Standards of Response Coverage

Sonoma Valley Fire & Rescue Authority

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Acknowledgements

The following individuals are responsible for this final report on the Standards of Response Coverage. The Sonoma Valley Fire & Rescue Authority appreciates their professional efforts and dedication.

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This report was produced as a team effort by the committee as well as Geographic Information Systems experts, REDCOM Regional Dispatch personnel and the leadership of the Sonoma Valley Fire & Rescue Authority

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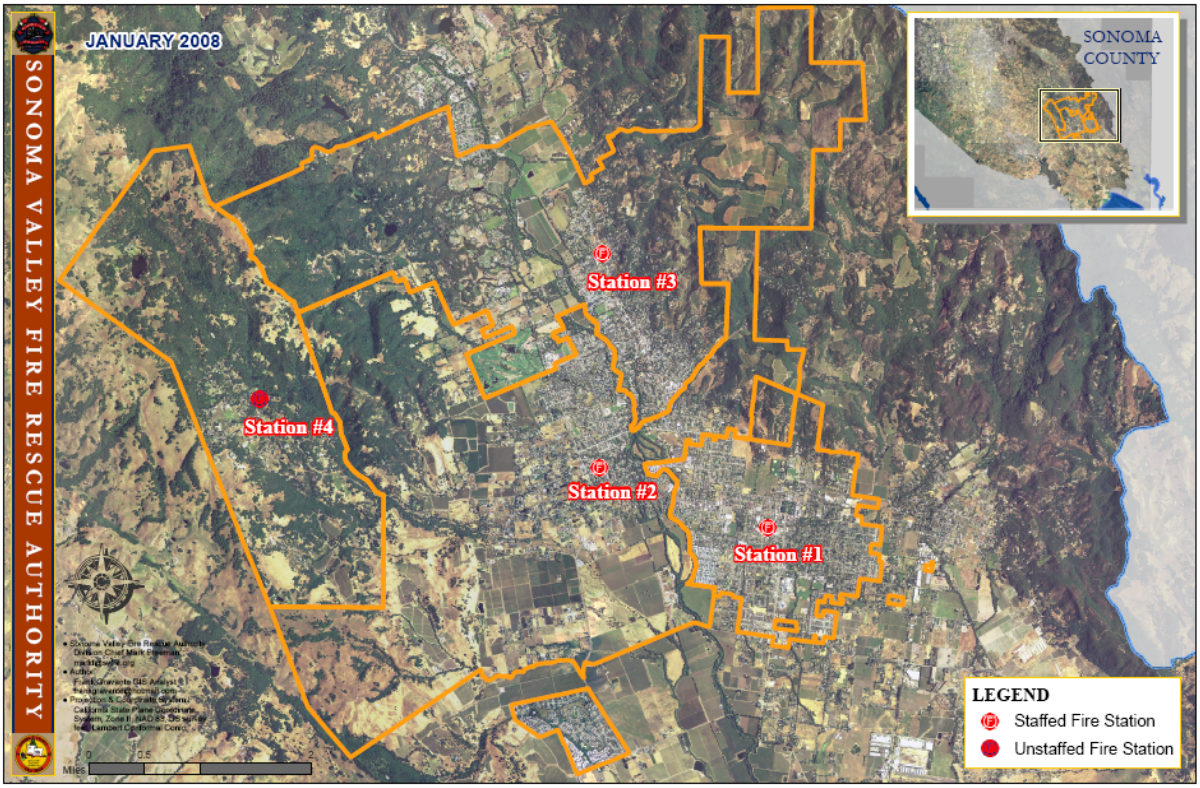
This report is submitted to the elected officials of the Sonoma Valley Fire & Rescue Authority by the Standards of Response Coverage Committee.

May 2008

Sonoma Valley Fire & Rescue Authority



Serving the communities of:

Agua Caliente
Boyes Hot Springs
El Verano
Fetters Hot Springs
Sonoma
&
Temelec/Seven Flags

SVFRA Mission Statement

To enhance the provision
of fire and emergency medical services
throughout the City and the Fire District,
while taking advantage of shared resources
and economies of scale.

Introduction

It is the Sonoma Valley Fire and Rescue Authority's (SVFRA) responsibility to evaluate the risks within the community and to provide adequate staffing and equipment to mitigate those risks. A way to accomplish this is to conduct an accurate self-assessment that provides a description of the department, risks protected, and examines and adopts standards for protecting these risks. The Center for Public Safety Excellence recommends a systems approach known as "Standards of Response Coverage" to evaluate deployment as part of the self-assessment process of a fire agency. This approach uses risk and community expectations on outcomes to assist elected officials in making informed decisions on fire and EMS deployment levels.

A systems approach in developing the Standards of Response Coverage document gives the organization and stakeholders in the community the opportunity to evaluate the risks in the community and define the deployment criteria that is necessary to ensure a safe, all-risk response to all threats. Such a systems approach to deployment, rather than a one-size-fits-all prescriptive formula, allows for local determination of acceptable service delivery.

The Standards of Response Coverage document contains the following key elements:

1. Agency Overview – an environmental scan
2. Risk Assessment - what assets are at risk in the community
3. Performance Expectations – what is needed of a response agency in order to efficiently, effectively and safely mitigate emergency incidents
4. Distribution Study – locating first due resources (typically engines and ambulances)
5. Concentration Study – first alarm assignment or the effective response force
6. Historical Reliability – ability to respond when needed
7. Historical Performance – annual comparison of response compliance
8. Overall Evaluation – standards of response coverage summary and goals

This document gathers all of the aforementioned criteria and presents facts regarding where the SVFRA is today with deployment and response times for the years 2005 through 2007. This report compares this information in relation to nationally recognized standards and is the basis for recommending "Service Level Objectives" and establishing "Distribution and Concentration Benchmarks" for the community.

Fire department deployment, simply stated, is about the ***speed*** and ***weight*** of the response. **Speed** calls for first-due, all-risk intervention units (fire engines and paramedic ambulances) to be strategically located across the community. These units are tasked with controlling the emergency. **Speed** is important in keeping the incident from escalating and requiring a second alarm (greater number of units) that could deplete the department resources. **Weight** is about multiple unit responses for serious emergencies such as a single-family residence structure fire, a multiple-patient incident, or a vehicle accident with extrication required. In these situations, enough firefighters

must be assembled in a reasonable time frame in order to safely control the emergency without it escalating to additional alarms.

Small fires and medical emergencies require a dual response (fire engine and ambulance) with a short response time. Larger incidents require additional personnel and equipment. In either case, if the crews arrive too late or the total personnel sent to the emergency are too few, they are drawn into a complicated scenario where the outcome becomes uncertain and more dangerous. The goal of fire crew deployment is to methodically distribute crews throughout the community to minimize emergencies and maximize positive outcomes, without spreading the stations so far apart that they can't mass together quickly enough to be effective in major emergencies.

The purpose of this document is to provide the following:

- A baseline tool for defining Service Level Objectives
- A descriptive tool for validating station location
- A management tool for determining apparatus type, staffing levels, and staffing patterns
- A predictive tool for helping to determine workload and ideal unit utilization
- A basis for continually measuring service level performance

Agency Overview

The SVFRA is a Joint Powers Authority (JPA) established in 2002 through a cooperative effort between the City of Sonoma and the Valley of the Moon Fire Protection District. The Authority provides fire protection services to 33,000 residents in a 31.5-square-mile area. Advanced Life Support (ALS) ambulance transport services are provided to the same area as well as the communities of Glen Ellen, Schellville, Eldridge and Mayacamas.

Governance

The SVFRA is governed by an Executive Board consisting of five elected members of the Sonoma City Council and five elected members of the Valley of the Moon Fire District Board. The Executive Board is scheduled to meet annually to receive, review and authorize updates regarding the activities of the Authority.

An additional Ad-Hoc committee comprised of the Fire District Board President, a City Council member, the City Manager, Assistant City Manager, Fire Chief, Division Chief, Union President and a representative of the Part-Time (Volunteer) Firefighters' Association meets monthly to consider the current and future activities of the SVFRA.

Services Provided

The SVFRA is an all-risk agency that provides a multitude of services to the community. A partial list includes:

Fire Suppression Response	Advanced Life Support Response
Emergency Medical Response	Basic Life Support Response
Vehicle Accident Response	Ambulance Transport Services
Agency Assist Response	Public Education Services
Natural Disaster Response	Life Safety Inspection Services
Hazardous Materials Response	Building Plan Check Services
Swift Water Rescue	Fire Investigation Services
Confined Space Rescue	Fire Prevention Services
Low/High Angle Rope Rescue	Ambulance Stand-by Services*

*The SVFRA has a contractual agreement to provide exclusive standby and emergency ambulance transport services to Infineon Raceway. Contract services are provided almost daily with certain events attracting in excess of 100,000 spectators, requiring multiple ambulances.

The establishment of the SVFRA has provided a mechanism whereby two agencies have come together in order to develop an enhanced delivery system for both fire and EMS that can be a model for other communities. This business model presents an economy of scale. The operational benefits of common training, common operational guidelines and consolidated administration and management improve operational effectiveness and efficiency as well as provide for personnel safety.

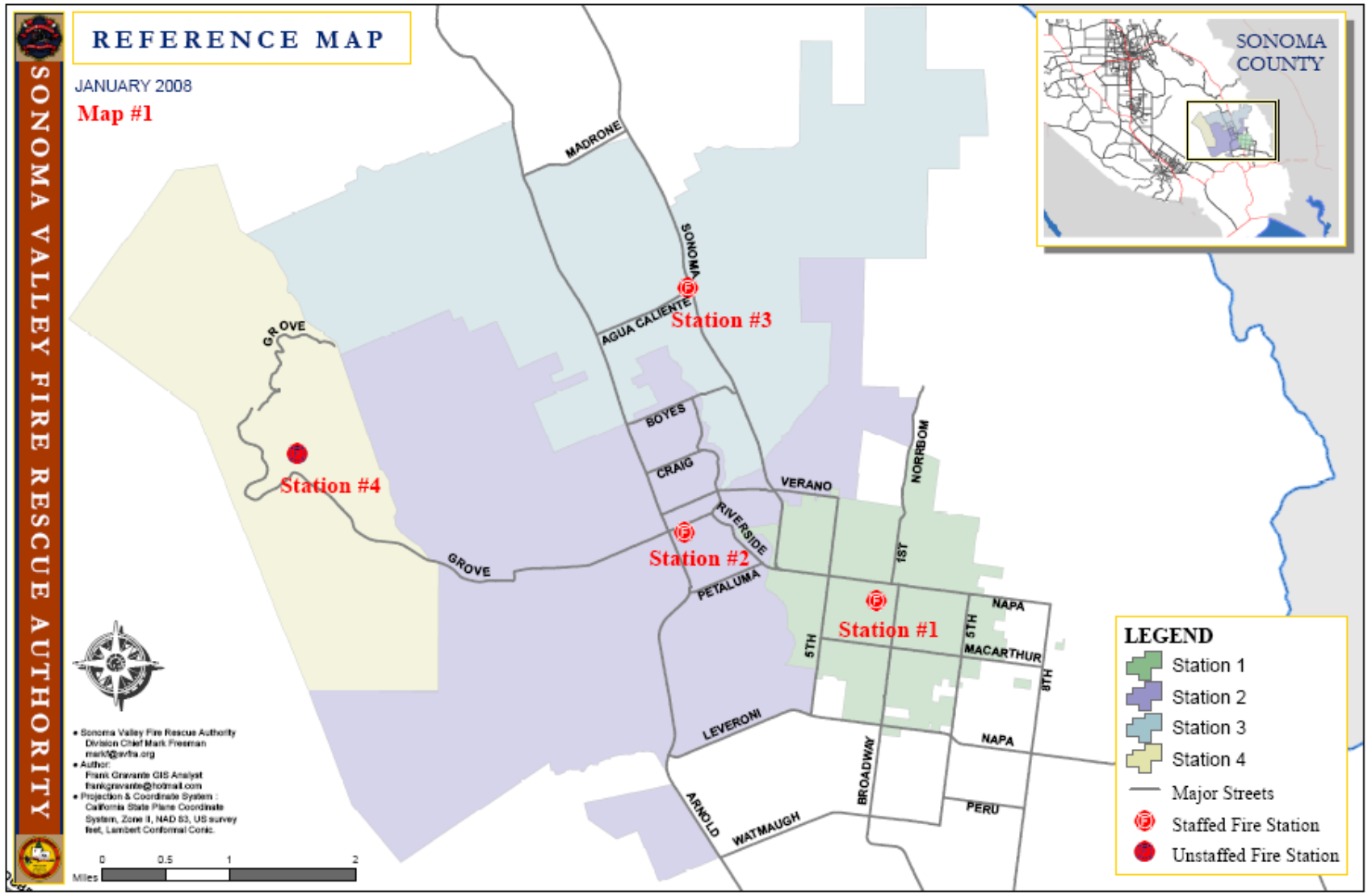
Community

Sonoma Valley is located in southeastern Sonoma County in the heart of one of the world's premier wine producing regions. The scenic hills and agricultural valley provide a setting of unparalleled natural beauty for a multitude of visitor attractions, including shopping in the historic Plaza, wine tasting, golf, spas, hiking, and an impressive selection of fine restaurants. The San Francisco de Solano Mission and other historic buildings in the central Plaza complement the area's viticultural prominence and visual beauty to make Sonoma a distinctive and desirable tourist destination. The diverse and rich cultural heritage is a source of pride for the 40,000 valley residents and a source of enjoyment for visitors.

Stations

The SVFRA currently operates out of four (4) fire stations. The locations for these stations were originally determined based on existing property ownership, property donation or the availability of land that would accommodate a fire station. The existing stations were not located based on any systems approach that used response times, hazards served, population served, or availability of volunteer firefighters, etc. The only criterion that was used by the Fire District was to locate staffed stations on opposite sides of Sonoma Creek so that a loss of bridges would not fully isolate a portion of the service area. The following map illustrates the location of each station as well as its respective first-due response area:

Please refer to Map #1 ***"Reference Map"*** *in the attached map book for a larger view.*



Fire Station 1 serves Fire Management Zone 1 (FMZ-1)

Station 1: Located in Sonoma at 630 Second Street West , this is Sonoma Valley Fire and Rescue Authority's headquarters station. The newest of the four facilities, it was constructed by the City of Sonoma in 2002. Construction was predominately funded by the City of Sonoma's Community Development Agency. The property was previously owned by the Pacific Gas & Electric Company and was used as a "service center" that housed various utility crews and equipment and a business office. The location provides a good central location within the municipal boundaries of Sonoma.

Station 1 houses the administrative operations of the Sonoma Valley Fire and Rescue Authority, including offices for the Fire Chief, Division Chiefs, Fire Prevention/EMS Captain, Training Captain, EMS Billing Office, and clerical support staff. The site includes space for the storage and display of antique fire apparatus and equipment and has a multi-use room intended as a fire department classroom, alternate E.O.C. and public meeting room. The department's vehicle maintenance shop and training tower are also located at this site.

Station 1 houses a Paramedic Advanced Life Support (ALS) Type I Engine Company and an ALS Ambulance. Station 1 also houses an unstaffed Type II/III Fire Engine, a 75' Type II Ladder Truck and numerous reserve ambulances used to service the Infineon Raceway.

Fire Station 2 serves Fire Management Zone 2 (FMZ-2)

Station 2: Located in El Verano at 877 Center Street, Station 2 is the oldest facility operated by the Sonoma Valley Fire and Rescue Authority and is in need of a major renovation and upgrade. The original structure, built in 1956, served as the Valley of the Moon Fire Protection District's vehicle maintenance shop prior to the construction of Station 1. The former maintenance structure is now used solely for storage of materials and supplies and the Mass Casualty Incident supply trailer.

Station 2 houses a Paramedic Advanced Life Support (ALS) Type I Engine Company and is the quarters for the on-duty Division Chief and Command Vehicle. Station 2 also houses an unstaffed Type II/III Fire Engine, a 1,500-gallon Water Tender and a reserve ambulance.

None of the current structures at this location are considered seismically sound. The fire station has been classified deficient in meeting basic Building Code standards as well as the much more stringent "Essential Service Facility" standards required by California State law. While a structural retrofit of Station 2 is technically possible, the architectural firm MSC Arch has estimated that associated costs would equal or exceed construction of a new facility. MSC Arch has determined that the original structure cannot be practically rehabilitated. If the station were to be rehabilitated, alternate temporary facilities would have to be acquired to house Station 2's fire apparatus and staff during the project.

Fire Station 3 serves Fire Management Zone 3 (FMZ-3)

Station 3: Located in Agua Caliente at 1 West Agua Caliente Road, it was the previous headquarters of the Valley of the Moon Fire Protection District. In accordance with a State law that requires Special District boards to conduct business meetings within a district's boundaries, Station 3 continues to serve as the meeting location for the Valley of the Moon Fire Protection District's Board of Directors.

Station 3 was constructed in 1985 and is in good condition. The architectural firm of MSC Arch has developed plans for the facility to provide for more efficient use of available space and to address ADA and gender equity issues at this facility.

Station 3 houses a Paramedic Advanced Life Support (ALS) Type I Engine Company and an ALS Ambulance. It also houses an unstaffed reserve ambulance and an OES Type I Fire Engine/"Light" Urban Search and Rescue unit operated by SVFRA on behalf of the California State Office of Emergency Services.

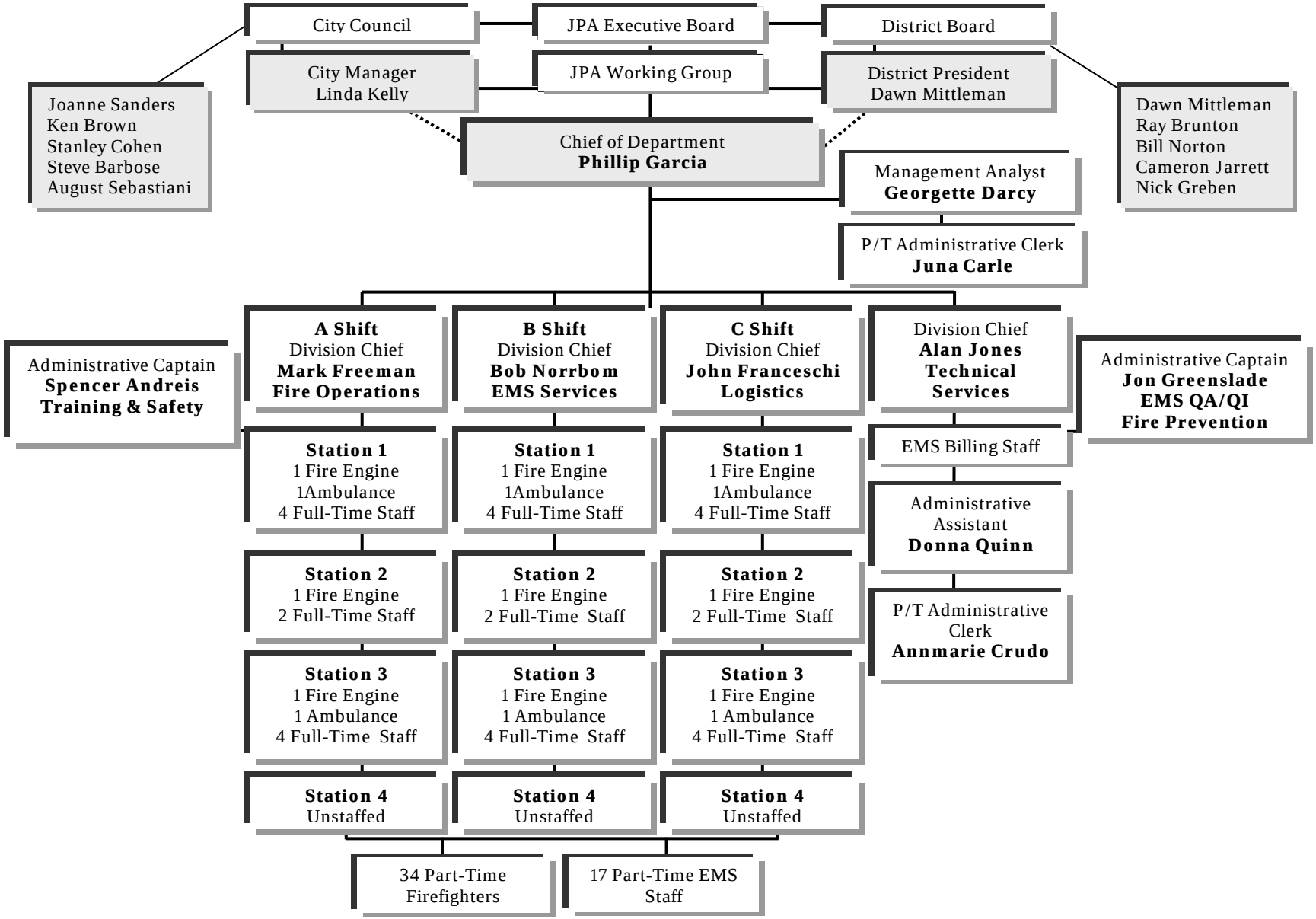
Fire Station 4 serves Fire Management Zone 4 (FMZ-4)

Station 4: Located in the Diamond A subdivision at 18798 Prospect Drive, Station 4 was constructed by District personnel in 1989 on land provided by the Diamond A Recreation Center. The land was made available to the District via a 34-year lease that will expire in 2023. Should the District choose to cease operations at Station 4, the land and the structure would revert to the control of the Diamond A Recreation Center. The structure is in good condition but does not have any facilities for housing staff or additional equipment.

Fire Station 4 is an unstaffed volunteer station with a Type I Fire Engine and a utility vehicle. These vehicles are staffed by part-time (volunteer) firefighters when a call is received.

Personnel

The SVFRA is comprised of 92 employees. The following "organizational chart" illustrates the composition and assignments of those personnel:



Daily Staffing

Sonoma Valley Fire & Rescue Authority *Daily Staffing*			
Location	Unit Identifier	Description	Staffing
Station 1	3381	Type 1 Fire Engine	2 (plus one part-time)*
	Medic 301	ALS Ambulance	2
Station 2	Battalion 33	Command Vehicle	1
	3382	Type 1 Fire Engine	2 (plus one part-time)*
Station 3	3383	Type 1 Fire Engine	2
	Medic 303	ALS Ambulance	2
		Total: 11-13*	

* If part-time staffing is available for 3381 and 3382, staffing increases to 12 - 13 personnel on duty.

On a daily basis, the SVFRA has three engines and two ambulances in service 24 hours a day, seven days a week. The agency also has the ability to add additional part-time staff to Engines 3381 and 3382 in 12- or 24-hour increments. This third position is filled allowing the part-time (volunteer) firefighters to post their availability to work in advance. The SVFRA's computerized staffing system allocates shift assignments through a series of rules that attempt to equitably balance the amount of time assigned to the participating part-time staff.

The SVFRA daily staffing consists of 13 personnel for emergency response 24 hours a day. Of the 13 positions, 11 provide both fire and emergency medical services and 2 are limited to emergency medical services only. The following positions make up the 13 personnel utilized in our current daily staffing model:

1 Division Chief (shift supervisor)

3 Fire Captains (station officers)

5 Engineer/Paramedics (apparatus operators)

2 Part-Time Firefighters

1 Paramedic (limited to EMS service delivery on Medic 303)

1 Emergency Medical Technician (limited to EMS service delivery on Medic 303)

Ambulances assigned to Infineon Raceway are staffed in a manner similar to the part-time firefighters. Part-time Paramedics and EMTs notify the SVFRA's computerized staffing

system of their work availability. Unfilled requests are reported to management for further action.

In the event of large or multiple-emergency incidents, part-time staff members are able to staff any of the resources listed in the table below. In these instances, part-time staff or mutual-aid responses may supplement the full-time staff. In 2005, 16 percent or 450 incidents occurred simultaneously with other incidents. In 2006, this number increased to 686 incidents or 22 percent, and in 2007 it increased to 937 or 25 percent.

Sonoma Valley Fire Rescue Authority *Unstaffed Resources*		
Station	**Unit Identifier**	**Description**
Station 1	3371	Type II/III Fire Engine
	3351	Type II Aerial Ladder
	Medic 304	ALS Ambulance
	Medic 306	ALS Ambulance
	Medic 307	ALS Ambulance
Station 2	MCI-33	MCI Trailer
	Medic 302	ALS Ambulance
	3372	Type II/III Fire Engine
	3392	Type II Water Tender
	3342	Utility Vehicle
Station 3	Medic 305	ALS Ambulance
	OES-319	Type I Fire Engine/USAR
Station 4	3384	Type I Fire Engine
	3343	Utility Vehicle

The agency has two types of part-time members:

- Community oriented
- Career oriented

Community-oriented members are often working professionals with long-term employment histories inside and outside of our service area.

The career-oriented members are college age, attending schools with an emphasis on fire technology or emergency medicine. These career-oriented members often provide the staffing during the day. The primary concern is that once these career-oriented members have met the educational requirements for fire service testing, they are often hired by other agencies. Occasionally, staffing shortages are created when members of a graduating class find full time employment. Currently, the agency is in a good position with career-oriented, part-time members, although most will soon complete their educational requirements making them eligible to test with other agencies for full-time employment.

The SVFRA has a relationship with Santa Rosa Junior College to host student interns who have completed the Firefighter 1 Academy and the Emergency Medical Technician course. The intern program requires the student to work five (5) 24-hour shifts per month. Currently, the agency has three (3) Interns, which provide a third person 50 percent of the

time on engine 3383. It is our goal to have six (6) student interns, which would provide a third person 100 percent of the time on engine 3383. We have not been successful in meeting this goal since the inception of the program due to the intern pool not being large enough to attract willing participants.

Current Deployment

The following chart shows the agency's deployment that is currently in place. Incident type determines the number of personnel and resources deployed. Personnel numbers in parentheses represent part time staffing in addition to full-time minimum staffing when those positions are filled.

Sonoma Valley Fire & Rescue Deployment			
Incident Type		**# of Personnel**	**Deployment**
Structure Fire:	1st Alarm	9 (13)	3-Fire Engines, 1-Truck, 1-Ambulance, 1-Chief Officer
Fire Alarm:	Residential	5 (7)	2-Fire Engines, 1-Chief Officer
	Commercial	5 (7)	2-Fire Engines, 1-Chief Officer
	Monitored Alarm	5 (7)	2-Fire Engines, 1-Chief Officer
	Carbon monoxide	2 (3)	1-Fire Engine
	Reset	2 (3)	1-Fire Engine
Vegetation Fire: (Wildland)	1st Alarm	9 (11)	3-Fire Engines, 1-Ambulance, 1-Chief Officer
Vehicle Fire		2 (3)	1-Fire Engine
Bus RV Truck		5 (7)	2-Fire Engines, 1-Chief Officer
Debris Fire (Landscape, Dumpster, etc)		2 (3)	1-Fire Engine
Vehicle Accident (Traffic Collision)		7 (9)	2-Fire Engines (one with extrication equip.), 1-Chief Officer, 1-Ambulance
Vehicle Accident Extrication [Subject(s) Trapped]		7 (9)	2-Fire Engines (one with extrication equip.), 1-Chief Officer, 1-Ambulance

Aircraft Emergency: (Inflight difficulties, Crash)	Level-Alpha (Small Aircraft)	7 (9)	2-Fire Engines (one with extrication equip.), 1-Chief Officer, 1-Ambulance
Haz-Mat:		8 (10)	3-Fire Engines, 1-Chief Officer, 1-County Fire Services Haz-Mat Officer
Hazardous Condition		2 (3)	1-Fire Engine
Medical Aid:		4 (5)	1-Fire Engine, 1-Ambulance
Multi-Casualty Incident		9 (11)	2-Fire Engines (one with extrication equip.), 1-Chief Officer, 2-Ambulance
Rescue:	Swift Water	7 (9)	2-Fire Engines, 1-Chief Officer, 1-Ambulance
	Low/High Angle	7 (9)	2-Fire Engines, 1-Chief Officer, 1-Ambulance
	Confined Space	7 (9)	2-Fire Engines, 1-Chief Officer, 1-Ambulance
	Industrial Accident	4 (5)	1-Fire Engine, 1-Ambulance
Service Call:		2 (3)	1-Fire Engine
	Agency Assist	2 (3)	1-Fire Engine
	Standby	2 (3)	1-Fire Engine
	Public Assist	2 (3)	1- Fire Engine
Unknown Type Fire		9 (11)	3-Fire Engines, 1-Ambulance, 1-Chief Officer
Investigation:	Smoke	2 (3)	1-Fire Engine
	Odor	2 (3)	1-Fire Engine
	Fire	2 (3)	1-Fire Engine
	Electrical	2 (3)	1-Fire Engine
Gas Inside a Structure		9 (11)	3-Fire Engines, 1-Ambulance, 1-Chief Officer
Gas Outside a Structure		2 (3)	1-Fire Engine

Risk Assessment

Risk assessment consists of five key elements:

1. **Probability**: the likelihood that a particular event will occur within a given period of time. An event that occurs daily is highly probable. An event that occurs only once in a century is very unlikely. Therefore, probability is an estimate of how often an event will occur.

2. **Consequence**: There are two components: 1) life safety (the loss of life or permanent injury), and 2) economic impact (the loss of property, income or irreplaceable assets).

3. **Fire Management Zones**: Fire management zones are geographical response areas that are designed to limit undue risk from extended responses.

4. **Occupancy Risk**: an assessment of the relative risk to life and property resulting from a fire inherent in a specific occupancy or in a generic occupancy class.

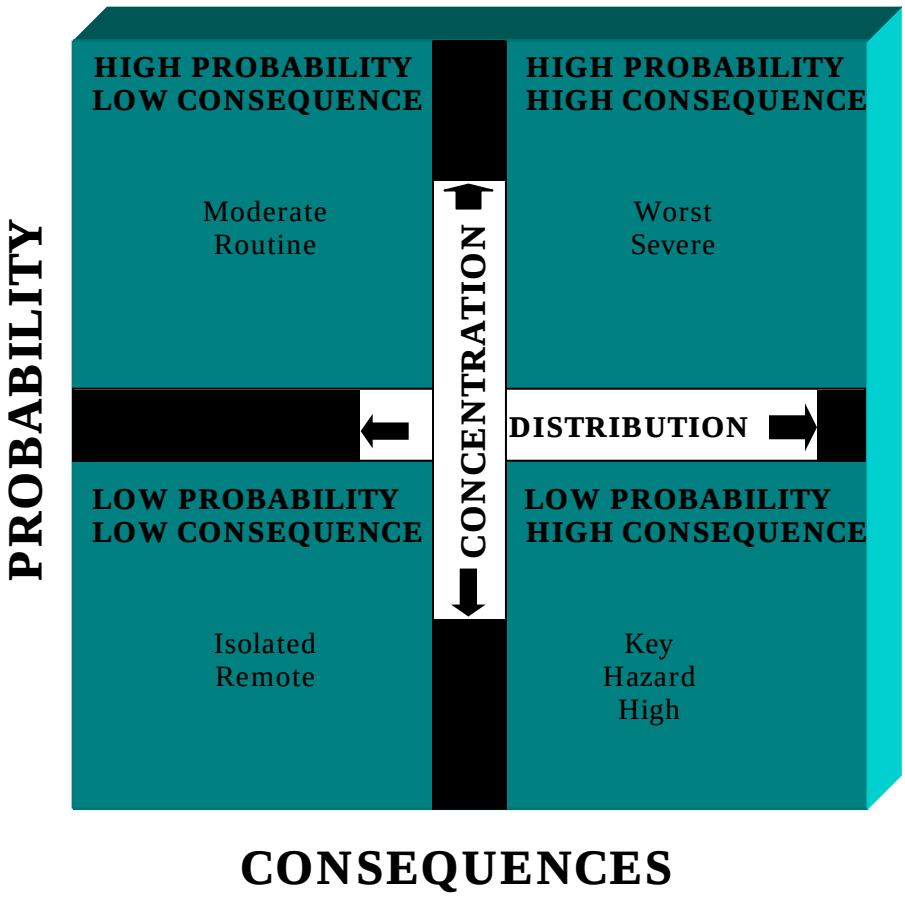
5. **Community Profile**: the overall profile of the community based on demographics, risk analysis and the level of service currently provided.

Probability and Consequences

Risk Assessment is an analysis of a community that results in community risk determinations based on probability and consequence. The chart below represents the risk assessment considerations. This includes the probability of the event occurring and the consequences of that event occurring. Each creates unique challenges requiring different commitments of resources.

KEY POINTS*:*

- Distribution is the number and location of resources placed throughout the community.
- Concentration is the number of resources needed in the community or area to deal with the risks.



As noted on the previous chart, different quadrants require different commitments of resources. The four possible relationships between probabilities and consequences and the distribution and concentration of resources are:

Low Probability, Low Consequences
Low Probability, High Consequences
High Probability, Low Consequences
High Probability, High Consequences

The fire risk assessment for a service area could include differences between a detached, single-family dwelling, a multiple-family dwelling, a commercial building, or a hospital by placing each in a separate category of risk. For a medical emergency, a single-patient incident would be contrasted with a multi-casualty incident.

There are many factors that make up risk: the ability of occupants to take self-preserving actions, construction features, built-in fire protection, available water supply, and the nature of the occupancy or its contents. Defining a community's risks is essential in determining the level of service the fire department should provide.

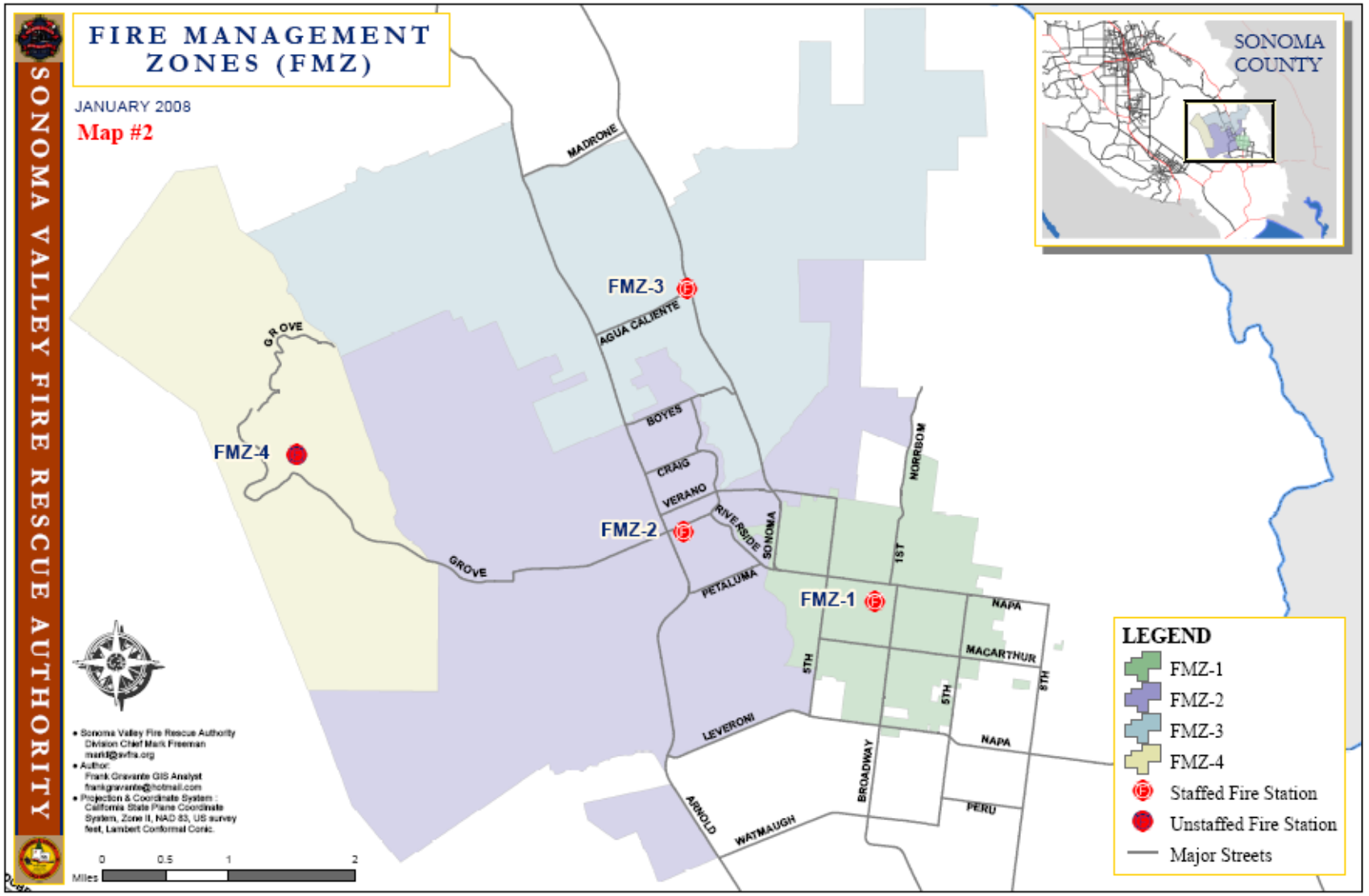
The SVFRA service area has a wide range of potential risks. There is an inverse relationship between risk and frequency. Daily events are usually found in the routine risk category, and less frequent events are in the highest risk levels. If the risk management system works as predicted, a truly major loss should be an extraordinarily rare event. In most cases, the majority of losses occur in the smallest percentage of emergencies. Structural fire incidents that become a significant event usually have experienced flashover. Urban/wildland interface fires present another set of risk factors that will be discussed later in this report.

The objective of risk assessment is to reduce significant losses. This involves trying to keep routine emergencies from becoming serious loss situations by distributing the available resources needed to respond to potential emergencies within the community. Station locations, response times and staffing levels are all key considerations for reducing loss of life and property.

Fire Management Zones (FMZ)

Fire management zones are geographical response areas that are designed to limit undue risk from extended responses. The SVFRA has four FMZ areas that are served by a fire station and define the first-due response area for each station. The following map illustrates the location of each Fire Management Zone:

Please refer to Map #2 ***"Fire Management Zones"*** *in the attached map book for a larger view.*



Occupancy Risk Categories

Risk planning takes into account fire potential, life hazards, and the potential economic impact to the community. Fire department staff designates buildings within the community using specific Risk Categories based on Sonoma County Land Use Codes:

Maximum Risk: This risk cannot normally be mitigated by resources present within the department at the time the major impact occurs. It would require a request for mutual aid to mitigate the event; examples would include hospitals, schools, nursing homes, and other high life hazard or large fire potential occupancies such as older downtown buildings.

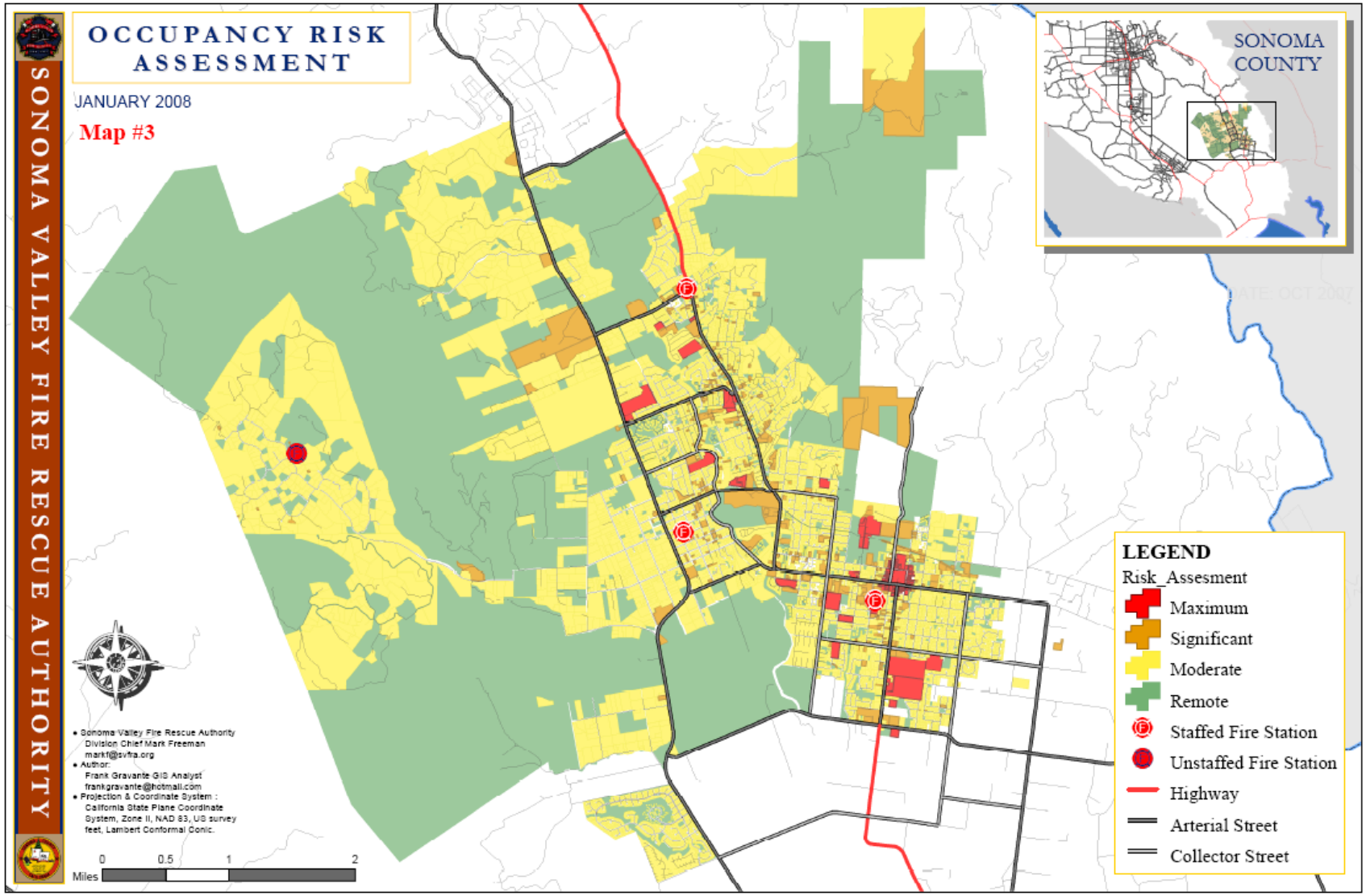
Significant Risk: This risk cannot normally be mitigated by resources present within the department at the time the major impact occurs. It would require a request for mutual aid to mitigate the event; examples would include apartments with more than four units, large or inaccessible residences, offices, mercantile or industrial occupancies, and government buildings.

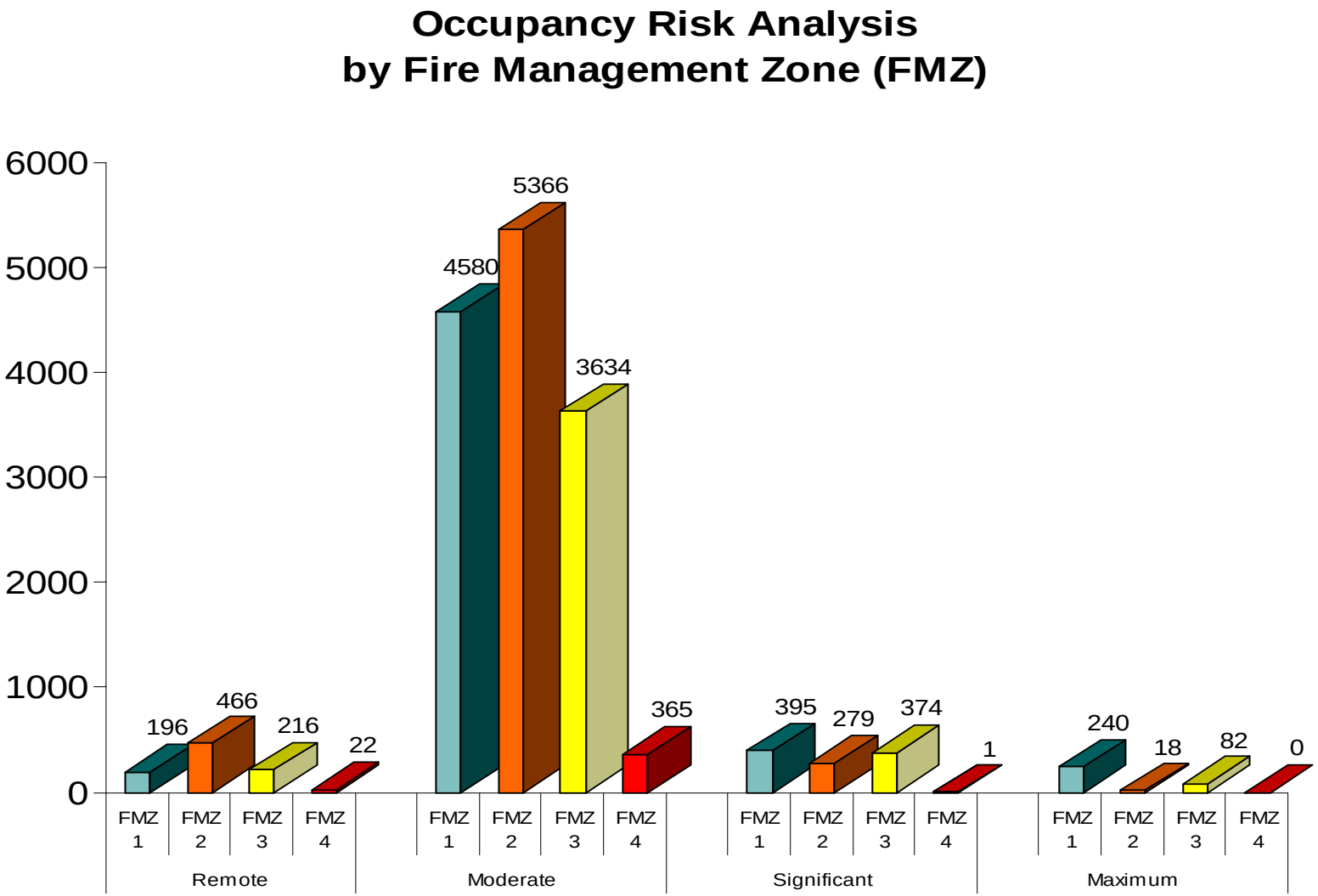
Moderate Risk: This risk can normally be mitigated by the first response resources present within the department at the time the impact or event occurs and would not usually require a request for mutual aid; examples would include average single-family residences; duplexes, detached garages or outbuildings, automobiles, and small natural-cover fires.

Remote/Rural Risk: This risk can normally be mitigated by the first response resources present within the department at the time the impact or event occurs; examples would include dry and irrigated farmland as well as recreational land.

The following maps and charts use current data to illustrate the types and locations of each risk category in the community:

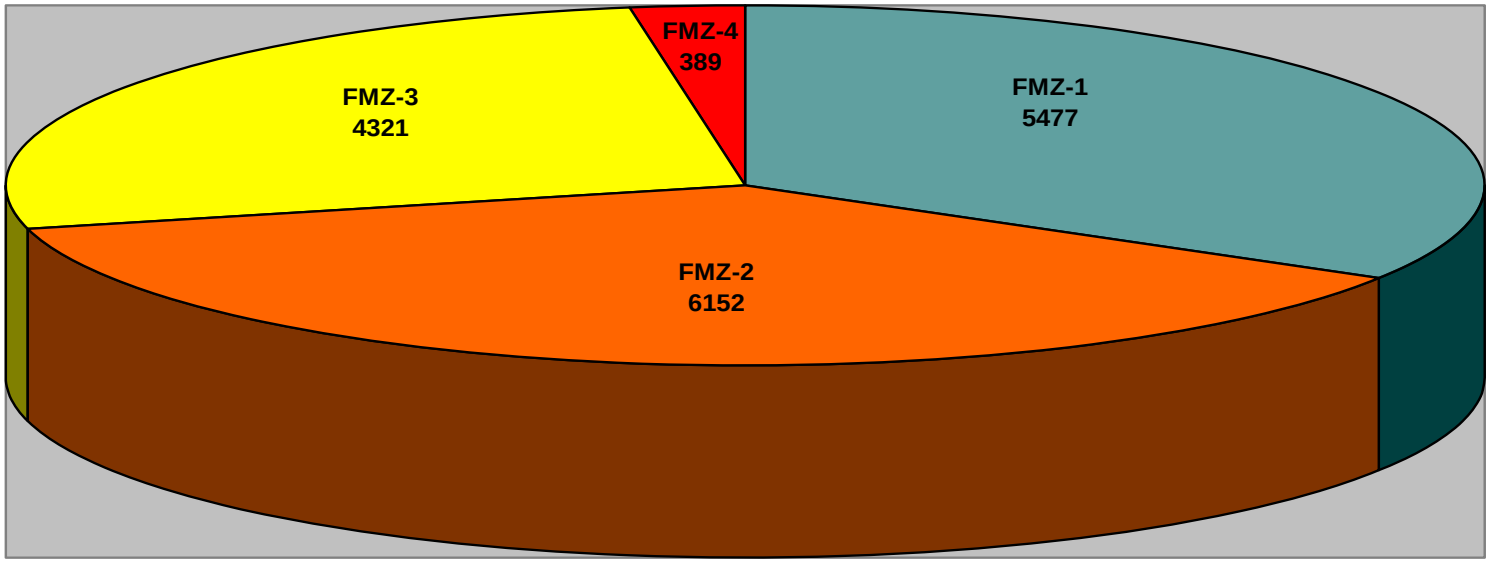
Please refer to Map #3 ***"Occupancy Risk Assessment"*** *in the attached map book for a larger view.*





Data Source: 11/2007 Sonoma County Assessors Office

Number of Structures By Fire Management Zone (FMZ)



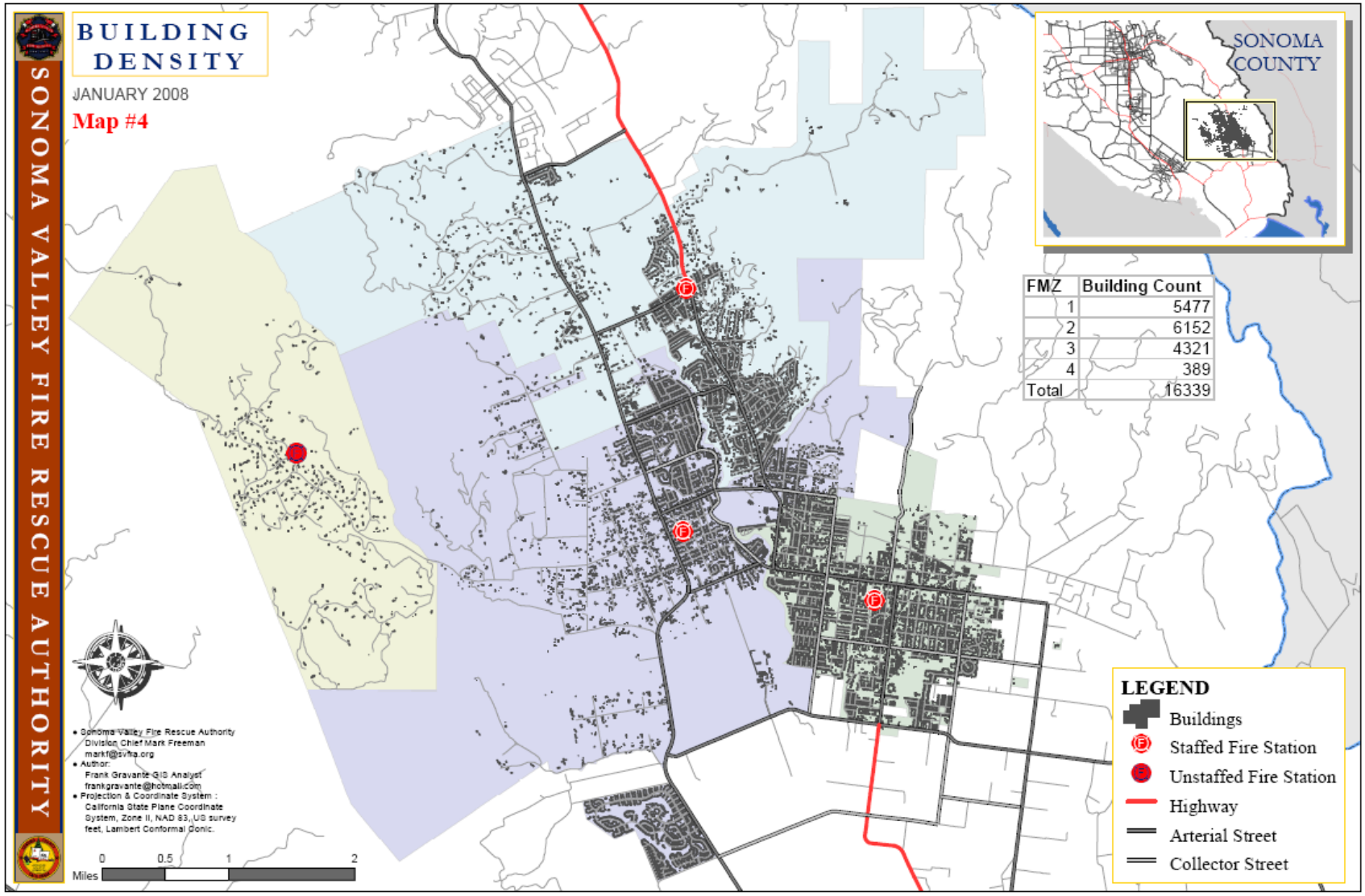
Data Source: 11/2007 Sonoma County Assessors Office

NUMBER OF STRUCTURES BY PROPERTY TYPE	
Commercial	603
Dry Farm	151
Government	247
Industrial	82
Institutional	141
Irrigated Farm	347
Miscellaneous	23
Recreational	32
Residential	14609
Unclassified	104
Total Structures	**16339**

Data Source: 11/2007 Sonoma County Assessors Office

The following map depicts building density within the SVFRA:

Please refer to Map #4 ***"Building Density"*** *in the attached map book for a larger view.*



Population Demographics

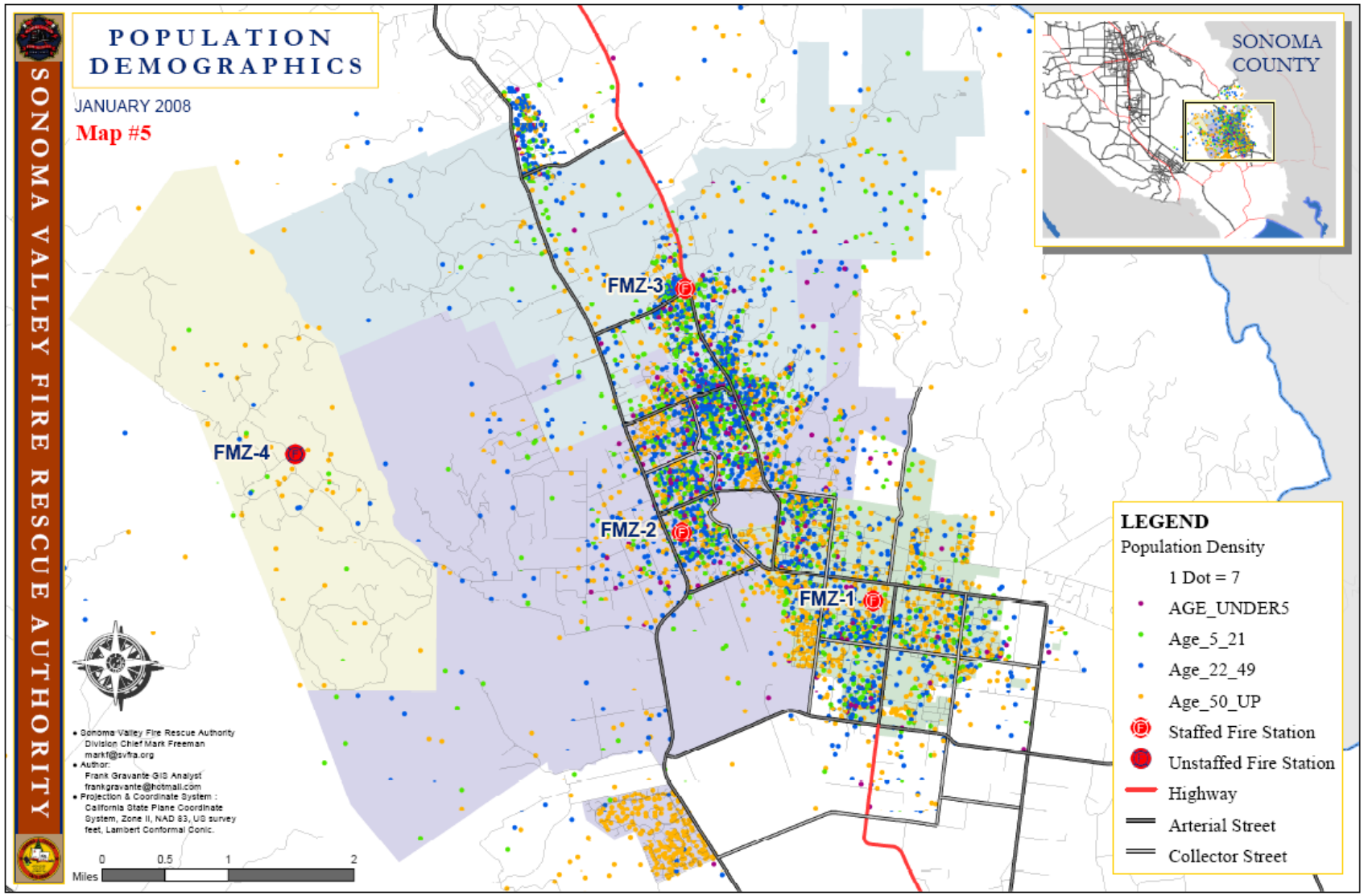
The SVFRA has a resident population of approximately 33,000 people. The overall growth in the population is expected to remain relatively low, as outlined in the area's growth management plans.

The average age of the community served is high compared to the rest of Sonoma County. According to recent census data, 24 percent of the population in the City of Sonoma and 18 percent in the Fire District are 65 or older as compared to 12 percent for the County. The average age in the community is expected to keep rising for the foreseeable future, as more retirees choose to live in this community. The map on the following page charts the population age demographics by plotting year 2000 census data for each census block.

It is important to note that retirement communities such as Temelec, 800 Oregon Street/Wine Country House, nursing homes, and adult-community mobile home parks represent a geographical area that will continually and predictably present a relatively higher call volume for emergency medical services. When possible, the SVFRA should locate stations to provide for timely service to these areas and should attempt to ensure that such areas are built within a timely distance of current fire stations.

Population density is concentrated along the Valley floor, mostly between Highway 12 to the east, Arnold Drive to the west, Madrone Road to the north, and Leveroni/Napa Road to the south. Emergency calls for service tend to be located within the most dense population areas, and this can be seen in the SVFRA data. The one dense area of population located outside this area is the retirement community of Temelec/Seven Flags, which also represents a relatively high call volume area.

Please refer to Map #5 ***"Population Demographics"*** *in the attached map book for a larger view.*



Risk Analysis

Structural Risk

The SVFRA response area contains structures that represent a wide variety of residential, commercial, agricultural, and business enterprises. The locations of these structures vary from built up urban centers to remote rural locations that must provide their own water supply.

- Primary concerns are structures that have potential for high loss of life or would result in significant economic loss such as:
    - Hospital/Nursing Homes where individuals may be less capable of self-preservation
    - Downtown structures/Hotels that have higher occupancy loads and outdated construction features that may lead to increased fire and earthquake risk
    - Multi-family residences and other large structures built prior to requirements for automatic sprinklers and other fire control systems that may have outdated construction features leading to increased fire and earthquake risk

EMS Risk

Emergency Medical service requests have the greatest impact on the resources of the SVFRA.

- As the population of the SVFRA increases and ages, and as the number of visitors to the area increases, the demand for emergency medical services will increase proportionately.

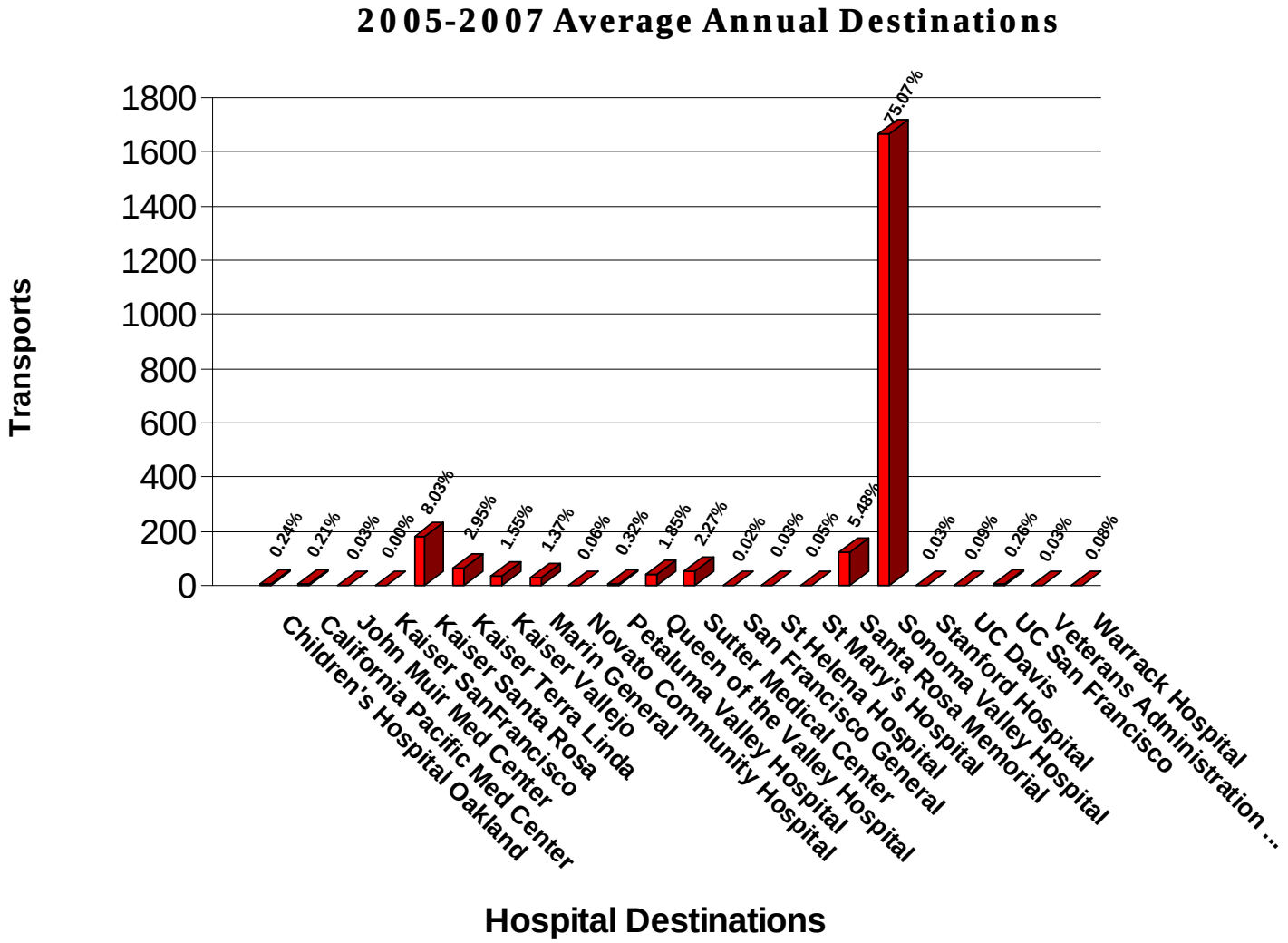
  According to the current U.S. Census Figures, the total population of Sonoma County increased 18.3 percent in the last decade, with those aged 60 years and older increasing by 11.57 percent.

  The number of visitors to the area has increased significantly, as evidenced by the increase in tourism revenues. Since 1992, Sonoma County tourism revenues have increased by 42 percent. It is expected that the demand for emergency medical services will increase proportionately.

- The response times to incidents will increase as traffic on local streets and roads increases. The most recent available Caltrans data for 2003/04 shows that traffic increases at 10 intersections along highway 12, between Agua Caliente Road and Watmaugh Road, amounted to an average increase of 300 vehicles per day.

- Should there be a closure of the Sonoma Valley Hospital (SVH), the time from the initial response to being available for service will increase due to ambulances having to transport all patients out of town.

Currently, most patients are transported to SVH. In the period 2005-2007, SVFRA ambulances transported to 22 different hospitals for emergent and non-emergent needs. The majority of the transports went to Sonoma Valley Hospital as shown in the graph below. Local transports provide much shorter transport times enabling ambulances to return to service quickly.



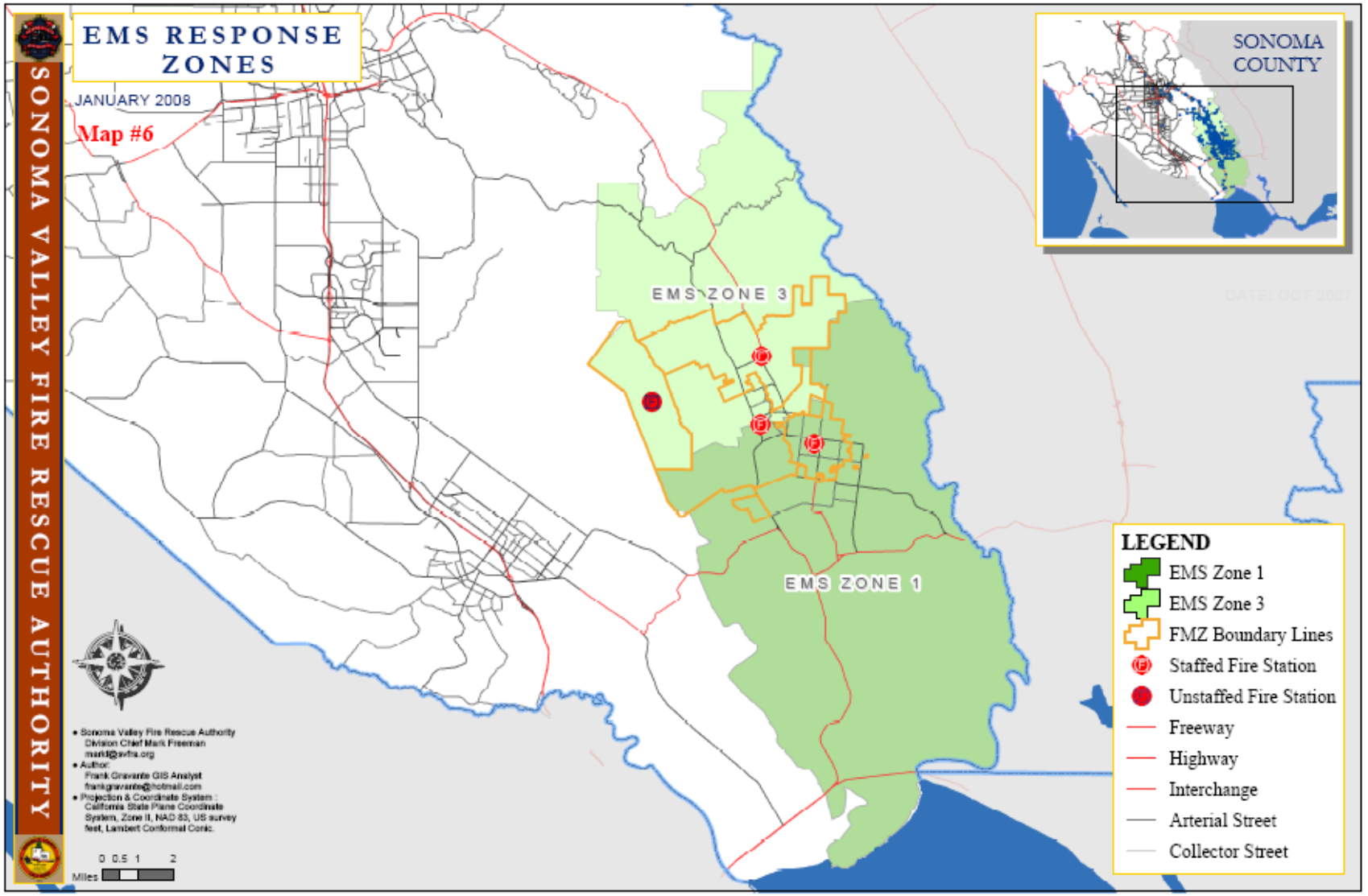
The associated impact from loss of a local hospital would be that first response Engine Companies would spend more time on scene waiting for an available ambulance to arrive, preventing them from responding to other incidents that occur while waiting for an ambulance to return to service.

The seamless interoperability of closest fire units and EMS transport units provides an enhanced service level to the public.

- Dispatching the closest fire unit on each emergency medical call provides for rapid life saving intervention.
- Fire apparatus on scene provides for public and emergency responder safety as well as rescue tool availability for accident scenes and forcible entry to structures where victims cannot provide access.

Personnel from fire apparatus provide needed staffing for patient care, incident scene control, vital patient and incident location data recording, and many other necessary scene tasks. The following map illustrates the EMS Response Zones in relationship to the fire protection boundary of the SVFRA:

Please refer to Map #6 ***"EMS Response Zones"*** *in the attached map book for a larger view.*



Non-Structural Risk

The SVFRA provides a wide range of services to the community such as Hazardous Materials Response and Technical Rescue. The demand for these services has been historically low. Due to available staffing, apparatus and the size of the jurisdiction, the agency generally responds with all available resources to these incidents and initiates immediate calls for mutual aid and response of off-duty personnel to mitigate these emergencies and to provide coverage for subsequent events.

Wildland/Urban Interface Risk

The residential population of the SVFRA extends from dense population centers and suburban areas to more rural or agricultural areas that are categorized by the fire service as the "Wildland/Urban Interface." These areas represent a significant fire risk to the community as a whole. The majority of these areas reside within both the Authority's jurisdiction and the State Responsibility Area (SRA), as defined by section 4102 of the Public Resources Code:

- Section 4102 of the Public Resources Code (PRC) defines "state responsibility areas" as those areas for which the State has the financial responsibility of preventing and suppressing fires. Under PRC Sections 4125 and 4126, these areas roughly correspond to vegetated lands that have watershed value.

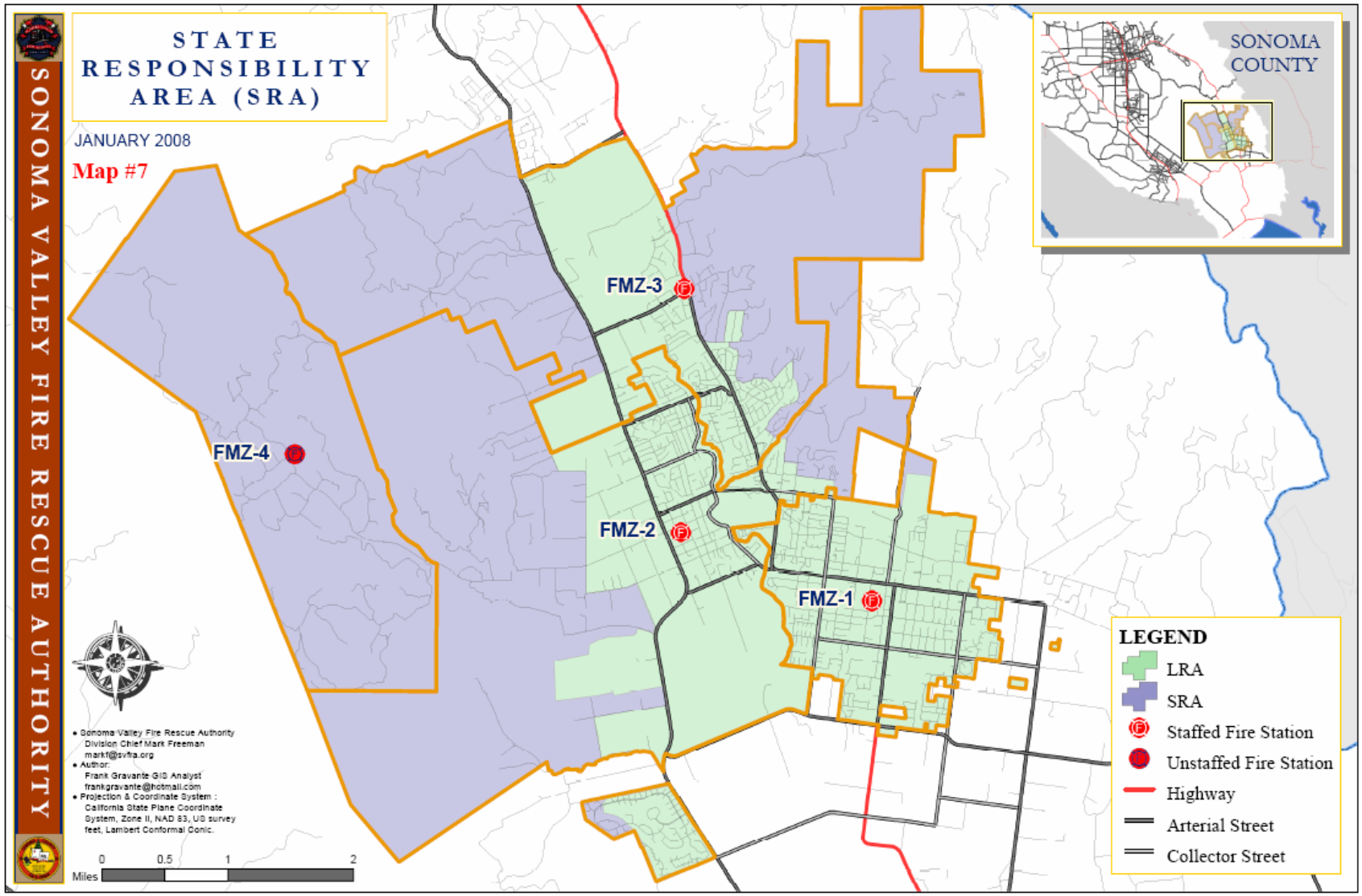
- Lands in incorporated cities or owned by the federal government are excluded. Areas that are not federal or state responsibility are commonly referred to as "Local Responsibility Area" or "LRA."

- By State Board regulations, unless specific circumstances dictate otherwise, lands are removed from SRA when housing densities average more than 3 units per acre over an area of 250 acres.

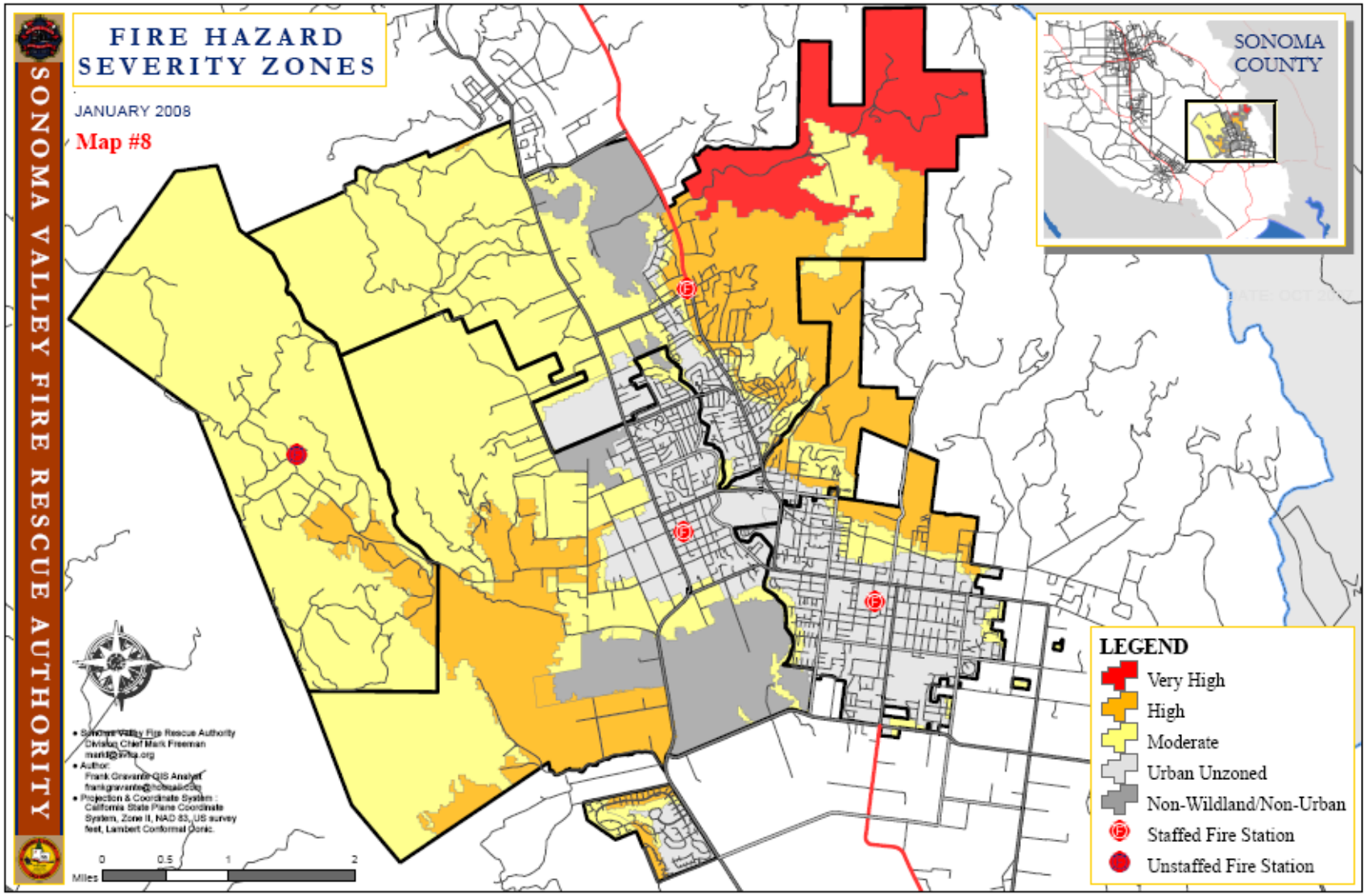
- California Department of Forestry and Fire Protection (CAL FIRE) has SRA responsibility for the protection of over 31 million acres of California's privately-owned wildlands.

When a wildland fire occurs in these areas, the Authority is augmented with a response from CAL FIRE, which provides direct access to state resources that include Fire Engines, Bulldozers, Aircraft, Hand Crews and Overhead to mitigate these incidents as part of the initial deployment. The following maps depict SRA/LRA areas and Fire Hazard Severity Zones within the community as defined by the State of California Department of Forestry and Fire Protection.

Please refer to Map #7 ***"State Responsibility Area"*** *in the attached map book for a larger view.*



Please refer to Map #8 ***"Fire Hazard Severity Zones"*** *in the attached map book for a larger view.*



Insurance Services Office (ISO) Public Protection Classification Program

The ISO classification program is an industry standard that measures certain aspects of an agency's emergency service delivery system and is considered a good indicator of effectiveness. The ISO classification survey is directed to the insurance industry as a guide for establishing premium rates for residential and smaller commercial properties. A Public Protection Classification from 1 to 10 is assigned. Class 1 represents the best public protection and Class 10 indicates no recognized protection. It does not reflect all the factors that must be considered when determining an effective response force for each of the services provided by the agency; the ISO survey does assist in verifying those factors that are important considerations in establishing standards of response coverage.

ISO provides information on:

- Communities: fire protection, water systems, emergency reporting capabilities, and other critical infrastructure, building codes, and potential for natural and man-made catastrophes.
- Buildings: size, construction, occupancies, hazards, and public and private fire protection

SVFRA's Public Protection Classification Rating

In February 2006, the Public Protection Department of ISO did a classification survey and analysis of the SVFRA's structural fire suppression delivery system for the property/casualty insurance industry. The ISO review process examined the receipt and handling of fire alarms, the fire department and water supply.

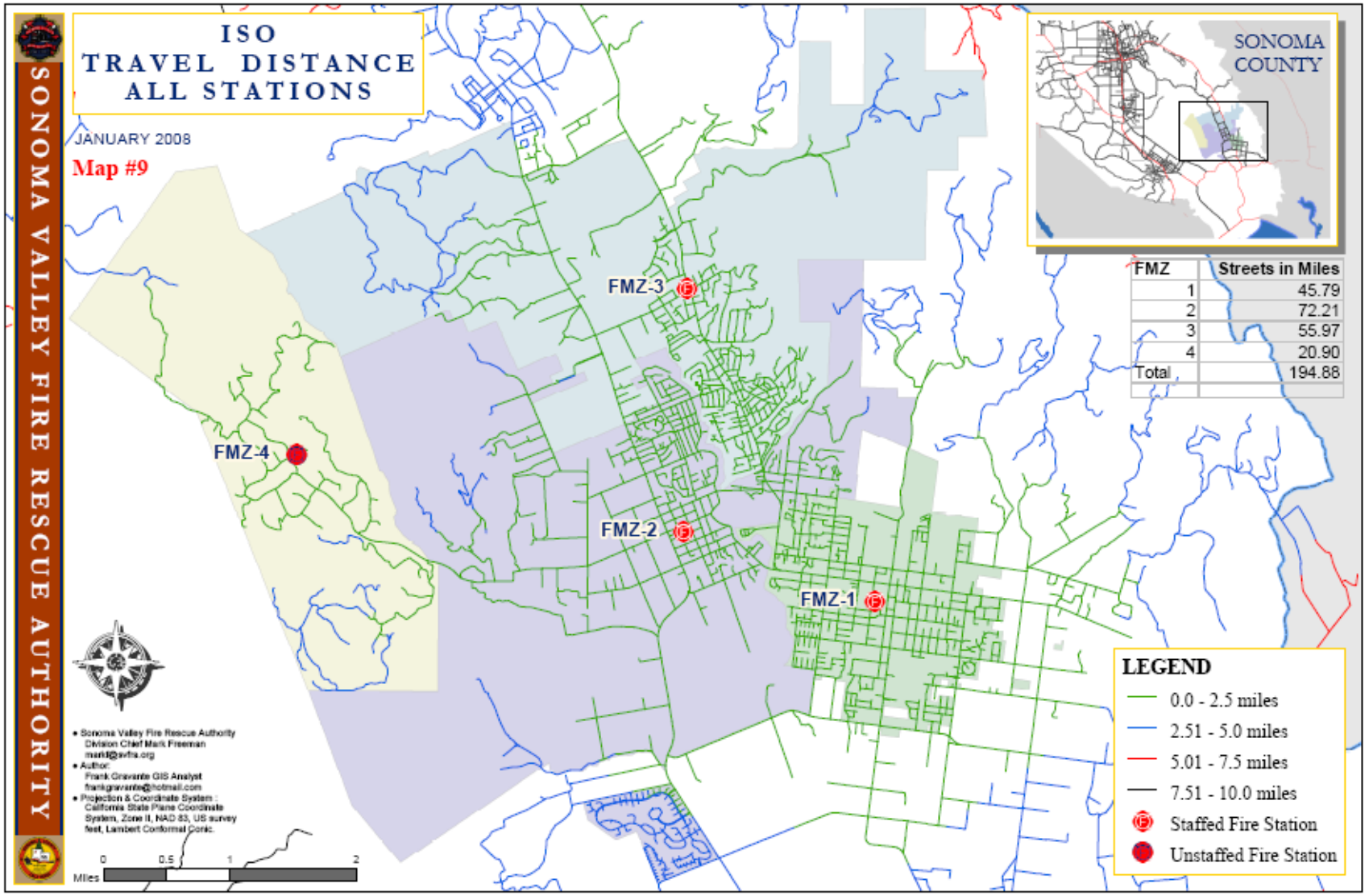
As a result of the survey, ISO has assigned the SVFRA a designation of Class 3 for properties with a required fire flow of 3,500 GPM or less that are located within five miles from a recognized responding fire station.

ISO has designated properties that are over five miles from a responding fire station as Class 10. This is the lowest ISO classification category. Currently, **no** property within the SVFRA response area meets this criterion; therefore, all properties realize an ISO classification of Class 3.

The combining of the two entities in 2002 enabled the area to realize an improved ISO rating. The City went from an ISO rating of Class 4 to a Class 3. The Valley of the Moon Fire District had two ratings: the areas with hydrants realized no change in maintaining their ISO Class 3 rating, but the non-hydrant areas went from an ISO rating of Class 8 to an ISO Class 3 rating. National statistics indicate that the improved ratings can save both homeowners and businesses hundreds of dollars in insurance premiums. An important factor is that the SVFRA has an all-risk emergency response agency ready to mitigate any

emergency with more equipment and personnel working in a coordinated attack, thereby enhancing the service provided to the community. The following map depicts travel distance from each station.

Please refer to Map #9 ***"ISO Travel Distance"*** *in the attached map book for a larger view.*



Performance Expectations

The Standards of Response Coverage Committee recommends the outcome expectations outlined in this section as the foundation for fire and emergency medical responses. These outcomes are in alignment with industry standards for NFPA 1710 and the American Heart Association as guidelines for service delivery.

Structure Fires

The main expectation is the capability to stop a serious fire from escalating beyond the room of origin. This means conducting a search and rescue for victims , confining fire damage in or near the room or area of origin, and limiting heat and smoke damage to the area or floor of origin.

Emergency Medical Incidents

For medical emergencies, a prompt response is needed; this enables medical personnel to evaluate the call for service and determine the appropriate treatment. The reasonable service goal is to be on scene soon enough to:

- Assess patients and prioritize care to minimize death and disability;
- Stabilize patients to prevent additional suffering; and
- Intervene successfully in life-threatening emergencies.

Wildland Fires

Another expectation is the capability to stop the escalation of an initial wildland fire beyond the area found upon arrival. Typically, this means controlling the fire to the area of origin without it spreading to adjacent structures or escalating to a size requiring additional resources to obtain control.

These outcome expectations are very powerful and drive staffing and response time factors. For example, to change the structure fire statement from “stop the escalation” to “confine the fire to room of origin” requires a much faster response. Most departments strive to stop fire in the room of origin, before it does substantial damage to the structure. A reasonable goal is to keep the fire from escalating beyond the room of origin and doing severe damage to the remainder of the structure and/or harming its occupants. The same ideas hold true for wildland fires - a reasonable goal is to keep them from becoming neighborhood-threatening events.

Dynamic Effect of Fire Growth

The dynamics of fire growth is essentially a chemical reaction with easily calculated and predictable elements.

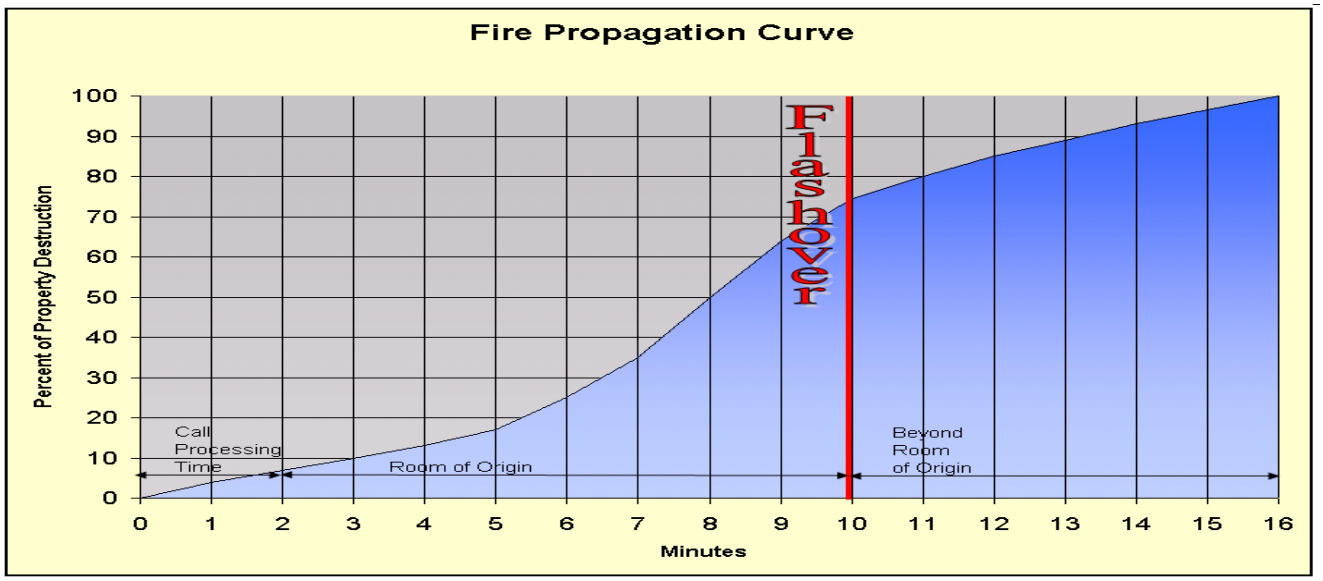
The answer for controlling the variation in fire dynamics lies in finding a common reference point: something that is common to all fires, regardless of the risk level of the structure, contents of the structure, or the time the fire has burned.

Regardless of the speed of growth or length of burn time, all structure fires go through the same stages of growth. The point of flashover marks the critical change in hazard conditions for both the occupants and the responding personnel. When flashover occurs, all combustibles in the room instantaneously erupt into flame. This eruption into flame generates a tremendous amount of heat, smoke and pressure, resulting in enough force to extend the fire beyond the room of origin through doors and windows or breaches in walls, ceilings and floors. The combustion process then speeds up geometrically because there is now an even greater amount of heat to transfer to unburned objects through convection, radiation, conduction and direct flame contact. To save lives and property, it is vital to have fire suppression efforts well underway before flashover occurs.

Flashover, which normally occurs within ten minutes after free burning begins, is the critical stage of fire growth for two primary reasons:

1. When a fire has reached flashover, it is too late to save anyone in the room of origin. No living thing in the room of origin will typically survive flashover. The chances of saving lives elsewhere in a structure after flashover also drop dramatically.
2. Flashover creates a quantum jump in the rate of combustion, and significantly greater amounts of water and resources are needed to reduce the temperature of the burning material below its ignition temperature. A post-flashover fire will burn hotter and move significantly faster, compounding the search and rescue problems in the remainder of the structure and requiring more firefighters for fire attack and extinguishment.

As shown in the following chart, there is a definite time of growth to the point of flashover that can be predicted. That growth pattern can only be changed by the intervention of firefighting personnel or the activation of protection systems such as automatic fire sprinklers.



It is important to note that, while the fire department cannot control the amount of time that passes between the inception, discovery and reporting of a fire to the emergency communications dispatch center, there are ways to reduce this time.

- Assuring that there are automatic fire sprinklers and smoke detection systems with direct alarm notification in every structure is the most positive factor in reducing the variables between fire initiation and notification of occupants and emergency responders.

Without automatic detection and notification, there are numerous variables that affect the detection and notification time frame. These variables include time of day and location of the fire, the capabilities of the person discovering the fire to make a report, and whether the reporting party uses a "landline" or a wireless telephone.

Cardiac Arrest Survival

Cardiac arrest is the sudden cessation of functional cardiac mechanical activity as confirmed by the absence of:

- signs of circulation
- response to stimulation
- breathing
- detectable pulse

Sudden Cardiac Arrest (SCA) is often precipitated by a sudden arrhythmia, ventricular fibrillation (VF), which causes the heart to quiver so that it cannot generate blood flow.

The definitive treatment of ventricular fibrillation requires chest compressions and delivery of shocks with a defibrillator. CPR may be particularly important in cases of prolonged

cardiac arrest (i.e., an arrest duration of 4 to 5 minutes without treatment). Chest compressions during CPR can generate a small but critical amount of blood flow to vital organs such as the brain and heart until circulation is restored by defibrillation or other therapy.

A system that designs responses to meet the needs of sudden cardiac arrest is well equipped to manage the needs of other less severe, but no less critical patients. Changes in the way ambulances, paramedics and fire trucks are deployed can help to improve survival rates. Unless the deployment of EMS resources has a total response time of 5 minutes or less after collapse, the victim's best chance for survival may be in the hands of bystanders.

With this potential, every effort should be made by government agencies to encourage and provide quality CPR education and AED device placement in all public settings.

The American Heart Association uses 4 links in a chain (the "Chain of Survival") to illustrate the important, time-sensitive actions for victims of Ventricular Fibrillation Sudden Cardiac Arrest (VFSCA) these links are

- Early recognition of the emergency and activation of the emergency medical services (EMS) or local emergency response system: "phone 911."
- Early bystander CPR: immediate CPR can double or triple the victim's chance of survival from VFSCA.
- Early delivery of a shock with a defibrillator: CPR plus defibrillation within 3 to 5 minutes of collapse can produce survival rates as high as 49 percent to 75 percent.
- Early advanced life support followed by post-resuscitation care delivered by healthcare providers

The American Heart Association (AHA) endorses the position that, "...all emergency personnel should be trained and permitted to operate an appropriately maintained defibrillator, if their professional activities require that they respond to persons experiencing cardiac arrest."

Universally, all groups that study survivability of cardiac arrest victims support early defibrillation by first responders within the first few minutes after discovery of cardiac arrest to ensure maximum survivability of the ventricular fibrillation patient.

While station location is an important factor in rapid response to these events, it is also important that early notification and intervention take place to increase the chances for survival.

It is for these reasons that NFPA Standard 1710 states:

- a fire department shall establish a total response time objective of "six (6) minutes or less for the arrival of a unit with first responder or higher level capability at an emergency medical incident,"
- a fire department shall establish a total response time objective of "ten (10) minutes or less for the arrival of an advanced life support unit at an emergency medical incident, where this service is provided by the fire department."

- ALS emergency response deployments "shall include a minimum of two members trained at the emergency medical technician-paramedic level and two members trained at the emergency medical technician-basic level arriving on scene within the established response time."

Cascade of Events

Once a report of an emergency and its location has been received by the emergency communications dispatch center, the SVFRA can begin to influence the subsequent timeline of events. By contractual agreement, the emergency communications dispatch center has a maximum of one minute and ten seconds (70 seconds) to notify SVFRA of the incident 90 percent of the time. From that point of notification, direct fire department actions, along with outside influences such as additional emergency calls, distance to the incident, traffic and weather patterns, etc., result in the final response time to any specific event.

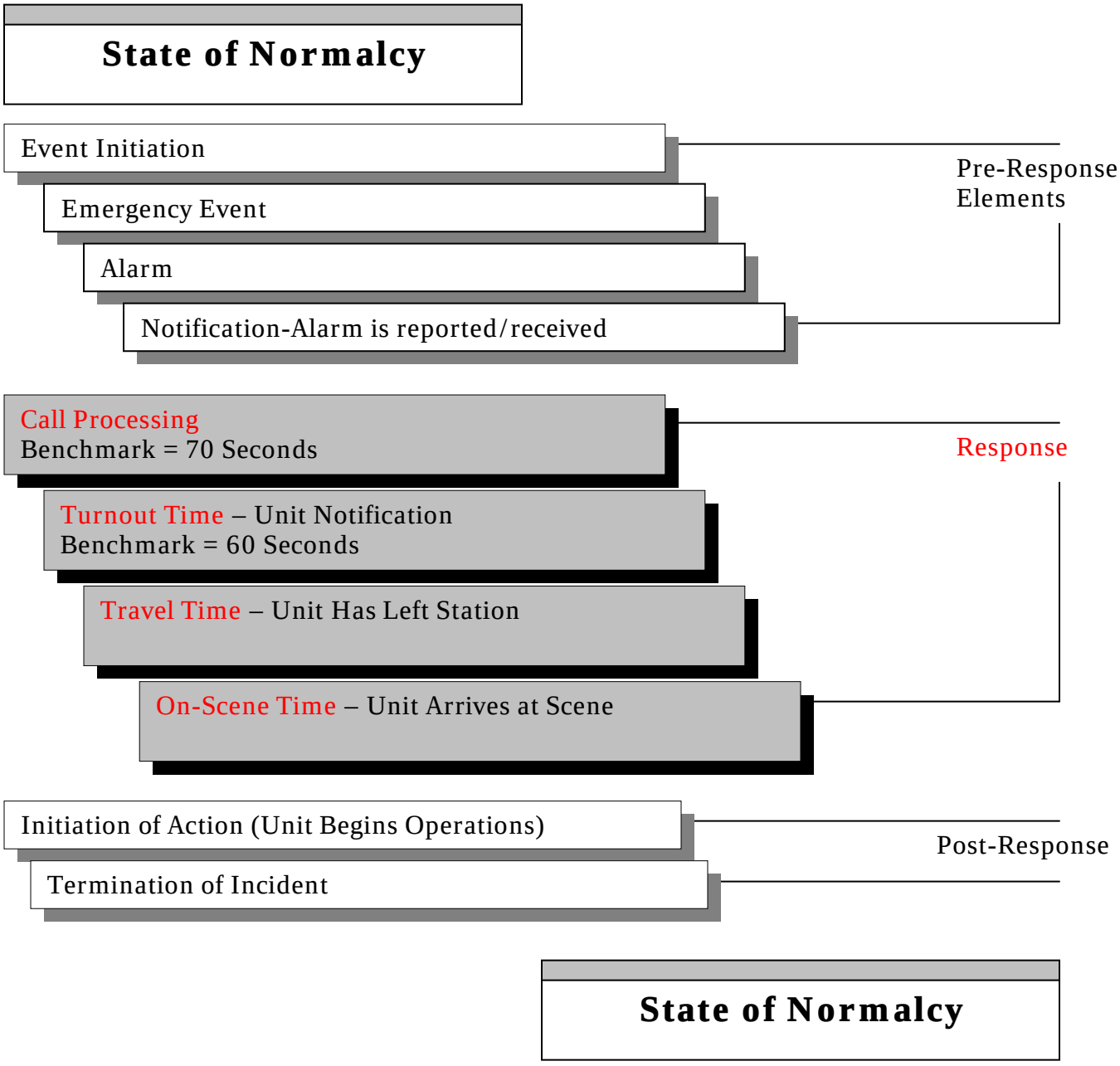
As can be seen in the following chart, there are several uncontrollable factors in responding to emergency incidents. These factors provide data that is not measurable. There is no measurement of the time from when an incident actually starts to when it is discovered. This fact holds true even when there are automatic detection devices and automatic extinguishing systems. There is no way to accurately determine the time between discovery of the event and notification of the emergency communications system (although that time seems to multiply in the minds of the average person discovering and reporting an emergency incident).

The following times can be readily measured:

Call Processing:	from initial point of contact (911) to when the appropriate response unit is dispatched
Turnout Time:	from when the appropriate response unit receives the alarm from dispatch to when the unit actually leaves the fire station
Travel Time:	the actual driving time from a fire station to an emergency incident
On Scene Time:	starts when the emergency response unit arrives on the scene of an incident

The SVFRA is improving diagnostic tools to measure and reduce times by working cooperatively with the regional emergency-dispatching agency (REDCOM) and by assessing internal operations for opportunities to improve.

For all incidents there are factors that affect successful outcomes. They include station location, number of units, and the staffing required to mitigate emergency incidents. These elements can be analyzed by using the following cascade of events:


State of Normalcy
Event Initiation
Emergency Event
Alarm
Notification-Alarm is reported/received
Pre-Response Elements
Call Processing
Benchmark = 70 Seconds
Turnout Time – Unit Notification
Benchmark = 60 Seconds
Travel Time – Unit Has Left Station
On-Scene Time – Unit Arrives at Scene
Response
Initiation of Action (Unit Begins Operations)
Termination of Incident
Post-Response
State of Normalcy

On-Scene Operations

It is known that the variables of fire growth dynamics along with property and life risk combine to determine the fire ground tasks that must be accomplished to stop the loss. These tasks are interrelated but can be separated into two basic types: fire flow and life safety. Fire-flow tasks are those related to getting water on the fire. Life-safety tasks are those related to finding trapped victims and removing them from the building.

Our number one priority on an incident is life safety for all individuals involved. The on scene incident commander makes an analysis upon arrival for life-safety tasks that need to be accomplished immediately. Some of the elements in the analysis are the type of structure, occupancy classification (single-family residence, multi-family, board and care, industrial, etc.) time of day, and known characteristics of the occupancy; all of these are factored into the deployment necessary to mitigate the emergency. The tasks can range from simple to complex based on all of the aforementioned criteria.

The required fire flow is based on the building: its size, structural material, and distance from other buildings, horizontal and vertical openness (lack of partitions) and its contents type, density, and combustibility. Fire flow tasks can be accomplished with handheld hoses or master streams (nozzles usually attached to the engine or ladder truck). Each handheld hose requires a minimum of two or three firefighters depending on the size of the hose being used. The diameter of the hose affects nozzle reaction (opposing force); the greater the force equates to more people needed to maneuver the line through or around obstructions. Master streams, which flow large quantities of water, take relatively fewer firefighters to operate because they are fixed to the apparatus.

The decision to use hand lines or master streams depends upon the stage of fire on arrival and the threat to life safety. If the fire is in a pre-flashover stage, firefighters can make an offensive fire attack into the building with hand lines. The lines are then used to attack the fire and shield trapped victims until they can be removed from the building. If the fire is in its post-flashover stage and the fire has extended beyond the capacity or mobility of hand-held hoses, or the structural damage is a threat to the firefighters' life safety, then the structure is declared lost and master streams are employed to keep the fire from advancing to surrounding buildings. This fire then becomes a defensive fire and we would use a defensive strategy. A defensive strategy is one that allows for no interior fire attack; therefore, no rescue of trapped victims is attempted. All firefighting is performed from the outside of the structure with the goal of containing the fire to the initial structure involved. Conversely, the offensive strategy is an aggressive interior fire attack with the top priority being rescue. The offensive strategy requires that fire companies arrive faster than in the defensive strategy.

SVFRA personnel are trained to perform aggressive offensive attacks whenever possible. The suppression objectives are to, first, put a hose line between the victims and the fire and, second, to contain the fire to the room of origin.

It is the goal of the SVFRA to limit the number of fires that spread beyond the room of origin.

Critical Task Analysis

Coordinated teamwork is the key to a fire department's success at a fire, regardless of whether the fire ground tasks are all fire flow related or a combination of fire flow and life safety tasks. In creating standards of response coverage, an assessment must be conducted to determine the capabilities of the arriving companies and individual firefighters to achieve those tasks.

The SVFRA has evaluated the critical tasks needed for fires in each of the risk categories. When identifying critical tasks, firefighter safety must be emphasized. Whenever interior fire operations are to be accomplished that require the use of protective clothing (turnout gear, SCBA and a minimum 1-3/4" hose line), additional personnel must be staged to perform rescue functions for interior firefighters in the event a rescue of those firefighters is necessary. It is also imperative that an on scene incident command structure be in place to manage the total incident and provide for accountability of personnel.

Below, you will find descriptions of critical tasks that must be accomplished by an effective response force in order for the SVFRA to meet its mission, goals and objectives:

Critical Tasks Definitions/Positions Required for Fire Emergencies

Attack Line

A 1-3/4" hose that produces 150 gallons per minute (GPM) and is usually handled by a minimum of two firefighters or a 2-1/2" hose that produces 250 GPM and is handled by two or three firefighters.

Each engine carries a set of attack lines that are either pre-connected to the pump, folded on the hose bed, or in a special pack (hose bundle) for carrying. The selection of which attack line to use depends on the type of structure, the distance to the seat of the fire, and the stage of the fire. The pre-connected lines are the fastest to use but are limited to fires within 200 feet of the fire engine. When attack lines are needed beyond this limit, the hose bed lines or hose bundles are used. A 2-1/2" attack line will be used when the fire is already beyond the flashover stage and threatens an unburned portion of a structure.

Back-up Line

A line that is equal to or greater than the attack line size and length that is taken in behind the attack crew to cover them in the case of an overwhelming fire or if a problem develops with the attack line.

This requires a minimum of two firefighters.

Incident Commander

An officer assigned to the incident to coordinate tactics and strategies for the incident, evaluate results, request additional resources, and monitor conditions that may jeopardize the safety to personnel and patients on the emergency scene.

Pump/Aerial Operator

One firefighter assigned to deliver water under the right pressure to the attack, backup and exposure lines, and to monitor the pressure changes caused by changing flows on each line.

Additionally, the firefighter may operate the aerial device for rescue, firefighter access/egress, or above ground water application. This firefighter also completes hose connections to the correct discharges and the water supply connections to the correct intake. The pump operator can sometimes manage the hydrant connection alone if the fire engine is near a hydrant, but typical hydrant spacing precludes this.

Safety Officer

One firefighter dedicated to the exterior of the structure with the sole responsibility of firefighter and on scene safety.

Search and Rescue

A minimum of two firefighters assigned to search for living victims and remove them from danger while the attack crew moves between the victims and the fire to stop the fire from advancing.

A two-person crew is normally sufficient for most moderate risk structures, but more crews are required in multi-story buildings or structures with people who are not capable of self-preservation.

Utilities/Forcible Entry

At least one firefighter must turn off natural gas supply lines, electrical service, and water to the affected structures. Interior firefighters cannot open any concealed spaces such as attics until utilities are secured. A firefighter may also be used to force rear doors for secondary egress, remove bars from windows, or force entry through gates to provide access around the structure.

Ventilation (Fire)

A minimum of two firefighters is needed to open a horizontal or vertical ventilation channel when the attack crew is ready to enter the building. Vertical ventilation or ventilation of a multi-story building can require more than two firefighters. Ventilation removes superheated gases and obscuring smoke, prevents flashover and allows attack crews to see and work closer to the seat of the fire. It also gives the fire an exit route so the attack crew can “push” the fire through the opening they choose, thereby keeping it away from endangered people or unburned property.

Ventilation must be closely timed with the fire attack. If performed too soon, the fire will get additional oxygen and grow. If performed too late, the attack crew cannot push the fire in the direction they want. Instead, the gases and smoke will be forced back toward the firefighters and their entry point, which endangers them, any victims they are protecting, and unburned property.

2-OUT/Rapid Intervention Team

A minimum of two firefighters equipped with self-contained breathing apparatus (SCBA) positioned near the point of entry with the sole purpose of rescuing firefighters who become trapped, lost or in need of rescue.

This particular requirement is an OSHA rule.

Critical Tasks Definitions/Positions Required for Medical Emergencies

The SVFRA also conducted a critical task analysis for cardiac arrest emergencies and traffic collisions requiring the extrication of patients.

Advanced Airway

The placement of a device into the patient's trachea to create a secure, non-collapsible airway and a potential route for medication administration.

This action requires one ALS provider who will be committed to placement and continuous monitoring.

Ambulance Driver

One person who drives the vehicle to the emergency scene and delivers the patient and personnel to the hospital.

C-Spine/Initial Assessment

One person who is responsible for initial contact and assessment of a potential spinal injury, while protecting the patient's cervical spine from further injury and obtaining consent for treatment.

This person will be committed to cervical spine stabilization until the patient is extricated and packaged for transport.

Compressions

The act of compressing the chest, at a specified location and prescribed rate and depth, to create blood flow by increasing the intra-thoracic pressure and directly compressing the heart.

This action requires one dedicated person, who will be committed to this task until relieved or arrival at the receiving facility.

Extrication

To free a patient from entrapment in a vehicle that has sustained major damage from impact.

This may include, but is not limited to: the removal of glass, removal of doors, vehicle stabilization, movement of steering column, and removal of any structural member of the vehicle.

Fire Engine Driver

One person who follows the ambulance to the hospital to pick up additional personnel assisting with patient care.

IV/Medication Administration

The act of placing an intravenous catheter to provide a non-collapsible route for the delivery of medications and fluids.

This task requires one ALS person to secure the IV and utilize it to administer necessary medications and fluid throughout patient care.

Patient Care & Transport

A minimum of two persons, one being ALS, who provide care for the patient at the accident scene.

During extrication they prepare equipment and coordinate care with the receiving hospital physician.

Protection Line

A 1-3/4" hose deployed from a fire engine and staffed with two persons for protection of patient and personnel operating at a traffic collision.

This line is a safety measure taken in the event fluids leaking from the vehicle ignite from extrication tools and/or the damaged vehicle.

Supervisor/Documentation

An engine company officer who, during a medical emergency, can supervise and monitor the actions of the personnel.

This position is also responsible for ensuring personnel and patient safety. Additionally, this person documents important information for pre-hospital care and report writing.

Ventilations (EMS)

Application of mechanically- or manually-generated pressures to gas in or about the airway as a means of producing gas exchange between the lungs and surrounding atmosphere.

Effective Response Force

The following charts outline critical tasks that must be performed by an “Effective Response Force” to meet service level objective(s) as recommended by the Standards of Response Coverage Committee for each risk type.

These charts indicate the minimum number of personnel required to safely perform each of the required tasks at typical incidents per NFPA 1710. These minimum staffing numbers increase because of incident size and severity, weather problems, and long distances from the apparatus to the seat of fire or victim location. Reductions of personnel below the minimum requirements for each type of incident adversely affect the safety of personnel, victims and property involved.

Minimum Tasks/Staffing Needed at a **"Moderate Risk"** Structure Fire	
	No. of Personnel
Attack Line	2
Pump Operator	1
Search & Rescue	2
Forcible Entry	1
Ventilation	2
Incident Commander/Safety	1
Back-Up Line	2
2-Out/ "I-RIT" (*Initial Rapid Intervention Team)*	2
Utility Control	1
Total	**14***

**2005/2006/2007 average SVFRA response for all structure fires was 14.*

Minimum Tasks/Staffing needed at a **"Significant Risk"** Structure Fire	
	No. of Personnel
Attack Line	2
Pump/Aerial Operator	2
Forcible Entry	1
Search & Rescue	2
Utility Control	1
Ventilation	3
Incident Commander	1
Safety Officer	1
Back-Up Line	2
Rapid Intervention Team	3
Total	**18***

**2005/2006/2007 average SVFRA response for all structure fires was 14.*

Minimum Tasks/Staffing Needed at a **"Maximum Risk"** Structure Fire	
	No. of Personnel
Attack Line	3
Pump/Aerial Operator	2
Forcible Entry	2
Search & Rescue	4
Utility Control	2
Ventilation	3
Incident Commander	1
Safety Officer	1
Back-Up Line	3
Rapid Intervention Team	3
Total	**24***

**2005/2006/2007 average SVFRA response for all structure fires was 14, 11 of which are funded daily staffing and the balance comprised of part-time and mutual aid agreements.*

Minimum Tasks/Staffing needed at a **"Wildland-Grass Fire"**	
	No. of Personnel
Attack Line(s)/Fire Line Construction	6
Pump Operators	2
Structure Protection	3
Incident Commander/Safety Officer	1
Total	**12***

**2005/2006/2007 average SVFRA response for wildland-grass fires was 12. Full time staffing is supplemented by a seasonal CAL FIRE (CDF) engine.*

Minimum Tasks/Staffing Traffic Collision **"Extrication 1 Patient"**	
	No. of Personnel
C-Spine & Initial Assessment	1
Extrication	3
Protection Line	2
Incident Commander/Safety Officer	1
Patient Care & Transport	2
Total	**9***

**2005/2006/2007 average SVFRA response for extrications (1 patient extricated) was 8. Typically, the protection line critical task would be reduced by one person as needed.*

Minimum Tasks/Staffing Medical Aid **"Cardiac Arrest" On-Scene**	
	No. of Personnel
Compressions	1
Ventilations	1
Advanced Airway	1
IV/ Medication Administration	1
Supervisor/Documentation	1
Total	**5***

*2005/2006/2007 average SVFRA response for all medical aids was consistently 5, including all cardiac arrest scenarios.

Minimum Tasks/Staffing Medical Aid **"Cardiac Arrest" Transport**	
	No. of Personnel
Ambulance Driver	1
Fire Engine Driver	1
Ventilations	1
Compressions	1
Drug Administration	1
Total	**5**

Standards of Response Coverage Benchmarks

Today's modern standards of response coverage benchmarks, as defined by the Center for Public Safety Excellence and the Commission on Fire Accreditation International, encourage multiple levels of service within the following categories combined with appropriate deployment of equipment and personnel. As agencies analyze their response times, those times should include call processing, turnout and travel time.

The Standards of Response Coverage Committee designates the categories below as the standard category designations as defined by the U.S. Census Bureau. The classifications Urban, Suburban, Rural have different response criteria based upon the population density of each zone

- It is often difficult for people living in a community that they consider to be suburban or rural to comprehend that population and building density in some areas of the community can present conditions that would cause those areas to be considered as urban when evaluating fire protection needs.
- In reviewing the appropriate maps showing the urban classification, it must be noted that in some areas the urban classifications extend into risk areas that are lesser risk classifications. This is due to the fact that census tract data was used to prepare the maps.

URBAN: as defined by the U.S. Census Bureau, an area with at least 1,000 people per square mile.

	1st Unit	2nd Unit	Balance of Assignment	Performance
Benchmark	6 min.	10 min.	10 min.	90 percent

SUBURBAN: as defined by the U.S. Census Bureau, an area with between 500 and 1,000 people per square mile.

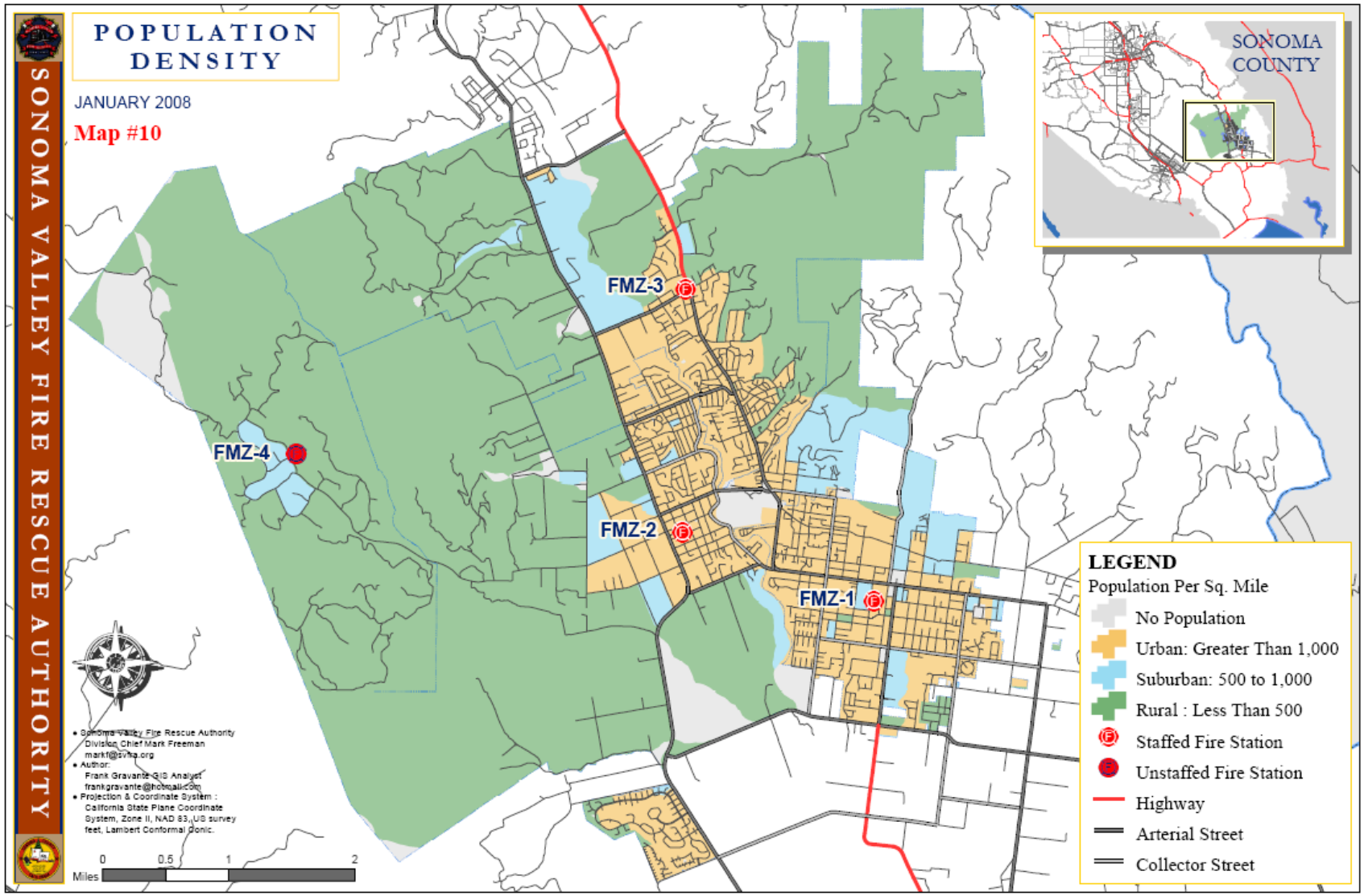
	1st Unit	2nd Unit	Balance of Assignment	Performance
Benchmark	7 min.	10 min.	12 min.	90 percent

RURAL: as defined by the U.S. Census Bureau, an area with fewer than 500 people per square mile.

	1st Unit	2nd Unit	Balance of Assignment	Performance
Benchmark	12 min.	16 min.	16 min.	90 percent

The following map illustrates the current population density in the service area:

Please refer to Map #10 ***"Population Density"*** *in the attached map book for a larger view.*



SERVICE LEVEL OBJECTIVES

Given the risks identified in the SVFRA's jurisdiction, the number of firefighters needed to perform critical tasks, and understanding Standards of Response Benchmarks, the Standards of Response Coverage Committee recommends the following performance goals for each category classification:

"Urban" Service Level Objectives

Emergency Medical Services

Goal: An effective response force of 5 personnel with appropriate equipment

Measure: The first unit shall arrive on scene within 6 minutes, 90 percent of the time. The ambulance shall arrive within 10 minutes, 90 percent of the time.

Performance Objective: To stop escalation of a medical emergency where found. Typically, this means providing advanced life support and/or minor medical treatment as necessary for two or fewer patients.

Traffic Collision (with patient extrication needed)

Goal: An effective response force of 9 personnel with appropriate equipment

Measure: The first unit shall arrive on scene within 6 minutes, 90 percent of the time. The remaining units, including the Chief Officer, shall arrive within 10 minutes, 90 percent of the time.

Performance Objective: To stop escalation of a medical emergency caused by a traffic collision where found. Typically, this means providing advanced life support and/or minor medical treatment and extrication of patients as necessary for two or fewer patients.

Structure Fire, Moderate Risk

Goal: An effective response force of 14 personnel with appropriate equipment

Measure: The first unit shall arrive on scene within 6 minutes, 90 percent of the time. Remaining units, including the Chief Officer, shall arrive within 10 minutes, 90 percent of the time.

Performance Objective: To stop escalation of a moderate risk fire where found. Typically, this means conducting a search and rescue for any victims, confining fire damage near the room of origin, plus limiting heat and smoke damage to the area or floor of fire origin, ventilation, rapid intervention rescue for trapped firefighters, and property salvage.

Structure Fire, Significant Risk

Goal: An effective response force of 18 personnel deployed with appropriate equipment

Measure: The first unit shall arrive on scene within 6 minutes, 90 percent of the time. Remaining units, including Chief Officers, shall arrive within 10 minutes, 90 percent of the time.

Performance Objective: To stop escalation of a significant risk fire where found. Typically, this means conducting a search and rescue for any victims, confining fire damage near the room of origin, plus limiting heat and smoke damage to the area of floor of fire origin, ventilation, rapid intervention rescue for trapped firefighters, and property salvage.

Structure Fire, Maximum Risk

Goal: An effective response force of 24 personnel with appropriate equipment

Measure: The first unit shall arrive on scene within 6 minutes, 90 percent of the time. Remaining units, including Chief Officers, shall arrive within 10 minutes, 90 percent of the time.

Performance Objective: To stop escalation of a maximum risk fire where found. Typically, this means conducting a search and rescue for any victims, confining fire damage near the room of origin, plus limiting heat and smoke damage to the area or floor of fire origin, ventilation, rapid intervention rescue for trapped firefighters, and property salvage.

Wildland/Grass Fire

Goal: An effective response force of 12 personnel with appropriate equipment

Measure: The first unit shall arrive on scene within 6 minutes, 90 percent of the time. The remaining units, including the Chief Officer, shall arrive within 10 minutes, 90 percent of the time.

Performance Objective: To stop the escalation of an initial wildland fire where found. Typically, this means controlling the fire to the area of origin without it spreading to adjacent structures or escalating to a size requiring additional resources.

"Suburban" Service Level Objectives

Emergency Medical Services

Goal: An effective response force of 5 personnel with appropriate equipment

Measure: The first unit shall arrive on scene within 7 minutes, 90 percent of the time. The ambulance shall arrive within 10 minutes, 90 percent of the time.

Performance Objective: To stop escalation of a medical emergency where found. Typically, this means providing advanced life support and/or minor medical treatment as necessary for two or fewer patients.

Traffic Collision (with patient extrication needed)

Goal: An effective response force of 9 personnel with appropriate equipment

Measure: The first unit shall arrive on scene within 7 minutes, 90 percent of the time. The second unit shall arrive within 10 minutes, 90 percent of the time, and the remaining units, including the Chief Officer, shall arrive within 12 minutes, 90 percent of the time.

Performance Objective: To stop escalation of a medical emergency caused by a traffic collision where found. Typically, this means providing advanced life support and/or minor medical treatment and extrication of patients as necessary for two or fewer patients.

Structure Fire, Moderate Risk

Goal: An effective response force of 14 personnel with appropriate equipment

Measure: The first unit shall arrive on scene within 7 minutes, 90 percent of the time. The second unit shall arrive within 10 minutes, 90 percent of the time, and the remaining units, including the Chief Officer, shall arrive within 12 minutes, 90 percent of the time.

Performance Objective: To stop escalation of a moderate risk fire where found. Typically, this means conducting a search and rescue for any victims, confining fire damage near the room of origin, plus limiting heat and smoke damage to the area or floor of fire origin, ventilation, rapid intervention rescue for trapped firefighters, and property salvage.

Structure Fire, Significant Risk

Goal: An effective response force of 18 personnel deployed with appropriate equipment

Measure: The first unit shall arrive on scene within 7 minutes, 90 percent of the time. The second unit shall arrive within 10 minutes, 90 percent of the time, and the remaining units, including the Chief Officer, shall arrive within 12 minutes, 90 percent of the time.

Performance Objective: To stop escalation of a significant risk fire where found. Typically, this means conducting a search and rescue for any victims, confining fire damage near the room of origin, plus limiting heat and smoke damage to the area or floor of fire origin, ventilation, rapid intervention rescue for trapped firefighters, and property salvage.

Structure Fire, Maximum Risk

Goal: An effective response force of 24 personnel with appropriate equipment

Measure: The first unit shall arrive on scene within 7 minutes, 90 percent of the time. The second unit shall arrive within 10 minutes, 90 percent of the time, and the remaining units, including the Chief Officer, shall arrive within 12 minutes, 90 percent of the time.

Performance Objective: To stop escalation of a maximum risk fire where found. Typically, this means conducting a search and rescue for any victims, confining fire damage near the room of origin, plus limiting heat and smoke damage to the area or floor of fire origin, ventilation, rapid intervention rescue for trapped firefighters, and property salvage.

Wildland/Grass Fire

Goal: An effective response force of 12 personnel with appropriate equipment

Measure: The first unit shall arrive on scene within 7 minutes, 90 percent of the time. The second unit shall arrive within 10 minutes, 90 percent of the time, and the remaining units, including the Chief Officer, shall arrive within 12 minutes, 90 percent of the time.

Performance Objective: To stop the escalation of an initial wildland fire where found. Typically, this means controlling the fire to the area of origin without it spreading to adjacent structures or escalating to a size requiring additional resources.

"Rural" Service Level Objectives

Emergency Medical Services

Goal: An effective response force of 5 personnel with appropriate equipment

Measure: The first unit shall arrive on scene within 12 minutes, 90 percent of the time. The ambulance shall arrive within 16 minutes, 90 percent of the time.

Performance Objective: To stop escalation of a medical emergency where found. Typically, this means providing advanced life support and/or minor medical treatment as necessary for two or fewer patients.

Traffic Collision (with patient extrication needed)

Goal: An effective response force of 9 personnel with appropriate equipment

Measure: The first unit shall arrive on scene within 12 minutes, 90 percent of the time. The remaining units, including the Chief Officer, shall arrive within 16 minutes, 90 percent of the time.

Performance Objective: To stop escalation of a medical emergency caused by a traffic collision where found. Typically, this means providing advanced life support and/or minor medical treatment and extrication of patients as necessary for two or fewer patients.

Structure Fire, Moderate Risk

Goal: An effective response force of 14 personnel with appropriate equipment

Measure: The first unit shall arrive on scene within 12 minutes, 90 percent of the time. Remaining units, including the Chief Officer, shall arrive within 16 minutes, 90 percent of the time.

Performance Objective: To stop escalation of a moderate risk fire where found. Typically this means conducting a search and rescue for any victims, confining fire damage near the room of origin; plus limiting heat and smoke damage to the area or floor of fire origin, ventilation, rapid intervention rescue for trapped firefighters, and property salvage.

Structure Fire, Significant Risk

Goal: An effective response force of 18 personnel deployed with appropriate equipment

Measure: The first unit shall arrive on scene within 12 minutes, 90 percent of the time. Remaining units, including Chief Officers, shall arrive within 16 minutes, 90 percent of the time.

Performance Objective: To stop escalation of a significant risk fire where found. Typically, this means conducting a search and rescue for any victims, confining fire damage

near the room of origin, plus limiting heat and smoke damage to the area or floor of fire origin, ventilation, rapid intervention rescue for trapped firefighters, and property salvage.

Structure Fire, Maximum Risk

Goal: An effective response force of 24 personnel with appropriate equipment

Measure: The first unit shall arrive on scene within 12 minutes, 90 percent of the time. Remaining units, including Chief Officers, shall arrive within 16 minutes, 90 percent of the time.

Performance Objective: To stop escalation of a maximum risk fire where found. Typically, this means conducting a search and rescue for any victims, confining fire damage near the room of origin, plus limiting heat and smoke damage to the area or floor of fire origin, ventilation, rapid intervention rescue for trapped firefighters, and property salvage.

Wildland/Grass Fire

Goal: An effective response force of 12 personnel with appropriate equipment

Measure: The first unit shall arrive on scene within 12 minutes, 90 percent of the time. The remaining units, including the Chief Officer, shall arrive within 16 minutes, 90 percent of the time.

Performance Objective: To stop the escalation of an initial wildland fire where found. Typically, this means controlling the fire to the area of origin without it spreading to adjacent structures or escalating to a size requiring additional resources.

Service Level Performance Objectives

(1st Due // 2nd Due // Remaining Units)

Incident Type	Urban (min.)	Suburban (min.)	Rural (min.)	#Personnel	Performance %
Emergency Medical	6 // 10 // 10	7 // 10 // 10	12 // 16 // 16	5	90%
Traffic Collision	6 // 10 // 10	7 // 10 // 12	12 // 16 // 16	9	90%
Structure Fire					
Moderate	6 // 10 // 10	7 // 10 // 12	12 // 16 // 16	14	90%
Significant	6 // 10 // 10	7 // 10 // 12	12 // 16 // 16	18	90%
Maximum	6 // 10 // 10	7 // 10 // 12	12 // 16 // 16	24	90%
Wildland//Grass Fire	6 // 10 // 10	7 // 10 // 12	12 // 16 // 16	12	90%

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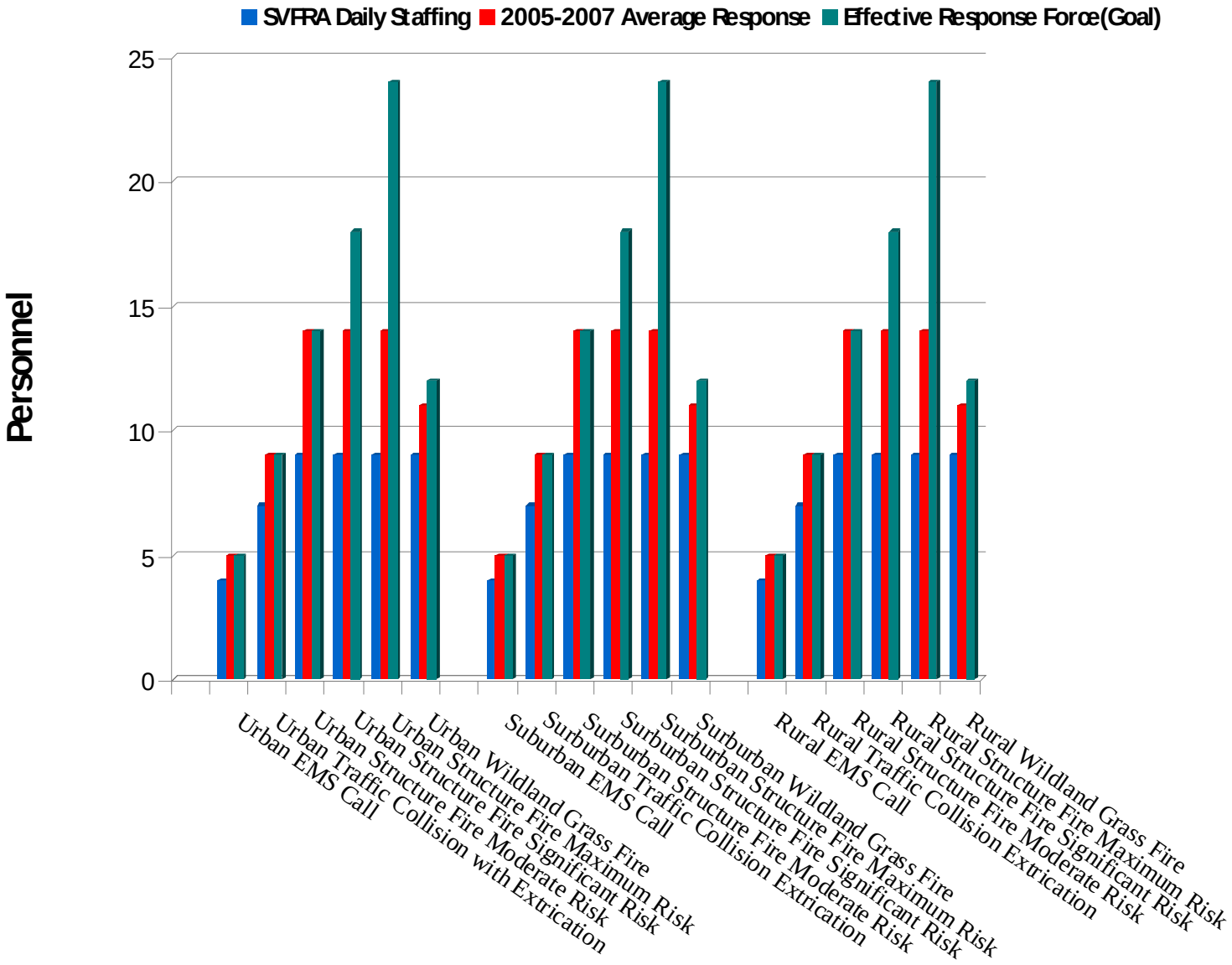
SVFRA Staffing vs. Effective Response Force



Distribution & Concentration Study

The Standards of Response Coverage Process is a baseline tool used to define service level objectives. All outcome data can be analyzed and used to determine appropriate crew size and response times, in addition to the efficient distribution of fire stations. Emergency medical and fire incidents have the most time-dependent constraints. In emergency medical incidents, be it a cardiac arrest that stops the heart, a trauma that causes severe blood loss, or in a respiratory emergency with respiratory failure, the brain can only live a maximum of eight to ten minutes without oxygen. In a building fire, a small incipient fire can grow to involve the entire room in five to ten minutes. If fire department deployment is to achieve positive outcomes in severe EMS and developing fire situations, all crews must arrive, examine the situation, and deploy effective measures before brain death occurs or the fire leaves the room of origin.

When an emergency occurs, whether detected or not, it will continue to escalate during the 911 notification process. In addition to Fire Department notification time, response time and equipment setup time, there are three "clocks" that fire and emergency medical crews must work against to achieve successful outcomes:

1. It takes five to ten minutes for an incipient room fire to fully engulf a room, thus substantially damaging the building and rendering the internal atmosphere untenable for life to exist.
2. When the heart stops in a cardiac arrest patient, the brain starts to die from lack of oxygen in four to six minutes and brain damage becomes irreversible at about the 10-minute point.
3. In a trauma patient the goal is to evaluate, stabilize and begin transport to a trauma center within 10 minutes. Severe blood loss and organ damage becomes so great after the first hour that survival is difficult if not impossible.

In all three instances, first responders that arrive within six minutes of the 911 call have a better chance at a successful resolution. Additional crews must arrive at approximately the ten-minute point.

Distribution

The Commission on Fire Accreditation International defines distribution as, "the locating of geographically distributed, first-due resources for all-risk, initial intervention. These station location(s) are needed to assure rapid deployment to minimize and terminate moderate emergencies." It is the combination of apparatus and staff responding from these stations that is required to mitigate the emergency call for service.

The Standards of Response Coverage Committee recommends using the NFPA 1710 standard of six (6) minutes total response time for the **"First Due Unit,"** using cardiac arrest and flashover as benchmarks when determining distribution of units to enhance the survivability of those we serve.

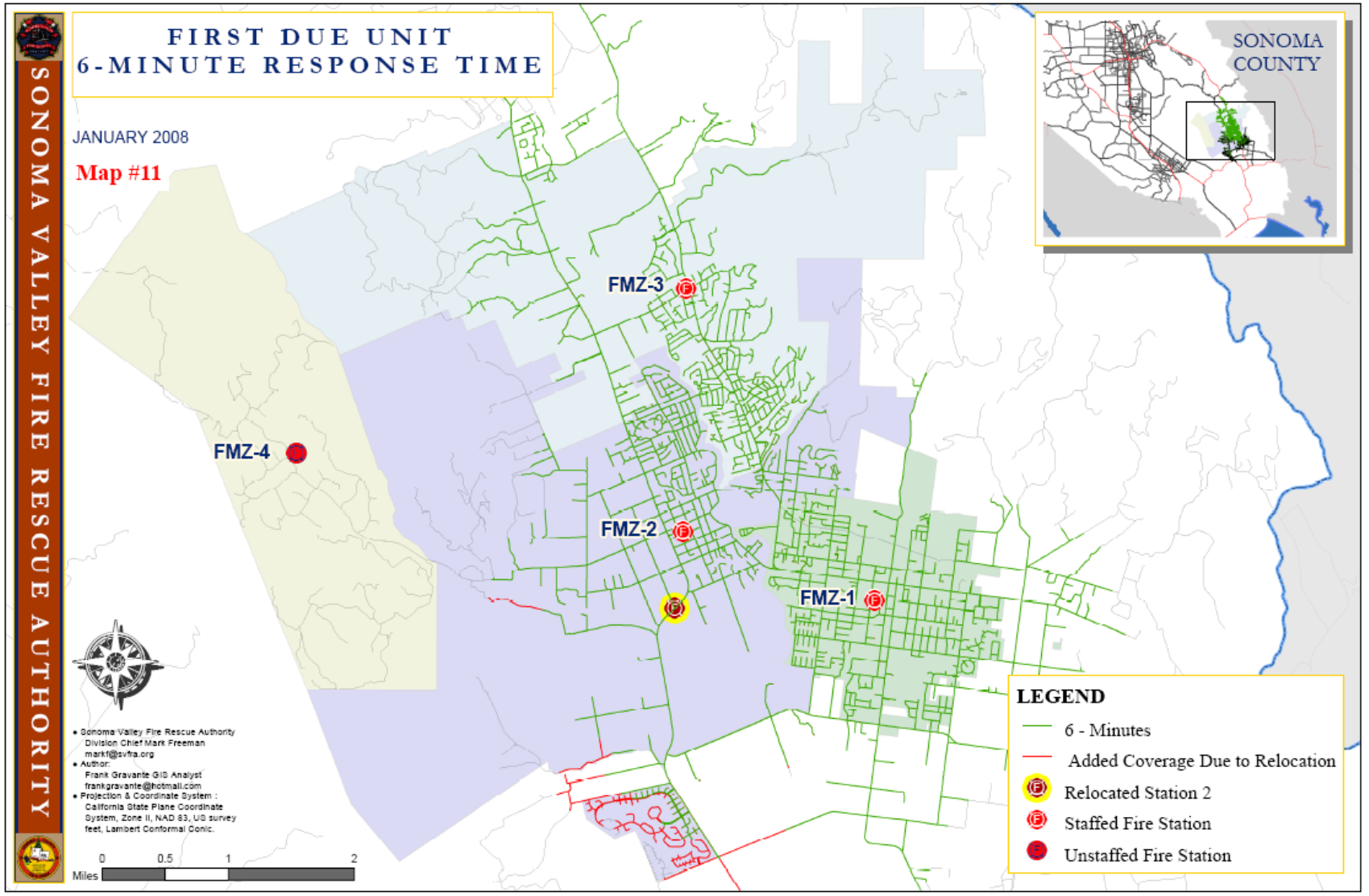
The Sonoma Valley Fire and Rescue Authority will continue to focus on call processing time, turnout and travel times in an effort to reduce total response time. The goal is to

have a call process time and a turnout time of less than one (1) minute each, and a travel time of less than four (4) minutes for the **"First Due Unit"** 90 percent of the time.

There are tentative plans to relocate Station 2 to improve response times in the southern portion of FMZ-2 at such time as funds become available. As can be seen on the following map entitled **"First Due Unit"**, the proposed relocation of Station 2 would take in a large area of the Temelec/Seven Flags area, which currently represents a high-call volume/hard-to-serve area due to its location.

To perform the necessary response time studies, the SVFRA used geographic information system (GIS) software to develop maps. This software uses realistic travel speeds along existing roads to show how far units from each fire station can cover in a given amount of time. The findings were within the time frames recommended utilizing current station locations for Stations 1 and 3 and within the proposed relocation of Station 2 based on call volume location data to meet urban service level objectives.

Please refer to Map #11 ***"First Due Unit"*** *in the attached map book for a larger view.*



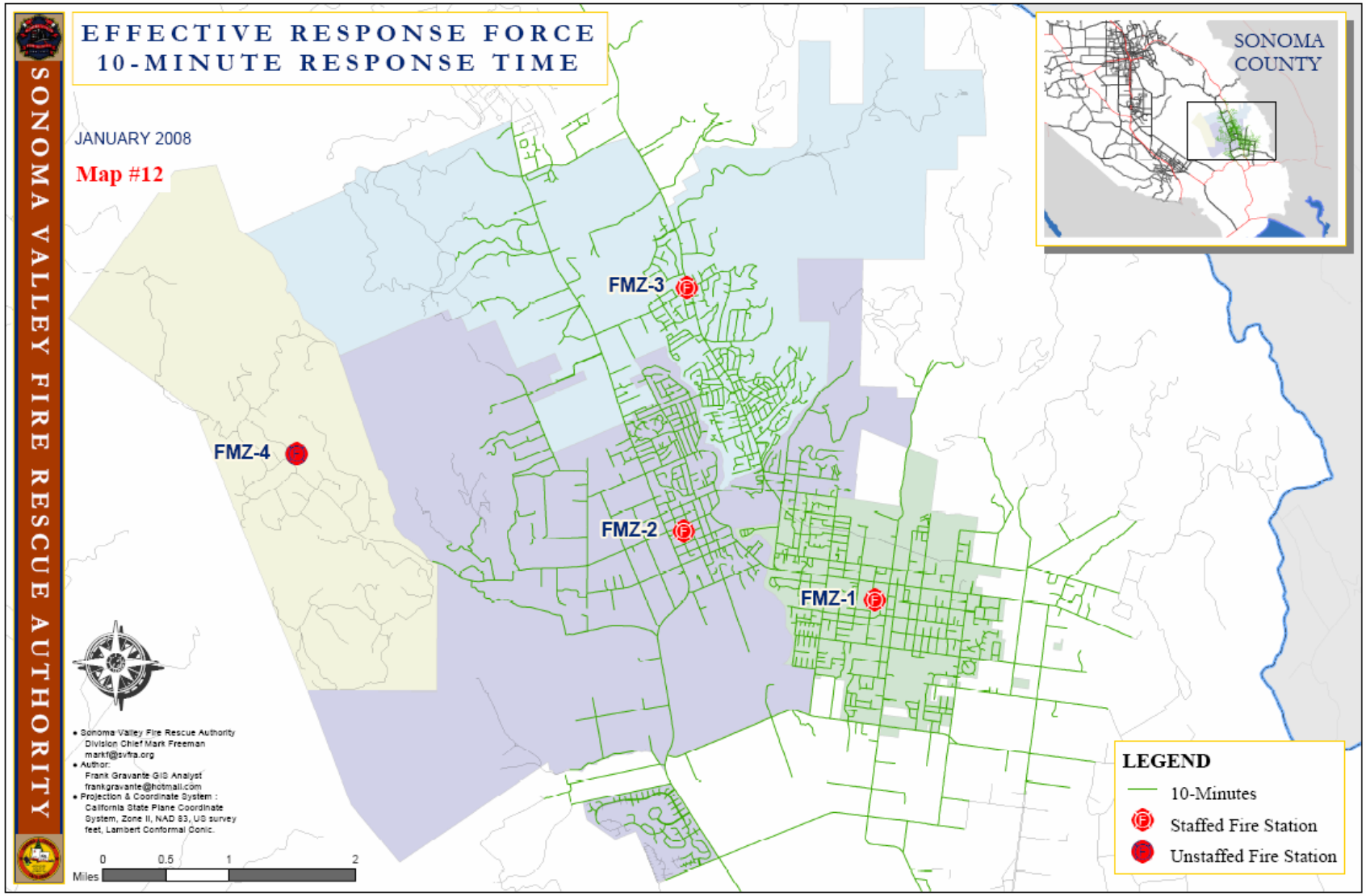
Concentration

The Commission on Fire Accreditation defines concentration as, "the spacing of multiple resources arranged close enough together to provide an initial **'Effective Response Force'** that can be assembled on scene within adopted public policy time frames. The balance of effective response force is that which will most likely stop the escalation of the emergency for each risk type."

The Standards of Response Coverage Committee recommends using the NFPA 1710 standard of ten (10) minutes total response time for the **"Effective Response Force"** and the critical task analysis as a benchmark when determining concentration of units and personnel.

The following map entitled **"Effective Response Force"** depicts the area in which an effective response force of staffed fire department units can arrive in a ten (10) minute total response time.

Please refer to Map #12 ***"Effective Response Force"*** *in the attached map book for a larger view.*



Historical Reliability and Performance

Reliability

Reliability of fire companies refers to the availability of emergency units to be able to respond to emergencies when needed. The reliability of the units is a reflection of the service demands placed on the units in the community by calls for service and other issues that might take a unit out of service.

To understand and evaluate the reliability of fire companies, it is important to understand total call volume, calls by hour of day, calls by day of week, calls by month of year, and a drawdown evaluation of department resources when multiple calls occur at the same time.

The agency is generally unable to handle more than one (1) fire incident or more than two (2) emergency medical incidents at the same time with the current resources of the agency.

Examples include:

- If the agency is working at a structure fire when an emergency medical incident is reported, the agency will not be able to fill the staffing requirements of the EMS event by sending an engine company on the EMS assignment.
- Conversely, if an ambulance has responded to an EMS incident or medical transport and there is a structure fire, the subsequent response force will be reduced by 2 personnel.
- If an engine is assigned to an EMS call along with the ambulance, the subsequent response force will be reduced by 4-5 personnel.

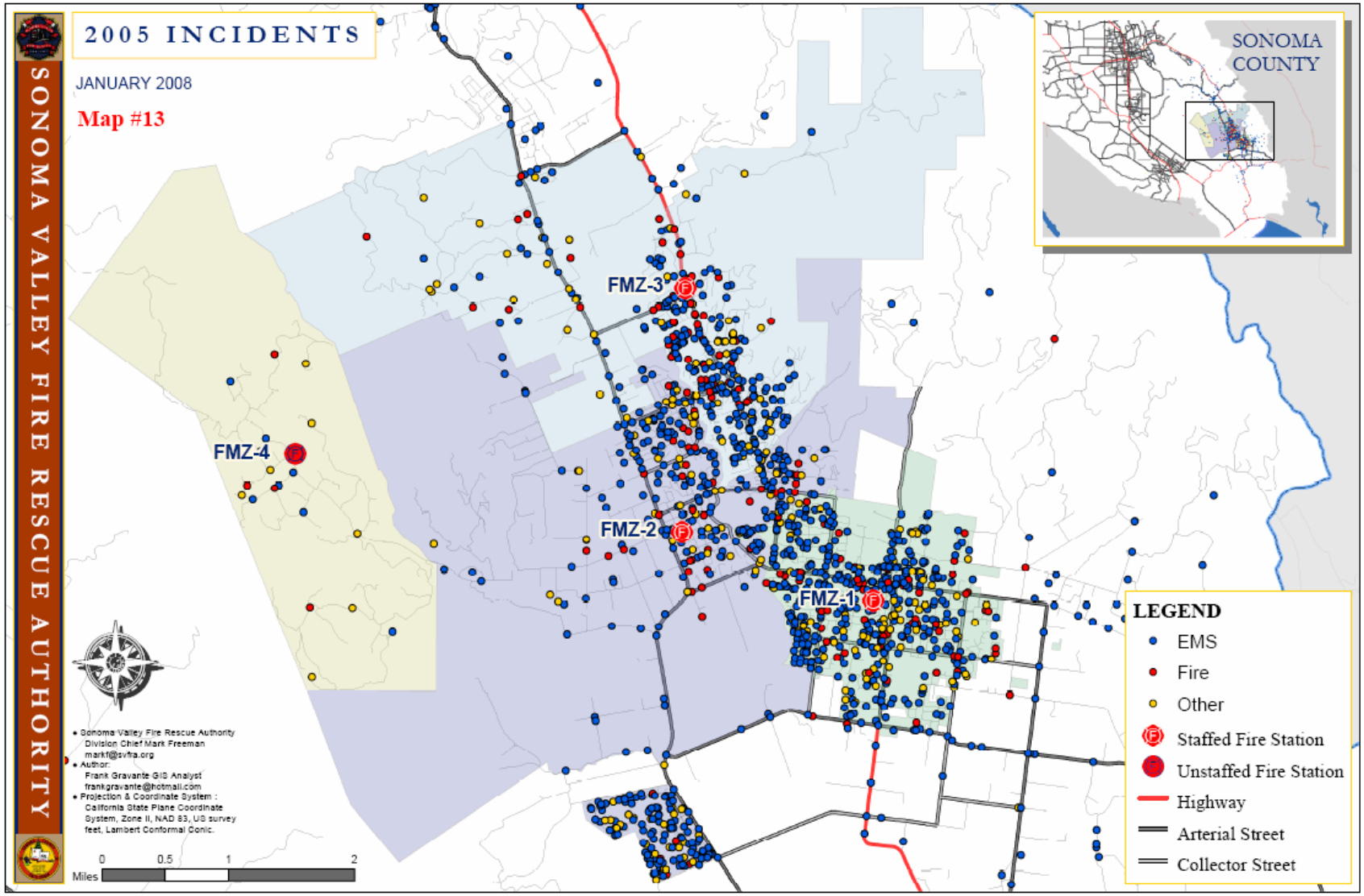
Performance

It must be noted that turnout, travel and response times require the dispatcher to manually time stamp status of a unit, which represents a time delay due to workflow and sometimes human error. "Call Processing Time," which is automated in the CAD (computer-aided dispatch) system is considered reliable and accurate data. In August 2007, the SVFRA implemented MDC (mobile data computer) technology, which enables us to monitor the status of our own units. This has improved the accuracy of turnout, travel and response times.

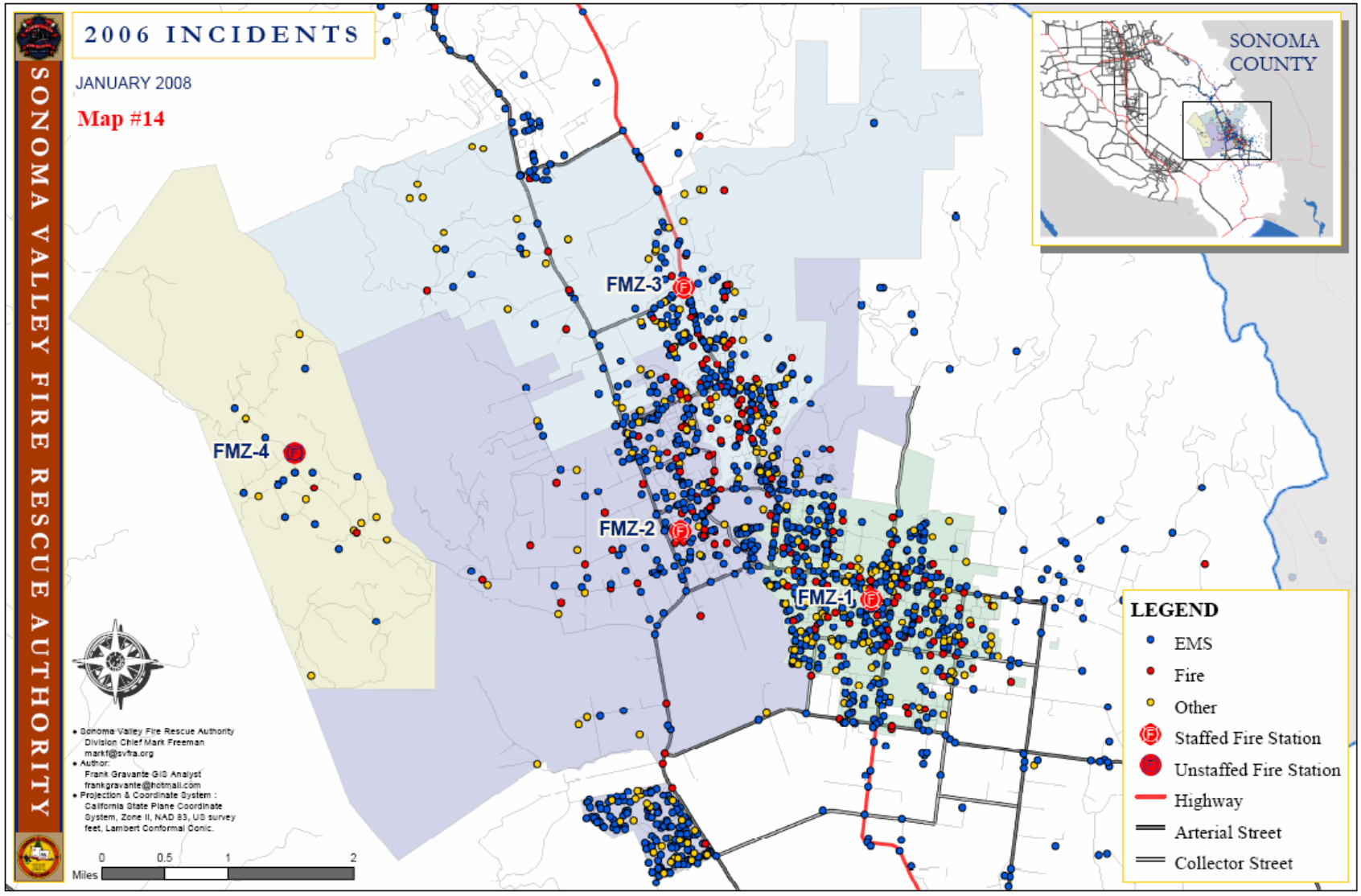
The following maps and charts provide a snapshot of current service demands and historical performance for the years 2005 through 2007.

Map #13, #14 and #15 represent total call volume by call type for calendar years 2005 thru 2007.

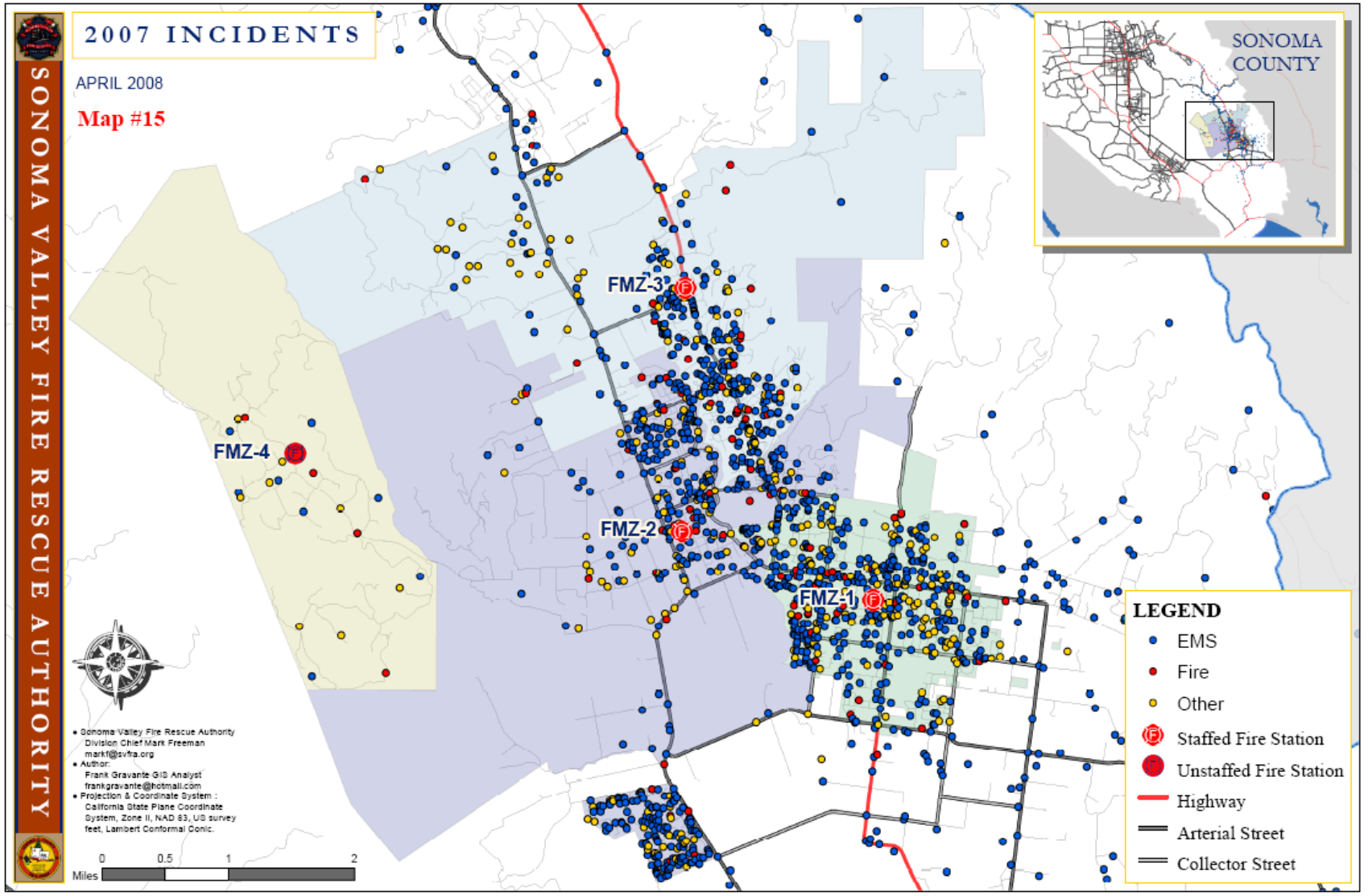
Please refer to Maps #13 ***"2005 Incidents"*** *in the attached map book for a larger view.*



Please refer to Map #14 ***"2006 Incidents"*** *in the attached map book for a larger view.*

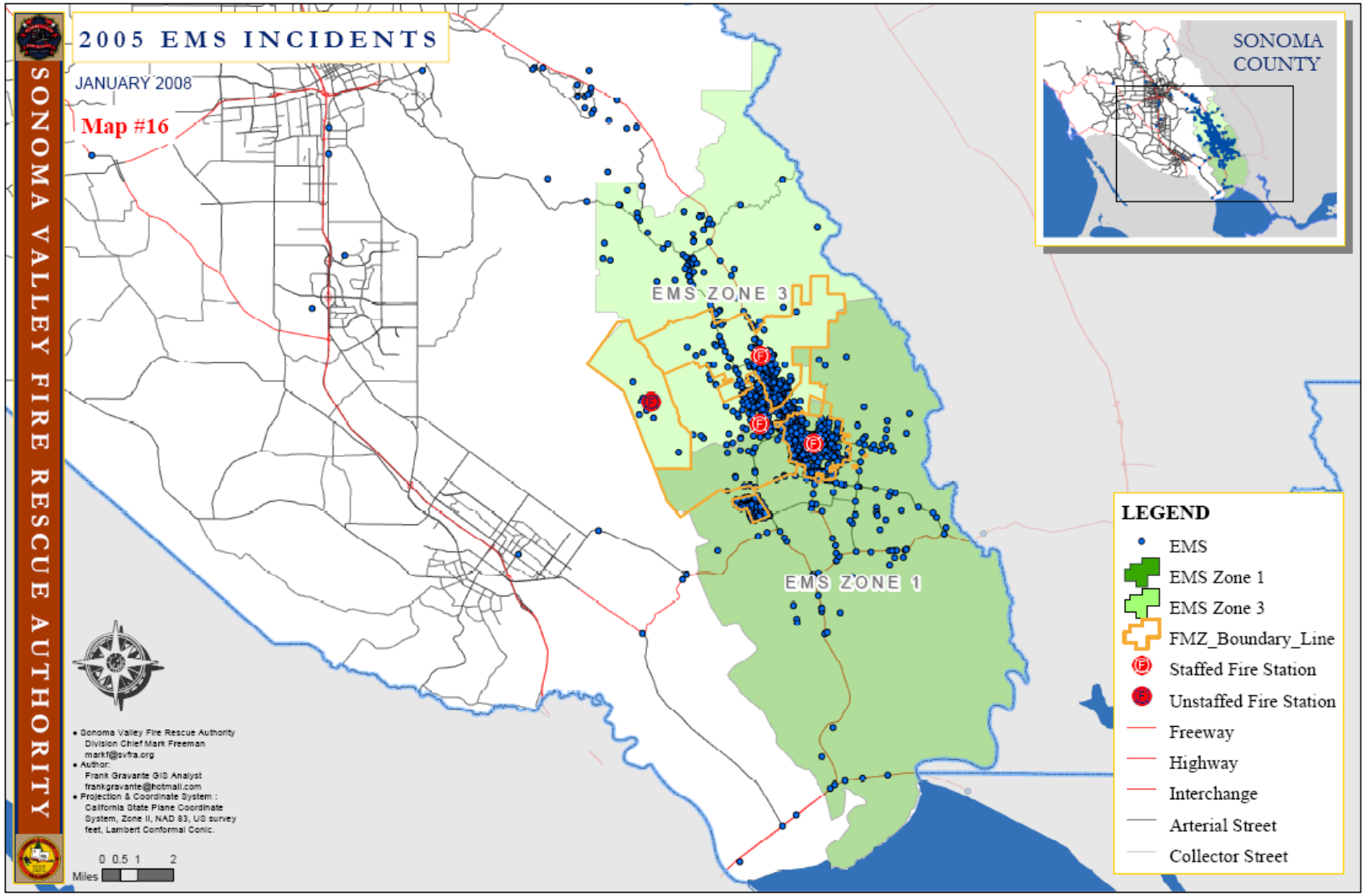


Please refer to Map #15 ***"2007 Incidents"*** *in the attached map book for a larger view.*

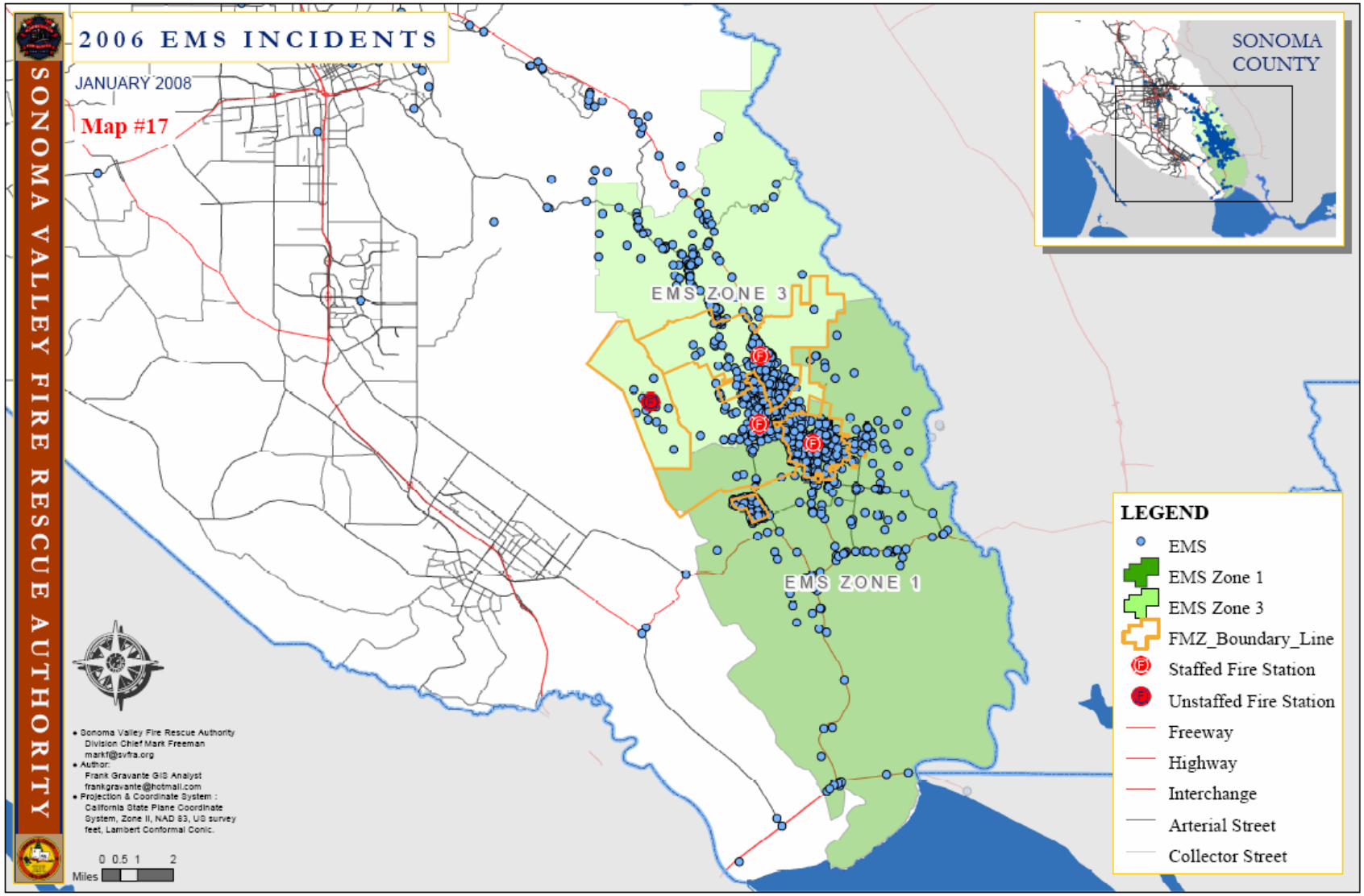


Map #16, #17 and #18 represent total EMS call volume for calendar years 2005 thru 2007.

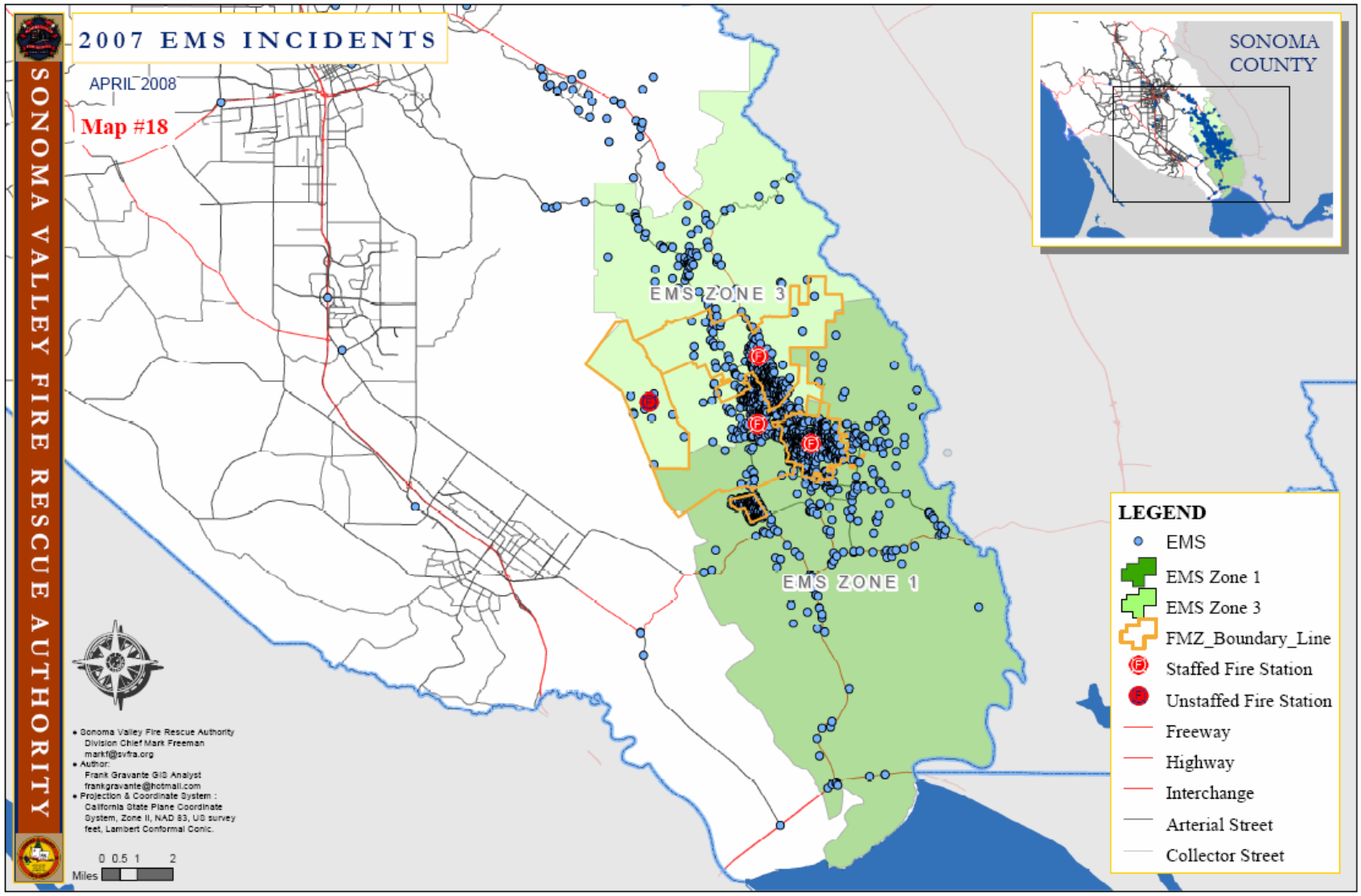
Please refer to Map #16 ***"2005 EMS Incidents"*** *in the attached map book for a larger view.*



Please refer to Map #17 ***"2006 EMS Incidents"*** *in the attached map book for a larger view.*



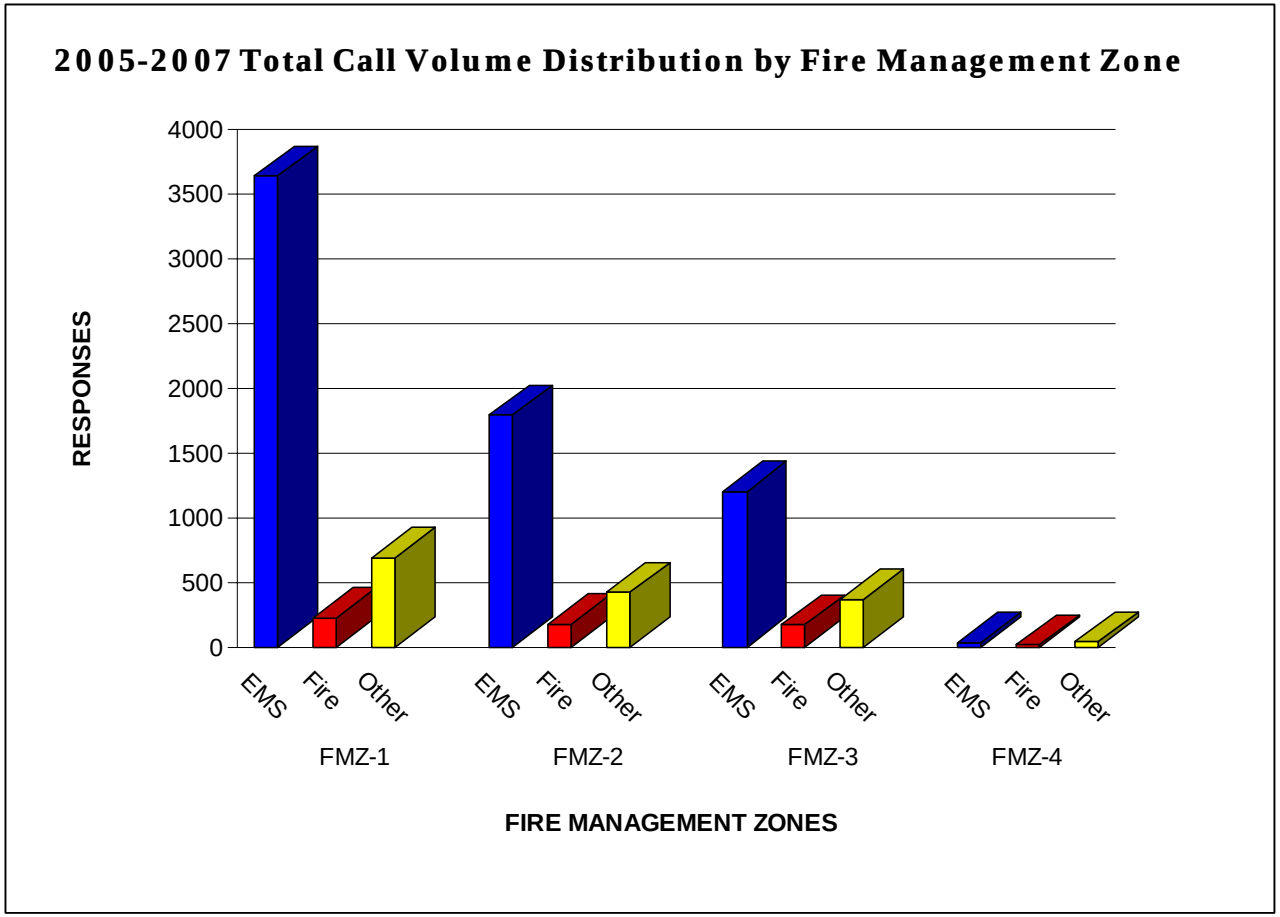
Please refer to Map #18 ***"2007 EMS Incidents"*** *in the attached map book for a larger view.*



2005 – 2007 Calls for Service

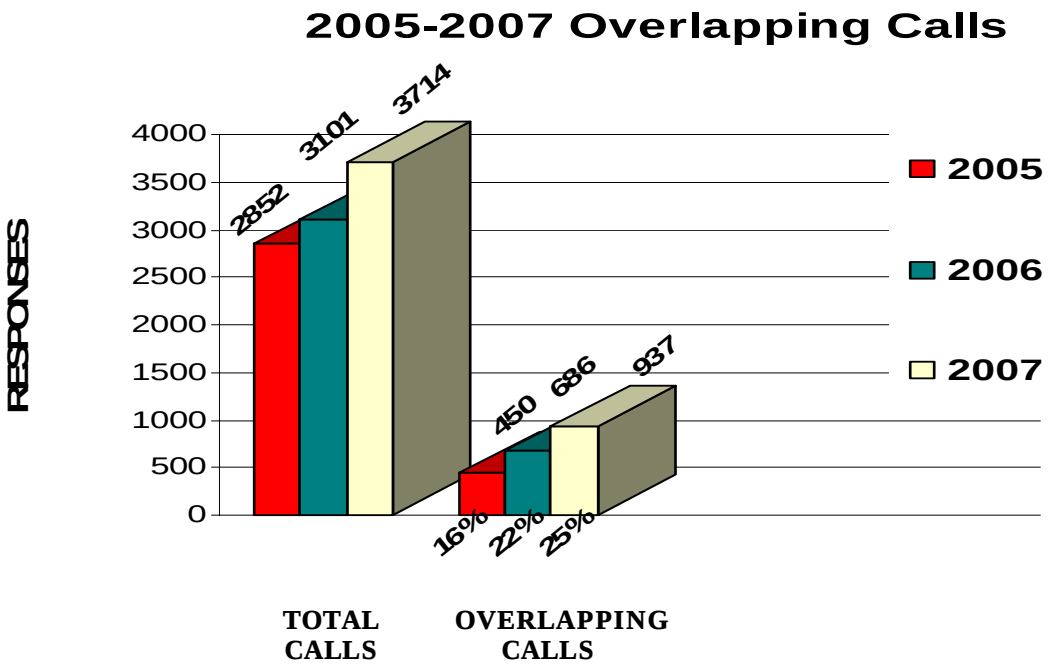
In 2005, there was a total of 3,504 emergency dispatches for the department. In 2006, there was a total of 4,072 emergency dispatches for the department. In 2007 there was a total of 4,127 emergency dispatches for the department.

In 2006 we experienced an increase of 568 calls for service. 294 of the calls are the result of tracking Infineon Raceway workload in overall call volume. Based upon the demographics of the community, it can be reasonably projected that the number of calls for service will continue to grow.



2005 – 2007 Overlapping Calls

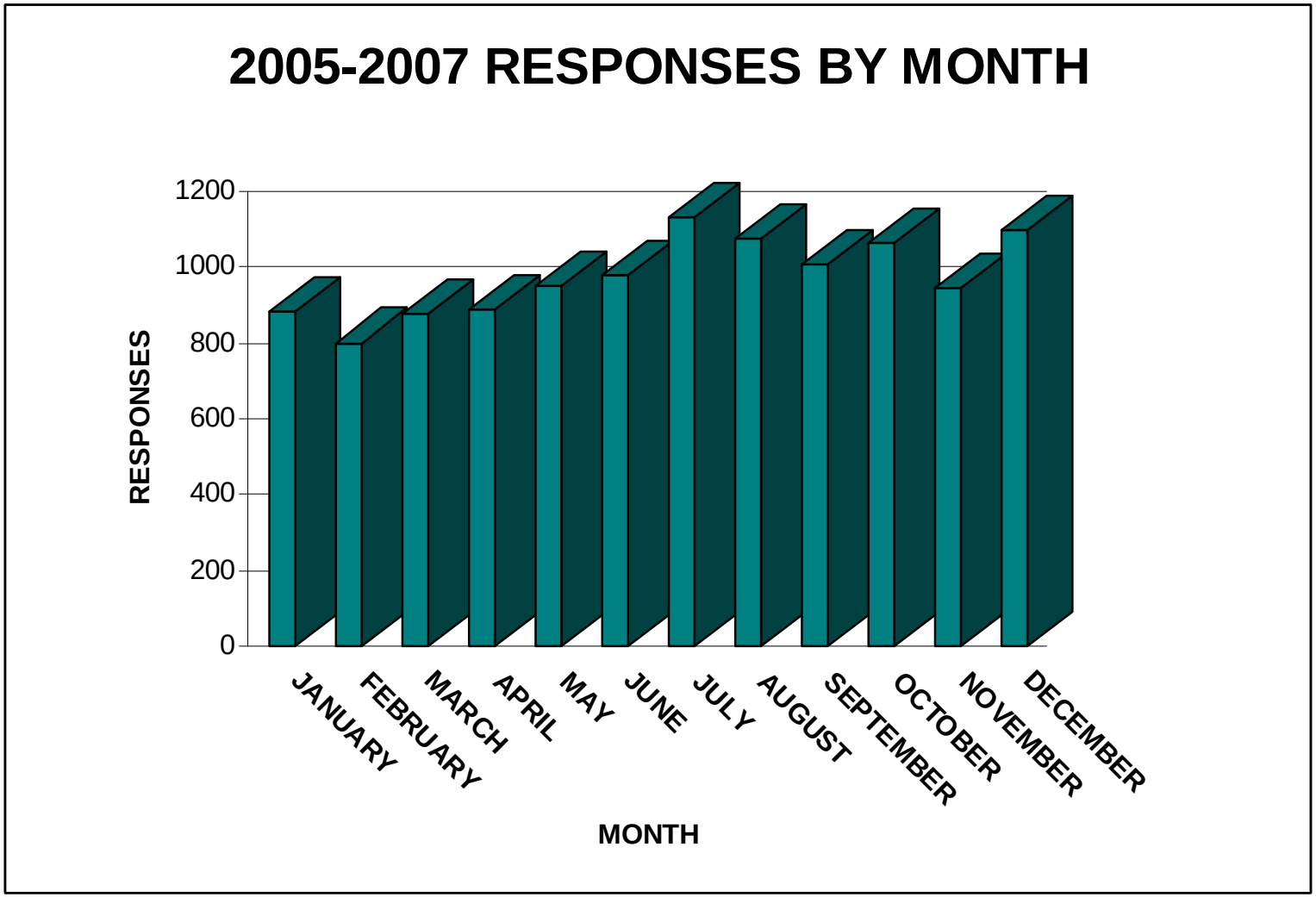
The following graph depicts emergent calls only (does not include Infineon standbys):



Overlapping calls occur when two or more calls for service are simultaneous and require department resources to respond. Every incident reduces available resources and increases travel times to subsequent incidents until the responding units return to service. These occurrences tax the organization's ability to maintain a state of readiness as an all-risk response agency. These conditions are common to every emergency service. The primary issue is to examine the specific impacts of this reduction on service delivery to enable the agency to develop plans and policies to address the issue of assuring a continuous high level of service.

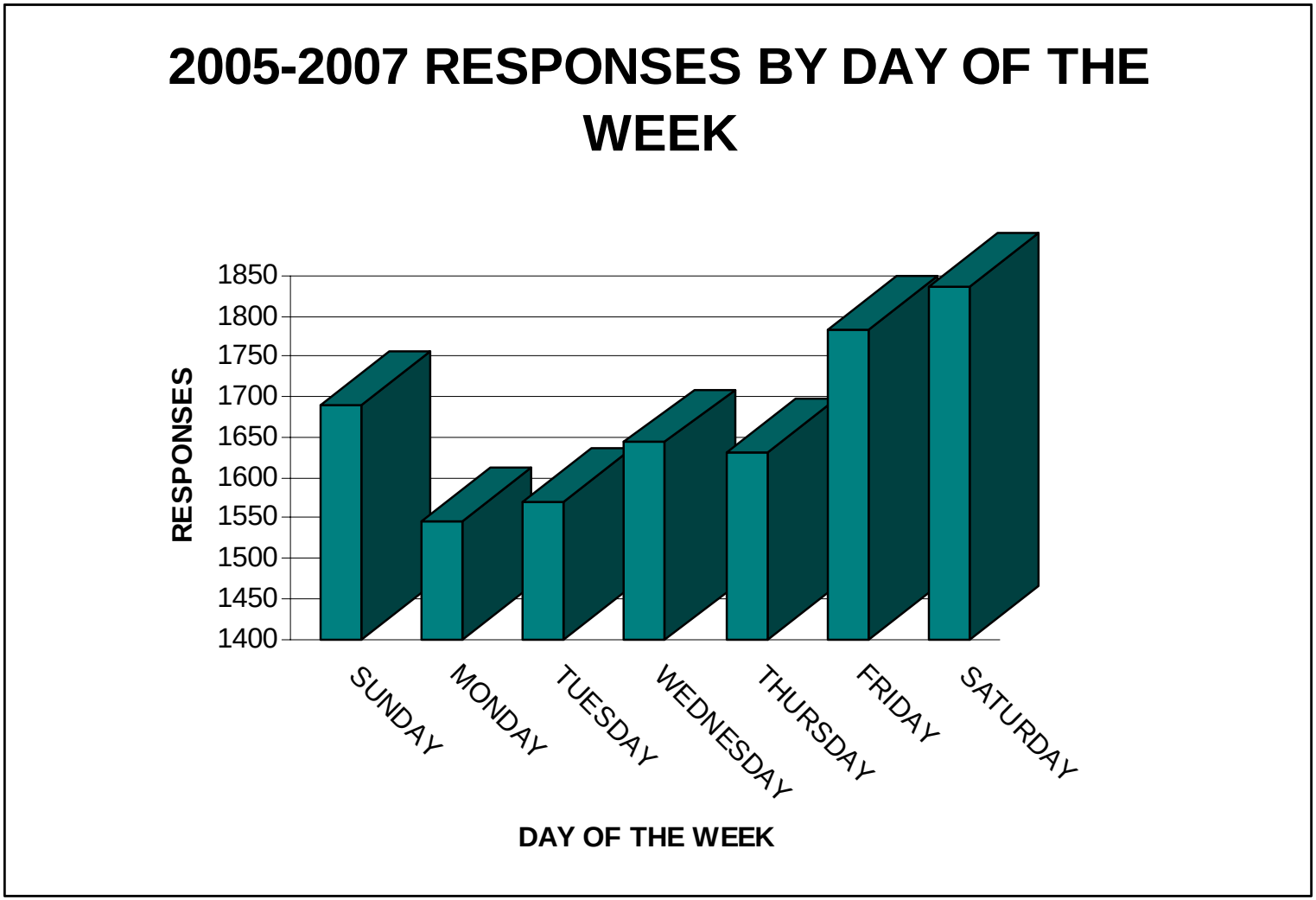
Month-of-Year Distribution of Total Call Volume

As shown in the following chart, there are more calls for service from June through December; however, the difference would not significantly affect staffing or response patterns.



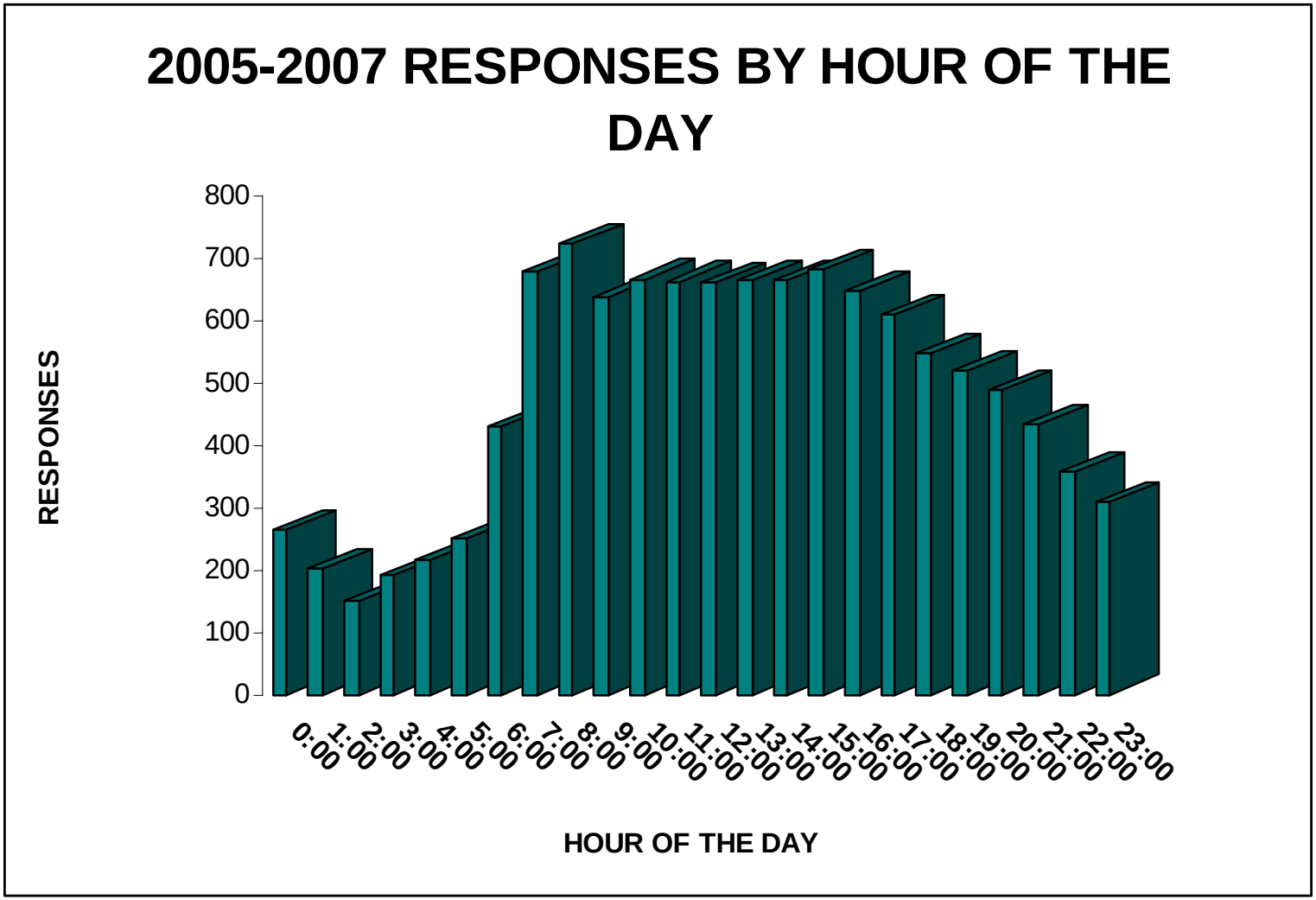
Day of Week Distribution of Total Call Volume

As shown in the following chart, there are more calls for service from Friday through Sunday; however, the difference would not significantly affect staffing or response patterns.



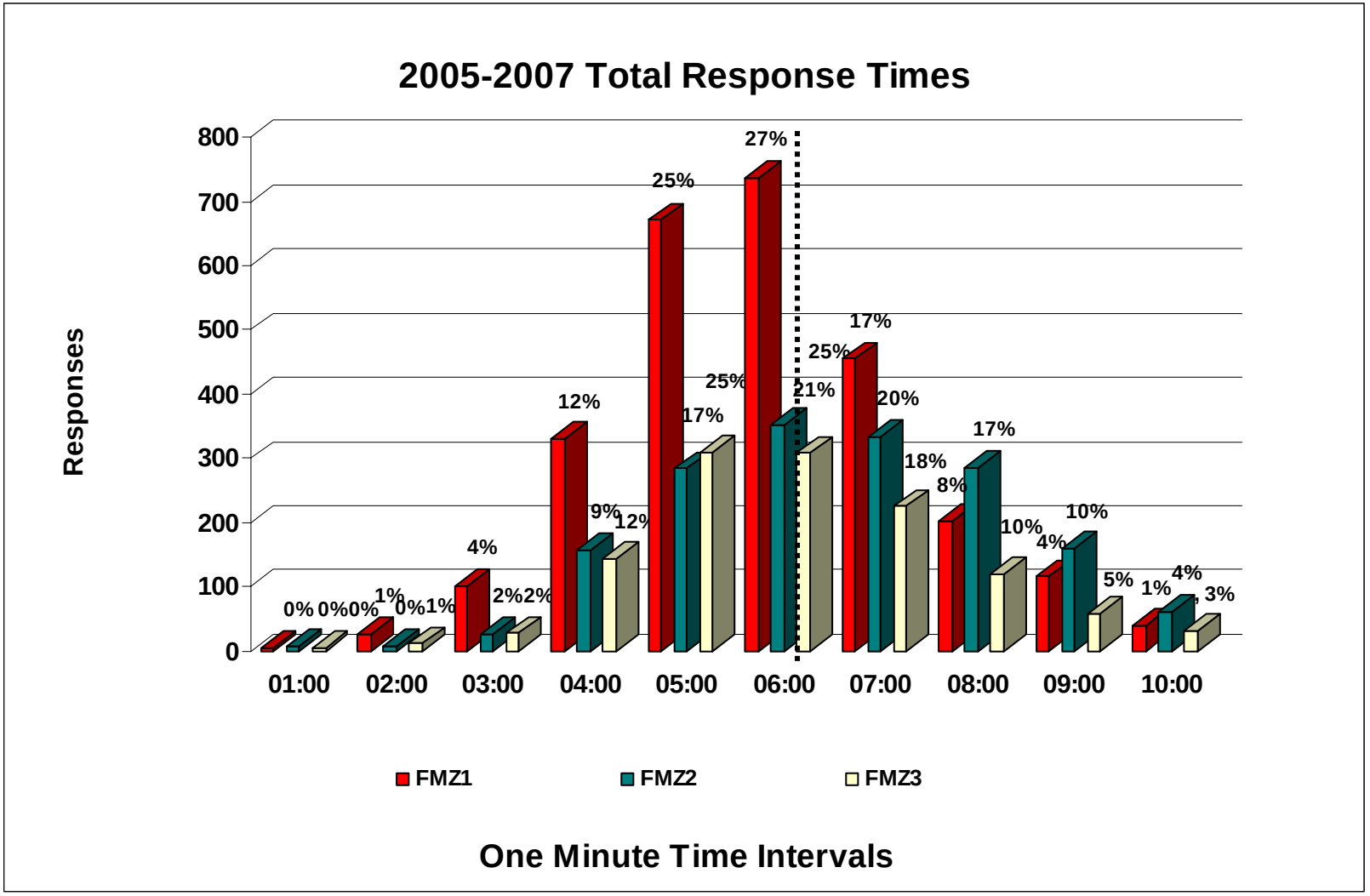
Time of Day Distribution of Total Call Volume

As shown in the chart below, there is a slight variance in the number of calls for service by the time of day; however, it can generally be predicted that the emergencies occurring during the hours with the least calls for service (from midnight to 5 a.m.) will be more severe. This is due to delay in discovery of fires, sleeping victims in buildings, and vehicle accidents involving drinking and driving.



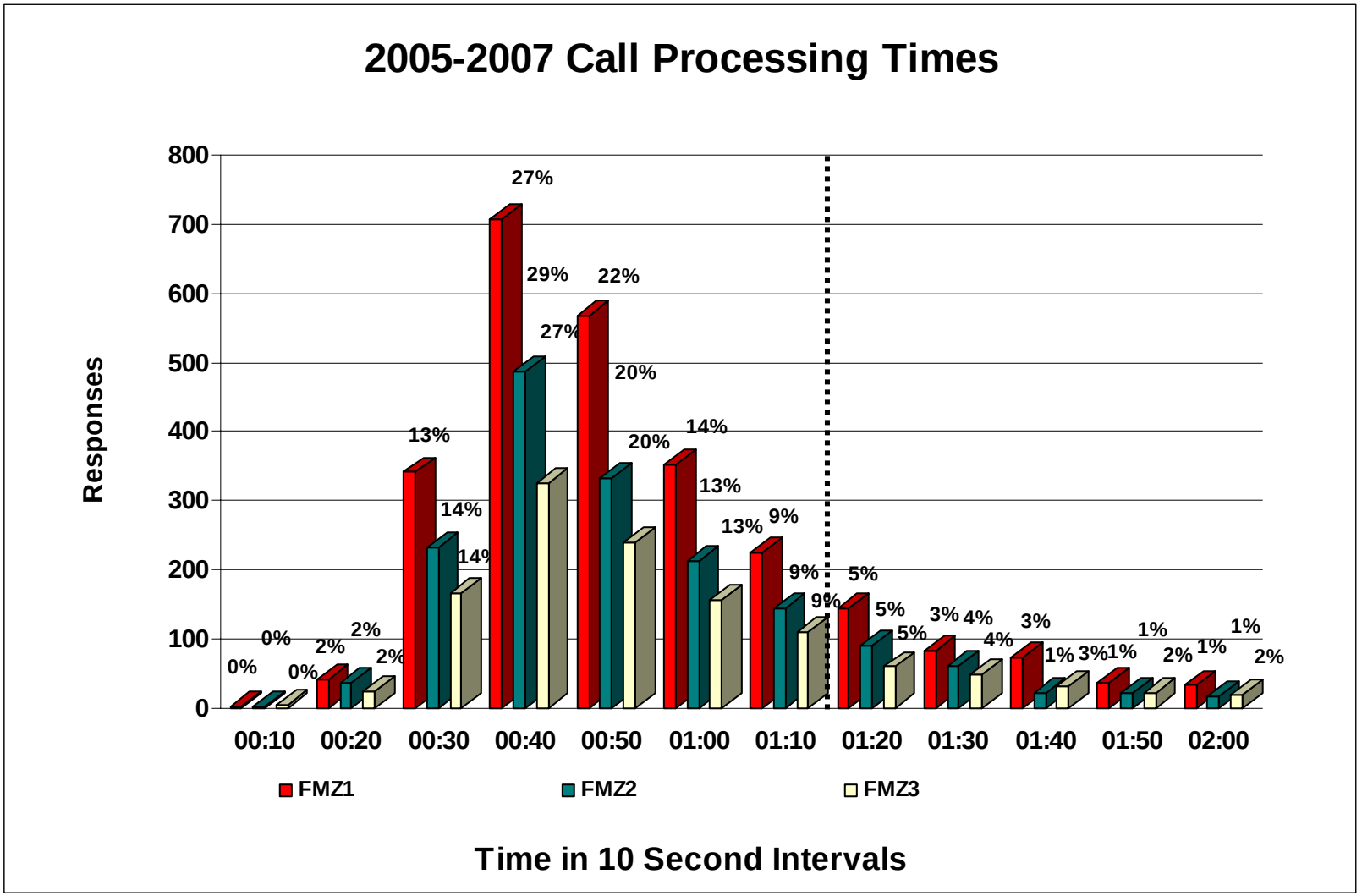
Total Response Time

Total response time is the sum of *call processing time* + *turnout time* + *travel time*. The goal is six minutes, 90 percent of the time.



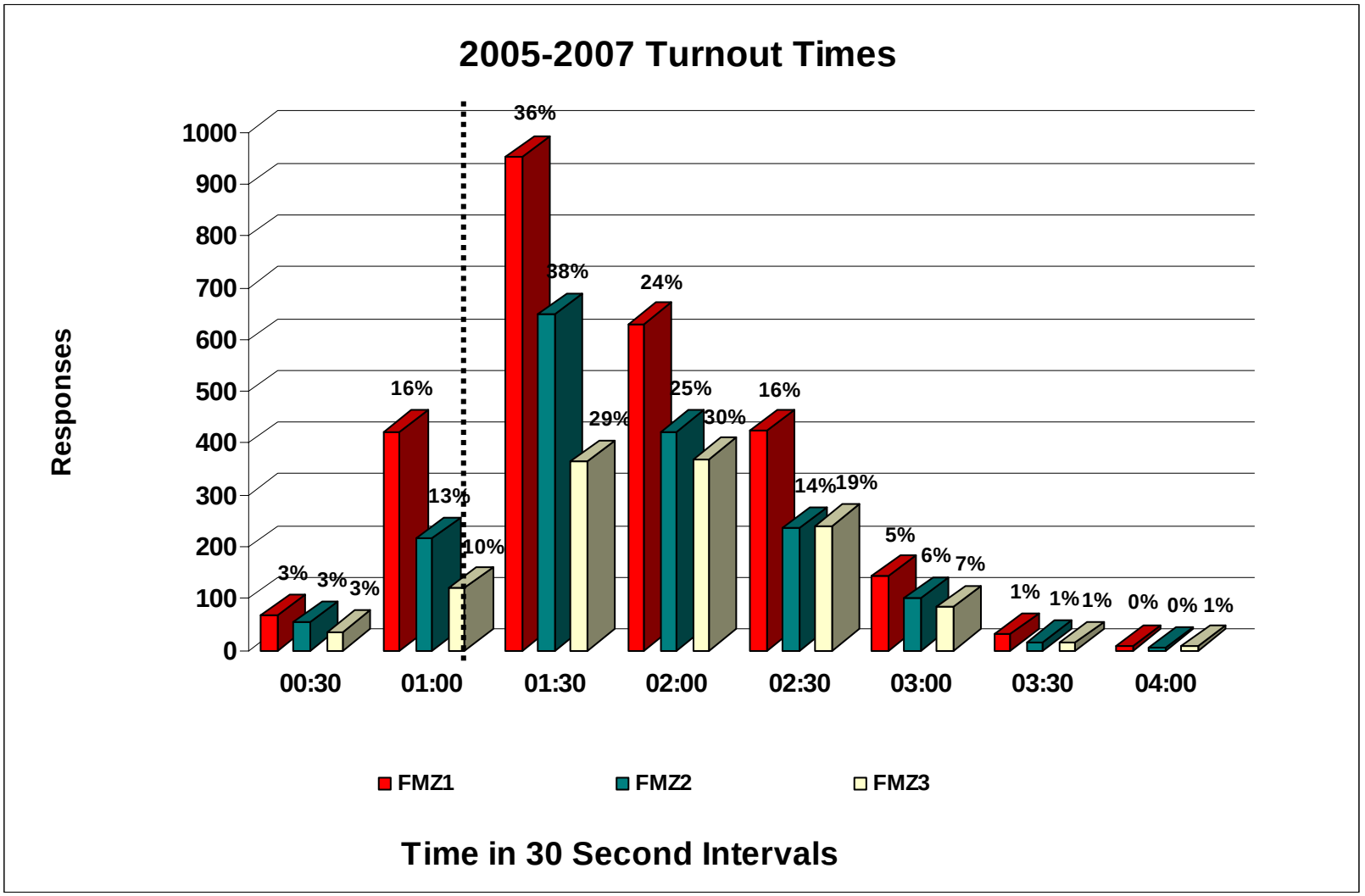
Call Processing Time

The benchmark for call processing time is one minute, ten seconds, 90 percent of the time.



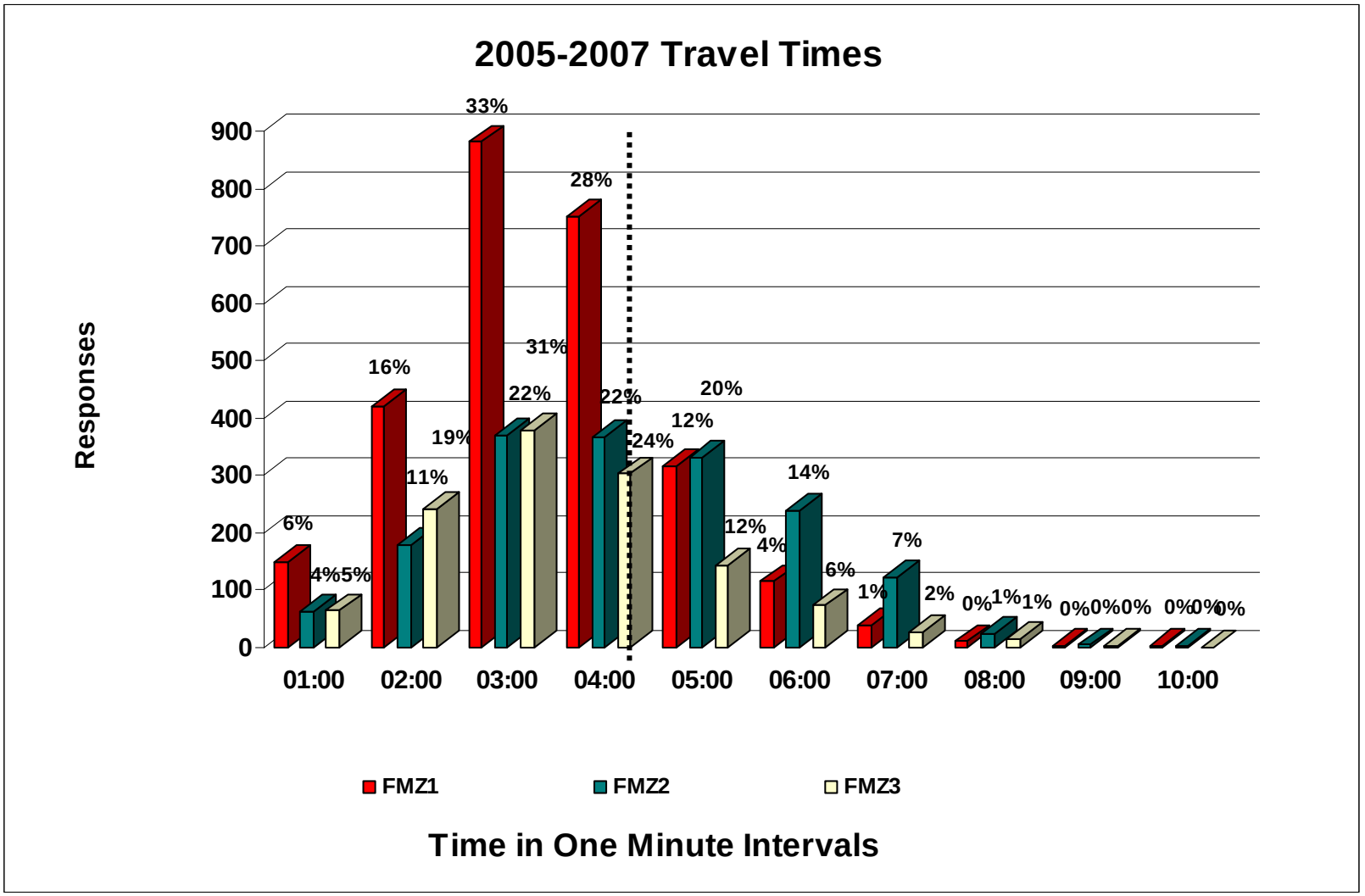
Turnout Time

The benchmark for turnout time is one minute, 90 percent of the time.



Travel Time

The benchmark for travel time is four minutes, 90 percent of the time.



Maintenance of Effort

The SVFRA has developed the SORC document as a baseline tool for defining service level objectives and giving us a comprehensive analysis of its response capabilities and performance. This process has demonstrated to the agency the importance of maintaining an ongoing effort to provide analysis and evaluation of the adopted standards of response coverage.

From the beginning of this project it was quickly understood that analysis of data depends on the reliability of that data. The agency is working with the current fire incident records management vendor, ACS Firehouse Solutions, to integrate dispatch data with post-incident reporting. The SVFRA is also in the process of automating response data on Mobile Data Computers mounted in vehicles to better track response times of first and subsequent arriving units. This process will not only record more accurate data, it will improve the ability of personnel in the dispatch center to handle multiple tasks.

The agency has assigned a Division Chief the responsibility for managing the Standards of Response Coverage on an ongoing basis. When service demands change it will become necessary to review apparatus types, staffing levels and staffing patterns to maintain service level objectives.

Overall Evaluation

The Sonoma Valley Fire & Rescue Authority provides a professional range of services to the community with a career and part-time (volunteer) staff that is highly dedicated to public service and is prepared to meet all of the challenges facing the organization

Calls for Service

Demographics and response history indicate that service demands will continue to increase for existing services. Additionally, new challenges that include natural and manmade disasters will increase call volume for the SVFRA.

Station 4 Responses

A concern of the agency is our ability to provide prompt fire protection and EMS services to the area protected by Station 4, which is not staffed and has only four (4) part-time (volunteer) firefighters.

Concurrent Calls

When a call for service is received, the response to subsequent calls for service depends on the ability of the previously assigned units to complete their call and become available. If units are unable to clear from an assigned call, it will increase the response time for the incident. The situation can be improved in two ways: adopting the dispatch center's Street Network Protocol for all dispatches and securing automatic aid agreements with neighboring departments.

Station 2 Relocation

With the exception of Station 2, our Stations (1, 3 and 4) are in good locations to serve the community in the 4 minute travel time stipulated in this document. It is an important priority to move Station 2 south on Arnold Drive to also meet the 4 minute travel time in the high-call-volume retirement communities of Temelec and Seven Flags.

Community Initiatives

Promoting the development of community AED (Automated External Defibrillator) Programs and Community Emergency Response Teams would give citizens the best chance of surviving a pre-hospital cardiac arrest, other medical emergencies or large scale disasters. Initiatives for placement of automatic fire protection sprinklers in all existing buildings and promoting a program for placement of AEDs in all government buildings and public gathering areas in the community should be a priority. These programs should be accompanied by CPR and AED training for public employees and the community at large.

Strategic Plan

SVFRA must also develop a strategic plan to advise community leaders on the steps necessary to meet the current stated objectives for response and deployment of resources. As needs change, it is also important to refine our diagnostic ability to measure the performance of the organization.

With a strategic plan and the ability to evaluate the organization with empirical information, the SVFRA will continue its development as an organization that is capable of adapting to the changing environment in the community while providing exemplary service to the community.

Strategic Recommendations

The SVFRA's primary goal is to continue providing acceptable response times and an effective response force to safely, effectively and efficiently manage emergency calls for service. To that end, the SVFRA is establishing standards of response coverage that measure service level performance. The measurement of service level performance will provide management and the public with a tool to assess the performance of the SVFRA and assist in facilitating decisions to ensure the department continues to provide a high level of service. The Standards of Response Coverage Committee recommends adopting the following service level objectives:

- **Urban Response** – in 90 percent of emergency incidents
  - the 1st due Unit will arrive within 6 minutes
  - the 2nd Unit will arrive within 10 minutes
  - the Balance of the Assignment will arrive within 10 minutes
- **Suburban Response** – in 90 percent of emergency incidents
  - the 1st due Unit will arrive within 7 minutes
  - the 2nd Unit will arrive within 10 minutes
  - the Balance of the Assignment will arrive within 12 minutes
- **Rural Response -** in 90 percent of emergency incidents
  - the 1st due Unit will arrive within 12 minutes
  - the 2nd Unit will arrive within 16 minutes
  - the Balance of the Assignment will arrive within 16 minutes

Service Level Performance Objectives

(1st Due // 2nd Due // Balance of Assignment)

Incident Type	Urban (min.)	Suburban (min.)	Rural (min.)	#Personnel	Performance %
Emergency Medical	6 // 10 // 10	7 // 10 // 10	12 // 16 // 16	5	90%
Traffic Collision	6 // 10 // 10	7 // 10 // 12	12 // 16 // 16	9	90%
Structure Fire					
Moderate	6 // 10 // 10	7 // 10 // 12	12 // 16 // 16	14	90%
Significant	6 // 10 // 10	7 // 10 // 12	12 // 16 // 16	18	90%
Maximum	6 // 10 // 10	7 // 10 // 12	12 // 16 // 16	24	90%
Wildland//Grass Fire	6 // 10 // 10	7 // 10 // 12	12 // 16 // 16	12	90%

Specific Recommendations

Every quality organization must engage in continuous self-examination and must seize opportunities for improvement as they are identified. As a result of the SORC process, the SORC Committee has identified several opportunities for improvement:

- Develop a strategic plan to advise community leaders on the steps necessary to meet the current stated objectives for response and deployment of resources.
- Relocate Station 2 to improve response times to the relatively high-call-volume area of Temelec and Seven Flags.
- Implement CAD/RMS Interface to improve reporting and monitoring of the SVFRA's performance.
- Ensure that all signal lights have Traffic Preemption Devices.
- Implement Street Network Protocol and AVL (automatic vehicle locater) devices to ensure the most efficient dispatching of the closest resources in a timely manner.
- Promote the establishment of community AED programs to give citizens the best chance of surviving pre-hospital cardiac arrest.
- Promote the development of Community Emergency Response Team programs to better help the community care for itself until emergency response units can arrive.
- Develop a Wildland Protection Plan to educate citizens on defensible space, fire-safe landscaping, and establishing predetermined evacuation routes and shelters.
- Formulate plans to increase the recruitment, retention, and training of part-time firefighters.
- Continue to look into resourceful ways to provide staffing, such as the partnership with Santa Rosa Junior College, grants to fund staffing, and the use of part-time firefighters for the 3rd position on the engine.
- Work with neighboring agencies to enhance existing and create new Automatic-Aid Agreements in an effort to meet SORC service level objectives.

Appendix "A"

NFPA 1710
Standard for the
Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments
2004 Edition

NFPA 1710

Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments

2004 Edition

This edition of NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*, was prepared by the Technical Committee on Fire and Emergency Service Organization and Deployment — Career and acted on by NFPA at its May Association Technical Meeting held May 23–26, 2004, in Salt Lake City, UT. It was issued by the Standards Council on July 16, 2004, with an effective date of August 5, 2004, and supersedes all previous editions.

This edition of NFPA 1710 was approved as an American National Standard on August 5, 2004.

Origin and Development of NFPA 1710

In 2001, the first edition of NFPA 1710 was issued. The development of that benchmark standard was the result of a considerable amount of hard work and tenacity by the Technical Committee members and the organizations they represented. That standard was the first organized approach to defining levels of service, deployment capabilities, and staffing levels for substantially career fire departments. Research work and empirical studies in North America were used by the Committee as a basis for developing response times and resource capabilities for those services, as identified by the fire department.

Following the issuance of the first edition, the NFPA Standards Council asked the Technical Committee to begin the revision process for NFPA 1710 so that a revised standard would be considered at the May 2004 NFPA membership meeting in Salt Lake City, Utah. The Committee met in the fall of 2001 and began the process of reviewing and revising the first edition of NFPA 1710. The Committee formed several Task Groups to look at various aspects of the document. The Committee met and reviewed the work of the Task Groups and the public proposals that had been received, and in the summer of 2003, the Committee's Report on Proposals was released for public review and comment. Based on the Committee's consideration and review of the public input received, this edition of the standard was developed.

The work done by the Committee provides the user with a template for developing an implementation plan on the standard. Most important, it provides the body politic and the citizens a true picture of the risks in their community and the fire department's capabilities to respond to and manage those risks.

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This list represents the membership at the time the Committee was balloted on the final text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the back of the document.

NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for documents on the organization, operation, deployment, and evaluation of substantially all career public fire protection and emergency medical services.

NFPA 1710
Standard for the
Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments
2004 Edition

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NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Annex A.

Changes other than editorial are indicated by a vertical rule beside the paragraph, table, or figure in which the change occurred. These rules are included as an aid to the user in identifying changes from the previous edition. Where one or more complete paragraphs have been deleted, the deletion is indicated by a bullet (•) between the paragraphs that remain.

A reference in brackets [ ] following a section or paragraph indicates material that has been extracted from another NFPA document. As an aid to the user, the complete title and edition of the source documents for mandatory extracts are given in Chapter 2 and those for nonmandatory extracts are given in Annex B. Editorial changes to extracted material consist of revising references to an appropriate division in this document or the inclusion of the document number with the division number when the reference is to the original document. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

Information on referenced publications can be found in Chapter 2 and Annex B.

Chapter 1 Administration

1.1* Scope.

1.1.1 This standard contains minimum requirements relating to the organization and deployment of fire suppression operations, emergency medical operations, and special operations to the public by substantially all career fire departments.

1.1.2 The requirements address functions and objectives of fire department emergency service delivery, response capabilities, and resources.

1.1.3 This standard also contains minimum requirements for managing resources and systems, such as health and safety, incident management, training, communications, and pre-incident planning.

1.1.4 This standard addresses the strategic and system issues involving the organization, operation, and deployment of a fire department and does not address tactical operations at a specific emergency incident.

1.2 Purpose.

1.2.1* The purpose of this standard is to specify the minimum criteria addressing the effectiveness and efficiency of the career public fire suppression operations, emergency

medical service, and special operations delivery in protecting the citizens of the jurisdiction and the occupational safety and health of fire department employees.
1.2.2 Nothing herein is intended to restrict any jurisdiction from exceeding these minimum requirements.

1.3* Equivalency.
Nothing in this standard is intended to prohibit the use of systems, methods, or approaches of equivalent or superior performance to those prescribed by this standard. Technical documentation shall be submitted to the authority having jurisdiction to demonstrate equivalency.

Chapter 2 Referenced Publications

2.1 General.
The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publications.
National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.
NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports*, 2003 edition.
NFPA 472, *Standard for Professional Competence of Responders to Hazardous Materials Incidents*, 2002 edition.
NFPA 1143, *Standard for Wildland Fire Management*, 2003 edition.
NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*, 2002 edition.
NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, 2002 edition.
NFPA 1561, *Standard on Emergency Services Incident Management System*, 2002 edition.
NFPA 1670, *Standard on Operations and Training for Technical Search and Rescue Incidents*, 2004 edition.

2.3 Other Publications.

2.3.1 U.S. Government Publications.
U.S. Government Printing Office, Washington, DC 20402.
Title 29, Code of Federal Regulations, Part 1910.120, "Hazardous Waste Operations and Emergency Response."
Title 29, Code of Federal Regulations, Part 1910.146, "Permit-Required Confined Space."

Chapter 3 Definitions

3.1 General.
The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not included, common usage of the terms shall apply.

3.2 NFPA Official Definitions.
3.2.1* Approved. Acceptable to the authority having jurisdiction.
3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

3.2.3 Shall. Indicates a mandatory requirement.
3.2.4 Should. Indicates a recommendation or that which is advised but not required.
3.2.5 Standard. A document, the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and which is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions shall be located in an appendix or annex, footnote, or fine-print note and are not to be considered a part of the requirements of a standard.
3.3 General Definitions.
3.3.1 Aid.
3.3.1.1* Automatic Aid. A plan developed between two or more fire departments for immediate joint response on first alarms. [**1142:**3.3]
3.3.1.2* Mutual Aid. Reciprocal assistance by emergency services under a prearranged plan. [**402:**3.3]
3.3.2* Aircraft Rescue and Fire-Fighting (ARFF) Vehicle. A vehicle intended to carry rescue and fire-fighting equipment for rescuing occupants and combating fires in aircraft at, or in the vicinity of, an airport. [**1002:**3.3]
3.3.3* Airport Fire Department Personnel. Personnel under the operational jurisdiction of the chief of the airport fire department assigned to aircraft rescue and fire fighting. [**403:**3.3]
3.3.4* Alarm. A signal or message from a person or device indicating the existence of a fire, medical emergency, or other situation that requires fire department action.
3.3.5* Apparatus. A motor-driven vehicle or group of vehicles designed and constructed for the purpose of fighting fires. [**1143:**3.3]
3.3.5.1 Fire Apparatus. A fire department emergency vehicle used for rescue, fire suppression, or other specialized functions.
3.3.5.2 Quint Apparatus. A fire department emergency vehicle with a permanently mounted fire pump, a water tank, a hose storage area, an aerial device with a permanently mounted waterway, and a complement of ground ladders.
3.3.5.3 Specialized Apparatus. A fire department emergency vehicle that provides support services at emergency scenes, including command vehicles, rescue vehicles, hazardous material containment vehicles, air supply vehicles, electrical generation and lighting vehicles, or vehicles used to transport equipment and personnel.
3.3.6* Company. A group of members: (1) Under the direct supervision of an officer; (2) Trained and equipped to perform assigned tasks; (3) Usually organized and identified as engine companies, ladder companies, rescue companies, squad companies, or multi-functional companies; (4) Operating with one piece of fire apparatus (engine, ladder truck, elevating platform, quint, rescue, squad, ambulance) except where multiple apparatus are assigned that are dispatched and arrive together, continuously operate together, and are managed by a single company officer; (5) Arriving at the incident scene on fire apparatus. [**1500:**3.3]
3.3.7 Emergency Incident. Any situation to which an emergency services organization responds to deliver emergency services and other forms of hazard control and mitigation.
3.3.8 Emergency Medical Care. The provision of treatment to patients, including first aid, cardiopulmonary resuscitation, basic life support (First Responder or EMT level), advanced life support (Paramedic level), and other medical procedures that occur prior to arrival at a hospital or other health care facility. [**1581:**1.3]

3.3.9 Fire Chief. The highest ranking officer in charge of a fire department. [**1201:**3.3]
3.3.10 Fire Department Member. See 3.3.25, Member.
3.3.11 Fire Department Vehicle. Any vehicle, including fire apparatus, operated by a fire department. [**1002:**3.3]
3.3.12 Fire Fighting.
3.3.12.1* Aircraft Rescue and Fire Fighting. The fire-fighting actions taken to rescue persons and to control or extinguish fire involving or adjacent to aircraft on the ground. [**1500:**3.3]
3.3.12.2* Marine Rescue and Fire Fighting. The fire-fighting action taken to prevent, control, or extinguish fire involved in or adjacent to a marine vessel and the rescue actions for occupants using normal and emergency routes for egress.
3.3.12.3 Structural Fire Fighting. The activities of rescue, fire suppression, and property conservation in buildings, enclosed structures, aircraft interiors, vehicles, vessels, aircraft, or like properties that are involved in a fire or emergency situation.
3.3.13 Fire Protection. Methods of providing for fire control or fire extinguishment. [**801:**3.3]
3.3.14* Fire Suppression. The activities involved in controlling and extinguishing fires. [**1500:**3.3]
3.3.15* First Responder (EMS). Functional provision of initial assessment (i.e., airway, breathing, and circulatory systems) and basic first-aid intervention, including CPR and automatic external defibrillator (AED) capability.
3.3.16 Forcible Entry. Techniques used by fire personnel to gain entry into buildings, vehicles, aircraft, or other areas of confinement when normal means of entry are locked or blocked.
3.3.17* Hazard. The potential for harm or damage to people, property, or the environment.
3.3.18 Hazardous Material. A substance that presents an unusual danger to persons due to properties of toxicity, chemical reactivity, or decomposition, corrosivity, explosion or detonation, etiological hazards, or similar properties.
3.3.19* High Hazard Occupancy. Areas that have high hazard buildings, materials, processes, or contents.
3.3.20 Incident Commander. The fire department member in overall command of an emergency incident.
3.3.21* Incident Management System (IMS). An organized system of roles, responsibilities, and standard operating procedures used to manage emergency operations.
3.3.22 Initial Full Alarm Assignment. Those personnel, equipment, and resources ordinarily dispatched upon notification of a structural fire.
3.3.23 Initial Rapid Intervention Crew (IRIC). Two members of the initial attack crew who are assigned for rapid deployment to rescue lost or trapped members.
3.3.24 Life Support.
3.3.24.1 Advanced Life Support (ALS). Emergency medical treatment beyond basic life support level as defined by the medical authority having jurisdiction. [**1500:**3.3]
3.3.24.2* Basic Life Support (BLS). Emergency medical treatment at a level as defined by the medical authority having jurisdiction. [**1500:**3.3]

3.3.25* Member. A person involved in performing the duties and responsibilities of a fire department, under the auspices of the organization. [**1500:**3.3]

3.3.26 Officer.

3.3.26.1* Company Officer. A supervisor of a crew/company of personnel.

3.3.26.2 Incident Safety Officer. An individual appointed to respond or assigned at an incident scene by the incident commander to perform the duties and responsibilities of that position as part of the command staff.

3.3.26.3* Supervisory Chief Officer. A member whose responsibility is to assume command through a formalized transfer of command process and to allow company officers to directly supervise personnel assigned to them.

3.3.27 Operations.

3.3.27.1 Emergency Operations. Activities of the fire department relating to rescue, fire suppression, emergency medical care, and special operations, including response to the scene of the incident and all functions performed at the scene. [**1500:**3.3]

3.3.27.2* Special Operations. Those emergency incidents to which the fire department responds that require specific and advanced training and specialized tools and equipment. [**1500:**3.3]

3.3.28 Public Safety Answering Point (PSAP). A facility in which 9-1-1 calls are answered, either directly or through rerouting. [**1221:**3.3]

3.3.29* Rapid Intervention Crew (RIC). A dedicated crew of fire fighters who are assigned for rapid deployment to rescue lost or trapped members.

3.3.30 Related Duties. Any and all functions that fire department members can be called upon to perform in the execution of their duties.

3.3.31 Rescue. Those activities directed at locating endangered persons at an emergency incident, removing those persons from danger, treating the injured, and providing for transport to an appropriate health care facility. [**1500:**3.3]

3.3.32* Staff Aide. A fire fighter or fire officer assigned to a supervisory chief officer to assist with the logistical, tactical, and accountability functions of incident, division, or sector command.

3.3.33 Standard Operating Procedure. A written organizational directive that establishes or prescribes specific operational or administrative methods to be followed routinely for the performance of designated operations or actions. [**1521:**3.3]

3.3.34 Sustained Attack. The activities of fire confinement, control, and extinguishment that are beyond those assigned to the initial responding companies.

3.3.35 Tactical Considerations. Specific fire-fighting objectives that are intended to support the strategy of the incident.

3.3.36 Team. Two or more individuals who have been assigned a common task and are in communication with each other, coordinate their activities as a work group, and support the safety of one another. [**1081:**3.3]

3.3.37 Time.

3.3.37.1 Alarm Time. The point of receipt of the emergency alarm at the public safety answering point to the point where sufficient information is known to the dispatcher to deploy applicable units to the emergency.

3.3.37.2 Call Processing Time. See 3.3.37.3, Dispatch Time.

3.3.37.3* Dispatch Time. The point of receipt of the emergency alarm at the public safety answering point to the point where sufficient information is known to the dispatcher and applicable units are notified of the emergency.

3.3.37.4 Response Time. The travel time that begins when units are en route to the emergency incident and ends when units arrive at the scene.

3.3.37.5 Turnout Time. The time beginning when units acknowledge notification of the emergency to the beginning point of response time.

Chapter 4 Organization

4.1 Fire Department Organizational Statement.

4.1.1* The authority having jurisdiction (AHJ) shall maintain a written statement or policy that establishes the following:

(1) Existence of the fire department
(2) Services that the fire department is required to provide
(3) Basic organizational structure
(4) Expected number of fire department members
(5) Functions that fire department members are expected to perform

4.1.2* The fire department organizational statement shall provide service delivery objectives, including specific response time objectives for each major service component (i.e., fire suppression, EMS, special operations, aircraft rescue and fire fighting, marine rescue and fire fighting, and/or wildland fire fighting) and objectives for the percentage of responses that meet the response time objectives.

4.1.2.1 The fire department shall establish the following time objectives:

(1) One minute (60 seconds) for turnout time
(2)* Four minutes (240 seconds) or less for the arrival of the first arriving engine company at a fire suppression incident and/or 8 minutes (480 seconds) or less for the deployment of a full first alarm assignment at a fire suppression incident
(3) Four minutes (240 seconds) or less for the arrival of a unit with first responder or higher level capability at an emergency medical incident
(4) Eight minutes (480 seconds) or less for the arrival of an advanced life support unit at an emergency medical incident, where this service is provided by the fire department

4.1.2.2 The fire department shall establish a performance objective of not less than 90 percent for the achievement of each response time objective specified in 4.1.2.1.

4.1.2.3 Evaluations.

4.1.2.3.1 The fire department shall evaluate its level of service and deployment delivery and response time objectives on an annual basis.

4.1.2.3.2 The evaluations shall be based on data relating to level of service, deployment, and the achievement of each response time objective in each geographic area within the jurisdiction of the fire department.

4.1.2.4 The fire department shall provide the AHJ with a written report, quadrennially, which shall be based on the annual evaluations required by 4.1.2.3.

4.1.2.4.1 The quadrennial report shall define the geographic areas and/or circumstances in which the requirements of this standard are not being met.

4.1.2.4.2 The quadrennial report shall explain the predictable consequences of these deficiencies and address the steps that are necessary to achieve compliance.

4.2 Fire Suppression Services.

The fire department organizational statement shall set forth the criteria for the various types of fire suppression incidents to which the fire department is required to respond.

4.3 Emergency Medical Services.

4.3.1 The fire department organizational statement shall set forth the criteria for the various types of emergency medical incidents to which the fire department is required and/or expected to respond.

4.3.2 The fire department organizational statement shall ensure that the fire department's emergency medical response capability includes personnel, equipment, and resources to deploy at the first responder level with automatic external defibrillator (AED) or higher treatment level.

4.3.3 Where emergency medical services beyond the first responder with AED level are provided by another agency or private organization, the AHJ, based upon recommendations from the fire department, shall include the minimum staffing, deployment and response criteria as required in Section 5.3 in the following:

(1) The fire department organizational statement

(2) Any contract, service agreement, governmental agreement, or memorandum of understanding between the AHJ and the other agency or private organization

4.4 Special Operations.

4.4.1 The fire department organizational statement shall set forth the criteria for the various types of special operations response and mitigation activities to which the fire department is required and/or expected to respond.

4.4.2* The fire department organizational statement shall ensure that the fire department's hazardous materials response capability includes personnel, equipment, and resources to deploy at the first responder operational level as required by 29 CFR 1910.120.

4.4.3 The fire department organizational statement shall ensure that the fire department's confined space response capability includes personnel, equipment, and resources to deploy at the confined space operational level as required by 29 CFR 1910.146.

4.4.4 The fire department organizational statement shall set forth the criteria for the various types of fire department response during natural disasters or terrorism incidents, weapons of mass destruction incidents, or large-scale or mass casualty events.

4.5 Airport Rescue and Fire-Fighting Services.

The fire department organizational statement shall set forth the criteria for the various types of airport rescue and fire-fighting incidents to which the fire department is required and/or expected to respond.

4.6 Marine Rescue and Fire-Fighting Services.

The fire department organizational statement shall set forth the criteria for the various types of marine rescue and fire-fighting incidents to which the fire department is required and/or expected to respond.

4.7 Wildland Fire Suppression Services.

The fire department organizational statement shall set forth the criteria for the various types of wildland fire suppression incidents to which the fire department is required and/or expected to respond.

4.8 Intercommunity Organization.

4.8.1* Mutual aid, automatic aid, and fire protection agreements shall be in writing and shall address issues such as liability for injuries and deaths, disability retirements, cost of service, authorization to respond, staffing, and equipment, including the resources to be made available and the designation of the incident commander.

4.8.2 Procedures and training of personnel for all fire departments in mutual aid, automatic aid, and fire protection agreement plans shall be comprehensive to produce an effective fire force and to ensure uniform operations.

4.8.3 Companies responding to mutual aid incidents shall be equipped with communications equipment that allow personnel to communicate with incident commander and division supervisors, group supervisors, or sector officers.

Chapter 5 Fire Department Services

5.1 Purpose.

5.1.1 The services provided by the fire department shall include those activities required by Chapter 4.

5.1.2 The procedures involved in these services, including operations and deployment, shall be established through written administrative regulations, standard operating procedures, and departmental orders.

5.2* Fire Suppression Services.

5.2.1 Fire Suppression Capability.

5.2.1.1 Fire suppression operations shall be organized to ensure that the fire department's fire suppression capability includes personnel, equipment, and resources to deploy the initial arriving company, the full initial alarm assignment, and additional alarm assignments.

5.2.1.2 The fire department shall be permitted to use established automatic mutual aid and mutual aid agreements to comply with the requirements of Section 5.2.

5.2.2* Staffing. On-duty fire suppression personnel shall be of the numbers necessary for fire-fighting performance relative to the expected fire-fighting conditions.

5.2.2.1 These numbers shall be determined through task analyses that take the following factors into consideration:

(1) Life hazard to the populace protected
(2) Provisions of safe and effective fire-fighting performance conditions for the fire fighters
(3) Potential property loss
(4) Nature, configuration, hazards, and internal protection of the properties involved
(5) Types of fireground tactics and evolutions employed as standard procedure, type of apparatus used, and results expected to be obtained at the fire scene

5.2.2.2* On-duty personnel assigned to fire suppression shall be organized into company units and shall have appropriate apparatus and equipment assigned to such companies.

5.2.2.2.1* The fire department shall identify minimum company staffing levels as necessary to meet the deployment criteria required in 5.2.4 to ensure that a sufficient number of members are assigned, on duty, and available to safely and effectively respond with each company.

5.2.2.2.2 Each company shall be led by an officer who shall be considered a part of the company.

5.2.2.2.3* Supervisory chief officers shall be dispatched or notified to respond to all full alarm assignments.

5.2.2.2.4 The supervisory chief officer shall ensure that the incident management system is established as required in Section 6.2.

5.2.2.2.5* Supervisory chief officers shall have staff aides deployed to them for purposes of incident management and accountability at emergency incidents.

5.2.3 Operating Units. Fire company staffing requirements shall be based on minimum levels for emergency operations for safety, effectiveness, and efficiency.

5.2.3.1 Fire companies whose primary functions are to pump and deliver water and perform basic fire fighting at fires, including search and rescue, shall be known as engine companies.

5.2.3.1.1 These companies shall be staffed with a minimum of four on-duty personnel.

5.2.3.1.2 In jurisdictions with tactical hazards, high hazard occupancies, high incident frequencies, geographical restrictions, or other pertinent factors as identified by the AHJ, these companies shall be staffed with a minimum of five or six on-duty members.

5.2.3.2 Fire companies whose primary functions are to perform the variety of services associated with truck work, such as forcible entry, ventilation, search and rescue, aerial operations for water delivery and rescue, utility control, illumination, overhaul, and salvage work, shall be known as ladder or truck companies.

5.2.3.2.1 These companies shall be staffed with a minimum of four on-duty personnel.

5.2.3.2.2 In jurisdictions with tactical hazards, high hazard occupancies, high incident frequencies, geographical restrictions, or other pertinent factors as identified by the AHJ, these companies shall be staffed with a minimum of five or six on-duty personnel.

5.2.3.3 Other Types of Companies.

5.2.3.3.1 Other types of companies equipped with specialized apparatus and equipment shall be provided to assist engine and ladder companies where deemed necessary as part of established practice.

5.2.3.3.2 These companies shall be staffed with a minimum number of on-duty personnel as required by the tactical hazards, high-hazard occupancies, high incident frequencies, geographical restrictions, or other pertinent factors as identified by the AHJ.

5.2.3.4 Fire Companies with Quint Apparatus.

5.2.3.4.1 Fire companies that deploy with quint apparatus, designed to operate as either an engine company or a ladder company, shall be staffed as specified in 5.2.3.

5.2.3.4.2 If the company is expected to perform multiple roles simultaneously, additional staffing, above the levels specified in 5.2.3, shall be provided to ensure that those operations can be performed as required.

5.2.4 Deployment.

5.2.4.1 Initial Arriving Company.

5.2.4.1.1 The fire department's fire suppression resources shall be deployed to provide for the arrival of an engine company within a 4-minute response time and/or the initial full alarm assignment within an 8-minute response time to 90 percent of the incidents as established in Chapter 4.

5.2.4.1.2* Personnel assigned to the initial arriving company shall have the capability to implement an initial rapid intervention crew (IRIC).

5.2.4.2 Initial Full Alarm Assignment Capability.

5.2.4.2.1* The fire department shall have the capability to deploy an initial full alarm assignment within an 8-minute response time to 90 percent of the incidents as established in Chapter 4.

5.2.4.2.2 The initial full alarm assignment shall provide for the following:

(1) Establishment of incident command outside of the hazard area for the overall coordination and direction of the initial full alarm assignment. A minimum of one individual shall be dedicated to this task.

(2) Establishment of an uninterrupted water supply of a minimum 1520 L/min (400 gpm) for 30 minutes. Supply line(s) shall be maintained by an operator who shall ensure uninterrupted water flow application.

(3) Establishment of an effective water flow application rate of 1140 L/min (300 gpm) from two handlines, each of which shall have a minimum of 380 L/min (100 gpm). Each attack and backup line shall be operated by a minimum of two individuals to effectively and safely maintain the line.

(4) Provision of one support person for each attack and backup line deployed to provide hydrant hookup and to assist in line lays, utility control, and forcible entry.

(5) A minimum of one victim search and rescue team shall be part of the initial full alarm assignment. Each search and rescue team shall consist of a minimum of two individuals.

(6) A minimum of one ventilation team shall be part of the initial full alarm assignment. Each ventilation team shall consist of a minimum of two individuals.

(7) If an aerial device is used in operations, one person shall function as an aerial operator who shall maintain primary control of the aerial device at all times.

(8) Establishment of an IRIC that shall consist of a minimum of two properly equipped and trained individuals.

5.2.4.3 Additional Alarm Assignments.

5.2.4.3.1 The fire department shall have the capability for additional alarm assignments that can provide for additional personnel and additional services, including the application of water to the fire; engagement in search and rescue, forcible entry, ventilation, and preservation of property; accountability for personnel; and provision of support activities for those situations that are beyond the capability of the initial full alarm assignment.

5.2.4.3.2 When an incident escalates beyond an initial full alarm assignment or when significant risk is present to fire fighters due to the magnitude of the incident, the incident commander shall upgrade the IRIC to a full rapid intervention crew(s) (RIC) that consists of four fully equipped and trained fire fighters.

5.2.4.3.3 An incident safety officer shall be deployed to all incidents that escalate beyond an initial full alarm assignment or when significant risk is present to fire fighters.

5.2.4.3.4 The incident safety officer shall ensure that the safety and health system is established as required in Section 6.1.

5.3* Emergency Medical Services.

5.3.1 Purpose. EMS operations shall be organized to ensure that the fire department's emergency medical capability includes personnel, equipment, and resources to deploy the initial arriving company and additional alarm assignments.

5.3.1.1 The fire department shall be permitted to use established automatic mutual aid or mutual aid agreements to comply with the requirements of Section 5.3.

5.3.1.2 The purpose of this section shall be to provide standards for the delivery of EMS by fire departments.

5.3.1.3 The fire department shall clearly document its role, responsibilities, functions, and objectives for the delivery of EMS.

5.3.2* System Components.

5.3.2.1 Treatment Levels.

5.3.2.1.1 The basic treatment levels within an EMS system, for the purposes of this standard, shall be categorized as first responder, basic life support (BLS), and advanced life support (ALS).

5.3.2.1.2 The specific patient treatment capabilities associated with each level shall be determined by the AHJ for the approval and licensing of EMS providers within each state or province.

5.3.2.2 Training Levels.

5.3.2.2.1 The minimal level of training for all fire fighters that respond to emergency incidents shall be to the first responder/AED level.

5.3.2.2.2 The AHJ shall determine if further training is required.

5.3.3 EMS System Functions.

5.3.3.1 The five basic functions within a career fire department EMS system shall be as follows:

(1) Initial response to provide medical treatment at the location of the emergency (first responder with AED capability or higher)
(2) BLS response
(3) ALS response
(4) Patient transport in an ambulance or alternative vehicle designed to provide for uninterrupted patient care at the ALS or BLS level while en route to a medical facility
(5) Assurance of response and medical care through a quality management program

5.3.3.2 The fire department shall be involved in providing any or all of the functions identified in 5.3.3.1.

5.3.3.3 Staffing.

5.3.3.3.1 On-duty EMS units shall be staffed with the minimum personnel necessary for emergency medical care relative to the level of EMS provided by the fire department.

5.3.3.3.2 EMS staffing requirements shall be based on the minimum levels needed to provide patient care and member safety.

5.3.3.3.2.1 Units that provide emergency medical care shall be staffed at a minimum with personnel trained to the first responder/AED level.

5.3.3.3.2.2 Units that provide BLS transport shall be staffed and trained at the level prescribed by the state or provincial agency responsible for providing emergency medical services licensing.

5.3.3.3.2.3 Units that provide ALS transport shall be staffed and trained at the level prescribed by the state or provincial agency responsible for providing emergency medical services licensing.

5.3.3.4 Service Delivery Deployment.

5.3.3.4.1 The fire department shall adopt service delivery objectives based on time standards for the deployment of each service component for which it is responsible.
5.3.3.4.2 The fire department's EMS for providing a first responder with AED shall be deployed to provide for the arrival of a first responder with AED company within a 4-minute response time to 90 percent of the incidents as established in Chapter 4.
5.3.3.4.3* When provided, the fire department's EMS for providing ALS shall be deployed to provide for the arrival of an ALS company within an 8-minute response time to 90 percent of the incidents as established in Chapter 4.
5.3.3.4.4 Personnel deployed to ALS emergency responses shall include a minimum of two members trained at the emergency medical technician–paramedic level and two members trained at the emergency medical technician–basic level arriving on scene within the established response time.

5.3.4 Quality Management.

5.3.4.1 The fire department shall institute a quality management program to ensure that the service has response times as required in 4.1.2.1 for all medical responses.

5.3.4.2 Fire Department Medical Personnel Review.

5.3.4.2.1 All first responder and BLS medical care provided by the fire department shall be reviewed by the fire department medical personnel.
5.3.4.2.2 This review process shall be documented.

5.3.4.3 Medical Director Review.

5.3.4.3.1 All fire departments with ALS services shall have a named medical director with the responsibility to oversee and ensure quality medical care in accordance with state or provincial laws or regulations.
5.3.4.3.2 This review process shall be documented.
5.3.4.4 Fire departments providing ALS services shall provide a mechanism for immediate communications with EMS supervision and medical oversight.

5.4 Special Operations Response.

Special operations shall be organized to ensure that the fire department's special operations capability includes personnel, equipment, and resources to deploy the initial arriving company and additional alarm assignments providing such services.
5.4.1 The fire department shall be permitted to use established automatic mutual aid or mutual aid agreements to comply with the requirements of Section 5.4.
5.4.2 The fire department shall adopt a special operations response plan and standard operating procedures (SOPs) that specify the roles and responsibilities of the fire department and the authorized functions of members responding to hazardous materials emergency incidents.
5.4.3 All fire department members who are expected to respond to emergency incidents beyond the first responder operations level for hazardous materials response shall be trained to the applicable requirements of NFPA 472.
5.4.4 All fire department members who are expected to respond to emergency incidents beyond the confined space operations level for confined space operations shall be trained to the applicable requirements of NFPA 1670.
5.4.5 The fire department shall have the capacity to implement an RIC during all special operations incidents that would subject fire fighters to immediate danger of injury, or in the event of equipment failure or other sudden events, as required by NFPA 1500.

5.4.6 If a higher level of emergency response is needed beyond the capability of the fire department for special operations, the fire department shall determine the availability of outside resources that deploy these capabilities and the procedures for initiating their response.

5.4.7 The fire department shall be limited to performing only those specific special operations functions for which its personnel have been trained and are correctly equipped.

5.5 Airport Rescue and Fire-Fighting Services.

5.5.1 Airport fire departments shall adopt operations response plan and standard operating procedures (SOPs) that specify the roles and responsibilities for non-aircraft incidents as required by 5.1.2.

5.5.2 Airport rescue and fire-fighting operations shall be organized to ensure that the fire department's capability includes personnel, equipment, and resources to deploy the initial arriving company, the full initial alarm assignment, and additional alarm assignments as required in 5.2.4.

5.5.3 Airport fire departments shall have access to special tools, equipment, supplies, personal protective equipment (PPE), and other airport resources that are required to perform operations in their assigned roles and responsibilities.

5.5.4 Deployment.

5.5.4.1 The airport fire department's aircraft rescue and fire-fighting (ARFF) resources shall deploy the required number of vehicles required for the airport assigned category as established by NFPA 403.

5.5.4.2 Airport fire department companies equipped with specialized apparatus and equipment shall be provided to assist ARFF companies where deemed necessary as identified in 5.5.1.

5.5.4.3 Airport fire department companies that deploy to structural incidents on airport property shall meet the response time requirements of 4.1.2.1.

5.5.4.4 Airport fire department companies that deploy to emergency medical incidents on airport property shall meet the response time requirements of 5.3.3.4.

5.5.4.5 The airport fire department shall be permitted to use established automatic mutual aid or mutual aid agreements to comply with the requirements of Section 5.5.

5.5.5 Staffing.

5.5.5.1 Airport fire department ARFF companies shall be staffed as required by NFPA 403.

5.5.5.2 Airport fire department companies that deploy to structural incidents on airport property shall meet the staffing requirements of 5.2.2.

5.5.5.3 Airport fire department companies that deploy to emergency medical incidents on airport property shall meet the staffing requirements of 5.3.3.3.

5.5.6 Emergency Operations.

5.5.6.1 At all emergency scene operations, an incident management system shall be used that meets the requirements of Section 6.2.

5.5.6.2* Incident command shall be established outside of the hazard area for the overall coordination and direction of the initial full alarm assignment.

5.5.6.3 An individual shall be dedicated to the task of incident commander.

5.5.6.4 Incident Safety Officer.

5.5.6.4.1 An incident safety officer shall be deployed to all incidents that escalate beyond a full alarm assignment or when there is a significant risk to fire fighters.
5.5.6.4.2 The incident safety officer shall ensure that the safety and health system is established as required in Section 6.1.

5.6* Marine Rescue and Fire-Fighting (MRFF) Services.

5.6.1 MRFF operations shall be organized to ensure that the fire department's marine capability includes personnel, equipment, and resources to deploy to the alarm assignments associated with a marine emergency incident.
5.6.2 The fire department shall adopt a marine operations response plan and SOPs that specify the roles and responsibilities of the fire department and the authorized functions of members responding to marine emergencies.
5.6.2.1 Fire department marine SOPs shall be coordinated with the applicable agencies, such as the port or harbor authority and supporting agencies.
5.6.3 Marine fire departments shall have access to special tools, equipment, supplies, PPE, and other marine resources that are required to perform operations in their assigned roles and responsibilities.

5.6.4 Staffing.

5.6.4.1 Numbers of On-Duty Marine Personnel.

5.6.4.1.1 On-duty marine personnel shall be composed of the number necessary for fire-fighting performance relative to the expected MRFF conditions.
5.6.4.1.2 These numbers shall be determined through task analyses as required for types of marine vessels and through additional task analyses that take the following factors into consideration:

(1) Life hazard to the populace protected
(2) Provisions of safe and effective fire-fighting performance conditions for the fire fighters
(3) Potential property loss
(4) Nature, configuration, hazards, and internal protection of the properties involved
(5) Types of tactics and evolutions employed as standard procedure, type of marine vessel used, and results expected to be obtained at the fire scene
(6) Requirements of the regulatory authorities having jurisdiction over navigable waters, ports, and harbors

5.6.4.2 Organization of On-Duty Personnel.

5.6.4.2.1 On-duty personnel assigned to marine fire fighting shall be organized into company units and shall have required vessels and equipment assigned to such companies.
5.6.4.2.2 Each marine company shall be led by an officer who shall be considered a part of the company.

5.6.5 Operating Units.

5.6.5.1* Fire companies whose primary function is to deliver and pump water and extinguishing agents at the scene of a marine incident shall be known as marine companies.
5.6.5.2 These companies shall be staffed with a minimum number of on-duty personnel as required by the tactical and occupancy hazards to which the marine vessel responds

and by the regulatory authorities having jurisdiction over navigable waters, ports, and harbors.

5.7 Wildland Fire Suppression Services.

5.7.1 Wildland fire suppression operations shall be organized to ensure that the fire department's wildland fire suppression capability includes personnel, equipment, and resources to deploy wildland direct operations that can address marginal situations before they get out of control and wildland indirect fire-fighting operations that can be assembled and placed into operation against major wildland fires.

5.7.2 Organization.

5.7.2.1 Fire departments performing wildland operations shall adopt a wildland fire-fighting operations response plan and SOPs that specify the roles and responsibilities of the fire department and the authorized functions of members responding to wildland fire emergencies.

5.7.2.2 All wildland fire suppression operations shall be organized to ensure compliance with NFPA 1143.

5.7.3 Fire departments performing wildland operations shall have access to special tools, equipment, supplies, PPE, and other wildland resources that are required to perform operations in their assigned roles and responsibilities.

5.7.4 Staffing. On-duty wildland fire-fighting personnel shall be of the numbers necessary for fire-fighting performance relative to the expected wildland fire-fighting conditions.

5.7.4.1 These numbers shall be determined through task analyses that take the following factors into consideration:

(1) Life hazard to the populace protected
(2) Provisions of safe and effective fire-fighting performance conditions for the fire fighters
(3) The number of trained response personnel available to the department, including mutual aid resources
(4) Potential property loss
(5) Nature, configuration, hazards, and internal protection of the properties involved
(6) Types of wildland tactics and evolutions employed as standard procedure, type of apparatus used, and results expected to be obtained at the fire scene
(7) Topography, vegetation, and terrain in the response area(s)

5.7.4.2 On-duty personnel assigned to wildland operations shall be organized into company units and shall have required apparatus and equipment assigned to such companies.

5.7.4.2.1 The fire department shall identify minimum company staffing levels necessary to meet the deployment criteria to ensure that a sufficient number of members are assigned, on duty, and available to respond with each company.

5.7.4.2.2 Each company shall be led by an officer who shall be considered a part of the company.

5.7.4.2.3 Supervisory chief officers shall be dispatched or notified to respond to all full alarm assignments.

5.7.4.2.4 The supervisory chief officer shall ensure that the incident management system is established as required in Section 6.2.

5.7.5 Operating Units. Fire companies whose primary function is to deliver and pump water and extinguishing agents at the scene of a wildland fire shall be known as wildland companies.

5.7.5.1 These companies shall be staffed with a minimum of four on-duty personnel.

5.7.5.2 Engine and ladder (truck) companies that respond to wildland fire fighting and/or urban interface wildland fire fighting incidents shall be staffed as required by 5.2.3.

5.7.5.3 Other Types of Companies.

5.7.5.3.1 Other types of companies equipped with specialized apparatus and equipment for wildland fire fighting, including aircraft, heavy equipment, mini pumpers, and fast attack vehicles, shall be provided to assist wildland engine and ladder companies where deemed necessary as part of established practice.

5.7.5.3.2 These companies shall be staffed with a minimum number of on-duty personnel as required by the tactical, topographical, environmental, fuel (vegetation), and occupancy hazards.

5.7.6 Deployment.

5.7.6.1 Required Number of Vehicles.

5.7.6.1.1 The fire department's wildland resources shall deploy the number of vehicles required for a direct and/or indirect attack.

5.7.6.1.2* Prior to the initiation of any wildland fire attack, the fire department shall have the capacity to establish a lookout(s), communications with all crew members, escape route(s), and safety zone(s) for vehicles and personnel.

5.7.6.2 Direct Attack.

5.7.6.2.1 The fire department shall have the capability to initiate a direct wildland attack within 10 minutes after arrival of the initial company or crew at the fire scene.

5.7.6.2.2 One individual in the first arriving company or crew shall be assigned as the incident commander for the overall coordination and direction of the direct attack activities.

5.7.6.2.3 The direct wildland attack shall include the requirements of 5.7.6.2.3.1 through 5.7.6.2.3.3.

5.7.6.2.3.1 Water Flow.

(A) An effective water flow application rate of 111 L/min (30 gpm) from at least two 150 m (500 ft) 38 mm (1.5 in.) diameter attack handlines from two engines shall be established.

(B) Each attack handline shall be operated by a minimum of two individuals to deploy and maintain the line.

5.7.6.2.3.2 One operator shall remain with each fire apparatus supplying water flow to ensure uninterrupted water flow application.

5.7.6.2.3.3 A wildland crew leader or company officer shall be provided with each crew to be responsible for overall supervision of each of the crew and for maintaining personnel accountability and crew safety.

5.7.6.3 Indirect Attack.

5.7.6.3.1 The fire department providing wildland fire suppression operations shall have the capability to deploy an indirect attack, including application of water to the fire, engagement in search and rescue and preservation of property, accountability for personnel, and provision of support activities for those situations that are beyond the capability of the direct attack.

5.7.6.3.2 An incident safety officer shall be deployed to all incidents that escalate beyond a direct attack alarm assignment or when there is a significant risk to fire fighters.

5.7.7 Non-Wildland Emergencies.

5.7.7.1 Wildland companies that deploy to structural incidents shall meet the response time requirements of 4.1.2.1.

5.7.7.2 Wildland companies that deploy to emergency medical incidents shall meet the response time requirements of 4.1.2.1.

Chapter 6 Systems

6.1 Safety and Health System.

A fire-fighter occupational safety and health program shall be provided in accordance with NFPA 1500.

6.2* Incident Management System.

6.2.1 An incident management system shall be provided in accordance with NFPA 1561 to form the basic structure of all emergency operations of the fire department, regardless of the scale of the department or the emergency.

6.2.2* An incident management system shall be designed to manage incidents of different types, including structure fires, wildland fires, hazardous materials incidents, emergency medical operations, and other types of emergencies that could be handled by the department.

6.3 Training Systems.

The fire department shall have a training program and policy that ensures that personnel are trained and competency is maintained to execute all responsibilities consistent with the department's organization and deployment as addressed in Chapters 4 and 5.

6.4 Communications Systems.

6.4.1 The fire department shall have a reliable communications system to facilitate prompt delivery of public fire suppression, emergency medical services, and special operations.

6.4.2 All communications facilities, equipment, staffing, and operating procedures shall comply with NFPA 1221.

6.4.3 Operating procedures for radio communications shall provide for the use of standard protocols and terminology at all types of incidents.

6.4.4 Standard terminology, in compliance with NFPA 1561, shall be established to transmit information, including strategic modes of operation, situation reports, and emergency notifications of imminent hazards.

6.5* Pre-Incident Planning.

6.5.1 The fire department shall set forth operational requirements to conduct pre-incident planning.

6.5.2 Particular attention shall be provided to all target hazards.

Annex A Explanatory Material

Annex A is not a part of the requirements of this NFPA document but is included for informational purposes only. This annex contains explanatory material, numbered to correspond with the applicable text paragraphs.

A.1.1 The standard includes minimum requirements that are intended to provide effective, efficient, and safe protective services that operate on a sound basis to prevent

fires and reduce risk to lives and property, to deal with incidents that occur, and to prepare for anticipated incidents. It sets minimum standards considered necessary for the provision of public fire protection by career fire departments. It addresses the structure and operation of organizations providing such services, including fire suppression and other assigned emergency response responsibilities, which include emergency medical services and special operations.

A.1.2.1 There is a fundamental concept of fire risk associated with modern society. Public fire service organizations are expected to reduce the risk within their areas of jurisdiction by taking measures to prevent the outbreak of fires, to limit the extent and severity of fires, to provide for the removal or rescue of endangered persons, to control and extinguish fires that occur within the jurisdiction, and to perform other emergency response operations and delivery of emergency medical services.

The cumulative effects of preventive efforts, risk reduction and control, and fire suppression capabilities result in variable levels of risk to the jurisdictions and their residents.

The risk remaining after deducting the cumulative effect of the public fire service organization's efforts is the responsibility of each individual, including owners, operators, occupants, and casual visitors to properties. It should be noted that fire risk cannot be completely avoided or eliminated.

A.1.3 The AHJ determines what systems, methods, or approaches are equivalent or superior in performance. An AHJ should approach the assessment by reviewing the overall public fire protection and EMS system performance.

A.3.2.1 Approved. The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials; nor does it approve or evaluate testing laboratories. In determining the acceptability of installations, procedures, equipment, or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure, or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization that is concerned with product evaluations and is thus in a position to determine compliance with appropriate standards for the current production of listed items.

A.3.2.2 Authority Having Jurisdiction (AHJ). The phrase “authority having jurisdiction,” or its acronym AHJ, is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

A.3.3.1.1 Automatic Aid. The capabilities of personnel and equipment for a predetermined response to a neighboring jurisdiction upon receipt of an alarm, this

process is accomplished through simultaneous dispatch, documented in writing, and included as part of a communication center's dispatch protocols.

A.3.3.1.2 Mutual Aid. A written policy or contract that allows for the deployment of personnel and equipment to respond to an alarm in another jurisdiction, this is part of the written deployment criteria for response to alarms as dispatched by a communication center. *(See also 3.3.1.1.)*

A.3.3.2 Aircraft Rescue and Fire-Fighting (ARFF) Vehicle. The apparatus is typically equipped with a large water tank (commencing at 1000 gal and extending to over 6000 gal); a supply of fire-fighting extinguishing agents; remote-controlled large roof turret(s), extendable turret nozzle(s), and bumper turret(s) (ground sweep nozzles) that are used for the discharge of extinguishing agent; and pre-connected handlines.

A.3.3.3 Airport Fire Department Personnel. These individuals can also be responsible for additional fire protection and suppression, emergency medical, and other emergency response within the boundaries of the airport facility.

A.3.3.4 Alarm. In some jurisdictions, this is referred to as an incident or call for service.

A.3.3.5 Apparatus. Examples include fire engines, water tenders, and ladder trucks.

A.3.3.6 Company. For fire suppression, jurisdictions exist where the response capability of the initial arriving company is configured with the response of two apparatus. In some jurisdictions, apparatus is not configured with seated and belted positions for four personnel and therefore would respond with an additional vehicle in consort with the initial arriving engine to carry additional personnel. This response would be to ensure that a minimum of four individuals are assigned to and deployed as a company. The intent of this definition and the requirements in the standard are to ensure that these two (or more) pieces of apparatus would always be dispatched and respond together as a single company. Some examples of this include the following:

(1) Engine and tanker/tender that would be responding outside a municipal water district
(2) Multiple-piece company assignment, specified in a fire department's response SOPs, such as an engine company response with a pumper and a hose wagon
(3) Engine with a vehicle personnel carrier
(4) Engine with an ambulance or rescue unit

“Company,” as used in this standard, is synonymous with company unit, response team, crew, and response group, rather than a synonym for a fire department.

A.3.3.12.1 Aircraft Rescue and Fire Fighting. Such rescue and fire-fighting actions are performed both inside and outside of the aircraft.

A.3.3.12.2 Marine Rescue and Fire Fighting. Marine companies can be utilized for special operations, including a platform for dive and scuba operations and for providing a secure water supply for land-based operations.

A.3.3.14 Fire Suppression. Fire suppression includes all activities performed at the scene of a fire incident or training exercise that expose fire department members to the dangers of heat, flame, smoke, and other products of combustion, explosion, or structural collapse.

A.3.3.15 First Responder (EMS). The first responder also assists higher-level emergency medical service providers.

A.3.3.17 Hazard. Hazards include the characteristics of facilities, equipment systems, property, hardware, or other objects; and the actions and inactions of people that create such hazards.

A.3.3.19 High Hazard Occupancy. Also included are high-risk residential occupancies, neighborhoods with structures in close proximity to one another, special medical occupancies, high-rise occupancies, and hazardous materials occupancies.

A.3.3.21 Incident Management System (IMS). Such systems are often referred to as incident command systems (ICS).

A.3.3.24.2 Basic Life Support (BLS). Basic life support personnel also assist higher-level EMS providers.

A.3.3.25 Member. A fire department member can be a full-time or part-time employee or a paid or unpaid volunteer, can occupy any position or rank within the fire department, and can engage in emergency operations.

A.3.3.26.1 Company Officer. This person can be someone appointed in an acting capacity. The rank structure could be either sergeant, lieutenant, or captain.

A.3.3.26.3 Supervisory Chief Officer. The position of supervisory chief officer is above that of a company officer, who responds automatically and/or is dispatched to an alarm beyond the initial alarm capabilities, or other special calls. In some jurisdictions, this is the rank of battalion chief, district chief, deputy chief, assistant chief, or senior divisional officer (U.K. fire service).

A.3.3.27.2 Special Operations. Special operations include water rescue, extrication, hazardous materials, confined space entry, high-angle rescue, aircraft rescue and fire fighting, and other operations requiring specialized training.

A.3.3.29 Rapid Intervention Crew (RIC). The RIC report directly to the incident commander or operations chief. This dedicated crew is not to be confused with the IRIC.

A.3.3.32 Staff Aide. This member is assigned to a supervisory chief officer who assists at incident scene operations, which can include personnel accountability, communications, and other logistical and administrative support. In addition, this member can assist in coordinating training activities, respond to citizen inquiries, coordinate staffing issues and sick leave follow-up, and assign resource allocations for facilities and apparatus under the supervisory chief officer's jurisdiction. Staff aides can be known as field incident technician, staff assistant, battalion fire fighter, or battalion adjutant.

A.3.3.37.3 Dispatch Time. Dispatch times are addressed in NFPA 1221. These include call-taking and call-processing requirements.

A.4.1.1 The AHJ generally has the responsibility to determine the following:

(1) Scope and level of service provided by the fire department
(2) Necessary level of funding
(3) Necessary level of personnel and resources, including facilities

To provide service, the AHJ should have the power to levy taxes or solicit funding, to own property and equipment, and to cover personnel costs. The authority necessary is conveyed by law to a local jurisdiction.

In addition, the governing body also should monitor the achievement of the management goals of the department, such as fire prevention, community life safety education, fire suppression, employee training, communications, maintenance, and department administration.

The organizational statement is a very important basis for many of the provisions of this standard. The statement sets forth the legal basis for operating a fire department, the organizational structure of the fire department, number of members, training requirements, expected functions, and authorities and responsibilities of various members or defined positions.

A key point is to clearly set out the specific services the fire department is authorized and expected to perform. Most fire departments are responsible to a governing body. The governing body has the right and should assert its authority to set the specific services and the limits of the services the fire department will provide. It also has the responsibility to furnish the necessary resources for delivery of the designated services. The fire department should provide its governing body with a specific description of each service, with options or alternatives and an accurate analysis of the costs and resources needed for each service.

Such services could include structural fire fighting, wildland fire fighting, airport/aircraft fire fighting, emergency medical services, hazardous materials response, high angle rescue, heavy rescue, and others.

Spelling out the specific parameters of services to be provided allows the fire department to plan, staff, and equip, train, and deploy members to perform these duties. It also gives the governing body an accounting of the costs of services and allows it to select those services it can afford to provide. Likewise, the governing body should identify services it cannot afford to provide and cannot authorize the fire department to deliver, or it should assign those services to another agency.

The fire department should be no different than any other government agency that has the parameters of its authority and services clearly defined by the governing body.

Legal counsel should be used to ensure that any statutory services and responsibilities are being met.

The majority of public fire departments are established under the charter provisions of their governing body or through the adoption of statutes. These acts define the legal basis for operating a fire department, the mission of the organization, the duties that are authorized and expected to be performed, and the authority and responsibilities that are assigned to certain individuals to direct the operations of the fire department.

The documents that officially establish the fire department as an identifiable organization are necessary to determine specific responsibilities and to determine the parties responsible for compliance with the provisions of this standard.

In many cases, these documents can be part of state laws, a municipal charter, or an annual budget. In such cases, it would be appropriate to make these existing documents part of the organizational statement, if applicable.

A.4.1.2 There can be incidents or areas where the response criteria are affected by circumstances such as response personnel who are not on duty, nonstaffed fire station facilities, natural barriers, traffic congestion, insufficient water supply, and density of population or property. The reduced level of service should be documented in the written organizational statement by the percentage of incidents and geographical areas for which the response time criteria are achieved.

A.4.1.2.1(2) This service delivery requirement is intended to have a fire department plan and situate its resources to consistently meet a 4-minute initial company fire suppression response and an 8-minute full alarm fire response assignment. While it is recognized that

on some occasions (e.g., a company is out of service for training) the initial company response might not meet the 4-minute requirement, the 8-minute criterion must always be met.

A.4.4.2 Occupational Safety and Health Administration (OSHA) regulations require that all fire departments be trained to respond to hazardous materials incidents at the first responder operations level.

Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA), known as the Emergency Planning and Right-to-Know Act, established requirements for federal, state, and local governments and industrial facilities regarding emergency planning for spills or other releases, community right-to-know, and reporting of hazardous and toxic chemicals.

The Emergency Planning and Right-to-Know Act covers the following four major areas that will provide the fire service and communities with a broad perspective on the chemical hazards within the local area and those at individual facilities:

(1) Sections 301 through 303 — emergency planning
(2) Section 304 — emergency release notification
(3) Sections 311 and 312 — community right-to-know reporting requirements
(4) Section 313 — toxic chemical release inventory

A.4.8.1 Where appropriate, the mutual aid agreement should include automatic responses on first alarms (automatic aid). This concept contemplates joint response of designated apparatus and personnel on a predetermined running assignment basis.

Mutual aid concepts should be considered on a regional basis. In an effective mutual aid arrangement, each fire department should retain reserves of personnel and apparatus. Traditionally and legally, overall command of the incident is vested with the senior officer of the jurisdiction experiencing the emergency.

Some areas use consolidated dispatching to coordinate the response of fire companies to assist an outside fire department. The management of responses can be made easier by utilizing computerization, “running cards,” and other advance planning.

A.5.2 Suppression capability is an expression of how much fire-fighting power can be put into action when there is a fire. It includes the amount of apparatus, equipment, and personnel available; the time needed to respond and place equipment in action; the water supply; the application of strategy and tactics; the level of training; and all of the components that add up to effective fireground operations.

A.5.2.2 For more information, see NFPA 1250; FEMA, National Fire Academy, “Fire Risk Analysis: A Systems Approach”; and Phoenix, AZ, Fire Department, “Fire Department Evaluation System (FIREDAP).”

A.5.2.2.2 For further information on companies, see 3.3.6 and A.3.3.6.

A.5.2.2.2.1 An early, aggressive, and offensive primary interior attack on a working fire, where feasible, is usually the most effective strategy to reduce loss of lives and property damage. In Figure A.5.2.2.2.1, the line represents a rate of fire propagation in an unsprinklered room, which combines temperature rise and time. It roughly corresponds to the percentage of property destruction. At approximately 10 minutes into the fire sequence, the hypothetical room of origin flashes over. Extension outside the room begins at this point.

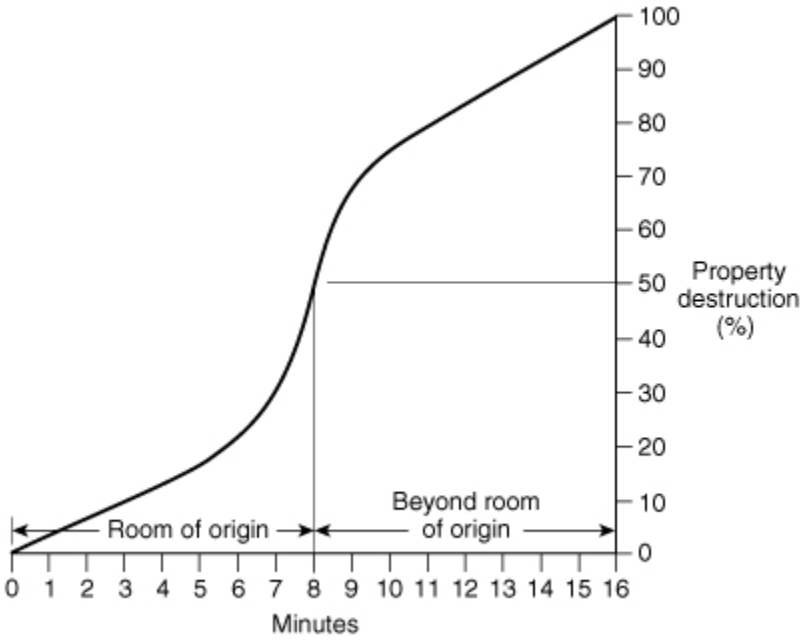

FIGURE A.5.2.2.2.1 Fire Propagation Curve.

Consequently, given that the progression of a structural fire to the point of flashover (i.e., the very rapid spreading of the fire due to superheating of room contents and other combustibles) generally occurs in less than 10 minutes, two of the most important elements in limiting fire spread are the quick arrival of sufficient numbers of personnel and equipment to attack and extinguish the fire as close to the point of its origin as possible. For more information, refer to *Fire Service Today*, "Reduced Staffing: At What Cost," and NIST, "Hazard I Fire Hazard Assessment Method." Also, refer to National Fire Academy, "Fire Risk Analysis: A Systems Approach," and Office of the Ontario Fire Marshal, *Shaping the Future of Fire Ground Staffing and Delivery Systems within a Comprehensive Fire Safety Effectiveness Model.*

The ability of adequate fire suppression forces to greatly influence the outcome of a structural fire is undeniable and predictable. Data generated by NFPA provide empirical data that rapid and aggressive interior attack can substantially reduce the human and property losses associated with structural fires *(see Table A.5.2.2.2.1)*

Table A.5.2.2.2.1 Fire Extension in Residential Structures 1994–1998

	Rate per 1000 Fires		
Extension	**Civilian Deaths**	**Civilian Injuries**	**Dollar Loss per Fire**
Confined to the room of origin	2.32	35.19	3,185
Beyond the room but confined to the floor of origin	19.68	96.86	22,720
Beyond the floor of origin	26.54	63.48	31,912

Note: Residential structures include dwellings, duplexes, manufactured homes (also called mobile homes), apartments, row houses, townhouses, hotels and motels, dormitories, and barracks.
Source: NFPA Annual Fire Experience Survey and National Fire Incident Reporting System.

A.5.2.2.2.3 The assignment of specific response districts to command officers should be based on the number of companies, workload, and response distances. Department administrative procedures should indicate clearly the jurisdiction of command officers.

A.5.2.2.2.5 For further information on staff aides, see 3.3.32.

A.5.2.4.1.2 NFPA 1500, 29 CFR 1910.134, and *Memorandum for Regional Administration and State Designees; Response to IDLH or Potential IDLH Atmospheres,* provide further information. The initial rapid intervention crew (IRIC) and the rapid intervention crew (RIC) members are equipped with the fire fighters' protective ensemble, including protective clothing and equipment as required by NFPA 1500.

A.5.2.4.2.1 For the purposes of this standard, the initial full alarm assignment capability is for a response to a structural fire in a typical 264 m^2 (2000 ft^2), two-story, single-family occupancy without a basement and with no exposures (detached home). The hazards presented by this scenario are not unusual, as all communities respond to fire incidents in this type of structure on a regular basis.

Other occupancies and structures in the community that present greater hazards should be addressed by additional fire fighter functions and additional responding personnel on the initial full alarm assignment. For further information on the classification of hazards, see NFPA *Fire Protection Handbook*.

A.5.3 An EMS is defined as a comprehensive, coordinated arrangement of resources and functions that are organized to respond in a timely, staged manner to medical

emergencies, regardless of their cause. The term *system* can be applied locally or at the state, province, or national level. The fundamental functions of an EMS system are the following:

(1) System organization and management
(2) Medical direction
(3) Human resources and training
(4) Communications
(5) Emergency response
(6) Transportation
(7) Care facilities
(8) Quality assurance
(9) Public information and education
(10) Disaster medical services
(11) Research
(12) Special populations

A.5.3.2 The following four functions do not necessarily exist as separate elements in a particular system:

(1) The first responding unit can be an advanced life support (ALS) ambulance that can provide ALS treatment and ambulance transportation.
(2) The first responding unit can be a fire suppression unit that can provide both initial and advanced level medical care.
(3) ALS can be provided by the ambulance or by an additional fire suppression unit or a unit that is dedicated to ALS response only.
(4) The system may not have ALS treatment capability — only a fire apparatus with fire fighters trained as first responder AED can respond.

A.5.3.3.4.3 The American Heart Association recommends the minimum required personnel for an emergency cardiac care response. In those systems that have attained survival rates higher than 20 percent for patients with ventricular fibrillation, response teams include, as a minimum, two ALS providers and two BLS providers. See "Guidelines 2000 for Cardiopulmonary Resuscitation and Emergency Cardiac Care," "Basic Trauma Life Support for Paramedics and Other Providers," "Pre-Hospital Trauma Life Support," "Pediatric Advanced Life Support," and "Emergency Care and Transportation of the Sick and Injured."

A.5.5.6.2 The U.S. Air Force has defined the areas involved in the emergency within 24 m (75 ft) of the aircraft as immediately dangerous to life and health (IDLH).

A.5.6 For additional information on marine fire fighting, see NFPA 1405.

A.5.6.5.1 For additional information on marine rescue and fire-fighting vessels, see NFPA 1925.

A.5.7.6.1.2 A system developed by Chief Paul Gleason of the United States Forest Service addresses specific mandatory fire orders in a system termed *LCES*, which stands for lookout(s), communication(s), escape route(s), and safety zone(s). These four items are to be implemented as an integrated system by a single resource unit, a strike team, or a full assignment. The implementation of LCES is a minimum safety requirement prior to the initiation of any wildland fire-fighting operations.

A.6.2 Emergency incidents can involve operations that vary considerably in their complexity and scale. The control of these incidents depends on the planned, systematic implementation of an effective fireground organization to accomplish identified objectives. Every fire department, regardless of size, needs a proper system to regulate and direct emergency forces and equipment at both routine and major incidents. The incident management system forms the basic structure of operations, regardless of scale. An effective system is designed to manage incidents of different types, including structure fires, wildland fires, hazardous materials incidents, and medical and other emergencies.

A.6.2.2 Unlike fire incidents where command is normally predicated by rank structure, EMS patient care is based upon statutory recognition of the individual with the highest level of medical certification. It is recommended that departments adopt protocols that define the degree of both member and nonmember involvement in direct patient care based upon local standards, medical control, and statutory requirements.

A.6.5 For additional information, see NFPA 1620.

Annex B Informational References

B.1 Referenced Publications.

The following documents or portions thereof are referenced within this standard for informational purposes only and are thus not part of the requirements of this document unless also listed in Chapter 2.

B.1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*, 2002 edition.

NFPA 1250, *Recommended Practice in Emergency Service Organization Risk Management*, 2004 edition.

NFPA 1405, *Guide for Land-Based Fire Fighters Who Respond to Marine Vessel Fires*, 2001 edition.

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, 2002 edition.

NFPA 1620, *Recommended Practice for Pre-Incident Planning*, 2003 edition.

NFPA 1925, *Standard on Marine Fire-Fighting Vessels*, 2004 edition.

NFPA Annual Fire Experience Survey and National Fire Incident Reporting System.

Fire Protection Handbook, 18th edition, 1997.

Fire Service Today, Gerard, J.C. and A.T. Jacobsen, "Reduced Staffing: At What Cost," September 1981.

B.1.2 Other Publications.

B.1.2.1 AMA Publication. American Medical Association, 515 North State Street, Chicago, IL 60610.

"Guidelines 2000 for Cardiopulmonary Resuscitation and Emergency Cardiac Care." 1992. *Journal of the American Medical Association*, 268(16) (October 28).

B.1.2.2 FEMA Publication. Federal Emergency Management Agency, Washington, DC 20002.

"Fire Risk Analysis: A Systems Approach," NFA-SM-FRAS, National Emergency Training Center, National Fire Academy, July 20, 1984.

B.1.2.3 NIST Publication. National Institute of Standards and Technology, Bldg. 820, Rm. 164, Gaithersburg, MD 20899.
"Hazard I Fire Hazard Assessment Method," U.S. Department of Commerce, June 1991.
B.1.2.4 U.S. Government Publications. U.S. Government Printing Office, Washington, DC 20402.
Memorandum for Regional Administration and State Designees; Response to IDLH or Potential IDLH Atmospheres, Department of Labor, Occupational Safety & Health Administration.
Title 29, Code of Federal Regulations, Part 1910.134, "Respiratory Protection," 1998.
B.1.2.5 Other Publications.
"Basic Trauma Life Support for Paramedics and Other Providers," American College of Emergency Physicians; John Campbell (ed); 1997.
Office of the Ontario Fire Marshal, *Shaping the Future of Fire Ground Staffing and Delivery Systems within a Comprehensive Fire Safety Effectiveness Model*, 1993.
"Pre-Hospital Trauma Life Support," American College of Surgeons; Paturaas, Wertz and McSwain (eds); 1999.
"Pediatric Advanced Life Support," American Heart Association; Besson (ed); 1997.
Phoenix, AZ, Fire Department, "Fire Department Evaluation System (FIREDAP)," December 1991.
"Emergency Care and Transportation of the Sick and Injured," American Association of Orthopedic Surgeons; Browner (ed); 1999.

B.2 Informational References.

The following documents or portions thereof are listed here as informational resources only. They are not a part of the requirements of this document.

B.2.1 CFAI Publication. Commission on Fire Accreditation International, 4500 Southgate Place, Suite 100, Chantilly, VA 20151.
Fire and Emergency Service Self Assessment Manuals, National Fire Service Accreditation Program.
B.2.2 Fire Protection Publications. International Fire Service Training Association/FPP Oklahoma State University, Stillwater, OK.
"Systems Approach to Managing Fire and Life Safety Services," Dennis Compton.
B.2.3 Government Accounting Standards Board. Government Accounting Standards Board, 401 Merritt, 7 P.O. Box 5116, Norwalk, CT 06856-5116.
B.2.4 IAFC/IAFF Publication. International Association of Fire Chiefs/International Association of Fire Fighters. International Association of Fire Chiefs, 4025 Fair Ridge Drive, Fairfax, VA 22033-2868. International Association of Fire Fighters, 1750 New York Avenue, NW, Washington, DC 20006.
"NFPA 1710 IMPLEMENTATION GUIDE," August 2002.
B.2.5 IAFF Publications. International Association of Fire Fighters, 1750 New York Avenue, NW, Washington, DC 20006.
Department of Research and Labor Issues, "Effectiveness of Fire-Based EMS," 1995.
Department of Research and Labor Issues, "Safe Fire Fighting Staffing," 1993.
Department of Emergency Medical Services, "Emergency Medical Services Performance Objectives, 2002."

B.2.6 Insurance Services Office Publication. ISO Customer Service Division, 545 Washington Blvd., Jersey City, NJ 07310-1686.
"Public Protection Classification Service"; Fire Suppression Rating Schedule.
B.2.7 International City/County Management Association Publication. 777 N. Capitol Street, Washington, DC 20022.
"Managing Fire and Rescue Services," June 2002.
"Interim Report of the Tricom Consortium."
B.2.8 U.S. Government Publications. U.S. Government Printing Office, Washington, DC 20402.
Title 29, Code of Federal Regulations, Part 1910.120, "Hazardous Waste Operations and Emergency Response," 1986.
Title 29, Code of Federal Regulations, Part 1910.156, "Fire Protection; Means of Egress; Hazardous Materials."
B.2.9 Other Publications.
"Guidelines 2000 for Cardiopulmonary Resuscitation and Emergency Cardiac Care," *JAMA*, August 2000.
Office of the Ontario Fire Marshal, "Performance Measurement and Benchmarking Project," 2003.
B.3 References for Extracts.
The following documents are listed here to provide reference information, including title and edition, for extracts given throughout the nonmandatory sections of this standard as indicated by a reference in brackets [ ] following a section or paragraph. These documents are not a part of the requirements of this document unless also listed in Chapter 2 for other reasons.
NFPA 402, *Guide for Aircraft Rescue and Fire Fighting Operations*, 2002 edition.
NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports*, 2003 edition.
NFPA 801, *Standard for Fire Protection for Facilities Handling Radioactive Materials*, 2003 edition.
NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*, 2003 edition.
NFPA 1081, *Standard for Industrial Fire Brigade Member Professional Qualifications*, 2001 edition.
NFPA 1142, *Standard on Water Supplies for Suburban and Rural Fire Fighting*, 2001 edition.
NFPA 1143, *Standard for Wildland Fire Management*, 2003 edition.
NFPA 1201, *Standard for Providing Emergency Services to the Public*, 2004 edition.
NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*, 2002 edition.
NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, 2002 edition.
NFPA 1521, *Standard for Fire Department Safety Officer*, 2002 edition.
NFPA 1581, *Standard on Fire Department Infection Control Program*, 2000 edition.

Appendix "B"

Census 2000 Urban and Rural Classification

U.S. Census Bureau

United States Census 2000

Census 2000 Urban and Rural Classification

The Census Bureau identifies and tabulates data for the urban and rural populations and their associated areas solely for the presentation and comparison of census statistical data. If a federal, state, local, or tribal agency uses these urban and rural criteria in a nonstatistical program, it is that agency's responsibility to ensure that the results are appropriate for such use. It also is that agency's responsibility to ensure that it has provided the necessary tools for use in that agency's programs.

The Census Bureau will be glad to answer questions about the Census 2000 urban and rural criteria and products. However, the Census Bureau is not qualified to provide information or assistance to users concerning the uses of urban and/or rural data in the programs of other agencies, nor does it have the resources to perform research to determine whether or not a locality or specific address is inside or outside an urbanized area or urban cluster.

The Census Bureau has produced several products to help users locate Census 2000 Urban Areas and Urban Clusters. See below for more information.

Urban and Rural Classification

For Census 2000, the Census Bureau classifies as "urban" all territory, population, and housing units located within an urbanized area (UA) or an urban cluster (UC). It delineates UA and UC boundaries to encompass densely settled territory, which consists of:

- core census block groups or blocks that have a population density of at least 1,000 people per square mile and
- surrounding census blocks that have an overall density of at least 500 people per square mile

In addition, under certain conditions, less densely settled territory may be part of each UA or UC.

The Census Bureau's classification of "rural" consists of all territory, population, and housing units located outside of UAs and UCs. The rural component contains both place and nonplace territory. Geographic entities, such as census tracts, counties, metropolitan areas, and the territory outside metropolitan areas, often are "split" between urban and rural territory, and the population and housing units they contain often are partly classified as urban and partly classified as rural.

Census 2000 Urban Area Criteria

The Census Bureau is providing information about the Census 2000 Urban Area Criteria and the process used in delineating Census 2000 Urban Areas. We also are providing a synopsis of the differences between the 1990 and Census 2000 criteria.

- Federal Register Notices for the Census 2000 Urban Area Criteria
- Differences between the 1990 and Census 2000 Urban Area Criteria

Census 2000 Urbanized Area and Urban Cluster Information

This page provides links to the May 1, 2002 Federal Register Notice announcing the results of the Census 2000 urban/rural delineations and Corrections to the May 1, 2002 Notice of Qualifying Urban Areas. It also provides links to lists of Urbanized Areas and Urban Clusters, lists of the Corrected Urbanized Areas and Urban Clusters, a list of Urban Area Central Places, and the list of Major Airports referenced in the delineation process.

Locating Urbanized Area and Urban Cluster Boundaries

Information about products, including TIGER/Line files, boundary files and maps, available to assist data users in locating Urbanized Area and Urban Cluster boundaries.

Contact Information

If you have questions regarding the criteria for Census 2000 urban and rural classifications, please contact the Geography Division at ua@geo.census.gov. If you have questions about geographic products, such as maps and TIGER/Line files, please contact the Geography Division at geography@geo.census.gov or by telephone at 301-763-1128.

NOTE: Census Bureau staff cannot answer specific questions about which areas or addresses are inside or outside urbanized areas or urban clusters. Users will need to determine that information themselves from the Census Bureau products described earlier on this Web page.

[PDF] or denotes a file in Adobe's Portable Document Format. To view the file, you will need the Adobe® Acrobat® Reader available **free** from Adobe.

Source: U.S. Census Bureau
Geography Division
Created: April 30, 2002

Page Last Modified: July 06, 2007

Glossary of Technical Terms

This glossary defines terms which may be unfamiliar to the reader and/or which have special meaning within the context of emergency services planning and operations.

AMBULANCE: an advanced life support vehicle staffed with Paramedics and/or Emergency Medical Technicians capable of transporting two patients

ACCEPTED RISK: the amount or level of risk that is allowed by policy. The question of whether a risk is acceptable must be gauged against a benchmark or standard that has been deemed adequate by a particular Authority Having Jurisdiction (see definition below under AHJ) at a specific point in time. The unprotected portion of what there is to burn is defined by policies and accepted by the community through approval of the objectives. Examples would vary according to the level of government involved; i.e., city, fire district, county or region through law, regulation or level of service.

ADVANCED LIFE SUPPORT (ALS): Special Services designed to provide definitive pre-hospital emergency medical care such as cardiopulmonary resuscitation, cardiac monitoring, cardiac defibrillation, advanced airway management, intravenous therapy, administration of specified drugs, and other specified techniques or procedures administrated by authorized personnel under the direct supervision of a base hospital or utilizing approved standing orders

ADVANCED LIFE SUPPORT UNIT (ALS Unit): emergency vehicles, such as ambulances, engine companies, truck companies, squad companies, helicopters, and other emergency vehicles that are especially equipped and staffed by certified emergency medical technicians-paramedics to provide Advanced Life Support to the sick and injured at a medical emergency

ADVISORY COMMITTEE: a body of community representatives that reviews and guides the work of the Planning Team

AHJ: acronym for Authority Having Jurisdiction: the governmental agency that regulates a particular area

ALARM PROCESSING TIME: the elapsed time from the receipt of an alarm by the dispatch center and the notification of specific fire companies that are to respond

APPARATUS: fire suppression equipment such as engine companies, aerial trucks, specialized rescue and command officer vehicles

AUTOMATIC AID: a contract between two or more agencies agreeing to a routine, pre-approved exchange of emergency response units, such as Fire apparatus, paramedic units, etc., to a predetermined geographical area, regardless of political boundaries to deal with day-to-day emergencies

BASE HOSPITAL (BH): a hospital which, upon designation by the Coastal Valleys Emergency Medical Services Agency with a written contractual agreement, is responsible for medical direction of the advanced life support system

BASIC LIFE SUPPORT (BLS): minimum acceptable level of pre-hospital care – fundamental emergency treatment consisting of cardiopulmonary resuscitation (CPR) or emergency cardiac care (ECC) that is provided until more precise medical treatment arrives. Basic Life Support consists of essential, non-invasive, life-saving procedures,

including CPR, bleeding control, splinting broken bones, artificial ventilation, basic airway management, and automated external defibrillation.

BENCHMARK: A benchmark is defined as a standard from which something can be judged. Searching for a "best practice" to use as a benchmark helps define superior performance of a product, or services – includes both public and private organizations, apparatus, equipment – fixed and mobile, facilities, methods, human resources and policies by the Authority Having Jurisdiction.

CFAI: the Commission on Fire Accreditation International – a division of the Center for Public Safety Excellence, Incorporated

COMMUNITY RISK ASSESSMENT: the evaluation of fire and other risks, taking into account all pertinent facts that increase or decrease hazard in order to define standards of coverage (see OCCUPANCY RISK ASSESSMENT)

CPR: Cardiopulmonary Resuscitation

DEPLOYMENT: the strategic assignment and placement of fire agency resources such as fire companies, fire stations and specific staffing levels for those companies

E 9-1-1: an enhanced 9-1-1 system that allows an emergency operator to identify the phone number and location from which a 9-1-1 call originated if made on a traditional "land line" telephone

EMERGENCY RESPONSE: response to the scene of an incident that threatens lives or property requiring the use of emergency warning devices in accordance with California Vehicle Code Section 21806

EMERGENCY MEDICAL SERVICE: medical service required for the immediate diagnosis and treatment of medical conditions, which if not immediately diagnosed and treated, could lead to serious physical or mental disability or death

EMERGENCY MEDICAL TECHNICIAN-A: an individual trained in Basic Life Support according to the standards prescribed by the Health and Safety Code and who has a current and valid certificate in the State of California issued pursuant to the Health and Safety Code

EMERGENCY MEDICAL TECHNICIAN-PARAMEDIC (EMT-P): an individual EMT-I or EMT-II who has received additional training in Advanced Cardiac Life Support according to the standards prescribed by the Health and Safety Code and who has a current and valid certificate pursuant to the Health and Safety Code.

EMERGENCY RESPONSE TRAVEL TIMES: (see SERVICE LEVEL OBJECTIVES)

EMERGENCY OPERATIONS CENTER (EOC): a central location where those in authority operate to allow for exchange of information and conduct face-to-face coordination in the making of decisions during an emergency situation. The center for the Sonoma Valley Fire & Rescue Authority district is located in the Sonoma Police Station, providing for centralized emergency management in major disasters. An "alternate" EOC is located in the classroom at Sonoma Valley Fire & Rescue Authority Station 1.

ENGINE COMPANY: fire apparatus that is equipped with fire hose, a water tank and a pump. This is the basic equipment used for initial attack on fires.

FEES FOR SERVICE: funds paid directly to the provider by the patient for charges. These funds are derived from a patient's income and other personal assets.

FIRE MANAGEMENT ZONE (FMZ): the elemental building block upon which strategic and tactical planning is based, an area in which the fire situation is defined and managed

FIRE PROTECTION: the act of shielding people and property from loss or injury due to fire

FIRE PROTECTION SYSTEM: public and private agencies, apparatus, equipment, facilities, procedures, and people employed in fire protection

FIRE SUPPRESSION: the total work of extinguishing a fire beginning with its discovery

FIRST RESPONDERS: personnel who have responsibility to initially respond to emergencies, such as firefighters, police officers, California Highway Patrol officers, lifeguards, forestry personnel, ambulance attendants, and other public safety personnel. California Law requires such persons to have completed a First Aid course and to be trained in Cardiopulmonary Resuscitation, and an EMTA Certification is desired.

FLASHOVER: thermal radiation feedback from the ceiling and upper walls, which have been heated by the fire. This radiation feedback gradually heats the contents of the fire area. When all the combustibles in the space have become heated to their ignition temperature, simultaneous ignition occurs. *(NFPA Handbook, Fourteenth Edition)*

GIS: acronym for Geographic Information System

INCIDENT COMMAND SYSTEM (ICS): a management system that is based on the F.I.R.E.S.C.O.P.E. System of controlling resources at the scene of an emergency. The ICS defines roles, relationships and functions of the different individuals responding to an emergency situation.

IAFC: acronym for the International Association of Fire Chiefs

IAFF: acronym for the International Association of Fire Fighters

IFSTA: acronym for the International Fire Service Training Association

ISFSI: acronym for the International Society of Fire Service Instructors

ISO: an independent company proving risk assessment to the public and the insurance industry, formerly a division of the insurance industry known as Insurance Services Office, a risk evaluating and grading organization, which establishes community rankings based on the capability of the fire organization

JURISDICTION: a population area wherein there is clearly defined responsibility, based on statutory authority, to provide fire and/or emergency medical services, also called Authority Having Jurisdiction or AHJ

LEVEL OF SERVICE: the magnitude of the supply for a public demand. In terms of fire protection, the magnitude may be expressed in many ways, such as percentage of people protected, percentage of buildings protected, area protected, monetary value of property protected, etc.

MCI: abbreviation for Mass Casualty Incident, an incident that has more patients involved in the incident than a normal First Medical Aid Response can handle. It will usually involve the use of multiple first-provider units, AIS units and ambulances – an example would be a

large traffic accident or hazardous material exposure to several people. An MCI is larger than the normal day-to-day incident, but smaller than a disaster.

MUTUAL AID: a written contract between all agencies in Sonoma County, wherein they agree to assist each other when an emergency occurs that exceeds the capabilities of any one agency. The Mutual Aid Plan is a countywide plan that can result in any one agency receiving assistance from any or all of the other agencies in the County. Mutual Aid extends to the Regional Area and to a statewide plan (also see AUTOMATIC AID).

NFPA Standards: publications adopted by the National Fire Protection Association through the consensus process, setting a level of standard for fire-service-related dimensions or equipment specification

OCCUPANCY RISK ASSESSMENT: an assessment of the potential vulnerability of a specific structure in relation to the fire agency's ability to handle the type and severity of emergencies within that structure. Occupancy Risk Assessment often includes classifying these risks into categories (see RISK CATEGORIES).

OES: the California Governor's Office of Emergency Services

PROVIDER AGENCIES: local governmental entities and agencies that elect to provide a complete pre-hospital care system

PROTECTIVE CLOTHING: personal items of clothing and equipment issued to individual firefighters for protection against heat, flame, abrasion, puncture or other traumatic injury during combat operations – includes, but is not limited to, coats, trousers, boots, gloves, helmets, personal alarm devices, fire shelters, and any other special equipment issued for evaluating exposure such as dosimeters, communicable disease shields, etc. (sometimes referred to by the acronym PPE).

PUBLIC SAFETY ANSWERING POINT (PSAP): the primary telephone answering point within a given geographical area, a term associated with the countywide 9-1-1 system

QUINT: apparatus combining a triple-combination pumper with an aerial ladder that is primarily designed and equipped to mitigate building fires, offering the capability to ladder and extinguish from a single vehicle. (Actual emergency incident mitigation tasks performed on scene depend upon company officers' incident assessment and judgment regarding most immediate needs and the staffing available to accomplish each task. Additional tasks can be performed from Quints through personnel arriving on other assigned units.)

RECEIVING HOSPITAL: a hospital contracting with and certified by the Emergency Medical Services Agency, providing an agreed-upon level of care to all patients served by EMT-paramedics and transported under medical care

REDCOM: the Redwood Empire Dispatch Communications system, a Joint Powers Authority fire and medical dispatch center serving the majority of Sonoma County's fire agencies and ambulance providers

SERVICE LEVEL OBJECTIVES: statements of performance unique to a given jurisdiction. These statements should be developed by the agency based upon nationally-recognized standards and practices for fire and ancillary services. The Service Level Objectives should be written according to a community's specific profile that includes both existing and future

risk levels. The community risk profile should examine occupancy types and intended uses, the probability/consequences of anticipated incidents, and historical responses, trends and patterns.

STAFFING: the number of personnel assigned to perform the anticipated emergency tasks of a specific fire company for the risk identified in a given district or community such as fire suppression, EMS or hazardous materials operations

STANDARDS OF RESPONSE COVERAGE: a written document that defines the current service levels and policies within an emergency response organization

STANDARD OPERATING PROCEDURES/GUIDELINES: a term used to describe written tactical direction provided to personnel in a manual format

TOTAL RESPONSE TIME: the total elapsed time from the point of notification to a responding fire company and the arrival of that unit at the scene. Total Response Time equals notification, plus Alarm Processing/Dispatch time, plus Turnout Time, plus Travel Time.

TRUCK COMPANY: apparatus designed to carry ground ladders, aerial apparatus (ladder, snorkel, or boom) and equipment to assist in ventilation and salvage operations

TRIPLE COMBINATION PUMPER: a Fire Engine that carries hose, an onboard water supply, and a mechanical water pump capable of delivering water onto a fire without the support of another fire department unit. (Most units in fire departments designated as Engines in service today have all the features of a triple-combination pumper.)

TYPE I FIRE ENGINE: apparatus that are triple-combination pumpers, primarily designed and equipped to mitigate building fires

TYPE II FIRE ENGINE: apparatus that are pumpers designed for the urban/rural interface, which are equipped to mitigate building fires as well as vegetation fires

TURNOUT TIME: the time it takes a fire company to discontinue routine operations and begin to respond

TURNOUT CLOTHING: a synonym for protective clothing, also called “bunker gear.” [The acronym PPE is used in many codes and standards (Personal Protective Equipment).]

USGS: United States Geological Survey

WATER TENDER: truck with large capacity water tank used to supply additional water to engines working in areas with no or limited public water supply