City of Marina
Fire Department

California

STANDARDS OF COVER: DEPLOYMENT ANALYSIS

ESCI Emergency Services Consulting International

Providing Expertise and Guidance that Enhances Community Safety

INTRODUCTION

The following report serves as the Marina Fire Department's Standards of Cover and Deployment Plan. It follows closely the Center for Fire Public Safety Excellence (CPSE) Standards of Cover model that develops written procedures to determine the distribution and concentration of a fire and emergency service agency's fixed and mobile resources. The purpose for completing such a document is to assist the agency in ensuring a safe and effective response force for fire suppression, emergency medical services, and specialty response situations.

Creating a Standards of Cover and Deployment Plan document requires that a number of areas be researched, studied, and evaluated. This report will begin with an overview of both the community and the agency. Following this overview, the plan will discuss topics such as community assessment, critical task analysis, agency service level objectives, and distribution and concentration measures. The report will provide analysis of historical performance and will conclude with policy and operational recommendations. ESCI extends its appreciation to the elected officials, business members, and community members of the City of Marina, the Marina Fire Department, and all others who contributed to this plan.

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TABLE OF CONTENTS

TABLE OF FIGURES

EXECUTIVE SUMMARY

This document describes the City of Marina Fire Department's Standards of Cover and Deployment Plan. Community risks, response resources, deployment strategies, and service levels have been evaluated in this study. It establishes response time goals and standards for measuring the effectiveness of fire department services and the deployment of its resources. The document is segregated into components generally based on the format recommended by the Center for Public Safety Excellence.

MFD serves a population of approximately 22,535 residents. It protects an area of approximately 10 square miles. The Department operates two ~~one~~ fire stations utilizing seven response apparatus, including reserve apparatus. Emergency (9-1-1) answering is provided by Monterey County's Consolidated Emergency Communications Department (ECD).

The Insurance Services Office (ISO) reviews the fire protection resources within communities and provides a Community Fire Protection Rating system from which insurance rates are often based. The rating system evaluates three primary areas: the emergency communication and dispatch system, the fire department, and the community's pressurized hydrant water supply. The overall rating is then expressed as a number between 1 and 10, with 1 the highest level of protection and 10 unprotected or nearly so. As of the latest survey (2019), ISO gave MFD a rating of Class 3.

The analysis completed during this study revealed a number of important findings. These include:

- There may be funding sources available to upgrade or expand traffic signal preemption.
- There has been a large increase in alarm activations at CSUMB in 2019.
- Inspections of apartment buildings are not occurring in accordance with the California State Fire Code.
- The department lacks a defined schedule to complete inspections of all commercial occupancies.
- Pre-incident planning is not occurring for all commercial and target hazard properties.
- General Fund revenues have increased over the past few years and have improved significantly with the voter approval of additional sources of revenue.
- An adopted, citywide capital improvement program, including the fire department, exists, and it appears funding is sufficient to accommodate the needs of all of the City's departments.
- The level of administrative support appears to be inadequate for an organization the size and complexity of MFD. The total response workload has increased by 51.4% over the 8 years.
- Overall call processing performance during 2019 exceeded MFD's performance goal.
- During 2019, turnout time for fire incidents exceeds the Department's performance goal.
- Travel time for all incidents during 2019 exceeded the Department's performance goal.
- The minimum complement of 16 firefighters needed for a low-rise residential fire cannot be provided to any part of the city.
- Fire Station 1 is of an inadequate configuration and size for a shared facility.

DESCRIPTION OF COMMUNITY SERVED

Organization Overview

Marina is a city in Monterey County, California, United States. The United States Census Bureau estimated its 2018 population at 22,535. Marina is located along the central coast of California, 8 miles west of Salinas, and 8 miles north of Monterey. Marina is also connected to Monterey, California, by California State Route 1, which also connects it with Santa Cruz, California, after driving for about 35 miles. Marina is at an elevation of 43 feet. Incorporated in 1975, Marina is the newest city on the Monterey Peninsula and home to the Fort Ord National Monument. The city includes part of the California State University, Monterey Bay (CSUMB) campus. In addition to CSUMB, the City has been developing the Dunes on Monterey Bay ("The Dunes"), a mixed-use, diverse, planned community that encompasses 429 acres of former Fort Ord, located just east of Highway 1 and south of Imjin Parkway. The long-term development consists of multiple phases and is actively under construction.

The City Council is responsible for hiring a City Manager to oversee the day-to-day affairs of the City through various departments, including the fire department. A department director manages each City department or, in the case of the police and fire departments, a chief. A five-member City Council governs the City, which includes the Mayor. The Mayor is elected at large with the four other members being elected by district. The City Council is responsible for the enactment of local laws/ordinances, the adoption of the annual City budget and capital improvement program, and other policy-level responsibilities.

Financial Overview

Organizational Finance

The City of Marina has an assessed valuation of $2,168,132,130 as of June 30, 2019.[1] This represents an increase in taxable value of approximately 46% from 2010. The City prepares a two-year operating budget and related other various capital improvement plans based on a July through June fiscal year. As with most municipalities, the City of Marina operates through numerous funds with the General Fund recording revenues and expenses for most governmental activities. General Fund revenues have increased from $12,668,923 in FY 14/15 to $18,859,358 in FY 18/19. General Fund revenues consist of property taxes and assessments (73%), licenses, permits, and fees (9%), charges for services (13%), and other types of revenues (5%). The City anticipates, through its budget adoption, the General Fund revenues will continue to increase. The City's operating expenditures provide for the majority of services provided. These expenditures include general government (23%), public safety (51%), economic development (12%), public works (7%), recreation (5%), capital outlay (1%), and debt service (1%). The voters recently approved additional funding resources for the City that will serve to strengthen the City's financial picture, allow for several items of deferred maintenance to be addressed, and create reserves for future years.

Municipalities, unlike a for-profit business, do not have the ability to immediately respond to changing economic conditions and require reasonable reserves to continue to provide service levels.

Figure 1: City of Marina General Fund Resources,
FY 16/17–18/19 Actual and Budgets for FY 19/20 and 20/21

	Actual 16/17	Actual 17/18	Actual 18/19	Budget 19/20	Budget 20/21
Revenues	20,998,269	23,534,750	25,837,621	26,237,667	26,059,667
Operating Expenditures	19,905,925	19,437,06	20,114,520	27,770,387	28,411,407
Transfers In (Out), Net	94,267	(619,209)	(865,047)	2,667,300	3,315,000
Net Change	1,186,611	3,478,135	4,858,054	1,134,580	962,810
Beginning Balance	7,901,437	9,088,048	12,566,183	17,424,237	18,558,817
Ending Balance	**9,088,048**	**12,566,183**	**17,424,237**	**18,558,817**	**19,521,627**

[1] *City of Marina Comprehensive Annual Financial Report, June 30, 2019.*

City of Marina Fire Department

The Marina Fire Department (MFD) provides some funding support to defray the cost of its services to the residents of the City. The Department charges for certain services it provides, receives compensation from the State for responses to wildfire incidents, and continuously seeks grant funding for new or replacement capital resources.

Figure 2: City of Marina Fire Department, FY 16/17–18/19 Actual and Budgets for FY 19/20 and 20/21

	Actual 16/17	Actual 17/18	Actual 18/19	Budget 19/20	Budget 20/21
Revenues, Reimburse., & Grants	273,016	524,997	429,006	160,350	117,350
Operating Expenditures	3,294,504	3,322,853	3,180,336	3,727,210	3,750,810
Required General Fund Tax Revenue Subsidy	**3,021,488**	**2,797,856**	**2,751,330**	**3,566,860**	**3,633,460**

The next figure shows the general operating expenditure history for the previous four fiscal years and the current adopted budget. During the five-year period, the Department's overall budget increased by 14%. The most significant operational and financial event in this period is the addition of four additional firefighters in the current (FY 19/20) budget cycle.

Figure 3: Fire Department Expenditures by Year, Actual FY 15/16–FY 18/19 and Budget FY 19/20

	Actual 15/16	Actual 16/17	Actual 17/18	Actual 18/19	Budget 19/20
Salaries & Wages	1,905,771	1,914,182	1,964,244	1,882,010	2,647,700
Employee Benefits	1,084,494	1,075,340	838,827	873,387	706,460
Services, Supplies, & Other Charges	271,468	304,982	444,782	424,940	373,050
Capital Outlay	-	-	75,000	-	-
Total	**3,261,733**	**3,294,504**	**3,322,853**	**3,180,337**	**3,727,210**

A comprehensive capital improvement and replacement program is important to the long-term financial and operational stability of any fire and/or emergency medical service organization. Such programs provide systematic development and renewal of the physical assets and rolling stock of the agency. A capital program must link with the planning process to anticipate and time capital expenditures in a manner that does not adversely influence the operation of the agency or otherwise place the agency in a negative financial position. Items usually included in capital improvement and replacement programs are facilities, apparatus, land acquisition, and other major capital projects. At the time of this writing, the City of Marina has an adopted multi-year capital improvement plan and separate fund (110) with approximately $6,400,000 set aside for General Fund facilities and major equipment inclusive of fire apparatus. Additional revenue sources were recently approved by the voters that may allow this to be better funded in the future.

Service Area Overview

Positioned at an elevation of 43 feet, Marina is located along the central coast of California, 8 miles west of Salinas, and 8 miles north of Monterey. Marina was incorporated in 1975, becoming the newest city on the Monterey Peninsula.

Figure 4: Location of Marina, CA

Marina Fire Department's service area population has grown by 15.8% since 2009 after a period when the population dropped from 20,049 in 2000, to 19,449 in 2008. There was a 14.3% increase in population between 2010 and 2018. The 2018 service area population was estimated at 22,535. The city covers approximately 10 square miles. A greater analysis of Marina's population is discussed later in this report. Over the course of the year, the temperature typically varies from 44°F to 70°F and is rarely below 36°F or above 80°F.

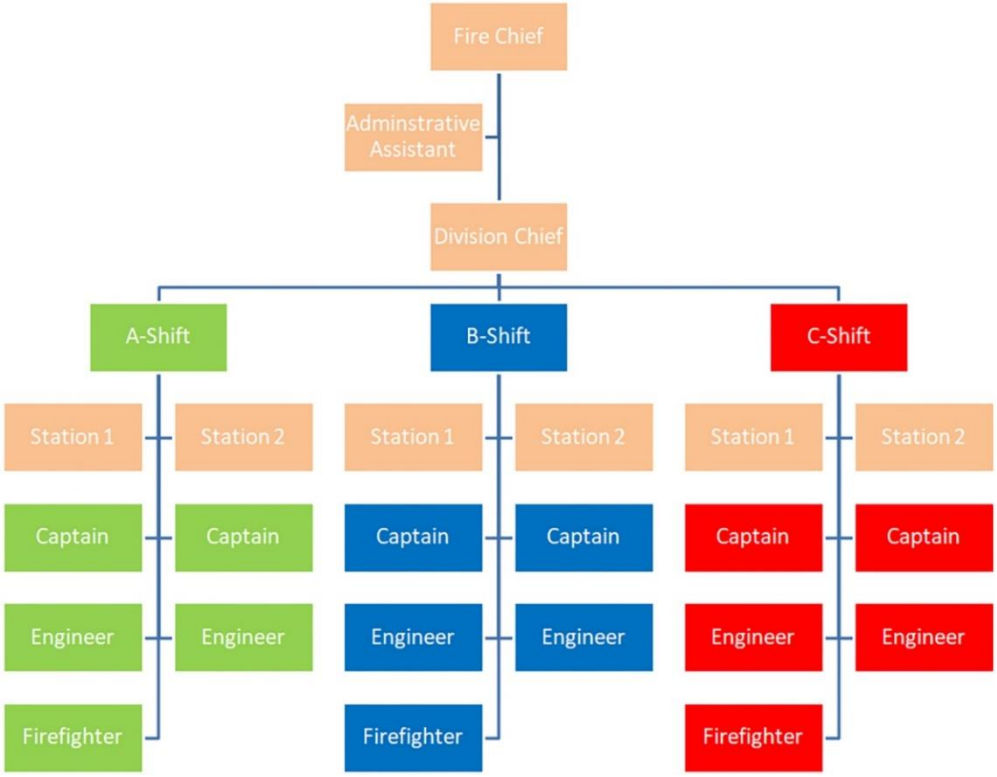
REVIEW OF SERVICES PROVIDED

Marina Fire Department is a combination fire department with both career and reserve members. The department's service area includes all of the City of Marina and shares a common border with the cities of Seaside Monterey County Regional Fire District and North County Fire Protection District. Marina Fire Department is an all-risk fire agency that provides and receives mutual aid to other agencies within the region when requested. The fire department provides a variety of response services, including structural and wildland fire suppression, basic life support (BLS) level emergency medical care, entrapment/extrication, and hazardous materials response at the technician level. Marina Fire Department also provides non-emergent response services, such as public assists, which encompasses the level of risk reduction within the community. Emergency (9-1-1) answering is provided by Monterey County's Consolidated Emergency Communications Department (ECD). Monterey County's Consolidated Emergency Fire Dispatch Center is staffed by full-time dispatchers and supplemented by professional firefighters. The ECD dispatches for 17 agencies (21 fire districts), one paramedic ambulance provider, and coordinates dispatch services for 16 other agencies. At the time of this study, ECD was utilizing Medical Priority Dispatch to prioritize requests for emergency medical services for AMR responses only.

Staffing Information

There are 15 full-time shift personnel involved in delivering services to the jurisdiction augmented by 14 reserves. Staffing coverage for emergency response is through career firefighters on 48-hour shifts. For immediate response, no less than 5 personnel are on-duty at all times.

Figure 5: Marina Fire Department Organizational Chart



MFD currently operates with a limited number of administrative support staff. The positions assigned to administration are one full-time Fire Chief, one full-time Division Chief, and one Administrative Assistant. ESCI noted that the Fire Chief and the Division Chief also provide emergency response and shift coverage. The level of administrative support appears to be inadequate for an organization the size and complexity of MFD.

The following figure illustrates administrative and staffing support for the Marina Fire Department.

Figure 6: Administrative and Support Staff

Position	Number
Fire Chief	1
Division Chief	1
Administrative Assistant	1
Total	**3**

The following figure illustrates response personnel by rank in the organization.

Figure 7: Response Personnel by Rank

Position	Number
Fire Chief	1
Division Chief	1
Fire Captain	6
Fire Apparatus Operator	6
Firefighter—Career	3
Firefighter Reserve	14
Total	**31**

Resources as Currently Deployed

The following figure provides basic information on each of the Department's core services, its general resource capability, and information regarding staff resources for each service.

Figure 8: Resource Staffing and Capabilities

Service	General Resource/Asset Capability	Basic Staffing Capability per Shift
Fire Suppression	1 Staffed Engine 1 Staffed Squad 1 Command Response Unit (Additional automatic and mutual aid engines, aerials, and support units available)	5 Suppression-Trained Personnel (Off-duty personnel, reserve firefighters, and additional automatic and mutual aid firefighters available)
Emergency Medical Services	1 Engine, BLS equipped 1 Squad	5 Certified Emergency Medical Technicians
Vehicle Extrication	1 Engine equipped with hydraulic rescue tools, hand tools, air bags, stabilization cribbing, and a cutter and a spreader hydraulic rescue tool 1 Squad	All firefighters are vehicle extrication/rescue trained
High-Angle Rescue	Countywide USAR Team	Department response: Evaluate and request mutual aid as needed
Trench and Collapse Rescue	Countywide USAR Team	Department response: Evaluate and request mutual aid as needed
Swift-Water Rescue	Beach Rescue, Rope Gun, PFDs, and rescue disc	All personnel trained to the awareness level.
Confined Space Rescue	Countywide USAR Team	Department response: Evaluate and request mutual aid as needed
Hazardous Materials Response	Countywide Haz Mat Team via Mutual Aid	Captains trained to IC level All personnel trained to FRO level

Apparatus

Response vehicles are an important resource of the emergency response system. If emergency personnel cannot consistently arrive quickly due to unreliable transport, or if the equipment does not function properly, the delivery of emergency service is likely compromised. Fire apparatus are unique and expensive pieces of equipment, customized to operate efficiently for a specifically defined mission. The following figure lists the apparatus assigned to each of the MFD fire stations.

Figure 9: MFD Fire Stations and Apparatus

Station 1							
Apparatus Designation	Type	Year	Make/Model	Condition	Seating Capacity	Pump Capacity	Tank Capacity
5400	SUV	2015	Ford	Good	4	N/A	N/A
5401	SUV	2017	Ford	Good	4	N/A	N/A
5404/Reserve	SUV	2008	Ford	Fair	4	N/A	N/A
5411	Type I Engine	2019	Rosenbauer	New	4	1500	500
5421/Reserve	Type I Engine	1998	Ferrara	good	4	1250	500
5431	Type III Engine	2004	Pierce/Internat'l	Good	4	500	500
5461	Rescue	1998	Ford	Fair	2[2]	500	500[2]

Station 2							
Apparatus Designation	Type	Year	Make/Model	Condition	Seating Capacity	Pump Capacity	Tank Capacity
5412	Type I Engine	2007	Ferrara	Good	4	1500	500
5422/Reserve	Type I Engine	1994	Pierce	Good	5	1250	500
5452	Engine/Patrol	1996	Becker	Good	2	120	300

Figure 10: Mutual Aid Resources

Department	Engines	Ladders Trucks	Other	Total Available Staffing
Presidio Fire Department	1	1	2	8
Seaside Fire Department	1	1	3	6
North County Fire District	3	1	3	7
Monterey County Regional Fire	7	–	7	19
Monterey Fire Department	6	2	–	22
Salinas Fire Department	6	2	–	26
Totals	**26**	**7**	**15**	**87**

These are the types of apparatus shown in the preceding figure:

- Engine—Primary response unit from each station for most types of service requests equipped with a pump and ability to carry water.
- Wildland Engine (Type III)—A smaller vehicle with a pump and water tank designed to be used for brush and grass fires in wildland areas.

REVIEW OF COMMUNITY EXPECTATIONS

The ultimate goal of any emergency service delivery system is to provide sufficient resources (personnel, apparatus, and equipment) to the scene of an emergency in time to take effective action to minimize the impacts of the emergency. This need applies to fires, medical emergencies, and other emergency situations to which the fire department responds. Obtaining and understanding the desires and expectations of community stakeholders is an important first step. MFD is committed to incorporating the needs and expectations of residents and policymakers in the service delivery planning process.

It is important to note that the information solicited and provided during this process was provided in the form of "individual inputs," some of which are perceptions as reported by stakeholders. All information was accepted at face value without an in-depth investigation of its origination or reliability. The project team reviewed the information for consistency and frequency of comment to identify specific patterns and/or trends. The observations included in this report were confirmed by multiple sources, or the information provided was significant enough to be included. Based on the information review, the team was able to identify a series of observations, recommendations, and needs that are included in this report.

Stakeholder Input

Community attitudes about the Marina Fire Department and its services were gathered by in-person and phone interviews of stakeholders. Eighteen stakeholders were scheduled for interviews that were completed over a multi-day period. The interviewees represented the City Council, City Administration, Community Members, Business Community, MFD Labor, Administrative Staff Members, and Chief Officers.

The stakeholder responses are summarized as follows:

BUSINESS, COMMUNITY GROUPS, AND CITIZENS

Describe your expectations of the Fire Department.

- Residents have high expectations when it comes to the delivery of service by the Fire Department.
- Reasonable response time, accessibility, visible to the public, and competent.

Which of these expectations are not being met to your satisfaction?

- Most comments heard are complementary; the Fire Department does a great job trying to meet service demands.
- The Fire Department responds as quickly as possible.
- If our Fire Engine is committed when another request for its service occurs, we are relying on POM or North County, the response time is affected and longer.
- The current management of funds for the Fire Department is a detriment to the City, its residents, and visitors.
- The Fire Department needs to hire more Firefighters.

What do you think the Fire Department is doing particularly well?

- Community relations.
- They provide excellent service.
- The Firefighters are all well-trained.
- They do an amazing job of managing their on-duty time with a limited number of responders.
- The Fire Chief has done a good job leading this Fire Department.

Are there services that you think the Department should be providing that they are not providing now?

- Seriously consider purchasing and staffing a Rescue-Medical Squad primarily assigned to respond to medical aid calls.
- The development review services, i.e., tentative maps, etc., all which includes the Fire Department to participate in the review process.
- Growth stimulates the economy and creates jobs.
- Stand up a City of Marina Community Emergency Response Team.
- Dedicated Fire Marshal.
- Enhance service to the City by adding Paramedics to the Fire Department as First Responders, which strengthens the Fire Department's capabilities and enhances services to the community.

Are there services the Fire Department is providing that you think should be discontinued or done differently?

- The Fire Department needs additional staff and resources in order to meet the demands of upcoming development/s.
- Currently, there is no back-up when the fire engine is committed to a call; cannot always depend on assistance via surrounding resources.
- Due to the size of the Department, they need more staff and equipment.
- Community Outreach is vital, and there isn't enough staffing to do this as often as they should.
- Public Information Officer—there is no staffing to share current information the public may want or need to know. As an example, the Fire Department has a Smoke Detector program, and most of the community doesn't even know what services are offered.

When you dial 9-1-1 to report an emergency, how long should it take for help to arrive?

- Several minutes 3–4. No longer than 5 minutes.
- Most of Marina: 3 to 5 minutes; further out, the response will take longer.
- Within 2 minutes, although the interviewee realizes it can be longer if the engine is in the Station or not.

Does that expectation change depending on where in the community you are located?

- Expectations may need to be managed, but response time shouldn't change.
- No, expectations do not change.
- It does change due to requests for services in areas that have no easy access to some residential developments, traffic, i.e., time of day, type of call, resources available, etc.

Do you believe the first arriving response units should be staffed and equipped to take appropriate actions given the emergency?

- Staff and appropriate equipment are needed in order to meet the contemplated risk at hand.
- Equipment should be properly staffed for that specific type of apparatus.
- Add a Rescue Unit in lieu of responding with an engine company for medical calls.
- Absolutely.

ELECTED OFFICIALS, CITY MANAGEMENT, AND DEPARTMENT HEADS

What strengths contribute to the success of the Fire Department?

- The biggest strength is the Fire Chief, who understands the fire industry and works well with the City's Administrative Team as well as with the community.
- The Firefighters appear to be very close, very much like a family.
- Upward mobility is being experienced, which allows opportunities to promote.
- There exists an extremely positive relationship between the Fire Department and the community.

What do they do well?

- The Fire Department appears to be aware of existing environmental issues and is following the City's General Plan.
- The Fire Department does an outstanding job and has an excellent relationship with neighboring agencies in which they can depend on for mutual aid.
- They do a very good job responding to request(s) for service and successfully accomplishes this with limited staffing.
- Responds to an incident as quickly as they can.
- Do well under stressful situations while experiencing multiple requests for service.

What are some areas in which you think the Department could make improvements?

- Reduced response time.
- Additional support.
- Purchase new equipment.
- Have the capability to protect two-or-more story structures/buildings in the event of a fire.
- Improve disaster management by providing the appropriate training.
- Adopt Equipment Replacement Standards.

What opportunities, in your view, are available to improve the service and capabilities of the fire department?

- When reviewing plans, we need to refer to the policies. Why approve a 5-story building when we do not have the appropriate equipment to protect the building?
- Add a Ladder Truck; however, we do not have a station capable of housing it.
- Increase our focus by providing the equipment that they need so they can do their job.

Please share your thoughts with us regarding staffing utilizing 12-hour shifts and peak hour units.

- Absolutely need to look into things like this.
- An analysis is needed.
- Need to look at things like this for the future.

What do you see as critical issues faced by the fire department today?

- The current budget is adequately funded; however, we are aware that future budgetary issues are going to be difficult.
- Fire and Police Budgets take a very large portion of the City's Budget and it is not sustainable.
- Restructure the existing service model used in responding to medical requests; requests for services will continue to grow.
- To have the capability to retain qualified staffing.
- To have the ability to fully fund additional staffing.
- Decide on the location of the second station.
- Succession planning beginning at the top to the bottom.

If you could change one thing in the fire department, what would it be?

- Review how we allocate our staffing resources in order to see if there is a better way.
- Break down the standard and look at data, demands. Is there a better way?
- Three fully staffed shifts with reasonable overtime.
- Does not see any major issues with the Fire Department.
- The Fire Department is incredible; they do best with what they have.

How would you describe the level of services provided by the fire department?

- There will be improvement due to staffing the second station.
- Has not heard any complaints.
- The community has voiced their support of the Fire Department.

What opportunities, in your view, are available to improve the service and capabilities within the region?

- Sharing stations on borders; Seaside is a prime example; the entire region would be positively affected.
- Emergency Planning that include department heads.
- Emergency Operations Center "EOC" exercises.

CHIEF OFFICERS, LABOR LEADERS, RESERVES, RANK & FILE, ADMINISTRATION

What strengths contribute to the success of the fire department?

- Versatile in having to change how to respond to requests for our services due to back-to-back calls and keep up with the volume.
- Working out of grade.
- Each individual's participation and enthusiasm.
- The Department's strong suit is the level of care while on EMS calls.
- We try to treat EMS patients with empathy and care that is equal to the care that would be provided to our own family members.
- Ability to focus on Fire since Fire and Police are now separate divisions.

What do you do well?

- Planning and how we will grow into full buildout.
- Connecting with the community and utilizing our Reserve Firefighters events.
- Attending public events and providing education to children.
- Training is going well.
- Interacting with the community.

What are some areas in which you think the Department could make improvements?

- Training: consider using props, identify a dedicated training facility, etc.
- Consider using the station at the Airport as a training facility.
- Communication
- Tactical co-officer training. We lack training in strategy and tactics.
- Staffing is an issue and we are working on it now.
- Reduce the reliance on neighboring agencies.

What opportunities, in your view, are available to improve the service and capabilities of the fire department?

- Hiring additional firefighters.
- Staffing 2nd engine at the other Marina, rather than having POM cover for us.
- Strategies and tactics training at the company officer level.
- Improve existing internal communication.
- Our responses are limited; we are not capable of responding to specialty calls such as Haz Mat, etc.
- Some of our Firefighters have experience, i.e., water rescue as an example, but can't utilize their skills.
- Improve capabilities to respond to specialty calls such as surf rescue, Haz Mat, etc.

What do you see as critical issues faced by the fire department today?

- Staffing is definitely #1 – of 3 at each station.
- Making sure the Firefighters are well trained for the position they're assigned to. Minimum staffing and adequate training for moving up.
- Investing in outreach to the community.
- Investing in the community, disaster preparedness, training to the community.
- Lack of a Public Education staff person.
- Amount of calls for one engine.
- Trained Firefighter Reserves that have a Class B driver's license, and who won't be limited to just covering the fire station.
- Leadership
- Quality training.
- Culture
- Excess amount of collateral duties given our limited staff.

Please share your thoughts/ideas regarding alternative staffing and dynamic deployment.

- Not sure; is a proponent of 3 and 3 staffing for two stations.
- Staff a 2nd engine and it would be an enhancement.
- All for departments trying different things and if it provides better service.
- Open to suggestions.

If you could change one thing in the fire department, what would it be?

- Add staffing.
- A Fire Station separate from the Police Station; two separate entities.
- At least one additional Chief Officer position; with the assumption the Department has adequate engine staffing.
- Culture

How would you describe the level of emergency services provided by the fire department?

- We do a great job; regularly are complimented by the ambulance crews.
- Training could be a lot better.
- Top-notch.
- Work well with other departments.
- Very good for what they have.
- The best.

SURROUNDING AREA CHIEFS

What strengths contribute to the success of the Seaside and Marina Fire Departments? What do the departments do well?

- Auto aid.
- Support one another.
- The level of service both Fire Departments provide is outstanding.
- Enjoys working with both Fire Departments.
- Seaside covers day to day requests for services without heavy reliance on their neighbors.
- Good leadership is in place.
- Work well with surrounding agencies.

What are some areas in which you think the departments could make improvements?

- Training, including high-rise.
- Closest resource dispatch regardless of where the incident is and who's jurisdiction it is in.
- Succession planning.
- Deployment and staffing.
- Reduce reliance on Presidio of Monterey.

What opportunities, in your view, are available to improve the service and capabilities within the region?

- A collaborative approach to addressing the impact of development.
- Enhanced EMS, such as Firefighter Paramedics.
- Standardize training throughout the region.
- Regional training, recruitment academy, etc.
- Enhanced command/Chief Officer response to incidents.
- Good job on communication/shared dispatch.

What are the critical issues facing the region over the next 5 years?

- Community risk reduction.
- Regional Communication is working, however, enhanced staffing.
- Training.
- Response times.
- Availability of firefighters.
- Upcoming development.
- Succession planning.
- Tightening of finances
- Boundary drop.

COMMUNITY RISK ASSESSMENT

Numerous risk factors can influence the types of services a community requires. Hazard identification is the process of recognizing the range of natural or human-caused events that threaten an area. Natural hazards result from uncontrollable, naturally occurring events such as flooding, windstorms, and earthquakes, whereas human-caused hazards result from human activity and technological hazards. An example of a technical hazard is an accidental hazardous materials release.

Community risk is assessed based on several factors; service area population, population density, demographics of the population served, local land use and development, and the geography and natural hazards present within the community. These factors affect the number and type of resources—both personnel and apparatus—necessary to mitigate an emergency.

- Population density is a risk factor, and demographics presents another unique risk. Over 21% of the population is under the age of 18 years of age, and over 37% of the population speak languages other than English at home.
- The physical characteristics of the area and the resultant natural hazards are risk factors. Marina lies in a valley and is at risk of earthquakes and flash floods. Marina lies along the coast near Monterey Bay and is at risk of earthquakes and flash floods. The wildfire risk within Marina is considered moderate in the majority of the city.
- Land use and zoning can also affect risk. Risk can be characterized as low (e.g., agricultural or low-density housing); moderate (e.g., small commercial and office); or high (e.g., large commercial, industrial, and high-density residential).

Risk Classification

Based on the narrative descriptions of the various hazards found throughout the Marina response area, ESCI has developed a numerical ranking of community hazards using historical incident data, as well as an assessment of the community and its vulnerabilities. Community hazards were grouped into broad categories as follows:

- Structure Fires
- Hazardous Materials
- Non-structure Fires
- Natural Hazards
- EMS-Medical Assist
- Technological Hazards
- Rescue
- Human Hazards

Within each category, specific hazards were identified, and a probability (likelihood) score between zero (representing "Not Applicable") and four (representing "Catastrophic") was assigned to each of the categories.

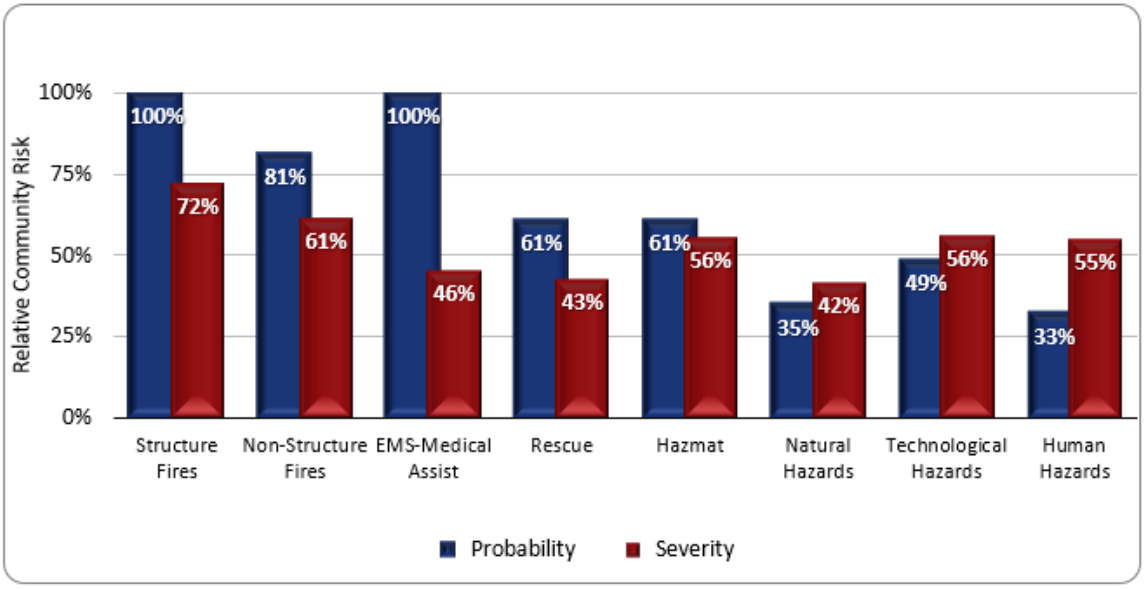
A severity score is developed by reviewing an incident's impact on the community and the ability to mitigate the event. Community Impact scores the effect of an incident on humans, property, and businesses. As the score increases, the impact in the community expands. Mitigation Capacity rates how well a community responds to an event based on preparedness and internal and external response. The lower the mitigation score indicates that the community is prepared for an event.

The overall scores were then used to generate a relative risk score as it applies to the City of Marina. Documentation of categorical scoring can be found in the appendices of this report. The completed hazard vulnerability analysis, including relative community risk, is shown in the following figures.[2] Details of each risk category are in Appendix A.

Figure 11: Hazard Risk Summary

	Structure Fires	Non-Structure Fires	EMS-Medical Assist	Rescue	Hazmat	Natural Hazards	Technological Hazards	Human Hazards	Total for Community
Probability	100.00%	81.25%	100.00%	61.11%	61.11%	35.00%	48.68%	32.50%	55%
Severity	72.22%	61.46%	45.83%	43.06%	55.56%	41.94%	56.14%	55.00%	54%
Relative Risk	72%	50%	46%	26%	34%	15%	27%	18%	29%

Figure 12: Relative Community Risk



ESCI also identified the following vulnerabilities specific to fire operations. Each is discussed in greater detail on the following pages.

- Population Density
- Physical Hazards
- At-Risk Populations
- Human-Caused Hazards

2 Based on reported NFIRS data January 01, 2016, to December 31, 2018, the Monterey Community Wildfire Plan, the Monterey County Multi-Jurisdictional Hazard Mitigation Plan, and others.

Population Density

According to the United States Census Bureau, Marina is classified as an urban city at 8.88 square miles in area. The 2018 estimated population is 22,535, with an estimated population density of about 2,537 per square mile, compared to an average of 239 people per square mile for California.

The population decrease in Marina can be attributed to the closing of Fort Ord in 1994. It has been steadily increasing since 2009 and tends to be concentrated in the northern and central parts of the community, in neighborhoods and planned development communities, surrounded by less densely populated areas near the airport. Much of the population density is defined by areas used for agricultural use or flood plain areas where lower population densities exist. The areas displaying the highest population density correspond to the highest incident response locations, as illustrated in the Service Demand Analysis.

Figure 13: Study Area Population Density

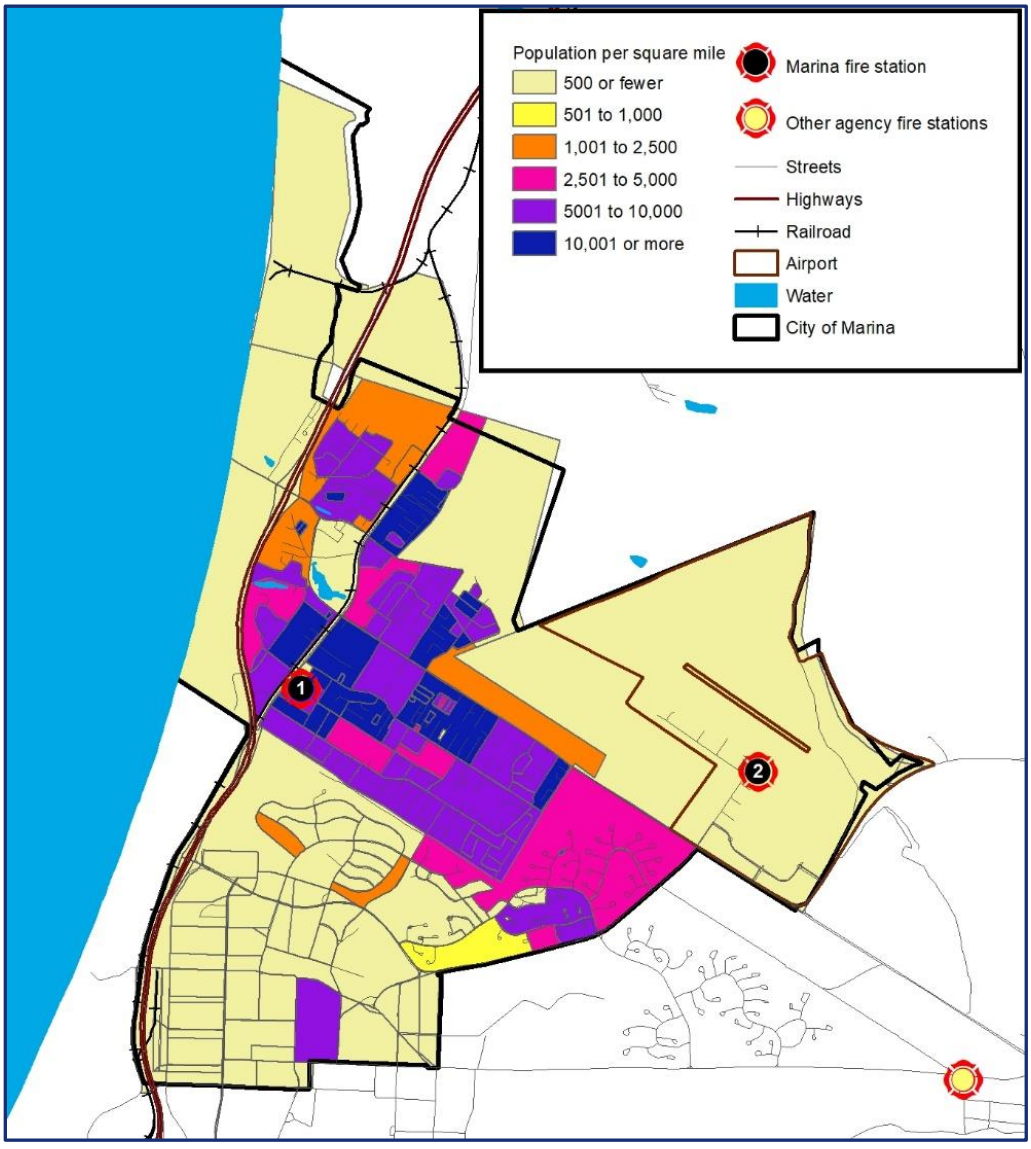
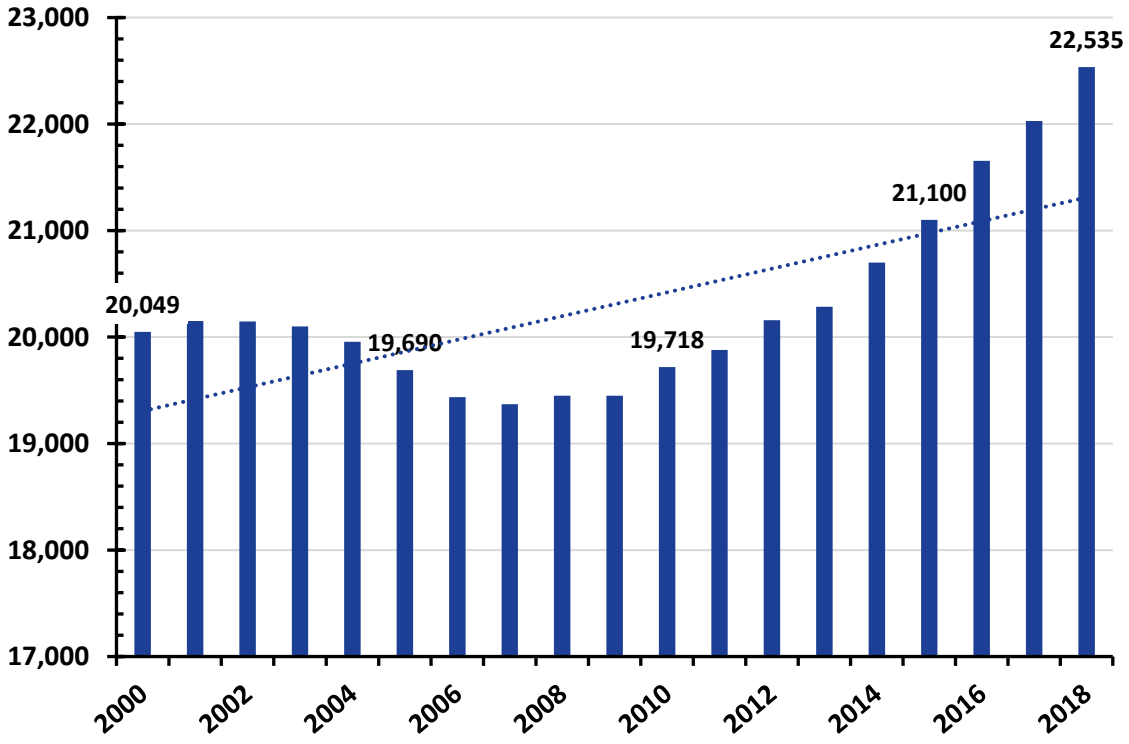


Figure 14: Population History, 2000–2018[3,4]



[3] *Retrieved from: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF.*
[4] *Retrieved from: https://www.census.gov/data/datasets/time-series/demo/popest/intercensal-2000-2010-cities-and-towns.html.*

Figure 15: Demographics for the MFD Service Area, 2018

Category	Number/%
Population	
Population estimates, July 1, 2018	22,535
Population estimates base, April 1, 2010	2,217.7
Population, percent change—April 1, 2010 (estimates base)–July 1, 2017	14.3%
Geography	
Population per square mile, 2017 (estimate)	4,719.2
Population per square mile, 2010	4,374.8
Land area in square miles, 2010	8.88
Age and Sex	
Persons under 5 years, 2017 (estimate)	8.7%
Persons under 18 years, 2017 (estimate)	22.1
Persons 65 years and over, 2017 (estimate)	13.9
Male persons, 2017 (estimate)	48.8%
Female persons, 2017 (estimate)	51.2%
Race	
Hispanic or Latino	29.5%
White alone	50.2%
Other Races or "two or more races"	20.3%
Population Characteristics	
Veterans, 2014–2018	1,519
Foreign born persons, 2014–2018	24.9%
Housing	
Housing units, 2018 ACS estimate	8,066
Owner-occupied housing unit rate, 2018 ACS estimate	44.5%
Median value of owner-occupied housing units, 2018 ACS estimate	$469,500
Median selected monthly owner costs—with a mortgage, 2018 ACS estimate	$2,082
Median selected monthly owner costs—without a mortgage, 2018 ACS estimate	$458
Median gross rent, 2018 ACS estimate	$1,308
Families and Living Arrangements	
Households, 2014–2018	7,549
Persons per household, 2014–2018	2.74
Living in same house 1 year ago, persons age 1 year+, 2014–2018	85.5%
Language other than English spoken at home, persons age 5 years+, 2014–2018	37.4%
Education	
High school graduate or higher, persons age 25 years+, 2014–2018	83.6%
Bachelor's degree or higher, persons age 25 years+, 2014–2018	27.8%
Health	
With a disability, under age 65 years, 2014–2018	9.7%
Persons without health insurance, under age 65 years	11.1%

Category	Number/%
Economy	
In civilian labor force, total, population age 16 years+, 2014–2018	64.1%
In civilian labor force, female, population age 16 years+, 2014–2018	57.7%
Total accommodation and food services sales, 2012 ($1,000)	$41,713
Total health care and social assistance receipts/revenue, 2012 ($1,000)	$31,515
Total merchant wholesaler sales, 2012 ($1,000)	$45,927
Total retail sales, 2012 ($1,000)	$208,952
Total retail sales per capita, 2012	$10,317
Transportation	
Mean travel time to work (minutes), workers age 16 years+, 2014–2018	24.3
Income and Poverty	
Median household income (in 2017 dollars), 2014–2018	$62,803
Per capita income in the past 12 months (in 2017 dollars), 2014–2018	$29,686
Persons in poverty	11.2%
Businesses	
All firms, 2012	1,223
Women-owned firms, 2012	442
Men-owned firms, 2012	597
Minority-owned firms, 2012	671
Nonminority-owned firms, 2012	499
Veteran-owned firms, 2012	154
Nonveteran-owned firms, 2012	1,001

At-Risk Populations

In addition to the distribution of the population, the demographics can affect the amount of service demand and the nature of hazards within a community. In urban cities, several factors that place groups of people at risk have been identified. An NFPA report has identified the groups that face a higher risk of being injured or killed in a fire as follows:[5]

- Children under 5 years of age
- Older adults over 65 years of age
- People with disabilities
- Language barrier
- People in low-income communities

According to the 2017 Census Bureau estimate, a number of the residents of Marina are in one or more at-risk population groups. This segment of the population is more likely to use fire department services, especially EMS, than other population groups.

Age

The percentage of young children in Marina is a factor that increases service demand and hence community risk in the service area. The median age of the population is 31.9 years old. This compares to an average age for the population of California of 36.5 years old and 37.8 years old for the U.S.[6] Of concern is the number of children under 5 years of age and adults over 65 years of age, representing 22.6% of the population. Adults 75 or older is 6.3% of the population compared to 6% for California.

Disabilities

People under 65 years of age with disabilities make up 9.7% of the population. These people may have difficulty or be incapable of self-preservation during an emergency. Likewise, people under 65 years of age with no health insurance are more prone to chronic illness or exhibit poor physical condition simply because they do not seek treatment promptly. More than 11% of the population is under 65 and has no health insurance, which is higher than the California average of 8.3%; thus, they may require a higher level of fire-rescue response.

[5] *National Fire Protection Association, 2007; Urban Fire Safety Project, Emmitsburg, MD; retrieved from http://www.nfpa.org/public-education/by-topic/people-at-risk/urban-fire-safety/reports-and-presentations.*
[6] *The U.S. Census Bureau.*

Low-Income

Likewise, low-income people are more at risk from fire or medical condition; almost one in five residents (17.3%) of Marina live below the poverty level.[7] Low income is often combined with other factors such as education, disability, and work status, as shown in the following figure.

Figure 16: Marina Household Incomes, 2017[8]

Subject	Households' Estimate	Families' Estimate	Married-Couple Families' Estimate	Nonfamily Households' Estimate
Total	7,549	4,829	3,226	2,720
Less than $10,000	5.5%	3.7%	1.0%	9.9%
$10,000 to $14,999	3.6%	1.4%	0.2%	8.2%
$15,000 to $24,999	8.20%	5.3%	3.8%	14.6%
$25,000 to $34,999	6.8%	5.7	4.5%	9.3%
$35,000 to $49,999	12.10%	11.7%	9.6%	12.5%
$50,000 to $74,999	20.8%	21.6%	19.5%	19.9%
$75,000 to $99,999	13.8%	15.0%	17.9%	11.2%
$100,000 to $149,999	18.1%	21.0%	24.1%	10.1%
$150,000 to $199,999	6.6%	9.4%	13.1%	1.2%
$200,000 or more	4.5%	5.1%	6.2%	3.1%
Median income	$62,803	$76,273	$87,656	$45,633
Mean income	$81,147	$89,673	*	$61,537

[7] *"The U.S. Dept of Health and Human Services 2019 poverty threshold is defined as $12,490 for an individual, $25,750 for a family of four." Retrieved from https://aspe.hhs.gov/prior-hhs-poverty-guidelines-and-federal-register-references.*

[8] *U.S. Census https://data.census.gov/cedsci/table?q=marina%20ca%20income&g=1600000US0645778&lastDisplayedRow=16&table=S1901&tid=ACSST5Y2018.S1901&t=Income%20%28Households,%20Families,%20Individuals%29.*

Physical Hazards

Since 1965, the number of federally declared disasters in Monterey County (20) is higher when compared to both the state (19) and national (16) averages.[9] The cause for each of these declarations is shown in the next figure. Although most of these declarations did not affect Marina directly, they are an indication of the hazards present throughout the County. The figure excludes one declaration related to Hurricane Katrina when evacuees were transported from New Orleans to Monterey County for shelter.

Figure 17: Federally Declared Disasters, Jan. 1965–Mar. 2018

Type	Type, Number	Type, Percent
Fire	3	15%
Flood	5	25%
Severe Storms	5	25%
Coastal Storm	1	5%
Freezing	3	15%
Earthquake	1	5%
Drought	1	5%
Tsunami	1	5%
Total	**20**	**100.0%**

Earthquakes

Earthquakes occur throughout California, but certain areas, including Marina, have a slightly lower probability of experiencing damaging ground motions caused by seismic activity compared to California. Marina has an earthquake index of 16.63 compared to California at 21.8. Most of Marina's population is in a high shaking hazard area. Marina is in the Reliz fault zone. A fault from the coast to the Municipal Airport and another just south and travels through California State University Monterey Bay.The Monterey County Draft Environmental Impact Report (2007) stated that there had not been any major activity along this fault in more than 100 years. A high ground shaking hazard area is derived from the U.S. Geological Survey (USGS) seismic hazard map, which shows the distribution of earthquake shaking levels that have a certain probability of occurring.

Soil liquefaction is primarily low in most of Marina but increases to moderate or high along the coast and Salinas River. Soil liquefaction occurs when seismic waves cause the soil to lose its strength and cause buildings to collapse.

According to one source, the risk of an earthquake greater than 5.0 within 50 years is 99.91% in Marina and gradually lower to approximately 28.12% for 7.0 or greater. Thus, the risk of earth movement, or ground shaking, ranges from strong to severe.[10]

[9] FEMA Disaster Declarations Summary—Open Government Dataset, U.S. Department of Homeland Security, last updated December 8, 2019. Retrieved from: https://www.fema.gov/openfema-dataset-disaster-declarations-summaries-v2.
[10] *https://www.homefacts.com/earthquakes/California/Monterey-County/Marina.html.*

The Marina area has had a total of 5,182 earthquakes since 1931. The largest earthquake to date was the 1989 Loma Prieta with a magnitude of 6.9 and centered 26 miles from Marina.[11]

Most losses of life and injuries resulting from an earthquake occur in or near structures. The potential for damage to and the collapse of structures is greatest in the downtown area due to the high number of masonry buildings.

Historical Earthquake Events

A total of 237 historical earthquake events that had recorded magnitudes of 3.5 or above were found in or near Marina, CA. Those measuring 5.6 or greater on the Richter Scale are shown here.[12]

Figure 18: Earthquakes Measuring 5.5 or Greater Within 50 Miles

Distance (miles)	Date	Magnitude	Depth (km)	Latitude	Longitude
43.3	1911-07-01	6.6	N/A	37.25	- 121.75
48.5	1984-04-24	6.2	8	37.32	- 121.7
13.3	1926-10-22	6.1	N/A	36.75	- 122
37.3	1979-08-06	5.9	6	37.1	- 121.5
29.2	1961-04-09	5.6	10	36.68	- 121.3

Wildfires

Like many fire jurisdictions in the Western United States, especially California, wildland fire risk is a factor in the MFD service area. The following figure uses CAL FIRE GIS data to examine the wildland fire hazard in and around Marina. This model produced by CAL FIRE considers vegetation, topography, weather, crown fire potential, and ember production and movement to summarize fire hazard zones as moderate, high, or very high. This figure demonstrates that most of the City of Marina has a moderate risk of wildfire due to urbanization, and a small portion north of Reservation Rd. is considered a higher risk.

The vast majority of Marina is an urbanized community with some agricultural lands on the northern portion of the city. The California Fire Resource and Assessment Program (FRAP) considers most of the city in a moderate wildland fire hazard area. This includes more than 25,000 residents, 6,300 residential buildings, 21 critical facilities, and the airport. A small percentage of residents are exposed to a high wildland fire hazard. The risks of wildland fires are greatest in undeveloped areas, primarily on the northeast and southeast sections of the city, and they should be evaluated on a continual basis for wildland-urban interface issues.

The Marina Fire Department participates in State and County-level mutual aid agreements, which provide additional resources for all risk incidents if they occur.

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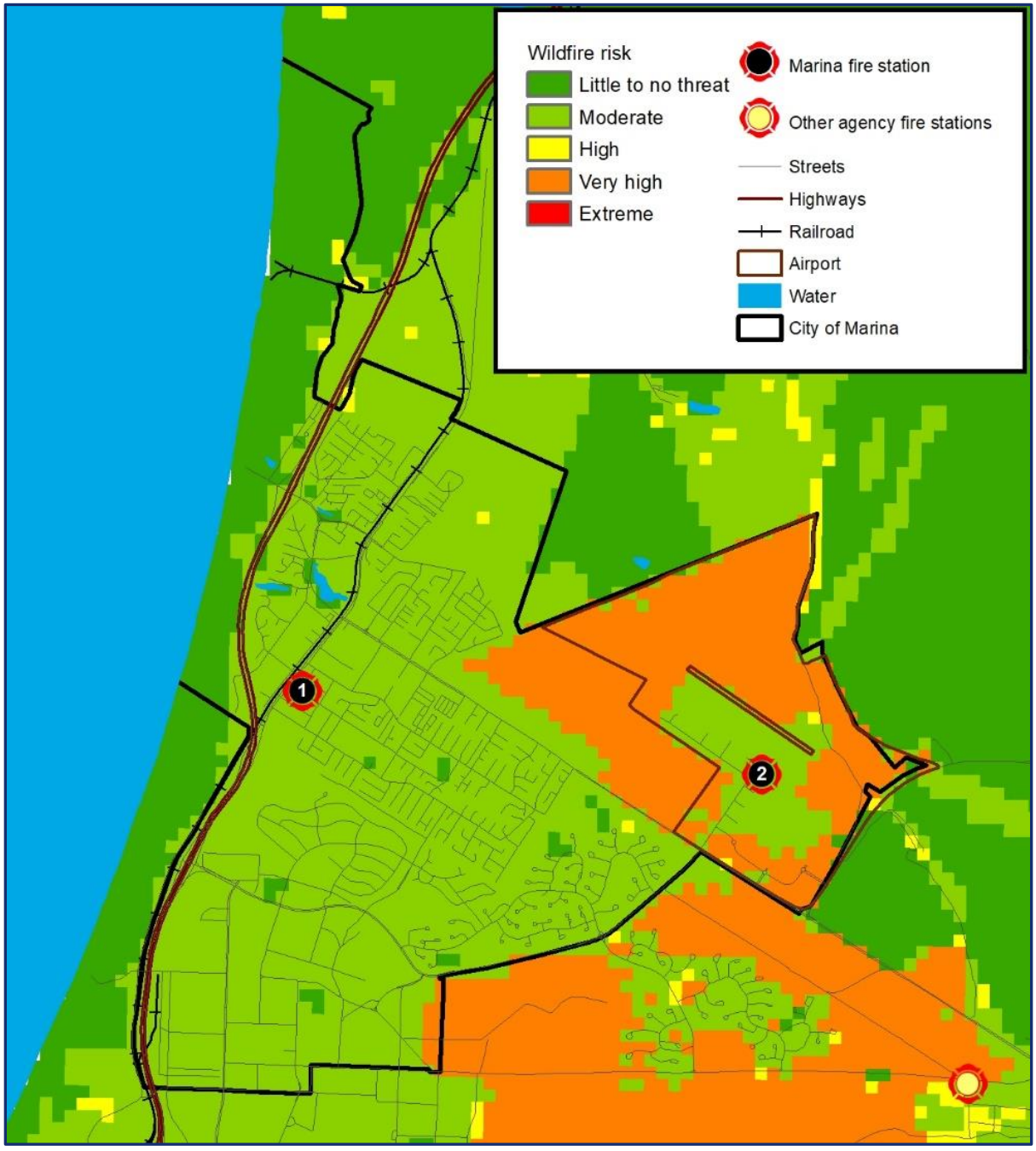
[11] *http://www.usa.com/marina-ca-natural-disasters-extremes.htm.*

[12] *Earthquakes that measure 6.0–6.9 on the Richter Scale are considered to be strong earthquakes (VIII to X on the Mercalli intensity scale) and are expected to result in damage to a moderate number of well-built structures in populated areas. Earthquake-resistant structures survive with slight to moderate damage. Poorly designed structures receive moderate to severe damage. Strong to violent shaking in the epicenter, felt in wider areas, up to hundreds of miles/kilometers away.*

Figure 19: MFD Study Area Wildland Fire Risk



Severe Weather

Tornadoes are created when warm, moist air near the ground interacts with cooler air above and rapidly increasing winds that change direction. Tornadoes are rare in California and even more so in Marina; the expectation of a tornado in Marina is almost 15 times lower than the U.S. average. The tornado index for Marina is 9.13 compared to California at 18.56 and the United States at 136.45.[13]

Since 1965, only 11 tornadoes have been recorded within 30 miles of Marina (interestingly half of these occurred in the month of December). [14] Only one of these events caused injuries when two individuals were injured after 75 mph winds shattered glass near the east/northeast section of Monterey and the adjoining Seaside-area on December 6, 1992.[15]

Figure 20: Tornado Intensity, Enhanced Fujita Scale

Designation	Wind Speed, mph	Typical Damage[16]
EF-0	65–85	Minor or no damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e., those that remain in open fields) are always rated EF0.
EF-1	86–110	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF-2	111–135	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF-3	136–165	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations are badly damaged.
EF-4	166–200	Devastating damage. Well-constructed and whole frame houses completely leveled; cars and other large objects thrown and small missiles generated.
EF-5	> 200	Extreme damage. Strong-framed, well-built houses leveled off foundations are swept away; steel-reinforced concrete structures are critically damaged; tall buildings collapse or have severe structural deformations; some cars, trucks, and train cars can be thrown approximately 1 mile (1.6 km).

[13] *http://www.usa.com/marina-ca-natural-disasters-extremes.htm#TornadoIndex.*
[14] *https://www.homefacts.com/tornadoes/California/Monterey-County/Marina.html.*
[15] *https://met.nps.edu/~ldm/renard_wx/dec92wx.pdf.*
[16] *Wikipedia. https://en.wikipedia.org/wiki/Enhanced_Fujita_scale.*

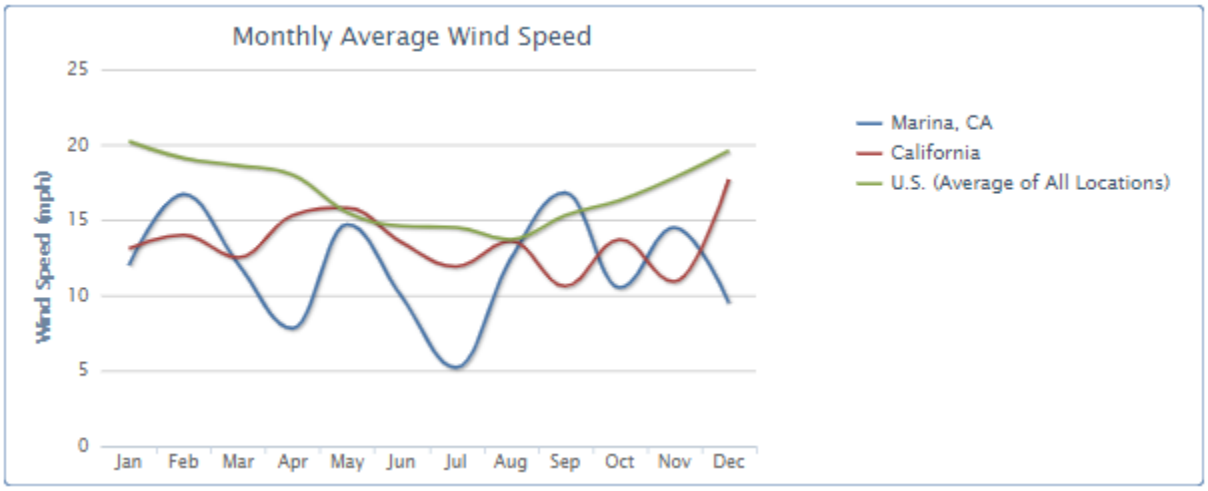
Microbursts can cause devastation similar to that caused by a tornado, but the mechanism is different. A microburst is a strong, small-scale downdraft of wind that hits the ground and spreads out; there is no rotation as there is with a tornado. Microbursts are frequently associated with strong thunderstorms.

A **macroburst** is another form of straight-line wind, similar to a microburst but spread out over a larger area. These damaging downdrafts do not occur very often in and around Marina unless associated with significant and violent thunderstorms.

Seasonal Winds

Marina has mild winds much of the year but spikes in February, May, and September, having a sharp increase in wind speeds (averaging up to 17 mph). The winds drop to less than 15 mph until rising again in November to approximately 20 mph. The annual average wind speed is 11.83 mph in Marina compared to 13.54 mph in California.[17] Prevailing winds are generally out of the west.

Figure 21: Marina Average Monthly Wind Speeds



Floods

Flooding can occur in localized areas during rain events and runoff from agricultural irrigation on the eastern side of the City. The Salinas River traverses the northeastern and eastern city limits and can pose minimal flooding. Other localized flooding can occur during heavy rain events and from wave action directly from the Pacific Ocean.

There are approximately 525 people and 293 buildings valued at more than $60 million within the 100-year flood zone. None of these buildings are considered critical facilities or infrastructure. The only road that may be impacted by flooding is Blanco Rd. where it crosses the Salinas River.

Even though major flooding within the 100-year flood plain is minimal, MFD should be aware of all locations and develop contingency plans in the event of flooding, whether localized or widespread.

[17] http://www.usa.com/santa-maria-ca-weather.htm#HistoricalWind%20Speed.

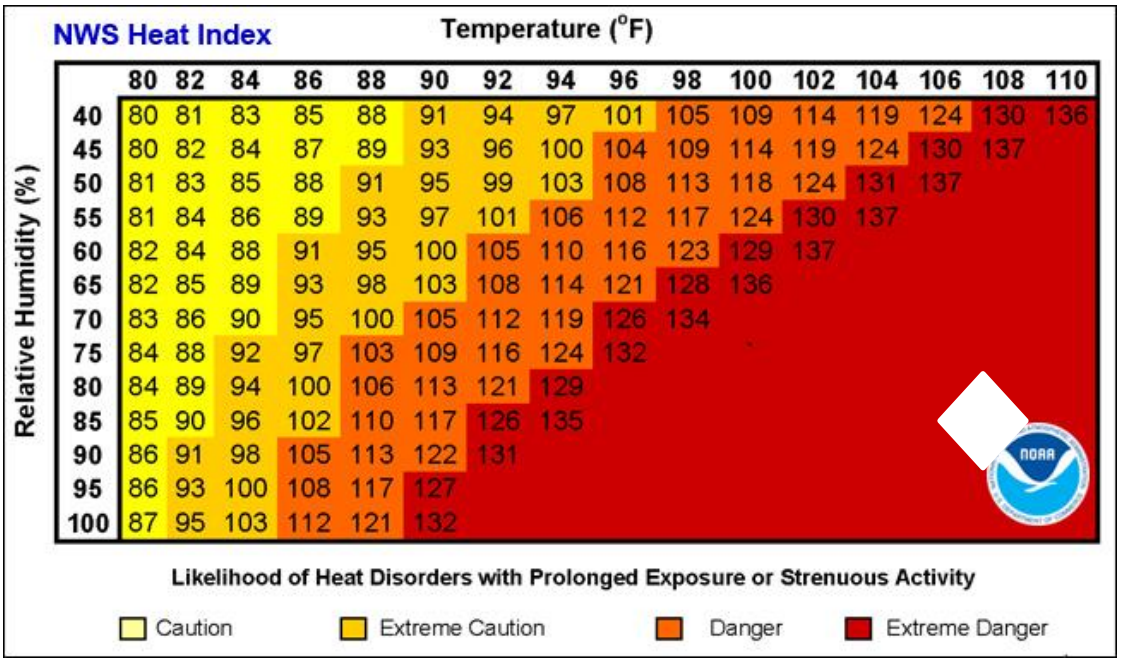
Dam Failure

The San Antonio and Nacimiento dams present a minimal risk along the eastern and northeastern city limits, affecting nine citizens and three residential and two non-residential buildings.

Extreme Heat

Extreme heat is any period when the temperature is high enough that overexposure can cause distress, including injury, heat-related illness, or death to humans and animals. Related to temperature is the heat index—an indicator of how hot it feels based on actual temperature and relative humidity. The higher the humidity, the hotter it feels due to the body's inability to cool itself. The National Weather Service (NWS) publishes a Heat Index, shown in the next figure, to help local planners prepare for and mitigate the effects of extreme temperatures.[18]

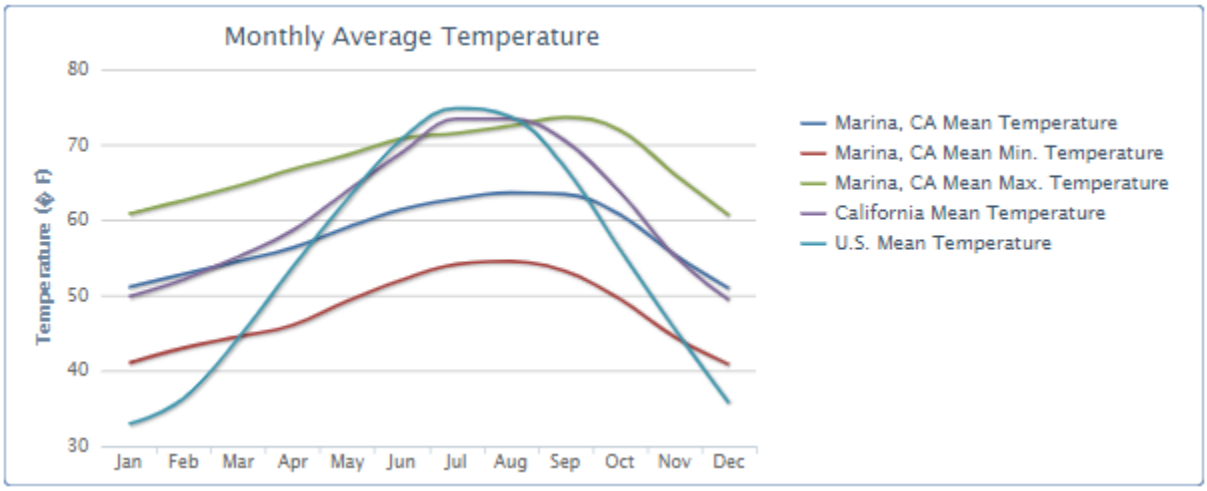
Figure 22: NWS Heat Index



While extreme temperatures are known to occur, prolonged heatwaves in Marina are rare. The hottest recorded temperature at the Monterey Peninsula AP weather station located near the Monterey Regional Airport was 103˚F in September 2017. The coldest extremes typically occur during December and January with the coldest temperature recorded is 25˚F.[19] Overall, Marina has relatively mild temperatures with a very low seasonal variation.

[18] *U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service. http://www.nws.noaa.gov/om/heat/heat-images/heatindexchart.png.*
[19] *https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca5796.*

Figure 23: Marina Average Monthly Temperatures[20]

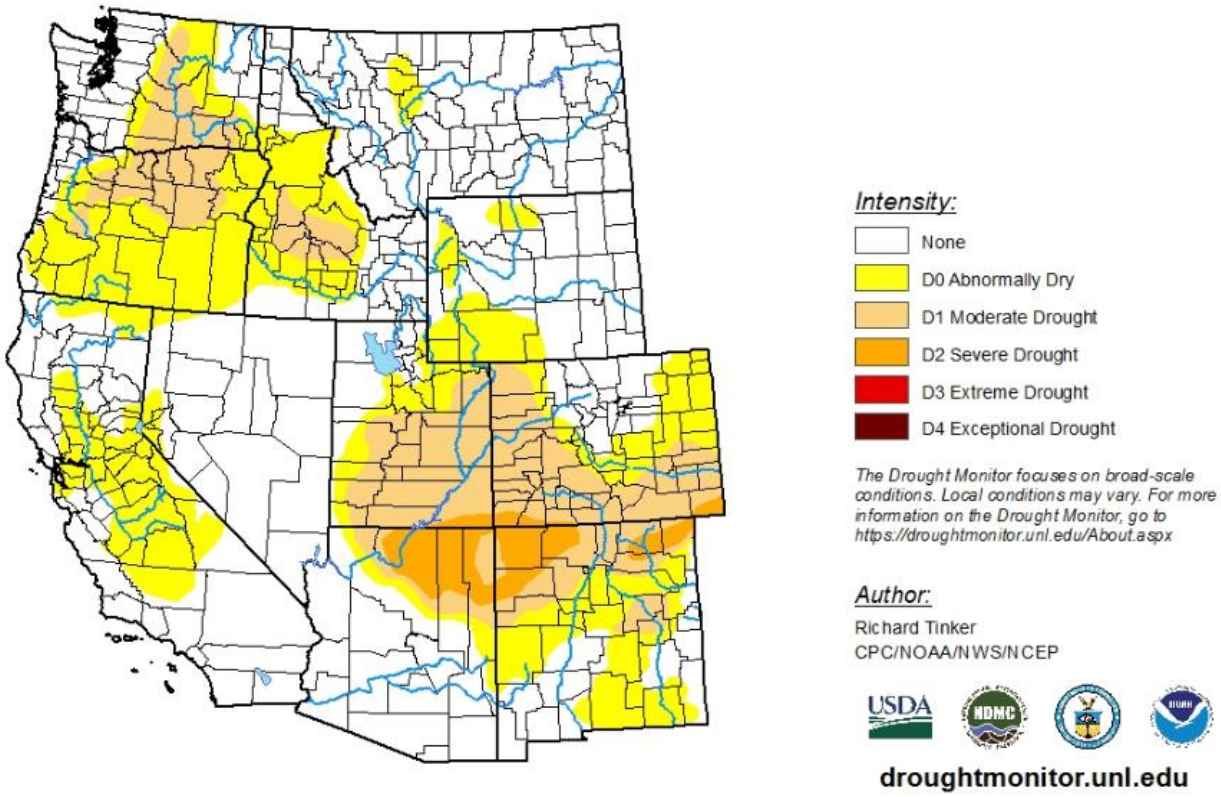


Drought

Drought is any period of dry weather, characterized by insufficient rain to grow crops or replenish surface water supplies. Droughts are gradual and persistent with secondary impacts on wildfire, crop production, oil and gas production, and socio-economic impact. Currently, portions of the West are reporting moderate and severe drought conditions. Abnormally dry conditions are only observed in Central California. Even though Monterey County is currently not in drought conditions, as little as three years ago, the area was experiencing a moderate to severe drought.[21]

[20] http://www.usa.com/salinas-ca-weather.htm.
[21] *United States Drought Monitor, https://droughtmonitor.unl.edu/.*

Figure 24: U.S. Drought Conditions, February 2020[22]



22 United States Drought Monitor, https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?West.

Technological (Human-Caused) Hazards

The most prominent technological, or human-caused, hazards faced by residents of Marina are transportation emergencies, structural fires, long-time power outage, and hazardous materials releases.

Transportation

Transportation corridors provide necessary access and egress for the Department. The configuration of transportation systems can also affect the response capability of emergency services. Limited access freeways can interrupt street connectivity, forcing apparatus to negotiate a circuitous route to reach an emergency scene.

Roads

Surface streets dominate the MFD service area. California State Route 1 is primarily a north-south highway with controlled access points. The primary hazard is related to over-the-road shipments of combustible and hazardous materials and motor vehicle accidents. The remainder of the Department's service has a mix of relatively well-interconnected street networks and disconnected neighborhoods characterized by some winding streets and cul-de-sacs.

There are some intersections with traffic signal preemption and use the older infrared technology. The signal pre-emption can provide a significant response time performance advantage as well as improved safety to motorists. Funding for additional locations is potentially available from Monterey Bay Air Resources District through the AB2722 program. More information can be provided by Monterey-Salinas Transit for other funding sources.

Airport

The Marina Municipal Airport is operated by the City and provides one runway. The airport utilizes minimal navigation aids for landings. The fire station located on airport property houses one engine and has recently been staffed with a Captain and an Engineer. Other facilities on airport property include hangers and fueling operations. Fueling is available 24 hours per day from a 12,000-gallon tank providing aviation gas and Jet A fuels. There are approximately 50 aircraft based at the airport and 40,000 annual operations, and the control tower is not staffed. The 2018 Marina Airport Master Plan recommended transiting from a recreational facility to one focused on business aviation. This change may affect fire department operations as more aircraft use the facility and additional structures are built on airport property.[23]

[23] *https://www.cityofmarina.org/DocumentCenter/View/10126/OAR-Complete-Final-Master-Plan-June-2018.*

Figure 25: Marina Municipal Airport

Physical Assets Protected

The definition of target hazards varies among jurisdictions; thus, every department must determine what is important in their community and must define and identify those special target hazards. For continuity, ESCI uses the FEMA definition of target hazards as "facilities in either the public or private sector that provide essential products and services to the general public, are otherwise necessary to preserve the welfare and quality of life in the community, or fulfill important public safety, emergency response, and/or disaster recovery functions."[24]

Critical Infrastructure and Key Resources

Critical infrastructure and key resources (CIKR) explain what is crucial for a community to function in a modern economy. Critical infrastructure is defined as a sector "whose assets, systems, and networks, whether physical or virtual, are considered so vital to the United States that their incapacitation or destruction would have a debilitating effect on security, national economic security, national public health or safety, or any combination thereof." There are sixteen defined Critical Infrastructure Sectors (CIS):[25]

- Chemical Sector
- Commercial Facilities Sector
- Communications Sector
- Critical Manufacturing Sector
- Dams Sector
- Defense Industrial Base Sector
- Emergency Services Sector
- Energy Sector
- Financial Services Sector
- Food and Agriculture Sector
- Government Facilities Sector
- Healthcare and Public Health Sector
- Information Technology Sector
- Nuclear Reactors, Materials, and Waste Sector
- Transportation Systems Sector
- Water and Wastewater Systems Sector

Although these types of sectors may not be in Marina, the goal is for each community to determine where critical infrastructure is located and develop pre-incident plans for responding personnel.

Other buildings to consider listing as target hazards could include occupancies with a potential for a large loss of life such as places of public assembly, schools and childcare centers, medical and residential care facilities, and multifamily dwellings. Other considerations include buildings with substantial value to the community—economic loss, replacement cost, or historic significance—that, if damaged or destroyed, would have a significant negative impact.

[24] *Community Risk Assessment: A Guide for Conducting a Community Risk Assessment, Version 1.5, John Stouffer for Vison 20/20, 2016, page 12.*
[25] *Infrastructure Security, Department of Homeland Security.*

Responses to target hazards are expected to require a significant number of MFD resources and automatic aid during an incident. MFD states that certain target hazards have pre-incident plans. Pre-incident plans completed by MFD should include the resources needed to provide an ERF for each type of incident. The following figure lists the inventory of critical facilities as provided by the City. ESCI purposely did not identify the location of these facilities in the interest of homeland security. MFD should maintain detailed information about critical facilities.

Figure 26: Critical Facilities

Type	Number
Airport	1
Detention Center	1
Fire Department Stations	2
Health Care Facilities	4
Law Enforcement Facilities	3
Maintenance Yards	1
Residential Elderly Facilities	2
Library	1
Schools	6
Public Utilities	1
Total	**22**

Occupancies can be classified according to the risk level; low, medium, or high-risk. These factors are used to assign a classification to an individual occupancy. They include the size of the building(s), construction type, the presence or absence of fire suppression features such as sprinklers and standpipes, the needed fire flow, the risk to life, the presence of chemicals and/or hazardous processes, and the amount of water available in relation to the needed fire flow. An effective response force can be established based on risk factors associated with the occupancy.

The ISO batch report lists the needed fire flow (the amount of water required to extinguish a fire if the building was fully involved) for every occupancy in Marina. The following figure lists the properties in Marina with needed fire flows of 3,000 gallons per minute or greater.

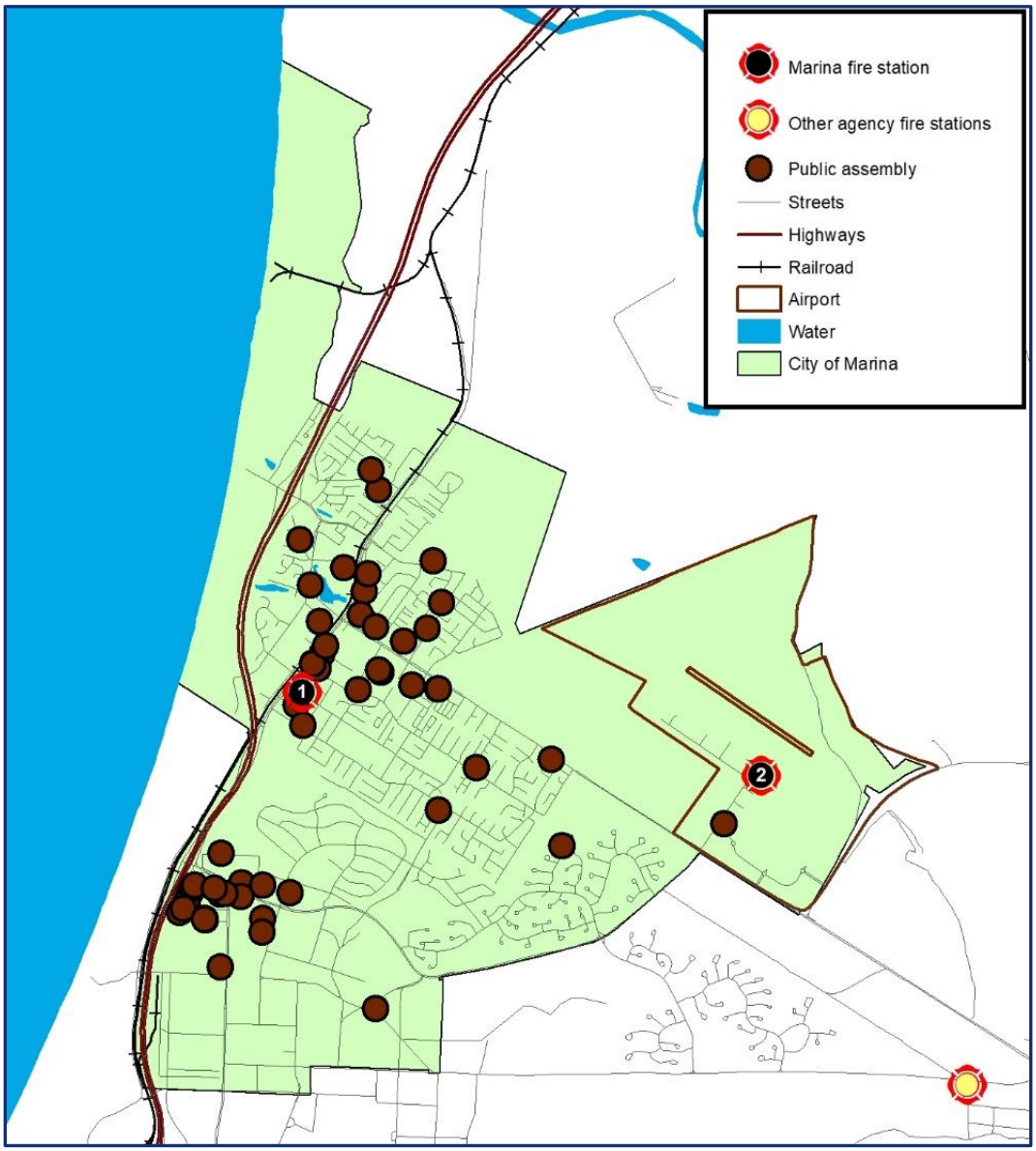
Figure 27: Buildings Requiring Fire Flow over 3,000 GPM or More

Public Assembly

Numerous buildings lie within cities in which large numbers of people gather for entertainment and worship. Venues include nightclubs, theaters, and other entertainment facilities that require pre-incident planning. Other examples include large outside festivals or sporting events and should be considered target hazards that may present issues for responders because of blocked streets or access to the location.

These facilities and locations present additional hazards, primarily for mass casualty incidents. Fire, criminal mischief, and potentially terrorism could cause a major medical emergency requiring significant emergency services resources. The following figure shows the locations of buildings identified as public assembly facilities within the city.

Figure 28: Public Assembly Facilities



Child Care Facilities

Several childcare facilities exist in Marina. Childcare facilities are of special concern due to the hazards associated with very young children during emergencies. Employees of these facilities must be familiar with required evacuation plans if an emergency occurs during operating hours.

Schools

The Monterey Peninsula Unified School District (MPUSD) serves more than 10,000 students in 24 schools and eight after school learning programs in several cities, including Marina. There is one early childhood learning center, one charter school (grades 7–12), three elementary, one middle, and one high school in Marina's jurisdiction. Pre-incident planning is necessary to properly prepare for emergencies and allow fire service personnel to become familiar with the building(s).

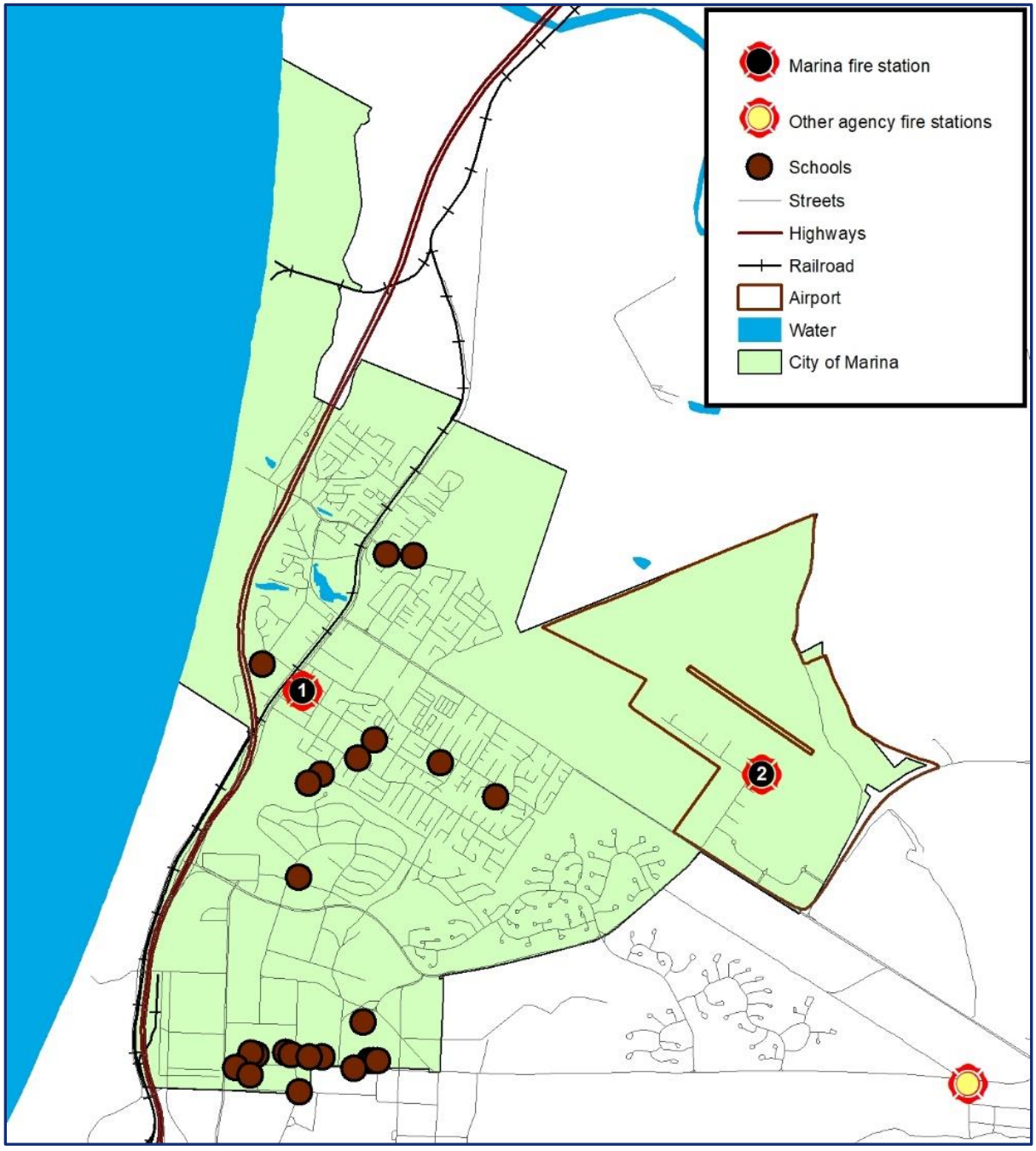
Student demographics from MPUSD includes 66% considered socioeconomically disadvantaged, 28% learning the English language, and 10% special education students.[26] These demographics can be considered risk factors because of low-income, which translates to less health care access, thus an increase in medical responses.

California State University Monterey Bay is located along the southern border of the city. While most of the classroom buildings are located in Seaside, several dormitories and apartments for students are in the city. These buildings accounted for 250 false alarms in 2019. MFD should investigate the reason for these false alarms to determine if they are caused by design features or other problems creating the activations.

The following figure shows the locations of public and private school facilities inside or near the city limits of Marina.

[26] *Monterey Peninsula Unified School District https://www.mpusd.net/.*

Figure 29: School Locations



Hospital and Medical Care Facilities

Medical care facilities—particularly hospitals—house vulnerable populations. Although there is not a hospital in Marina, the Veteran's Administration operates the Major General William H. Gourley Outpatient Clinic. This facility provides basic health care services but not an emergency room. These facilities are generally built of fire-resistive construction with built-in fire suppression, but emergencies can occur that require the quick movement of patients away from the hazard. Smaller medical facilities such as urgent care clinics or doctor offices may not have built-in fire protection systems. This information should be collected during a pre-incident survey. The following figure shows the location of medical facilities and offices.

Figure 30: Hospitals and Care Facilities[27]

[27] *As reported by MFD , April 2019.*

Other Critical Infrastructure

In this section, other types of infrastructure critical to a community are discussed in general terms. It is important the fire department plan for emergencies at any of these facilities.

Communications

Emergency communication centers and the associated transmitting and receiving equipment are essential facilities for emergency response. The Marina Fire Department is dispatched by the Monterey County Consolidated Emergency Fire Dispatch Center and accounts for 5.11% of fire incidents in the County. This communication center is equipped with a state-of-the-art computer-aided-dispatch system and has the primary responsibility to receive and process 9-1-1 calls for service and coordinate the response of emergency equipment and personnel.

The communication center is staffed by full-time telecommunicators and supplemented by professional firefighters. It provides emergency fire and law enforcement dispatch service for the entire County, dispatching for 26 agencies (13 fire and 13 law enforcement).

The communication center is prepared to answer calls from the public who speak various worldwide languages. The State of California provides transfer numbers for translation services for 9-1-1 telephone calls in foreign languages (Spanish, Vietnamese, and Mandarin Chinese) or via telecommunications devices for the deaf. In addition, the Monterey County Dispatch Center subscribes to Voiance Language Line Service, a commercial service providing telephone translation in over 140 languages. EMS incidents are sent to fire telecommunicators and AMR concurrently for dispatch. Emergency Medical Dispatch (EMD), a method used to prioritize responses, is provided by AMR for approximately 60% of their incidents. The remaining incidents not using EMD are received from other public safety agencies such as California Highway Patrol.

There is not a back-up dispatch facility or known back-up plan if Monterey County Emergency Communications Center experiences an incident that disrupts dispatch services. Salinas had a mobile command unit in its fleet that can receive 9-1-1 call diversions and has been transferred to Monterey County Sheriff's Department.

There are other communication facilities and equipment equally important to the community and government operations. Telephone company central offices and transmission lines of local service providers are necessary to support the community. Many businesses and residential customers now use internet providers for telephone services. Wireless cellular communication providers provide essential communication capabilities for the community as well as emergency personnel through their facilities and equipment.

Energy

Previously discussed community services, from communications to traffic signals to normal operations, require the use of energy. Whether it is electricity generation and transmission systems, fuel distribution and storage tanks, or natural gas pipelines and regulator stations, the community is dependent upon energy sources. Electrical power is provided by Pacific Gas and Electrical (PGE). PGE operates two high-voltage transmission lines in Marina and two natural gas transmission pipelines.

Water Distribution

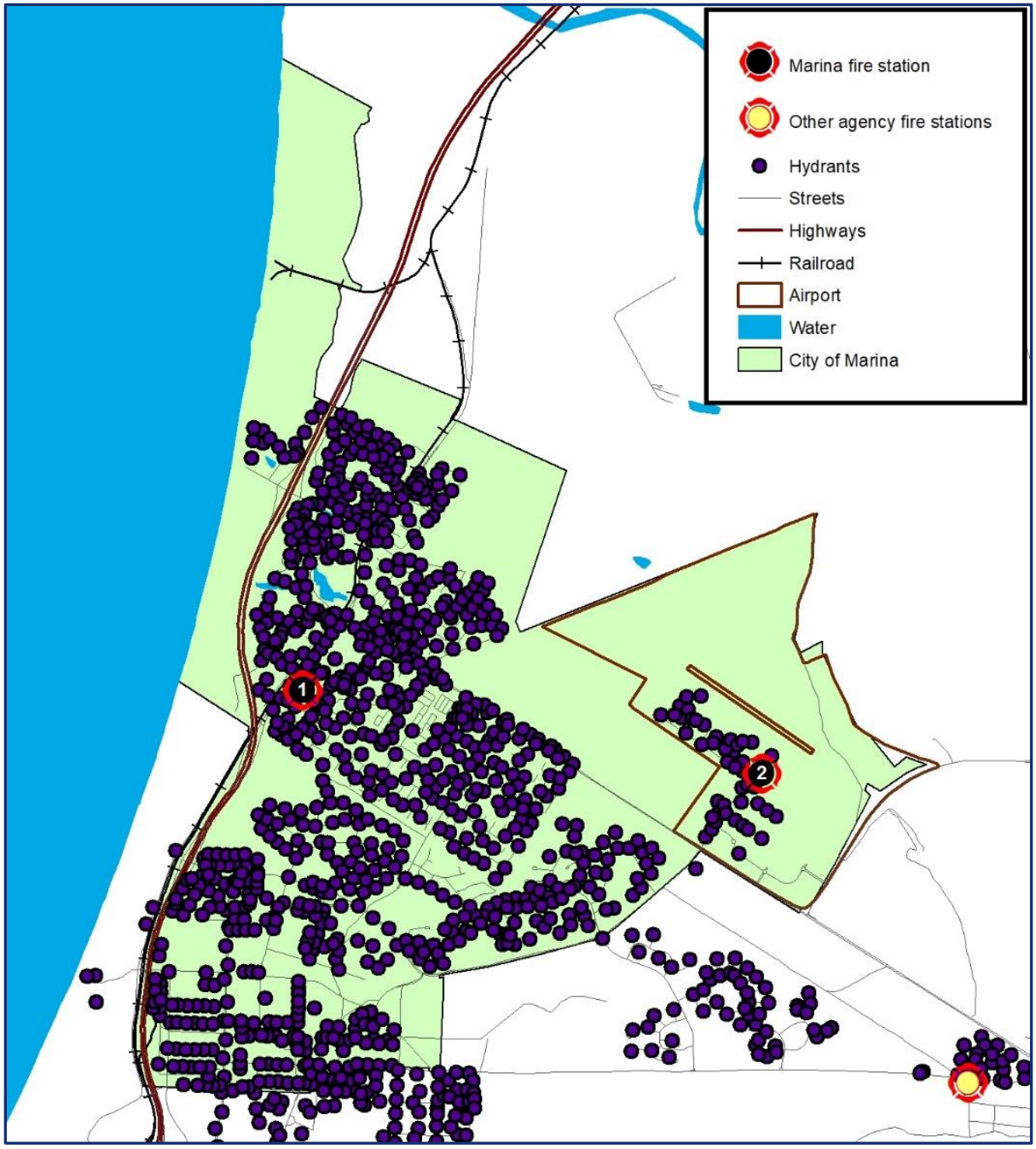
The most obvious concern to the fire department is water availability and mains, and fire hydrant system. Providing sufficient storage, distribution, and access to this valuable firefighting resource through well-distributed fire hydrants is necessary. As shown in the next figure, hydrants are well-distributed through portions of the city.

The Marina Coast Water District (MCWD) provides potable water for drinking and firefighting needs to MFD. The initial system expanded after the closure of Fort Ord in 1997. In 2001, the military transferred the system to MCWD. Combining the two systems has enhanced services and lowered costs for MCWD. In 2017, MCWD adopted a five-year strategic plan that examined water sources, infrastructure, fiscal planning, strategic partners, employees, and administrative management. The District has an adopted Capital Improvement Plan to maintain, expand, and upgrade the system.[28] All inspections, maintenance, and repairs of hydrants are completed by MCWD.

[28] *Marina Coast Water District https://www.mcwd.org/index.html.*

Figure 31: Marina Coast Water District Facilities

Figure 32: Fire Hydrants



Structural Hazards

Certain buildings, their contents, functions, and size present a greater firefighting challenge and require special equipment, operations, and training. Information for this section has been drawn from MFD records and the Insurance Services Office (ISO) database.

Hazardous Materials

Buildings that have been identified as containing hazardous materials can create a dangerous environment to the community as well as the firefighters during a spill or fire. Special equipment, such as protective clothing and sensors, along with specialized training, is necessary to mitigate a hazardous materials incident successfully. Any location that has on-site, for any one day in a calendar year, an amount of a hazardous chemical equal to or greater than the following threshold limits established by the EPA must file information, known as Tier II reports, about each material and the on-site amount with local authorities, planning committees, and the State's Emergency Response Commission under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), commonly known as SARA Title III:

- Ten-thousand pounds for hazardous chemicals
- Lesser of 500 pounds or the threshold planning quantity for extremely hazardous substances

Currently, there are no facilities with Extremely Hazardous Substances (EHS) in Marina. There are other businesses, such as big-box and hardware stores, that sell products considered hazardous materials. Pre-incident plans of these locations should be completed and updated to provide information on types and locations of hazardous substances to responding firefighters.

Figure 33: Hazardous Materials Locations

Buildings Three or More Stories in Height

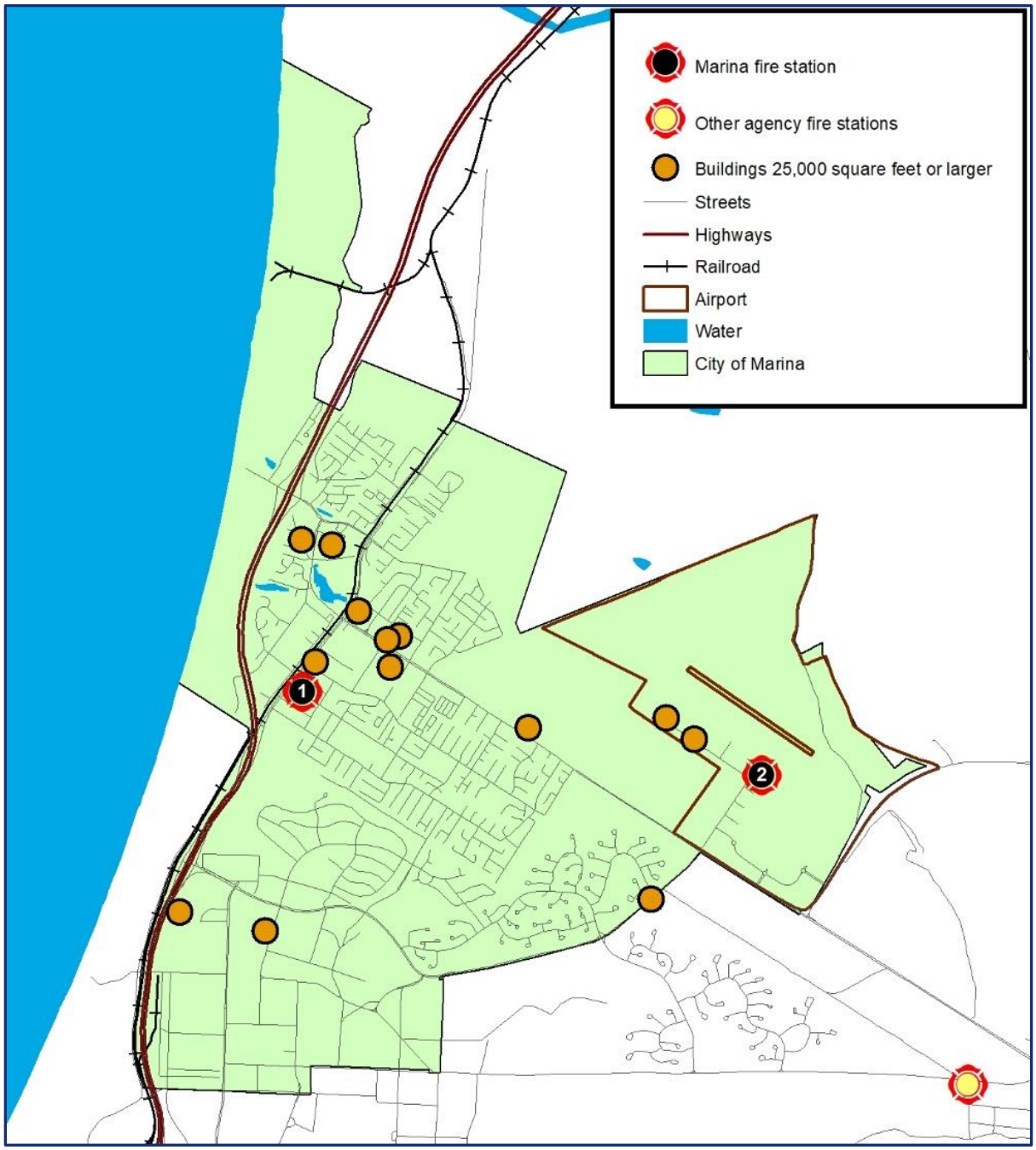
The Insurance Services Office calls for a ladder truck within 2.5 miles of developed areas containing buildings three or more stories in height. Accessing the upper floors and roof of buildings this tall typically requires ladder truck capability as ground ladders may not provide access. The MFD does not have a ladder truck of its own and must rely on automatic aid for coverage from Monterey County. This discrepancy is noted in the recent ISO classification letter identifying that only 1.56 points were given out of 4.0. The following figure shows the locations of buildings that are three or more stories in height.

Figure 34: Buildings Three or Four Stories in Height

Large Square Footage Buildings

Large buildings, such as warehouses, malls, and large "box" stores, need greater volumes of water for firefighting and require more firefighters to advance hose lines long distances into the building. The following figure is based on data from ISO and shows the locations for buildings 25,000 square feet and larger.

Figure 35: Buildings 25,000 Square Feet and Larger



Comparison of Fire Risk in Other Communities

Using information provided by MFD, recent NFPA reports, and other sources, ESCI compared fire risk in Marina with communities of comparable population across the U.S. The information contained in this section is based on the latest data reported to the NFPA and other sources. As such, the information **does not reflect recommended rates or defined fire protection standards** and is provided for illustrative, benchmark purposes only.

Fire Loss

For additional context, United States fire departments responded to an estimated 1,318,500 fires in 2018. These fires resulted in 3,655 civilian fire fatalities, 15,200 civilian fire injuries, and an estimated $25.6 billion in direct property loss (this figure includes a $12 billion loss in Northern California wildfires). Home fires caused 2,720, or 74%, of the civilian fire deaths.

Figure 36: Fire Losses by Region and Size of Community, 2018

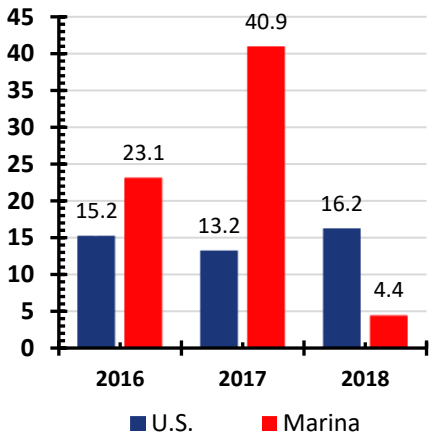
Community Size 150,000–199,999	Number of Fires Per Thousand Population	Property Loss Per Capita
Marina	1.77	$35.63
The U.S.	3.7	$78.25

The fire loss for Marina of $35.63 in 2018 is less than half the United States per capita. This rate can vary from year-to-year based on the number and severity of fires. In 2017, the rate decreased to $5.33 when the fire loss was $117,375. In smaller communities such as Marina, even a single fire or death can greatly affect annual statistics. Therefore, these numbers should be considered in that context. It was noted during ESCI's analysis that an incident involving water damage was included in the fire loss values incorrectly. That fire loss was removed for analysis, and it is recommended to begin a quality control process for incident reports.

Arson

Arson is defined as "any willful or malicious burning or attempt to burn, with or without intent to defraud, a dwelling house, public building, motor vehicle or aircraft, personal property of another."[29] Intentionally set fires should be investigated and tracked to determine if a problem exists. Data from Marina indicates these types of fires were well above the national averages for 2016 and 2017 but decreased substantially in 2018. The increase has been attributed to abandoned houses on the closed Ft. Ord property intentionally set on fire. The City is currently developing a plan to remove "blight" properties for redevelopment. This will decrease the number of abandoned properties within the city.

Figure 37: Arson Rate per 100,000 Population



[29] *https://www.ucrdatatool.gov/offenses.cfm.*

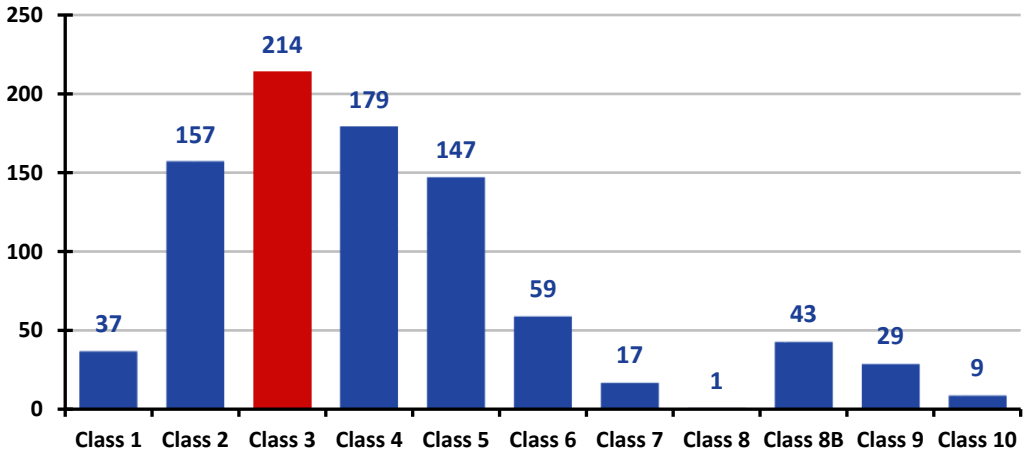
ISO Fire Protection Class Rating

The Insurance Services Office, Inc. (ISO©) is an independent company that collects and analyzes data about municipal fire suppression efforts in communities throughout the United States. According to their report, the ISO's Public Protection Classification program, or PPC, "is a proven and reliable predictor of future fire losses." All other factors being equal, commercial property insurance rates are expected to be lower in areas with lower (better) ISO PPC Class rating.

At the time of the most recent ISO survey, the ISO Fire Suppression Rating Schedule (FSRS) measured four primary elements of a community's fire protection system: *Emergency Communications* (max 10 points); *Fire Department* (max 50 points); *Water Supply* (max 40 points), and *Community Risk Reduction* (max 5.5 points) for a maximum possible total of 105.5 points. ISO then assigns a grade using a scale of 1 to 10, with Class 1 representing the highest degree of fire protection, and Class 10 designating a fire suppression program that does not meet ISO's minimum criteria.

In 2019, the City of Marina was assigned an ISO classification of Group 3/3Y. Marina is one of 214 communities out of 892 communities surveyed across the State to achieve a Class 3 rating, as shown in the following figure.

Figure 38: Comparison of ISO Class Ratings, California



Community Risk Reduction

Developing a community risk reduction (CRR) should be a goal of every organization. The completion of an assessment provides basic information about hazards in a community. Every department should continue to review their data to determine if specific hazards are increasing or decreasing based on incident responses. Risks may change as new development occurs in a community and impacts service delivery.

CRR can be defined as, "The identification and prioritization of risks followed by the integrated application of resources to improve public safety and reduce increasing call volumes."[30] The goal is to begin the integration of emergency operations with prevention efforts at the fire station level, where operations personnel are involved in the process of developing a risk reduction program. The station-level approach is preferred because risks vary from one station to another and can even vary within a station's district. Simply put, CRR is examining problems and developing prevention or mitigation strategies to reduce the hazards.

Figure 39 is a basic methodology offered by Vision 20/20 to identify and analyze risks within a community.[31] Vision 20/20's website (www.strategicfire.org) provides substantial information on how to create a community risk reduction plan.

Figure 39: The Community Risk Assessment Process

[30] *Vision 20/20.*
[31] *Retrieved from http://strategicfire.org/wp-content/uploads/2016/04/Community-Risk-Assessment-Guide-v1.5.pdf.*

MFD offers several risk reduction programs, and information is available on their website. Programs include weed abatement to reduce wildfire hazards, disaster preparedness, building and fire safety to prevent fires. Marina has a Community Emergency Response Team (CERT) to assist in a natural disaster, but it is currently inactive. The department has a partnership with the American Red Cross to install smoke alarms in homes where they are not present or operating properly. They have an open house at the fire station during Fire Prevention Week each year and promote fire safety during the event. MFD has representation on the City's transportation committee to address pedestrian injuries and deaths.

Each of these risk-reduction programs is intended to improve the health and safety of the citizens of Marina. What is missing is an evaluation to determine if the programs are meeting their intended goal(s). Any CRR program should have goals with clear timelines and milestones. Using the Vision 20/20 model, MFD can enhance these programs through additional partnerships based on the hazards identified in this assessment. This process will allow them to develop risk reduction programs that focus on the problems they face on a day-to-day basis and specific to Marina.

Fire Inspections

Currently, Marina does not have a schedule for inspections of commercial properties, but only follows requirements set forth by the State of California. Apartment inspections are required but are not being completed. The Fire Chief has the ultimate responsibility of conducting inspections along with his administrative duties. The Chief conducts all rough-in inspections for residential fire sprinkler systems and is assisted by the Deputy Chief. All other final inspections for new construction are conducted by a private contractor. MFD reviews site plans for new construction prior to approval by the Community Development department. An outside contractor provides plan reviews for fire sprinklers, alarms, and commercial hood systems. All schools and hotels are inspected by engine company personnel.

Inspections are tracked with different software packages. New commercial construction is entered in Citizen Serve, which is the software utilized by the Community Development department. This software tracks the project from conception until it has been completed for occupancy. The administrative assistant tracks schools, hotels, and weed abatement inspections conducted by an engine company. None of the personnel are certified as an inspector. Business inspections are conducted when a new business license is issued. No periodic inspections of other businesses are completed unless they fall in any of the previous categories.

A component of CRR is the inspection of commercial properties. When a jurisdiction has not adopted a schedule for required or periodic inspections, priority should be based on identified hazards. Occupancy classifications such as assembly, educational, institutional, high-rise, and hazardous should be considered the highest risks when developing an inspection schedule. Figure 40 provides an example of occupancies and their associated risk and can guide the development of an inspection schedule. High-risk occupancies should be performed annually, moderate every two years, and low at a three-year interval. Nothing prevents a jurisdiction from adjusting the schedule to meet the needs of the community.

Figure 40: IBC Occupancy Classifications

PRI Risk	IBC Group	Examples
High	A-1, A-2	Nightclub, restaurant, theater, airport/cruise ship terminal
	A-3, A-4, A-5	Arenas, museums, religious
	H-1, H-2, H-3, H-4, H-5	Hazardous materials sites (Tier II)
	B	All government & public buildings, other office buildings over 2 stories
		Schools, daycare centers
	E	Hospitals, assisted living centers, correctional
	I-1, I-2, I-3, I-4	Strip centers, closed-air shopping malls, big box stores
	M	Hotels, motels, dormitories, apartments, board & care
	R-1, R-2	Railroads, Interstate highways, airports
	Special Risk (Target hazard)	Any building with life safety risk beyond the reach of preconnected hose lines > 200 feet such as a high-rise
Moderate	B	Outpatient clinics, general business, offices < 3 stories
	F-1	Fabrication or manufacturing of combustible materials
	M	Mercantile, free-standing
	I-2, R-4	Foster group homes, assisted living homes
	S-1	Storage of combustible materials, car repair, hangars
Low	F-2	Fabrication or manufacturing of non-combustible materials
	R-1	1- and 2-family dwellings, foster homes
	S-2	Storage of combustible materials
	U	Barns, silos, other unclassified

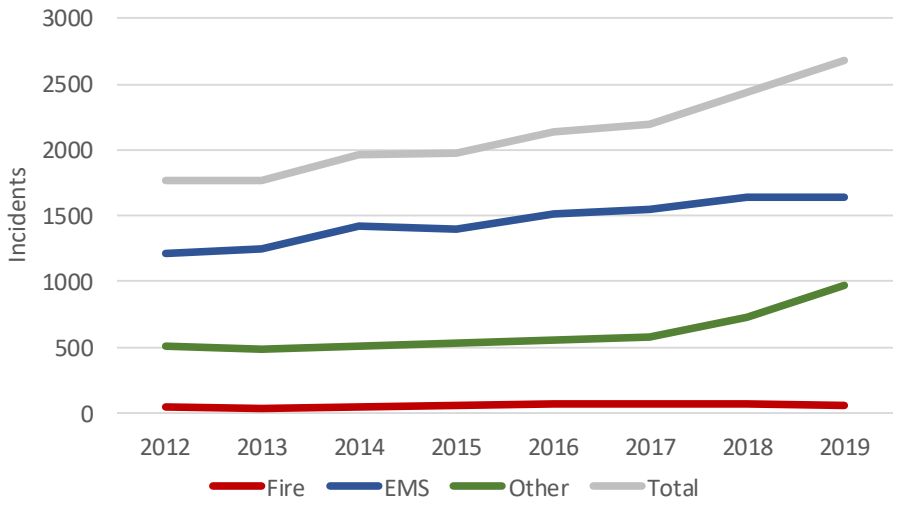
ESCI recommends that the Marina Fire Department establish a schedule to inspect all commercial properties based on the risk associated with the occupancy type. The California State Fire Code requires operational permits for process or storage in an occupancy. Currently, permits are not being issued for these occupancies or are fees assessed. Without the permits being issued, fees are not collected for cost recovery. To properly administer an inspection and operational permitting program, it is recommended that MFD hire a dedicated Fire Inspector. This employee can manage these programs and administer the Department's CRR program.

HISTORICAL SYSTEM RESPONSE WORKLOAD

Before a full response time analysis is conducted, it is important first to examine the level of workload (service demand) that a fire department experiences. Higher service demands can strain the resources of a department and may result in a negative effect on response time performance.

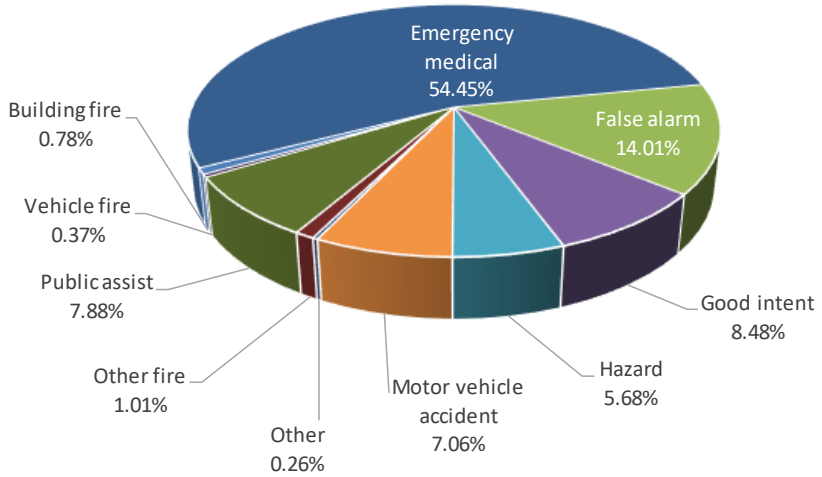
The following figure shows response workload for the past 8 years. The total response workload has increased by 51.4% over the 8 years. The community utilization rate of fire department services was 137.6 incidents per 1,000 population. This is somewhat higher than in other similar urban areas.

Figure 41: Response Workload History, 2010–2019



During 2019, MFD responded to 2,676 incidents. The next figure shows responses by type of incident during 2019. Emergency medical type responses are the most common at 54% of total responses.

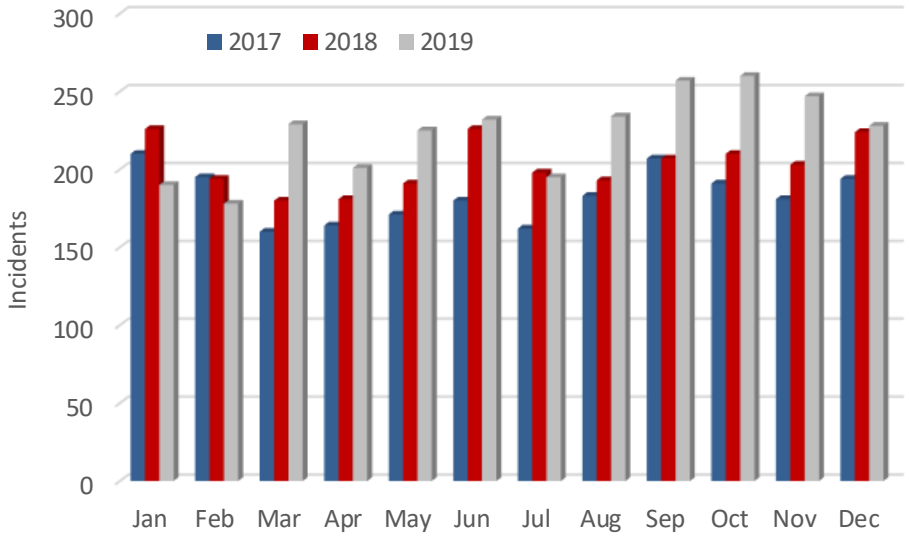
Figure 42: Responses by Type of Incident



Temporal Analysis

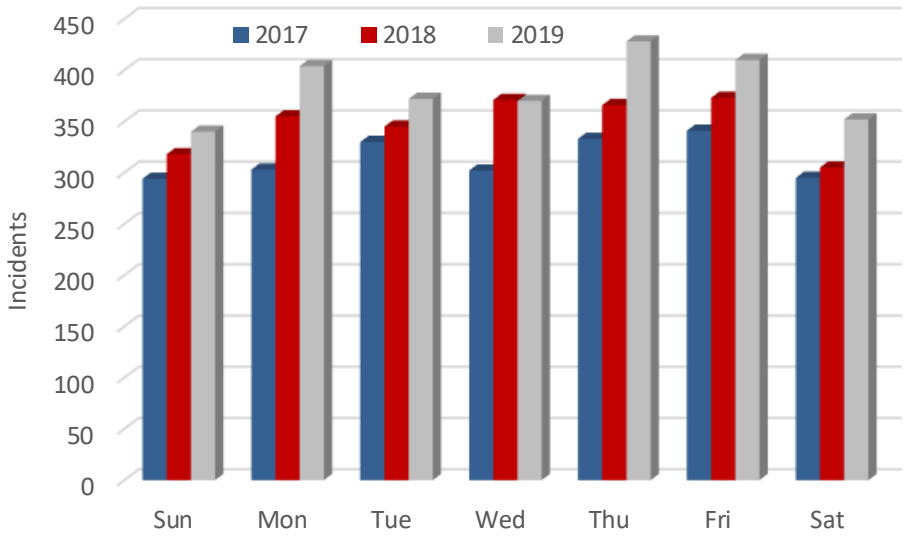
A review of incidents by time of occurrence also reveals when the greatest response demand is occurring. The following figures show how activity and demand change for MFD based on various measures of time. The following figure shows response activity during 2017, 2018, and 2019 (study period) by month. There is some variation by month.

Figure 43: Monthly Response Workload



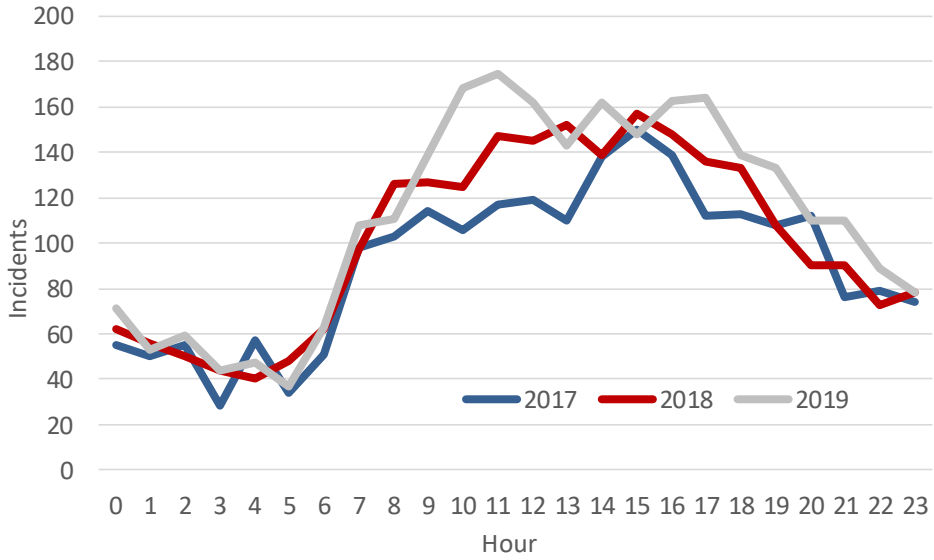
Next, the response workload is compared by the day of the week. Again, there is little variation in response workload by weekday.

Figure 44: Daily Response Workload



The time analysis that always shows significant variation is response activity by the hour of the day. Response workload directly correlates with the activity of people, with workload increasing during daytime hours and decreasing during nighttime hours, as shown in the following figure. Incident activity is at its highest between 9:00 a.m. and 9:00 p.m.

Figure 45: Hourly Response Workload

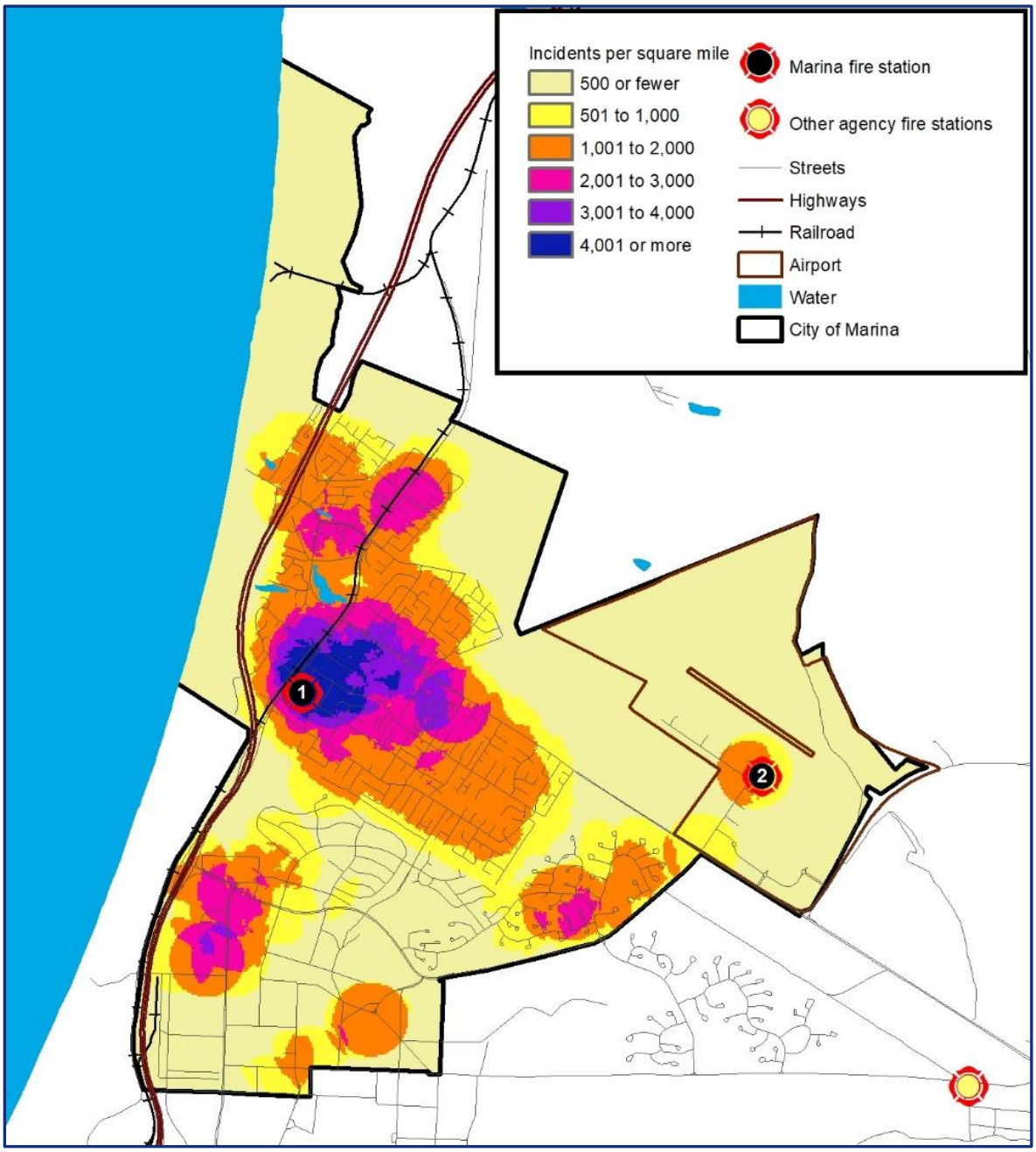


Spatial Analysis

In addition to the temporal analysis, it is useful to examine the geographic distribution of service demand. The following figures indicate the distribution of emergency incidents in MFD during 2019.

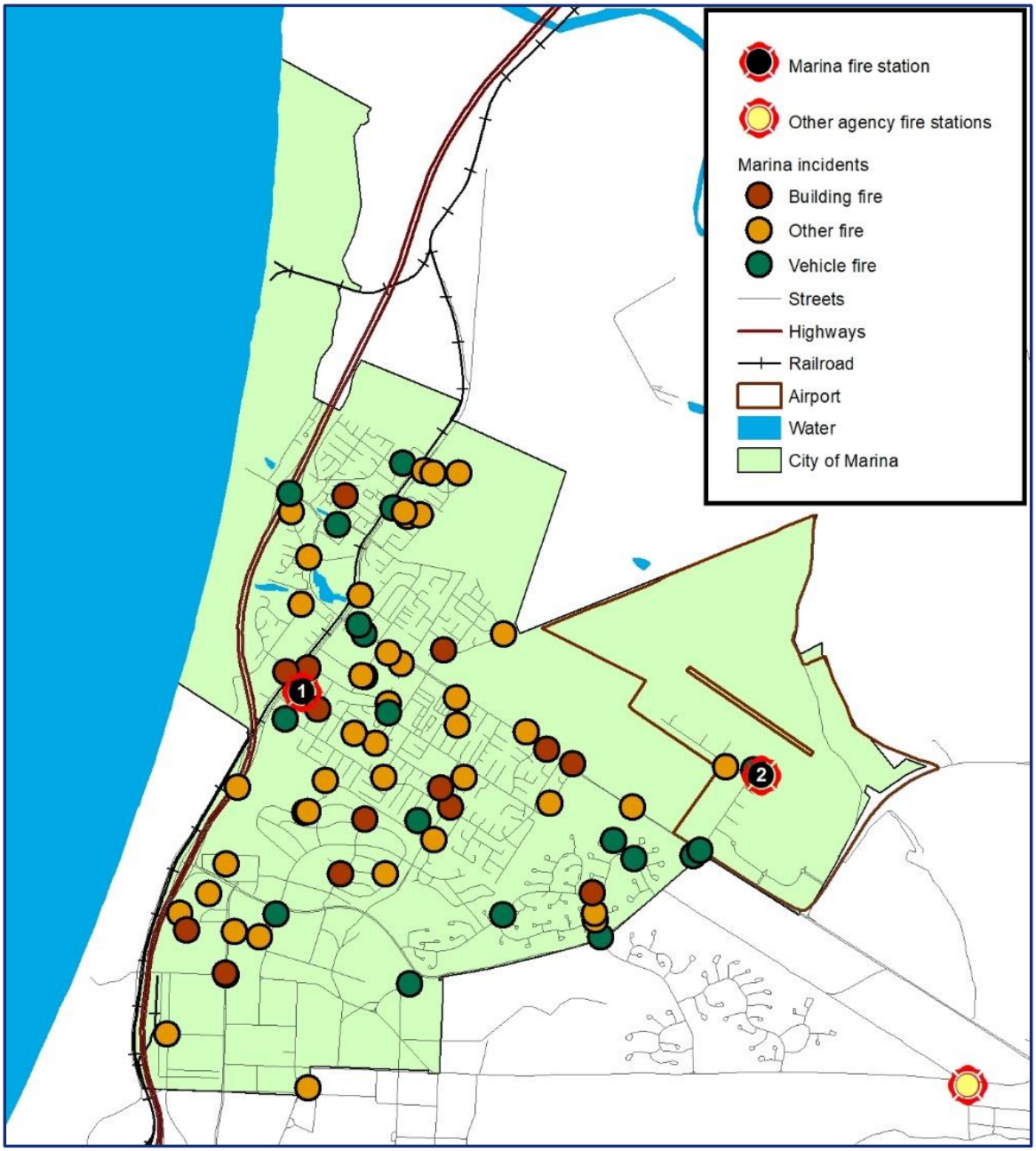
The first figure displays the number of incidents per square mile within various parts of the city. The greatest service demand occurs around Marina Fire Station 1.

Figure 46: Service Demand Density, 2019



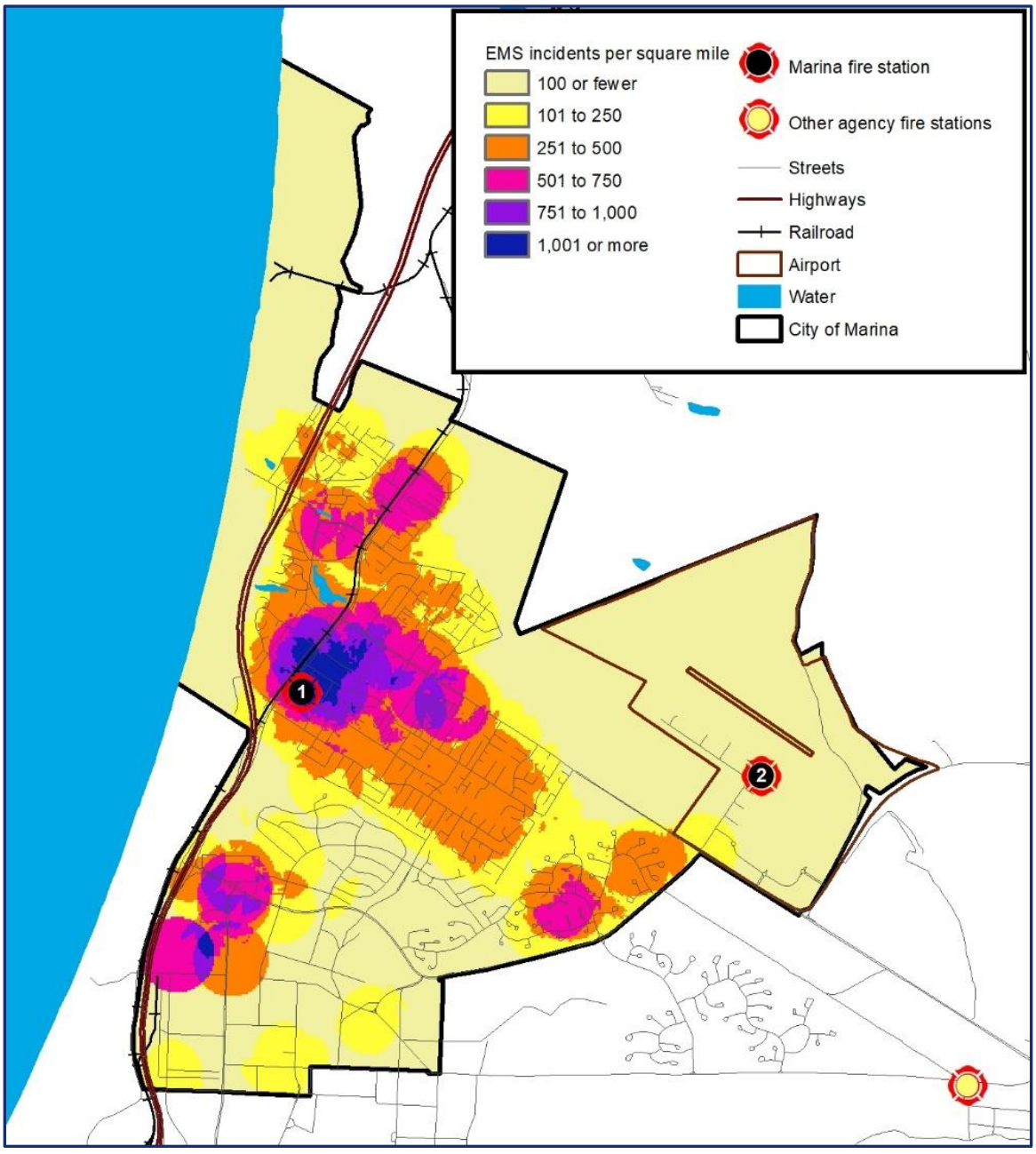
The preceding figure reflects all calls within the city served by MFD. Service demand can vary by area based on incident type. The following figure displays the location of fires occurring within the MFD service area during 2019. This illustrates that fire incidents are distributed throughout the developed area of the city.

Figure 47: Fires, 2019



Similarly, emergency medical incidents also occur in greater concentration in areas of higher population density. The following figure displays emergency medical incidents per square mile during 2019. Incident concentration follows population density.

Figure 48: Emergency Medical Incidents per Square Mile, 2019



Unit Workload Analysis

A review of workload by response unit can reveal much about response time performance. Although fire stations and response units may be distributed in a manner to provide quick response, that level of performance can only be obtained when the response unit is available in its primary service area. If a response unit is already on an incident and a concurrent request for service is received, a more distant response unit will need to be dispatched. This will increase response times.

Response Unit Workload

The workload on individual response units during the study period is shown in the following figure. The individual response unit workload can be greater than the workload in its home station area. Many incidents, such as structure fires, require more than one response unit. Engine 5431 is cross-staffed by the on-duty crew. Engine 5412 is staffed only by call-back personnel.

Figure 49: Response Unit Workload

Unit	2017	2018	2019
Engine 5411	1,937	2,255	2,157
Engine 5412	39	28	12
Engine 5431	29	8	11

The amount of time a given unit is committed to an incident is also an important workload factor. The following figure illustrates the average time in minutes each unit was committed to an incident, from initial dispatch until it was available for another incident.

Figure 50: Average Time Committed to an Incident by Unit

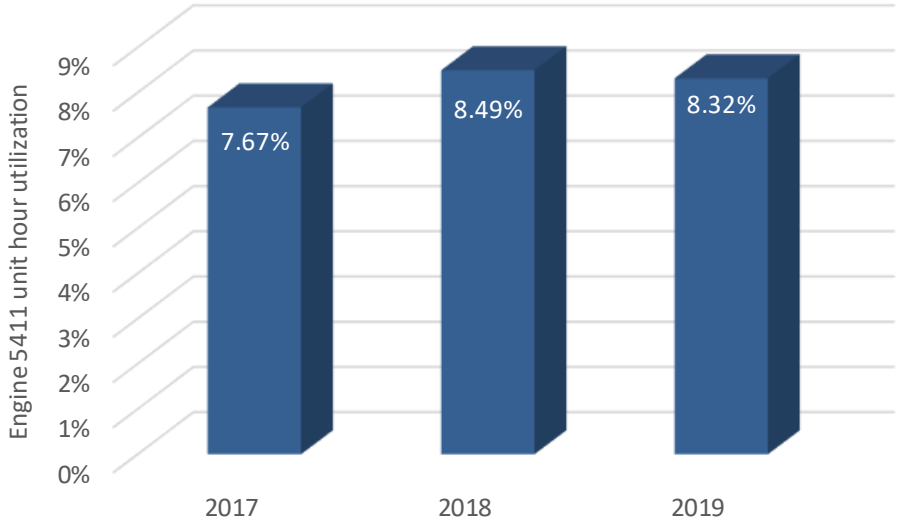
Unit	2017	2018	2019
Engine 5411	20.82	19.80	20.26
Engine 5412	22.13	20.90	15.52
Engine 5431	25.93	19.39	113.08

Unit hour utilization is an important workload indicator. It is calculated by dividing the total time a unit is committed to all incidents during a year divided by the total time in a year. Expressed as a percentage, it describes the amount of time a unit is not available for response since it is already committed to an incident. The larger the percentage, the greater a unit's utilization and the less available it is for assignment to an incident.

Unit hour utilization is an important statistic to monitor for those fire agencies using percentile-based performance standards, as does MFD. In MFD's case, where performance is measured at the 90th percentile, a response unit with greater than 10% utilization will not be able to provide an on-time response to its 90% target even if response is its only activity.

The only unit with enough workload to evaluate unit hour utilization is Engine 5411. It remains below 10% utilization.

Figure 51: Unit Hour Utilization, Engine 5411



Population and Incident Workload Projection

The most significant predictor of future incident workload is population; 100% of requests for emergency medical services are people-driven. The National Fire Protection Association reports that approximately 70% of all fires are the result of people either doing something they should not have (i.e., misuse of ignition source) or not doing something they should have (i.e., failure to maintain equipment). It is reasonable to use forecast population growth to predict future fire department response workload.

The current population of the City of Marina is 22,535. The City provided a population forecast. Marina's population is forecast to grow to 30,510 by 2040.

The current fire department services utilization rate is 137.6 incidents per 1,000 population. The total utilization rate has increased by 51.4% over the last 8 years.

If the utilization growth rate of the past eight years continues, the total utilization rate could reach 189.4 incidents per 1,000 population. The increased utilization rate, plus expected population growth, will increase the MFD's workload to as many as 5,700 incidents by the year 2040, driven primarily by requests for emergency medical services.

Several new developments within the city may increase the future population even more. Each is in various levels of completion.

- Sea Haven – 1,050 dwelling units
- The Dunes – 1,237 dwelling units
- Marina Station – 1,360 dwelling units

MFD will need to monitor these and future developments to track the impact on emergency services.

CRITICAL TASKING AND ALARM ASSIGNMENTS

The MFD service area is a highly populated urban environment and, as such, contains an elevated number, density, and distribution of risk. As the actual or potential risk increases, the need for higher numbers of personnel and apparatus also increases. With each type of incident and corresponding risk, specific critical tasks need to be accomplished, and certain numbers and types of apparatus should be dispatched.

Tasks that must be performed at a fire can be broken down into two key components: life safety and fire flow. Life safety tasks are based on the number of building occupants, and their location, status, and ability to take self-preservation action. Life safety-related tasks involve the search, rescue, and evacuation of victims. The fire flow component involves delivering sufficient water to extinguish the fire and create an environment within the building that allows entry by firefighters.

The number and types of tasks needing simultaneous action will dictate the minimum number of firefighters required to combat different types of fires. In the absence of adequate personnel to perform concurrent action, the commanding officer must prioritize the tasks and complete some in chronological order, rather than concurrently. These tasks include the following:

- Command
- Scene safety
- Search and rescue
- Fire attack
- Water supply
- Pump operation
- Ventilation
- Backup/rapid intervention

Critical task analyses also apply to non-fire-type emergencies, including medical, technical rescue, and hazardous materials emergencies. Numerous simultaneous tasks must be completed to control an emergency effectively. The department's ability to muster needed numbers of trained personnel quickly enough to make a difference is critical to successful incident outcomes.

The following figure illustrates the minimum emergency incident staffing recommendations of the Commission on Fire Accreditation, International. The following definitions apply to the figure:

- **Low-Risk**: Minor incidents involving small fires (fire flow less than 250 gallons per minute), single patient non-life-threatening medical incidents, minor rescues, small fuel spills, and small wildland fires without unusual weather or fire behavior.
- **Moderate-Risk**: Moderate-risk incidents involving fires in single-family dwellings and equivalently sized commercial office properties (fire flow between 250 gallons per minute to 1,000 gallons per minute), life-threatening medical emergencies, hazardous materials emergencies requiring specialized skills and equipment, rescues involving specialized skills and equipment, and larger wildland fires.
- **High-Risk**: High-risk incidents involving fires in larger commercial properties with a sustained attack (fire flows more than 1,000 gallons per minute), multiple patient medical incidents, major releases of hazardous materials, high-risk rescues, and wildland fires with extreme weather or fire behavior.

Figure 52: Staffing Recommendations Based on Risk

Incident Type	High Risk	Moderate Risk	Low Risk
Structure Fire	29	15	6
Emergency Medical Service	12	4	2
Rescue	15	8	3
Hazardous Materials	39	20	3

The MFD has developed the following Critical Task Analysis for various incident types. Further, it has defined, based on current unit staffing levels, the number and type of apparatus needed to deliver sufficient numbers of personnel to meet the critical tasking identified. ESCI's review of the Critical Task Analysis concludes that all are generally in keeping with industry standards and provide the minimum number of personnel needed for effective incident operations.

Establishing resource levels needed for various types of emergencies is a uniquely local decision. Factors influencing local decisions for incident staffing include the type of equipment operated, training levels of responders, operating procedures, geography, traffic, and the nature of buildings and other hazards protected.

Critical Task Analysis

Critical tasks are those activities that must be conducted early on and in a timely manner by firefighters at emergency incidents in order to control the situation, to stop loss, and to perform necessary tasks required for a medical emergency. MFD is responsible for ensuring that responding companies are capable of performing all of the described tasks in a prompt, efficient, and safe manner. These are the minimum number of personnel needed by incident type. More personnel will be needed for incidents of increased complexity or size.

Figure 53: Low-Rise Structure Fire

Task	Number of Personnel
Command/Safety	1
Pump Operations	3
Attack Line	2
Search and Rescue/Back up Line	2
Ventilation	3
IRIC	2
Non-Suppression Medic Amb	2
Total	**15**

Figure 54: Moderate-Risk Commercial Structure Fire

Task	Number of Personnel
Command/Safety	2
Pump Operations	3
Attack Line	4
Search and Rescue/Back-up Line	4
Ventilation	3
RIC	4
Non-Suppression Medic Amb	2
Total	**22**

Figure 55: High-Risk Commercial Structure Fire

Task	Number of Personnel
Command/Safety	2
Pump Operations	4
Attack Line	9
Search and Rescue/Back-up Line	3
Ventilation	3
RIC	4
Non-Suppression Medic Amb	2
Total	**27**

Figure 56: Wildland Fire—Low Risk

Task	Number of Personnel
Command/Safety	1
Pump Operations	1
Attack Line	2
Total	**4**

Figure 57: Wildland Fire—High Risk

Task	Number of Personnel
Command/Safety	1
Pump Operations	2
Attack Line	4
Structure Protection	3
Water Supply	2
Total	**12**

Figure 58: Aircraft Emergency

Task	Number of Personnel
Command/Safety	1
Aircraft Fire Suppression	4
Pump Operations	6
Backup Line	4
Rescue	3
Emergency Medical Care	2
Water Supply	2
Total	**22**

Figure 59: Hazardous Materials—Low Risk

Task	Number of Personnel
Pump and Attack Line	3
Total	**3**

Figure 60: Hazardous Materials—High Risk

Mutual aid will be requested from the County Haz-Mat Team and the County Health Department Hazardous Materials Technician. Marina Fire would respond as initial responder and FRO activities as needed per Haz-Mat Team.

Task	Number of Personnel
Command	1
Safety	1
Decontamination	3
Research Support/Tech Spec	2
Team Leader, Safety, Entry Team, and Backup Team	7
Total	**14**

Figure 61: Emergency Medical Aid (Life Threatening)

Task	Number of Personnel
Patient Management (AMR)	2
Patient Care	2
Documentation	1
Total	**5**

Figure 62: Major Medical Response (10+ Patients)

Task	Number of Personnel
Incident Command/Safety	1
Triage Manager	1
Treatment Manager	1
Patient Care	20
Transportation Manager	1
AMR Supervisor	1
Medic Units	10
Total	**35**

Figure 63: Motor Vehicle Accident (Non-Trapped)

Task	Number of Personnel
Scene Management/Documentation	1
Patient Care/Extrication	2
Non-Suppression Medic Unit	2
Total	**5**

Figure 64: Motor Vehicle Accident (Trapped)

Task	Number of Personnel
Command/Safety	1
Patient Care	2
Extrication/Vehicle Stabilization	3
Pump Operator/Suppression Line	1
Non-Suppression Medic Amb	2
Total	**9**

Figure 65: Technical Rescue—Beach Rescue

Task	Number of Personnel
Command/Safety	1
Rescue Team / Life Guard	3
Backup Team	2
Patient Care	2
Rescue Boat	2
Total: MFD is Awareness Level. Operations requires Mutual Aid.	**10**

Figure 66: Technical Rescue—Rope

Task	Number of Personnel
Command/Safety	1
Rescue Team	2
Backup/Support Team	2
Patient Care	2
Rigger	1
Attendant	1
Ground Support	4
Edge Person	1
Total	**14**

Figure 67: Technical Rescue—Confined Space

Task	Number of Personnel
Command/Safety	1
Rescue Team	2
Backup/Support Team	2
Patient Care	2
Attendant	1
Rigger	1
Ground Support	4
Total: MFD is Awareness Level. Operations requires Mutual Aid	**13**

Alarm Assignments

To ensure sufficient personnel and apparatus are dispatched to an emergency event, the following first alarm response assignments have been established. "Total Staffing Needed" is the number identified in the previous Critical Tasking Analysis. The number of personnel and apparatus required to mitigate an active and complex working incident will require additional resources above and beyond the numbers listed next. With currently available resources, MFD is able to staff a number of incident types in accordance with its Critical Tasking Analysis.

Figure 68: Low-Rise Structure Fire

Unit Type	Number of Units	Total Personnel
Engine	3	10
Truck	1	3
Squad	1	2
Duty Chief	1	1
Non-Suppression Medic Ambulance	1	2
Total Staffing Provided		**18**
Total Staffing Needed		**15**

Figure 69: Moderate-Risk Commercial Structure Fire

Unit Type	Number of Units	Total Personnel
Engine	3	10
Truck	2	7
Squad	1	2
Duty Chief	2	2
Non-Suppression Medic Amb	1	2
Total Staffing Provided		**23**
Total Staffing Needed		**22**

Figure 70: High-Risk Commercial Structure Fire

Unit Type	Number of Units	Total Personnel
Engine	4	13
Truck	2	7
Squad	1	2
Duty Chief	2	2
Non Suppression Medic Amb	1	2
Total Staffing Provided		**26**
Total Staffing Needed		**27**

Figure 71: Wildland Fire—Low Risk

Unit Type	Number of Units	Total Personnel
Engine	1	3
Duty Chief	0	0
Total Staffing Provided		**3**
Total Staffing Needed		**3**

Figure 72: Wildland Fire—High Risk

Unit Type	Number of Units	Total Personnel
Brush Engine Type 3	1	3
Type 1 Engine	2	6
Water Tender	1	2
Duty Chief	1	1
Total Staffing Provided		**12**
Total Staffing Needed		**12**

Figure 73: Aircraft Emergency

Unit Type	Number of Units	Total Personnel
Engine	4	13
Truck	1	3
Squad	1	2
Non-Suppression Medic Amb	1	2
Duty Chief	1	1
Total Staffing Provided		**21**
Total Staffing Needed		**22**

Figure 74: Hazardous Materials—Low or High Risk

Unit Type	Number of Units	Total Personnel
Engine	1	3
Truck		
Duty Chief		
Total Staffing Provided		**3**
Total Staffing Needed		**3**

Figure 75: Emergency Medical Service (Life Threatening)

Unit Type	Number of Units	Total Personnel
Engine or Truck	1	3
Total Staffing Provided		**3**
Total Staffing Needed		**3**

Figure 76: Major Medical Response (10+ Patients)

Unit Type	Number of Units	Total Personnel
Engine	6	18
Squad	1	2
Truck or Engine	0	0
Non-Suppression Medic Unit	6	12
Non-Suppression EMS Supervisor	1	1
Total Staffing Provided		**33**
Total Staffing Needed		**35**

Figure 77: Motor Vehicle Accident (Non-Trapped)

Unit Type	Number of Units	Total Personnel
Engine or Truck	1	3
Non-Suppression Medic Unit	1	2
Total Staffing Provided		**5**
Total Staffing Needed		**5**

Figure 78: Motor Vehicle Accident (Trapped)

Unit Type	Number of Units	Total Personnel
Engine	1	3
Squad	1	2
Non-Suppression Medic Unit	1	2
Duty Chief	1	1
Total Staffing Provided		**8**
Total Staffing Needed		**9**

Figure 79: Technical Rescue—Beach Rescue

Unit Type	Number of Units	Total Personnel
Engine	1	3
Duty Chief	1	1
Mutual Aid, if Warranted	3	5
Non-Suppression Medic Unit	1	2
Total Staffing Provided		**11**
Total Staffing Needed		**10**

Figure 80: Technical Rescue—Rope

Unit Type	Number of Units	Total Personnel
Engine	1	3
USAR Team	1	8
Duty Chief	1	1
Non-Suppression Medic Unit	1	2
Total Staffing Provided		**14**
Total Staffing Needed		**14**

Figure 81: Technical Rescue—Confined Space

Unit Type	Number of Units	Total Personnel
Engine	1	3
US&R	1	8
Duty Chief	1	1
Non-Suppression Medic Unit	1	2
Total Staffing Provided		**14**
Total Staffing Needed		**13**

Figure 82: Technical Rescue—Trench

Unit Type	Number of Units	Total Personnel
Engine	1	3
US&R Team	1	8
Duty Chief	1	1
Non-Suppression Medic Unit	1	2
Total Staffing Provided		**14**
Total Staffing Needed		**13**

REVIEW OF HISTORICAL SYSTEM PERFORMANCE

Incident data for the period between January 1, 2017, and December 31, 2019 (study period), was evaluated in detail to determine MFD's current performance. Data was obtained from MFD incident reports and the dispatch center's computer-aided dispatch system.

Only priority incidents occurring within the MFD service area are included in the analysis. Priority incidents involve emergencies to which the fire department initiated a "code 3" (using warning lights and sirens) response (1,720 incidents during 2017, 1,819 during 2018, and 2,156 during 2019). Non-emergency public assistance requests were excluded. Performance is reported based on the initial type of incident as dispatched. Three categories are used to report performance:

- Fire—Responses to a report of fire or other hazardous incident.
- Emergency medical—All emergency medical incidents.
- Other—Any other incident to which the fire department responded with lights and sirens.

Each phase of the incident response sequence was evaluated to determine the current performance. This allows an analysis of each individual phase to determine where opportunities might exist for improvement.

The total incident response time continuum consists of several steps, beginning with the initiation of the incident and concluding with the appropriate mitigation of the incident. The time required for each of the components varies. The policies and practices of the fire department directly influence some of the steps.

MFD's response performance was compared to its own adopted goals. These goals match those found in the national consensus standard for response performance; the *National Fire Protection Association Standard 1710: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*, 2016 Edition. The dispatch center's performance was compared to the MFD's goals as well as standards found in the *National Fire Protection Association Standard 1221: Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*, 2019 Edition.

The following figure summarizes the performance standards found in the National Fire Protection Association (NFPA) documents.

Figure 83: Summary of MFD Performance Goals

Incident Interval	Performance Goal
9-1-1 call answer time (time from first ring to answer).	Within 15 seconds, 90% of the time
Call process time (time from acceptance at the dispatch center until notification of response units).	Within 60 seconds, 90% of the time
Turnout time (time from notification of response personnel until the initiation of movement towards the incident). Fire incidents and special operations incidents All other emergency incidents	 Within 80 seconds, 90% of the time Within 60 seconds, 90% of the time
First unit travel time (time from initiation of response until arrival of the first unit at the incident).	Within 4 minutes, 90% of the time
First unit response time (time from dispatch until arrival of the first unit at the incident). Fire incidents and special operations incidents All other emergency incidents	 Within 5 minutes, 20 seconds, 90% of the time Within 5 minutes, 90% of the time
Full effective response force travel time (time from dispatch until all units initially dispatched arrive at the incident. Response resources needed for a low-rise building fire are used for the evaluation.)	Within 9 minutes, 20 seconds, 90% of the time

In keeping with *NFPA Standards 1710* and *1221* and MFD's performance goals, all response time elements are reported at a given percentile. Percentile reporting is a methodology by which response times are sorted from least to greatest, and a "line" is drawn at a certain percentage of the calls to determine the percentile. The point at which the "line" crosses the 90th percentile, for example, is the percentile time performance. Thus, 90% of the times were at or less than the result. Only 10% were longer.

Percentile differs greatly from average. Averaging calculates response times by adding all response times together and then dividing the total number of minutes by the total number of responses (mean average). Measuring and reporting average response times is not recommended. Using averages does not give a clear picture of response performance because it does not clearly identify the number and extent of events with times beyond the stated performance goal.

What follows is a detailed description and review of each phase of the response time continuum. All phases will be compared to MFD's performance goals.

Detection

The detection of a fire (or medical incident) may occur immediately if someone happens to be present or if an automatic system is functioning. Otherwise, detection may be delayed, sometimes for a considerable period. The time period for this phase begins with the inception of the emergency and ends when the emergency is detected. It is largely outside the control of the fire department and not a part of the event sequence that is reliably measurable.

Call Processing

Most emergency incidents are reported by telephone to the 9-1-1 center. Call takers must quickly elicit accurate information about the nature and location of the incident from persons who are apt to be excited. A citizen well-trained in how to report emergencies can reduce the time required for this phase. The dispatcher must identify the correct units based on incident type and location, dispatch them to the emergency, and continue to update information about the emergency while the units respond. This phase begins when the 9-1-1 call is answered at the primary public safety answer point (PSAP) and ends when response personnel are notified of the emergency. This phase, which has two parts, is labeled "call processing time."

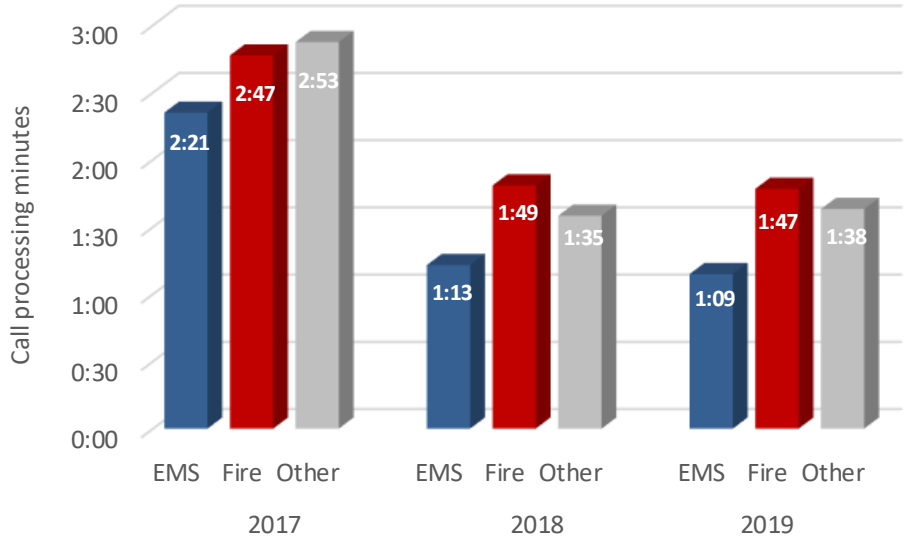
Monterey County Emergency Communications (MCEC), is the PSAP and dispatch service provider for the Marina. It answers the call, processes the information, and dispatches MFD response units.

National Fire Protection Association Standard 1221 recommends that 9-1-1 calls be answered within 15 seconds, 90% of the time (within 20 seconds, 95% of the time). MCEC reports that during 2019 they answered calls within 15 seconds 95.5% of the time.

The second part of call processing time, dispatch time, begins when the call is received at the dispatch center (MCEC) and ends when response units are notified of the incident. MFD standards prescribe that this phase should occur within 60 seconds, 90% of the time.

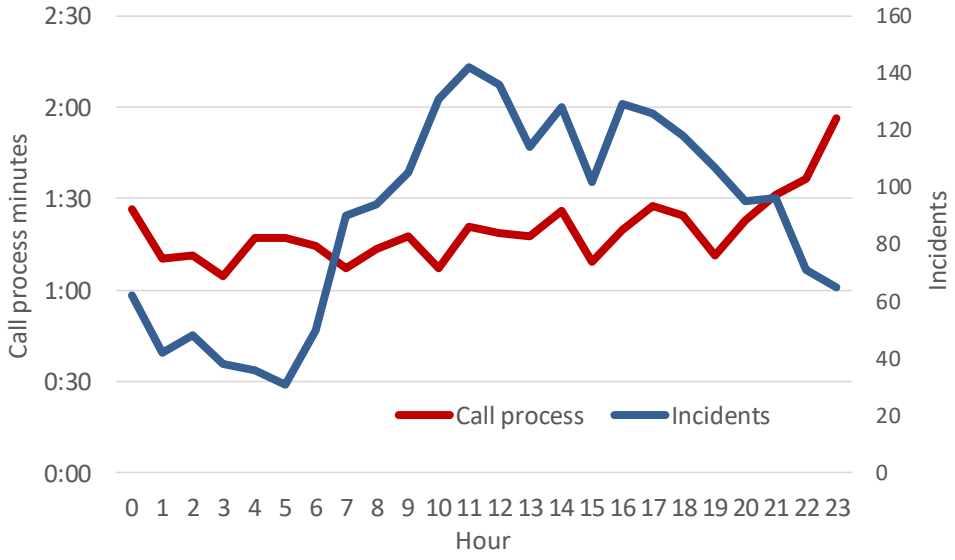
The following figure illustrates performance by MCEC from the time it receives the call until it notifies response units. Overall performance during 2019 was within 1 minute, 17 seconds, 90% of the time, more than MFD's goal.

Figure 84: MCEC Dispatch Time Performance



The workload at the dispatch center can influence call processing performance. The following figure illustrates performance at different times of the day compared to the fire department's response workload. It does not appear that workload is impacting dispatch center performance.

Figure 85: Call Processing Time by Hour of Day, 2019

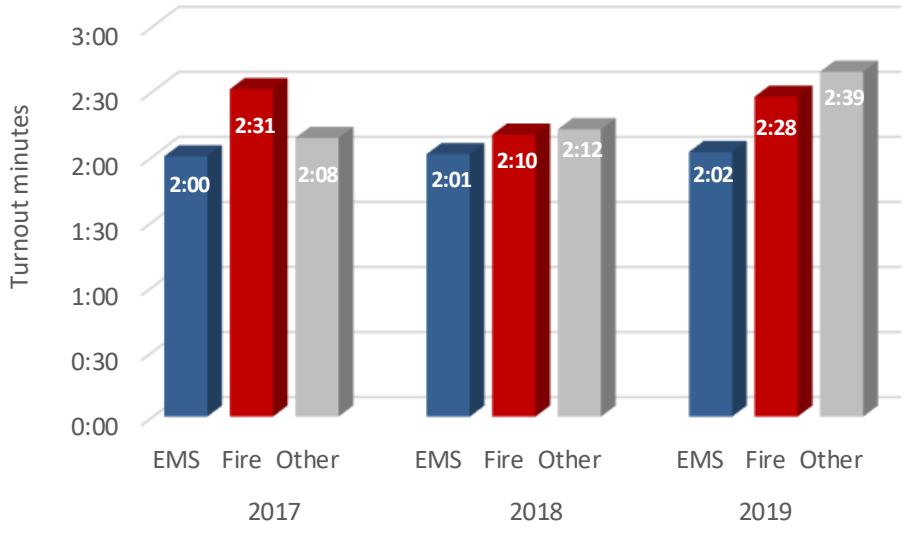


Turnout Time

Turnout time is a response phase controllable by the fire department. This phase begins at the notification of an emergency in progress by the dispatch center and ends when personnel and apparatus begin movement towards the incident location. Personnel must don appropriate personal protective equipment (PPE), assemble on the response vehicle, and begin travel to the incident. Good training and proper fire station design can minimize the time required for this step.

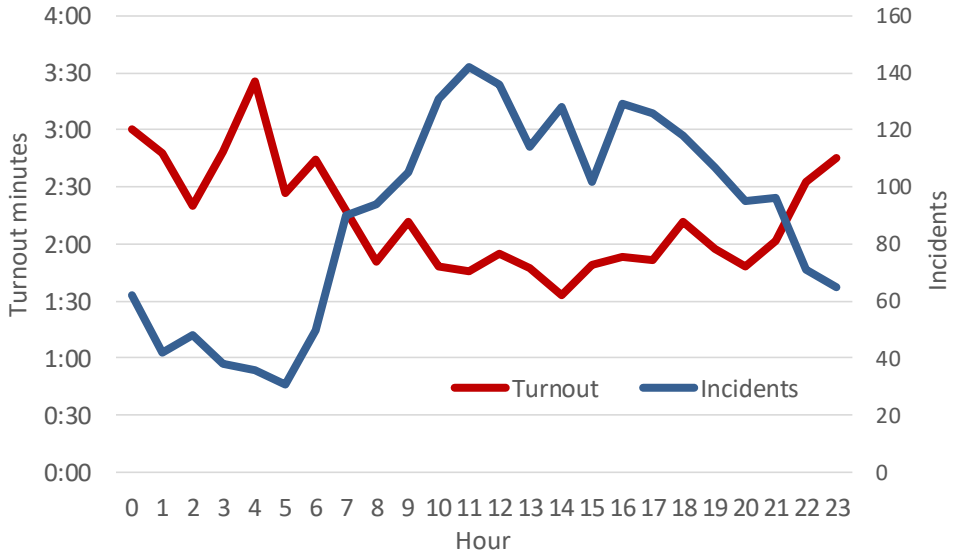
The performance goal for turnout time is within 80 seconds, 90% of the time for fire and special operations incidents, within 60 seconds, 90% of the time for all other priority emergency incidents. The following figure lists turnout time for all incidents as well as specific incident types. Turnout times for all incident types exceed standards. During 2019, turnout time for fire incidents was within 2 minutes, 28 seconds, 90% of the time, within 2 minutes, 2 seconds, 90% of the time for EMS incidents, and within 2 minutes, 39 seconds, 90% of the time for other incidents.

Figure 86: Turnout Time Performance



Turnout time can vary by the hour of the day. In this case, turnout time varied by 78 seconds between the early morning hours and daytime hours.

Figure 87: Turnout Time by Hour of Day, 2019

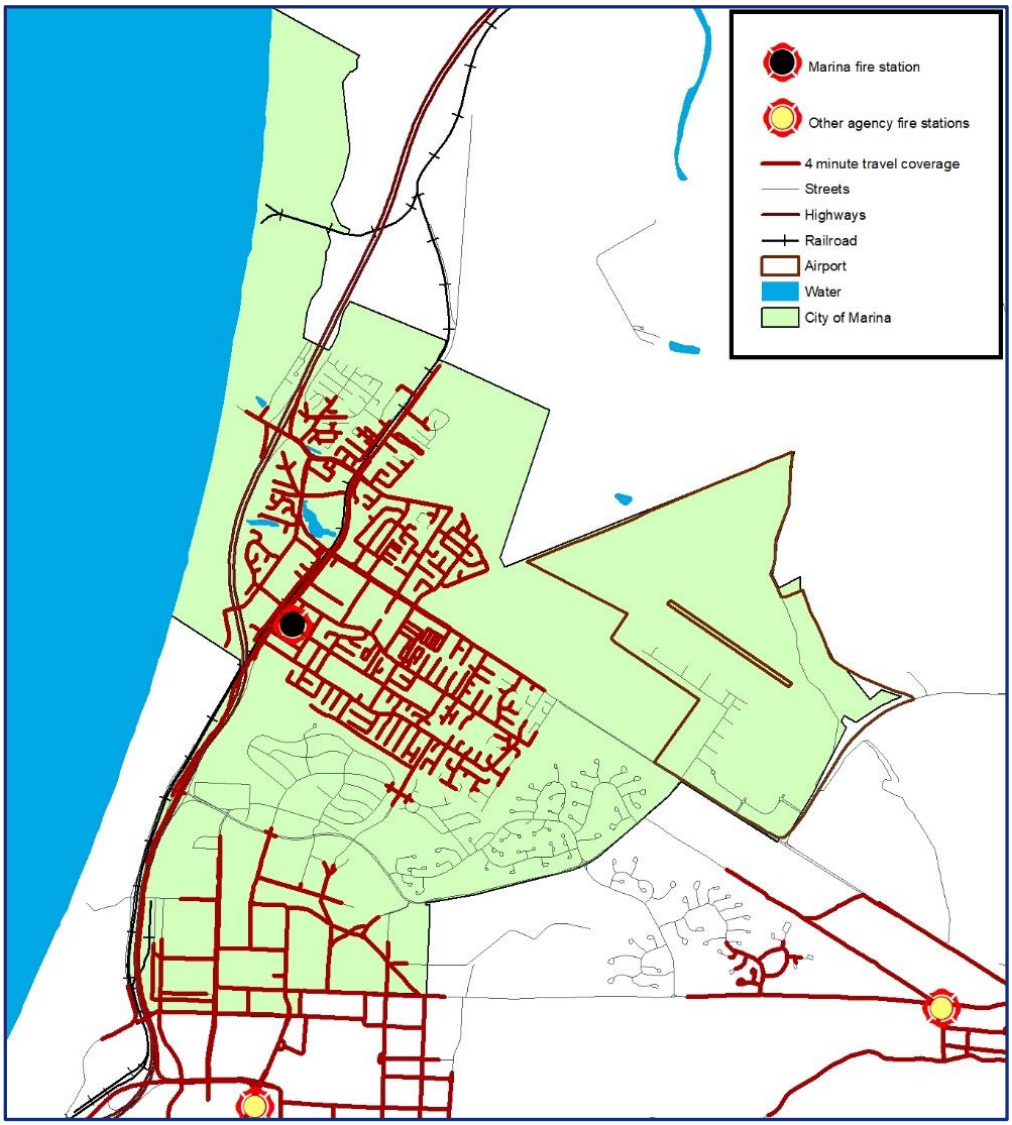


Distribution and Initial Arriving Unit Travel Time

Travel time is potentially the longest of the response phases. The distance between the fire station and the location of the emergency influences response time the most. The quality and connectivity of streets, traffic, driver training, geography, and environmental conditions are also factors. This phase begins with the initial apparatus movement towards the incident location and ends when response personnel and apparatus arrive at the emergency's location. Within the performance goal, four minutes is allowed for the first response unit to arrive at an incident.

The following figure illustrates the street sections that can be reached from the MFD fire station and neighboring stations in four minutes of travel time. It is based on posted road speeds modified to account for turning, stops, and acceleration.

Figure 88: Initial Unit Four Minute Travel Time Capability

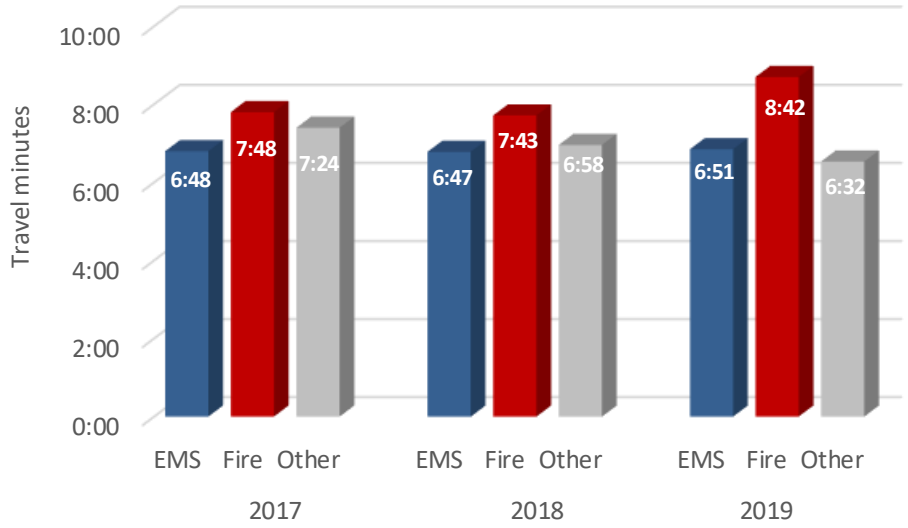


MFD recently staffed Station 2 with a two-person rescue. The following figure shows the area served when its four-minute travel coverage is included. Note that this did not improve coverage for the first due fire engine, only the first unit of any type.

Figure 89: Initial Unit Four Minute Travel Time Capability with Station 2

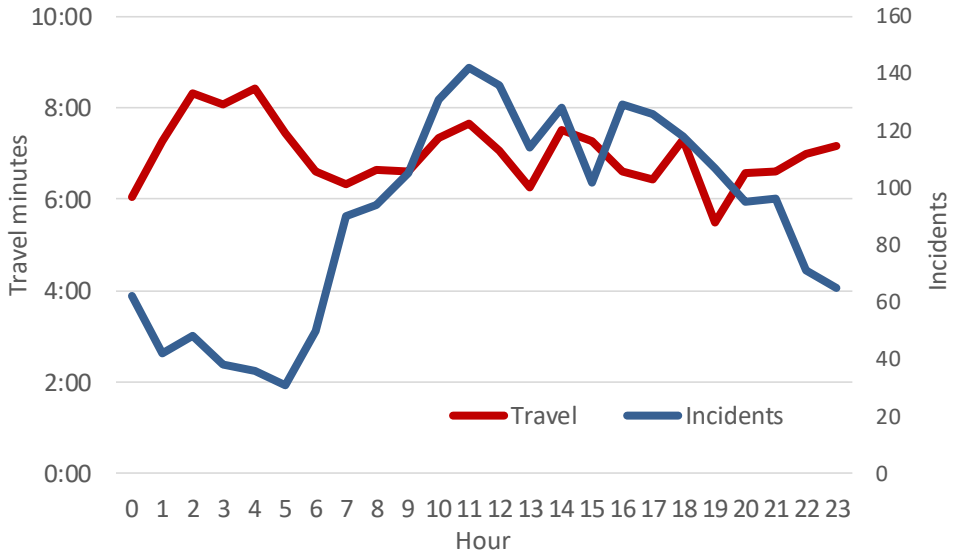
The following figure lists travel time for all priority incidents as well as specific incident types. MFD's travel times exceed its goal in all incident types. Travel time for all incidents during 2019 was within 6 minutes, 52 seconds, 90% of the time.

Figure 90: Travel Time Performance—First Arriving Unit



Travel time can vary considerably by the time of the day. Heavy traffic during morning and evening rush hours can slow fire department response. Concurrent incidents can also increase travel time since units from more distant stations would need to respond. Traffic does not appear to be a factor here as daytime travel was shorter than nighttime.

Figure 91: Overall Travel Time and Incidents by Hour of Day—First Arriving Unit, 2019



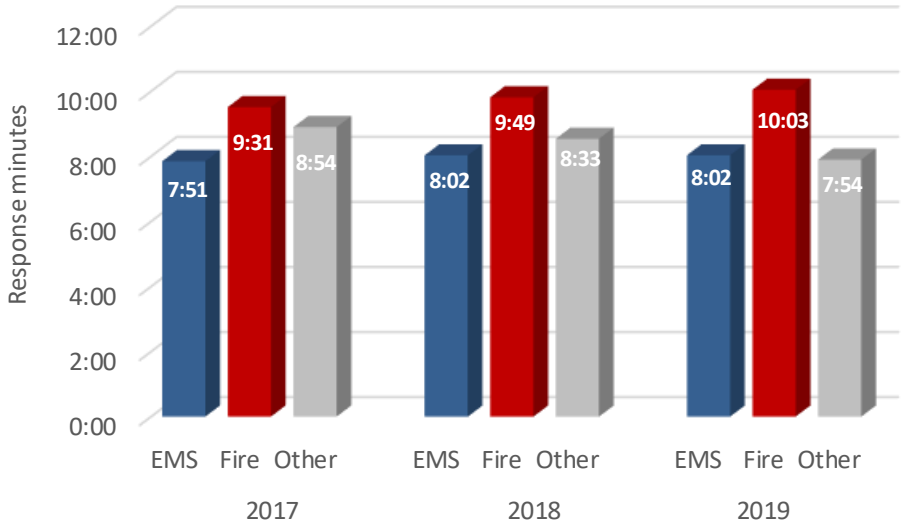
To provide an on-time response, a response unit must be within four travel minutes of the incident. Incidents were reviewed to identify how many occurred within four travel minutes of a fire station. During 2019, 2,027 of the 2,553 incidents within the MFD service area (79.4%) occurred within four travel minutes of a fire station. With Station 2 now added, 2,202 of 2,553 incidents (86.2%) would have been within four travel minutes of a fire station.

First Arriving Unit Response Time

Response time is defined as that period between the notification of response personnel by the dispatch center that an emergency is in progress until the arrival of the first fire department response unit at the emergency. When turnout time and travel time are combined, the performance goal for response time is within 5 minutes, 20 seconds, 90% of the time for fire and special operations incidents, and within 5 minutes, 90% of the time for all other priority incidents.

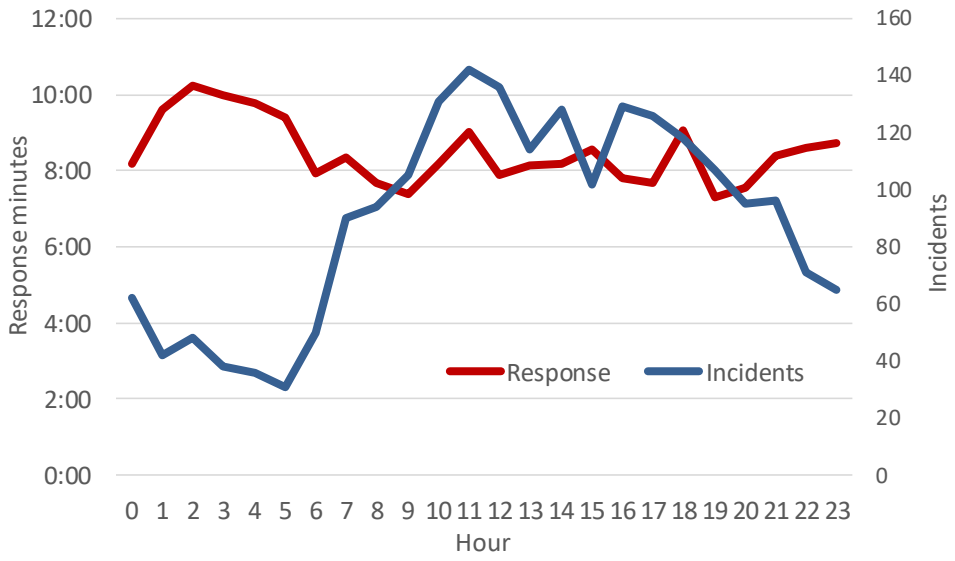
The following figure illustrates the response time for all priority incidents as well as specific incident types. Overall, response time for all priority incidents was within 8 minutes, 10 seconds, 90% of the time during 2019.

Figure 92: Response Time Performance—First Arriving Unit



The next figure shows response time and the number of incidents by the hour of the day for all incidents. Response time is slowest during the nighttime hours and fastest during the day. Generally, MFD's best response times occur during the period of the day when response activity is at its highest.

Figure 93: Hourly Response Time Performance, 2019

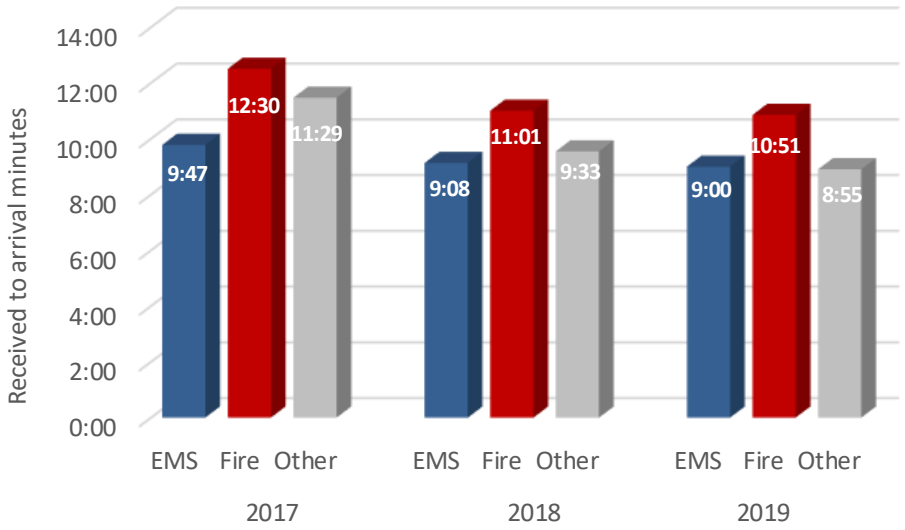


First Arriving Unit Received to Arrival Time

From the customer's standpoint, response time begins when the emergency occurs. Their first contact with emergency services is when they call for help, usually by dialing 9-1-1. Received to arrival time combines call processing, turnout, and travel time. When the performance goals are combined, received to arrival time should be within 6 minutes, 20 seconds, 90% of the time for fire and special operations incidents, and within 6 minutes, 90% of the time for all other priority incidents.

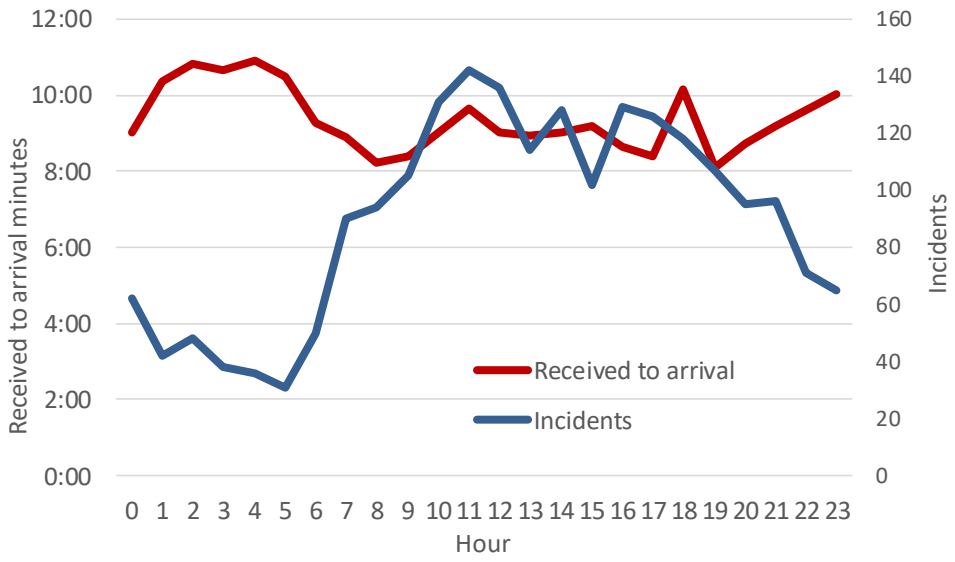
The next figure shows received to arrival performance for priority incidents within the MFD service area. Overall, received to arrival time was within 9 minutes, 4 seconds, 90% of the time during 2019.

Figure 94: Received to Arrival Time—First Arriving Unit



The next figure shows received to arrival performance by time of day also compared to incident activity by time of day. Received to arrival, from the customer's standpoint, is quickest during the day and slowest during the early morning hours.

Figure 95: Hourly Received to Arrival Performance, 2019



Concentration and Effective Response Force Capability Analysis

Effective Response Force (ERF) is the number of personnel and apparatus required to be present on the scene of an emergency incident to perform the critical tasks in such a manner to effectively mitigate the incident without unnecessary loss of life and/or property. The ERF is specific to each individual type of incident and is based on the critical tasks that must be performed.

The response time goal for the delivery of the full ERF to a building fire is within 9 minutes, 20 seconds, 90% of the time. MFD has defined the minimum full effective response force for low rise building fires as three fire engines, one truck, and one Division Chief and a total of 16 firefighters. Higher risk fires require additional apparatus and personnel.

No data is available to identify if building fires by type of risk (low-rise, high-risk commercial, etc.). All building fires have been evaluated using the low-rise effective response force criteria. The following figure illustrates effective response performance during the study period. The effective response force was delivered to 11 building fires during the study period. The following figure illustrates the time required to deliver the effective response force of apparatus to each of these fires.

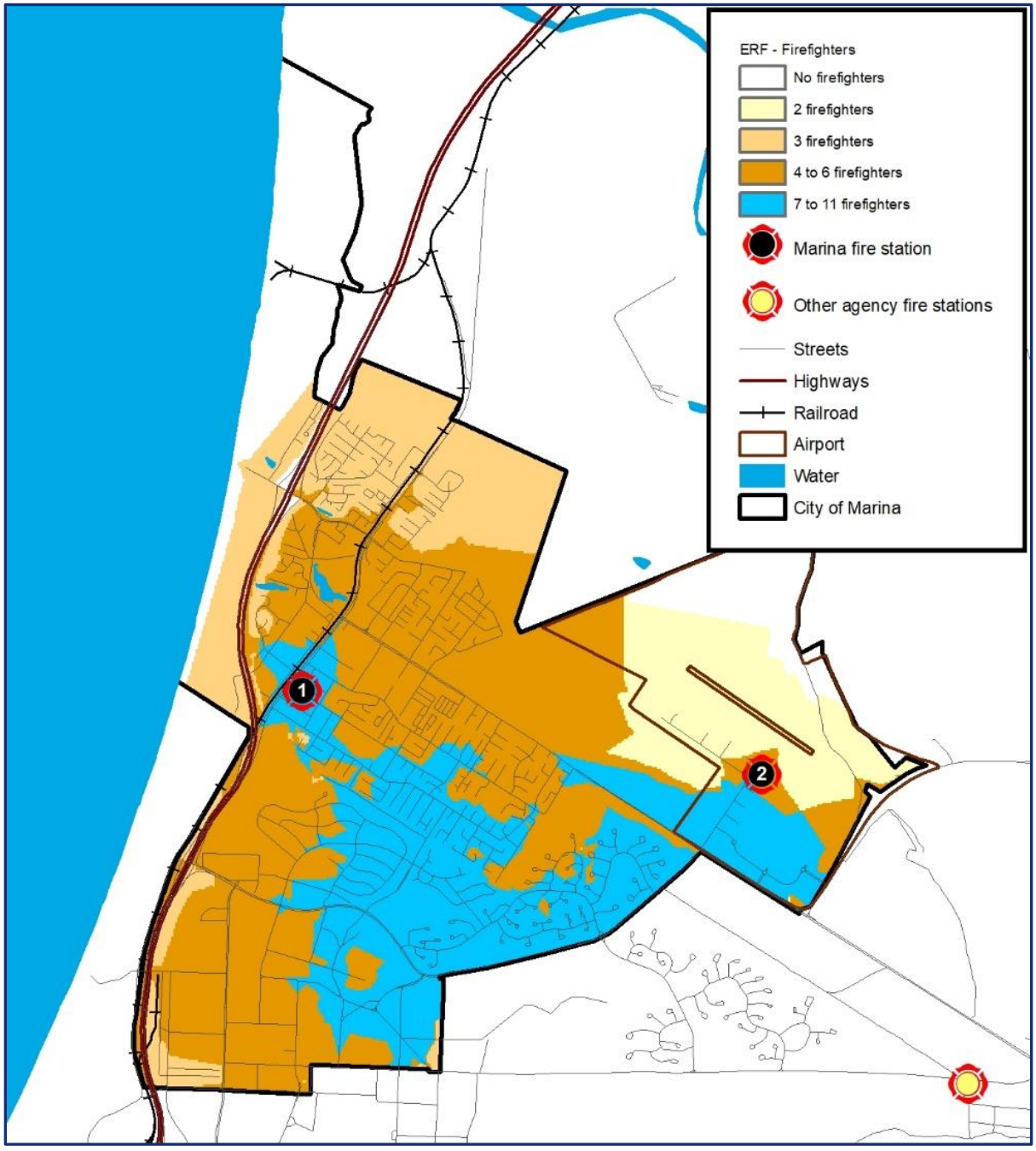
Figure 96: Effective Response Force Performance

Year	Time to Effective Response Force Arrival
2017	26:59
2017	10:58
2017	13:05
2017	08:46
2017	11:37
2017	25:12
2017	21:33
2018	18:12
2019	19:29
2019	17:03
2019	14:58

Concentration analysis reviews the physical capability of MFD's resources to achieve its target ERF travel time to its service area. The following figures depict the physical capability of MFD to assemble apparatus and firefighters by area within an eight-minute travel time. The modeled analysis shown assumes that all response units are available. Included is the Marina airport station recently staffed with a rescue and two firefighters.

The first figure shows the area that can be reached by the various numbers of firefighters. Eight minutes of travel time is allowed to assemble the defined full effective response force on-scene. Since automatic aid resources are required to deliver an effective response force, this figure includes the resources of adjacent agency stations. The minimum complement of 16 firefighters needed for a low-rise residential fire cannot be provided to any part of the city.

Figure 97: Effective Response Force—Firefighters



The next figure shows the area to which three fire engines, one truck, and a Division Chief can respond within eight minutes of travel time. The model indicates these resources cannot be delivered within eight minutes of travel to any portion of the city.

Figure 98: Effective Response Force—Apparatus, Low Rise Fire

Second Unit Arrival Time

MFD fire engines are staffed with three personnel. Safety regulations require that at least four firefighters be on-scene before firefighters can enter a burning building. The only exception is if it is known that a person is inside the building and needs rescue. Current staffing levels on engines require the arrival of a second response unit before non-rescue interior firefighting activities can be initiated.

Incident data for building fires during the study period were reviewed to determine the time the second response unit arrived on the scene. According to the data, the second unit arrived on-scene of a structure fire within 5 minutes, 44 seconds, 90% of the time after the arrival of the first unit (3 minutes, 24 seconds on average).

Incident Concurrency and Reliability

When evaluating the effectiveness of any resource deployment plan, it is necessary to evaluate the workload of the individual response units to determine to what extent their availability for dispatch is affecting the response time performance. In simplest terms, a response unit cannot make it to an incident across the street from its own station in four minutes if it is unavailable to be dispatched to that incident because it is committed to another call.

Concurrency

One way to look at resource workload is to examine the number of times multiple incidents happen within the same time frame. Incidents during the study period were examined to determine the frequency of concurrent incidents. This is important because concurrent incidents can stretch available resources and delay response to other emergencies. This factor significantly impacts total response times to emergencies in the jurisdiction.

The following figure shows the number of times that one or more incidents occurred concurrently. This shows that 2,376 times during 2019, only one incident was in progress at a time. However, 284 times there were two incidents in progress at the same time; 15 times there were three incidents in progress at the same time; and once there were four incidents in progress at the same time.

Figure 99: Incident Concurrency

No. of Incidents	2019
1	2,376
2	284
3	15
4	1

It is also useful to review the number of times one or more response units are committed to incidents at the same time. Since MFD only operated one response unit during the study period, response units from other agencies were included. The following figure shows the number of times one or more MFD and other agency response units were committed to incidents within Marina. It is common for multiple response units to be simultaneously committed to incidents, with two and three concurrent responses occurring regularly.

Figure 100: Response Unit Concurrency

Concurrent Unit Responses	2019
1	2,444
2	453
3	95
4	33
5	10
6	9
7	5
8	1

PERFORMANCE OBJECTIVES AND PERFORMANCE MEASURES

Dynamics of Fire in Buildings

Most fires within buildings develop predictably unless influenced by highly flammable material. Ignition, or the beginning of a fire, starts the sequence of events. It may take several minutes or even hours from the time of ignition until a flame is visible. This smoldering stage is very dangerous, especially during times when people are sleeping, because large amounts of highly toxic smoke may be generated during this phase.

Once flames do appear, the sequence continues rapidly. Combustible material adjacent to the flame heat and ignite, which, in turn, heats and ignites other adjacent materials if sufficient oxygen is present. As the objects burn, heated gases accumulate at the ceiling of the room. Some of the gases are flammable and highly toxic.

The spread of the fire from this point continues quickly. Soon, the flammable gases at the ceiling, as well as other combustible material in the room of origin, reach ignition temperature. At that point, an event termed "flashover" occurs; the gases and other material ignite, which, in turn, ignites everything in the room. Once flashover occurs, damage caused by the fire is significant, and the environment within the room can no longer support human life. Flashover usually occurs about five to eight minutes from the appearance of flame in typically furnished and ventilated buildings. Because flashover has such a dramatic influence on the outcome of a fire event, the goal of any fire agency is to apply water to a fire before flashover occurs.

Although modern codes tend to make fires in newer structures more infrequent, today's energy-efficient construction (designed to hold heat during the winter) also tends to confine the heat of a hostile fire. In addition, research has shown that modern furnishings generally ignite more quickly and burn hotter (due to synthetics). In the 1970s, scientists at the National Institute of Standards and Technology found that after a fire broke out, building occupants had about 17 minutes to escape before being overcome by heat and smoke. Today, that estimate is as short as three minutes.[32] The necessity of effective early warning (smoke alarms), early suppression (fire sprinklers), and firefighters arriving on the scene of a fire in the shortest span of time is more critical now than ever.

The prompt arrival of at least four personnel is critical for structure fires. Federal regulations (CFR 1910.120) require that personnel entering a building involved in fire must be in groups of two. Further, before personnel can enter a building to extinguish a fire, at least two personnel must be on scene and assigned to conduct search and rescue in case the fire attack crew becomes trapped. This is referred to as the two-in, two-out rule.

[32] *National Institute of Standards and Technology, Performance of Home Smoke Alarms, Analysis of the Response of Several Available Technologies in Residential Fire Settings, Bukowski, Richard, et al.*

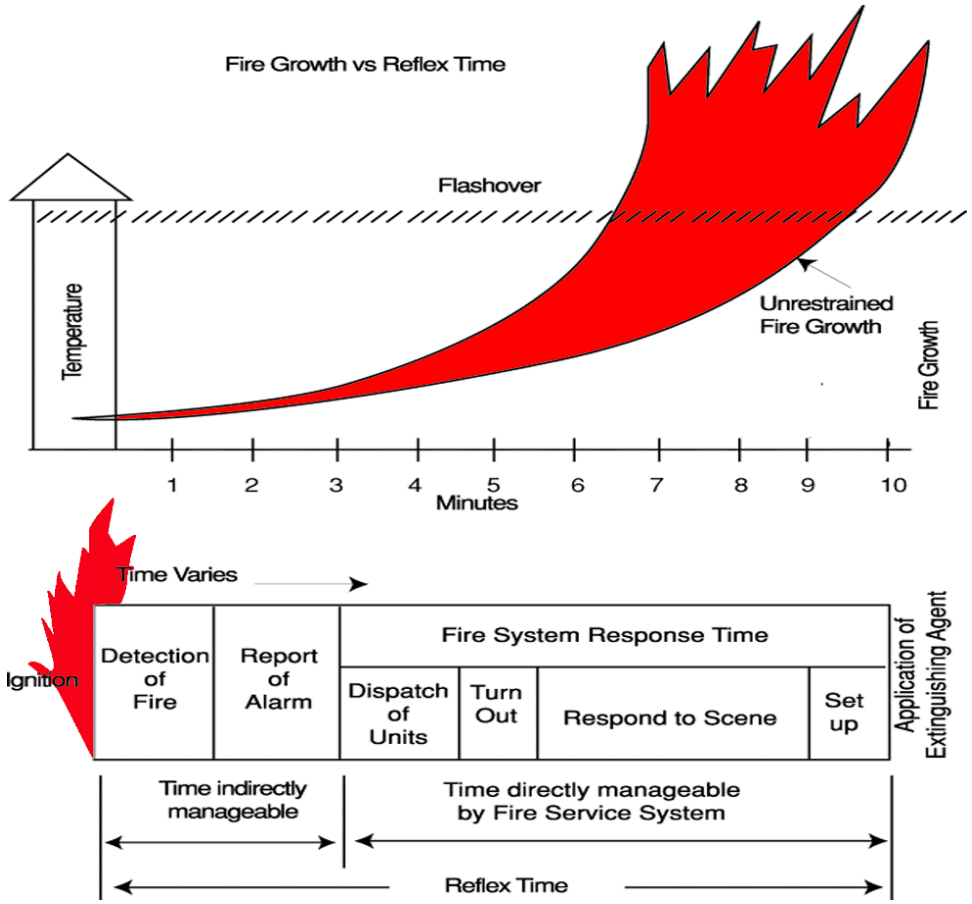
However, if it is *known* that victims are trapped inside the building, a rescue attempt can be performed without additional personnel ready to intervene outside the structure. Further, there is no requirement that all four arrive on the same response vehicle. Many fire departments rely on more than one unit arriving to initiate an interior fire attack.

Perhaps as important as preventing flashover is the need to control a fire before it does damage to the structural framing of a building. Materials used to construct buildings today are often less fire-resistive than the heavy structural skeletons of older frame buildings. Roof trusses and floor joists are commonly made with lighter materials that are more easily weakened by the effects of fire. "Lightweight" roof trusses fail after five to seven minutes of direct flame impingement. Plywood I-beam joists can fail after as little as three minutes of flame contact. This creates a dangerous environment for firefighters.

In addition, the contents of buildings today have a much greater potential for heat production than in the past. The widespread use of plastics in furnishings and other building contents rapidly accelerates fire spread and increases the amount of water needed to control a fire effectively. All of these factors make the need for early application of water essential to a successful fire outcome.

The following figure illustrates the sequence of events during the growth of a structure fire over time.

Figure 101: Fire Growth versus Reflex Time



As is apparent by this description of the sequence of events, the application of water in time to prevent flashover is a serious challenge for any fire department. It is critical, though, as studies of historical fire losses can demonstrate.

The National Fire Protection Association found that fires contained to the room of origin (typically extinguished prior to or immediately following flashover) had significantly lower rates of death, injury, and property loss when compared to fires that had an opportunity to spread beyond the room of origin (typically extinguished post-flashover). As evidenced in the following figure, fire losses, casualties, and deaths rise significantly as the extent of fire damage increases.

Figure 102: Fire Extension in Residential Structures—United States, 2011–2015

Extension	Rates per 1,000 Fires		
	Civilian Deaths	Civilian Injuries	Average Dollar Loss Per Fire
Confined to room of origin or smaller	1.8	24.8	$4,200
Confined to floor of origin	15.8	81.4	$36,300
Confined to building of origin or larger	24.0	57.6	$67,600

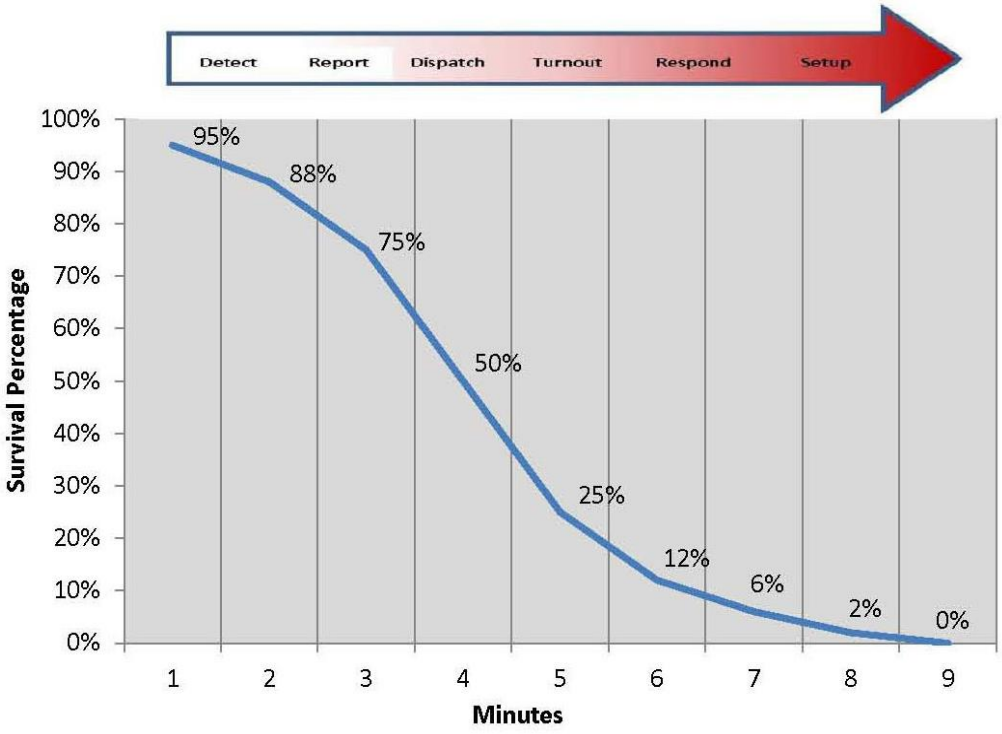
Source: National Fire Protection Association

Emergency Medical Event Sequence

Cardiac arrest is the most significant life-threatening medical event in emergency medicine today. A victim of cardiac arrest has mere minutes in which to receive lifesaving care if there is to be any hope for resuscitation. The American Heart Association (AHA) issued a set of cardiopulmonary resuscitation guidelines designed to streamline emergency procedures for heart attack victims and to increase the likelihood of survival. The AHA guidelines include goals for the application of cardiac defibrillation to cardiac arrest victims. Cardiac arrest survival chances fall by 7 to 10% for every minute between collapse and defibrillation. Consequently, the AHA recommends cardiac defibrillation within five minutes of cardiac arrest.

As with fires, the sequence of events that lead to emergency cardiac care can be graphically illustrated, as in the following figure.

Figure 103: Cardiac Arrest Event Sequence



The percentage of opportunity for recovery from cardiac arrest drops quickly as time progresses. The stages of medical response are very similar to the components described for a fire response. Recent research stresses the importance of rapid cardiac defibrillation and administration of certain medications as a means of improving the opportunity for successful resuscitation and survival.

People, Tools, and Time

Time matters a great deal in the achievement of an effective outcome to an emergency event. Time, however, is not the only factor. Delivering sufficient numbers of properly trained, appropriately equipped personnel within the critical time period completes the equation.

For medical emergencies, this can vary based on the nature of the emergency. Many medical emergencies are not time-critical. However, for serious trauma, cardiac arrest, or conditions that may lead to cardiac arrest, a rapid response is essential.

Equally critical is delivering enough personnel to the scene to perform all of the concurrent tasks required to deliver quality emergency care. For a cardiac arrest, this can be up to six personnel; two to perform CPR, two to set up and operate advanced medical equipment, one to record the actions taken by emergency care workers, and one to direct patient care.

Thus, for a medical emergency, the real test of performance is the time it takes to provide the personnel and equipment needed to deal effectively with the patient's condition, not necessarily the time it takes for the first person to arrive.

Fire emergencies are even more resource critical. Again, the true test of performance is the time it takes to deliver sufficient personnel to initiate the application of water to a fire. This is the only practical method to reverse the continuing internal temperature increases and ultimately prevent flashover. The arrival of one person with a portable radio does not provide fire intervention capability and should not be counted as "arrival" by the fire department.

OVERVIEW OF COMPLIANCE METHODOLOGY

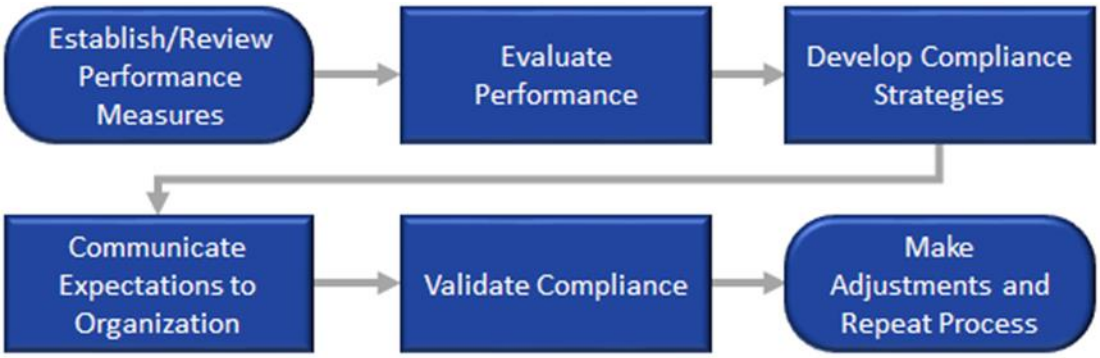
The preceding sections of this report provide a detailed analysis of the historical performance of the Marina Fire Department. For this analysis to prove beneficial to the Department and City policymakers, the continued analysis should be performed on a routine basis. The data provided to the project team for analysis proved to be difficult to analyze from the standpoint of consistency and completeness. These issues will also hinder future efforts to measure performance without significant improvement in the data collection process.

MFD is committed to a continual process of analyzing and evaluating actual performance against the adopted Standards of Cover and will enhance the data collection procedures of field operations personnel. A periodic review of the Department's records management system reports will be necessary to ensure compliance and reliability of data.

Compliance Model

Compliance is best achieved through a systematic approach. Marina Fire Department has identified the following six-step compliance model.

Figure 104: Six-Step Compliance Model



Phase 1—Establish/Review Performance Measures

Complete the initial Standards of Cover process. Conduct a full review of the performance measures every five years:

- Identify services provided.
- Define levels of service.
- Categorize levels of risk.
- Develop performance objectives and measures:
  - By incident type
  - By geographic demand zone
  - Distribution (first on scene)
  - Concentration (arrival of full first alarm)

Phase 2—Evaluate Performance

Performance measures are applied to actual services provided:

- System level
- First due area level
- Unit level
- Full effective response force (ERF)

Phase 3—Develop Compliance Strategies

Determine issues and opportunities:

- Determine what needs to be done to close the gaps.
- Determine if resources can/should be reallocated.
- Seek alternative methods to provide service at the desired level.
- Develop budget estimates as necessary.
- Seek additional funding commitment as necessary.

Phase 4—Communicate Expectations to Organizations

Communicate expectations:

- Explain the method of measuring compliance to personnel who are expected to perform services.
- Provide feedback mechanisms.
- Define the consequences of noncompliance.

Train personnel:

- Provide appropriate levels of training/direction for all affected personnel.
- Communicate the consequences of noncompliance.
- Modify (remediate) business processes, business application systems, and technical infrastructure as necessary to comply.

Phase 5—Validate Compliance

Develop and deploy verification tools and/or techniques that can be used by subsections of the organization on an ongoing basis to verify that they are meeting the requirements:

- Monthly evaluation:
  - Performance by unit
  - Overall performance
  - Review of performance by division/section management
- Quarterly evaluation:
  - Performance by unit
  - Performance by first due
  - Overall performance
  - Review of performance by executive management

Phase 6—Make Adjustments/Repeat Process

Review changes to ensure that service levels have been maintained or improved. Develop and implement a review program to ensure ongoing compliance:

- Annual review and evaluation:
  - Performance by unit
  - Performance by first due
  - Overall performance
  - Review of performance by governing body
  - Adjustment of performance standards by governing body as necessary
- Five-year update of Standards of Cover:
  - Performance by unit
  - Performance by first due
  - Full effective response force
  - Overall performance
  - Adoption of performance measures by the governing body
- Establish management processes to deal with future changes in the MFD service area.

OVERALL EVALUATION, CONCLUSIONS, AND RECOMMENDATIONS

Overall Evaluation

This Community Assessment: Standards of Cover is based on the *CFAI Standards of Cover, 6th Edition.* It required the completion of an intensive analysis of all aspects of the MFD deployment policies. The analysis used various tools to review historical performance, evaluate risk, validate response coverage, and define critical tasking and alarm assignments. The analysis relied on the experience of staff officers and their historical perspective combined with historical incident data captured by both the dispatch center and MFD's in-house records management system.

The Description of Community Served section provided a general overview of the organization, including governance, lines of authority, finance, and capital and human resources, as well as an overview of the service area, including population and geography served. The Review of Services Provided section detailed the core services the organization provides based on general resource/asset capability and basic staffing complements.

An overview of the community was provided to identify the risks and challenges faced by the fire department. Geospatial characteristics, topographic and weather hazards, transportation network risks, physical assets, and critical infrastructure were reviewed and then identified as medical incidents, structure fires, and rescues as the primary risks within the community. As a factor of risk, community populations and demographics were evaluated against historical and projected service demand. Population and service demand has increased over the past decade and will continue to increase in the future.

Evaluating risk using advanced geographic information systems (GIS) provided an increased understanding of community risk factors and led to an improved deployment policy.

During the analysis of service level goals, critical tasking assignments were completed for incident types ranging from a basic medical emergency to a high-rise structure fire. Critical tasking required a review of on-scene staffing requirements to mitigate the effects of an emergency. These tasks ultimately determine the resource allocation necessary to achieve a successful operation. The results of the analysis indicate that a low-rise building fire required a minimum of 17 personnel.

The review of historical system performance evaluated each component of the emergency incident sequence. These included call processing, turnout, and travel time. Beyond the response time of the initial arriving units, the additional components of concentration and effective response force, reliability, and call concurrency were evaluated.

The analysis completed during this study revealed a number of important findings. These include the following:

- There may be funding sources available to upgrade or expand traffic signal preemption.
- There has been a large increase in alarm activations at CSU-MB in 2019.
- Inspections of apartment buildings are not occurring in accordance with the California State Fire Code.
- The department lacks a defined schedule to complete inspections of all commercial occupancies.
- Pre-incident planning is not occurring for all commercial and target hazard properties.
- General Fund revenues have increased over the past few years and have improved significantly with the voter approval of additional sources of revenue.
- An adopted, citywide capital improvement program, including the fire department, exists, and it appears funding is sufficient to accommodate the needs of all of the City's departments.
- The level of administrative support appears to be inadequate for an organization the size and complexity of MFD. The total response workload has increased by 51.4% over the 8 years.
- Overall call processing performance during 2019 exceeded MFD's performance goal.
- During 2019, turnout time for fire incidents exceeds the Department's performance goal.
- Travel time for all incidents during 2019 exceeded the Department's performance goal.
- The minimum complement of 16 firefighters needed for a low-rise residential fire cannot be provided to any part of the city.
- Fire Station 1 is of an inadequate configuration and size for a shared facility.

Based on the analysis and considering community expectations, recommendations are offered to improve the delivery of fire and emergency services to the community by MFD. It is not expected that all will be implemented in the short term. Some may wait until economic conditions allow their implementation. However, all of the recommendations offered to chart a course to improved capability and service.

Recommendations

Recommendation A: Adopt response performance goals to guide service delivery improvement. A community's desired level of service is a uniquely individual decision. No two communities are exactly alike. Performance goals must be tailored to match community expectations, community conditions, and the ability to pay for the resources necessary to attain the desired level of service.

Levels of service and resource allocation decisions are the responsibility of the community's elected officials, in this case, the Marina City Council. The policy-making body must carefully balance the needs and expectations of its citizenry when deciding how to allocate money to all the services it provides.

MFD's current response performance goals will be difficult to achieve without the addition of many new resources, including response personnel and vehicles. The cost will be significant.

The following are recommended as MFD's fire and life safety response performance goals. They align directly with nationally recommended standards. These are not levels of service that must be achieved immediately but, instead, are targets for achievement when resources are available to do so. Further, the adoption of goals allows MFD management to regularly report progress on the achievement of these goals, conditions that are impeding progress, and resources needed to improve service.

Call-Processing Performance Goal

The first phase of overall response time is call processing time. This phase begins when the call is received at the PSAP center and ends when response resources are notified of an emergency. There are two components: answer time and dispatch time.

Recommended Call Processing Goal

- 9-1-1 calls will be answered at the primary PSAP within 15 seconds, 90 percent of the time.
- Response resources shall be notified of a priority incident within 60 seconds from receipt of the call at the dispatch center, 90 percent of the time.
    - **Exceptions:** These call types shall be processed and dispatched within 90 seconds, 90 percent of the time:
        - Calls requiring emergency medical dispatch questioning
        - Calls requiring language translation
        - Calls requiring the use of TTY/TTD devices
        - Calls of criminal activity
        - Hazardous materials and technical rescue incidents

Current performance: *Answer time is within 15 seconds, 99.5 percent of the time. Dispatch time currently is within 77 seconds, 90 percent of the time.*

Turnout Time Performance Goal

Turnout time is one area over which the fire department has total control and is not affected by outside influences. Turnout time, or the time between when the call is received by the response units (dispatched) and when the unit is en route to the incident location (responding), affects overall response times. Reducing this time component reduces total response time.

The National Fire Protection Association Standard 1710 recommends turnout time performance of 80 seconds or less for fire and special operations response, and 60 seconds or less for all other priority responses.

Recommended Turnout Goal

- Response personnel shall initiate the response of a unit capable of mitigating an incident to a priority fire and special operations incident 80 seconds from notification, 90 percent of the time.

  Current performance: *Within 2 minutes, 28 seconds, 90 percent of the time.*
- Response personnel shall initiate a response to all other priority incidents within 60 seconds from notification 90 percent of the time.

  Current performance: *Within 2 minutes, 2 seconds, 90 percent of the time.*

Response Time for the First-Due Unit Goal

The time required to deliver the first response unit capable of intervening in the emergency includes both turnout time and travel time, but not call processing time. When the recommended standards for turnout time and travel time are combined, response time should be within 5 minutes, 20 seconds, 90 percent of the time for fire and special operations incidents, and within 5 minutes, 90 percent of the time for all other priority incidents.

Recommended First-Due Response Time Goal

- The first response unit capable of initiating effective incident intervention shall arrive at a priority fire or special operations incident within 5 minutes, 20 seconds from notification of response personnel, 90 percent of the time.

  Current performance: *Within 8 minutes, 2 seconds, 90 percent of the time.*

- The first response unit capable of initiating effective incident intervention shall arrive at all other priority incidents within 5 minutes from notification of response personnel, 90 percent of the time.

  Current performance: *Within 10 minutes, 3 seconds, 90 percent of the time.*

Effective Response Force Performance Goal

A fire department's resource *concentration* is the spacing of multiple resources close enough together so that an initial "Effective Response Force" (ERF) can be assembled on the scene of an emergency within the specific time frame identified in the community's performance goals for that risk type. An initial effective response force is defined as that which will be most likely to stop the escalation of the emergency.

The minimum ERF for low-rise structure fires is identified as the arrival of at least three fire engines, one ladder truck, and one Battalion Chief (15 personnel total). This initial ERF does not necessarily represent the entire alarm assignment, as additional units may be assigned based on long-term incident needs and risks. Additional engines, ladders, or other specialty companies are assigned to higher risk responses to accomplish additional critical tasks that are necessary beyond the initial attack and containment.

Recommended Effective Response Force Goal

- The full effective response force shall arrive at a moderate-risk structure fire within 9 minutes, 20 seconds of notification of response personnel, 90 percent of the time.

  Current performance: *Within 19 minutes, 90 percent of the time.*

Cost to Implement: No cost to establish the goals.

Recommendation B: Reduce the time required to dispatch a fire incident.

Currently, it takes 1 minute, 47 seconds, 90 percent of the time for MCEC to dispatch a fire incident. Performance for other incident types is at or near national recommendations.

MFD and MCEC should explore this to determine what is taking so much time during the dispatch sequence. Changes in procedures or other actions should be accomplished to shorten this time.

Cost to Implement: Dependent on solutions selected.

Recommendation C: Improve MFD response unit turnout times.

National guidance suggests turnout time should be within 80 seconds, 90 percent of the time for fire and special operations incidents, and within 60 seconds, 90 percent of the time for all other priority incidents. MFD response crew turnout times currently are longer.

A review of station configuration, alerting systems, and other factors should be conducted to identify and remove any obstacles to prompt initiation of response.

Crew performance must also be addressed. Personnel should be provided regular reports of turnout time performance. Performance standards should be adopted and enforced.

Cost to Implement: Dependent on changes needed.

Recommendation D: Improve the efficiency of response to emergency medical incidents.

MFD's current practice is to send a fire engine to all emergency medical incidents regardless of severity. Some responses are undoubtedly non-emergent but are not recognized as such until the ambulance response has been downgraded or the arrival of the MFD responding unit.

Many dispatch centers will query the caller with a standardized list of questions that can quickly differentiate between a life-threatening incident and a non-life-threatening incident, or between emergent and non-emergent. The response (or other alternative) to a medical incident is based on the results of this query.

MCEC does not currently offer this service for fire unit dispatch but should. Serious attention should be given to this because the resulting reduction in unit utilization and improvement in system reliability would be valuable. Further, it better matches resource to need, keeping critical resources available for other, higher priority calls, thus, potentially reducing response time.

ESCI recommends MFD coordinate with County EMS to implement Emergency Medical Dispatch protocols for fire unit dispatch. The final decision as to the number and type of apparatus and staff dispatched should be determined by MFD consistent with the department's and City's 201 rights.

Cost to Implement: Minimal as EMD is currently being provided for ambulance response.

Recommendation E: Explore cooperative service and consolidation opportunities.

MFD is highly dependent on neighboring fire agencies for the delivery of effective response services to the City of Marina. Although many incidents can be handled with one or both of the MFD response units, all building fires and other large incidents require support from outside agencies.

Although MFD is dependent on outside resources, it has no direct control over them. Support is provided by the other agencies at their discretion. Personnel qualifications and training are also at the discretion of the other agencies.

MFD should work with neighboring communities and the Department of Defense to develop a more integrated system. This could include agreements for shared training services, fire prevention services, joint purchasing, and the like.

Ideally, the communities in the region consolidate through a joint-powers authority (JPA) or similar structure. Orange County Fire Authority is a California example.

Each partner would designate a representative to the JPA Board of Directors, which would be the JPA's governing body. The JPA Board of Directors would select its Fire Chief, who would then have the authority to build a fully integrated fire services system.

The resulting system will provide a more effective response system. Cost reductions from current are likely since the number of administrative personnel may be reduced.

Cost to Implement: Dependent on the model selected.

Recommendation F: Add response units during periods of high incident activity.

Fire stations should be located, staffed, and equipped to provide response resources using two primary considerations:

1. Provide response times that ensure unit(s) arrive in time to mitigate an emergency effectively.
2. Provide sufficient resources to ensure a reliable response to predictable emergency service requests.

The first consideration suggests that stations and response units should be located to minimize travel time to emergencies. The second consideration suggests that during periods of higher incident activity, additional resources should be available to respond. The additional resources should be of the type necessary for predictable requests for service. Emergency medical incidents are the most common.

The second consideration is a dynamic approach to deployment and provides two benefits. First, additional response resources can be made available during times each is predictably needed. Second, because these resources are not needed or assigned during slower workload periods, the organization is maximizing its ability to match resources with system demand.

Peak workload periods occur every day of the week. The following figure illustrates the workload by the time of day during the study period.

Figure 105: Incidents by Period of Day, 2019

Incidents 9:00 a.m.–8:59 p.m.	Incidents 9:00 p.m.–8:59 a.m.	Incidents per hour 9:00 a.m.–8:59 p.m.	Incidents per hour 9:00 p.m.–8:59 a.m.
1,806	870	0.41	0.20

A process called "queuing analysis" has been used to determine the number of units needed in each station area by the time of day. This process utilizes probability analysis to determine the number of units needed in each station area to reduce the likelihood that a response unit would not be available to serve an incident to 10 percent or less. It uses the variables incidents per hour, number of available response units, and the average time committed per incident.

Though very useful to this effort, queuing analysis has some limitations. It assumes that customers (incidents) arrive at a constant rate. This is not always true in emergency services. It also assumes that each customer requires an equal amount of time from servers (response units). While the average time committed to an incident was used for service time, some incidents require less or substantially more than the average.

The following figure illustrates the current deployment for both daytime (9:00 a.m. to 8:59 p.m.) and nighttime (9:00 p.m. to 8:59 a.m.). The figure includes the current probability of wait analysis based on the current number of response units.

Figure 106: Probability of Wait—Current Response Units

Current Units Day	Current Units Night	Current Probability of Wait—Day	Current Probability of Wait—Night
2	**2**	**1.0%**	**.02%**

The next figure shows what the probability of wait would be with only a single unit available. This demonstrates that, at least during daytime hours, two units are necessary to maintain a reliable response capability.

Figure 107: Probability of Wait—Single Response Unit

Units Day	Units Night	Current Probability of Wait—Day	Current Probability of Wait—Night
1	**1**	**14.4%**	**7.0%**

MFD is currently operating two response units 24 hours per day. It should continue to do so, at least during daytime hours.

Cost to Implement: No additional expense above the current cost.

Recommendation G: Relocate both fire stations to improve travel time coverage.

MFD's Station 1 and 2 are not well located to serve the growing community. Travel coverage from Station 1 does not extend north far enough. Travel coverage from Station 2 is very limited by the airport.

Each station should be relocated to improve service. The following figure illustrates locations suggested for each. These are not exact points. A suitable site within a few blocks of each will suffice. Also shown on the map is the four-minute travel time coverage that would be provided from the new locations and from adjacent agency stations. The coverage is nearly 100 percent.

Figure 108: Proposed Station Locations

Each station should have a staffed fire engine. This will improve effective response force coverage.

Cost to implement: Total cost is dependent on size and configuration. The average square foot cost for fire station construction in the area as of 2019 was $625 per square foot.

Recommendation H: Explore opportunities to reduce response workload.

Response workload has grown by 51% over the past 8 years. At this rate of growth, MFD will be unable to maintain service levels without new resources. Response workload is expected to increase to over 5,700 incidents per year by 2040. The City's ability to fund new resources to maintain service levels is limited.

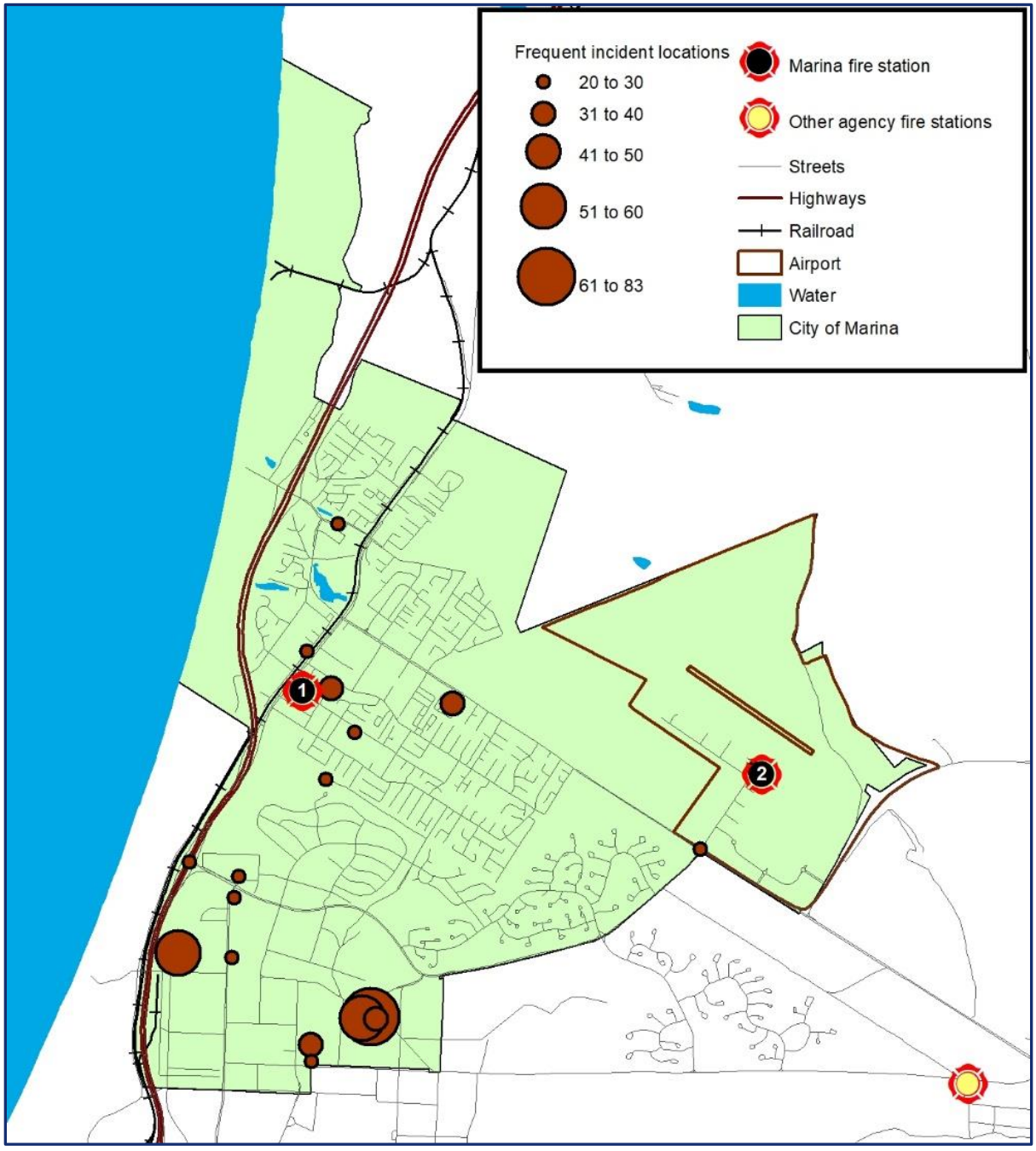
Work with Frequent Users of EMS Services to Reduce Utilization

Most fire service agencies have patients and facilities who routinely call multiple times for a response from the local fire department. While some of these patients undoubtedly have acute medical challenges that require a response and assessment, many others have chronic illnesses and have become reliant upon first responders as their primary care provider. Still others are living alone but struggling to live independently, relying instead on first responders to address their routine challenges. A smaller subset may be relying upon first responders for social needs or may have mental health challenges that cause them to call inappropriately for first responders.

Fire agencies can also have significant response workload at single facilities such as nursing homes, assisted living, and mobility-impaired resident facilities. Many calls for service are legitimate medical emergencies, while some are lift-assists that occur when a mobility-impaired resident falls from bed and needs assistance getting back into bed. First responders in these cases perform a quick assessment of the latter group and place them back into bed. While this may seem to be an appropriate service to provide to the residents of such facilities, in many cases it is a liability shift and/or a staffing shift from a fee-for-service facility to the taxpayer-provided emergency responders. Further, it misuses critical emergency response resources to address decidedly non-emergent problems.

The following figure illustrates the locations that used fire department services 20 or more times during 2019.

Figure 109: Number of Incidents by Location



There are different approaches available to fire departments that experience the high-frequency individual and the high-frequency facility. These approaches are explained more fully in the two following subsections.

Responses to High-Frequency Patients

A growing concept nationally is the community paramedicine program. The concept of this approach is to better support high-frequency EMS system users. Community paramedicine is intended to decrease 9-1-1 over-users or abusers, decrease the on-scene time for response units, and provide a higher level of service to customers.

There are a variety of models in use throughout the country. Some employ a single paramedic in a vehicle who conducts follow-up visits of patients recently released from the hospital. The purpose is to ensure the patient is taking appropriate medications, following up with their primary care physician, and to check the patient's overall well-being. These single paramedic units can also be dispatched to incidents known to be non-life threatening.

Other models team a paramedic with community social service workers who can also address other needs such as food, housing, mental health care, and the like.

Agencies that have successfully implemented a community paramedicine type program include Mesa, Arizona, which developed the concept; Spokane, Washington, Tualatin Valley Fire and Rescue, Oregon, and Bellevue, Washington.

This is a shared service opportunity. This type of resource could easily be shared between the cities of Marina and Seaside.

Responses to High-Frequency Facilities

There are a number of facilities within Marina that generate frequent requests for emergency medical assistance. Some of these facilities have medical professionals on-site; others may not. Of the top 15 addresses with repeat service requests for 2019, three are medical facilities. They are listed in order of response frequency.

Figure 110: Facilities With 20 or More Incidents, 2019

Incidents	Location
87	201 9th St – VA Clinic
83	400 8th St Bldg B – CSUMB Promontory
56	400 8th St Bldg C – CSUMB Promontory
39	400 8th St Bldg A – CSUMB Promontory
38	356 Reservation Rd – El Rancho Mobile Home Park
34	3082 Sunset Ave – an Apartment Complex Low Income
32	6015 Gen. Jim Moore Blvd – CSUMB Vineyard Suites
26	3095 Marina Dr – a Condominium Complex
23	Marina Airport
22	294 Hillcrest Ave – Los Arboles School
21	6011 Gen. Jim Moore Blvd – CSUMB Pinnacles Suites
21	Reservation Rd & Imjin Rd
21	298 Patton Parkway – Marina High School
21	2920/2930 2nd Ave Montage Medical/Urgent Care Same Building
20	930 2nd Ave Davita Dialysis Center

For facilities with qualified medical professionals, the dispatch center currently should have the ability to send only an ambulance when all that is needed is the transportation of the patient to a medical facility. MFD should review this practice and revise procedures as necessary to allow for this.

For facilities without qualified medical professionals, a full response is typically sent to a request for emergency medical assistance. However, many of these requests can turn out to be lift-assists, or other minor problems.

MFD should work with managers of high-frequency facilities to ensure fire department resources are not overused. This may involve providing training to facility staff, modifying EMS system regulations to allow alternative response practices, or other creative solutions.

Cost to Implement a single paramedic in a vehicle: The following figure identifies the cost to implement the community paramedicine program, plus vehicle and equipment. It is expected that community health partners would likely provide subsidies for a program of this type.

Description	Factor	Amount
Base Compensation		26.2520
Paramedic Incentive (Est)		1.0000
Hourly Compensation		27.2520
Contract Equity Pay - 7-1-2020	2.00%	0.5450
COLA - 7-1-2020	3.50%	0.9538
Education/Certification Pay	2.50%	0.6813
Hourly Rate		29.4322
Annual Hours		2,080
Annual Compensation		61,219
CalPERS	7.7320%	4,733
UAL		5,149
CalPERS Pension		9,882
Medical Insurance		541
Uniforms		600
Benefits Cost		11,023
Total Salary & Benefits Cost		**72,242**
Vehicle Operations		5,000
Medical Supplies		5,000
Total Annual Program Costs		**82,242**
Capital Start-up Costs		
Assume Full-size 4-door PU		40,000
Emergency Equipment Upfit		20,000
Medical Equipment		50,000
Total Capital Costs		**110,000**

Recommendation I: Implement a quality control process for incident reporting fire loss data.
Proper coding of incident reports provides accurate data to make operational decisions and assists in strategic planning. It is recommended that all incident reports be reviewed for accurate fire loss data as part of a quality control process.

Cost to Implement: The estimated cost relates to staff time to review each incident report.

Recommendation J: Conduct pre-incident plans for commercial buildings and target hazards.
Pre-incident planning is designed to provide information for responding personnel to assist with strategies and tactics during an event and provides building familiarization to operations staff. It allows responding personnel to conduct a site visit to gather information on built-in fire protection features, building construction, floor plans, or hazards in a building.

Cost to Implement: Staff time, the department's record management system provides a method for tracking building information for use during an emergency.

Recommendation K: Develop a fire inspection program for all commercial properties and multi-family occupancies.
Currently, there is not a defined schedule to inspect all commercial properties in Marina. Inspections of occupancies are designed to meet the enforcement and educational components of a community's risk reduction program. ESCI recommends Marina develop a schedule to inspect all commercial buildings for fire code compliance.

Inspections of Multi-family Housing: Inspections of the common areas for multi-family housing should be implemented immediately to ensure compliance with California State Fire Code requirements that all residential apartments be inspected annually.

Cost to Implement: *The cost would include salary and benefits for a Fire Marshal comparable to the Department's current Chief Officer pay schedule. This position would be responsible for the development and management of a fire safety inspection program, manage code compliance, and issuance of permits. There could be some cost recovery through the collection of new permit fees.*

APPENDIX A: HAZARD VULNERABILITY RISK TABLES

ESCI HAZARD AND VULNERABILITY ASSESSMENT TOOL STRUCTURE FIRES								
EVENT	PROBABILITY	SEVERITY = IMPACT - MITIGATION)						RISK
		COMMUNITY IMPACT			MITIGATION CAPACITY			
	Likelihood this will occur	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPARED-NESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	Relative threat*
SCORE	0 = N/A 1= Low 2 = Moderate 3 = High 4 = Very High	0 = N/A 1= Low 2 = Moderate 3 = High 4 = Catastrophic	0 = N/A 1= Low 2 = Moderate 3 = High 4 = Catastrophic	0 = N/A 1= Low 2 = Moderate 3 = High 4 = Catastrophic	0 = Very High 1= High 2 = Moderate 3 = Low 4 = None	0 = Very High 1= High 2 = Moderate 3 = Low 4 = None	0 = Very High 1= High 2 = Moderate 3 = Low 4 = None	*0 - 100%*
High Risk Urban	4	4	4	4	2	2	2	75%
Moderate Risk Urban	4	3	4	4	2	2	2	71%
Low Risk Urban	4	3	4	4	2	2	2	71%
High Risk Suburban	4	4	4	4	2	2	2	75%
Moderate Risk Suburban	4	3	4	4	2	2	2	71%
Low Risk Suburan	4	3	4	4	2	2	2	71%
AVERAGE SCORE	4.00	3.33	4.00	4.00	2.00	2.00	2.00	72%

ESCI HAZARD AND VULNERABILITY ASSESSMENT TOOL NON-STRUCTURE FIRES								
EVENT	PROBABILITY	SEVERITY = IMPACT - MITIGATION)						RISK
		COMMUNITY IMPACT			MITIGATION CAPACITY			
	Likelihood this will occur	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPARED-NESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	Relative threat*
SCORE	0 = N/A 1= Low 2 = Moderate 3 = High 4 = Very High	0 = N/A 1= Low 2 = Moderate 3 = High 4 = Catastrophic	0 = N/A 1= Low 2 = Moderate 3 = High 4 = Catastrophic	0 = N/A 1= Low 2 = Moderate 3 = High 4 = Catastrophic	0 = Very High 1= High 2 = Moderate 3 = Low 4 = None	0 = Very High 1= High 2 = Moderate 3 = Low 4 = None	0 = Very High 1= High 2 = Moderate 3 = Low 4 = None	*0 - 100%*
High Risk Urban	4	3	3	3	2	2	2	63%
Moderate Risk Urban	4	3	3	3	2	2	2	63%
Low Risk Urban	3	3	3	3	2	2	2	47%
Urban/Wildland Interface	2	2	3	3	2	2	2	29%
AVERAGE SCORE	3.25	2.75	3.00	3.00	2.00	2.00	2.00	50%

ESCI HAZARD AND VULNERABILITY ASSESSMENT TOOL								
EMS-MEDICAL ASSISTS								
EVENT	PROBABILITY	SEVERITY = IMPACT - MITIGATION)						RISK
		COMMUNITY IMPACT			MITIGATION CAPACITY			
	Likelihood this will occur	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPARED-NESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	Relative threat*
SCORE	0 = N/A 1 = Low 2 = Moderate 3 = High 4 = Very High	0 = N/A 1 = Low 2 = Moderate 3 = High 4 = Catastrophic	0 = N/A 1 = Low 2 = Moderate 3 = High 4 = Catastrophic	0 = N/A 1 = Low 2 = Moderate 3 = High 4 = Catastrophic	0 = Very High 1 = High 2 = Moderate 3 = Low 4 = None	0 = Very High 1 = High 2 = Moderate 3 = Low 4 = None	0 = Very High 1 = High 2 = Moderate 3 = Low 4 = None	*0 - 100%*
High Risk	4	3	3	2	2	2	2	58%
Moderate Risk	4	2	2	2	1	2	2	46%
Low Risk	4	1	1	1	1	2	2	33%
AVERAGE SCORE	4.00	2.00	2.00	1.67	1.33	2.00	2.00	46%

ESCI HAZARD AND VULNERABILITY ASSESSMENT TOOL								
RESCUE								
EVENT	PROBABILITY	SEVERITY = IMPACT - MITIGATION)						RISK
		COMMUNITY IMPACT			MITIGATION CAPACITY			
	Likelihood this will occur	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPARED-NESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	Relative threat*
SCORE	0 = N/A 1 = Low 2 = Moderate 3 = High 4 = Very High	0 = N/A 1 = Low 2 = Moderate 3 = High 4 = Catastrophic	0 = N/A 1 = Low 2 = Moderate 3 = High 4 = Catastrophic	0 = N/A 1 = Low 2 = Moderate 3 = High 4 = Catastrophic	0 = Very High 1 = High 2 = Moderate 3 = Low 4 = None	0 = Very High 1 = High 2 = Moderate 3 = Low 4 = None	0 = Very High 1 = High 2 = Moderate 3 = Low 4 = None	*0 - 100%*
Rescue - MVA	4	2	2	1	2	2	1	42%
Rescue - Structural Collapse	2	3	3	2	1	2	1	25%
Rescue - Trench	2	2	2	1	2	2	1	21%
Rescue - Low/High Angle	2	1	1	1	2	2	1	17%
Rescue - Confined Space	2	1	4	1	2	2	1	23%
Rescue - Swiftwater	2	1	4	1	2	2	1	23%
Rescue - Stillwater	2	2	4	1	2	2	1	25%
Rescue - Beach Rescue	4	3	0	0	2	1	1	29%
Rescue - Other	2	1	4	2	2	2	1	25%
AVERAGE SCORE	2.44	1.78	2.67	1.11	1.89	1.89	1.00	26%

ESCI HAZARD AND VULNERABILITY ASSESSMENT TOOL								
HAZARDOUS MATERIALS								
EVENT	PROBABILITY	SEVERITY = IMPACT - MITIGATION)						RISK
		COMMUNITY IMPACT			MITIGATION CAPACITY			
	Likelihood this will occur	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPARED-NESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	Relative threat*
SCORE	0 = N/A 1 = Low 2 = Moderate 3 = High 4 = Very High	0 = N/A 1 = Low 2 = Moderate 3 = High 4 = Catastrophic	0 = N/A 1 = Low 2 = Moderate 3 = High 4 = Catastrophic	0 = N/A 1 = Low 2 = Moderate 3 = High 4 = Catastrophic	0 = Very High 1 = High 2 = Moderate 3 = Low 4 = None	0 = Very High 1 = High 2 = Moderate 3 = Low 4 = None	0 = Very High 1 = High 2 = Moderate 3 = Low 4 = None	*0 - 100%*
High Risk Hazmat - Urban	3	3	3	3	3	2	2	50%
Moderate Risk Hazmat - Urban	3	3	3	3	3	2	2	50%
Low Risk Hazmat - Urban	2	2	2	2	3	2	2	27%
High Risk Hazmat - Suburban	2	3	3	3	3	2	2	33%
Moderate Risk Hazmat - Suburban	2	2	2	2	3	2	2	27%
Low Risk Hazmat - Suburban	2	1	1	1	3	2	2	21%
High Risk Hazmat - Rural	3	2	2	3	3	2	2	44%
Moderate Risk Hazmat - Rural	3	1	2	2	3	2	2	38%
Low Risk Hazmat - Rural	2	1	1	1	3	2	2	21%
AVERAGE SCORE	2.44	2.00	2.11	2.22	3.00	2.00	2.00	34%

ESCI HAZARD AND VULNERABILITY ASSESSMENT TOOL								
NATURALLY OCCURRING EVENTS								
EVENT	PROBABILITY	SEVERITY = IMPACT - MITIGATION)						RISK
		COMMUNITY IMPACT			MITIGATION CAPACITY			
	Likelihood this will occur	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPARED-NESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	Relative threat*
SCORE	0 = N/A 1= Low 2 = Moderate 3 = High 4 = Very High	0 = N/A 1= Low 2 = Moderate 3 = High 4 = Catastrophic	0 = N/A 1= Low 2 = Moderate 3 = High 4 = Catastrophic	0 = N/A 1= Low 2 = Moderate 3 = High 4 = Catastrophic	0 = Very High 1= High 2 = Moderate 3 = Low 4 = None	0 = Very High 1= High 2 = Moderate 3 = Low 4 = None	0 = Very High 1= High 2 = Moderate 3 = Low 4 = None	*0 - 100%*
Tornado	1	1	1	1	2	2	2	9%
Severe Thunderstorm	2	2	2	2	2	2	2	25%
Snow Fall	0	0	0	0	2	2	2	0%
Blizzard	0	0	0	0	0	0	0	0%
Ice Storm	0	0	0	0	3	3	3	0%
Earthquake	4	4	4	4	1	1	1	63%
Tidal Wave	1	1	1	1	2	2	2	9%
Temperature Extremes	2	3	3	2	2	2	2	29%
Drought	3	3	3	3	2	2	2	47%
Flood, External	2	2	2	3	2	2	2	27%
Wild Fire	2	2	2	2	2	1	1	21%
Landslide	2	2	2	1	2	2	2	23%
Dam Inundation	0	0	0	0	0	0	0	0%
Volcano	0	0	0	0	2	4	4	0%
Epidemic	2	4	4	4	2	2	2	38%
AVERAGE SCORE	1.40	1.60	1.60	1.53	1.73	1.80	1.80	15%

ESCI HAZARD AND VULNERABILITY ASSESSMENT TOOL								
TECHNOLOGIC EVENTS								
EVENT	PROBABILITY	SEVERITY = IMPACT - MITIGATION)						RISK
		COMMUNITY IMPACT			MITIGATION CAPACITY			
	Likelihood this will occur	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPARED-NESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	Relative threat*
SCORE	0 = N/A 1 = Low 2 = Moderate 3 = High 4 = Very High	0 = N/A 1 = Low 2 = Moderate 3 = High 4 = Catastrophic	0 = N/A 1 = Low 2 = Moderate 3 = High 4 = Catastrophic	0 = N/A 1 = Low 2 = Moderate 3 = High 4 = Catastrophic	0 = Very High 1 = High 2 = Moderate 3 = Low 4 = None	0 = Very High 1 = High 2 = Moderate 3 = Low 4 = None	0 = Very High 1 = High 2 = Moderate 3 = Low 4 = None	*0 - 100%*
Electrical Failure	3	3	2	3	2	3	3	50%
Generator Failure	2	2	2	2	2	3	3	29%
Transportation Failure	2	2	2	2	2	3	2	27%
Fuel Shortage	2	2	1	3	3	3	2	29%
Natural Gas Failure	2	2	2	3	3	3	2	31%
Water Failure	2	3	2	3	2	3	3	33%
Sewer Failure	2	3	2	3	2	3	3	33%
Steam Failure	0	0	0	0	0	0	0	0%
Fire Alarm Failure	2	2	1	2	2	2	2	23%
Communications Failure	2	3	2	2	2	2	2	27%
Medical Gas Failure	2	4	1	1	2	3	3	29%
Medical Vacuum Failure	2	4	1	1	2	3	3	29%
HVAC Failure	2	2	1	2	2	3	3	27%
Information Systems Failure	2	3	2	4	2	3	3	35%
Fire, Internal	2	2	3	4	2	2	2	31%
Flood, Internal	2	2	3	3	2	2	2	29%
Hazmat Exposure	2	2	3	4	3	2	2	33%
Supply Shortage	2	1	1	2	2	2	2	21%
Structural Damage	2	2	3	4	2	2	2	31%
AVERAGE SCORE	1.95	2.32	1.79	2.53	2.05	2.47	2.32	27%

ESCI HAZARD AND VULNERABILITY ASSESSMENT TOOL								
HUMAN RELATED EVENTS								
EVENT	PROBABILITY	SEVERITY = IMPACT - MITIGATION)						RISK
		COMMUNITY IMPACT			MITIGATION CAPACITY			
	Likelihood this will occur	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPARED-NESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	Relative threat*
SCORE	0 = N/A 1 = Low 2 = Moderate 3 = High 4 = Very High	0 = N/A 1 = Low 2 = Moderate 3 = High 4 = Catastrophic	0 = N/A 1 = Low 2 = Moderate 3 = High 4 = Catastrophic	0 = N/A 1 = Low 2 = Moderate 3 = High 4 = Catastrophic	0 = Very High 1 = High 2 = Moderate 3 = Low 4 = None	0 = Very High 1 = High 2 = Moderate 3 = Low 4 = None	0 = Very High 1 = High 2 = Moderate 3 = Low 4 = None	*0 - 100%*
Mass Casualty Incident (trauma)	2	2	1	1	2	2	2	**21%**
Mass Casualty Incident (medical/infectious)	2	2	1	1	2	2	2	**21%**
Terrorism	1	2	2	2	2	2	2	**13%**
VIP Situation	2	1	3	2	2	2	2	**25%**
Infant Abduction	1	2	2	1	3	3	3	**15%**
Hostage Situation	1	2	3	2	3	3	3	**17%**
Civil Disturbance	1	2	3	2	3	3	3	**17%**
Labor Action	1	2	3	2	3	3	3	**17%**
Forensic Admission	1	1	2	1	2	3	3	**13%**
Bomb Threat	1	2	2	2	2	3	3	**15%**
AVERAGE SCORE	1.30	1.80	2.20	1.60	2.40	2.60	2.60	**18%**

APPENDIX B: FIRE STATIONS/CAPITAL ASSETS

Capital Assets and Improvements

Three basic resources are required to successfully carry out the mission of a fire department—trained personnel, firefighting equipment, and fire stations. No matter how competent or numerous the firefighters, if appropriate capital equipment is not available for use by responders, it is impossible for a fire department to deliver services effectively. The capital assets that are the most essential to the provision of emergency response are facilities and apparatus (response vehicles). The following figures summarize the fire stations and fire and EMS apparatus operated by the Marina Fire Department.

Fixed Facilities

Fire stations play an integral role in the delivery of emergency services for several reasons. A station's location will dictate, to a large degree, response times to emergencies. A poorly located station can mean the difference between confining a fire to a single room and losing the structure. Fire stations also need to be designed to adequately house equipment and apparatus, as well as meet the needs of the organization, its workers, and/or its members.

Consideration should be given to a fire station's ability to support the jurisdiction's mission as it exists today and into the future. The activities that take place within the fire station should be closely examined to ensure the structure is adequate in both size and function.

ESCI associates conducted walk-through inspections of the Marina Fire Department's Administrative Headquarters and fire stations utilizing a standard checklist at each facility.

Special attention was made to the building's location, future use viability in terms of serving the community, and the capability of accommodating an increase in staffing levels and emergency response apparatuses in the future.

Figure 111: Fire Station Condition Definitions

Excellent	Like new condition. No visible structural defects. The facility is clean and well maintained. Interior layout is conducive to function with no unnecessary impediments to the apparatus bays or offices. No significant defect history. Building design and construction match the building's purposes.
Good	The exterior has a good appearance with minor or no defects. Clean lines, good workflow design, and only minor wear of the building interior. Roof and apparatus apron are in good working order, absent any significant full-thickness cracks or crumbling of apron surface or visible roof patches or leaks. Building design and construction match the building's purposes.
Fair	The building appears to be structurally sound with weathered appearance and minor to moderate nonstructural defects. The interior condition shows normal wear and tear but flows effectively to the apparatus bay or offices. Mechanical systems are in working order. Building design and construction may not match the building's purposes well. Showing increasing age-related maintenance, but with no critical defects.
Poor	The building appears to be cosmetically weathered and worn with potentially structural defects, although not imminently dangerous or unsafe. Large, multiple full-thickness cracks and crumbling of concrete on apron may exist. The roof has evidence of leaking and/or multiple repairs. The interior is poorly maintained or showing signs of advanced deterioration with moderate to significant nonstructural defects. Problematic age-related maintenance and/or major defects are evident. May not be well suited to its intended purpose.

The following figures depict the results of ESCI's inspections:

Figure 112: Marina Fire Department Station 1 & Administrative Offices

Station Name/Number:	Station #1
Address/Physical Location:	211 Hillcrest, Marina, CA 93933

This station was originally designed to accommodate a Public Safety Model configuration. The department has exceeded the administrative and crew capability needs of the current facility. As currently configured, the area occupied by the fire department is inadequate and presents safety concerns.

Structure						
Construction Type	Type 2					
Date of Construction	2000					
Seismic Protection	Yes					
Auxiliary Power	Yes					
General Condition	Good					
Number of Apparatus Bays		Drive-through bays	4	Back-in bays		
Special Considerations (ADA, etc.)	No					
Square Footage	3,300					
Facilities Available						
Separate Rooms/Dormitory/Other	4	Bedrooms	4	Beds		Dormitory Beds
Maximum Station Staffing Capability						
Exercise/Workout Facilities	No					
Kitchen Facilities	Yes					
Individual Lockers/Storage Assigned	Yes					
Shower Facilities	Yes					
Training/Meeting Rooms	Yes					
Washer/Dryer	No					
Safety & Security						
Sprinklers	Yes					
Smoke Detection	Yes					
Decontamination/Biohazard Disposal	No					
Security	Yes					
Apparatus Exhaust System	Ward No Smoke					

Figure 113: Marina Fire Department Station 2

Station Name/Number:	Station #2
Address/Physical Location:	3260 Injim Road

The Department has plans to staff this station in the near future with a full-time crew. While the station has recently undergone some remodeling, it will need additional work to meet safety and OSHA mandates.

Structure						
Construction Type	Type 3					
Date of Construction						
Seismic Protection	No					
Auxiliary Power	Yes					
General Condition	Good					
Number of Apparatus Bays		Drive-through bays			2	Back-in bays
Special Considerations (ADA, etc.)						
Square Footage						
Facilities Available						
Separate Rooms/Dormitory/Other	3	Bedrooms	3	Beds		Dormitory Beds
Maximum Station Staffing Capability						
Exercise/Workout Facilities	No					
Kitchen Facilities	Yes					
Individual Lockers/Storage Assigned	No					
Shower Facilities	Yes					
Training/Meeting Rooms	No					
Washer/Dryer	Yes					
Safety & Security						
Sprinklers	Yes					
Smoke Detection	Yes					
Decontamination/Biohazard Disposal	No					
Security	Alarm					
Apparatus Exhaust System	Ward No Smoke					

Facilities Summary

The facilities range in age from 20 to in excess of 40 years old. Fire Station 2 has recently undergone a remodel/upgrades in an effort to prepare it to be staffed full-time.

Fire Station 1 is of an inadequate configuration and size for a shared facility. Firefighter protective clothing is stored in an area that results in direct contact with contaminants generated by apparatus exhaust. The efficiency of the HVAC system is questionable given the increased call loads and design of the original building. Firefighters do not have locker space due to the needs of the police department; the design of the station is an impediment to effective turnout times as the only way from the crews quarters is via a stairwell, which creates a safety concern for crews attempting to quickly travel to the apparatus bay.

Fire Station 2 has previously been an unstaffed facility used mostly for storage and has recently undergone some upgrades to prepare it to be staffed full time. Prior to assigning full-time staff, the doors leading into the apparatus bay should be updated to fire-resistive rated doors, with smoke seals and self-closers. Accommodations need to be considered that will permit the storage of all firefighter protective gear to be stored in such a location and manner that will minimize contamination. Given the size of this station, crew size should be considered prior to activation.