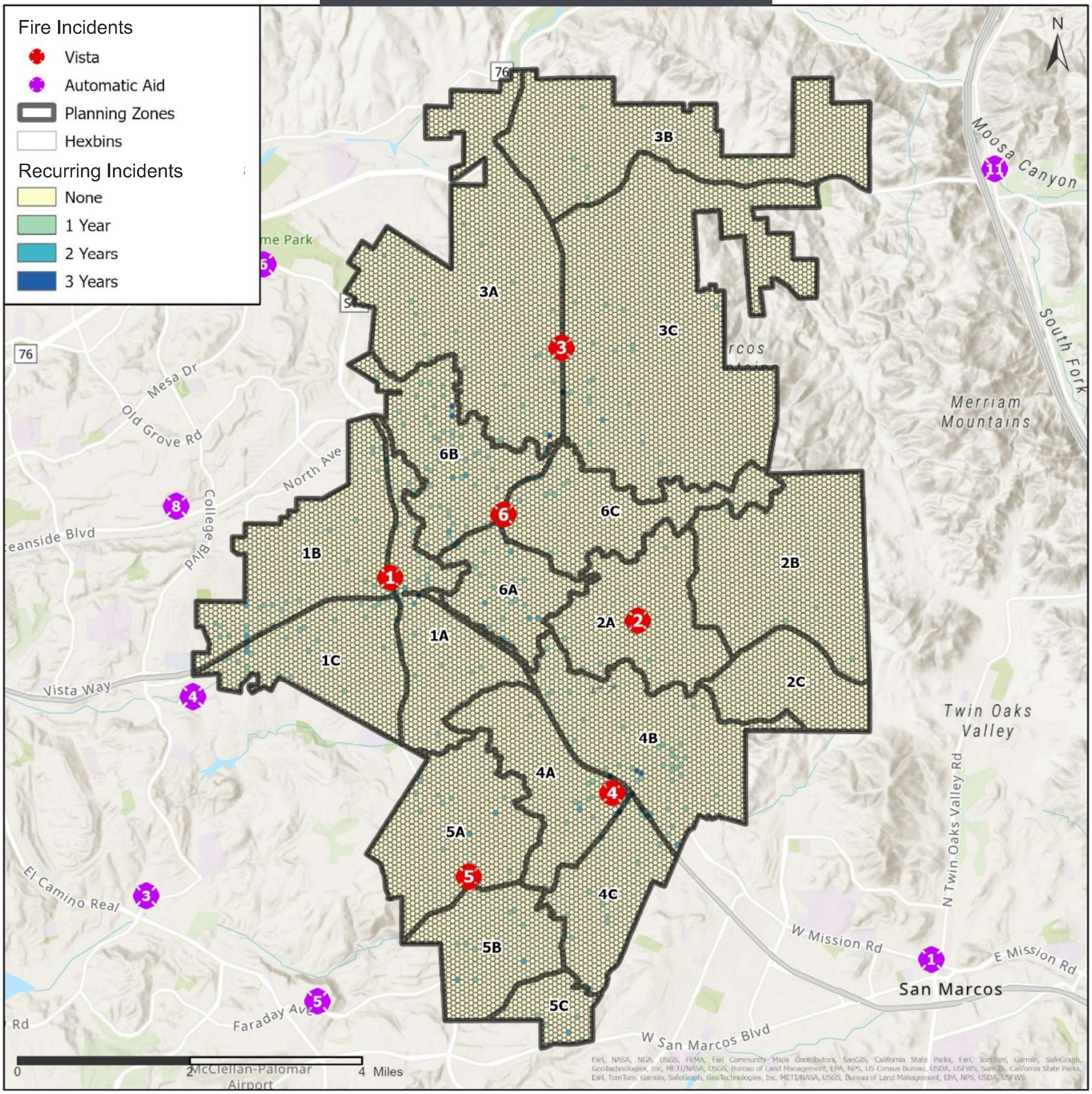
Map of Hexbin Grid



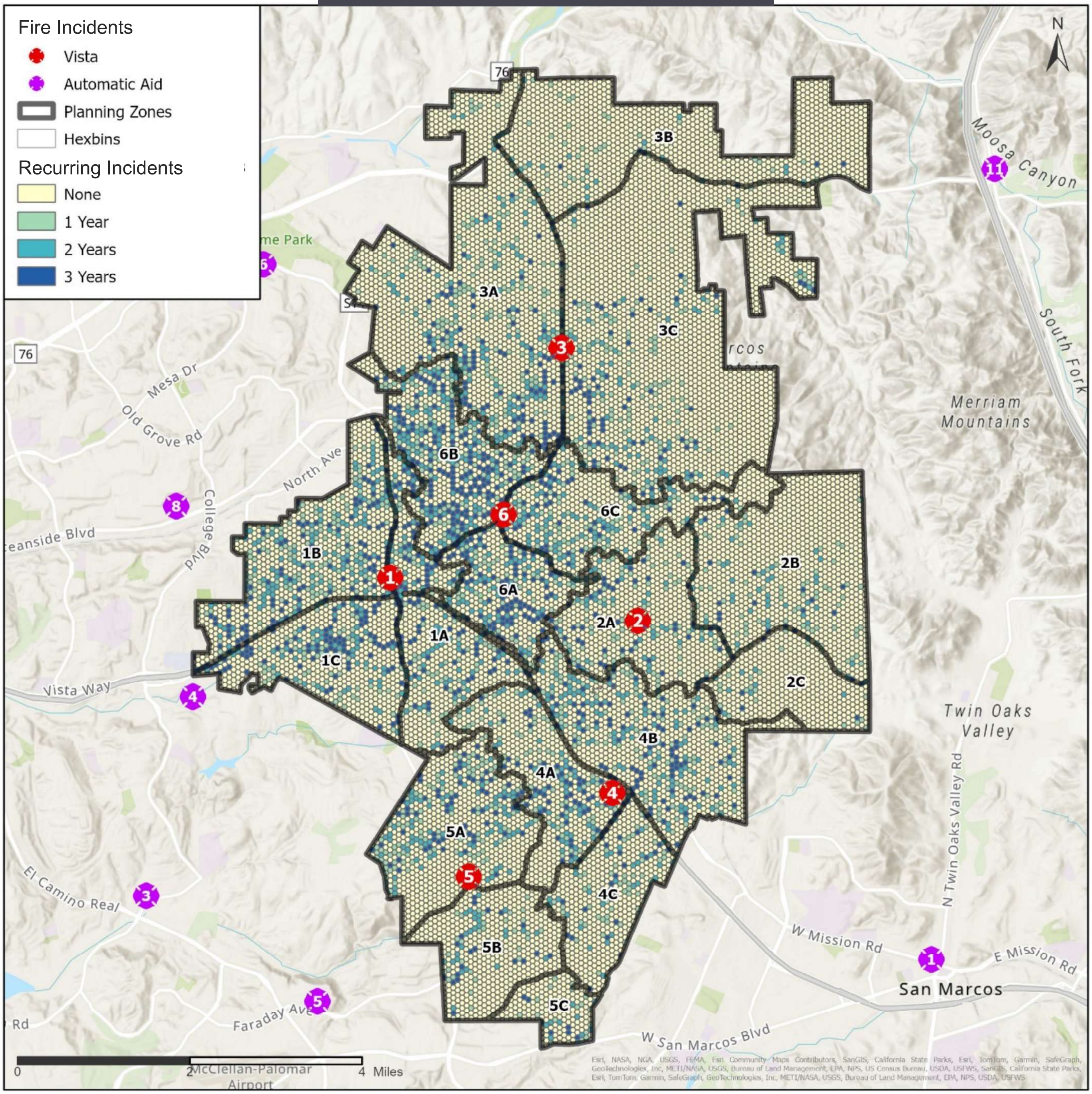
Map of Recurring Incidents, 2018–2023



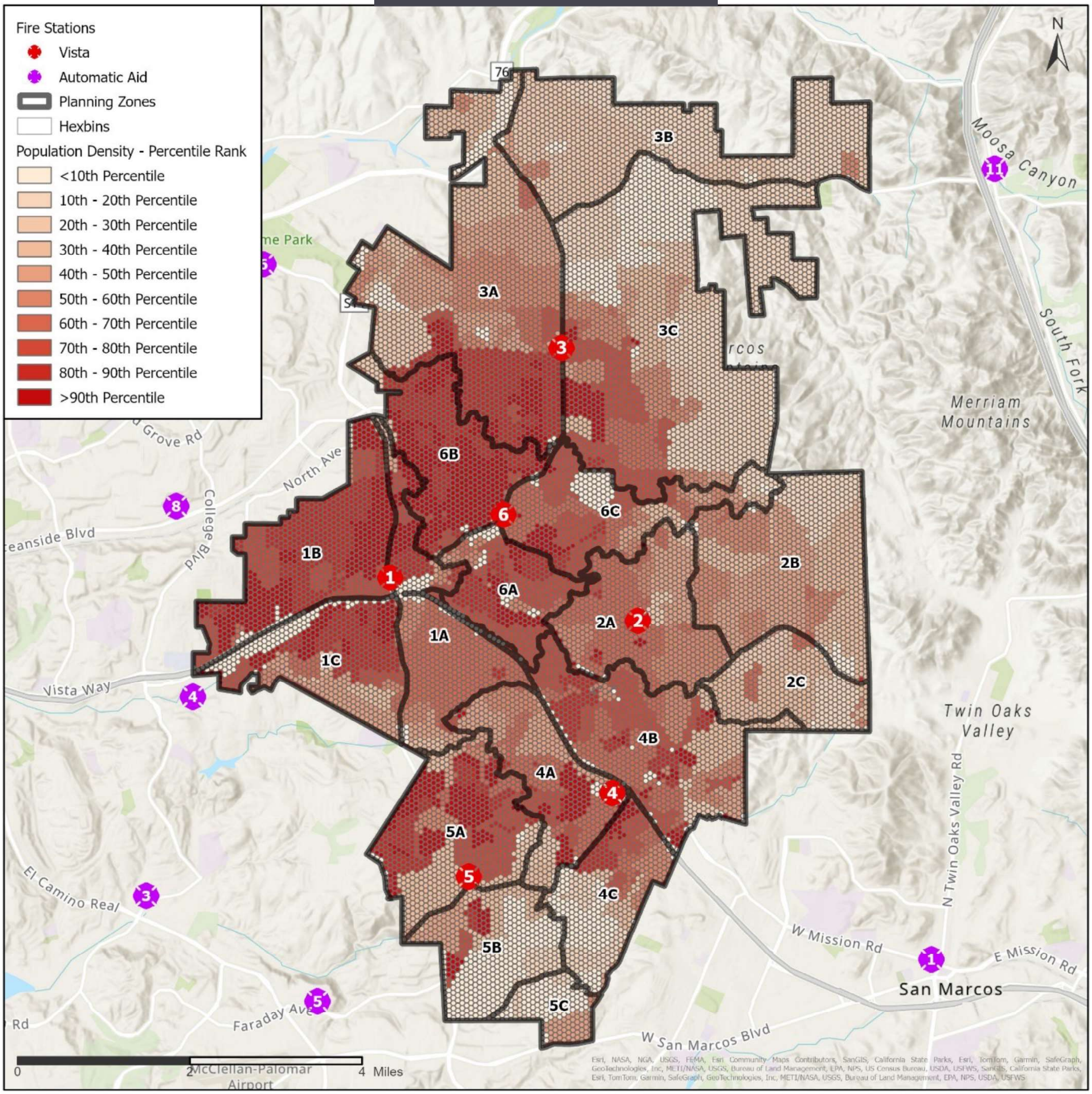
Map of Recurring Fire Incidents, 2021–2023



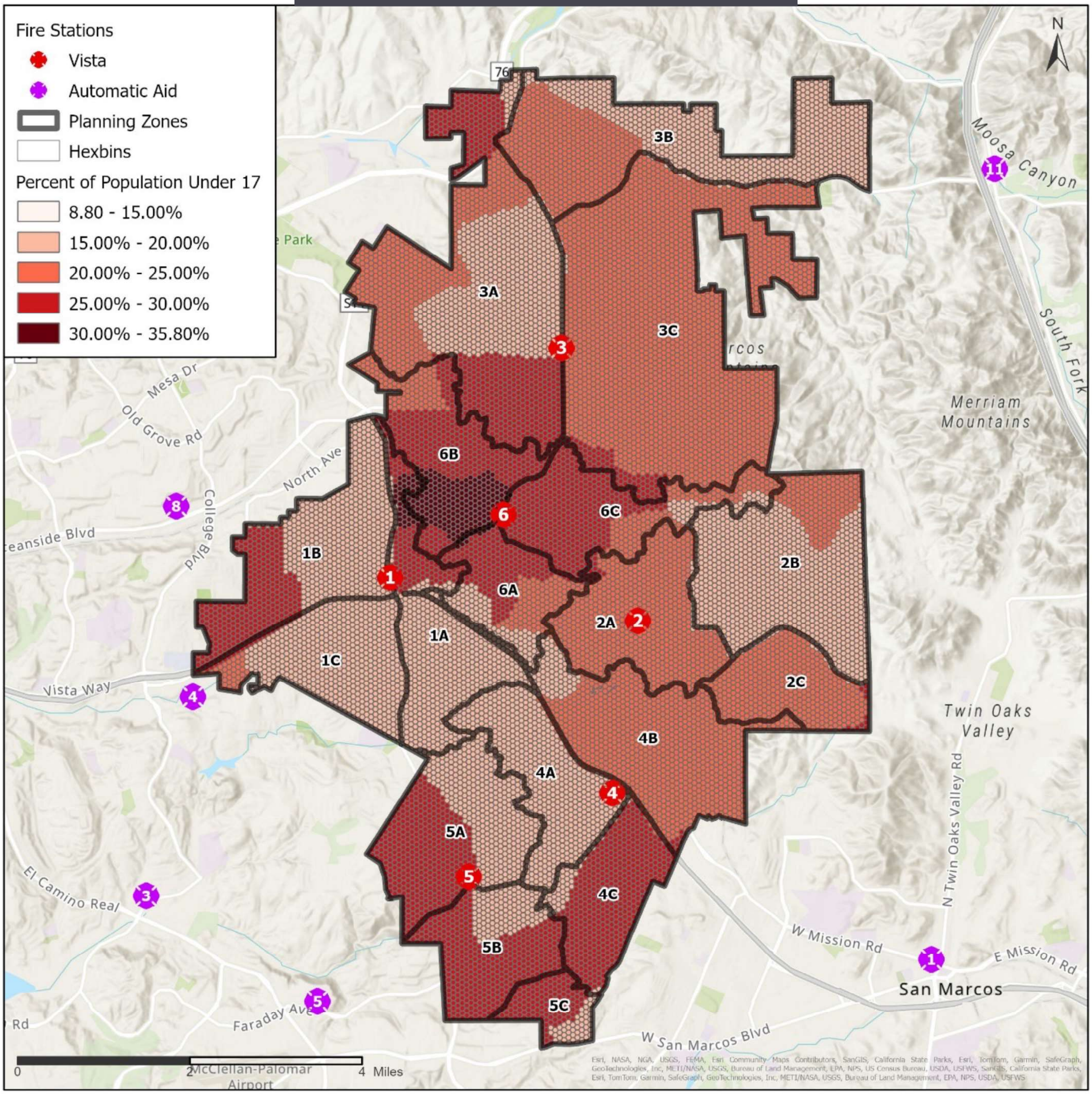
Map of Recurring EMS Incidents, 2021–2023



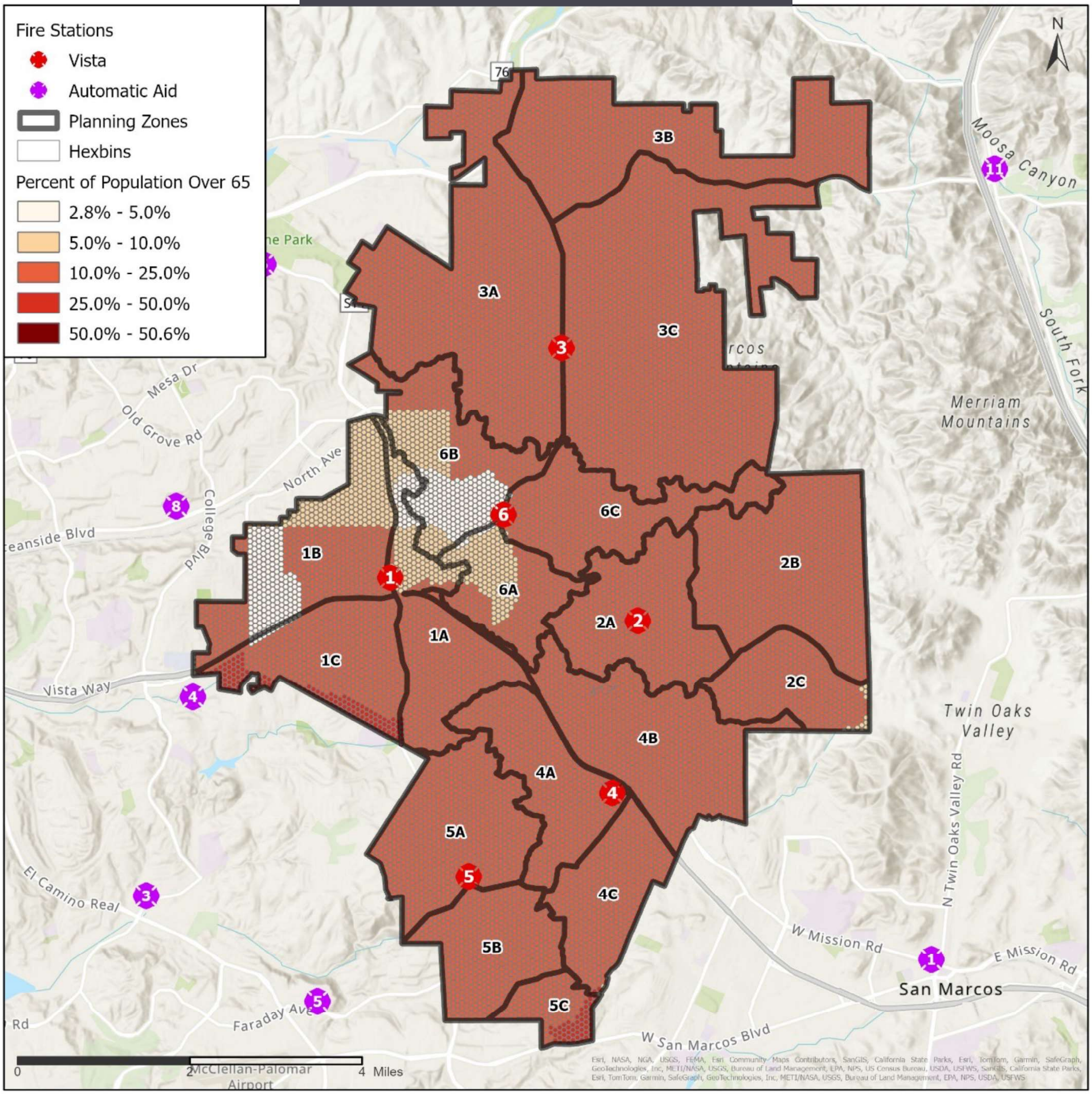
Map of Population Density Rank



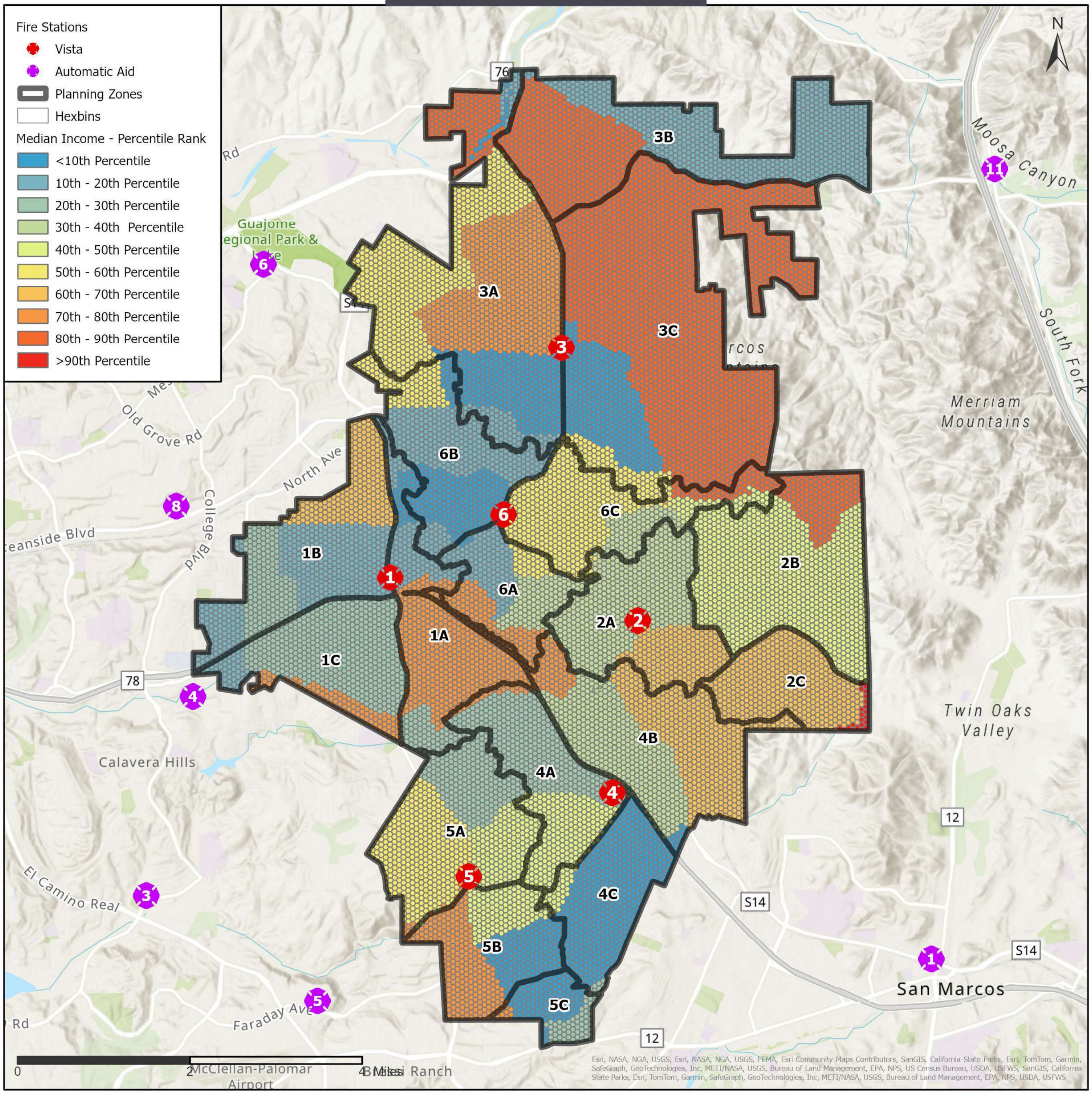
Map Showing Percent of Population Under Age 17



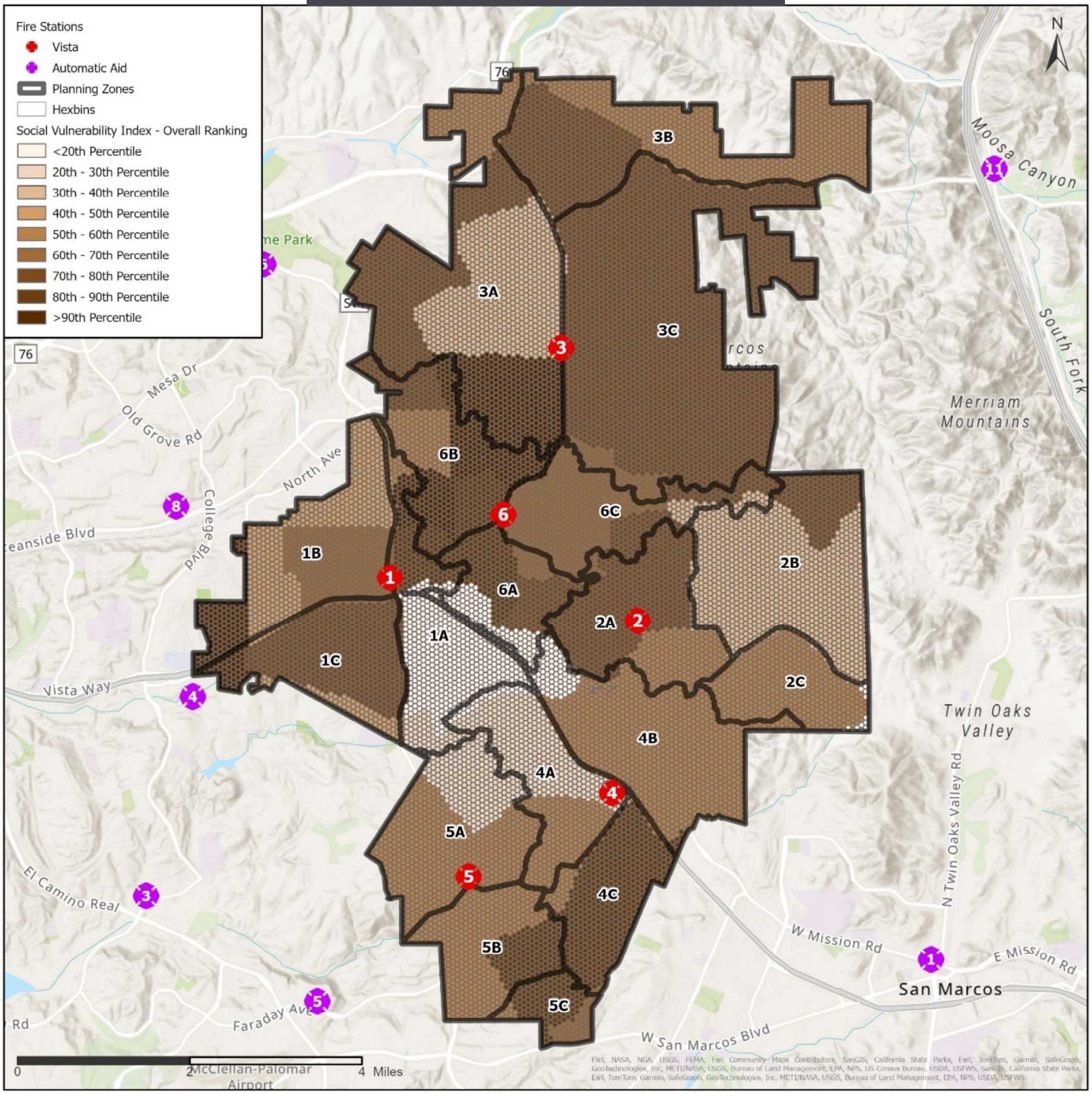
Map Showing Percent of Population Over Age 65



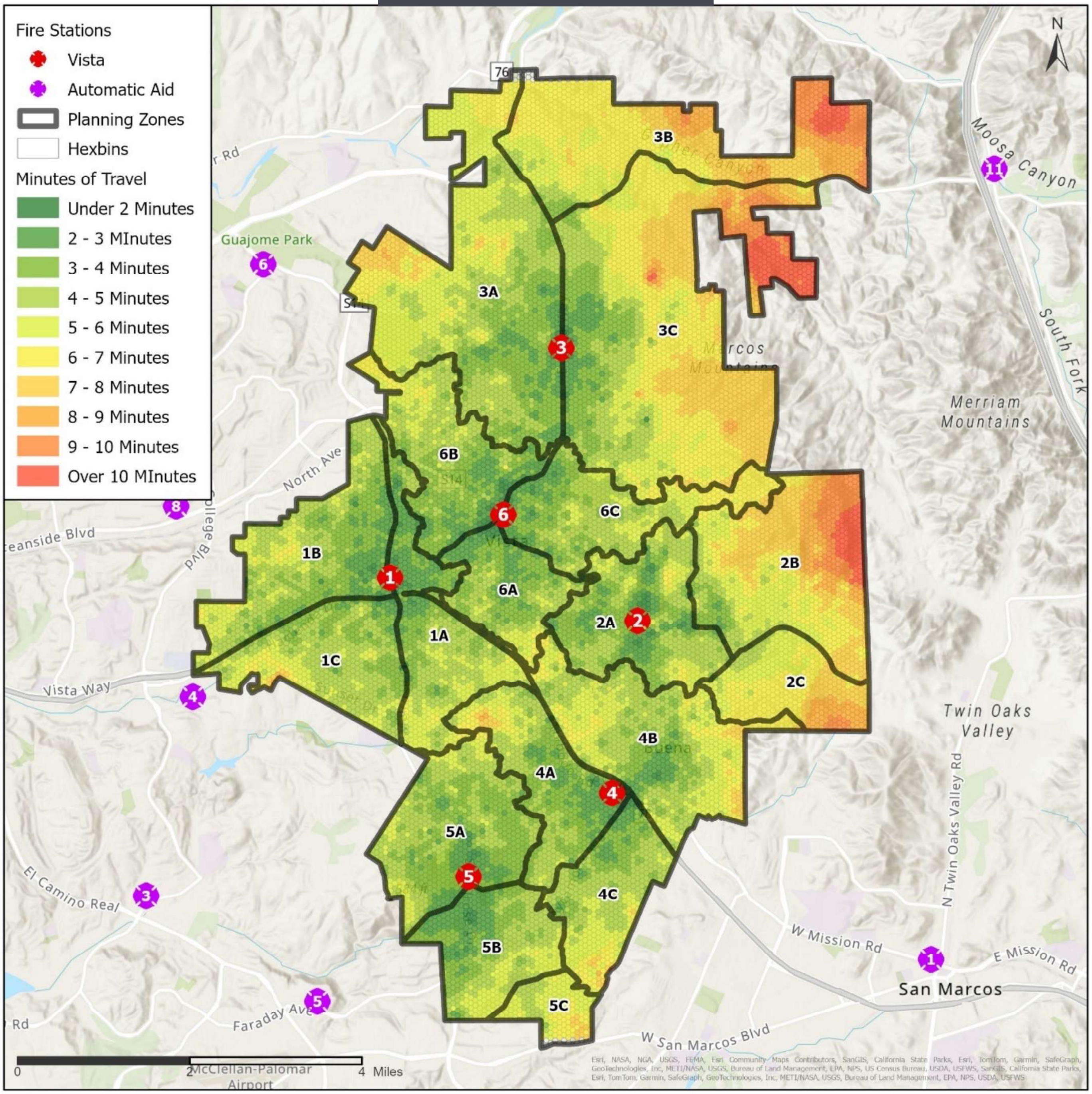
Map of Median Income Rank



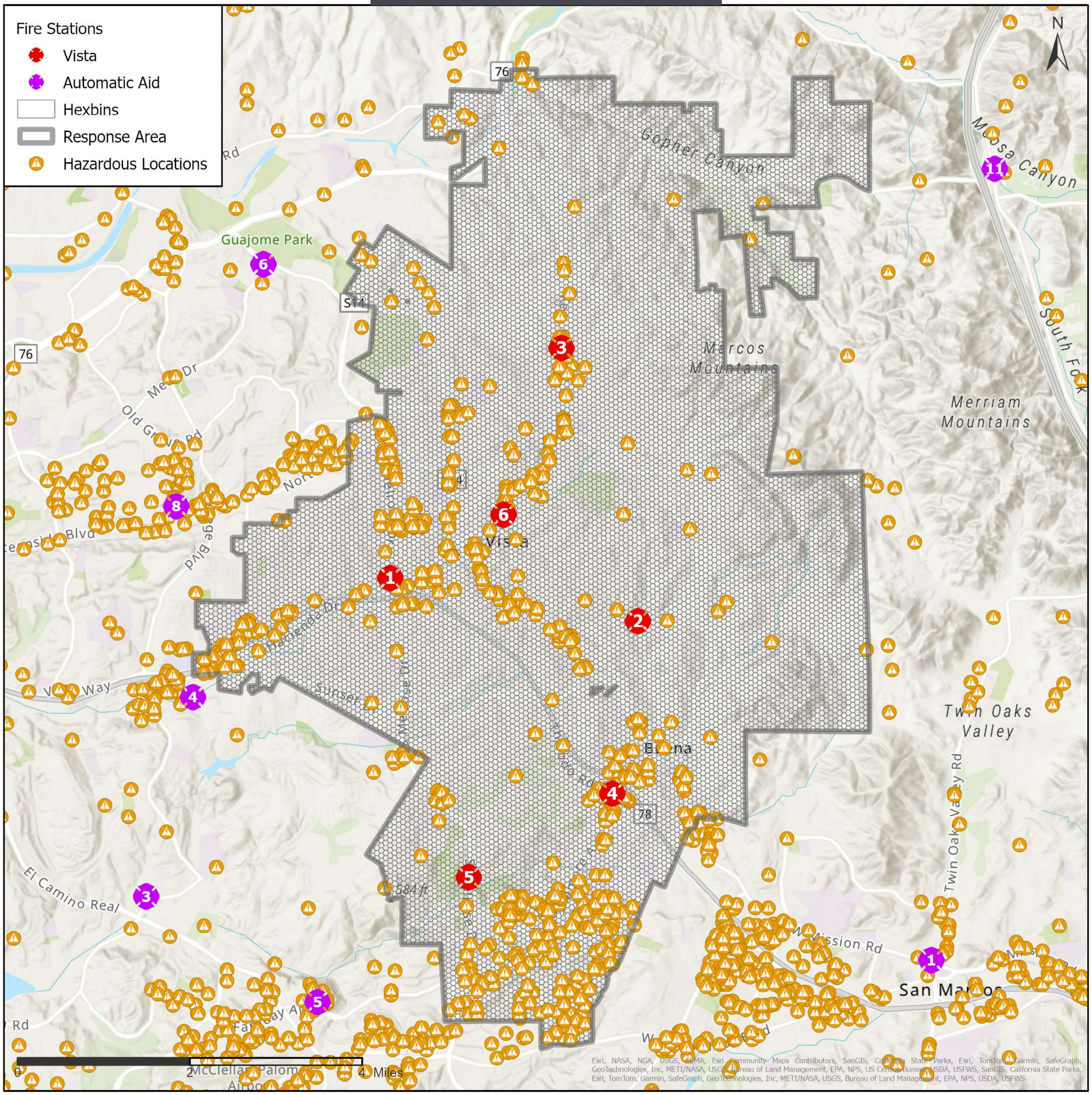
Map Showing Overall Social Vulnerability Index



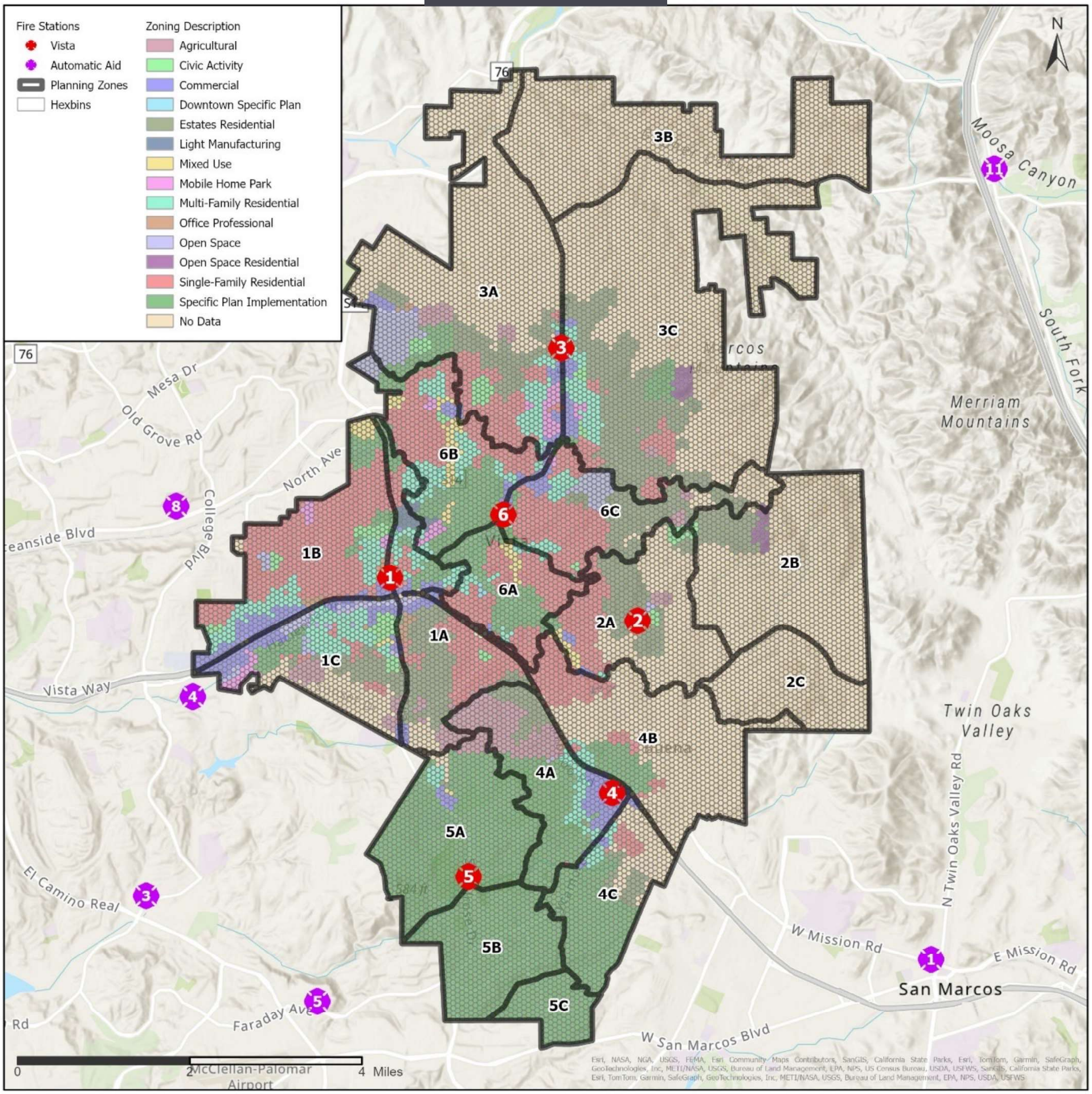
Map of Fire Station Travel Times



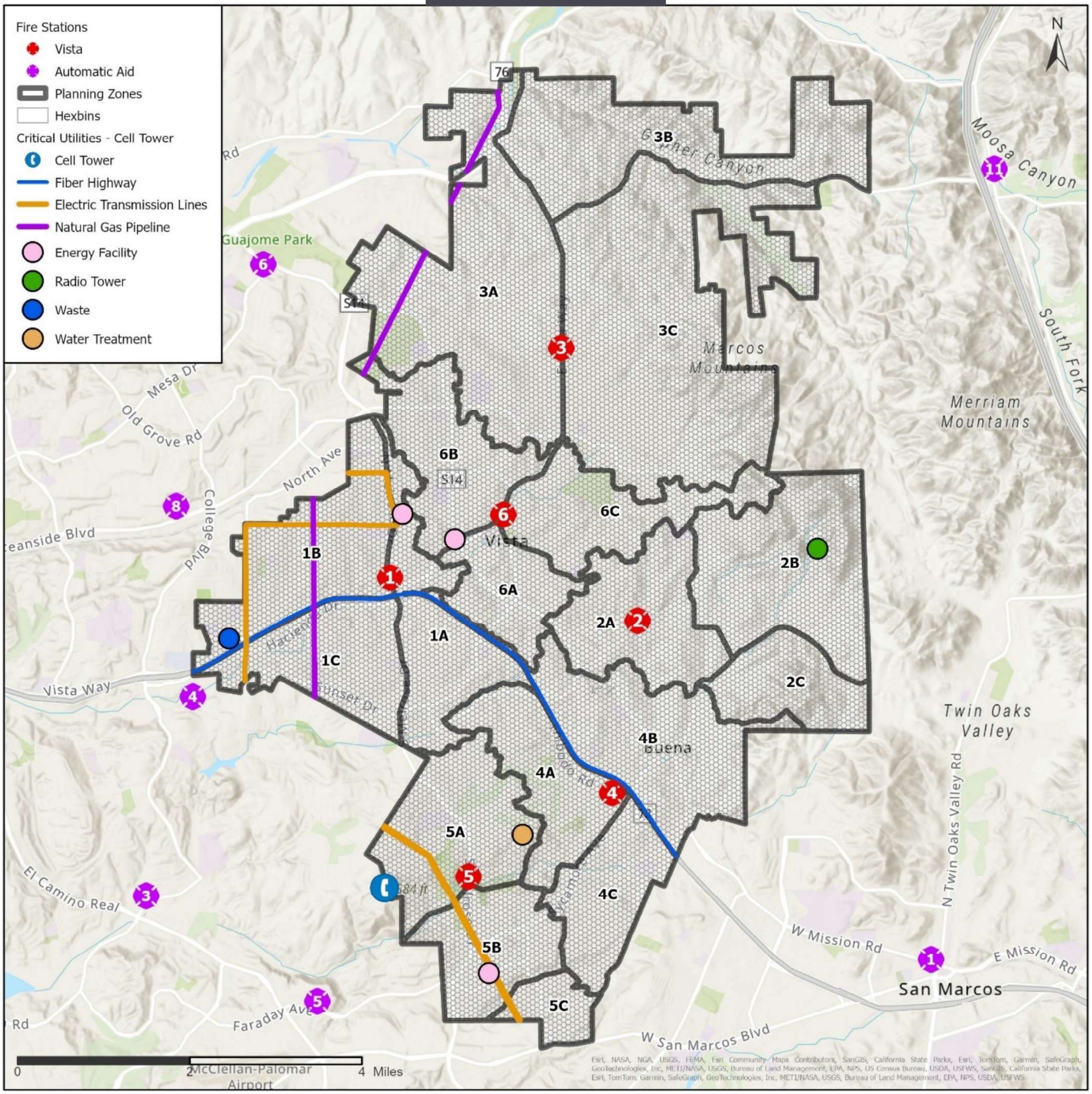
Map of HazMat Facility Locations



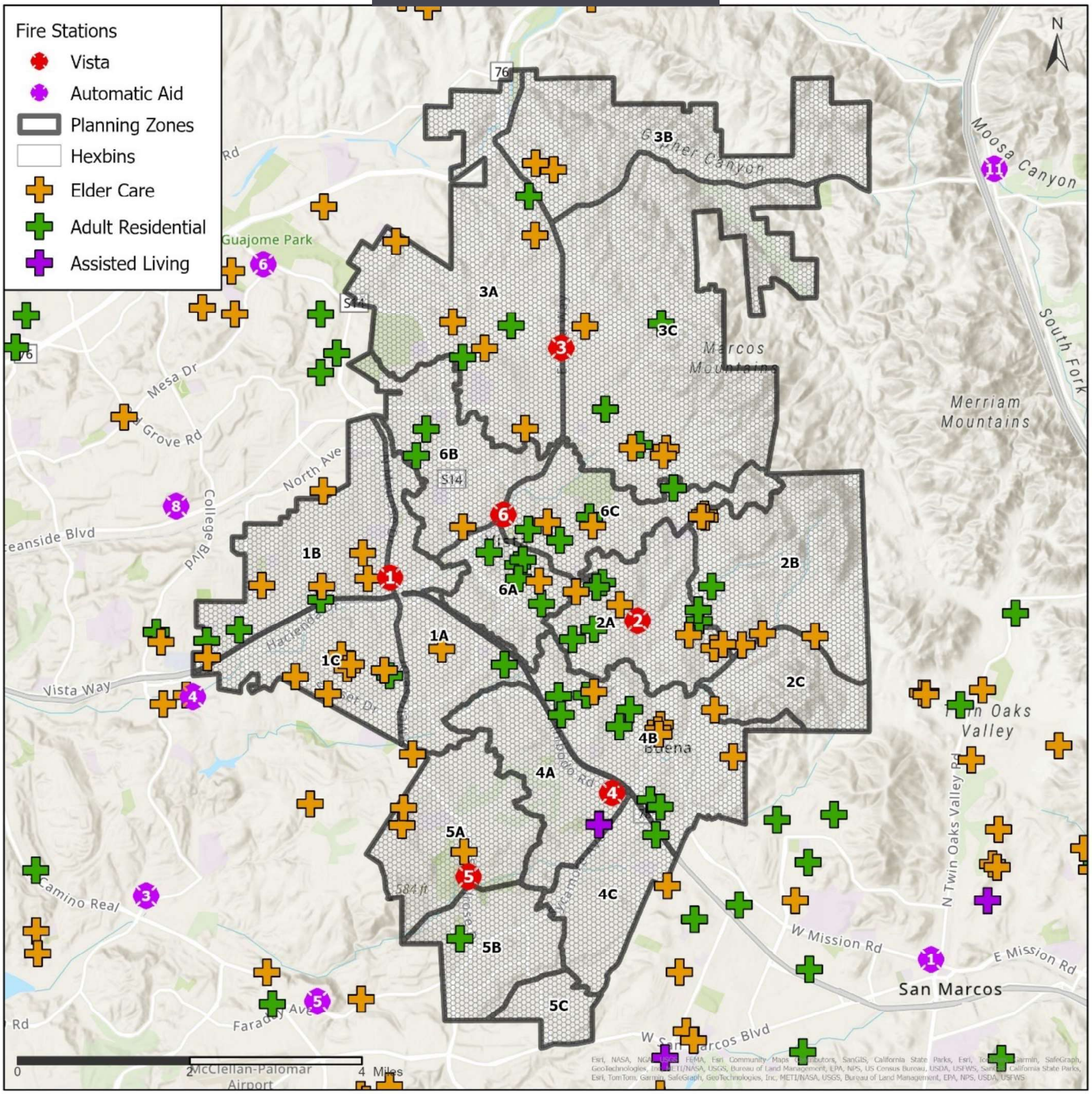
Map of Land Use Type



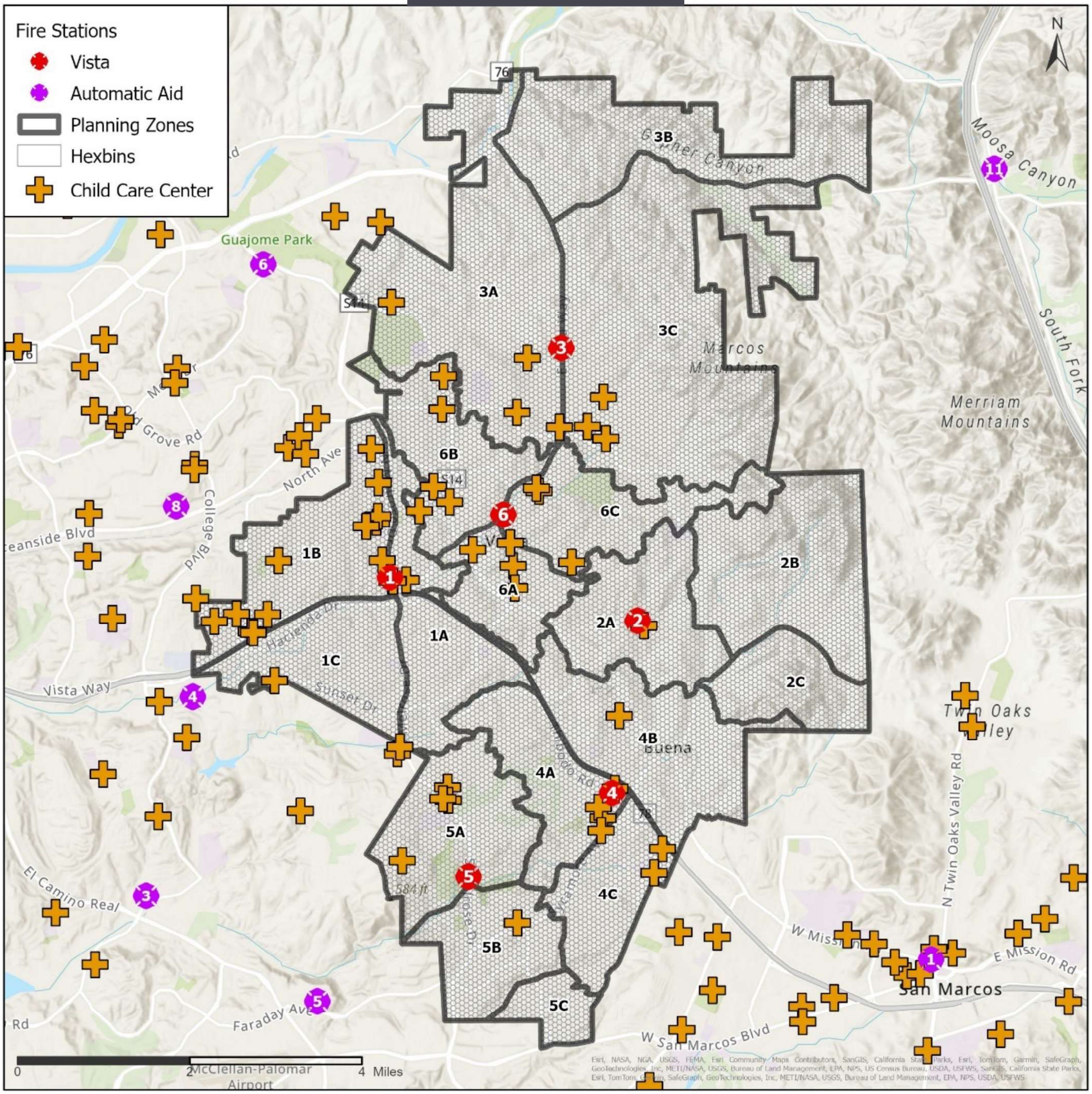
Map of Major Utilities



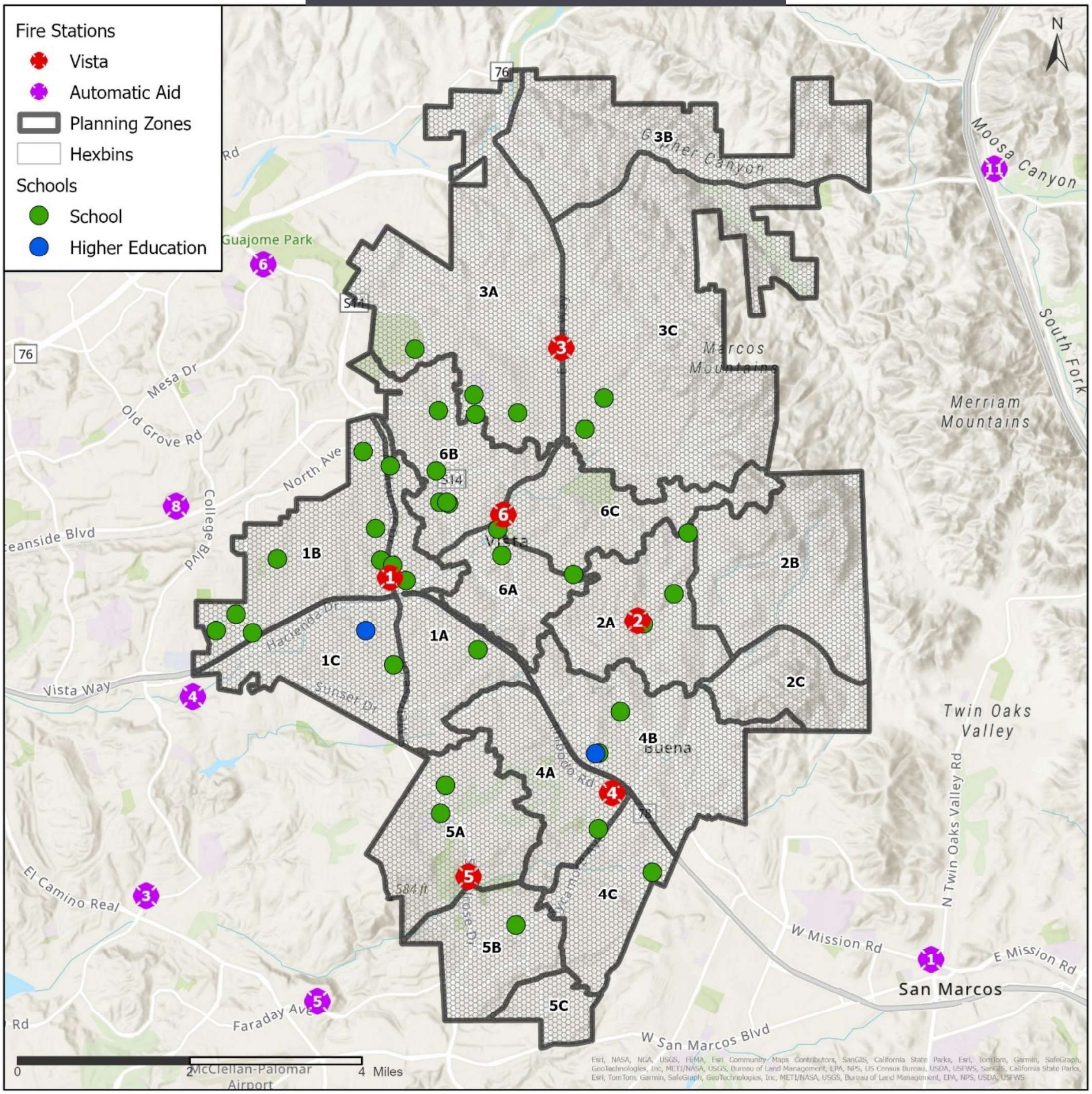
Map of Continuing Care Facilities



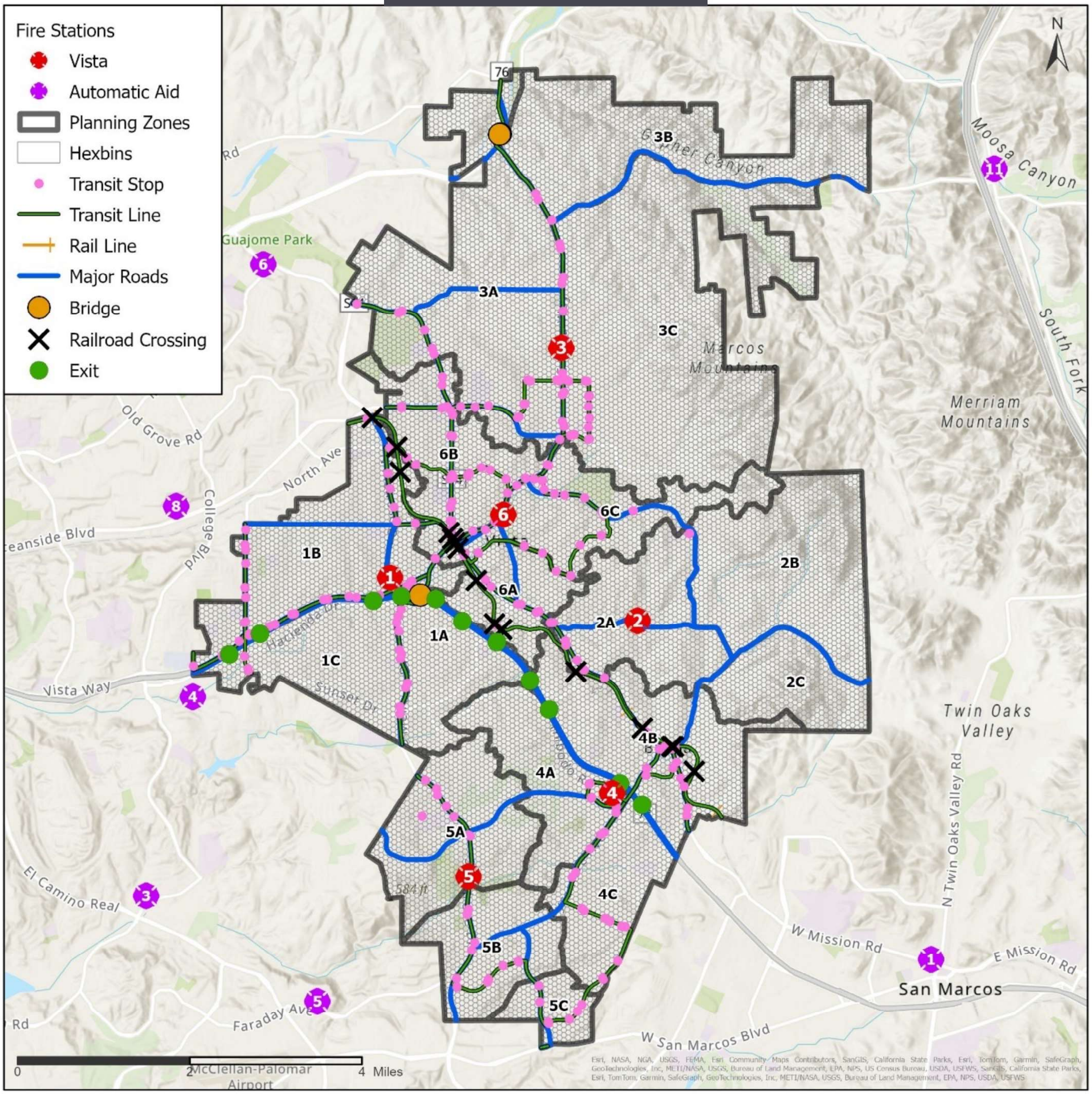
Map of Childcare Centers



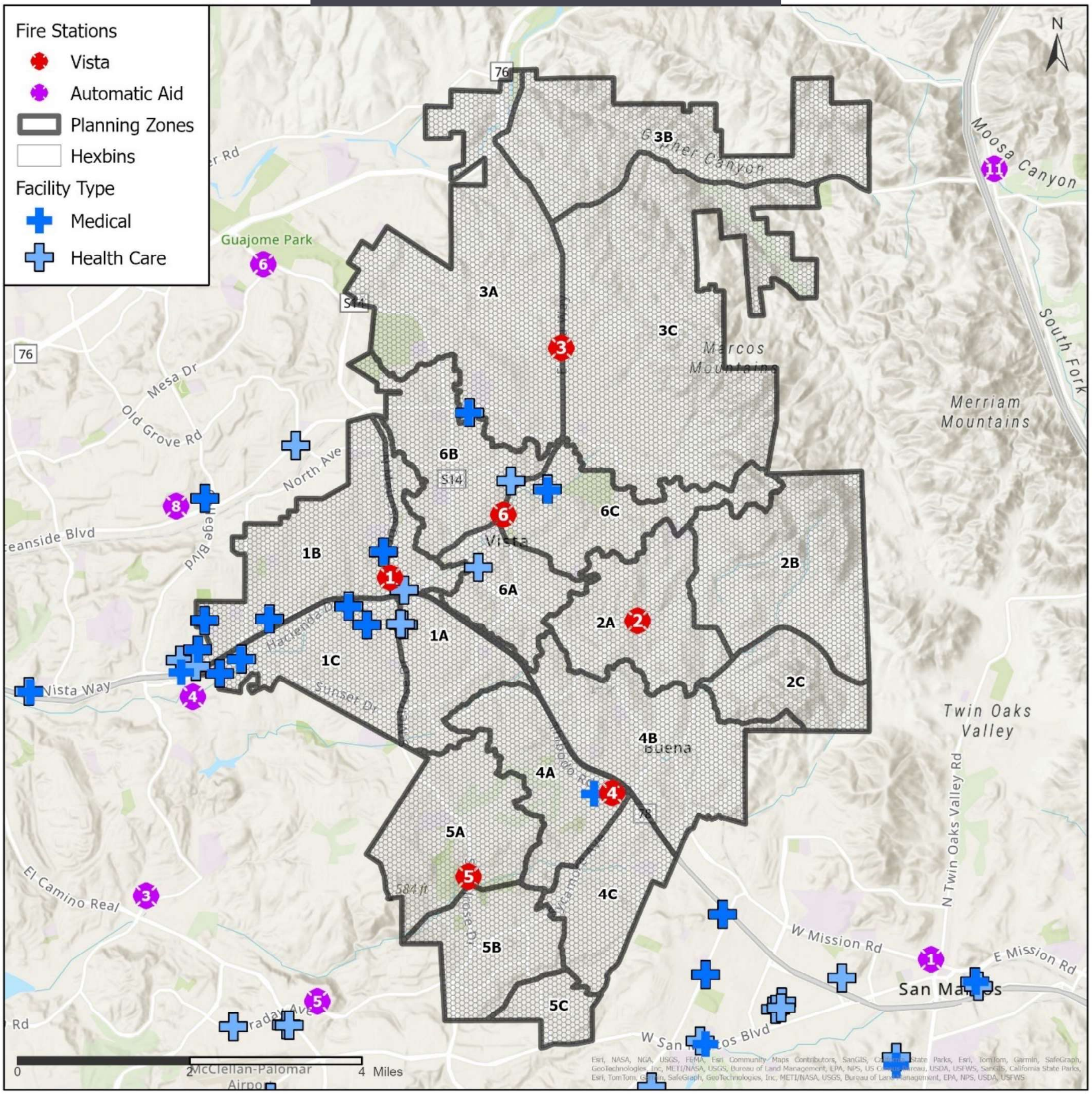
Map of Schools and Other Educational Facilities



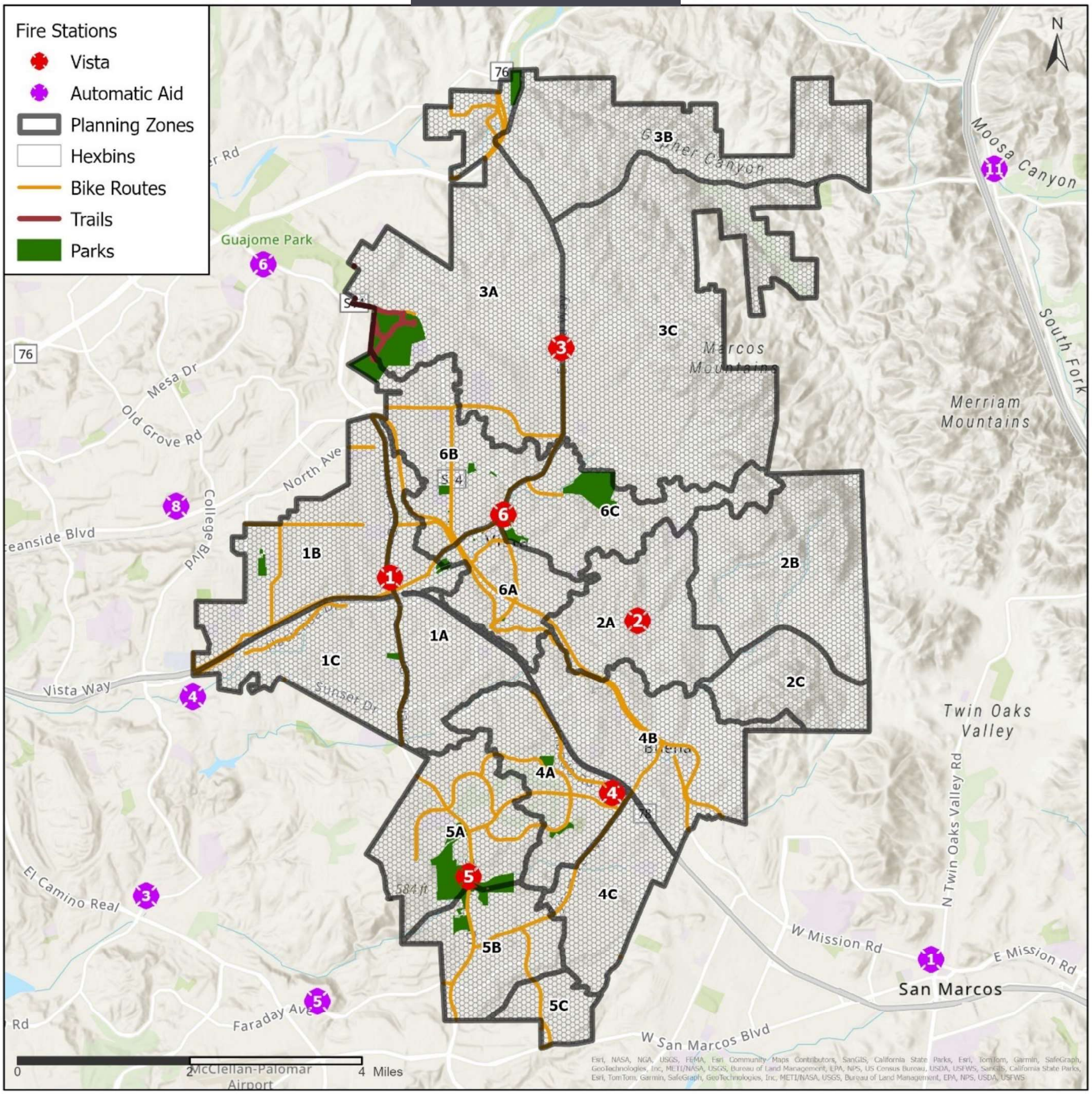
Map of Transportation Systems



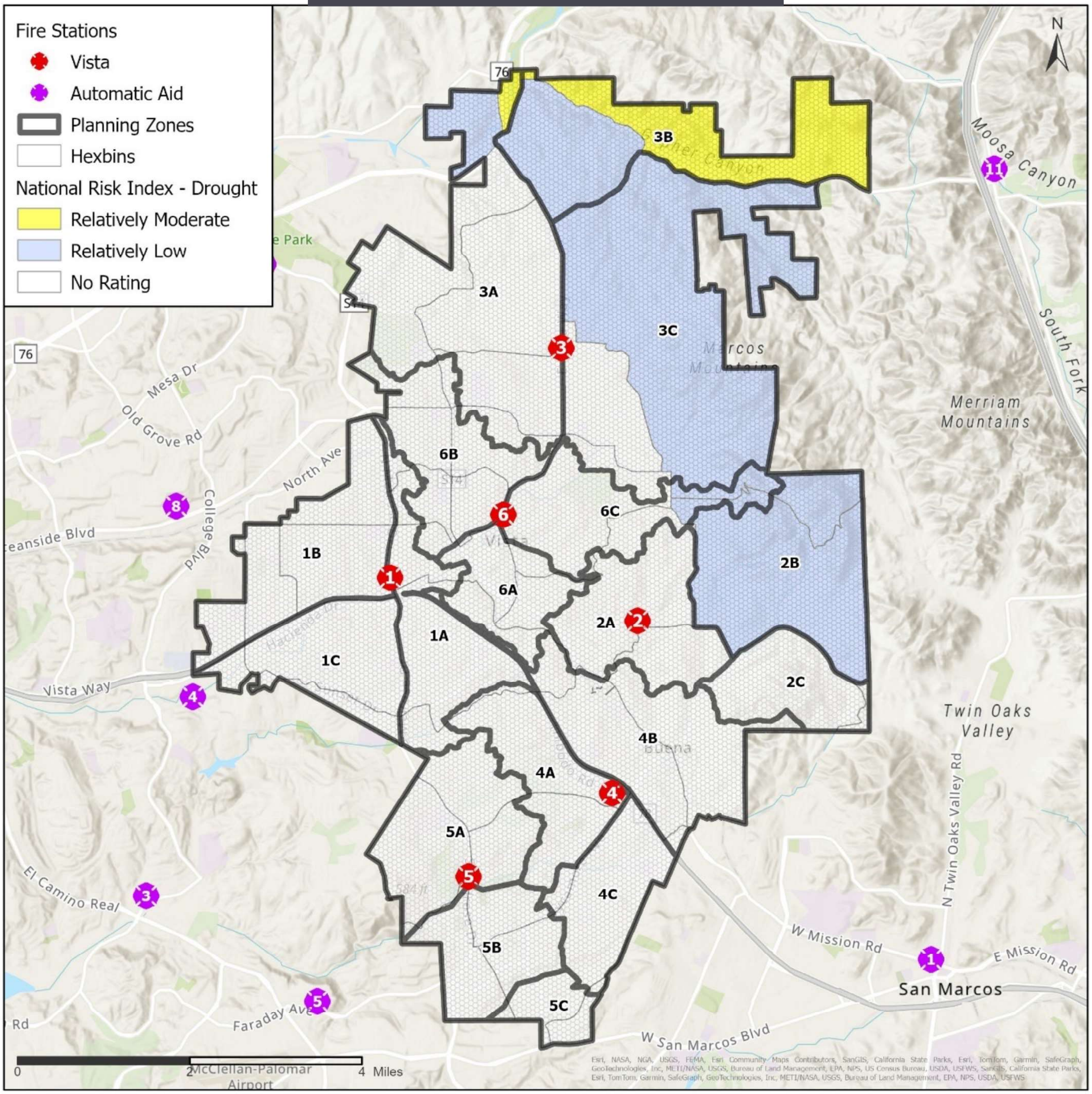
Map of Medical and Other Healthcare Facilities



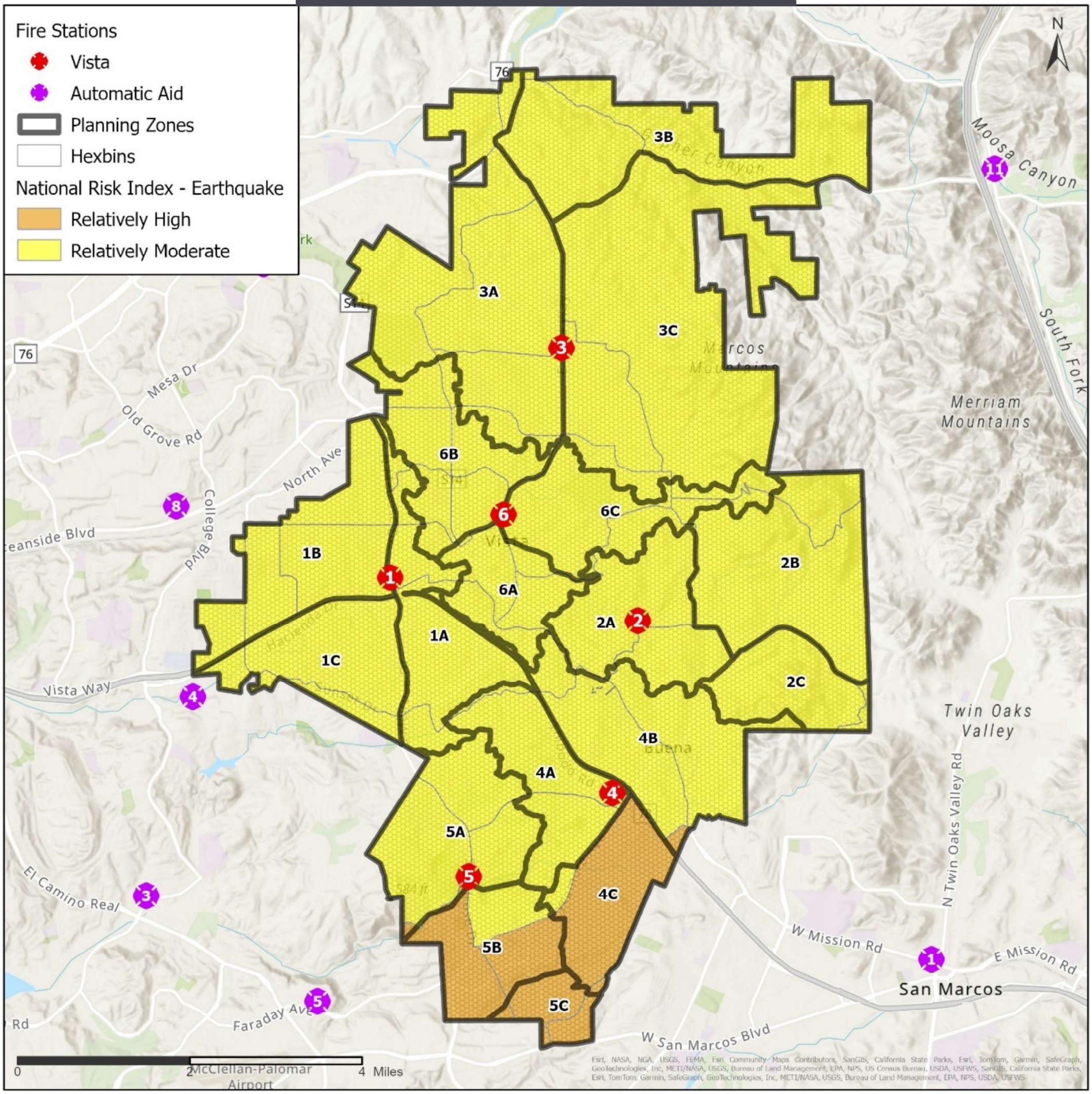
Map of Trails and Parks



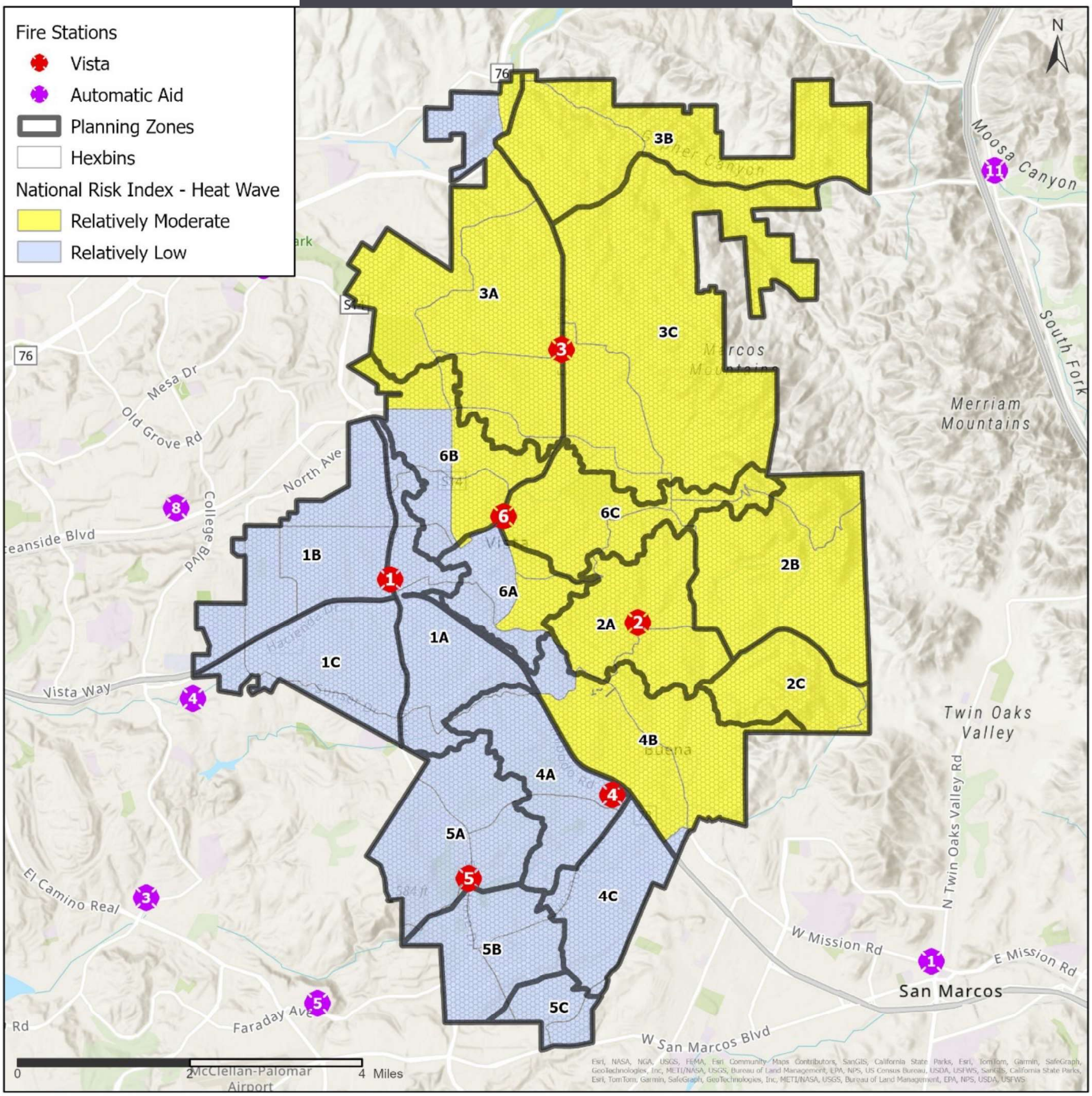
Map of National Risk Index Scores for Drought



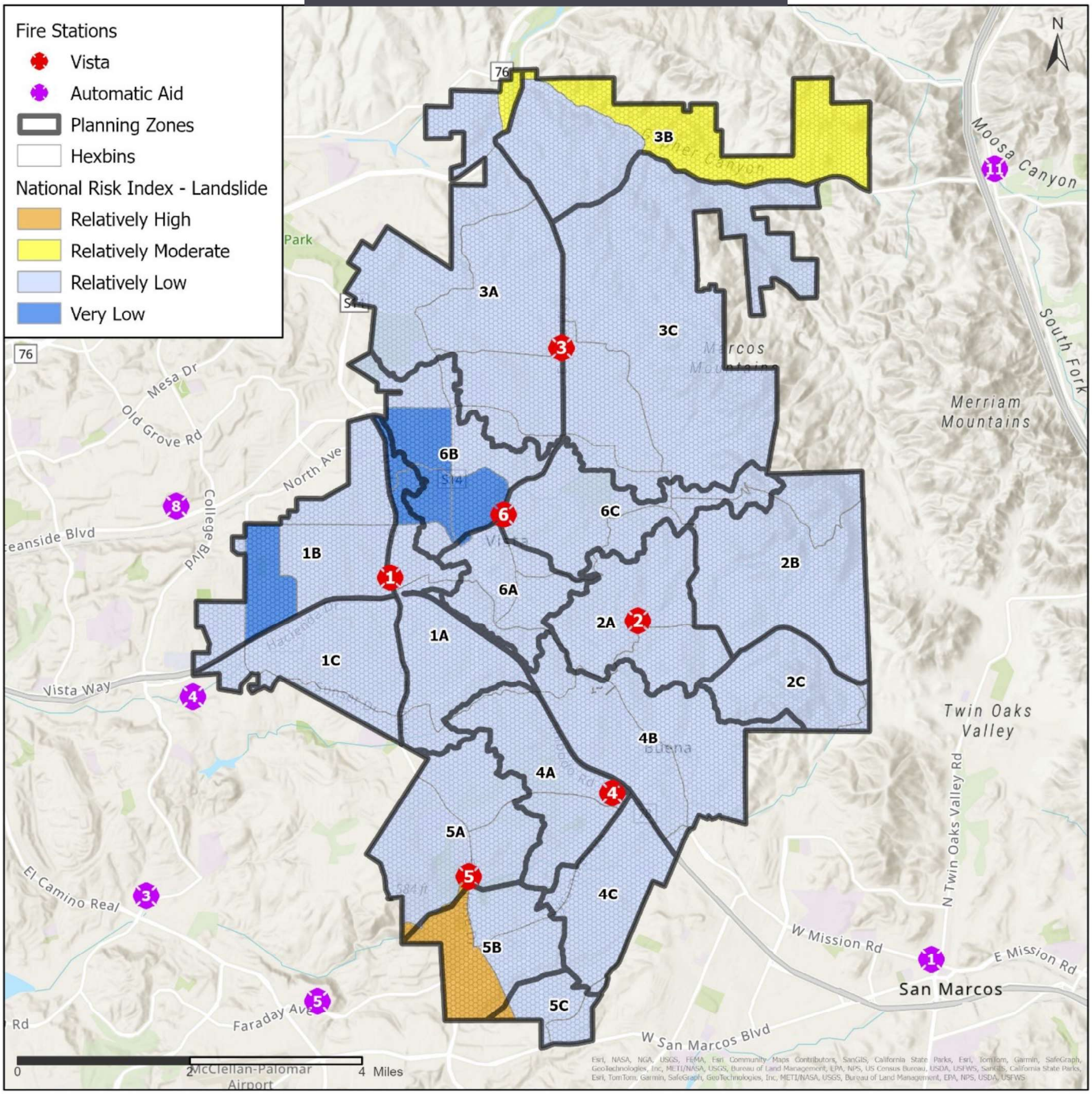
Map of National Risk Index Scores for Earthquake



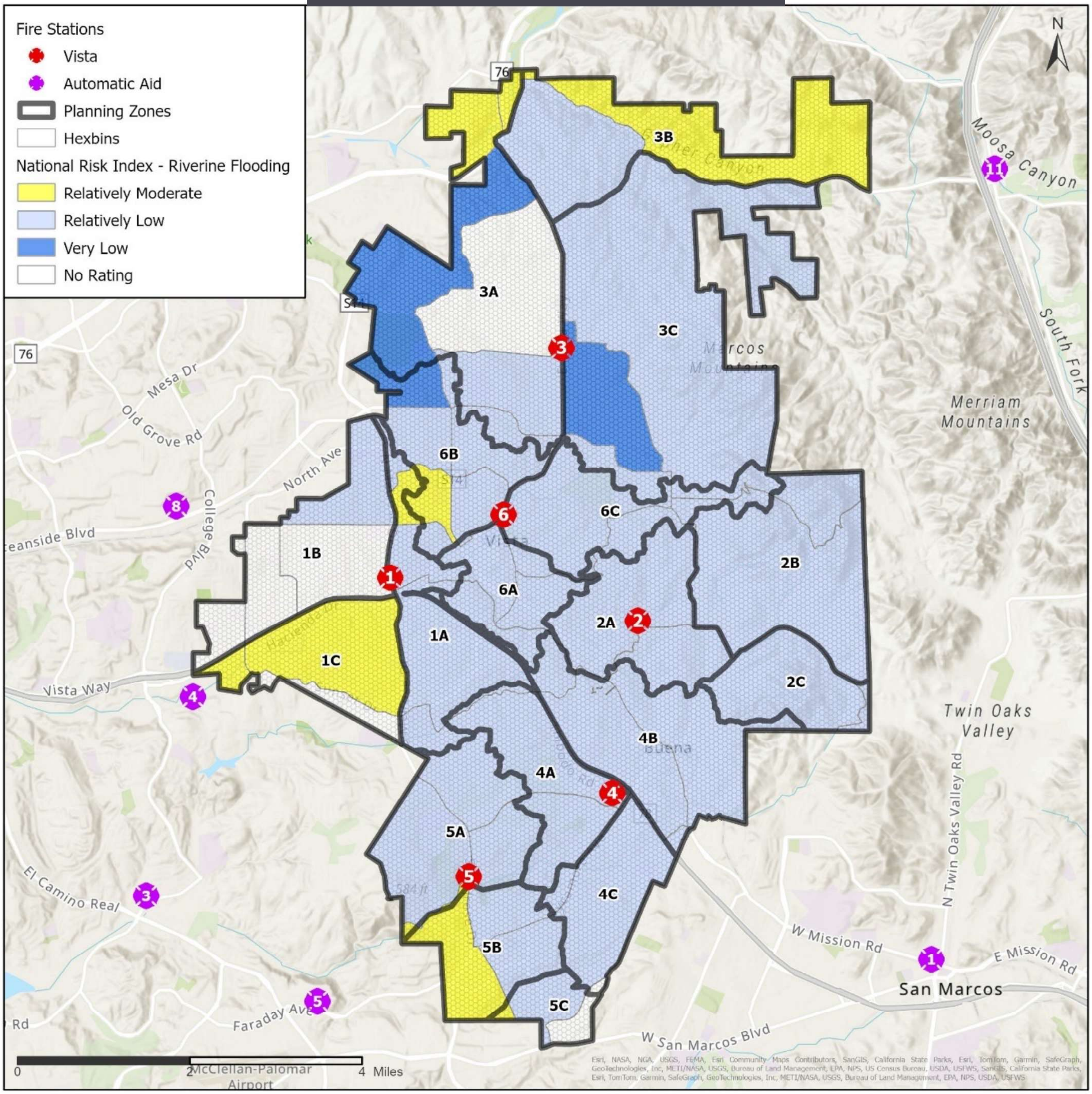
Map of National Risk Index Scores for Heat Wave

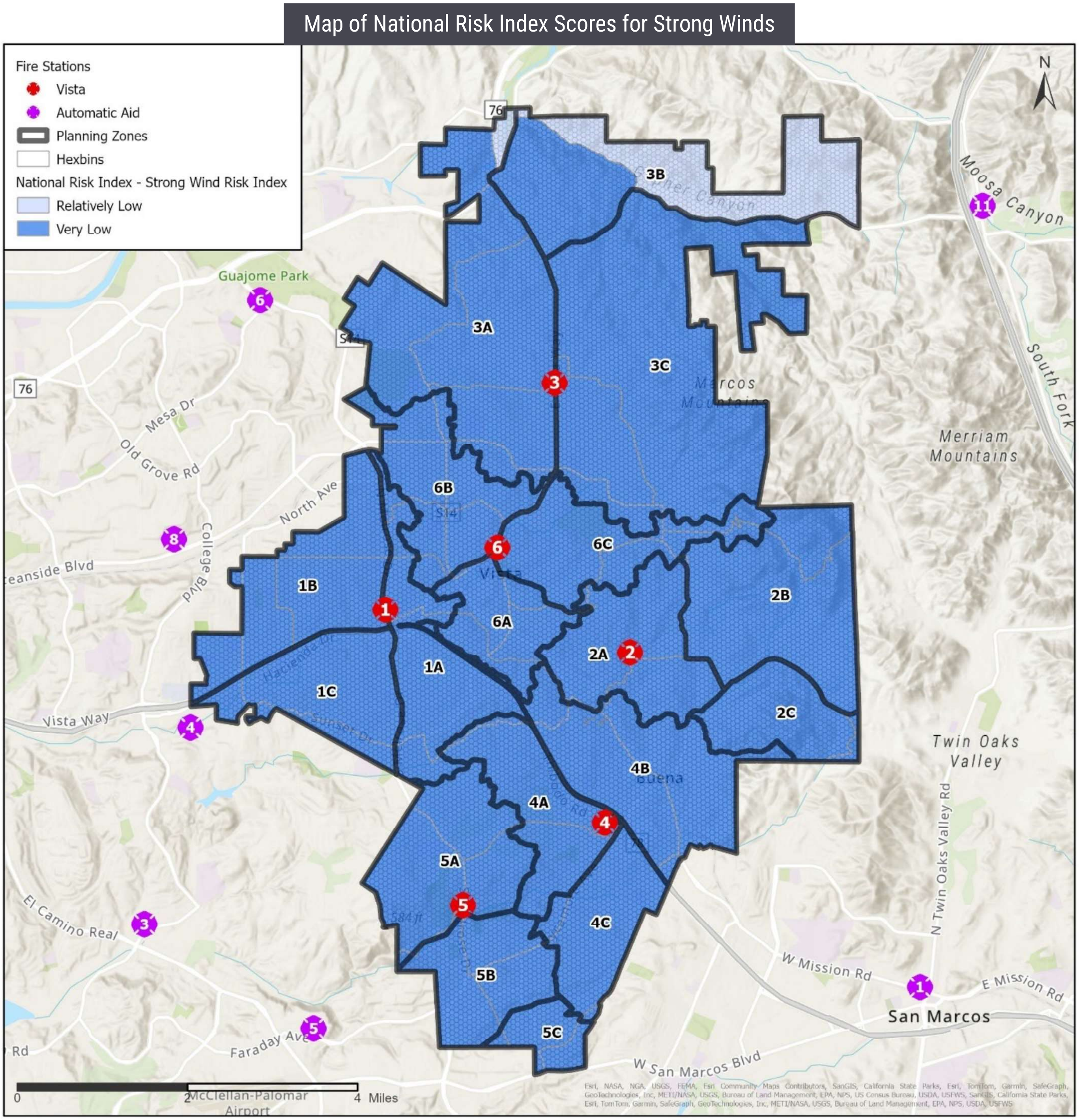


Map of National Risk Index Scores for Landslide



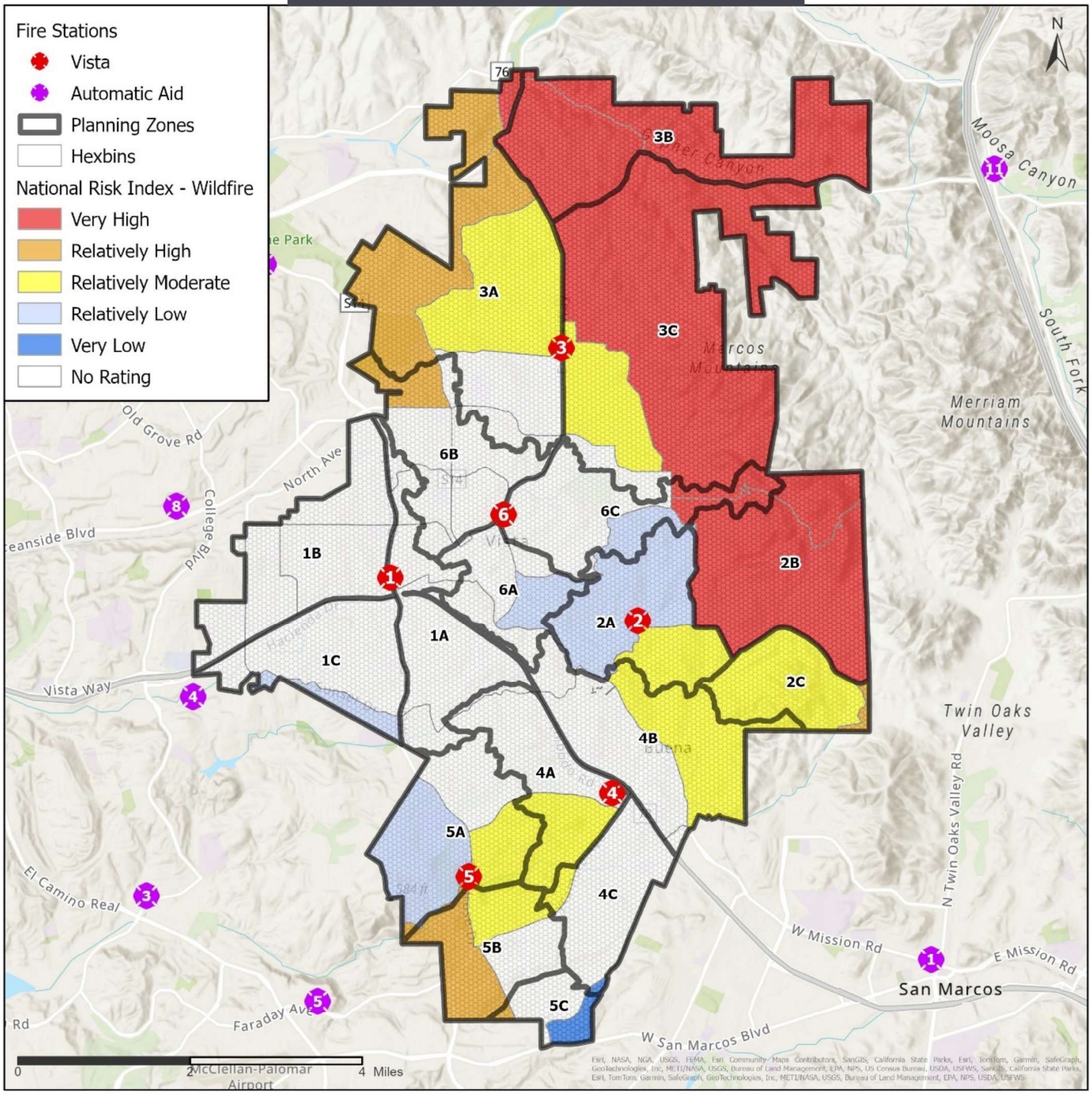
Map of National Risk Index Scores for Flooding



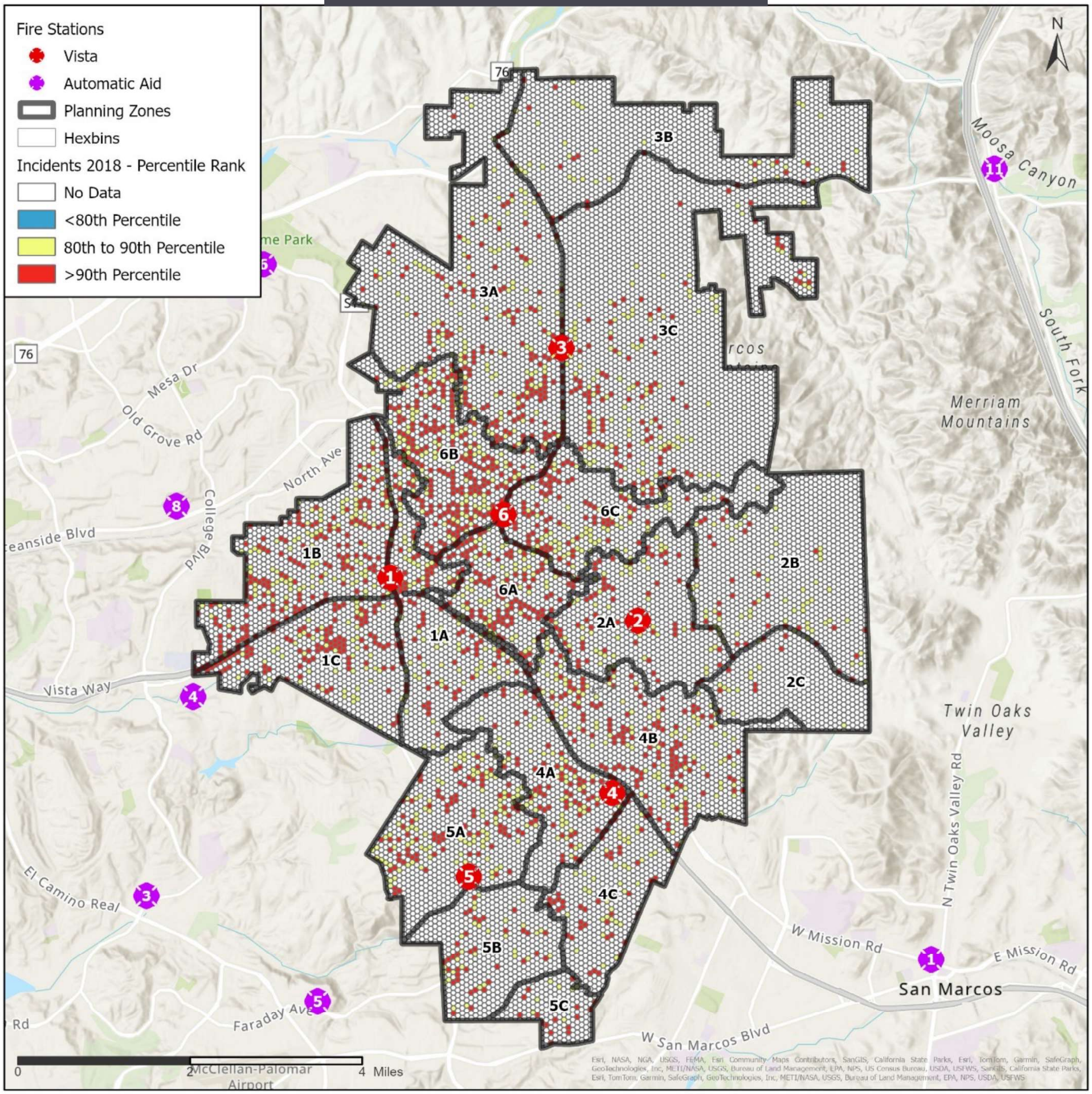


Map of National Risk Index Scores for Strong Winds
Fire Stations
Vista
Automatic Aid
Planning Zones
Hexbins
National Risk Index - Strong Wind Risk Index
Relatively Low
Very Low
1A
1B
1C
2A
2B
2C
3A
3B
3C
4A
4B
4C
5A
5B
5C
6A
6B
6C
Guajome Park
Mesa Dr
Old Grove Rd
North Ave
College Blvd
Vista Way
El Camino Real
Faraday Ave
Moosa Canyon
South Fork
Merriam Mountains
Twin Oaks Valley
N Twin Oaks Valley Rd
W Mission Rd
E Mission Rd
San Marcos
W San Marcos Blvd
McClellan-Palomar Airport
0
2
4 Miles
N

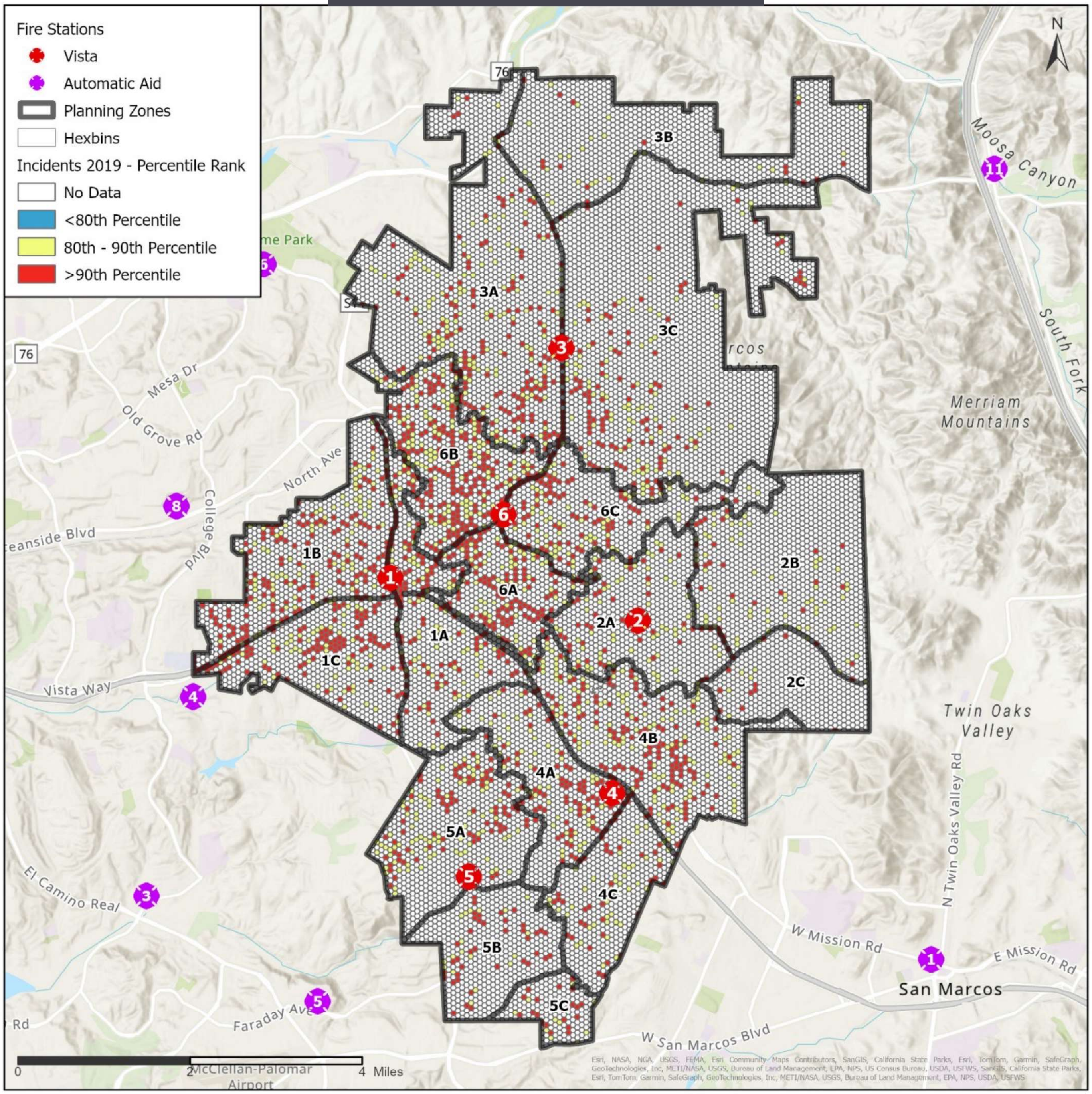
Map of National Risk Index Scores for Wildland Fires



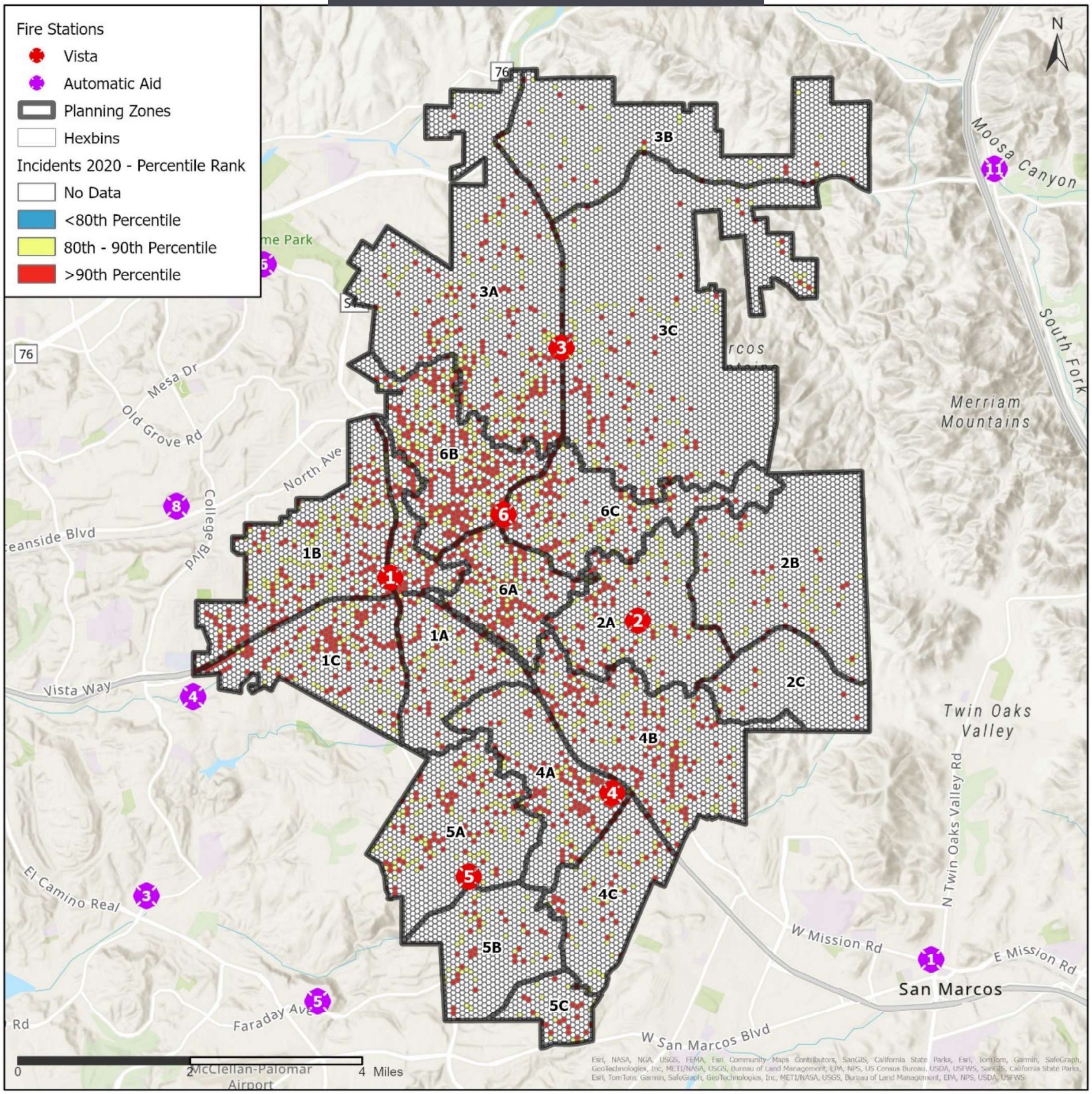
Map of Percentile-Ranked Incidents in 2018



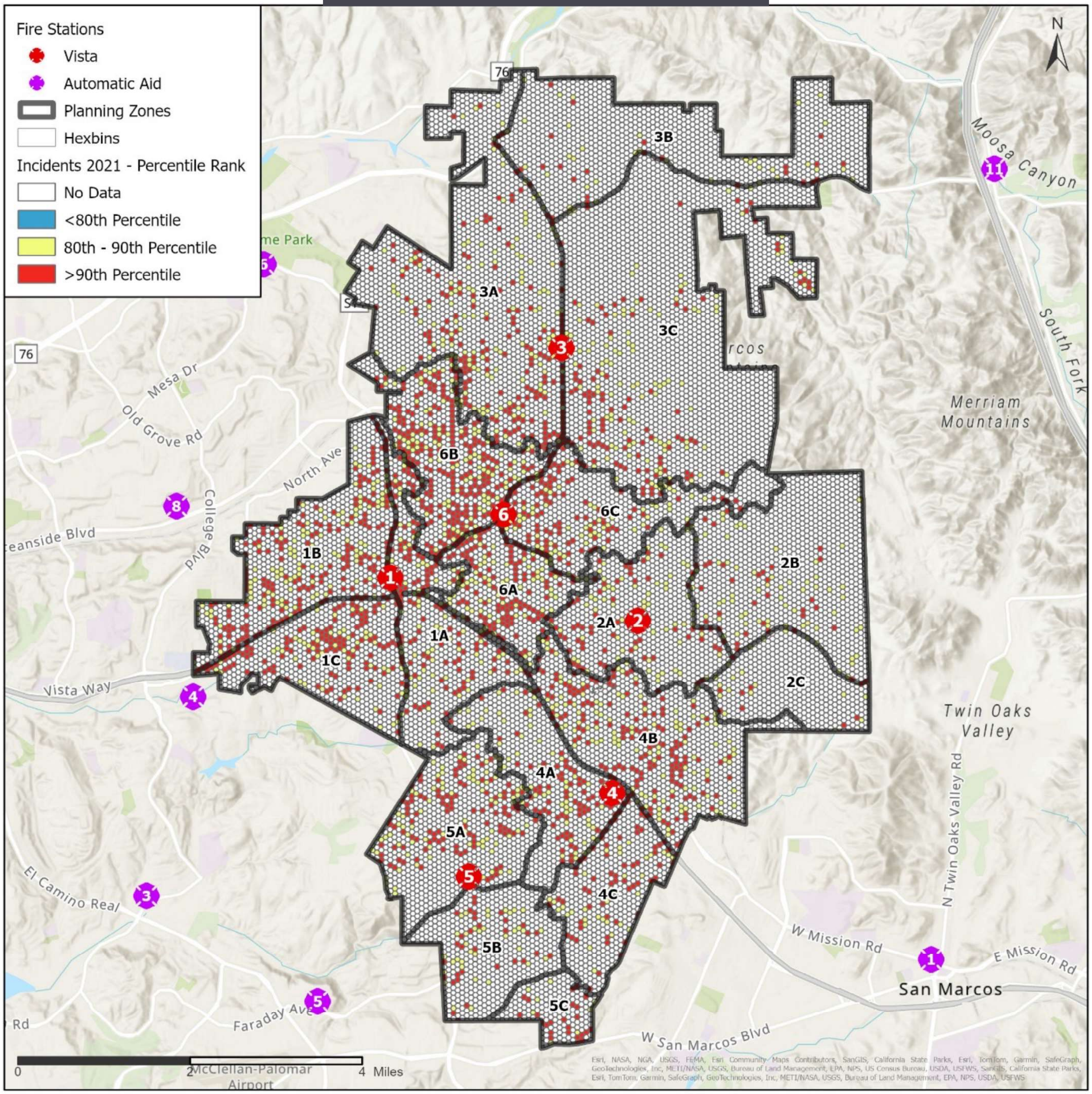
Map of Percentile-Ranked Incidents in 2019



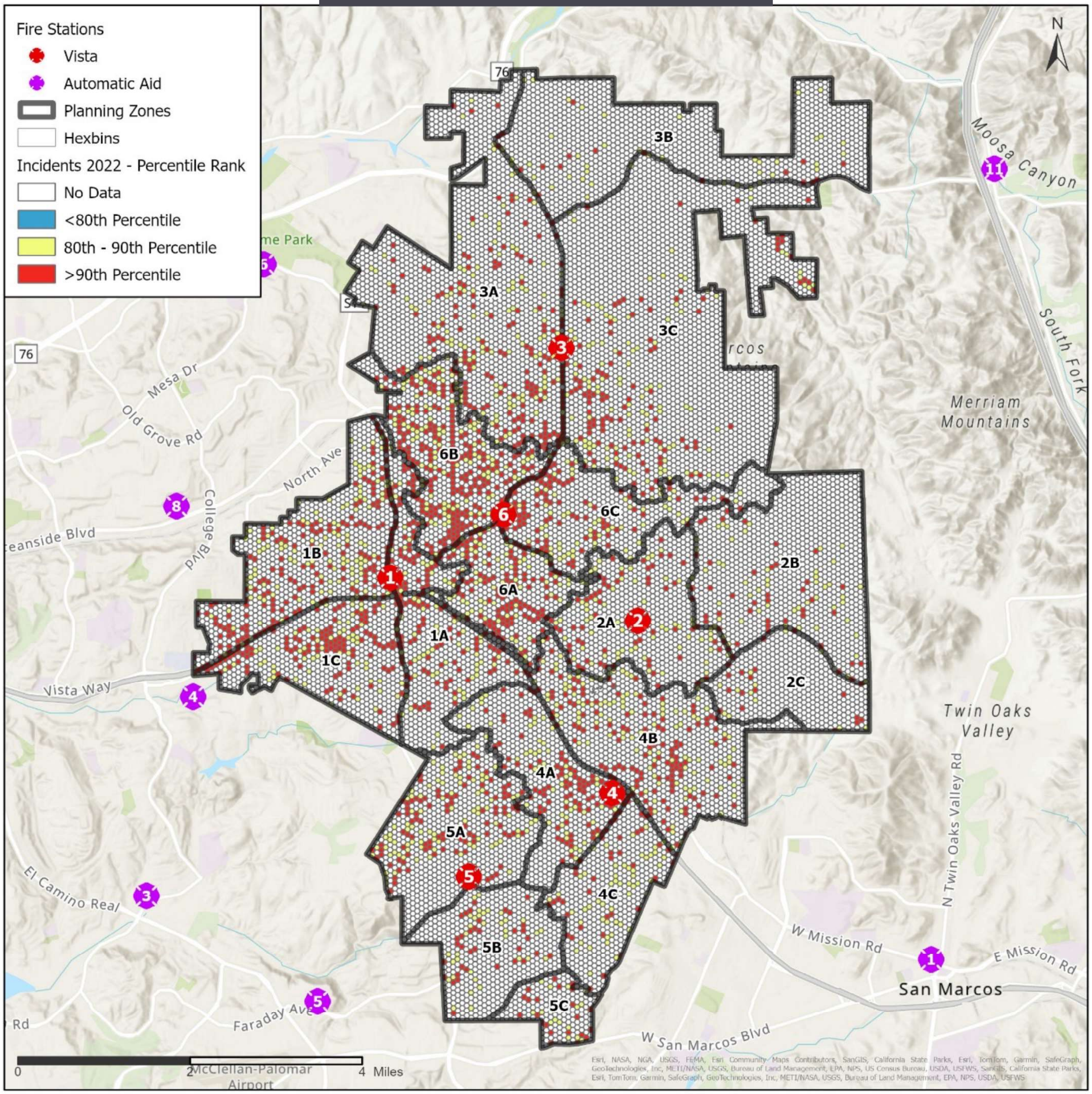
Map of Percentile-Ranked Incidents in 2020



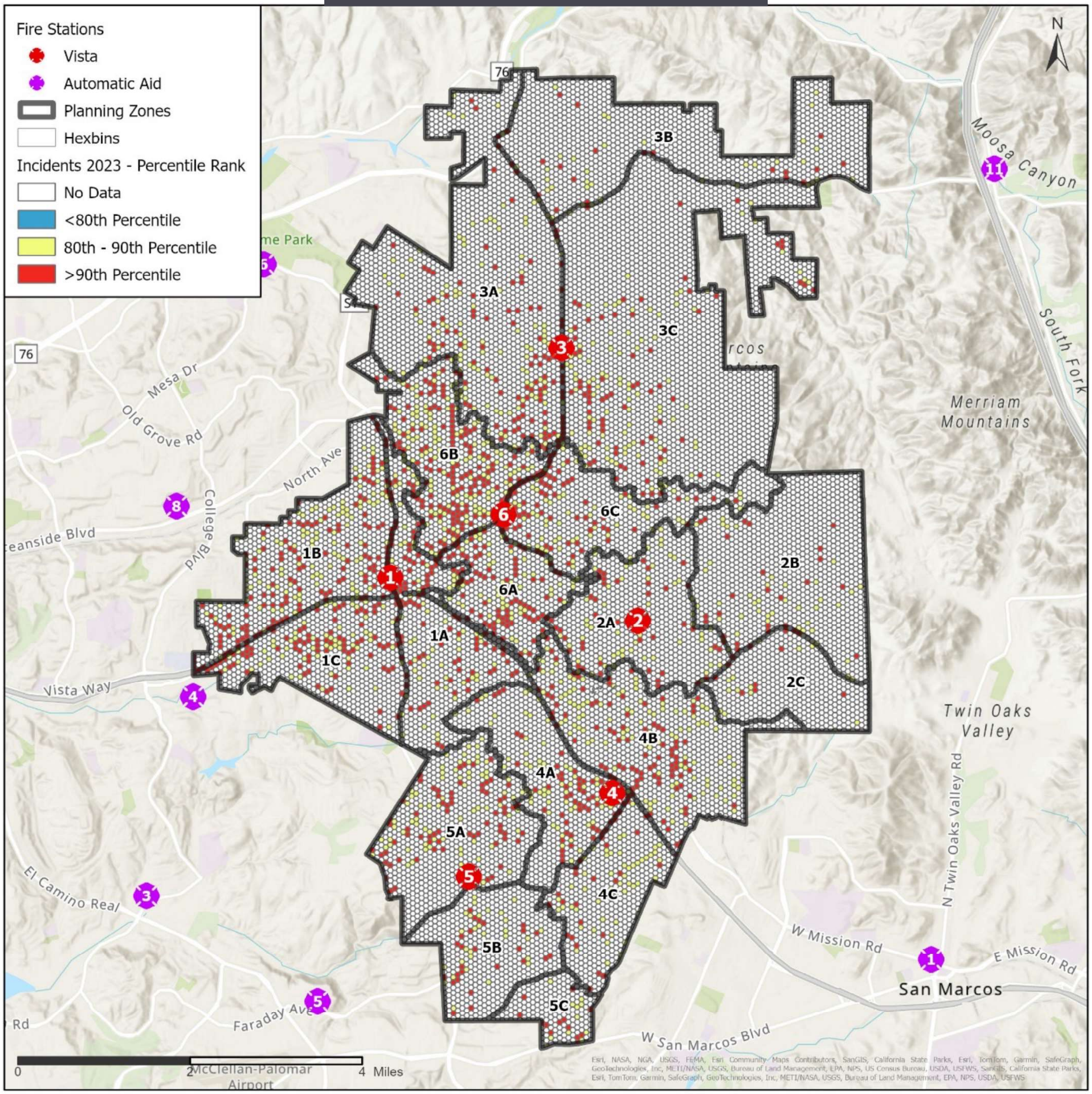
Map of Percentile-Ranked Incidents in 2021

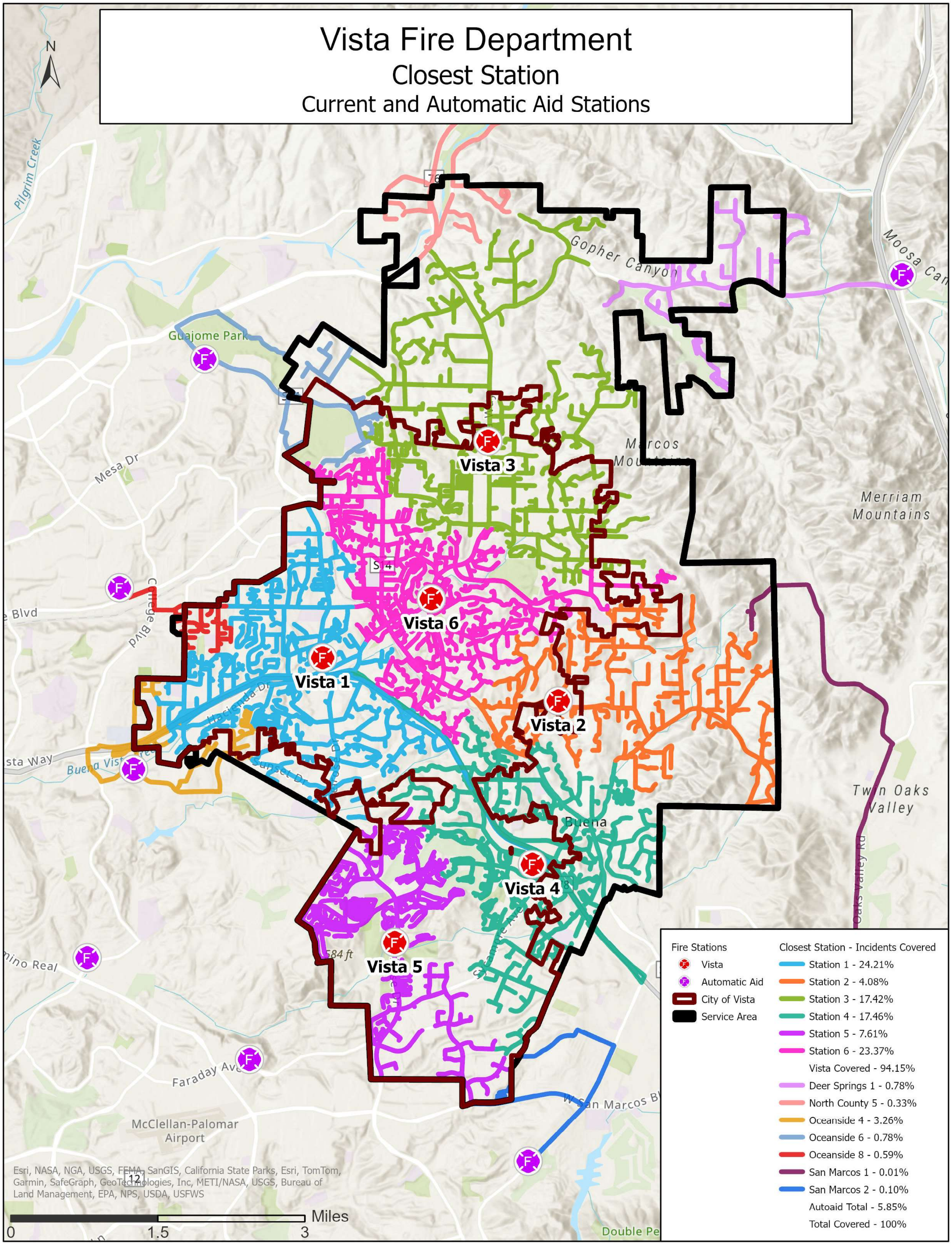


Map of Percentile-Ranked Incidents in 2022

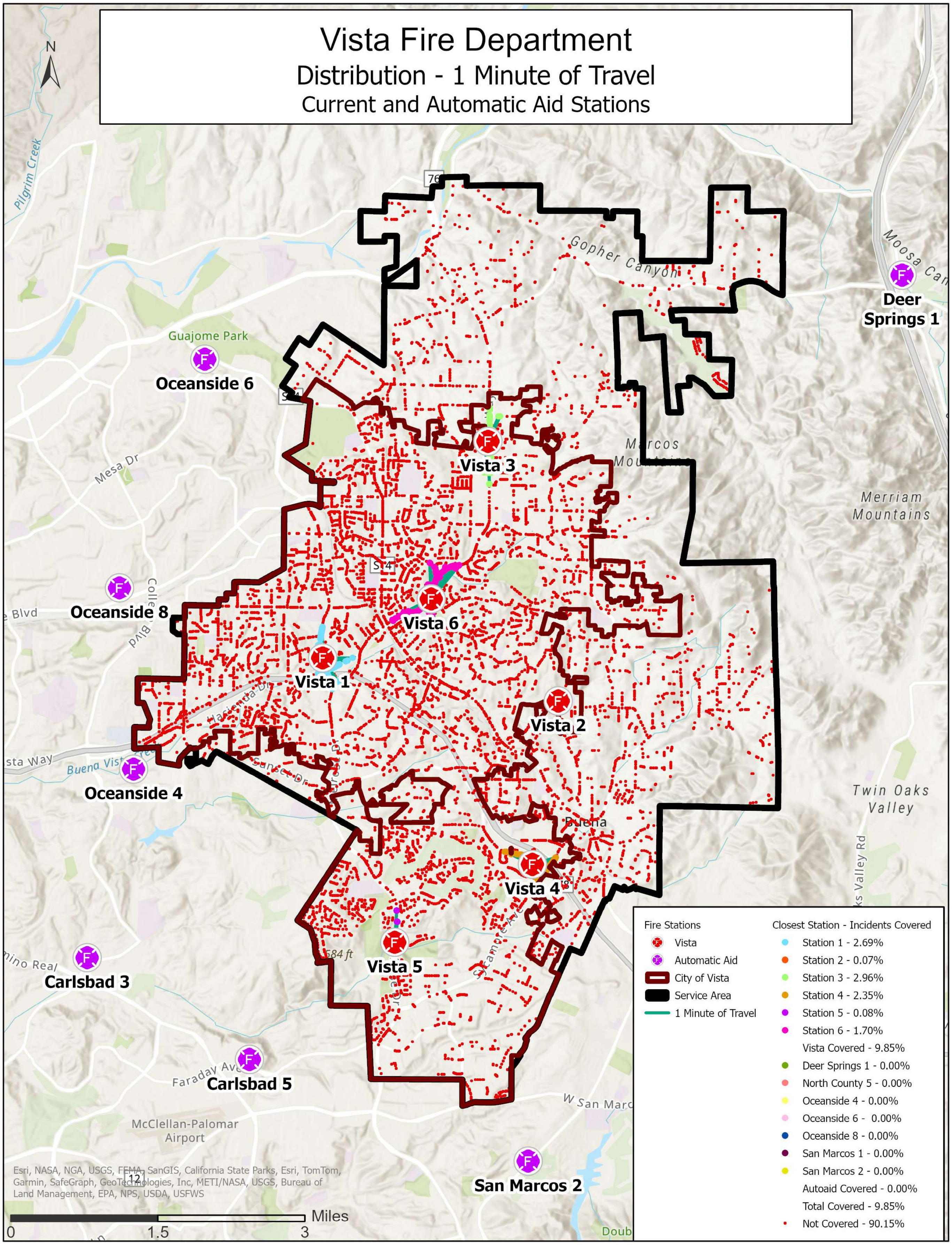


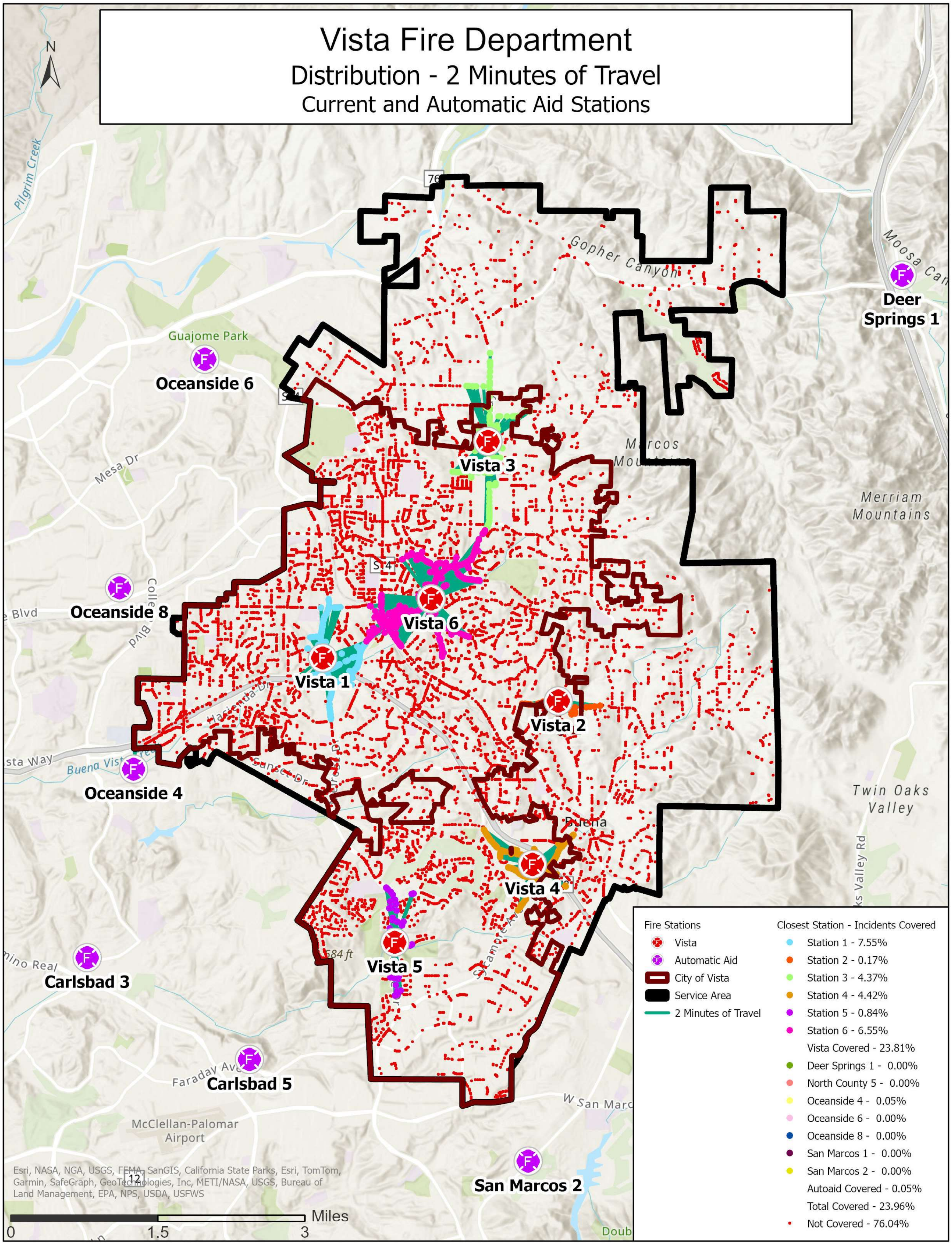
Map of Percentile-Ranked Incidents in 2023



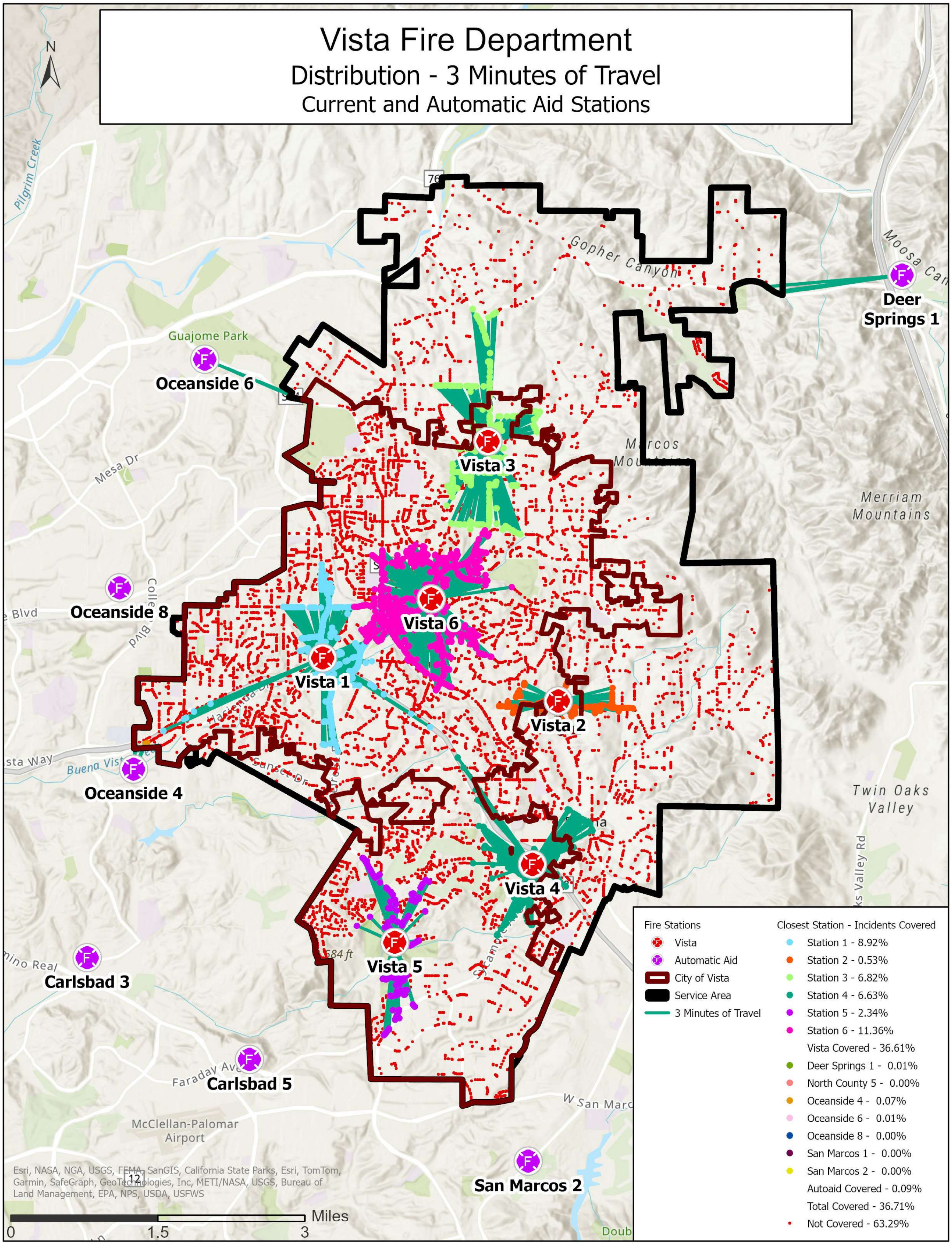


Vista Fire Department
Closest Station
Current and Automatic Aid Stations
N
Vista 1
Vista 2
Vista 3
Vista 4
Vista 5
Vista 6
Fire Stations
Vista
Automatic Aid
City of Vista
Service Area
Closest Station - Incidents Covered
Station 1 - 24.21%
Station 2 - 4.08%
Station 3 - 17.42%
Station 4 - 17.46%
Station 5 - 7.61%
Station 6 - 23.37%
Vista Covered - 94.15%
Deer Springs 1 - 0.78%
North County 5 - 0.33%
Oceanside 4 - 3.26%
Oceanside 6 - 0.78%
Oceanside 8 - 0.59%
San Marcos 1 - 0.01%
San Marcos 2 - 0.10%
Autoaid Total - 5.85%
Total Covered - 100%
Miles
0
1.5
3
Esri, NASA, NGA, USGS, FEMA, SanGIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS

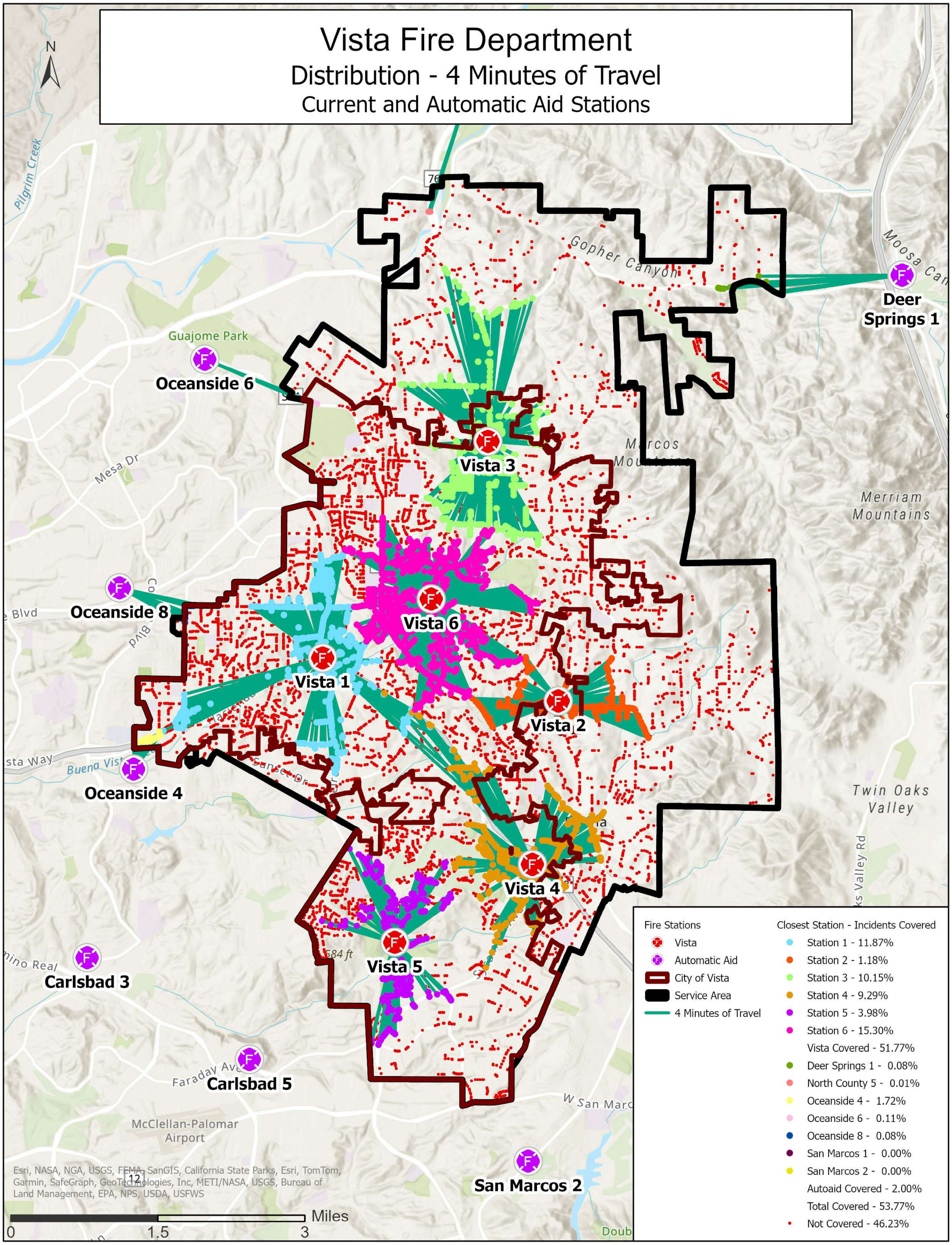

Vista Fire Department
Distribution - 1 Minute of Travel
Current and Automatic Aid Stations
N
Oceanside 6
Oceanside 8
Oceanside 4
Carlsbad 3
Carlsbad 5
San Marcos 2
Deer Springs 1
Vista 1
Vista 2
Vista 3
Vista 4
Vista 5
Vista 6
Guajome Park
Gopher Canyon
Marcos Mountains
Merriam Mountains
Twin Oaks Valley
McClellan-Palomar Airport
Fire Stations
Vista
Automatic Aid
City of Vista
Service Area
1 Minute of Travel
Closest Station - Incidents Covered
Station 1 - 2.69%
Station 2 - 0.07%
Station 3 - 2.96%
Station 4 - 2.35%
Station 5 - 0.08%
Station 6 - 1.70%
Vista Covered - 9.85%
Deer Springs 1 - 0.00%
North County 5 - 0.00%
Oceanside 4 - 0.00%
Oceanside 6 - 0.00%
Oceanside 8 - 0.00%
San Marcos 1 - 0.00%
San Marcos 2 - 0.00%
Autoaid Covered - 0.00%
Total Covered - 9.85%
Not Covered - 90.15%
Esri, NASA, NGA, USGS, FEMA, SanGIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS
0
1.5
3
Miles

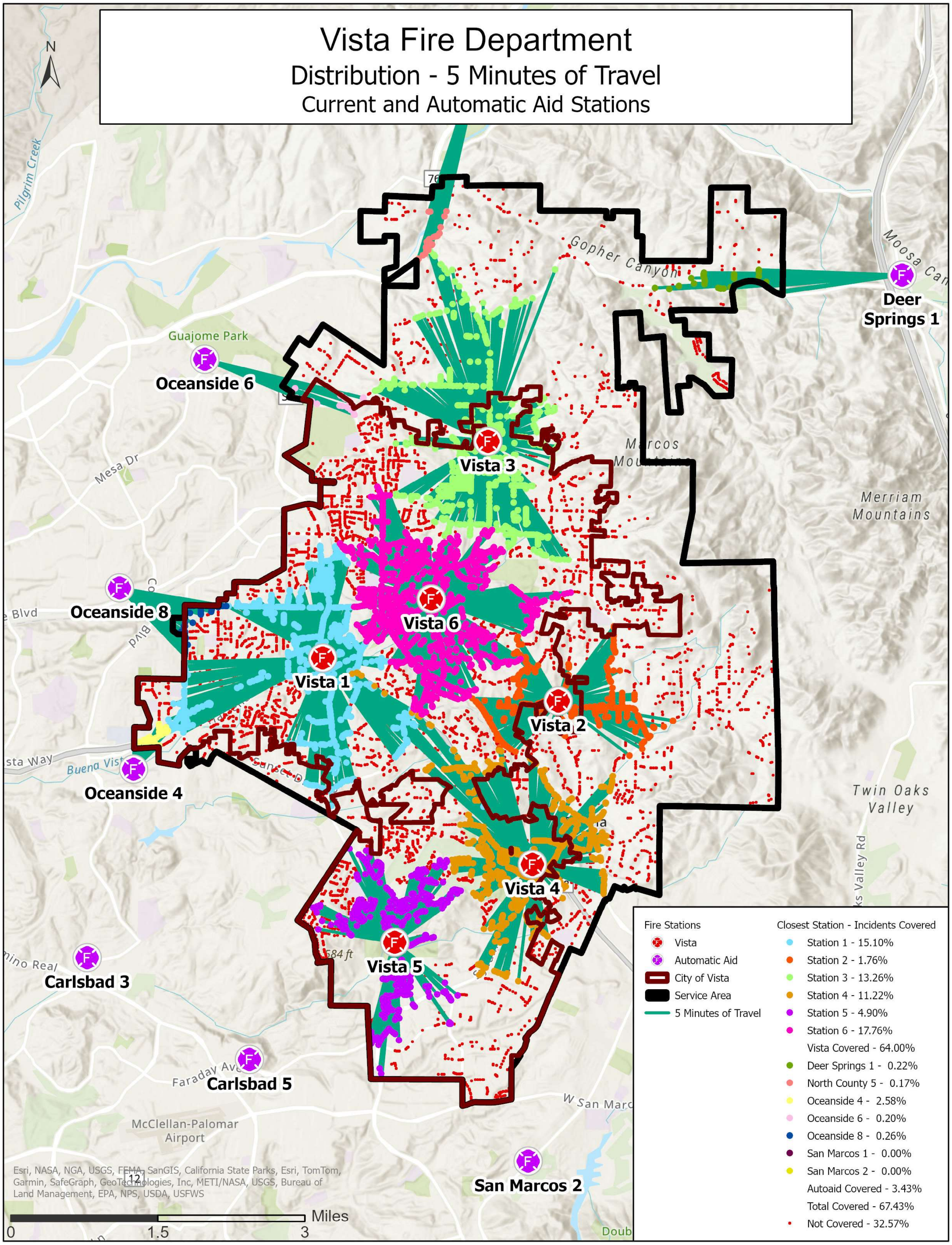


Vista Fire Department
Distribution - 2 Minutes of Travel
Current and Automatic Aid Stations
N
Vista 1
Vista 2
Vista 3
Vista 4
Vista 5
Vista 6
Oceanside 4
Oceanside 6
Oceanside 8
Carlsbad 3
Carlsbad 5
San Marcos 2
Deer Springs 1
Guajome Park
Gopher Canyon
Marcos Mountains
Merriam Mountains
Twin Oaks Valley
McClellan-Palomar Airport
Fire Stations
Vista
Automatic Aid
City of Vista
Service Area
2 Minutes of Travel
Closest Station - Incidents Covered
Station 1 - 7.55%
Station 2 - 0.17%
Station 3 - 4.37%
Station 4 - 4.42%
Station 5 - 0.84%
Station 6 - 6.55%
Vista Covered - 23.81%
Deer Springs 1 - 0.00%
North County 5 - 0.00%
Oceanside 4 - 0.05%
Oceanside 6 - 0.00%
Oceanside 8 - 0.00%
San Marcos 1 - 0.00%
San Marcos 2 - 0.00%
Autoaid Covered - 0.05%
Total Covered - 23.96%
Not Covered - 76.04%
Esri, NASA, NGA, USGS, FEMA, SanGIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS
0 1.5 3 Miles

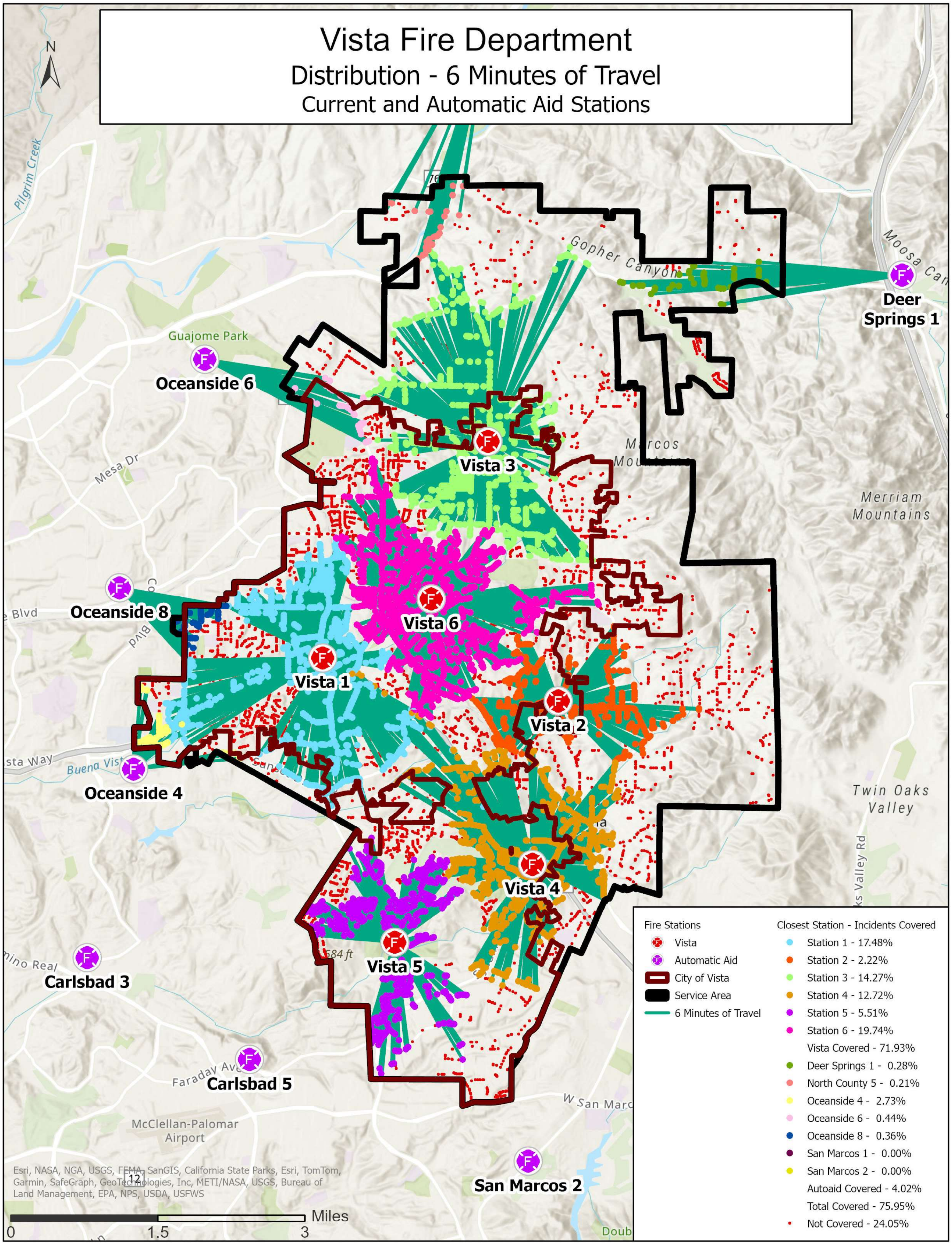


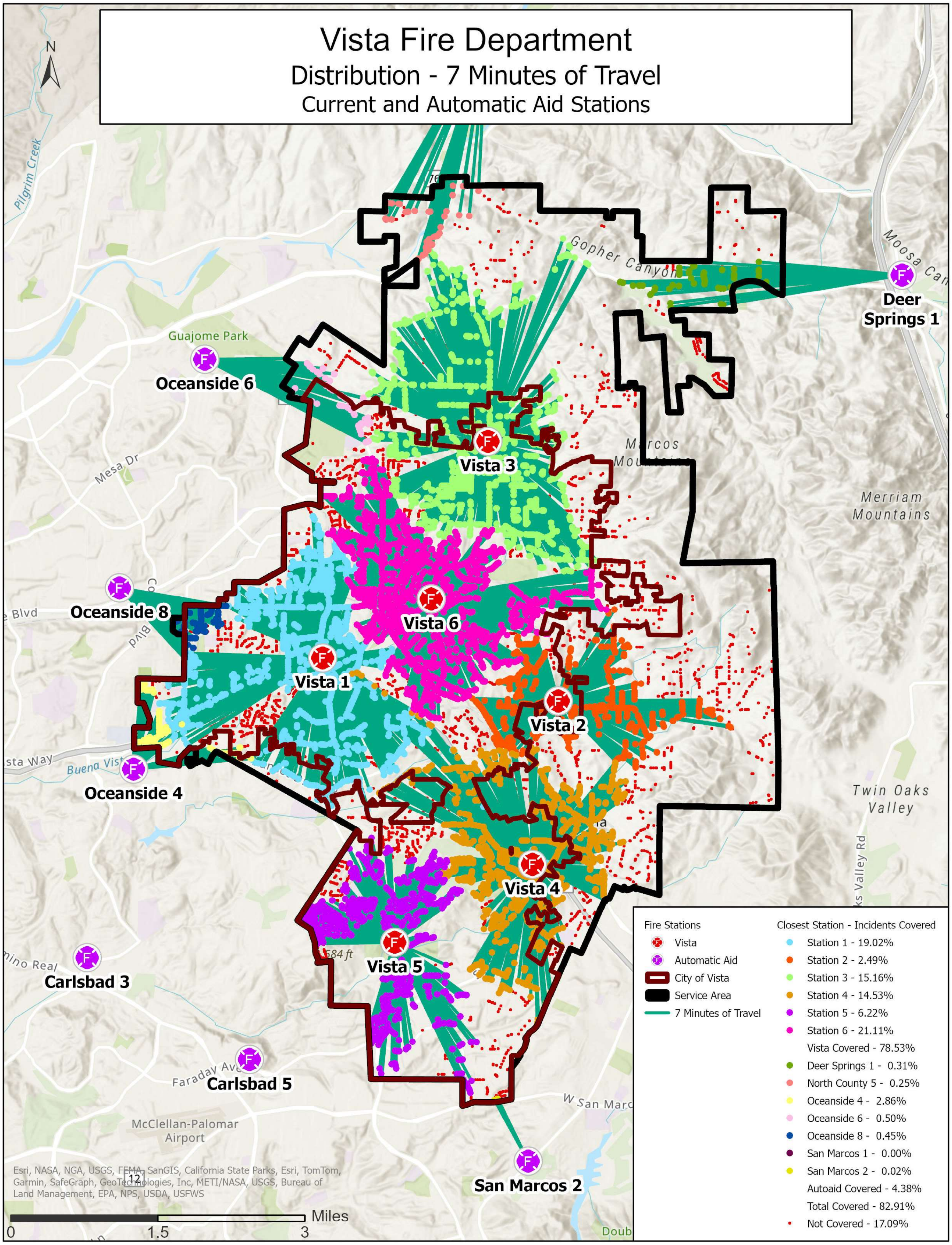
Vista Fire Department
Distribution - 3 Minutes of Travel
Current and Automatic Aid Stations
N
Deer Springs 1
Oceanside 6
Vista 3
Oceanside 8
Vista 6
Vista 1
Vista 2
Oceanside 4
Vista 4
Vista 5
Carlsbad 3
Carlsbad 5
San Marcos 2
Guajome Park
Gopher Canyon
Marcos Mountains
Merriam Mountains
Twin Oaks Valley
McClellan-Palomar Airport
Fire Stations
Vista
Automatic Aid
City of Vista
Service Area
3 Minutes of Travel
Closest Station - Incidents Covered
Station 1 - 8.92%
Station 2 - 0.53%
Station 3 - 6.82%
Station 4 - 6.63%
Station 5 - 2.34%
Station 6 - 11.36%
Vista Covered - 36.61%
Deer Springs 1 - 0.01%
North County 5 - 0.00%
Oceanside 4 - 0.07%
Oceanside 6 - 0.01%
Oceanside 8 - 0.00%
San Marcos 1 - 0.00%
San Marcos 2 - 0.00%
Autoaid Covered - 0.09%
Total Covered - 36.71%
Not Covered - 63.29%
Esri, NASA, NGA, USGS, FEMA, SanGIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS
0
1.5
3
Miles


Vista Fire Department
Distribution - 4 Minutes of Travel
Current and Automatic Aid Stations
N
Deer Springs 1
Oceanside 6
Guajome Park
Vista 3
Oceanside 8
Vista 6
Vista 1
Vista 2
Oceanside 4
Vista 4
Vista 5
Carlsbad 3
Carlsbad 5
San Marcos 2
McClellan-Palomar Airport
Gopher Canyon
Marcos Mountains
Merriam Mountains
Twin Oaks Valley
Mesa Dr
Faraday Ave
W San Marc
Fire Stations
Vista
Automatic Aid
City of Vista
Service Area
4 Minutes of Travel
Closest Station - Incidents Covered
Station 1 - 11.87%
Station 2 - 1.18%
Station 3 - 10.15%
Station 4 - 9.29%
Station 5 - 3.98%
Station 6 - 15.30%
Vista Covered - 51.77%
Deer Springs 1 - 0.08%
North County 5 - 0.01%
Oceanside 4 - 1.72%
Oceanside 6 - 0.11%
Oceanside 8 - 0.08%
San Marcos 1 - 0.00%
San Marcos 2 - 0.00%
Autoaid Covered - 2.00%
Total Covered - 53.77%
Not Covered - 46.23%
Esri, NASA, NGA, USGS, FEMA, SanGIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS
0 1.5 3 Miles

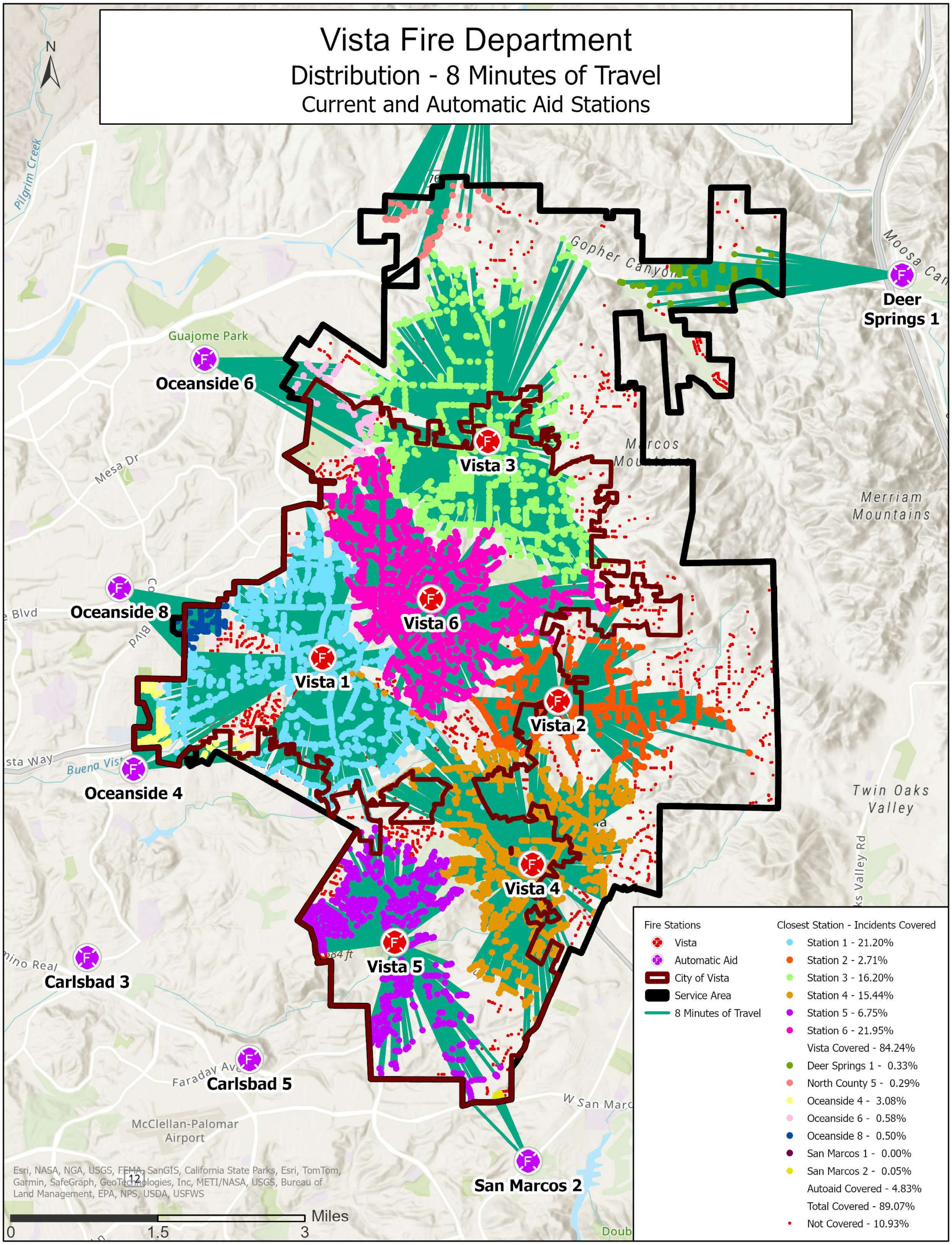


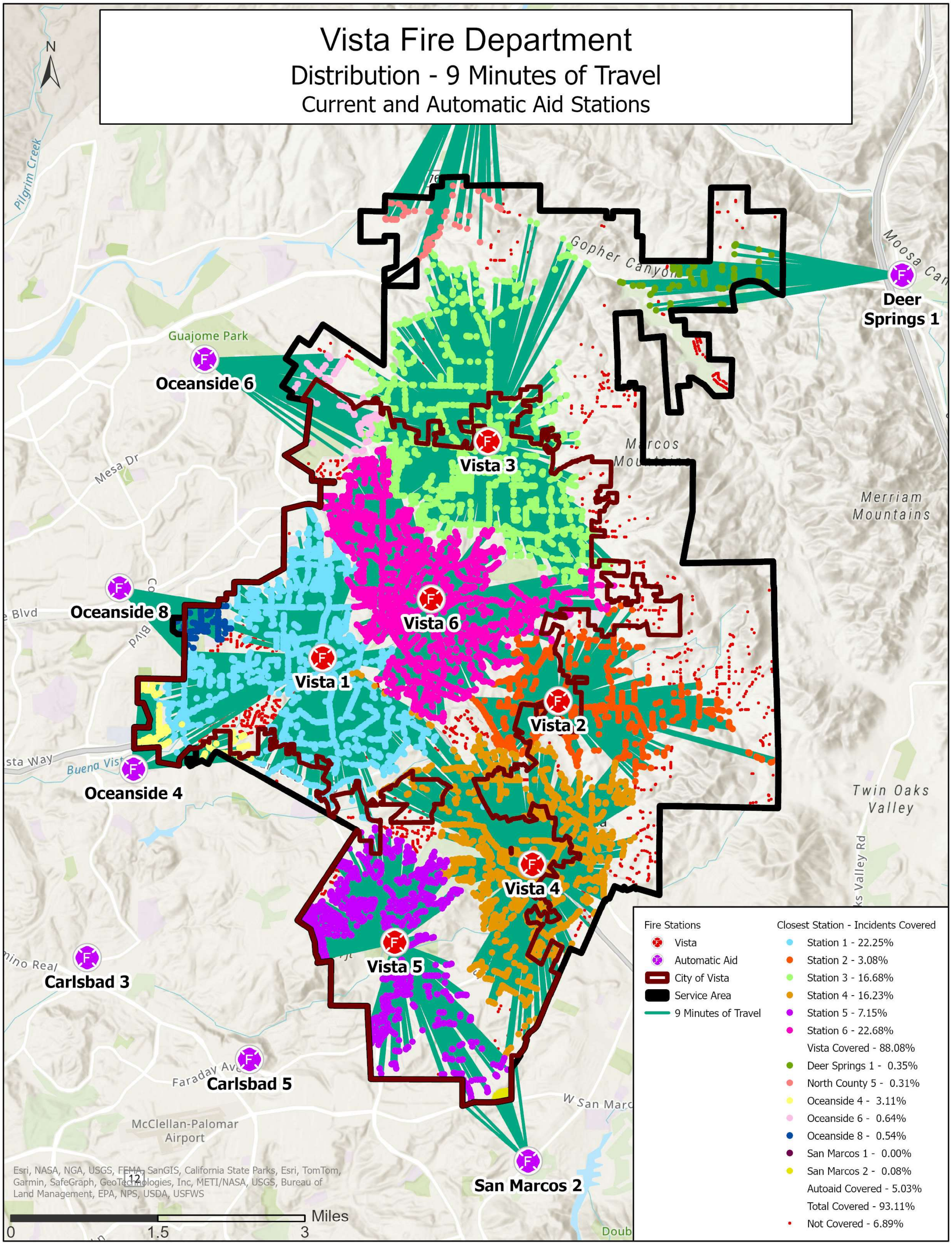
Vista Fire Department
Distribution - 5 Minutes of Travel
Current and Automatic Aid Stations
N
Deer Springs 1
Oceanside 6
Oceanside 8
Oceanside 4
Carlsbad 3
Carlsbad 5
San Marcos 2
Vista 1
Vista 2
Vista 3
Vista 4
Vista 5
Vista 6
Guajome Park
Gopher Canyon
Marcos Mountains
Merriam Mountains
Twin Oaks Valley
McClellan-Palomar Airport
Fire Stations
Vista
Automatic Aid
City of Vista
Service Area
5 Minutes of Travel
Closest Station - Incidents Covered
Station 1 - 15.10%
Station 2 - 1.76%
Station 3 - 13.26%
Station 4 - 11.22%
Station 5 - 4.90%
Station 6 - 17.76%
Vista Covered - 64.00%
Deer Springs 1 - 0.22%
North County 5 - 0.17%
Oceanside 4 - 2.58%
Oceanside 6 - 0.20%
Oceanside 8 - 0.26%
San Marcos 1 - 0.00%
San Marcos 2 - 0.00%
Autoaid Covered - 3.43%
Total Covered - 67.43%
Not Covered - 32.57%
Esri, NASA, NGA, USGS, FEMA, SanGIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS
0 1.5 3 Miles

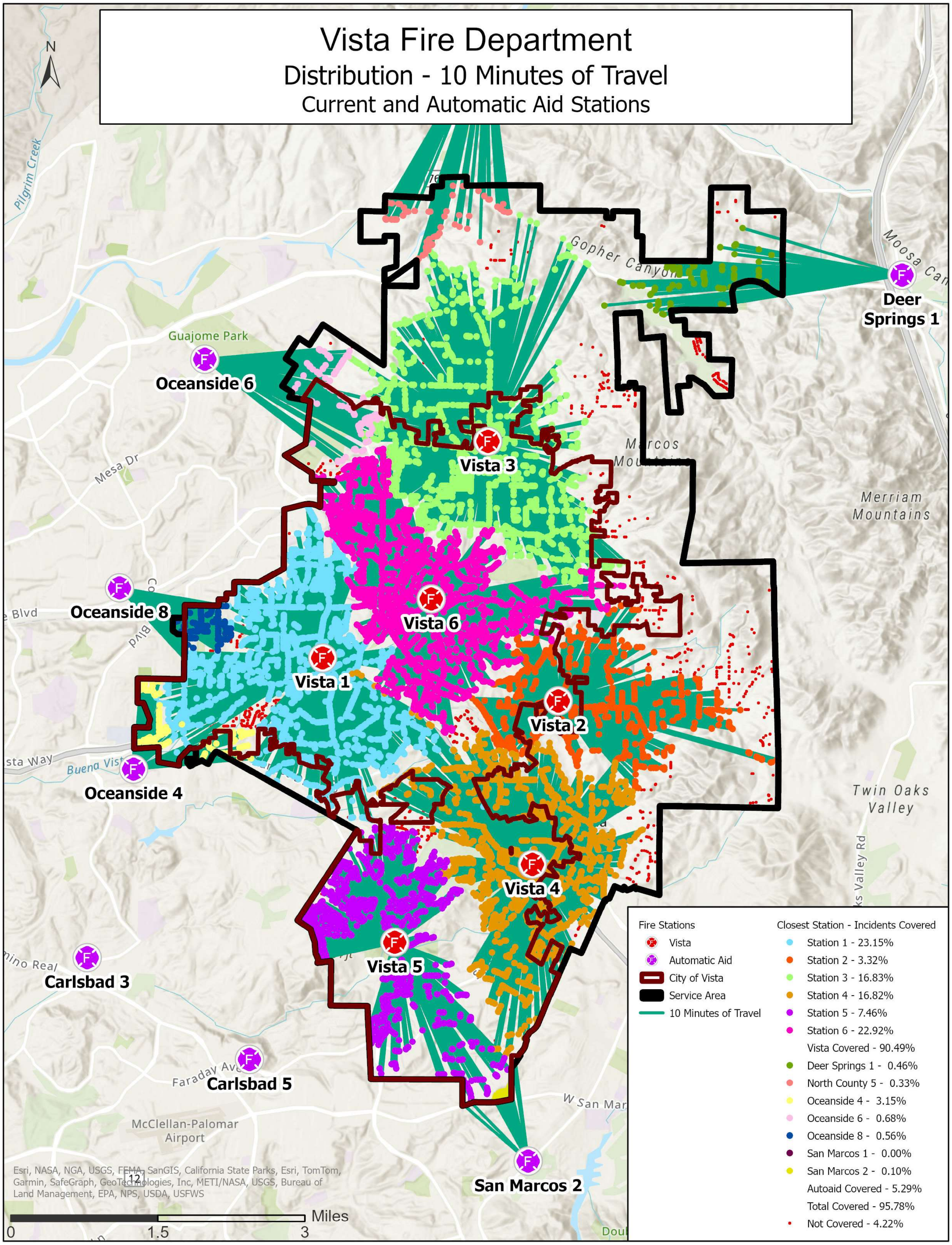

Vista Fire Department
Distribution - 6 Minutes of Travel
Current and Automatic Aid Stations
N
Deer Springs 1
Oceanside 6
Oceanside 8
Oceanside 4
Carlsbad 3
Carlsbad 5
San Marcos 2
Vista 1
Vista 2
Vista 3
Vista 4
Vista 5
Vista 6
Guajome Park
Gopher Canyon
Merriam Mountains
Twin Oaks Valley
McClellan-Palomar Airport
Mesa Dr
Pilgrim Creek
Faraday Ave
W San Marc
584 ft
Fire Stations
Vista
Automatic Aid
City of Vista
Service Area
6 Minutes of Travel
Closest Station - Incidents Covered
Station 1 - 17.48%
Station 2 - 2.22%
Station 3 - 14.27%
Station 4 - 12.72%
Station 5 - 5.51%
Station 6 - 19.74%
Vista Covered - 71.93%
Deer Springs 1 - 0.28%
North County 5 - 0.21%
Oceanside 4 - 2.73%
Oceanside 6 - 0.44%
Oceanside 8 - 0.36%
San Marcos 1 - 0.00%
San Marcos 2 - 0.00%
Autoaid Covered - 4.02%
Total Covered - 75.95%
Not Covered - 24.05%
Esri, NASA, NGA, USGS, FEMA, SanGIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS
0
1.5
3
Miles

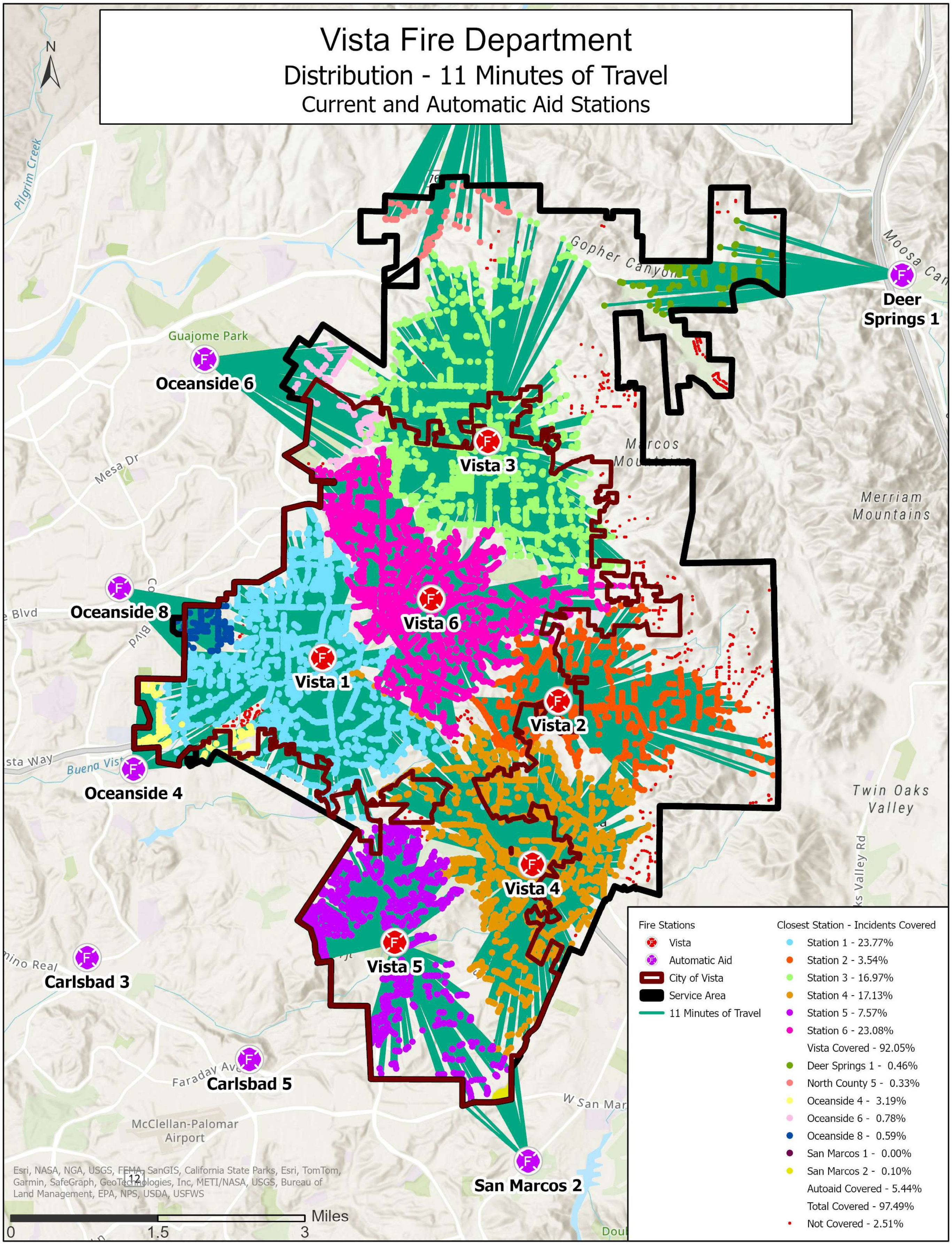


Vista Fire Department
Distribution - 7 Minutes of Travel
Current and Automatic Aid Stations
N
Deer Springs 1
Oceanside 6
Vista 3
Oceanside 8
Vista 6
Vista 1
Vista 2
Oceanside 4
Vista 4
Vista 5
Carlsbad 3
Carlsbad 5
San Marcos 2
Guajome Park
McClellan-Palomar Airport
Merriam Mountains
Twin Oaks Valley
Gopher Canyon
Fire Stations
Vista
Automatic Aid
City of Vista
Service Area
7 Minutes of Travel
Closest Station - Incidents Covered
Station 1 - 19.02%
Station 2 - 2.49%
Station 3 - 15.16%
Station 4 - 14.53%
Station 5 - 6.22%
Station 6 - 21.11%
Vista Covered - 78.53%
Deer Springs 1 - 0.31%
North County 5 - 0.25%
Oceanside 4 - 2.86%
Oceanside 6 - 0.50%
Oceanside 8 - 0.45%
San Marcos 1 - 0.00%
San Marcos 2 - 0.02%
Autoaid Covered - 4.38%
Total Covered - 82.91%
Not Covered - 17.09%
Esri, NASA, NGA, USGS, FEMA, SanGIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS
0 1.5 3 Miles

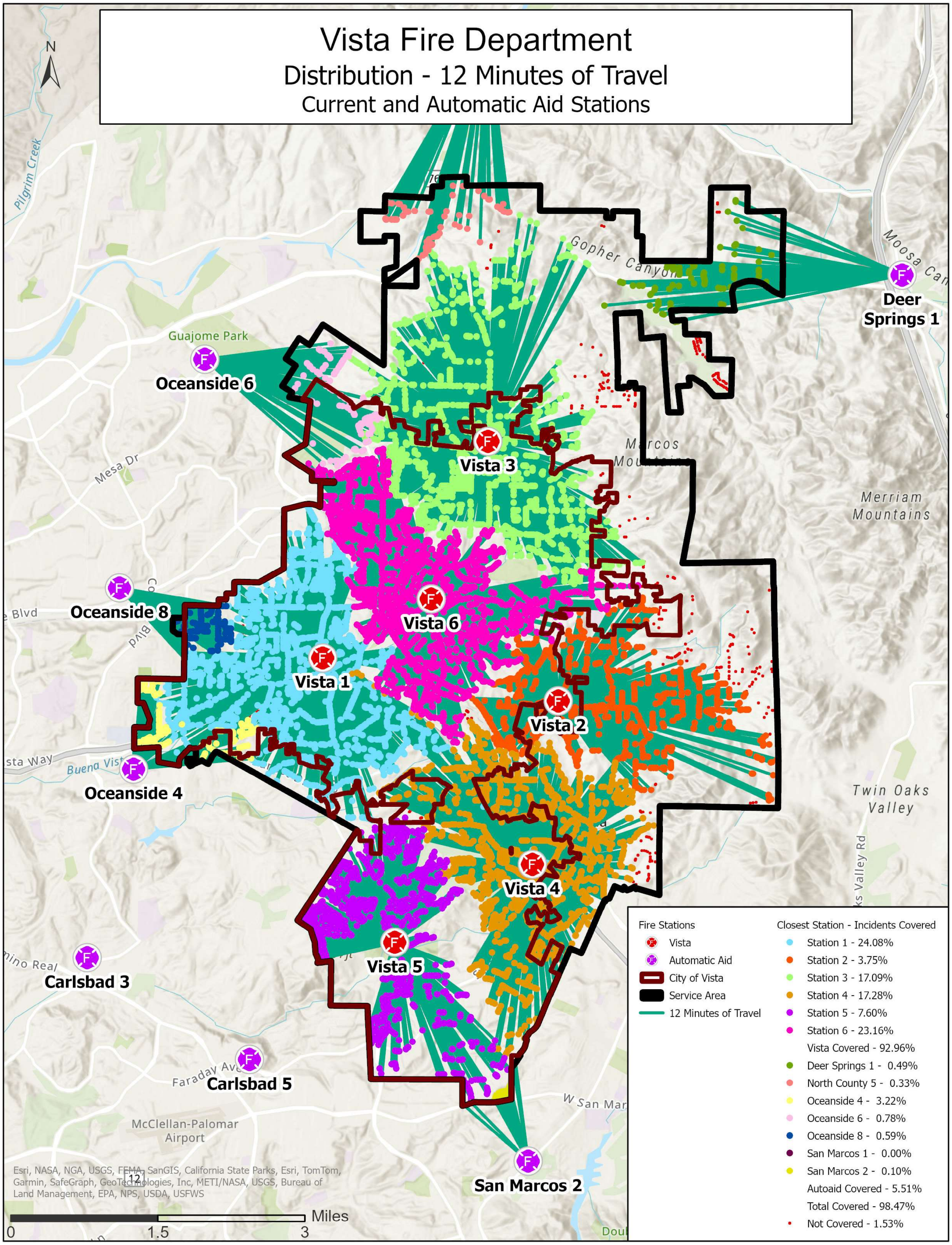

Vista Fire Department
Distribution - 8 Minutes of Travel
Current and Automatic Aid Stations
N
Deer Springs 1
Oceanside 6
Oceanside 8
Oceanside 4
Carlsbad 3
Carlsbad 5
San Marcos 2
Vista 1
Vista 2
Vista 3
Vista 4
Vista 5
Vista 6
Guajome Park
Gopher Canyon
Merriam Mountains
Twin Oaks Valley
McClellan-Palomar Airport
Fire Stations
Vista
Automatic Aid
City of Vista
Service Area
8 Minutes of Travel
Closest Station - Incidents Covered
Station 1 - 21.20%
Station 2 - 2.71%
Station 3 - 16.20%
Station 4 - 15.44%
Station 5 - 6.75%
Station 6 - 21.95%
Vista Covered - 84.24%
Deer Springs 1 - 0.33%
North County 5 - 0.29%
Oceanside 4 - 3.08%
Oceanside 6 - 0.58%
Oceanside 8 - 0.50%
San Marcos 1 - 0.00%
San Marcos 2 - 0.05%
Autoaid Covered - 4.83%
Total Covered - 89.07%
Not Covered - 10.93%
Esri, NASA, NGA, USGS, FEMA, SanGIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS
0
1.5
3
Miles


Vista Fire Department
Distribution - 9 Minutes of Travel
Current and Automatic Aid Stations
N
Deer Springs 1
Oceanside 6
Vista 3
Oceanside 8
Vista 6
Vista 1
Vista 2
Oceanside 4
Vista 4
Vista 5
Carlsbad 3
Carlsbad 5
San Marcos 2
Guajome Park
Gopher Canyon
Marcos Mountains
Merriam Mountains
Twin Oaks Valley
McClellan-Palomar Airport
Fire Stations
Vista
Automatic Aid
City of Vista
Service Area
9 Minutes of Travel
Closest Station - Incidents Covered
Station 1 - 22.25%
Station 2 - 3.08%
Station 3 - 16.68%
Station 4 - 16.23%
Station 5 - 7.15%
Station 6 - 22.68%
Vista Covered - 88.08%
Deer Springs 1 - 0.35%
North County 5 - 0.31%
Oceanside 4 - 3.11%
Oceanside 6 - 0.64%
Oceanside 8 - 0.54%
San Marcos 1 - 0.00%
San Marcos 2 - 0.08%
Autoaid Covered - 5.03%
Total Covered - 93.11%
Not Covered - 6.89%
Esri, NASA, NGA, USGS, FEMA, SanGIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS
Miles
0
1.5
3

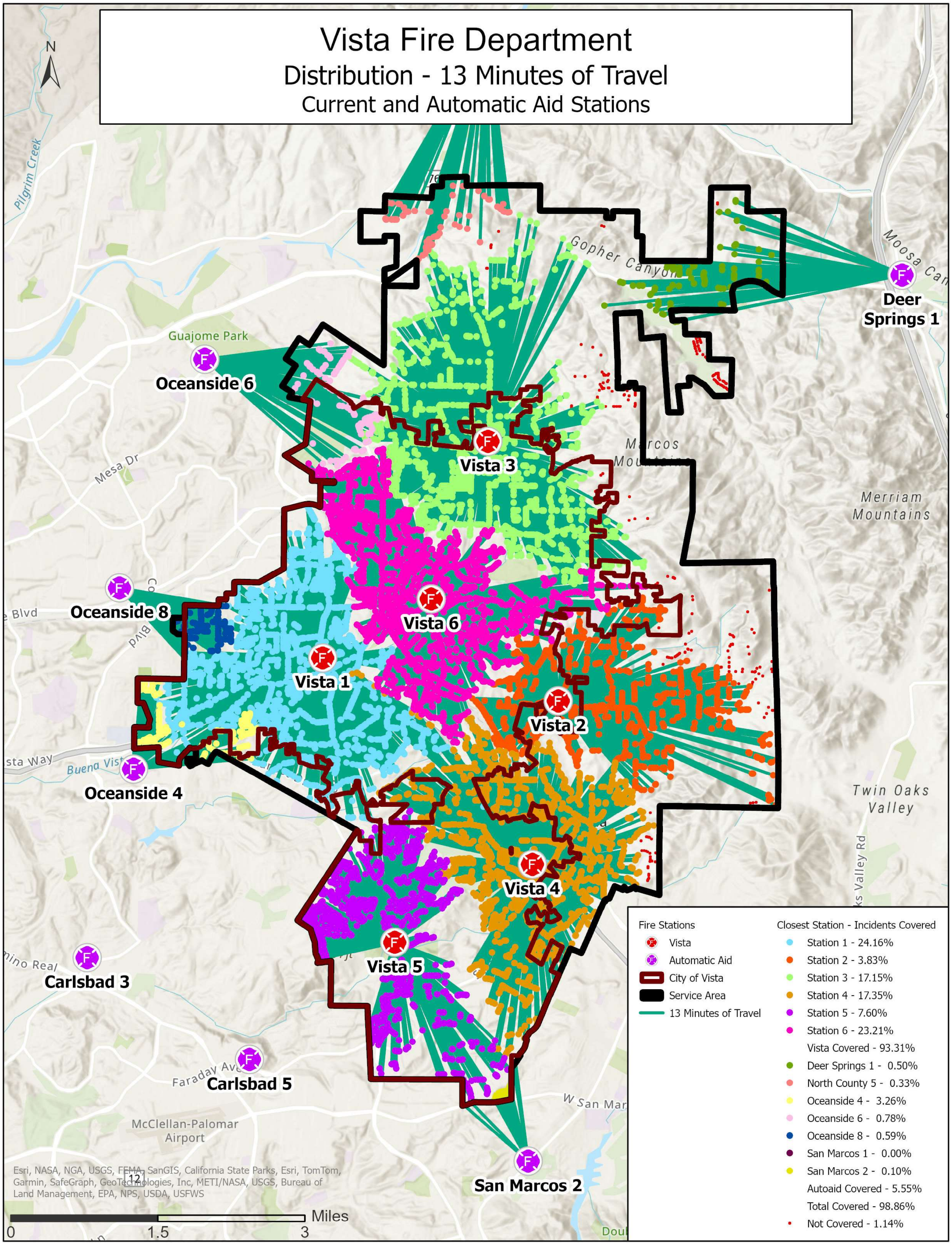

Vista Fire Department
Distribution - 10 Minutes of Travel
Current and Automatic Aid Stations
N
Deer Springs 1
Oceanside 6
Vista 3
Oceanside 8
Vista 6
Vista 1
Vista 2
Oceanside 4
Vista 4
Vista 5
Carlsbad 3
Carlsbad 5
San Marcos 2
McClellan-Palomar Airport
Guajome Park
Marcos Mountains
Merriam Mountains
Twin Oaks Valley
Fire Stations
Vista
Automatic Aid
City of Vista
Service Area
10 Minutes of Travel
Closest Station - Incidents Covered
Station 1 - 23.15%
Station 2 - 3.32%
Station 3 - 16.83%
Station 4 - 16.82%
Station 5 - 7.46%
Station 6 - 22.92%
Vista Covered - 90.49%
Deer Springs 1 - 0.46%
North County 5 - 0.33%
Oceanside 4 - 3.15%
Oceanside 6 - 0.68%
Oceanside 8 - 0.56%
San Marcos 1 - 0.00%
San Marcos 2 - 0.10%
Autoaid Covered - 5.29%
Total Covered - 95.78%
Not Covered - 4.22%
Esri, NASA, NGA, USGS, FEMA, SanGIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS
0 1.5 3 Miles

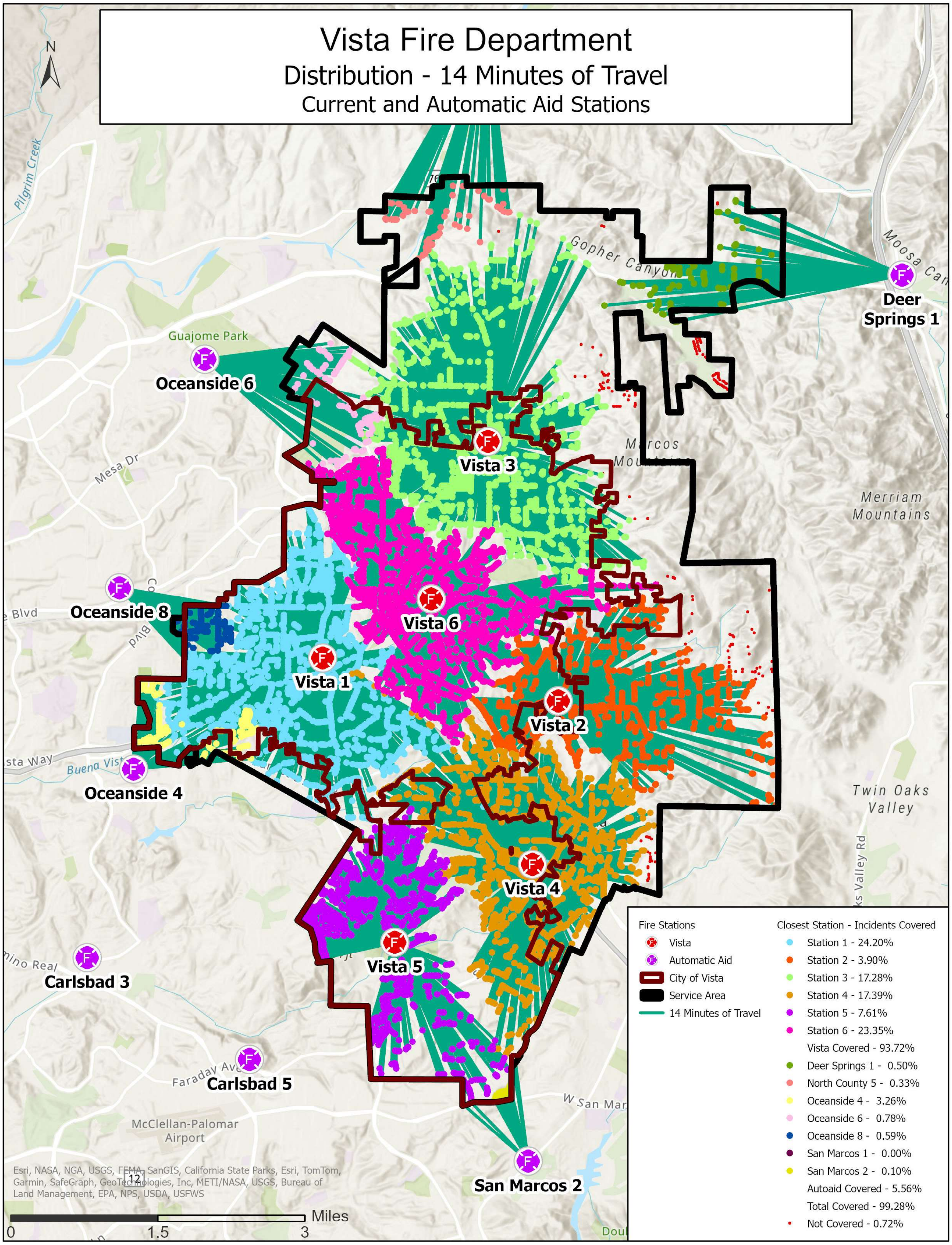


Vista Fire Department
Distribution - 11 Minutes of Travel
Current and Automatic Aid Stations
N
Deer Springs 1
Oceanside 6
Vista 3
Oceanside 8
Vista 6
Vista 1
Vista 2
Oceanside 4
Vista 4
Vista 5
Carlsbad 3
Carlsbad 5
San Marcos 2
Guajome Park
Gopher Canyon
Merriam Mountains
Twin Oaks Valley
McClellan-Palomar Airport
Fire Stations
Vista
Automatic Aid
City of Vista
Service Area
11 Minutes of Travel
Closest Station - Incidents Covered
Station 1 - 23.77%
Station 2 - 3.54%
Station 3 - 16.97%
Station 4 - 17.13%
Station 5 - 7.57%
Station 6 - 23.08%
Vista Covered - 92.05%
Deer Springs 1 - 0.46%
North County 5 - 0.33%
Oceanside 4 - 3.19%
Oceanside 6 - 0.78%
Oceanside 8 - 0.59%
San Marcos 1 - 0.00%
San Marcos 2 - 0.10%
Autoaid Covered - 5.44%
Total Covered - 97.49%
Not Covered - 2.51%
Esri, NASA, NGA, USGS, FEMA, SanGIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS
0
1.5
3
Miles

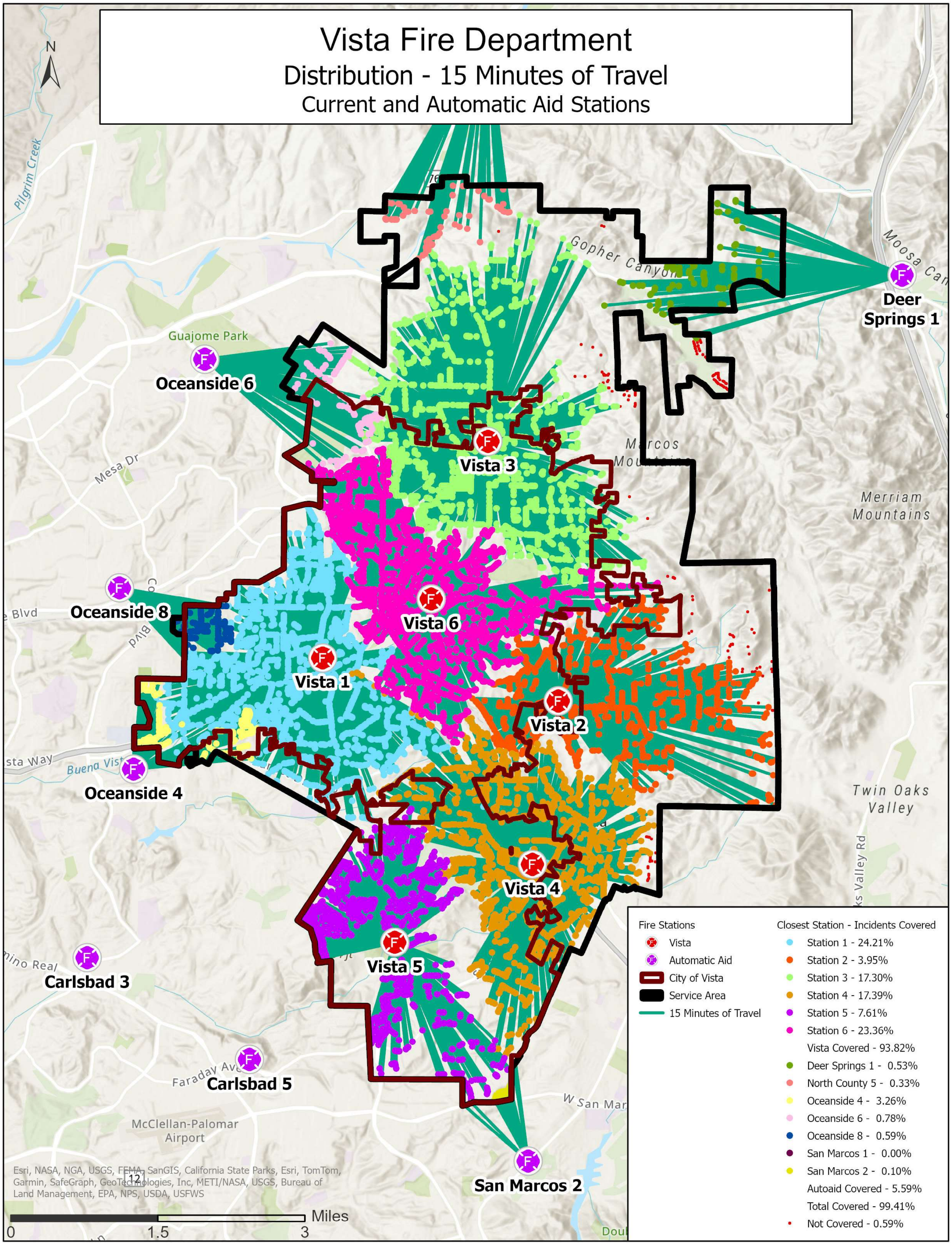


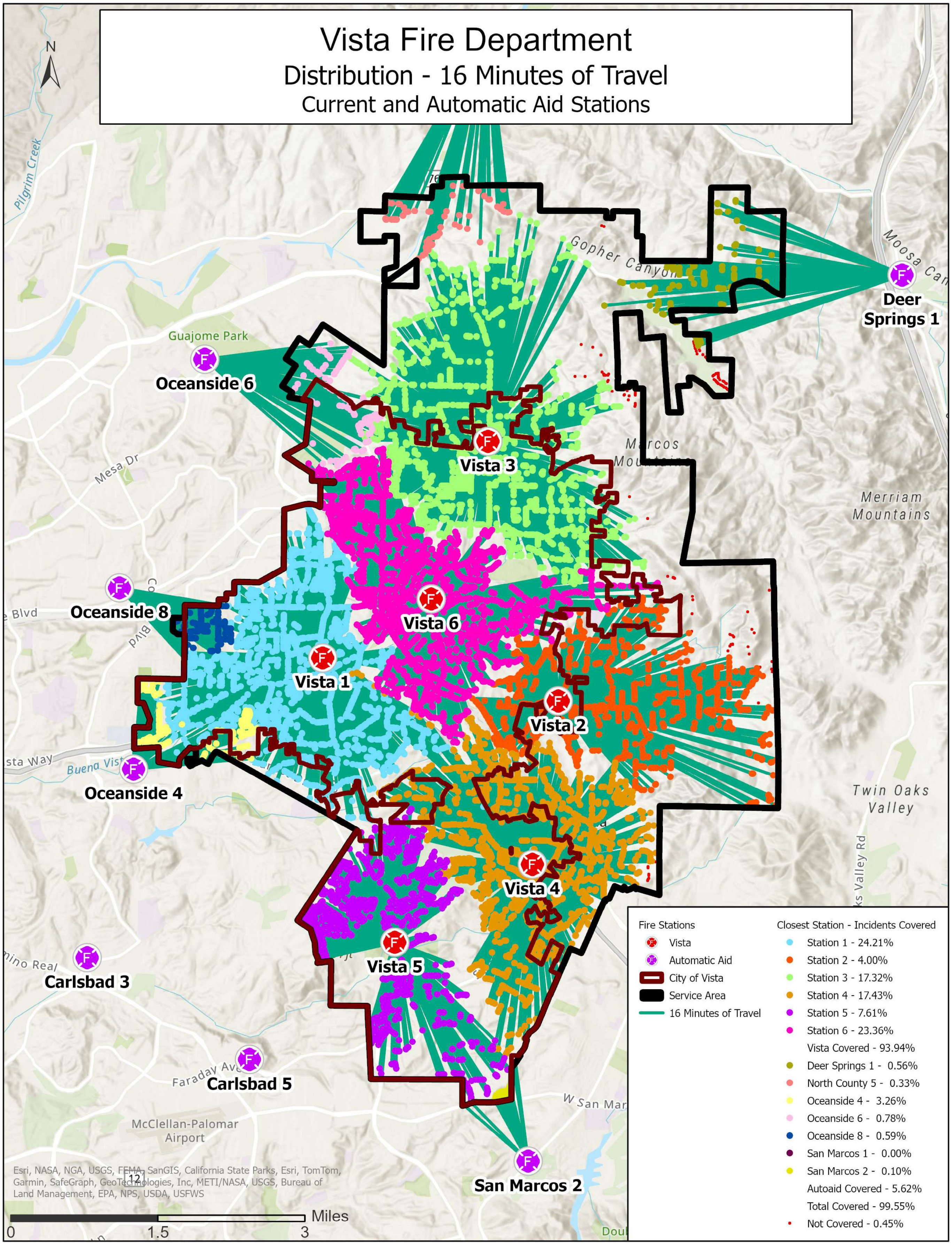
Vista Fire Department
Distribution - 12 Minutes of Travel
Current and Automatic Aid Stations
N
Deer Springs 1
Oceanside 6
Guajome Park
Vista 3
Oceanside 8
Vista 6
Vista 1
Vista 2
Oceanside 4
Vista 4
Vista 5
Carlsbad 3
Carlsbad 5
San Marcos 2
McClellan-Palomar Airport
Merriam Mountains
Twin Oaks Valley
Gopher Canyon
Mesa Dr
Pilgrim Creek
Faraday Ave
Fire Stations
Vista
Automatic Aid
City of Vista
Service Area
12 Minutes of Travel
Closest Station - Incidents Covered
Station 1 - 24.08%
Station 2 - 3.75%
Station 3 - 17.09%
Station 4 - 17.28%
Station 5 - 7.60%
Station 6 - 23.16%
Vista Covered - 92.96%
Deer Springs 1 - 0.49%
North County 5 - 0.33%
Oceanside 4 - 3.22%
Oceanside 6 - 0.78%
Oceanside 8 - 0.59%
San Marcos 1 - 0.00%
San Marcos 2 - 0.10%
Autoaid Covered - 5.51%
Total Covered - 98.47%
Not Covered - 1.53%
Esri, NASA, NGA, USGS, FEMA, SanGIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS
0 1.5 3 Miles


Vista Fire Department
Distribution - 13 Minutes of Travel
Current and Automatic Aid Stations
N
Guajome Park
Oceanside 6
Oceanside 8
Oceanside 4
Carlsbad 3
Carlsbad 5
San Marcos 2
Deer Springs 1
Vista 1
Vista 2
Vista 3
Vista 4
Vista 5
Vista 6
Gopher Canyon
Merriam Mountains
Twin Oaks Valley
McClellan-Palomar Airport
Pilgrim Creek
Mesa Dr
Faraday Ave
Esri, NASA, NGA, USGS, FEMA, SanGIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS
0
1.5
3
Miles
Fire Stations
Vista
Automatic Aid
City of Vista
Service Area
13 Minutes of Travel
Closest Station - Incidents Covered
Station 1 - 24.16%
Station 2 - 3.83%
Station 3 - 17.15%
Station 4 - 17.35%
Station 5 - 7.60%
Station 6 - 23.21%
Vista Covered - 93.31%
Deer Springs 1 - 0.50%
North County 5 - 0.33%
Oceanside 4 - 3.26%
Oceanside 6 - 0.78%
Oceanside 8 - 0.59%
San Marcos 1 - 0.00%
San Marcos 2 - 0.10%
Autoaid Covered - 5.55%
Total Covered - 98.86%
Not Covered - 1.14%

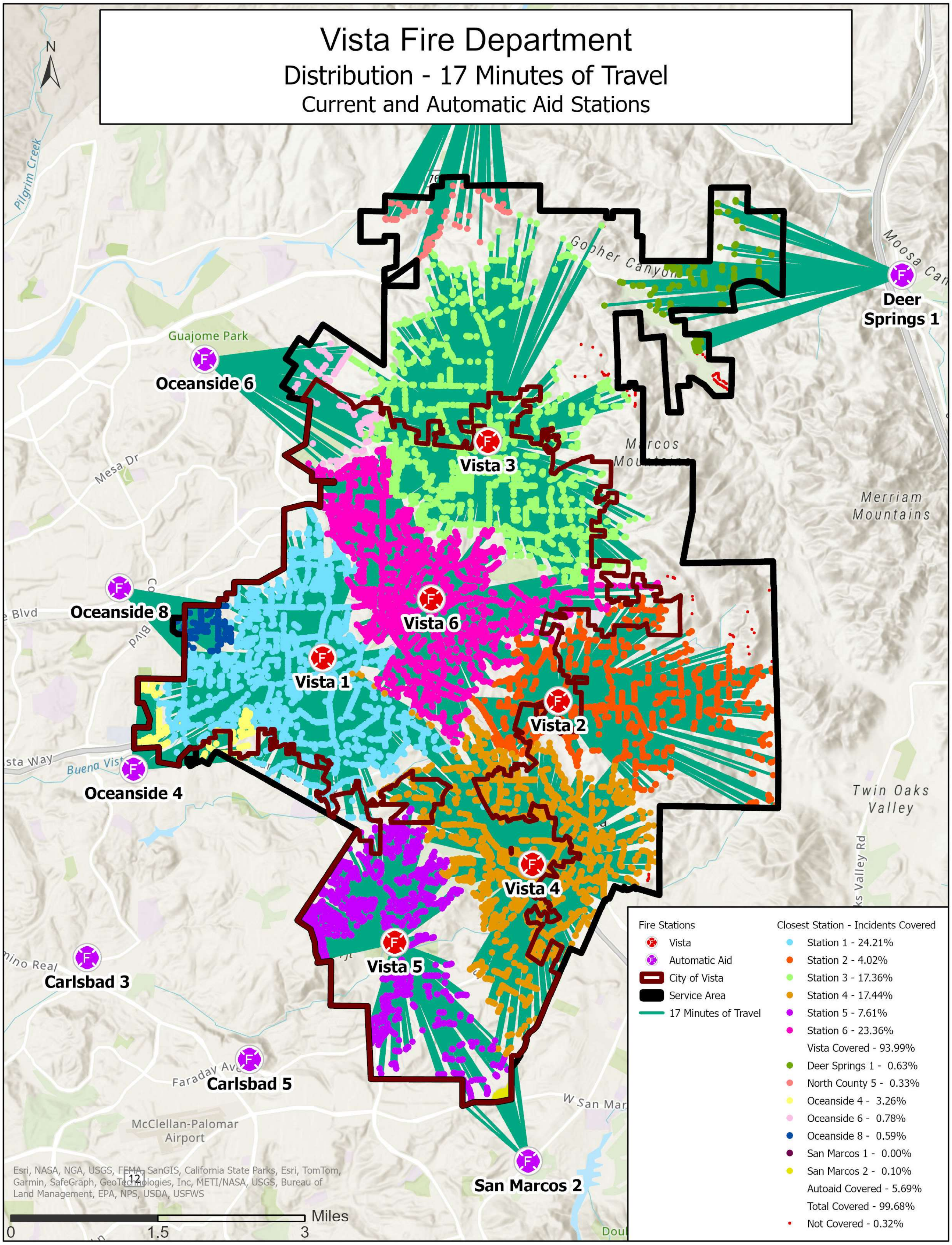


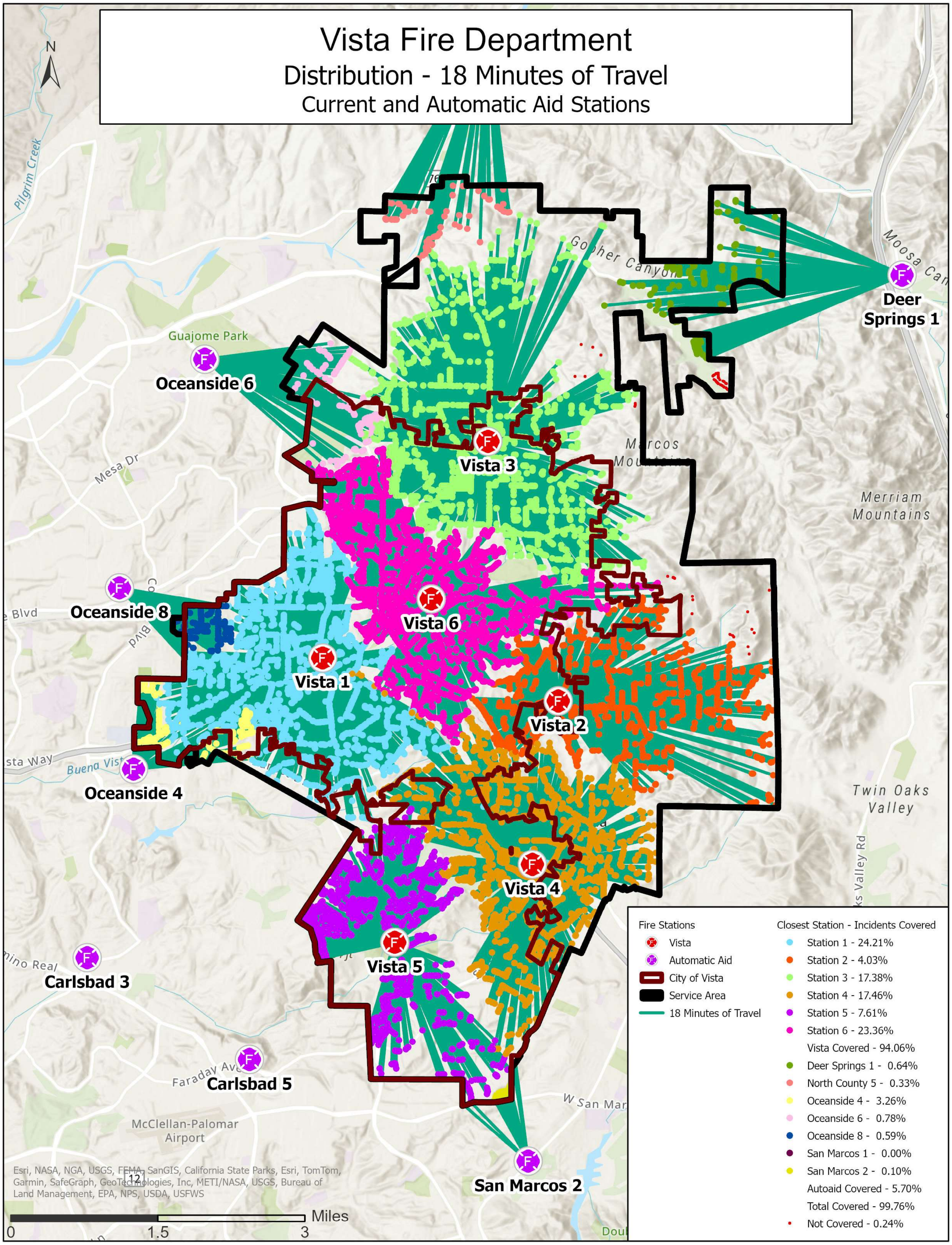
Vista Fire Department
Distribution - 14 Minutes of Travel
Current and Automatic Aid Stations
N
Deer Springs 1
Oceanside 6
Vista 3
Vista 6
Oceanside 8
Vista 1
Vista 2
Oceanside 4
Vista 4
Vista 5
Carlsbad 3
Carlsbad 5
San Marcos 2
Guajome Park
Gopher Canyon
Marcos Mountains
Merriam Mountains
Twin Oaks Valley
Mesa Dr
McClellan-Palomar Airport
Faraday Ave
W San Mar
Fire Stations
Vista
Automatic Aid
City of Vista
Service Area
14 Minutes of Travel
Closest Station - Incidents Covered
Station 1 - 24.20%
Station 2 - 3.90%
Station 3 - 17.28%
Station 4 - 17.39%
Station 5 - 7.61%
Station 6 - 23.35%
Vista Covered - 93.72%
Deer Springs 1 - 0.50%
North County 5 - 0.33%
Oceanside 4 - 3.26%
Oceanside 6 - 0.78%
Oceanside 8 - 0.59%
San Marcos 1 - 0.00%
San Marcos 2 - 0.10%
Autoaid Covered - 5.56%
Total Covered - 99.28%
Not Covered - 0.72%
Esri, NASA, NGA, USGS, FEMA, SanGIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS
0 1.5 3 Miles


Vista Fire Department
Distribution - 15 Minutes of Travel
Current and Automatic Aid Stations
N
Vista 1
Vista 2
Vista 3
Vista 4
Vista 5
Vista 6
Deer Springs 1
Oceanside 4
Oceanside 6
Oceanside 8
Carlsbad 3
Carlsbad 5
San Marcos 2
Guajome Park
McClellan-Palomar Airport
Marcos Mountains
Merriam Mountains
Twin Oaks Valley
Gopher Canyon
Mesa Dr
Faraday Ave
Pilgrim Creek
Fire Stations
Vista
Automatic Aid
City of Vista
Service Area
15 Minutes of Travel
Closest Station - Incidents Covered
Station 1 - 24.21%
Station 2 - 3.95%
Station 3 - 17.30%
Station 4 - 17.39%
Station 5 - 7.61%
Station 6 - 23.36%
Vista Covered - 93.82%
Deer Springs 1 - 0.53%
North County 5 - 0.33%
Oceanside 4 - 3.26%
Oceanside 6 - 0.78%
Oceanside 8 - 0.59%
San Marcos 1 - 0.00%
San Marcos 2 - 0.10%
Autoaid Covered - 5.59%
Total Covered - 99.41%
Not Covered - 0.59%
Esri, NASA, NGA, USGS, FEMA, SanGIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS
0
1.5
3
Miles

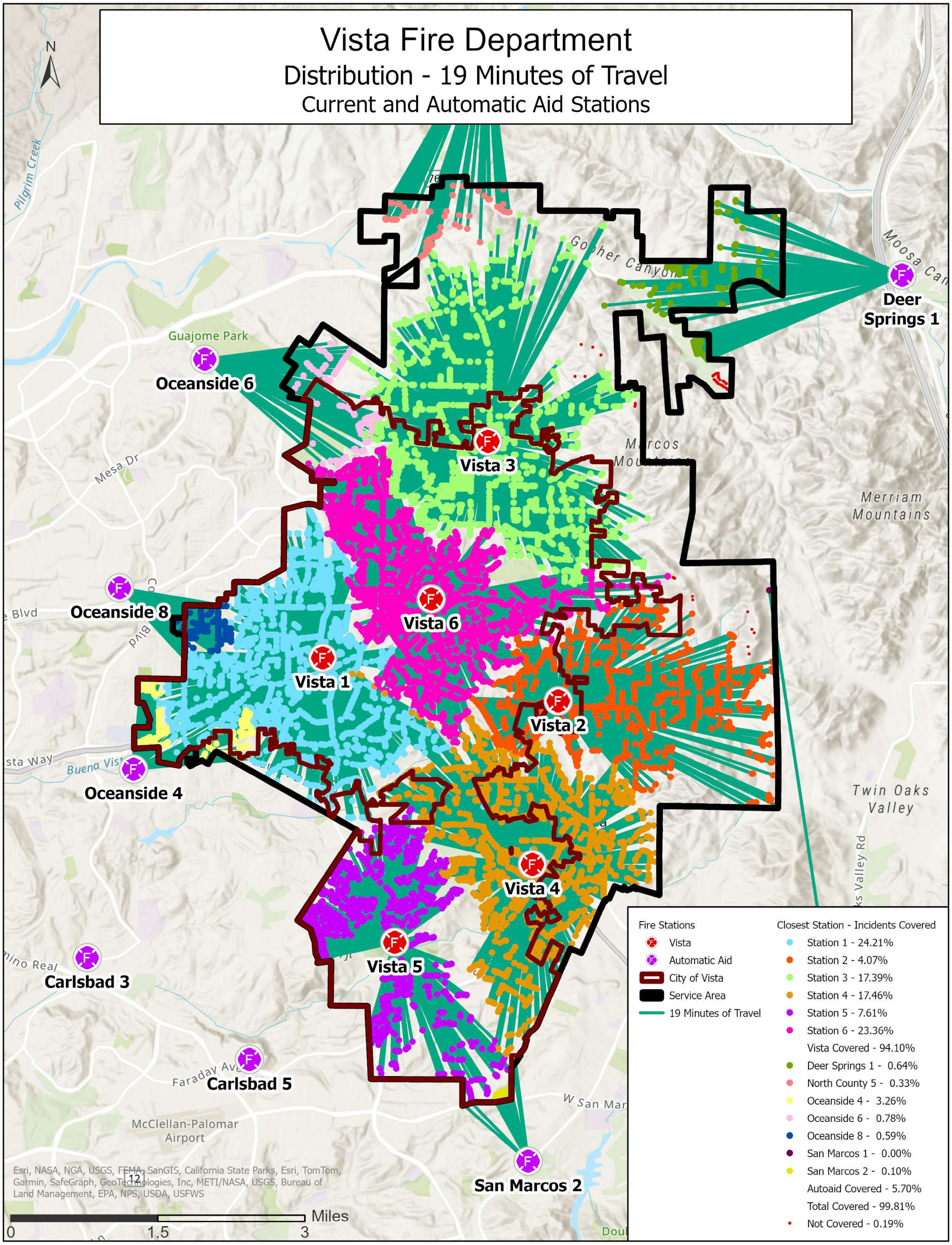


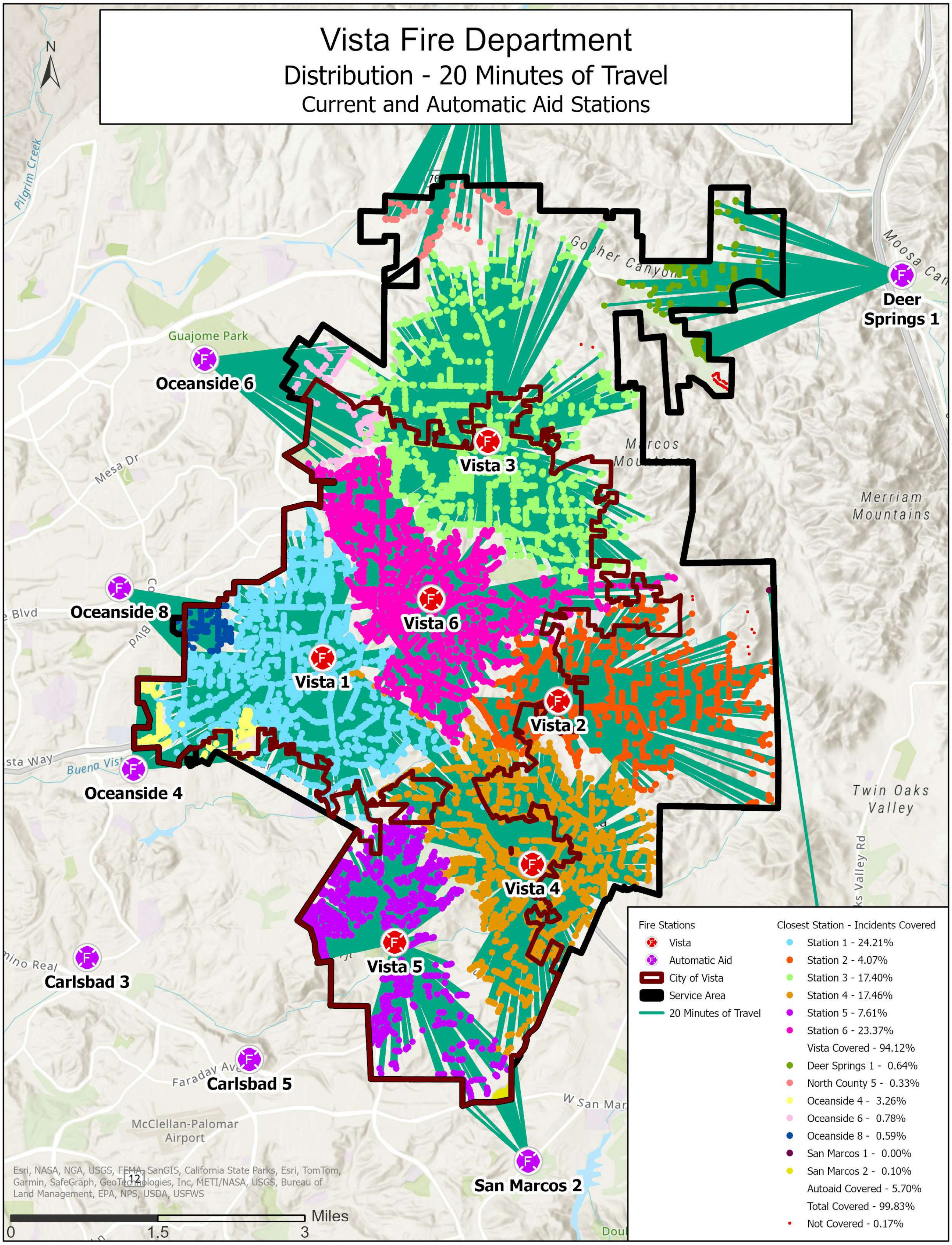
Vista Fire Department
Distribution - 16 Minutes of Travel
Current and Automatic Aid Stations
N
Deer Springs 1
Oceanside 6
Oceanside 8
Oceanside 4
Carlsbad 3
Carlsbad 5
San Marcos 2
Vista 1
Vista 2
Vista 3
Vista 4
Vista 5
Vista 6
Guajome Park
Merriam Mountains
Twin Oaks Valley
McClellan-Palomar Airport
Fire Stations
Vista
Automatic Aid
City of Vista
Service Area
16 Minutes of Travel
Closest Station - Incidents Covered
Station 1 - 24.21%
Station 2 - 4.00%
Station 3 - 17.32%
Station 4 - 17.43%
Station 5 - 7.61%
Station 6 - 23.36%
Vista Covered - 93.94%
Deer Springs 1 - 0.56%
North County 5 - 0.33%
Oceanside 4 - 3.26%
Oceanside 6 - 0.78%
Oceanside 8 - 0.59%
San Marcos 1 - 0.00%
San Marcos 2 - 0.10%
Autoaid Covered - 5.62%
Total Covered - 99.55%
Not Covered - 0.45%
Esri, NASA, NGA, USGS, FEMA, SanGIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS
0 1.5 3 Miles


Vista Fire Department
Distribution - 17 Minutes of Travel
Current and Automatic Aid Stations
N
Deer Springs 1
Oceanside 6
Guajome Park
Vista 3
Oceanside 8
Vista 6
Vista 1
Vista 2
Oceanside 4
Vista 4
Vista 5
Carlsbad 3
Carlsbad 5
San Marcos 2
McClellan-Palomar Airport
Merriam Mountains
Twin Oaks Valley
Gopher Canyon
Fire Stations
Vista
Automatic Aid
City of Vista
Service Area
17 Minutes of Travel
Closest Station - Incidents Covered
Station 1 - 24.21%
Station 2 - 4.02%
Station 3 - 17.36%
Station 4 - 17.44%
Station 5 - 7.61%
Station 6 - 23.36%
Vista Covered - 93.99%
Deer Springs 1 - 0.63%
North County 5 - 0.33%
Oceanside 4 - 3.26%
Oceanside 6 - 0.78%
Oceanside 8 - 0.59%
San Marcos 1 - 0.00%
San Marcos 2 - 0.10%
Autoaid Covered - 5.69%
Total Covered - 99.68%
Not Covered - 0.32%
Esri, NASA, NGA, USGS, FEMA, SanGIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS
0 1.5 3 Miles



Vista Fire Department
Distribution - 18 Minutes of Travel
Current and Automatic Aid Stations
N
Deer Springs 1
Oceanside 6
Vista 3
Oceanside 8
Vista 6
Vista 1
Vista 2
Oceanside 4
Vista 4
Vista 5
Carlsbad 3
Carlsbad 5
San Marcos 2
Guajome Park
Marcos Mountains
Merriam Mountains
Twin Oaks Valley
McClellan-Palomar Airport
Fire Stations
Vista
Automatic Aid
City of Vista
Service Area
18 Minutes of Travel
Closest Station - Incidents Covered
Station 1 - 24.21%
Station 2 - 4.03%
Station 3 - 17.38%
Station 4 - 17.46%
Station 5 - 7.61%
Station 6 - 23.36%
Vista Covered - 94.06%
Deer Springs 1 - 0.64%
North County 5 - 0.33%
Oceanside 4 - 3.26%
Oceanside 6 - 0.78%
Oceanside 8 - 0.59%
San Marcos 1 - 0.00%
San Marcos 2 - 0.10%
Autoaid Covered - 5.70%
Total Covered - 99.76%
Not Covered - 0.24%
Esri, NASA, NGA, USGS, FEMA, SanGIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS
0 1.5 3 Miles


Vista Fire Department
Distribution - 19 Minutes of Travel
Current and Automatic Aid Stations
N
Deer Springs 1
Oceanside 6
Vista 3
Oceanside 8
Vista 6
Vista 1
Vista 2
Oceanside 4
Vista 4
Vista 5
Carlsbad 3
Carlsbad 5
San Marcos 2
Guajome Park
McClellan-Palomar Airport
Merriam Mountains
Twin Oaks Valley
Fire Stations
Vista
Automatic Aid
City of Vista
Service Area
19 Minutes of Travel
Closest Station - Incidents Covered
Station 1 - 24.21%
Station 2 - 4.07%
Station 3 - 17.39%
Station 4 - 17.46%
Station 5 - 7.61%
Station 6 - 23.36%
Vista Covered - 94.10%
Deer Springs 1 - 0.64%
North County 5 - 0.33%
Oceanside 4 - 3.26%
Oceanside 6 - 0.78%
Oceanside 8 - 0.59%
San Marcos 1 - 0.00%
San Marcos 2 - 0.10%
Autoaid Covered - 5.70%
Total Covered - 99.81%
Not Covered - 0.19%
Esri, NASA, NGA, USGS, FEMA, SanGIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS
0 1.5 3 Miles


Vista Fire Department
Distribution - 20 Minutes of Travel
Current and Automatic Aid Stations
N
Vista 1
Vista 2
Vista 3
Vista 4
Vista 5
Vista 6
Deer Springs 1
Oceanside 4
Oceanside 6
Oceanside 8
Carlsbad 3
Carlsbad 5
San Marcos 2
Guajome Park
Gopher Canyon
Marcos Mountains
Merriam Mountains
Twin Oaks Valley
McClellan-Palomar Airport
Fire Stations
Vista
Automatic Aid
City of Vista
Service Area
20 Minutes of Travel
Closest Station - Incidents Covered
Station 1 - 24.21%
Station 2 - 4.07%
Station 3 - 17.40%
Station 4 - 17.46%
Station 5 - 7.61%
Station 6 - 23.37%
Vista Covered - 94.12%
Deer Springs 1 - 0.64%
North County 5 - 0.33%
Oceanside 4 - 3.26%
Oceanside 6 - 0.78%
Oceanside 8 - 0.59%
San Marcos 1 - 0.00%
San Marcos 2 - 0.10%
Autoaid Covered - 5.70%
Total Covered - 99.83%
Not Covered - 0.17%
Esri, NASA, NGA, USGS, FEMA, SanGIS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS
0
1.5
3
Miles

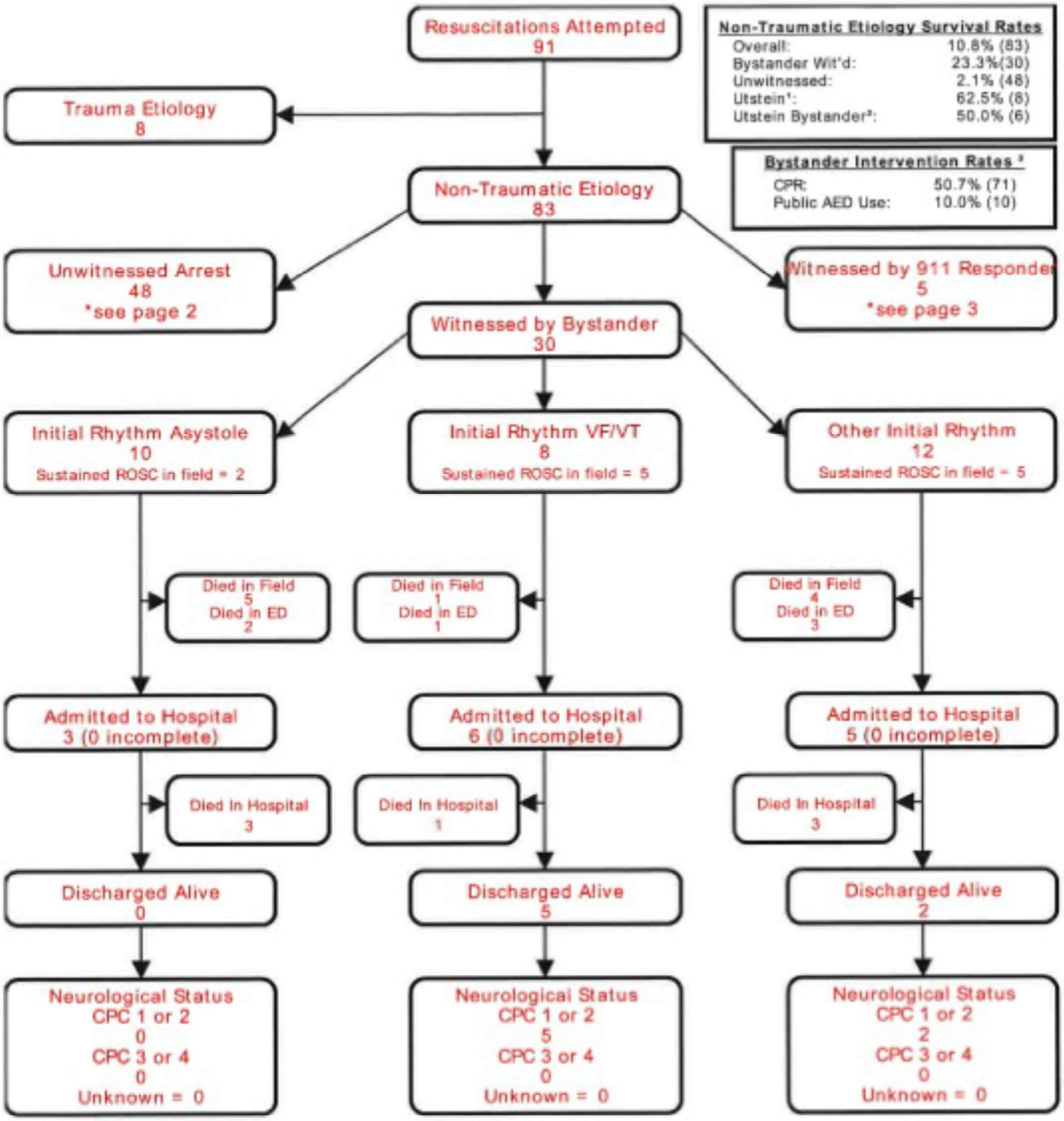
APPENDIX

Utstein Survival Report

Utstein Survival Report

Vista Fire Department

First Responder: Vista Fire | Date of Arrest: From 01/01/2023 Through 12/31/2023



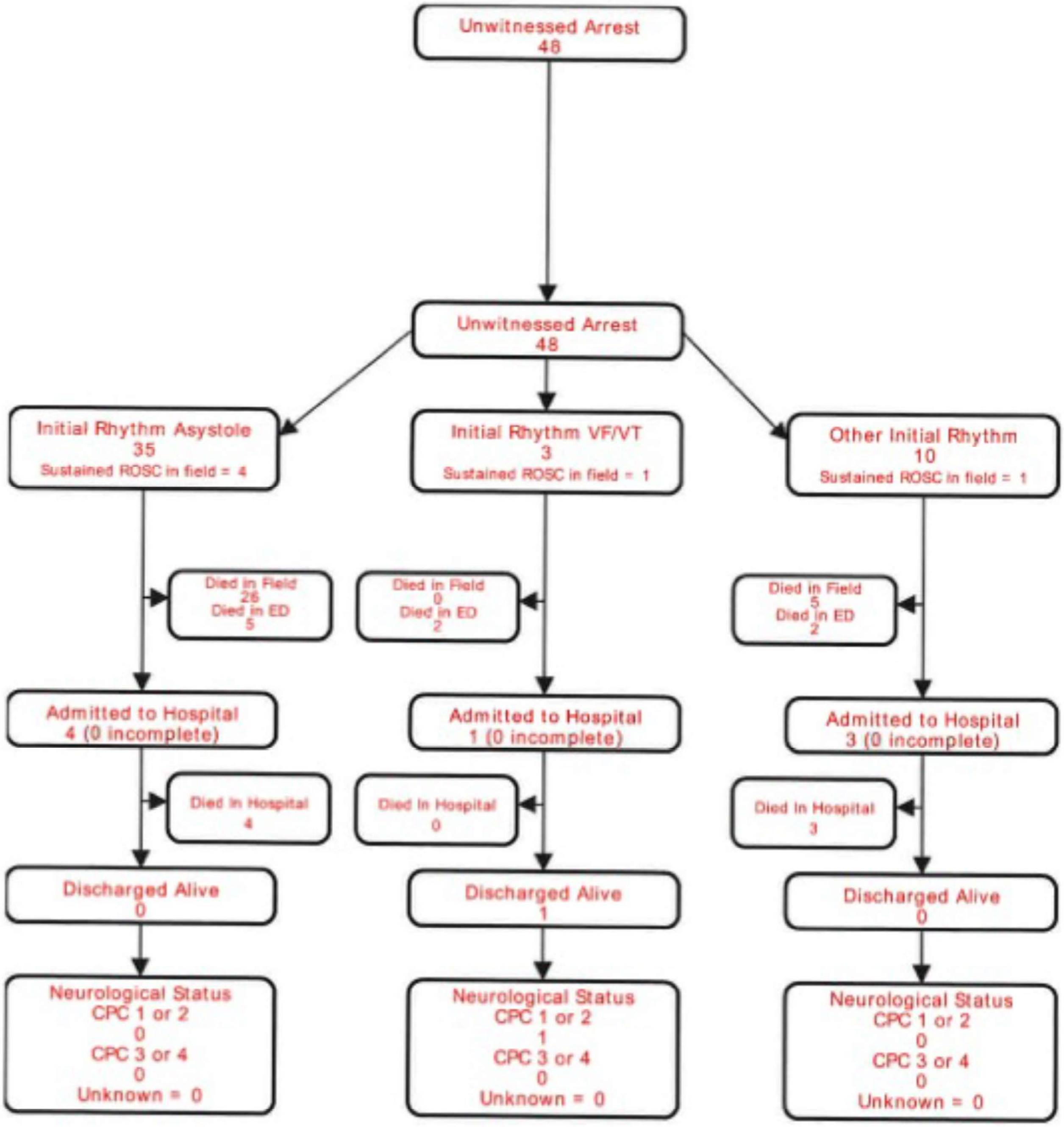
[1]Utstein: Witnessed by bystander and found in shockable rhythm.
[2]Utstein Bystander: Witnessed by bystander, found in shockable rhythm, and received some bystander intervention (CPR and/or AED application).
[3]Bystander CPR rate excludes 911 Responder Witnessed, Nursing Home, and Healthcare Facility arrests. Public AED Use rate excludes 911 Responder Witnessed, Home/Residence, Nursing Home, and Healthcare Facility arrests.

*Only data from the previous calendar year is fully audited. Data from the current calendar year is dynamic.

Utstein Survival Report

Vista Fire Department

First Responder: Vista Fire | Date of Arrest: From 01/01/2023 Through 12/31/2023



APPENDIX

Demographic Summaries

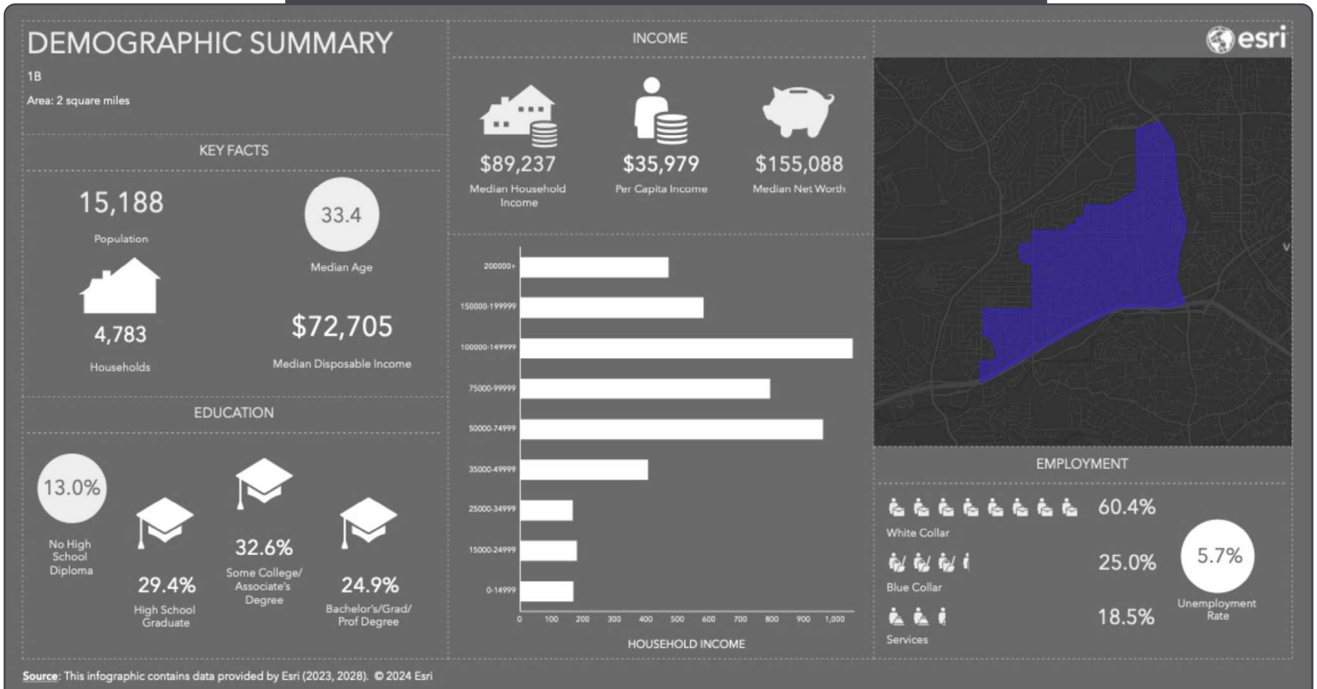
ESRI Demographic Summary of City of Vista Planning Zone 1A

AREA	Area: 1.64 square miles

INCOME BY HOUSEHOLD (HH)	
2023 HH Income <$15,000	83
2023 HH Income $15,000-$24,999	42
2023 HH Income $25,000-$34,999	60
2023 HH Income $35,000-$49,999	136
2023 HH Income $50,000-$74,999	269
2023 HH Income $75,000-$99,999	312
2023 HH Income $100,000-$149,999	403
2023 HH Income $150,000-$199,999	219
2023 HH Income $200,000+	226
MEDIAN INCOME	
2023 Median HH Income	$97,163
2023 Per Capita Income	$41,120
2023 Median Net Worth	$212,114

KEY FACTS	
2023 Total Population	5,456
2023 Median Age	37.0
2023 Total Hhs	1,750
2023 Median Disposable Income	$78,912
EDUCATION	
No High School Diploma	13.3%
High School Graduate	24.3%
Some College/Associate's Degree	32.7%
Bachelor's/Grad/Prof Degree	29.7%
EMPLOYMENT	
White Collar	60.0%
Blue Collar	26.4%
Services	16.7%
2023 Unemployment Rate	2.9%

ESRI Demographic Summary of City of Vista Planning Zone 1B



AREA	Area: 2 square miles

INCOME BY HOUSEHOLD (HH)	
2023 HH Income <$15,000	169
2023 HH Income $15,000-$24,999	180
2023 HH Income $25,000-$34,999	167
2023 HH Income $35,000-$49,999	406
2023 HH Income $50,000-$74,999	961
2023 HH Income $75,000-$99,999	793
2023 HH Income $100,000-$149,999	1,055
2023 HH Income $150,000-$199,999	582
2023 HH Income $200,000+	471

MEDIAN INCOME	
2023 Median HH Income	$89,237
2023 Per Capita Income	$35,979
2023 Median Net Worth	$155,088

KEY FACTS	
2023 Total Population	15,188
2023 Median Age	33.4
2023 Total Hhs	4,783
2023 Median Disposable Income	$72,705

EDUCATION	
No High School Diploma	13.0%
High School Graduate	29.4%
Some College/Associate's Degree	32.6%
Bachelor's/Grad/Prof Degree	24.9%

EMPLOYMENT	
White Collar	60.4%
Blue Collar	25.0%
Services	18.5%
2023 Unemployment Rate	5.7%

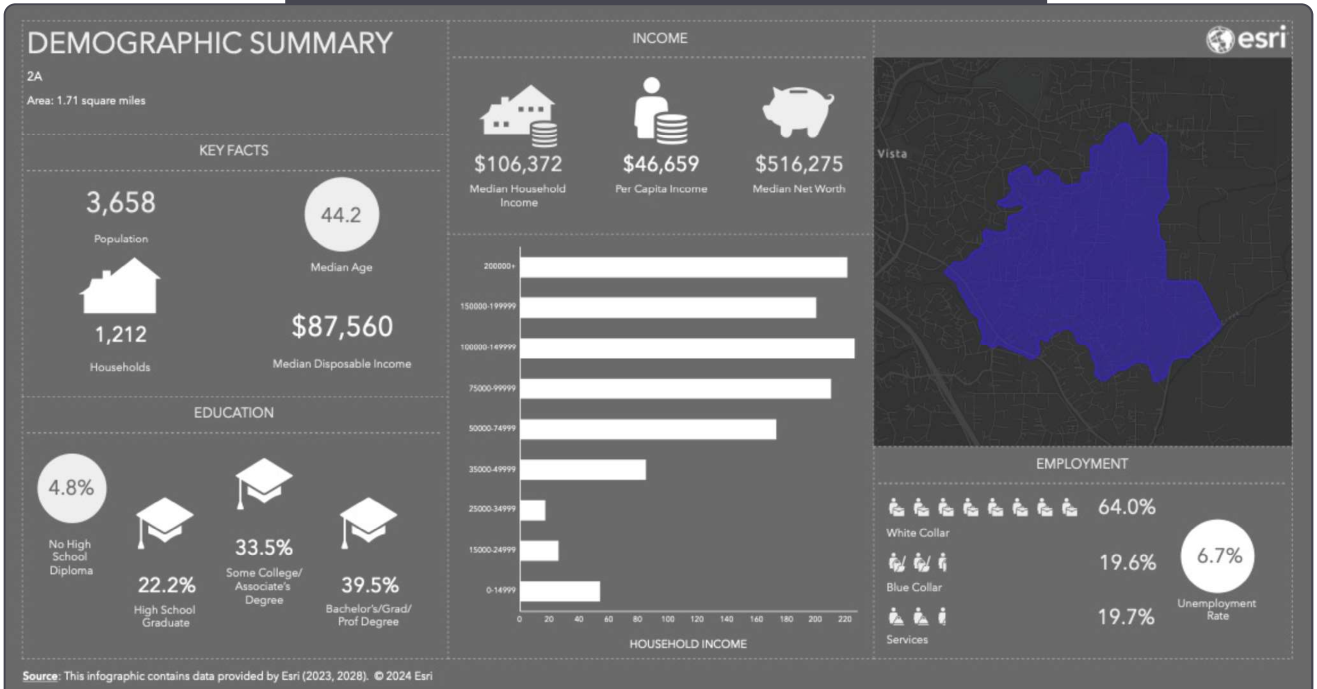
ESRI Demographic Summary of City of Vista Planning Zone 1C

AREA	Area: 1.51 square miles

INCOME BY HOUSEHOLD (HH)	
2023 HH Income <$15,000	131
2023 HH Income $15,000-$24,999	172
2023 HH Income $25,000-$34,999	143
2023 HH Income $35,000-$49,999	274
2023 HH Income $50,000-$74,999	394
2023 HH Income $75,000-$99,999	466
2023 HH Income $100,000-$149,999	629
2023 HH Income $150,000-$199,999	279
2023 HH Income $200,000+	317
MEDIAN INCOME	
2023 Median HH Income	$88,625
2023 Per Capita Income	$43,172
2023 Median Net Worth	$129,931

KEY FACTS	
2023 Total Population	7,543
2023 Median Age	34.8
2023 Total Hhs	2,805
2023 Median Disposable Income	$71,678
EDUCATION	
No High School Diploma	8.7%
High School Graduate	19.5%
Some College/Associate's Degree	39.7%
Bachelor's/Grad/Prof Degree	32.1%
EMPLOYMENT	
White Collar	66.8%
Blue Collar	22.7%
Services	16.2%
2023 Unemployment Rate	5.1%

ESRI Demographic Summary of City of Vista Planning Zone 2A



AREA	Area: 1.71 square miles

INCOME BY HOUSEHOLD (HH)	
2023 HH Income <$15,000	54
2023 HH Income $15,000-$24,999	26
2023 HH Income $25,000-$34,999	17
2023 HH Income $35,000-$49,999	85
2023 HH Income $50,000-$74,999	173
2023 HH Income $75,000-$99,999	210
2023 HH Income $100,000-$149,999	226
2023 HH Income $150,000-$199,999	200
2023 HH Income $200,000+	221
MEDIAN INCOME	
2023 Median HH Income	$106,372
2023 Per Capita Income	$46,659
2023 Median Net Worth	$516,275

KEY FACTS	
2023 Total Population	3,658
2023 Median Age	44.2
2023 Total Hhs	1,212
2023 Median Disposable Income	$87,560
EDUCATION	
No High School Diploma	4.8%
High School Graduate	22.2%
Some College/Associate's Degree	33.5%
Bachelor's/Grad/Prof Degree	39.5%
EMPLOYMENT	
White Collar	64.0%
Blue Collar	19.6%
Services	19.7%
2023 Unemployment Rate	6.7%

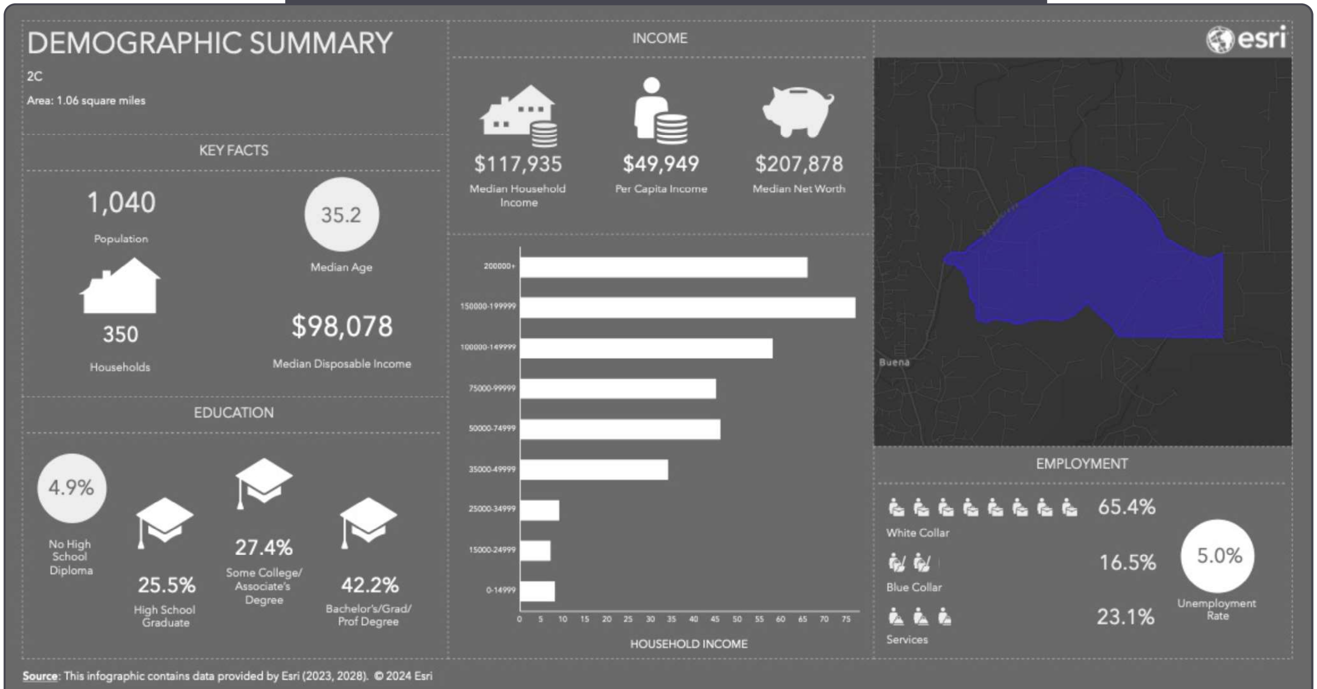
ESRI Demographic Summary of City of Vista Planning Zone 2B

AREA	Area: 2.54 square miles

INCOME BY HOUSEHOLD (HH)	
2023 HH Income <$15,000	45
2023 HH Income $15,000-$24,999	22
2023 HH Income $25,000-$34,999	26
2023 HH Income $35,000-$49,999	70
2023 HH Income $50,000-$74,999	108
2023 HH Income $75,000-$99,999	68
2023 HH Income $100,000-$149,999	151
2023 HH Income $150,000-$199,999	108
2023 HH Income $200,000+	150
MEDIAN INCOME	
2023 Median HH Income	$108,191
2023 Per Capita Income	$47,383
2023 Median Net Worth	$485,300

KEY FACTS	
2023 Total Population	2,324
2023 Median Age	47.7
2023 Total Hhs	746
2023 Median Disposable Income	$88,431
EDUCATION	
No High School Diploma	7.5%
High School Graduate	20.5%
Some College/Associate's Degree	31.2%
Bachelor's/Grad/Prof Degree	40.8%
EMPLOYMENT	
White Collar	68.5%
Blue Collar	15.8%
Services	24.6%
2023 Unemployment Rate	2.0%

ESRI Demographic Summary of City of Vista Planning Zone 2C



AREA	Area: 1.06 square miles

INCOME BY HOUSEHOLD (HH)	
2023 HH Income <$15,000	8
2023 HH Income $15,000-$24,999	7
2023 HH Income $25,000-$34,999	9
2023 HH Income $35,000-$49,999	34
2023 HH Income $50,000-$74,999	46
2023 HH Income $75,000-$99,999	45
2023 HH Income $100,000-$149,999	58
2023 HH Income $150,000-$199,999	77
2023 HH Income $200,000+	66
MEDIAN INCOME	
2023 Median HH Income	$117,935
2023 Per Capita Income	$49,949
2023 Median Net Worth	$207,878

KEY FACTS	
2023 Total Population	1,040
2023 Median Age	35.2
2023 Total Hhs	350
2023 Median Disposable Income	$98,078
EDUCATION	
No High School Diploma	4.9%
High School Graduate	25.5%
Some College/Associate's Degree	27.4%
Bachelor's/Grad/Prof Degree	42.2%
EMPLOYMENT	
White Collar	65.4%
Blue Collar	16.5%
Services	23.1%
2023 Unemployment Rate	5.0%

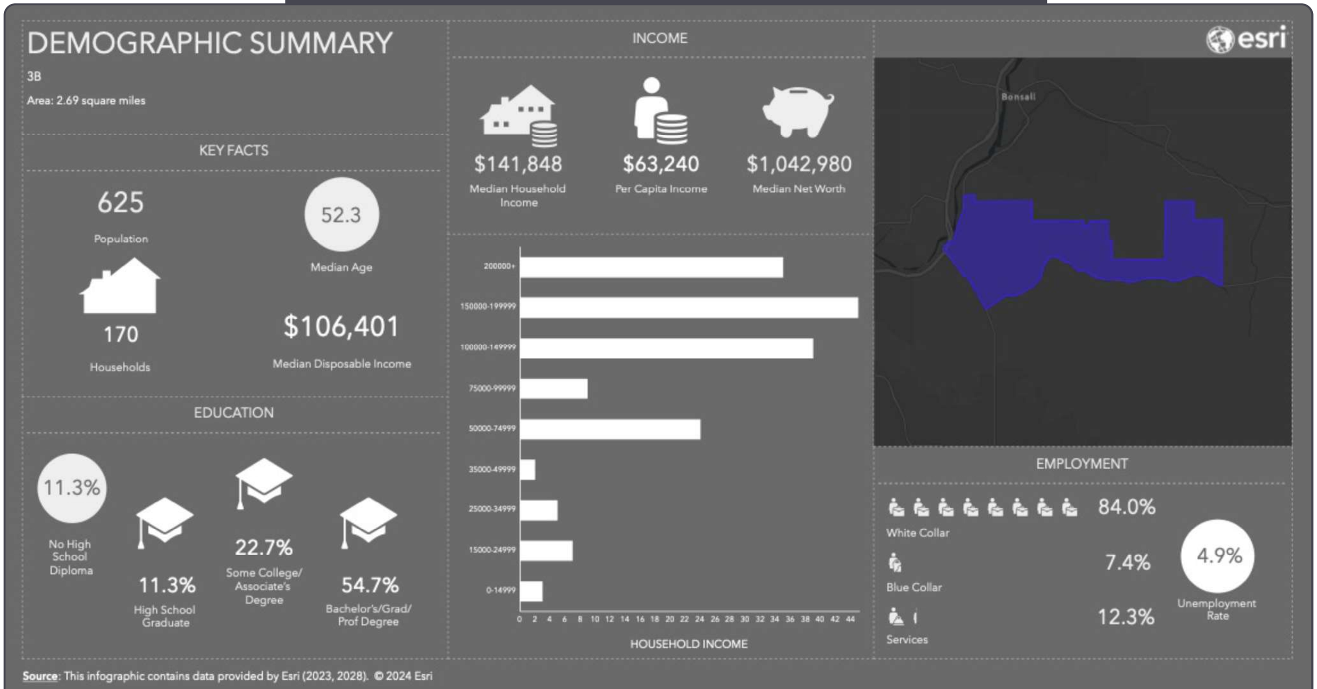
ESRI Demographic Summary of City of Vista Planning Zone 3A

AREA	Area: 4.09 square miles

INCOME BY HOUSEHOLD (HH)	
2023 HH Income <$15,000	246
2023 HH Income $15,000-$24,999	228
2023 HH Income $25,000-$34,999	199
2023 HH Income $35,000-$49,999	354
2023 HH Income $50,000-$74,999	455
2023 HH Income $75,000-$99,999	402
2023 HH Income $100,000-$149,999	726
2023 HH Income $150,000-$199,999	465
2023 HH Income $200,000+	297
MEDIAN INCOME	
2023 Median HH Income	$86,047
2023 Per Capita Income	$35,422
2023 Median Net Worth	$168,283

KEY FACTS	
2023 Total Population	10,820
2023 Median Age	39.8
2023 Total Hhs	3,371
2023 Median Disposable Income	$69,791
EDUCATION	
No High School Diploma	14.0%
High School Graduate	33.4%
Some College/Associate’s Degree	27.1%
Bachelor’s/Grad/Prof Degree	25.5%
EMPLOYMENT	
White Collar	58.5%
Blue Collar	25.6%
Services	21.8%
2023 Unemployment Rate	3.6%

ESRI Demographic Summary of City of Vista Planning Zone 3B



AREA	Area: 2.69 square miles

INCOME BY HOUSEHOLD (HH)	
2023 HH Income <$15,000	3
2023 HH Income $15,000-$24,999	7
2023 HH Income $25,000-$34,999	5
2023 HH Income $35,000-$49,999	2
2023 HH Income $50,000-$74,999	24
2023 HH Income $75,000-$99,999	9
2023 HH Income $100,000-$149,999	39
2023 HH Income $150,000-$199,999	45
2023 HH Income $200,000+	35

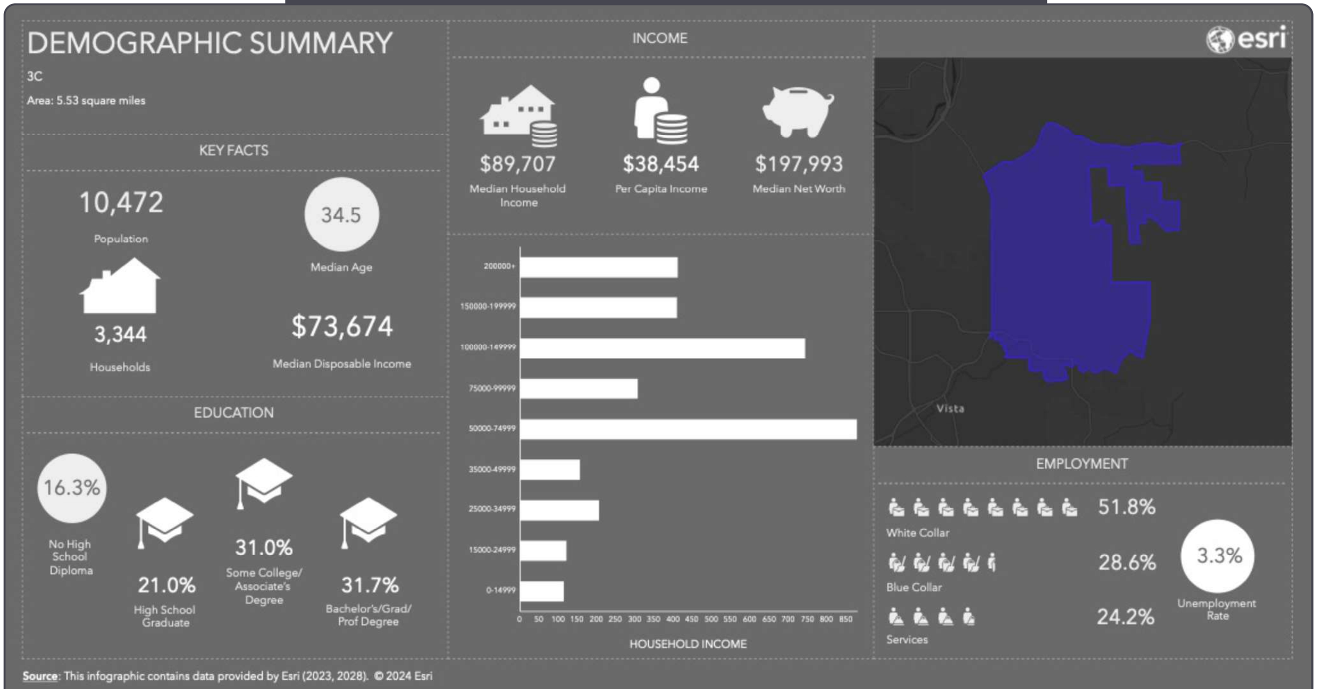
MEDIAN INCOME	
2023 Median HH Income	$141,848
2023 Per Capita Income	$63,240
2023 Median Net Worth	$1,042,980

KEY FACTS	
2023 Total Population	625
2023 Median Age	52.3
2023 Total Hhs	170
2023 Median Disposable Income	$106,401

EDUCATION	
No High School Diploma	11.3%
High School Graduate	11.3%
Some College/Associate's Degree	22.7%
Bachelor's/Grad/Prof Degree	54.7%

EMPLOYMENT	
White Collar	84.0%
Blue Collar	7.4%
Services	12.3%
2023 Unemployment Rate	4.9%

ESRI Demographic Summary of City of Vista Planning Zone 3C

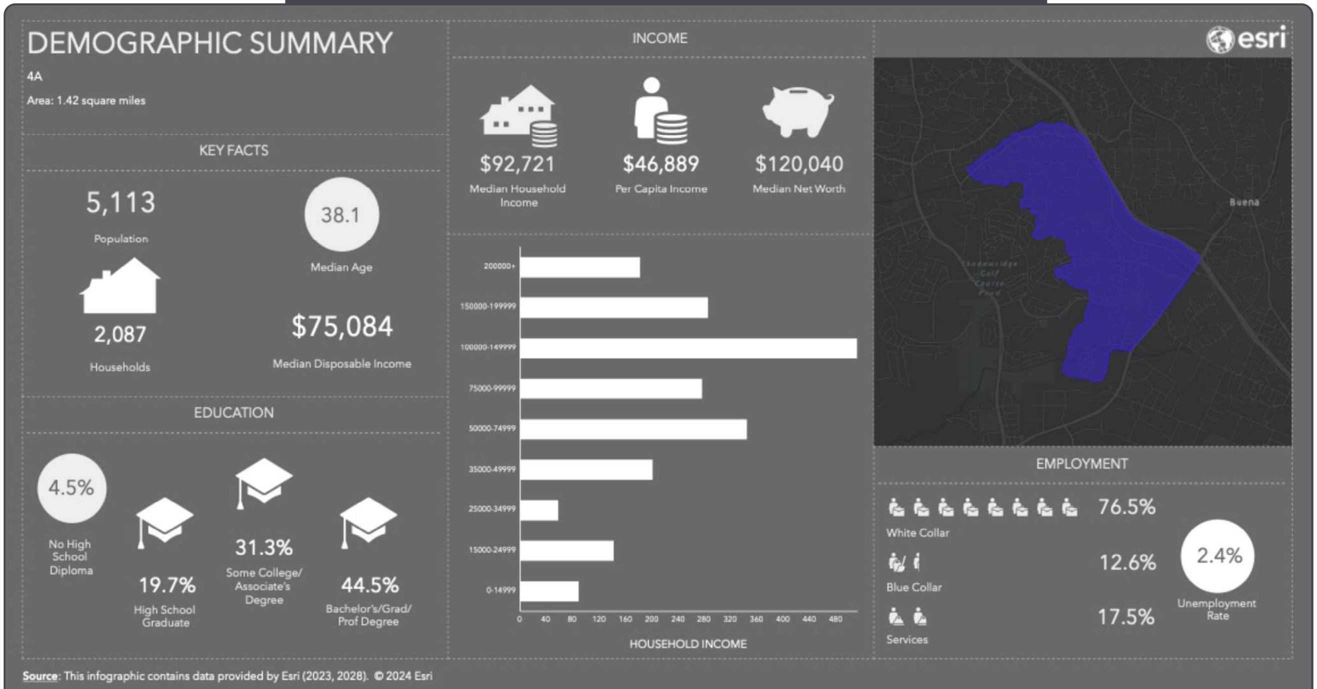


AREA	Area: 5.53 square miles

INCOME BY HOUSEHOLD (HH)	
2023 HH Income <$15,000	114
2023 HH Income $15,000-$24,999	121
2023 HH Income $25,000-$34,999	206
2023 HH Income $35,000-$49,999	156
2023 HH Income $50,000-$74,999	878
2023 HH Income $75,000-$99,999	307
2023 HH Income $100,000-$149,999	743
2023 HH Income $150,000-$199,999	409
2023 HH Income $200,000+	411
MEDIAN INCOME	
2023 Median HH Income	$89,707
2023 Per Capita Income	$38,454
2023 Median Net Worth	$197,993

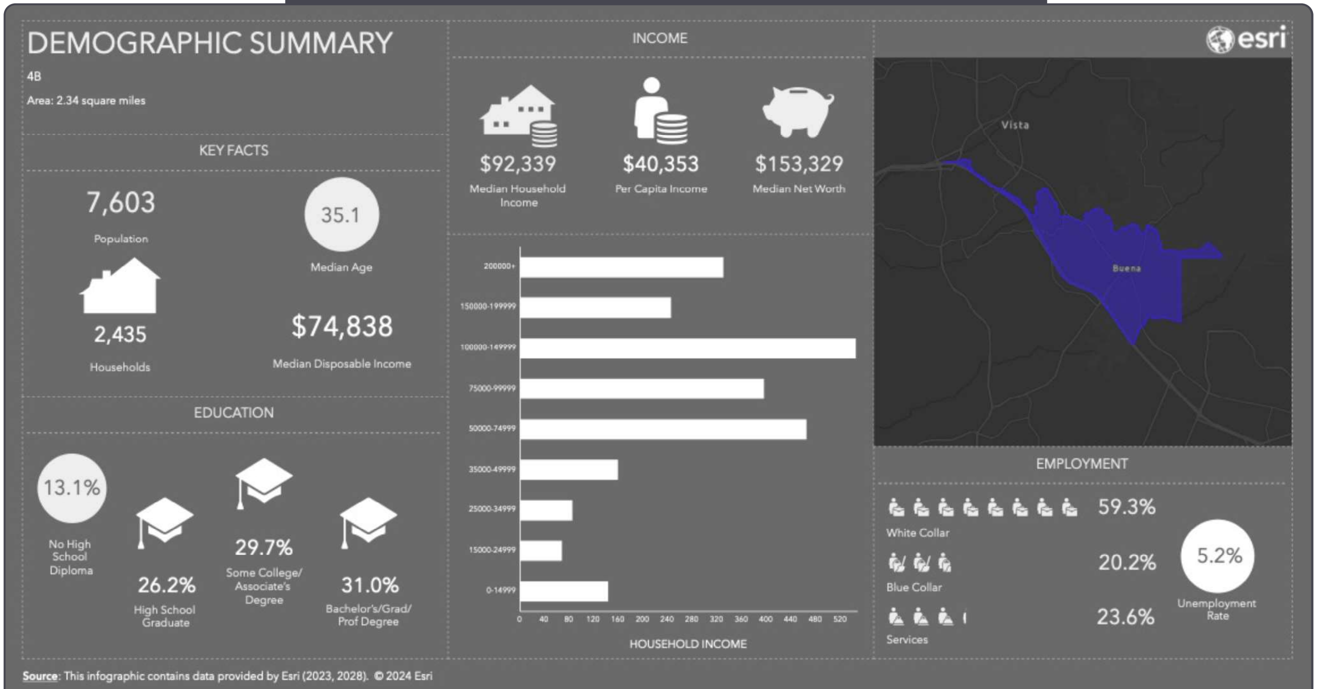
KEY FACTS	
2023 Total Population	10,472
2023 Median Age	34.5
2023 Total Hhs	3,344
2023 Median Disposable Income	$73,674
EDUCATION	
No High School Diploma	16.3%
High School Graduate	21.0%
Some College/Associate's Degree	31.0%
Bachelor's/Grad/Prof Degree	31.7%
EMPLOYMENT	
White Collar	51.8%
Blue Collar	28.6%
Services	24.2%
2023 Unemployment Rate	3.3%

ESRI Demographic Summary of City of Vista Planning Zone 4A



AREA		Area: 1.42 square miles	
INCOME BY HOUSEHOLD (HH)		**KEY FACTS**	
2023 HH Income <$15,000	89	2023 Total Population	5,113
2023 HH Income $15,000-$24,999	142	2023 Median Age	38.1
2023 HH Income $25,000-$34,999	58	2023 Total Hhs	2,087
2023 HH Income $35,000-$49,999	201	2023 Median Disposable Income	$75,084
2023 HH Income $50,000-$74,999	344	**EDUCATION**	
2023 HH Income $75,000-$99,999	276	No High School Diploma	4.5%
2023 HH Income $100,000-$149,999	511	High School Graduate	19.7%
2023 HH Income $150,000-$199,999	285	Some College/Associate's Degree	31.3%
2023 HH Income $200,000+	182	Bachelor's/Grad/Prof Degree	44.5%
MEDIAN INCOME		**EMPLOYMENT**	
2023 Median HH Income	$92,721	White Collar	76.5%
		Blue Collar	12.6%
2023 Per Capita Income	$46,889	Services	17.5%
2023 Median Net Worth	$120,040	2023 Unemployment Rate	2.4%

ESRI Demographic Summary of City of Vista Planning Zone 4B



AREA	Area: 2.34 square miles

INCOME BY HOUSEHOLD (HH)	
2023 HH Income <$15,000	143
2023 HH Income $15,000-$24,999	68
2023 HH Income $25,000-$34,999	85
2023 HH Income $35,000-$49,999	159
2023 HH Income $50,000-$74,999	465
2023 HH Income $75,000-$99,999	396
2023 HH Income $100,000-$149,999	545
2023 HH Income $150,000-$199,999	245
2023 HH Income $200,000+	330
MEDIAN INCOME	
2023 Median HH Income	$92,339
2023 Per Capita Income	$40,353
2023 Median Net Worth	$153,329

KEY FACTS	
2023 Total Population	7,603
2023 Median Age	35.1
2023 Total Hhs	2,435
2023 Median Disposable Income	$74,838
EDUCATION	
No High School Diploma	13.1%
High School Graduate	26.2%
Some College/Associate's Degree	29.7%
Bachelor's/Grad/Prof Degree	31.0%
EMPLOYMENT	
White Collar	59.3%
Blue Collar	20.2%
Services	23.6%
2023 Unemployment Rate	5.2%

ESRI Demographic Summary of City of Vista Planning Zone 4C

AREA	Area: 1.23 square miles

INCOME BY HOUSEHOLD (HH)	
2023 HH Income <$15,000	58
2023 HH Income $15,000-$24,999	37
2023 HH Income $25,000-$34,999	71
2023 HH Income $35,000-$49,999	154
2023 HH Income $50,000-$74,999	224
2023 HH Income $75,000-$99,999	121
2023 HH Income $100,000-$149,999	142
2023 HH Income $150,000-$199,999	44
2023 HH Income $200,000+	80
MEDIAN INCOME	
2023 Median HH Income	$63,657
2023 Per Capita Income	$34,624
2023 Median Net Worth	$99,079

KEY FACTS	
2023 Total Population	2,566
2023 Median Age	36.5
2023 Total Hhs	931
2023 Median Disposable Income	$54,121
EDUCATION	
No High School Diploma	16.8%
High School Graduate	33.7%
Some College/Associate's Degree	23.6%
Bachelor's/Grad/Prof Degree	26.0%
EMPLOYMENT	
White Collar	44.5%
Blue Collar	26.3%
Services	32.3%
2023 Unemployment Rate	8.6%

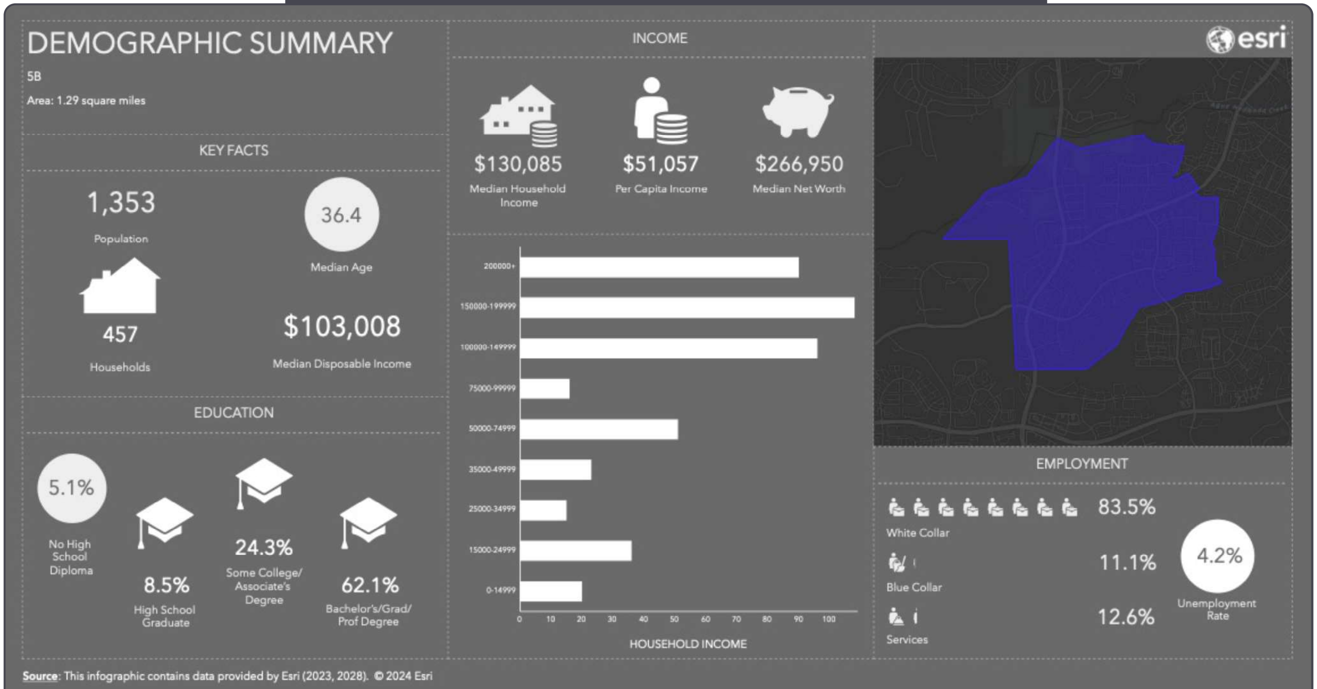
ESRI Demographic Summary of City of Vista Planning Zone 5A

AREA	Area: 1.88 square miles

INCOME BY HOUSEHOLD (HH)	
2023 HH Income <$15,000	180
2023 HH Income $15,000-$24,999	245
2023 HH Income $25,000-$34,999	154
2023 HH Income $35,000-$49,999	350
2023 HH Income $50,000-$74,999	426
2023 HH Income $75,000-$99,999	429
2023 HH Income $100,000-$149,999	814
2023 HH Income $150,000-$199,999	756
2023 HH Income $200,000+	548
MEDIAN INCOME	
2023 Median HH Income	$107,107
2023 Per Capita Income	$51,209
2023 Median Net Worth	$196,545

KEY FACTS	
2023 Total Population	9,934
2023 Median Age	40.0
2023 Total Hhs	3,901
2023 Median Disposable Income	$86,666
EDUCATION	
No High School Diploma	5.6%
High School Graduate	16.6%
Some College/Associate's Degree	34.6%
Bachelor's/Grad/Prof Degree	43.2%
EMPLOYMENT	
White Collar	75.6%
Blue Collar	11.6%
Services	14.8%
2023 Unemployment Rate	4.3%

ESRI Demographic Summary of City of Vista Planning Zone 5B



AREA	Area: 1.29 square miles

INCOME BY HOUSEHOLD (HH)	
2023 HH Income <$15,000	20
2023 HH Income $15,000-$24,999	36
2023 HH Income $25,000-$34,999	15
2023 HH Income $35,000-$49,999	23
2023 HH Income $50,000-$74,999	51
2023 HH Income $75,000-$99,999	16
2023 HH Income $100,000-$149,999	96
2023 HH Income $150,000-$199,999	108
2023 HH Income $200,000+	90

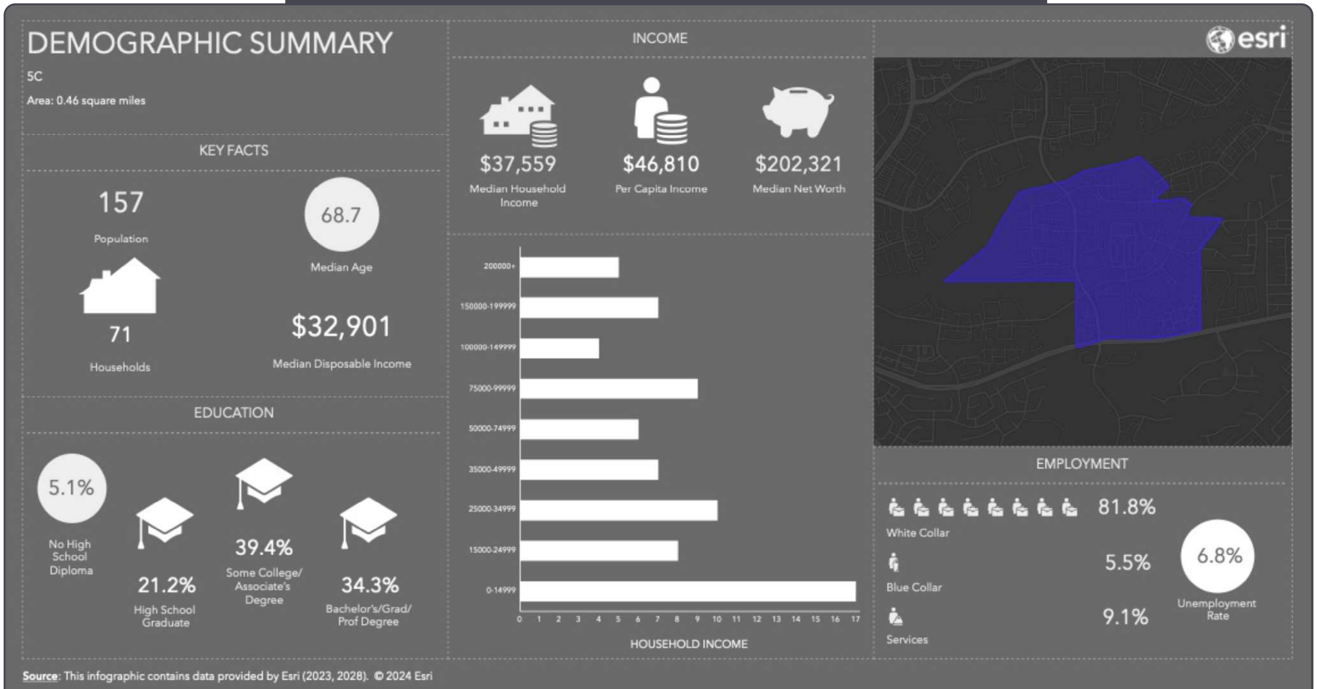
MEDIAN INCOME	
2023 Median HH Income	$130,085
2023 Per Capita Income	$51,057
2023 Median Net Worth	$266,950

KEY FACTS	
2023 Total Population	1,353
2023 Median Age	36.4
2023 Total Hhs	457
2023 Median Disposable Income	$103,008

EDUCATION	
No High School Diploma	5.1%
High School Graduate	8.5%
Some College/Associate's Degree	24.3%
Bachelor's/Grad/Prof Degree	62.1%

EMPLOYMENT	
White Collar	83.5%
Blue Collar	11.1%
Services	12.6%
2023 Unemployment Rate	4.2%

ESRI Demographic Summary of City of Vista Planning Zone 5C

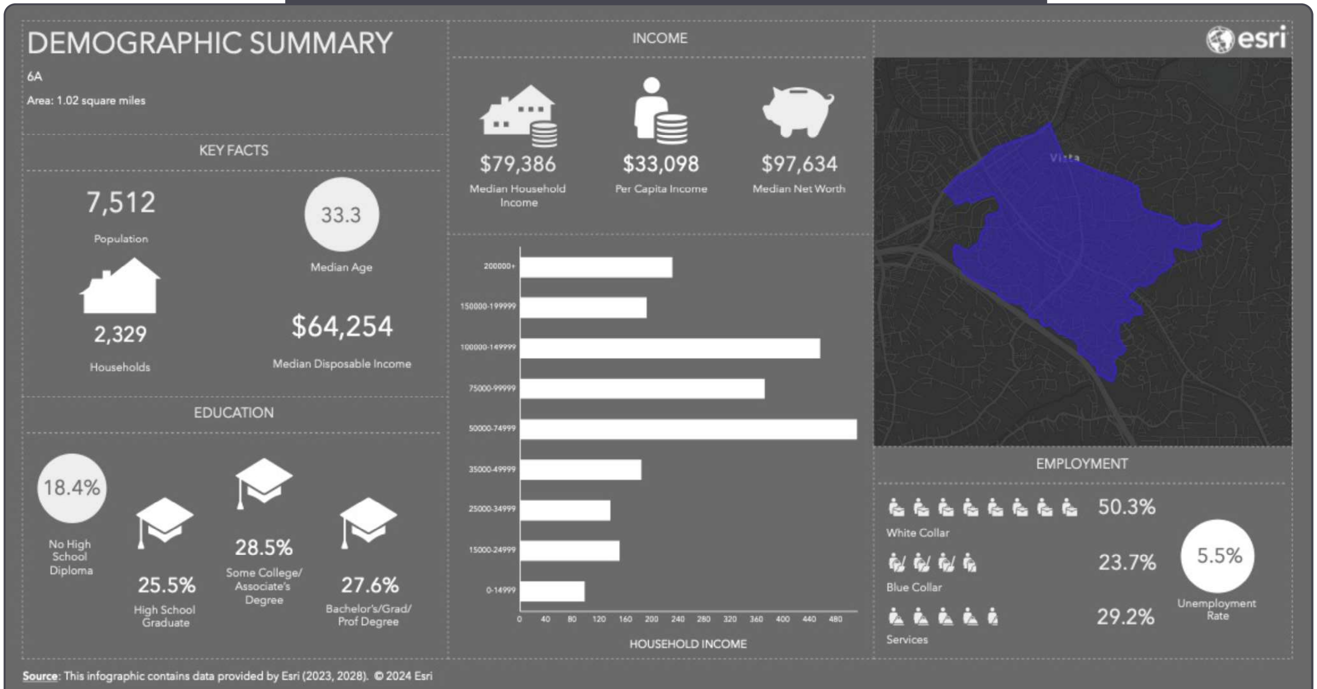


AREA	Area: 0.46 square miles

INCOME BY HOUSEHOLD (HH)	
2023 HH Income <$15,000	17
2023 HH Income $15,000-$24,999	8
2023 HH Income $25,000-$34,999	10
2023 HH Income $35,000-$49,999	7
2023 HH Income $50,000-$74,999	6
2023 HH Income $75,000-$99,999	9
2023 HH Income $100,000-$149,999	4
2023 HH Income $150,000-$199,999	7
2023 HH Income $200,000+	5
MEDIAN INCOME	
2023 Median HH Income	$37,559
2023 Per Capita Income	$46,810
2023 Median Net Worth	$202,321

KEY FACTS	
2023 Total Population	157
2023 Median Age	68.7
2023 Total Hhs	71
2023 Median Disposable Income	$32,901
EDUCATION	
No High School Diploma	5.1%
High School Graduate	21.2%
Some College/Associate's Degree	39.4%
Bachelor's/Grad/Prof Degree	34.3%
EMPLOYMENT	
White Collar	81.8%
Blue Collar	5.5%
Services	9.1%
2023 Unemployment Rate	6.8%

ESRI Demographic Summary of City of Vista Planning Zone 6A



AREA	Area: 1.02 square miles

INCOME BY HOUSEHOLD (HH)	
2023 HH Income <$15,000	98
2023 HH Income $15,000-$24,999	151
2023 HH Income $25,000-$34,999	137
2023 HH Income $35,000-$49,999	184
2023 HH Income $50,000-$74,999	511
2023 HH Income $75,000-$99,999	371
2023 HH Income $100,000-$149,999	455
2023 HH Income $150,000-$199,999	192
2023 HH Income $200,000+	231
MEDIAN INCOME	
2023 Median HH Income	$79,386
2023 Per Capita Income	$33,098
2023 Median Net Worth	$97,634

KEY FACTS	
2023 Total Population	7,512
2023 Median Age	33.3
2023 Total Hhs	2,329
2023 Median Disposable Income	$64,254
EDUCATION	
No High School Diploma	18.4%
High School Graduate	25.5%
Some College/Associate's Degree	28.5%
Bachelor's/Grad/Prof Degree	27.6%
EMPLOYMENT	
White Collar	50.3%
Blue Collar	23.7%
Services	29.2%
2023 Unemployment Rate	5.5%

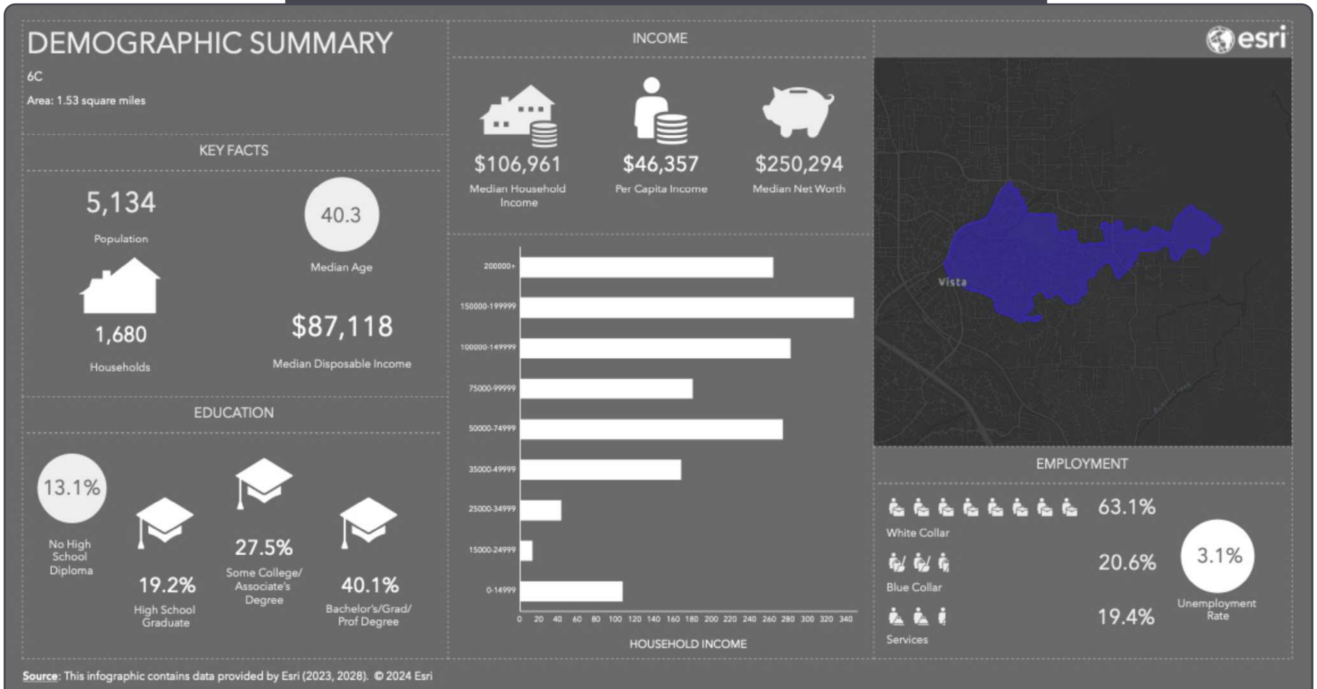
ESRI Demographic Summary of City of Vista Planning Zone 6B

AREA	
Area: 1.63 square miles	

INCOME BY HOUSEHOLD (HH)	
2023 HH Income <$15,000	446
2023 HH Income $15,000-$24,999	412
2023 HH Income $25,000-$34,999	492
2023 HH Income $35,000-$49,999	645
2023 HH Income $50,000-$74,999	1,296
2023 HH Income $75,000-$99,999	749
2023 HH Income $100,000-$149,999	1,182
2023 HH Income $150,000-$199,999	482
2023 HH Income $200,000+	441
MEDIAN INCOME	
2023 Median HH Income	$69,241
2023 Per Capita Income	$24,744
2023 Median Net Worth	$49,323

KEY FACTS	
2023 Total Population	23,652
2023 Median Age	28.9
2023 Total Hhs	6,146
2023 Median Disposable Income	$58,018
EDUCATION	
No High School Diploma	33.9%
High School Graduate	31.1%
Some College/Associate’s Degree	22.8%
Bachelor’s/Grad/Prof Degree	12.1%
EMPLOYMENT	
White Collar	38.4%
Blue Collar	39.1%
Services	27.1%
2023 Unemployment Rate	4.4%

ESRI Demographic Summary of City of Vista Planning Zone 6C

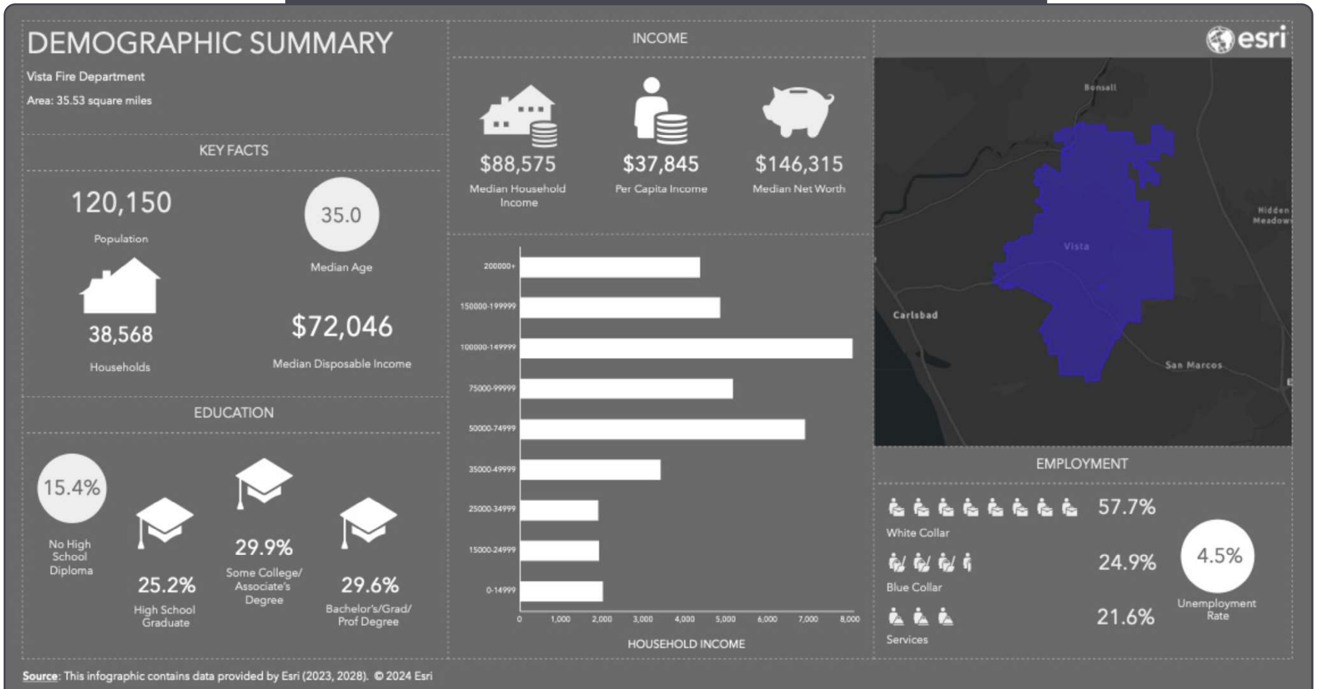


AREA	Area: 1.53 square miles

INCOME BY HOUSEHOLD (HH)	
2023 HH Income <$15,000	107
2023 HH Income $15,000-$24,999	13
2023 HH Income $25,000-$34,999	43
2023 HH Income $35,000-$49,999	168
2023 HH Income $50,000-$74,999	274
2023 HH Income $75,000-$99,999	180
2023 HH Income $100,000-$149,999	282
2023 HH Income $150,000-$199,999	348
2023 HH Income $200,000+	264
MEDIAN INCOME	
2023 Median HH Income	$106,961
2023 Per Capita Income	$46,357
2023 Median Net Worth	$250,294

KEY FACTS	
2023 Total Population	5,134
2023 Median Age	40.3
2023 Total Hhs	1,680
2023 Median Disposable Income	$87,118
EDUCATION	
No High School Diploma	13.1%
High School Graduate	19.2%
Some College/Associate's Degree	27.5%
Bachelor's/Grad/Prof Degree	40.1%
EMPLOYMENT	
White Collar	63.1%
Blue Collar	20.6%
Services	19.4%
2023 Unemployment Rate	3.1%

ESRI Demographic Summary of City of Vista Fire Department



AREA	Area: 35.53 square miles

INCOME BY HOUSEHOLD (HH)	
2023 HH Income <$15,000	2,009
2023 HH Income $15,000-$24,999	1,916
2023 HH Income $25,000-$34,999	1,897
2023 HH Income $35,000-$49,999	3,408
2023 HH Income $50,000-$74,999	6,907
2023 HH Income $75,000-$99,999	5,160
2023 HH Income $100,000-$149,999	8,059
2023 HH Income $150,000-$199,999	4,849
2023 HH Income $200,000+	4,363

MEDIAN INCOME	
2023 Median HH Income	$88,575
2023 Per Capita Income	$37,845
2023 Median Net Worth	$146,315

KEY FACTS	
2023 Total Population	120,150
2023 Median Age	35.0
2023 Total Hhs	38,568
2023 Median Disposable Income	$72,046

EDUCATION	
No High School Diploma	15.4%
High School Graduate	25.2%
Some College/Associate's Degree	29.9%
Bachelor's/Grad/Prof Degree	29.6%

EMPLOYMENT	
White Collar	57.7%
Blue Collar	24.9%
Services	21.6%
2023 Unemployment Rate	4.5%