# City of Modesto Fire Department

*California*


## Fire Department Program Service Audit, Master Plan, and ISO Community Fire Service Performance Review

ISO Community Analytic Services

September 2015

ESCI Emergency Services Consulting International

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## Acknowledgments

Without the considerable support of the leadership of the City of Modesto, this project would not have been possible. Emergency Services Consulting International thanks and acknowledges the following representatives for their invaluable contribution to this undertaking

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## Executive Summary

Emergency Services Consulting International (ESCI) was engaged by the City of Modesto to provide a long-range plan for the delivery of emergency services within the Modesto Department (MFD). This Emergency Services Master Plan will assist the department in future planning and provision of comprehensive emergency services to the citizens of Modesto. This report is organized as an organizational master plan that evaluates current conditions; projects future growth, development and service demand; and provides recommendations to enhance current services or to provide an equal level of service over the next 10 to 20 years.

ESCI thanks the Modesto City Council, the City Manager, and the staff of the MFD for their outstanding cooperation in the preparation of this report. All involved were candid in their comments and provided a tremendous amount of essential information. Special appreciation is offered to Fire Chief Sean Slamon in acknowledgement of the time, effort, and resources he provided for this plan.

The audit and master plan begins with a community forum and review of the current service delivery provided by MFD including its programs, administration, management, service delivery performance, and financial health. All areas are evaluated and discussed in detail, and specific recommendations are provided where applicable.

### *Community Forum*

In order to dedicate time, energy, and resources on the functions that are most desired by its customers, the MFD wants to understand the customers' priorities and expectations. To better understand these priorities and expectations, two facilitated citizen forums were utilized to obtain community perspective regarding the MFD.

The community forums were conducted with community members invited to participate in the master planning process. Invitations were sent out from the City of Modesto and MFD to community leaders and neighborhoods throughout the city. Approximately 20 attendees were asked to fill out several survey instruments pertaining to how they think the MFD should plan for the future. The citizens represented were asked to identify the most important functions and services the fire department provides, based on the list of services currently provided, and rank those services as a critical priority, an important priority, or a low priority. In addition, participants were asked to rate a number of key indicators as they related to service levels, staffing, and cost of service.

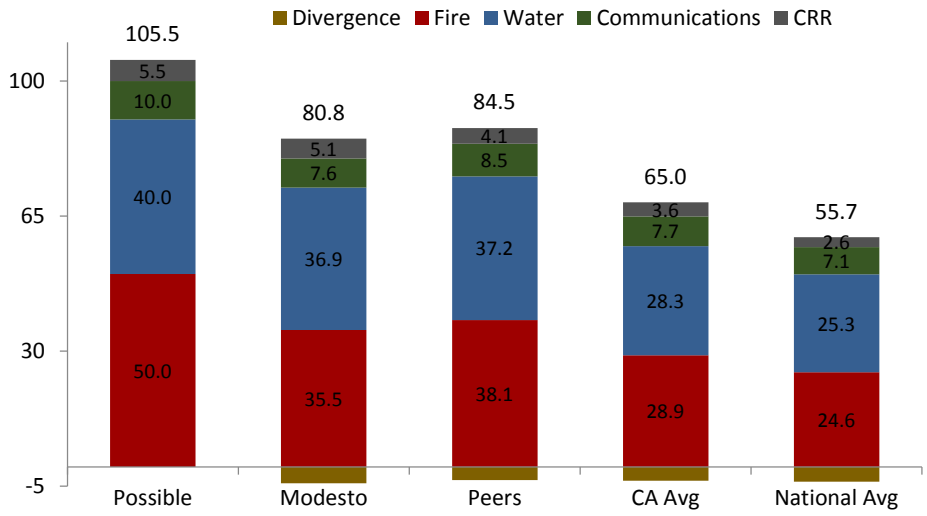
Understanding what the community expects of its fire and emergency medical services organization is critical to developing an effective long-range perspective. Armed with this knowledge, the MFD internal emphasis can be adjusted to better fulfill customer needs. The citizens group identified the following expectations:

- Adequate staffing and a timely response
- Maintenance of existing fire suppression and emergency medical service levels
- Well trained and response ready
- Professionalism and competency
- Continued integration and partnership with the communities served
- Community access to stations and personnel

### *Report Section I: Evaluation of Current Conditions*

An analysis of current conditions is documented in nine survey sections, reviewing the MFD administration, governance, staffing, personnel management, service delivery, planning, support programs, and capital assets. Each component of the evaluation includes an introductory explanation of the subject area and discussion of desirable outcomes and identified best practices.

Criterion used to evaluate the fire department has been developed over many years. These gauges include relevant guidelines from national accreditation criteria, the National Fire Protection Association (NFPA) standards, federal and state mandates for fire and EMS systems, recommendations by various organizations such as the Center for Public Safety Excellence (CPSE), and generally accepted best practices within the fire and EMS industry. In addition, the Insurance Service Organization (ISO) Analytics Division established a peer comparison group of approximately 15 similar departments and benchmarked key MFD functions and attributes with the identified peer agencies. The following figure shows the ISO rating criteria points against peer, state, and national standards. These point values and rating system determine the city's ISO rating. This ISO rating is utilized by the insurance industry in determining fire insurance rates for the specified jurisdiction.



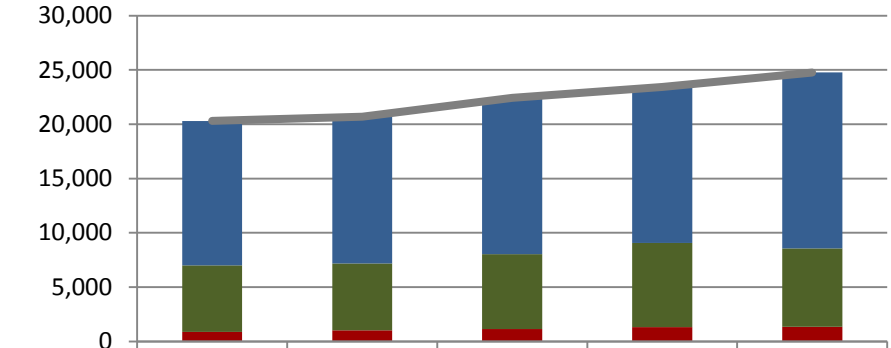
The evaluation of current conditions offers the City a detailed assessment of existing fire department operations and also provides the ESCI project team with a snapshot in time, the basis from which the balance of the Fire Department Program and Service Audit and Master Plan is developed. The following discusses some of the key findings:

### *Service Demand*

The City of Modesto and adjacent areas are experiencing mild to moderate economic and population growth, which is expected to continue into the near future. With the economic and housing trends seen in Modesto and the central valley in general, cities and communities are seeing increased service demand and workload on the fire department. This increased service demand has been significant within the city of Modesto and has created some service delivery challenges for the MFD as they try to keep pace with the growing community needs.

Over the years, the department has evolved into the agency it is today, providing fire prevention and suppression, technical rescue, hazardous materials, and advanced life support (ALS) and basic life support (BLS) medical first response. The department operates from 11 strategically placed facilities using a fleet of 9 engines, two aerial ladder units (truck companies), one Airport Rescue Fire Fighting engine, three engines with ALS capabilities, a hazardous material and heavy rescue unit, several brush/wildland units, and a number of ancillary support vehicles. The department staffs entirely career personnel that include an administrative complement of 10 and an operations complement of 140 personnel.

The following figure shows a 50 percent increase in the number of fire calls over the past five years. This is significant as similar jurisdictions have seen reductions in fire calls and are showing a consistent trend throughout the fire service as a result of enhanced fire prevention services, increased fire safe construction, and adopted fire code standards. This fire call increase is further impacted by double-digit increase of 21.7 percent for EMS calls. Additionally, other service demand resulted in an 18.3 percent increase in calls for service. “Other” calls are representative of those not falling into the fire or EMS categories and include calls such as citizen assists, alarm sounding, and other calls for assistance.

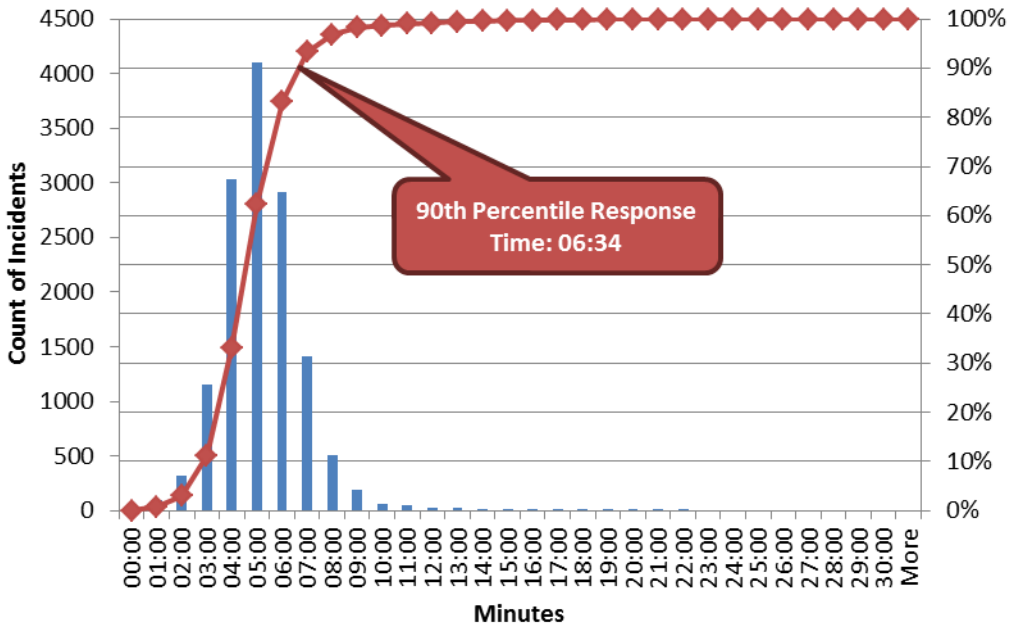



| | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| EMS | 13,306 | 13,495 | 14,369 | 14,354 | 16,193 |
| Other | 6,105 | 6,159 | 6,894 | 7,757 | 7,222 |
| Fire | 894 | 1,024 | 1,156 | 1,313 | 1,347 |
| Total | 20,305 | 20,678 | 22,419 | 23,424 | 24,762 |

### *Service Delivery and Response Performance*

Response performance criteria and actual service delivery performance is analyzed in detail, providing information with which the Department can develop future deployment methodologies and identify desired levels of response performance and staffing.

The response time to calls within the City of Modesto that the Department responded to in the study year were answered in 6 minutes 34 seconds or less 90 percent of the time. The following chart displays the 90th percentile response time from dispatch to arrival:



Fire stations are generally well located to provide reasonable response time intervals. GIS analysis indicates that just over 90 percent of incidents occurring within the City are within 6 minutes 34 second "travel" time from an existing fire station. This 90th percentile, 6 minute 34 second coverage is considered acceptable. However, without defined response performance goals, it is unknown if it meets community expectations or is meeting desired outcomes. It is explained further in the report that some aspects of response performance are best developed locally, based on identified risk, community expectations, and desired service levels. It is important that Modesto develops and adopts response, performance, and staffing standards that best meet the city's risk profile and needs of the communities served. To meet the identified standards and/or improve upon current response times with anticipated future growth, additional personnel, fire apparatus and alternative response capabilities will be needed in the future.

It was noted that the MFD's ability to assemble multiple units as an effective firefighting force is negatively impacted by three key elements seen within the city: 1. Simultaneous calls or unit reliability is an issue due to the high EMS and fire call volume frequently putting units out of position for optimum response. 2. Truck company coverage is inadequate to ensure optimized rescue, ventilation, and coordinated fire attack functions. 3. Battalion Chief response is extended due to one battalion chief covering the entire city. This chief officer response model is causing delayed response times for assigned Chief Officers. This delayed response is resulting in an excessive span of control for supervision and oversight, delayed incident command and scene control measures, and delayed fire ground accountability functions.

### *Staffing*

The staffing section of the report reviews both operational and administrative and support personnel deployment. In general terms, operational (emergency response) staffing of fire apparatus is found to be within acceptable parameters. However, as mentioned previously, key response elements are challenged based on staffing levels being stretched to meet current service demand and inability to optimize response for anticipated future service demand growth.

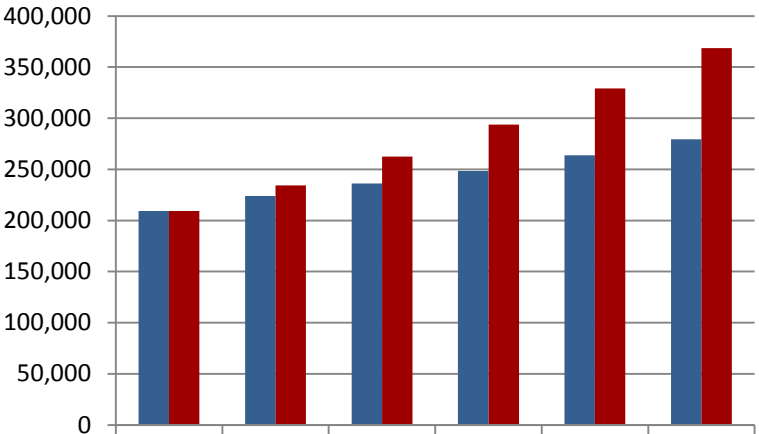
In review of administrative and support staffing levels, several shortcomings are revealed. The ratio of administrative staffing to departmental operational manpower is lower than what ESCI's experience finds to be most effective. Further, the Operations Division Chief position is assigned multiple responsibilities, exceeding the capacity of one individual. Additionally, it is found that the Training Division is under-staffed in consideration of the anticipated addition of new personnel and the need to meet existing and future training mandates, which directly impact training workload.

Finally, the Department's Fire Prevention, Emergency Management, and Public Education functions are understaffed, a situation that has been partially addressed by utilizing line (on duty responders) personnel to assist with prevention and education functions. Several opportunities to address inadequate administrative staffing can be addressed through enhanced regional partnerships with the existing cooperative service partners. Additional assessment and recommendations are provided in the report.

*Report Section II: Future System Demand Projections*

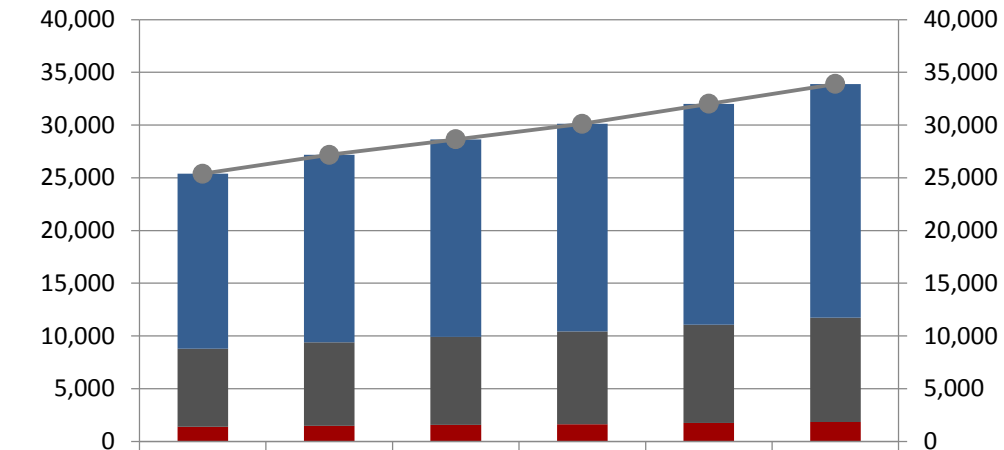
Following the evaluation of current conditions, the report continues to analyze the service delivery demands that can be expected to confront the MFD in the future. Existing demographics are identified and compared to the U.S. Census Bureau as well as local and regional planning resources for development of projected future needs.

In evaluating the deployment of facilities, resources, and staffing, it is imperative that consideration be given to potential changes, such as population growth, that can directly affect emergency workload. Changes in service demand may require changes and adjustments in the deployment of staffing and capital assets in order to maintain acceptable levels of performance. For the purposes of this study, ESCI utilizes data from the US Census Bureau, the California Department of Finance (Demographics Division), the Modesto Urban Area General Plan, and the Stanislaus Council of Governments (Stancog) to project population change within the MFD service area. The results are shown in the following figure:




| | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|---|
| DOF (1.3% AAGR) | 209,186 | 223,966 | 236,119 | 248,272 | 263,802 | 279,331 |
| Modesto GP (2.4%) | 209,186 | 234,288 | 262,403 | 293,891 | 329,158 | 368,657 |

The following figure displays projected service demand (summarized as “Fire,” “EMS,” and “Other” incident categories) through 2040. Fires (includes all types of fires) demonstrate the lowest rate of increase. This reflects a national trend attributed to improvements in building codes and fire prevention over the last several decades. EMS incidents are expected to continue to be the predominant factor affecting service demand in the MFD service area. This projection demonstrates a nearly 34 percent increase in service demand over the next 25 years. Note that using the 2.4 percent annual adjusted growth rate (AAGR) from the 2008 Modesto General Plan results in a projection of possible future service demand of over 33,800 incidents by 2040.




| | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|---|
| EMS | 16,598 | 17,771 | 18,736 | 19,699 | 20,931 | 22,163 |
| Other | 7,403 | 7,926 | 8,356 | 8,786 | 9,335 | 9,885 |
| Fire | 1,381 | 1,478 | 1,559 | 1,639 | 1,741 | 1,844 |
| Total | 25,381 | 27,174 | 28,651 | 30,123 | 32,008 | 33,892 |

*Report Section III: Future Delivery System Models*

The current conditions analysis and system demand projections form the foundation from which ESCI has developed strategies for the delivery of services in Modesto for the future.

This report cites multiple future system model modifications, including both short term and long term initiatives that are identified in the interest of improving and maintaining future system integrity. Each initiative is discussed in detail, and guidance is provided.

The discussion of future delivery systems begins with an explanation of the importance of developing response time standards and targets, viewed by ESCI as a critical step that is needed if MFD is to be able to appropriately plan for the future. Guidance is offered regarding how the agency can assess critical tasking, risk analysis, and staffing performance from which response time performance objectives can be established.

Short and mid-term strategies and models are discussed next. The initiatives identified and explained include:

- Future resource deployment needs
- Fire Prevention and Public Education operations and staffing needs
- Emergency Medical Services system participation/engagement and future considerations, including alternative response units
- Emergency Management program shortcomings and needs
- Administrative and Support program and organizational development needs
- Implementation of a comprehensive cooperative service agreement
- Training Program direction and ability to meet increasing training needs

The report continues by discussing long-term strategies and needs, including:

- Additional ladder truck company at station 5
- Additional Battalion Chief at station 5
- Fire Department accreditation
- Fire Dispatch center Academies of Emergency Dispatch (ACE) accreditation

The strategies needed to meet future service demand do not come without cost. It is understood and recommended that the MFD and City of Modesto view these strategies as longer term and incremental. The implementation of these recommendations should be based upon the identified service delivery need, meeting adopted performance and outcome standards, and the city's ability to provide the necessary capital equipment, revenue and personnel resources.

In the corresponding strategic plan to this report, alternative funding and phased implementation of the identified long-range recommendations are addressed. The strategic plan also contains recommendation tables and tracking tools that provide a consolidated view of the key short, mid- and long-term recommendations. The recommendation tables and tracking tools can serve as a tracking and progress report for the recommendations submitted as part of the Master Plan.

## Evaluation of Current Conditions

Emergency Services Consulting International (ESCI) was engaged by the City of Modesto to provide a long-range plan for the delivery of fire and emergency services within the Modesto Fire Department (MFD) that will assist the department in future efforts and long-range planning. This report serves as the culmination of the project and is configured as an organizational Master Plan that evaluates current conditions; projects future growth, development, and service demands; and provides recommendations to enhance current services or provide an equal level of service over the next 10 to 20 years.

Using organizational, operational, staffing, and geographic information system (GIS) models; this phase of the study provides recommendations for improvement in current services delivered to the community. The evaluation and analysis of data and other information is based on California state laws and regulations, National Fire Protection Association (NFPA) standards, Commission on Fire Accreditation International (CFAI)[1] self-assessment criteria, health and safety requirements, federal and state mandates relative to emergency services, and generally accepted best practices within the emergency services community.

Each section in the following report provides the reader with general information about that element, as well as observations and analyses of any significant issues or conditions that are pertinent. Observations are supported by data provided by the MFD and collected as part of the review and interview process. Finally, specific recommendations are included to address identified issues or to take advantage of opportunities that may exist.

### ORGANIZATIONAL OVERVIEW

The Organizational Overview component provides a review of the organization, discussing the agency's configuration and the services that it provides. Data provided by the MFD, City of Modesto Planning Department, and Stanislaus Regional Communications Center (SR 911) was combined with information collected in the course of ESCI's fieldwork to develop the following overview.

The purpose of this section is two-fold. First, it verifies the accuracy of baseline information along with ESCI's understanding of the agency's composition. This provides the foundation from which the Program and Services Audit and Master Plan is developed.

Secondly, the overview serves as a reference for the reader who may not be fully familiar with the details of the agency's operations. Where appropriate, ESCI includes recommended modifications to current observations based on industry standards and best practices.

The Modesto Fire Department (MFD) provides emergency response services and life safety education programs to the citizens of the City of Modesto. This service is provided to approximately 205,000 people residing in a 37 square-mile area. Emergency response services include: fire suppression, emergency medical services, hazardous materials response, technical rescue, as well as wild land fire suppression.

In 2014, MFD responded to 24,762 calls for service from 11 fire stations located throughout the service area. In addition, MFD responded to 266 calls outside the service area in neighboring jurisdictions for a

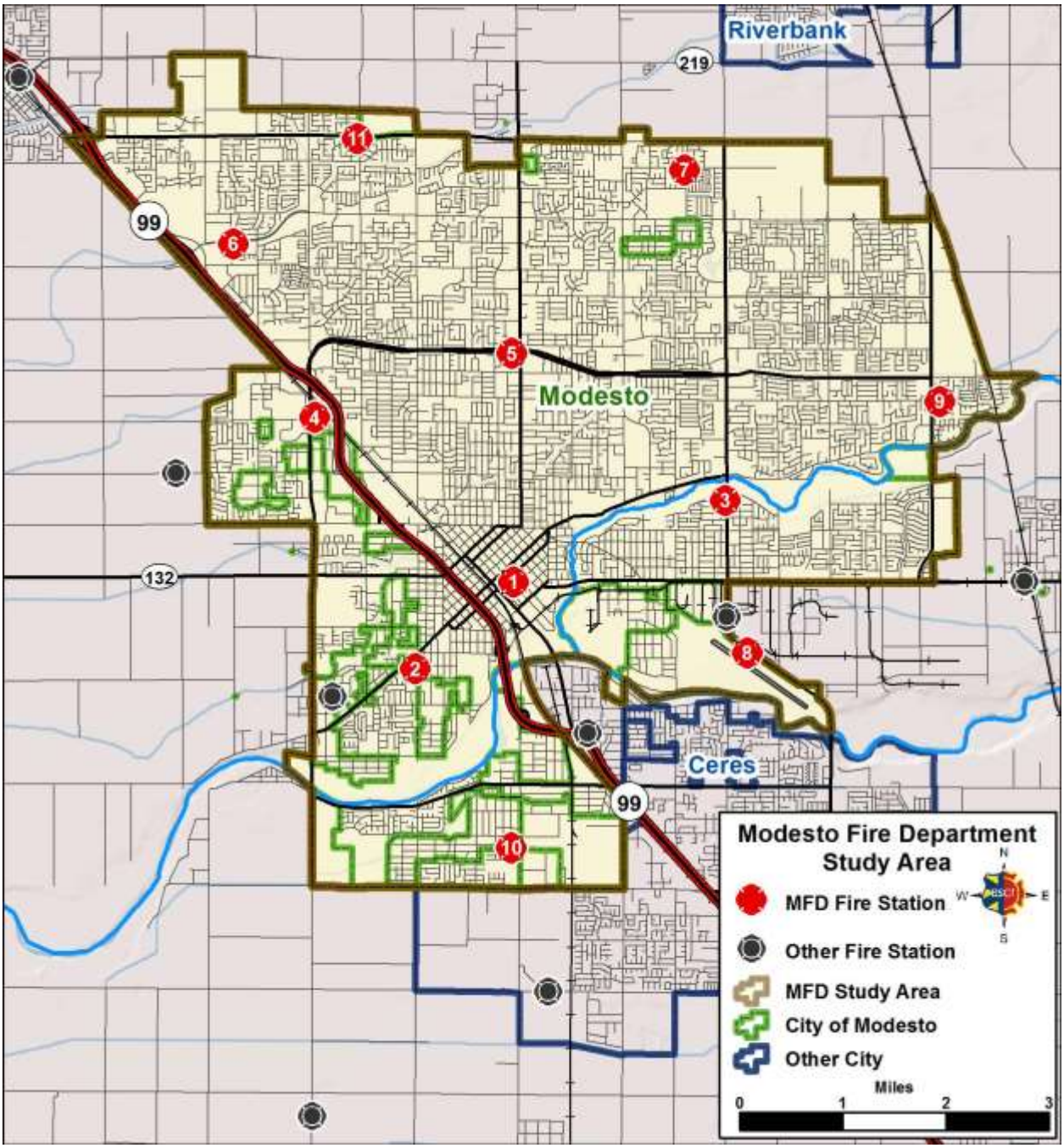
[1] The CFAI organization is now a subsection of the Center for Public Safety Excellence (CPSE) but maintains its prime function of accrediting fire agencies.

total of 25,005 responses. Approximately seventy percent of those calls were medical emergencies. Three MFD fire engine medic vehicles are fully equipped for advanced life support capabilities.

MFD's Prevention Division manages code review and revision; plan review, code enforcement, and fire/arson investigations. In addition, the MFD Prevention Division provides fire and life safety programs for all age groups and special events, such as station tours and open houses. Trained and certified instructors teach fire and life safety in an entertaining, yet meaningful format. Educational programs include: Juvenile Fire-Setter Program, Life Safety Education Presentations, Bike Helmet Safety, and Community Safety Events.

The MFD receives dispatch services from the Stanislaus Regional Communication Center (SR911) as a member of a joint powers authority (JPA) involving several jurisdictions. SR 911 is managed by the Stanislaus County Sheriff's Department and has a JPA governing board with representation from the major stakeholders including the Modesto Fire and Police Departments. The Stanislaus Regional Communications Center is the "first" first responder on fire and medical emergencies. This team provides assistance and information to citizens, both to emergency 911 calls and to routine fire request calls, 24-hours a day. If needed, communications specialists assist with CPR and rescue breathing instructions over the phone until paramedic/fire personnel arrive.

**Figure 1: Service Area Map**



## FOCUS GROUP MEETING

In order to dedicate time, energy, and resources on the functions that are most desired by its customers, the MFD wants to understand the customers' priorities and expectations. Two facilitated citizen forums were utilized to obtain community perspective regarding the MFD. Invitations were sent out from the fire department and City of Modesto to community leaders and established community stakeholder and participation mailing lists.

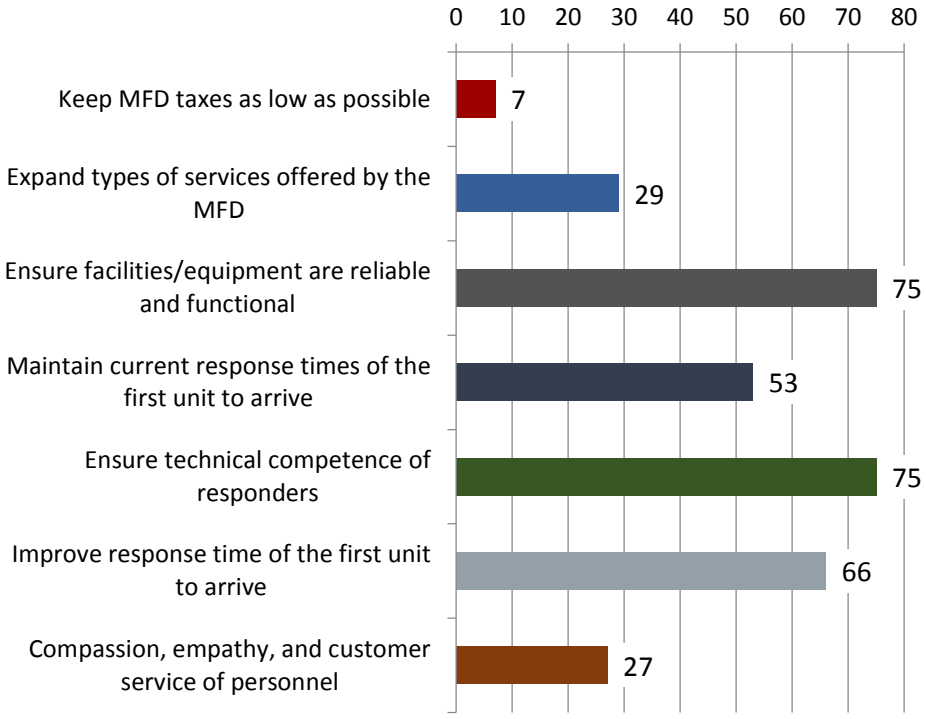
*The beginning is the most important part of the work.*

Feedback was solicited regarding:

- The appropriateness of the current mission, vision, and guiding principles.
- Expectations, concerns, and organizational strengths.
- Current services and planning elements were prioritized.
- Cost, staffing, and response performance were surveyed.

Forum participants were asked to fill out several survey instruments pertaining to how they think the MFD should plan for the future. The planning priorities were presented to the citizens as a forced ranking of seven separate dimensions, allowing the citizens to list those dimensions each citizen felt were more important than the others and so on. These were then compiled as a group to reflect consensus ranking of planning priorities. The following figure describes citizen planning priorities.

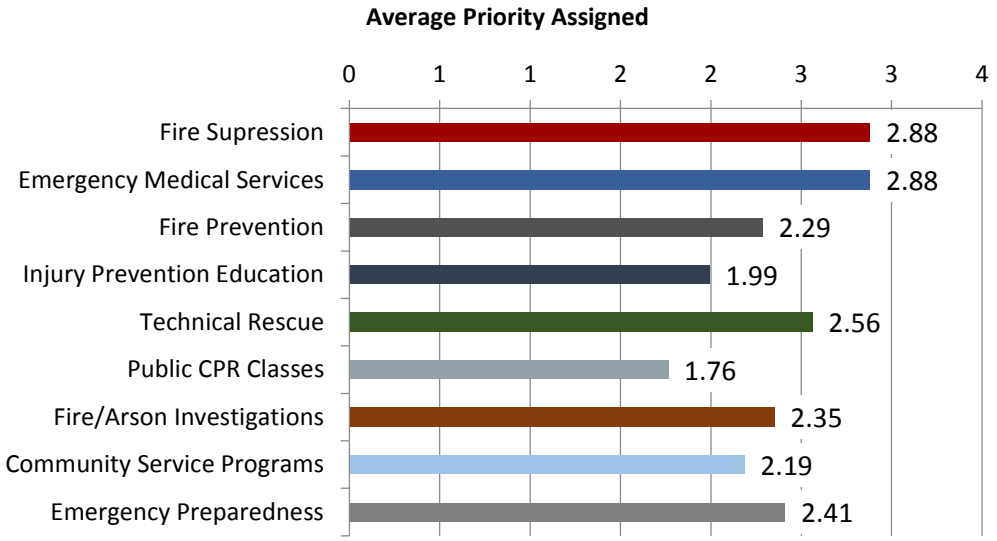
**Figure 2: Citizen Planning Priorities**



Forum participants felt it was most important to center the MFD planning and funding efforts on the technical and professional competence and safety of their fire service providers, ensuring they can adequately provide services their communities. Equal prioritization was given to ensuring that fire department facilities and equipment were maintained, reliable, and functional. The next level of planning priorities was to ensure the MFD provides adequate response times resulting in an adequate and effective response force.

Next, the citizens were asked to identify the most important functions and services the fire department provides based on the list of services that are currently provided, and rank those services as a critical priority, an important priority, or a low priority. In this case, the participants could elect to assign a single priority to multiple services. The following figure describes the forum participants' service priorities:

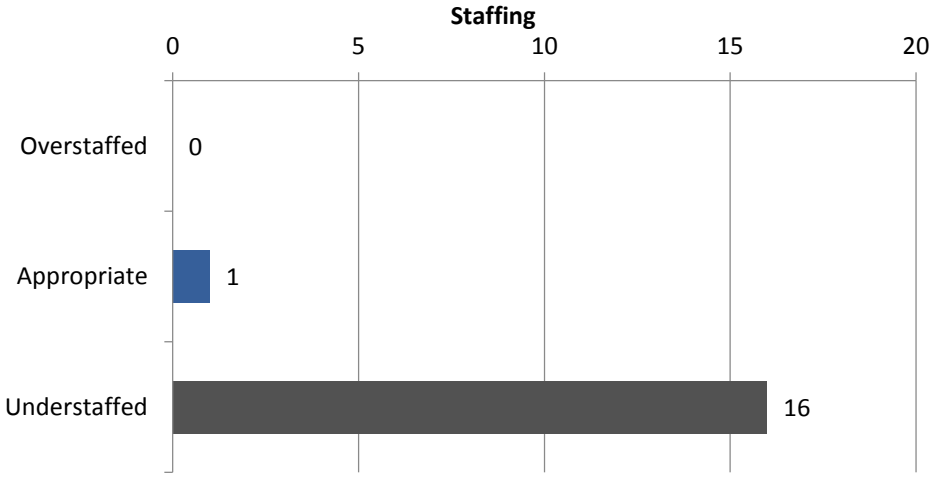
**Figure 3: Citizen Service Priorities**




Forum participants were consistent in their desire to have MFD center their service efforts on their core mission of fire, EMS, and specialized rescue services. The next tiers of service priorities were centered on code enforcement, fire investigation, and community preparedness. Lastly, while everyone enjoyed and felt community education classes were important they were considered optional given limited resources. However, there was consistent and strong support for continued presence and interaction with the communities served.

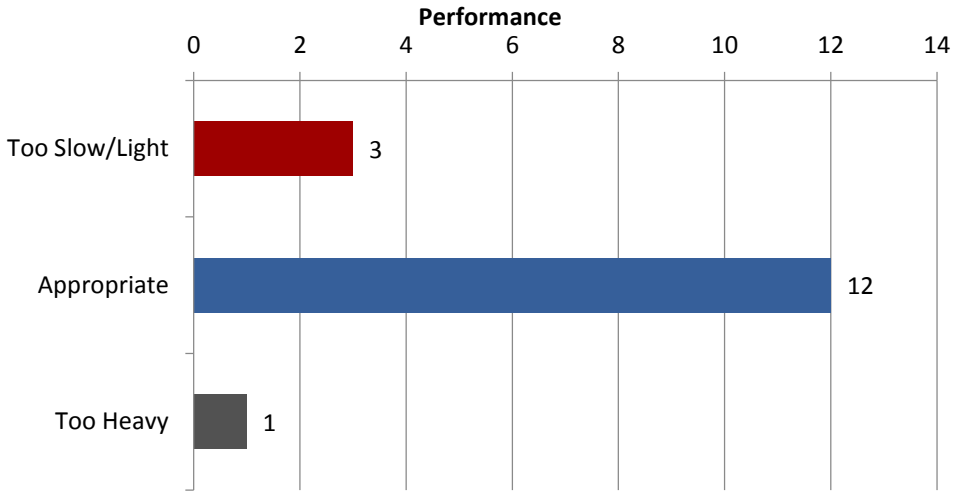
Next, the forum participants were asked to rate and compare the staffing, response performance, and cost of services with their expectations and desired service levels. The following figures describe the results.

**Figure 4: Citizen Ranking of Staffing Levels**



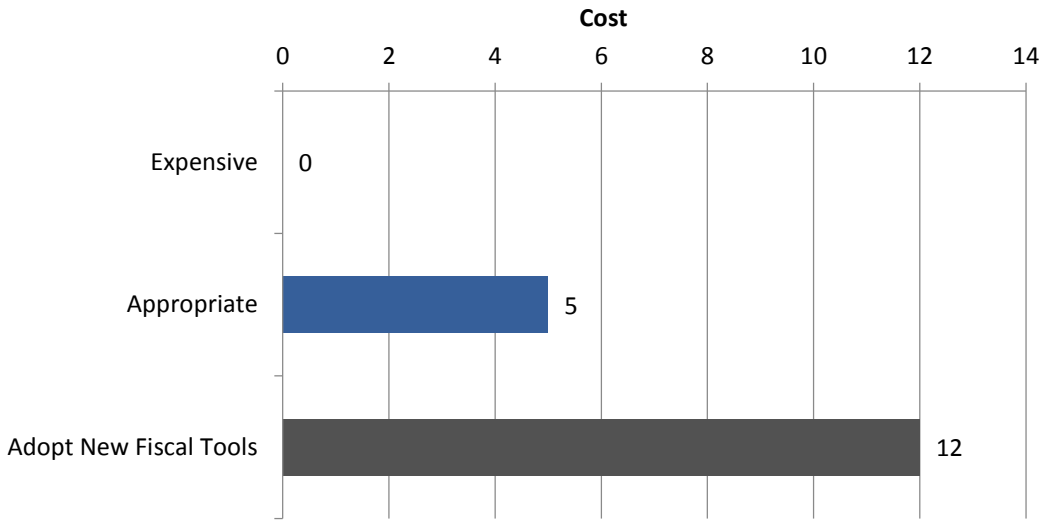

Forum participants clearly identified a need for addittional personnel to meet existing and anticipated future service delivery needs. There was acknowledgement that existing recources have experienced significant reductions and have been redistributed in an effective manner. The community recognized that the service delivery demands exceed current resource capabilities.

**Figure 5: Citizen Ranking of Response Levels**




Participants (by a three to one margin) felt responses by MFD were appropriate. While this seems somewhat inconsistent with the staffing level responses, it is understandable that the participants feel they are adequately protected by the MFD. However, it was consistently mentioned they would like to see MFD distribute and concentrate resources in a manner that will ensure adequate personnel and apparatus within the desired response time targets and take into account the severity, magnitude, and appropriate response level for each call.

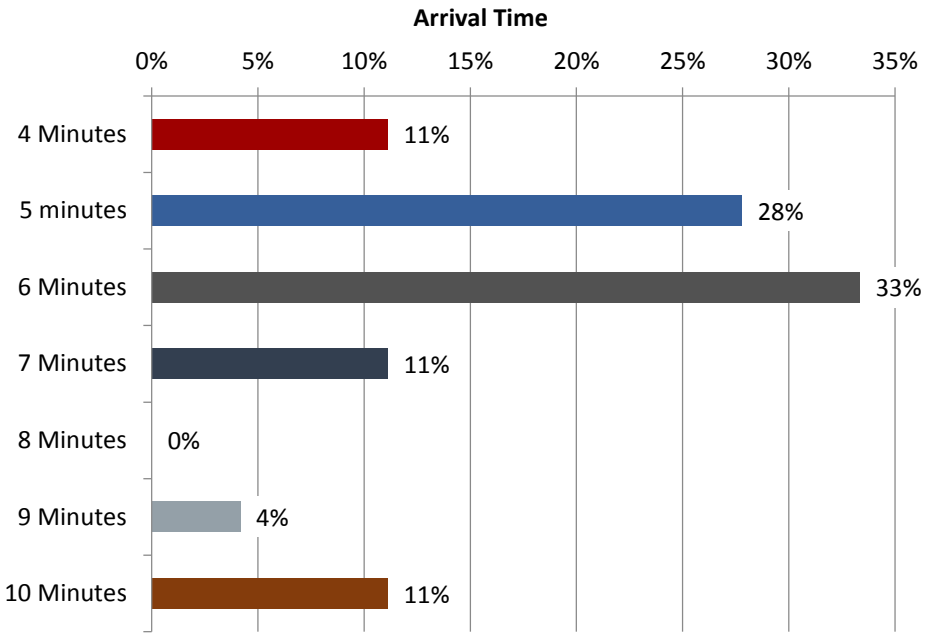
**Figure 6: Citizen Ranking of Cost of Services**




While cost was a significant issue and concern for all in attendance, the overwhelming perspective was that the resources allocated to MFD are managed well and being maximized for efficiency and effectiveness. There was broad support for adopting new fiscal tools such as peak demand staffing, grants, and other efficiency and revenue measures to ensure adequate service levels and capabilities are maintained.

Lastly, forum participants were instructed to share with ESCI their desired response time, given their understanding and observation of response times by MFD. These responses are based on the personal perceptions and biases of the forum attendees and did not take into consideration past performance data or comparison to fire service industry best practices or standards.

**Figure 7: Citizen Ranking of Preferred Response Time**




There was a significant and somewhat equal deviation of what stakeholders viewed as an acceptable response time. Current overall MFD response times are at 6 minutes 34 seconds ninety percent of the time. The five-minute and six-minute response time target received the highest amount of votes at 28 and 33 percent each for a total of 61 percent of the votes, four and seven minutes received the next highest amount of votes at a combined 22 percent. A response time of over seven minutes received a cumulative percentage of 26 percent of the vote.

There was a consistent desire by attendees of the forums for MFD to meet industry and regional best practices. Overall, current response times were thought not to be optimum and that service demands are exceeding the available resources on a regular basis. There was support to decrease current response times to meet industry best practices. In addition, there was a common understanding and desire to have appropriate resources respond to calls based on the urgency of the call and need for personnel and services. There was strong support for a tiered response force with alternative response options based on the type of call and the associated urgency and magnitude of the incident.

### *Customer Strengths*

Customer views on the strengths and image of MFD must inform and impact all effective planning. Needless efforts are often put into over-developing areas that are already successful. However, using and promoting customer-identified strengths may help the organization overcome or offset some of the identified weaknesses. The citizens group identified the following strengths:

- Resource placement
- Focus on EMS
- Leadership and professionalism
- A valued community resource
- Capabilities
- Creativity and innovation
- Strong stakeholder relationships
- Forward thinking organization and leadership

### *Customer Expectations*

Understanding what a community expects of its fire and emergency medical services organization is critical to developing an effective long-range perspective. Armed with this knowledge the MFD internal emphasis can be adjusted to better fulfill customer needs. The citizens group identified the following expectations:

- Be on time when the emergency occurs
- Be thorough and responsive
- Well equipped
- Strong community preparedness
- Operate in a safe manner
- Be well trained and knowledgeable
- Community involvement and engagement

### *Customer Concerns*

The customer centered planning process would be incomplete without expression from the customers of concerns about the organization. Some concerns, in fact, identify weaknesses within the delivery system. However, others may be perceptions based on limited customer knowledge. The citizens group identified the following concerns:

- Lack of response consistency throughout the service area
- Understaffed
- Response times too long
- Not enough resources to meet future needs
- Adequate future funding and fire station closures

### *MFD Mission, Vision, and Values*

In order to effectively establish a planning framework, it is imperative that organizations adopt and utilize a mission statement, vision statements, and values on which they can build policy priorities, goals, objectives, and recommendation for the future. Citizens were asked to comment on the relevance and impact of the MFD existing mission statement and values. In addition, they offered suggestions on key elements that should be included in vision statements for the future. The citizen groups identified the following key elements:

**Previous Mission Statement Perceptions:**

- Too long
- “Hostile fire” is a confusing term
- Needs to speak to the citizen/community protection
- No life safety, prevention, and education reference
- Focus on life and property
- “Mission of,” “effective,” and “efficient” is redundant
- First sentence says it all
- Reference timely and appropriate response
- Make customer service focused
- Statement of responsiveness to community
- Needs to state essential service

**Current Vision Statements to Address:**

- Dependability
- Industry leader/model department
- Adequate and safe facilities
- Fully staffed with fair compensation
- Citizen first community partnership
- Rapid, efficient, and closest appropriate unit response
- Innovation and creativity resulting in alternative service delivery
- Fiscal stewardship
- Build upon industry best practices
- Measurable outcomes
- Transparency
- Benchmarking against similar departments
- Strong marketing
- Achieve and maintain national standards

**Values Important to the Community:**

- Professionalism
- Quality service with a customer service focus
- Fiscal stewardship and business best practices
- Teamwork
- Competence and knowledge
- Strong expertise
- Demonstrate respect and empathy
- Strong cultural competency
- Physically fit
- Responsive
- Integrity and trustworthy (doing the right thing)
- Strong work ethic
- A Strategic organization

### *Governance and Structure*

Regardless of organization type, fire departments, like any other formal organization, are overseen by a governing entity. This entity can take the form of a City Council, County Commission, Board of Directors, or Executive Board. Since the MFD is a municipal fire department that is a standing department within the organizational structure of the City of Modesto, the fire chief reports to the city manager and ultimately answers to the City Council.

**Figure 8: Survey Table – Governance**

| Survey Components | Modesto Fire Department Observations | Comments And Recommendations |
|---|---|---|
| **Governance And Lines Of Authority** | | |
| Governing Body | City Of Modesto | |
| Head Of Governing Body | Mayor | |
| Key Employee Of Governing Body | City Manager And Two Deputy City Managers | |
| Meetings | First Three Tuesdays Of Each Month | |
| Elected Official Authority Defined | Defined By City Charter | |
| Fire Chief Position | | |
| Hired By Contract | Yes | |
| Term Of Contract | Open Ended Term | |
| Periodic Performance Evaluation | Yes | |
| Fire Chief/Authority Defined | Defined In The City Charter | |
| Policy And Administrative Roles Defined | Defined In Charter As Well As City Personnel Administrative Orders (PAOs) | |
| **Attributes Of Successful Organizations** | | |
| Policy, Rules, Guiding Documents | Policy And Procedure Manual, Rules And Regulations Manual | |
| Process For Revision Provided | Revised On An As Needed Basis | Establish A Defined Annual Process For Regular Review And Revision Of Rules, Policies, And Procedures. Include Labor Input. |
| Legal Counsel Maintained | Via City Attorney's Office, Contracted Service | |
| Consultation Available | Available As Needed | |
| Labor Counsel | Same Contract Attorney Advises On Labor Matters | |
| Financial Controls | | |
| Financial Control System | Fire Department Falls Under City Financial Protocols | |
| Financial Review | Outside Audit Performed As A Part Of The City Wide Audit Process | |
| Auditor | Moss Adams | |
| Frequency Of Review | Annual | |
| Governing Body Minutes Maintained | Yes | |
| Availability Of Minutes | Posted And Public Broadcast | |

**Key Recommendations:**

- Establish a defined annual process for regular review and revision of rules, policies, and procedures that includes labor participation.

**Discussion**

The City of Modesto governance configuration is typical of California cities, operating under the direction of a City Council and mayor. Within the organization itself, the department is structured in a typical top-down hierarchy and is separated into clear operating divisions consisting of administration (overseen by the fire chief), operations overseen by a Division Chief, prevention (overseen by a fire marshal), training (overseen by a captain), and EMS (overseen by an EMS officer). Each division has additional support positions as identified in the figure that follows.

### *Organizational Design*

The organizational design of an emergency services agency is vitally important to the agency's ability to deliver service in an efficient and timely manner while providing the necessary level of safety and security to the members of the organization. During an emergency, an individual's ability to supervise multiple personnel is diminished; thus, industry standards recommend a span of control of four-to-six personnel under stressed situations. This recommendation is derived from military history and has shown to be effective in emergency service situations.

**Figure 9: Survey Table – Organizational Design**

| Survey Components | Modesto Fire Department Observations | Comments And Recommendations |
|---|---|---|
| **Organizational Structure** | | |
| Structure Type | Traditional Top-Down Hierarchy | |
| Descriptions Of All Jobs Maintained | Yes | |
| Job Descriptions Updated | As Needed Only | Scheduled Job Description Review And Update Is Needed. |
| Employment Agreements | IAFF Local 1289 Contract Inspectors: Modesto Police Non-Sworn Association (MPNSA) Non-Sworn: Modesto Confidential Management Association (MCMA) Clerical Staff (Non-Confidential): Modesto City Employees Association (MCEA) | |
| **Chain Of Command** | | |
| Defined Chain Of Command | Yes | |
| Span Of Control | Five Direct Reports To Fire Chief. One Battalion Chief (BC) To 12 Companies. | BC Span Of Control Excessive 16:1 With 4 Relief Engineers That Also Report Directly To BC. Need To Establish Second Battalion To Establish A Manageable Span Of Control. |
| Hiring/Firing Authority | Fire Chief Recommends To City Manager | |
| **Formation And History** | | |
| Organization Formed | 1875 | |
| History Maintained | Yes | |
| Individual Or Group Responsible | Retired Battalion Chief | |

**Key Recommendations:**

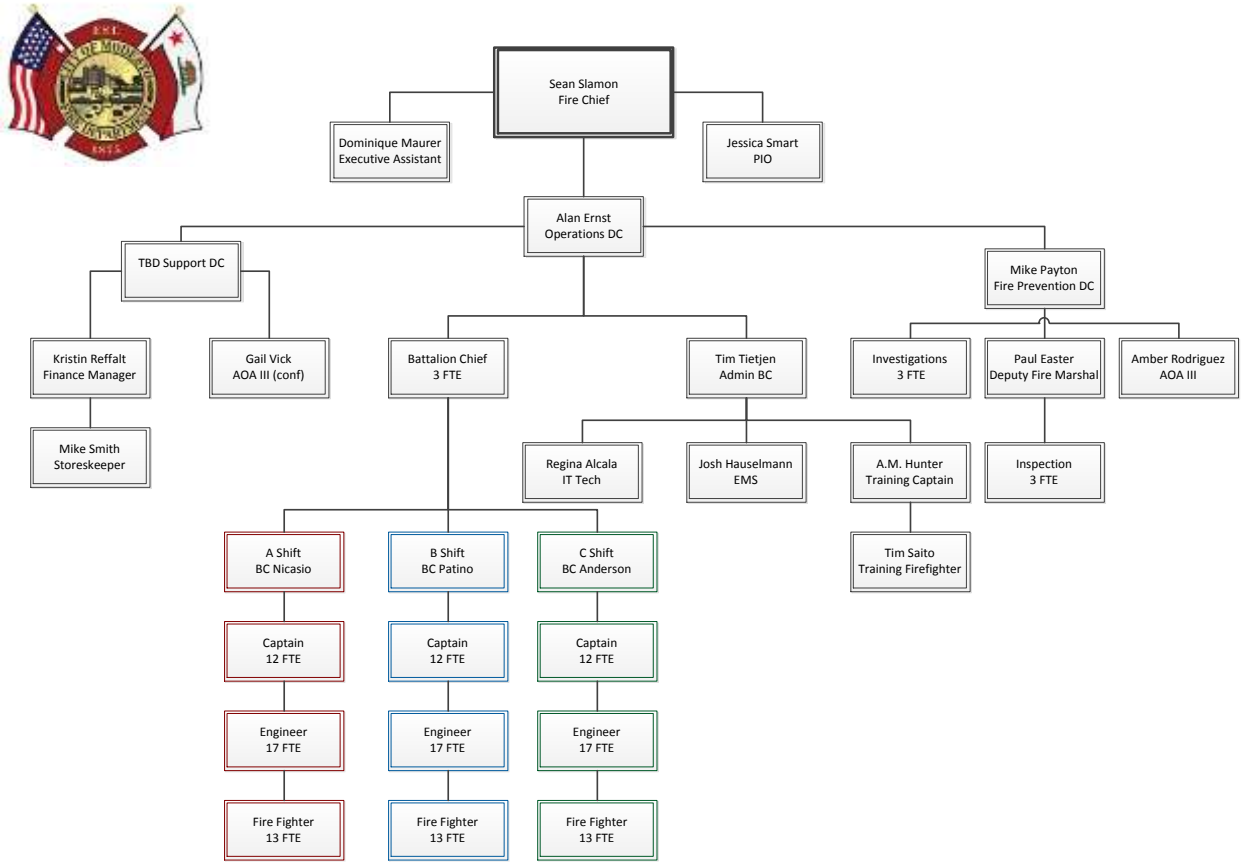
- Establish an additional battalion 24/7 to reduce the existing span of control and ensure adequate oversight, supervision, and safer fire ground operations.

### *Organizational Chart*

To operate effectively, the structure of a fire department needs to be clearly defined in the form of an organizational chart.

The chart institutionalizes the agency's hierarchy, identifies roles and, most importantly, reporting authority. A well-developed chart helps to assure that communication flows appropriately and limits opportunities to circumvent the reporting structure.

**Figure 10: Organizational Chart**




While the chart above shows an appropriate and traditional organizational structure, it is important to note the span of control for the battalion chief position is well beyond accepted industry standards. In addition, the fire prevention, training, and EMS divisions are functioning at minimal staffing levels and below similar departments and industry standards.

### *Service Area and Infrastructure*

The size and composition of a fire department's service area affects the type and number of personnel, fire stations, and vehicles that are needed to provide services efficiently. Sometimes complex decisions need to be made regarding which deployment strategies should be employed to properly position resources based on land area, geography, risk and similar factors. Following is a summary of the MFD service area and service infrastructure resources.

**Figure 11: Survey Table – Service Area and Infrastructure**

| Survey Components | Modesto Fire Department Observations | Comments And Recommendations |
|---|---|---|
| **General Description Of Agency** | | |
| Agency Type | Municipal Subdivision | |
| Area, Square Miles | 37 | |
| Headquarters | Station 1 | |
| Fire Stations | 11 | |
| Other Facilities | Administration Office And Rented Offices At City Hall. Also Partial Ownership And Use Of Offices At The Regional Fire Training Center. | |
| Population Served | Estimated 205,000 Including Unincorporated Area. | |
| **Service Delivery Infrastructure** | | |
| Emergency Vehicles | | |
| Engines | 9 | |
| Engine, Reserve | 3 | |
| Ladder Truck | 2 + 1 Reserve | |
| Ambulance | 0 | |
| Ambulance, Reserve | 0 | |
| Quick Response Unit | 0 | |
| Water Tender | 0 | |
| Brush | 3 | |
| Rescue | 1 Heavy Rescue | |
| ARFF | 1 + 1 Reserve | |
| Haz Mat | 1 Level A Team | |
| ISO Rating | 2 | |
| Total Fire Department Personnel, Uniformed And Civilian | 150 Allocated Positions | |
| Administrative And Support Personnel, Full-Time | 10 | |
| Administrative And Support Personnel, Volunteer | 1 | |
| Operational Personnel, Full-Time | 140 | |
| Operational Personnel, Volunteer | 12 Explorers | |

**Key Recommendations:**

- Implement alternative delivery models that realize efficiencies and increase unit reliability and effective response force capabilities without reducing existing ISO rating.

**Discussion**

The MFD has been able to deploy people and apparatus in 11 strategically located fire stations, balancing the needs of providing effective coverage to both city and cooperative service automatic aid areas. However, the department is challenged to meet current and future service demand needs in the light of static staffing and apparatus levels for the past five years with a significant increase in annual service demand and a very significant 35 percent increase of fire incidents during the same period.

Based on an estimated 3-4 percent annual increase in service demand, additional and/or relocated fire apparatus, and alternative service delivery models will need to be considered and implemented. These types of efficiencies and innovations will be vital to address increased service demand with limited revenue and personnel resources. The ongoing test will be making the most prudent decisions based on multiple considerations including risk exposure, response times and deployment, community expectations, and fire department capacity. Those decisions are difficult given financial considerations that must be taken into account.

ESCI understands the complexity that is confronting the City of Modesto in terms of growth management, future risk exposure, fire department workload, and financial considerations. With those factors in mind, a detailed assessment of current service delivery and effectiveness is provided in the Service Delivery and Performance section of this report.

### *Budget and Finance*

No fire or EMS agency can survive without adequate funding. Funding, which typically comes in a variety of means (i.e. property taxes, fundraisers, donations, etc.) form the basis from which the entity is able to provide a high level of service to the community.

In the current economic state, communities in California and throughout the rest of the nation are seeking means to reduce expenses while keeping high levels of service at the forefront of their operations. Alongside this, many have asked the community for increases in funding to adequately supply expected levels of service.

Displayed below is a summary of Modesto's current conditions, revenue and expense trends, per capita costs, and projected future costs based on inflationary factors/assumptions.

#### *Current Conditions*

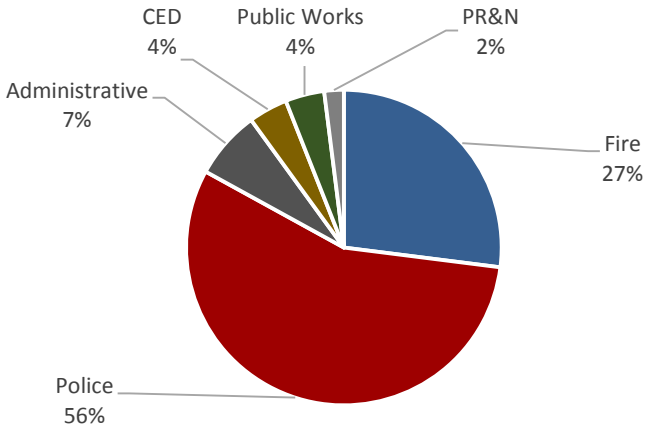
**Figure 12: Survey Table – Operating Budget and Financial Resources**

| Survey Components | MFD |
|---|---|
| Designated Fiscal Year | July To June |
| Assessed Property Value, FY 2014 - 15 | $3.3 B |
| Revised Current Year General Operating Fund Budget, Fire Department | $25.3 M |
| General Fund Property Tax, City Levy – Current Budget Year | $33.8 M |
| Levy Rate | 1.001% |
| General Fund Levy Collection Rate – Prior Year | 1.001% |
| Bonds, Fire Department | None |
| Levy Rate | N/A |
| Other Tax Levy, Public Safety | None |
| Levy Rate | N/A |

### *Revenues and Expenses*

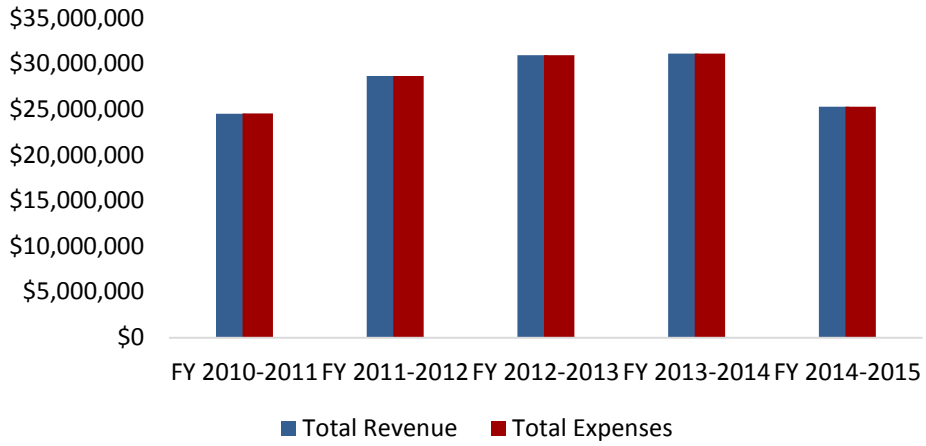
ESCI reviewed baseline financial information provided by the City and fire department to identify the structure of MFD's funding support. Based on FY 14/15 Proposed, all public safety services (police and fire) account for approximately 83 percent of the total City of Modesto general fund revenues. Included in the following figure are the police, fire, administration, CED, public works, and PR&N. Within this subdivision, the fire department comprises 27 percent of the public safety total. This is illustrated in the following figure.

**Figure 13: City of Modesto Net of Cost Allocations and Department Revenues, FY 2015-16 Proposed**




As illustrated in the following figure, the department has seen an increase in annual budget over the last four years at an average of two percent. It is very important to note, fiscal years 2011-12 through 2013-14 Modesto fire and emergency services were a part of a joint powers agreement between the City of Modesto, County of Stanislaus, and District of Salida – known as Modesto Regional Fire Authority. Therefore, budgetary figures are slightly misrepresentative of a standalone agency as a result of having a blended budget of three entities. Based on our interviews with fire executives, City of Modesto Fire made up approximately 85 percent of each year's budget during the time under the MRFA. Additionally, fiscal years 2011-12 through 2013-14 Less than Countywide revenues were part of the County contribution amount.

**Figure 14: Revenues and Expense Trends, 2010-2014**




As with many city fire departments, general fund revenue (typically in the form of a property tax) comprises a vast majority of the operating revenue. General fund revenues have remained fairly consistent with a slight decline since fiscal year (FY) 2010-11 of less than one percent over the past five fiscal years. As shown in the following figure, FY 2014-15 general fund contributions make up 89 percent of the total revenues.

**Figure 15: Revenues Trends, 2010-2014**

| Revenue Source | FY 2010-11 | FY 2011-12 | FY 2012-13 | FY 2013-14 | FY 2014-15 |
|---|---|---|---|---|---|
| City of Modesto General Fund | $23,172,559 | $23,388,508 | $24,458,566 | $24,590,642 | $22,617,884 |
| Salida/County Contribution | $0 | $4,537,826 | $5,279,527 | $4,848,827 | $1,230,000 |
| Reimbursed Expenses | $0 | $10,000 | $353,575 | $0 | $325,000 |
| Other Income | $1,371,906 | $719,444 | $859,867 | $1,682,824 | $788,810 |
| LTCW Funding | $0 | $0 | $0 | $0 | $331,058 |
| ***Total Revenue*** | ***$24,544,465*** | ***$28,655,778*** | ***$30,951,535*** | ***$31,122,293*** | ***$25,292,752*** |

Expenses have increased by three percent from FY 2010-11 through FY 2014-15. Personnel costs make up 87 percent of the total operating expenses (which is typical for most emergency services organizations, personnel and benefits costs comprise a vast majority of the department's overall budget).

IT support, insurance, and legal are not included within the department's budget above. The City of Modesto charges for these services two years in arrears through inter-department services charges. Consequently, MFD will begin to see inter-department charges for these functional services in FY 2016-2017. Lastly, there is a line item in the budget for apparatus maintenance; however, beginning in FY 2016-2017, it will also be handled through inter-department charges.

In addition to expenses discussed above, MFD completed a capital lease in 2014-15 and retained full ownership of the equipment, extinguishing an outstanding debt of $77,611.89. However, they have acquired two new engines during the current fiscal year that are expected to be delivered next fiscal

year payable over next three fiscal years (2015-16 through 2017-18) in the amount of $367,077.61 per year. The termination value is $1.

There are no capital improvement plans that have been adopted and funded.

**Figure 16: Expense Trends, 2010-2014**

| Expenditure Source | FY 2010-11 | FY 2011-12* | FY 2012-13* | FY 2013-14* | FY 2014-15 |
|---|---|---|---|---|---|
| Salaries and Benefits | $21,366,983 | $24,038,374 | $24,175,975 | $25,630,840 | $22,053,828 |
| Supplies & Services | $1,370,322 | $2,153,450 | $2,190,055 | $2,389,353 | $1,420,655 |
| Fleet Maintenance/Fuel | $261,754 | $153,454 | $579,339 | $723,304 | $602,000 |
| Capital Lease Expense | $77,612 | $77,612 | $77,612 | $77,612 | $77,611 |
| 911 Dispatch Services | $795,000 | $1,174,350 | $1,188,577 | $1,272,650 | $850,000 |
| City Services | $682,794 | $1,058,538 | $656,211 | $270,845 | $288,658 |
| Salida/County Services | $0 | $0 | $140,186 | $24,689 | $0 |
| Fixed Assets | $0 | $0 | $1,943,580 | $733,000 | $0 |
| ***Total Expenses*** | ***$24,554,465*** | ***$28,655,778*** | ***$30,951,535*** | ***$31,122,293*** | ***$25,292,752*** |

* In Fiscal Years 2011-12 through 2013-14 MFD was part of a joint powers agreement between the City of Modesto, County of Stanislaus, and District of Salida – known as Modesto Regional Fire Authority.

### *Cost per Capita*

The cost of delivering high quality services to citizens varies on a variety of factors such as seasonal conditions, deployment schedules, and service level demands. There is little evidence supporting a "standard" in terms of how much a community should pay. However, many public officials have expressed an interest in per capita cost relative to peer groups and national averages.

The cost per capital comparison is based on government data relative to all fire department types in California and the rest of the United States, and should be viewed only as a broadly generalized point of reference. The actual cost of service delivery results from a local community decision that identifies the level of emergency response that is desired and the risk present within each community. MFD has unique challenges geographically and internally that drive the need for distinctive resource deployment, along with a community desire and expectation for a high level of services. The following figure is a quick comparison of the cost per capita for Modesto, a California peer group, and the United States.

**Figure 17: Comparison of Cost per Capita (Summary) – FY 14/15**

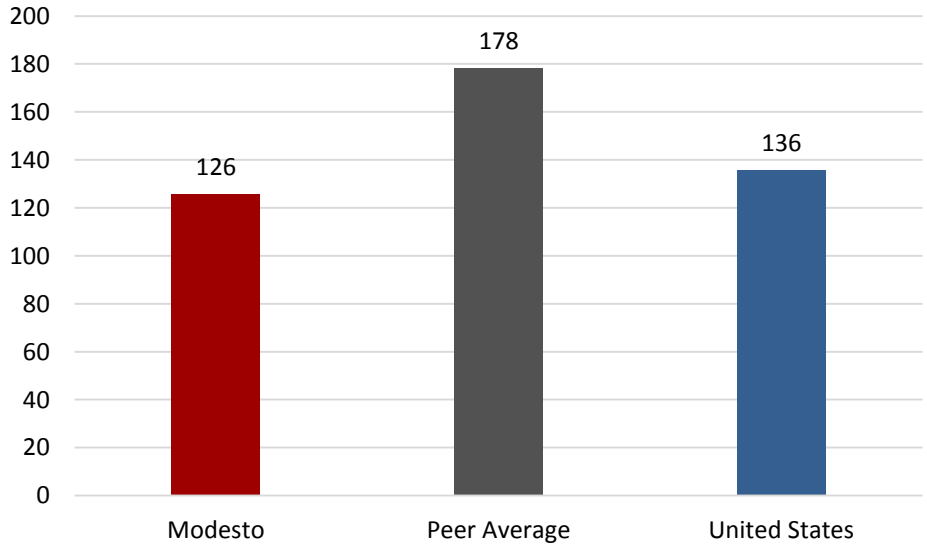



**Figure 18: Comparison of Cost per Capita (Detailed) – FY 14/15**

| Entity | Population | Coverage (Sq. Mi.) | Pop per Sq. Mi. | Per Capita Cost | Per Capita Peer Rank |
|---|---|---|---|---|---|
| Fremont | 214,082 | 87 | 2,452 | $174 | 5 |
| Glendale | 191,914 | 31 | 6,257 | $293 | 9 |
| Huntington Beach | 191,057 | 49 | 3,866 | $233 | 7 |
| Ontario | 164,066 | 50 | 3,281 | $239 | 8 |
| Escondido FD | 155,016 | 48 | 3,213 | $141 | 4 |
| Chula Vista | 244,171 | 54 | 4,561 | $100 | 1 |
| Santa Rosa | 176,445 | 45 | 3,934 | $189 | 6 |
| Modesto | 201,051 | 37 | 5,462 | $126 | 3 |
| Oxnard | 197,684 | 52 | 3,833 | $110 | 2 |
| **Peer Group Average** | **192,832** | **50** | **4,095** | **$178** | - |
| **United States** | **320,970,000** | **3,805,943** | **84** | **$136** | - |

The preceding figures indicate that MFD costs per capita are below the California peer group average and below the national average. It is noted that the total used includes the department's annual operating budget for FY 2014-15 utilizing the most current population data. Among the peer group, Modesto ranks as the third lowest funding level in terms of per capita costs.

### *Revenues and Expenses Projections*

As part of this study, ESCI developed baseline projections utilizing trend data and industry standards. The forecasts shown below are not predictions of future policy direction nor are they recommendations as to what revenues and expense levels should be. The projections purely reflect a series of assumptions based on historical behavior, inflationary factors, and industry experience. The following tables include key assumptions utilized in the forecast.

**Figure 19: Baseline Revenue Forecast – FY 15/16 - 19/20**

| | | Forecast | | | | |
|---|---|---|---|---|---|---|
| **Revenue Source** | **FY 2014-2015** | **FY 2015-16** | **FY 2016-17** | **FY 2017-18** | **FY 2018-19** | **FY 2019-20** |
| City of Modesto General Fund | $22,617,884 | $26,841,733 | $27,915,402 | $29,032,018 | $30,193,299 | $31,401,031 |
| Salida/County Contribution | $1,230,000 | $0 | $0 | $0 | $0 | $0 |
| Other Revenue | $1,113,810 | $1,142,713 | $1,394,865 | $1,668,368 | $1,964,659 | $2,285,262 |
| ***Total Revenue*** | ***$24,961,694*** | ***$27,984,446*** | ***$29,310,267*** | ***$30,700,386*** | ***$32,157,958*** | ***$33,686,293*** |

General fund revenues could potentially increase over the next five fiscal years at an average of three percent year over year. As shown in the figure below, FY 2019-20 general fund contributions make up 92 percent of the total revenues.

**Figure 20: Baseline Expense Forecast – FY 15/16 - 19/20**

| | | Forecast | | | | |
|---|---|---|---|---|---|---|
| **Expenditure Source** | **FY 2014-2015** | **FY 2015-16** | **FY 2016-17** | **FY 2017-18** | **FY 2018-19** | **FY 2019-20** |
| Salary and Benefits | $22,053,828 | $24,522,590 | $25,748,720 | $27,036,155 | $28,387,963 | $29,807,361 |
| Service and Supplies | $2,950,266 | $3,323,077 | $3,422,769 | $3,525,452 | $3,631,216 | $3,740,152 |
| ISF/Inter-Fund Charges | $288,658 | $138,779 | $138,779 | $138,779 | $138,779 | $138,779 |
| ***Total Expenses*** | ***$25,292,752*** | ***$27,984,446*** | ***$29,310,268*** | ***$30,700,387*** | ***$32,157,958*** | ***$33,686,293*** |

Expenses potentially increase from FY 2015-16 through FY 2019-20 by three percent each year. Personnel and material (combined) costs make up 93 percent of the total operating expenses. Two new engines in the amount of $367,077.61 per year are included in the assumptions as well.

### *Emergency Response Type and Frequency*

In 2014, the MFD responded to 24,762 requests for assistance from the citizens of the city and joint response areas in the 2013 reporting year. As is typically found, the vast majority of incidents are of an emergency medical nature. The department's emergency calls for 2014 are listed in the following figure.

**Figure 21: Survey Table – Emergency Response Type and Frequency**

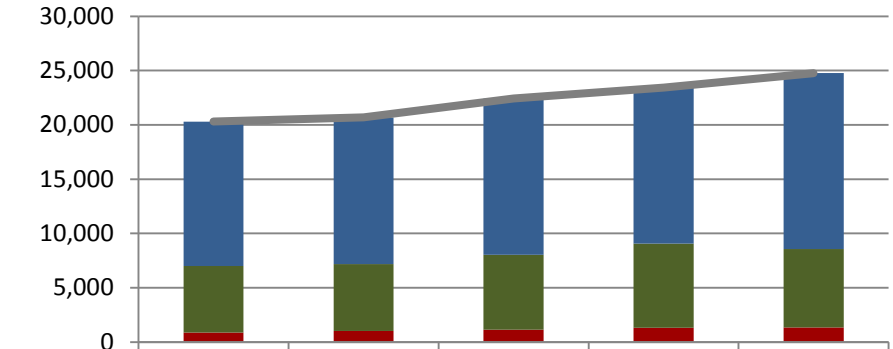
| Survey Components | Modesto Fire Department Observations | Comments And Recommendations |
|---|---|---|
| **Incidents** | | |
| Fire | 1,367 | |
| Value Of Property Exposed To Fire, Last Full Calendar Year | $25,384,882 | |
| Value Of Property Lost To Fire, Last Full Calendar Year | $9,276,295 | |
| Rupture Or Explosion | 4 | |
| EMS/Rescue | 16,193 | |
| Number Of EMS Transports | Na | |
| Hazardous Condition | 379 | |
| Service Call | 1,643 | |
| Good Intent Call | 4,240 | |
| False Call | 908 | |
| Severe Weather | 4 | |
| Other | 24 | |
| Total | 24,762 | |

**Discussion**

65.4 percent of MFD's 2014 incidents involved response to medical emergencies. The percentage is similar to, though slightly lower than, what is generally found in most fire departments. 1,347 incidents were reported as fires in the reporting year, which is significantly higher than is typically found in similar sized agencies. Additional detail on emergency response, service delivery effectiveness, and response performance is provided in the Service Delivery and Performance section of this report.

ESCI compared the number and type of incidents the MFD responded to over a five-year period. The following figure displays the call volume, type numbers, and trend line for 2009 through 2013. A total increase of 15.7 percent in service demand is significant given the average 3.1 percent increase in service demand annually.

**Figure 22: MFD Service Demand, 2010 through 2014**




| | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| EMS | 13,306 | 13,495 | 14,369 | 14,354 | 16,193 |
| Other | 6,105 | 6,159 | 6,894 | 7,757 | 7,222 |
| Fire | 894 | 1,024 | 1,156 | 1,313 | 1,347 |
| Total | 20,305 | 20,678 | 22,419 | 23,424 | 24,762 |

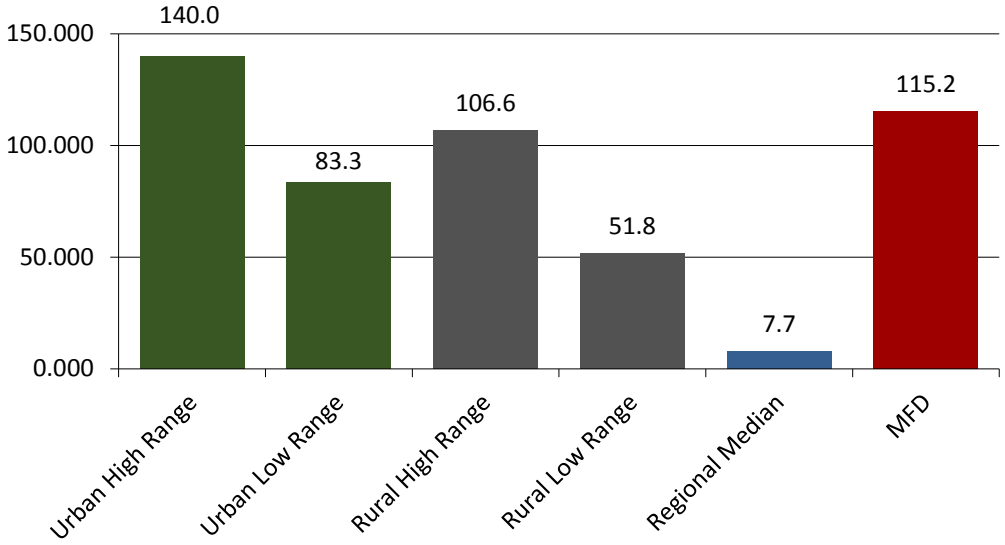
The following figure shows a 50 percent increase in the number of fire calls over the past five years. This is significant as similar jurisdictions have seen reductions in fire calls that are showing a consistent trend throughout the fire service as a result of enhanced fire prevention services, increased fire safe construction and adopted fire code standards. This fire call increase is further impacted by double-digit increase of 21.7 percent for EMS calls. Additionally, other service demand resulted in an 18.3 percent increase in calls for service. “Other” calls are representative of those not falling into the fire or EMS categories and include calls such as citizen assists, alarm sounding, and other calls for assistance.

**Figure 23: Total Percent Change – 2010-2014**

| Incident Category | Percent Change |
|---|---|
| Fire | 50.7% |
| Other | 18.3% |
| EMS | 21.7% |
| **Total Demand** | **15.7%** |

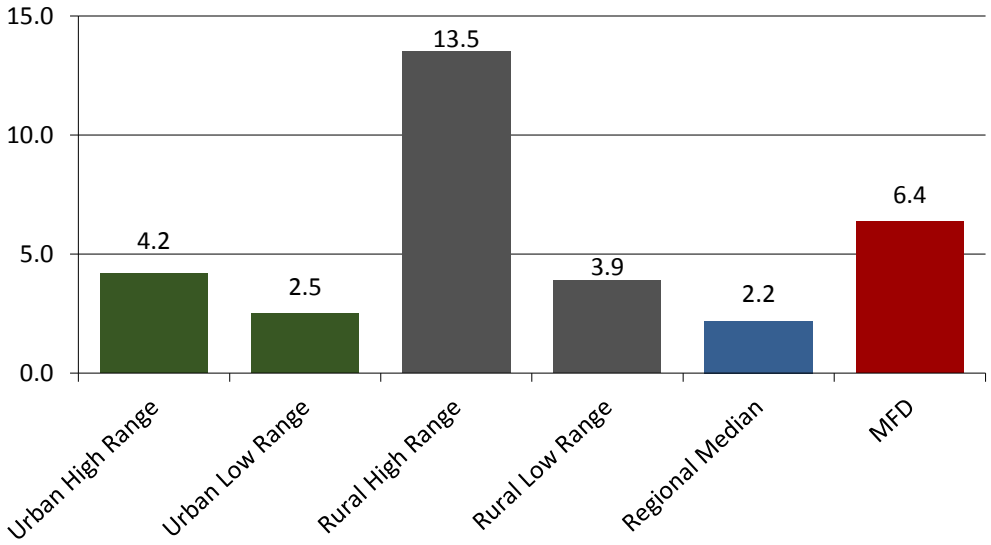
In total emergency incidents, MFD falls at the high end of the incidents per 1,000 population. This indicates a robust unit hour utilization of resources and shows the MFD is utilizing their emergency response resources at a level that is over 90 percent higher than the regional median.

**Figure 24: Total Incidents per 1,000 Population**



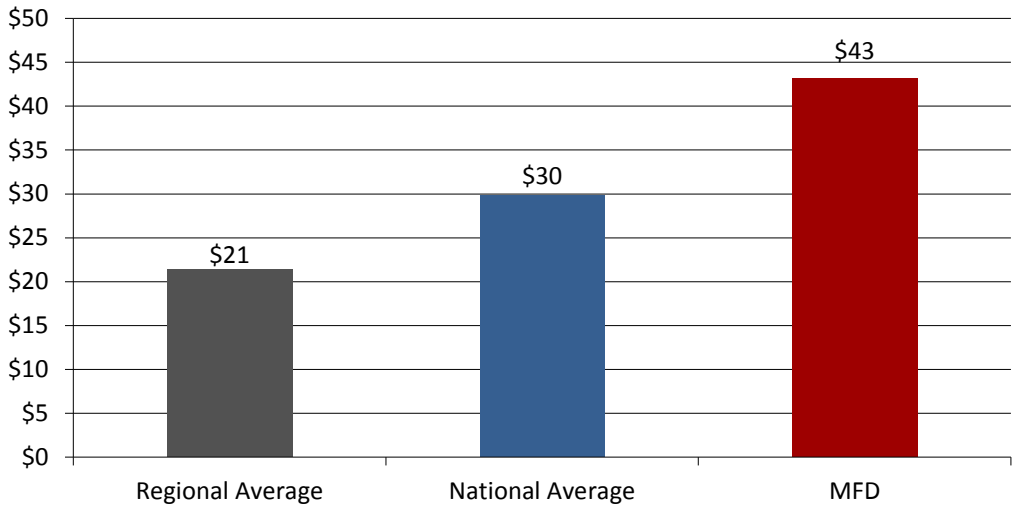

The occurrence of fires per 1,000 population is above the urban high range category and well above the regional median. A significant increase over the regional median is likely a result of a combination of unique, growth, housing vacancy patterns, construction, occupancy types, and fire incidents that are not being seen by other similar sized communities within the region. The high number of rural fire incidents per thousand is not relevant as they respond to much fewer calls and have very low population.

**Figure 25: Total Fires per 1,000 Population**



The following figure is based on 2013 and 2014 data, indicating that MFD fire losses are significantly above the national and double the regional averages. Since the number of fires per capita is over 60 percent higher than the regional average combined with over twice the fire loss per capita, the higher dollar loss in indicative of high fire loss incidents over the past two years. The benchmarking elements are consistently pointing to the City of Modesto having a significant fire problem that significantly exceeds similar regional and state agencies.

**Figure 26: Fire Loss per Capita**



## Insurance Services Organization (ISO) Community Fire Service Performance Review

In addition to the previous statistical and national benchmarking criteria, ESCI has partnered with ISO for the purpose of providing a more in-depth benchmarking and comparison process. This performance review is focused on a hand-selected peer group that most accurately reflects the key elements of fire protection and response within the City of Modesto.

While it is impossible to create perfect comparisons due to the uniqueness of fire departments, the use of ISO's extensive data universe and intelligent segmentation provides highly directional guidance to identify areas of strength and opportunity. Peer groupings were developed leveraging our vast database of over 26,000 fire departments. The peer groupings are defined to enable fair and actionable comparisons. The peer group includes 16 fire jurisdictions that have the most commonalities with City of Modesto Fire Department across the six criteria listed below. The large number of peers will ensure that any statistical outliers will not impact the analysis. State and national comparisons are also included for context.

**Figure 27: Criteria Used for Peer Group Selection**

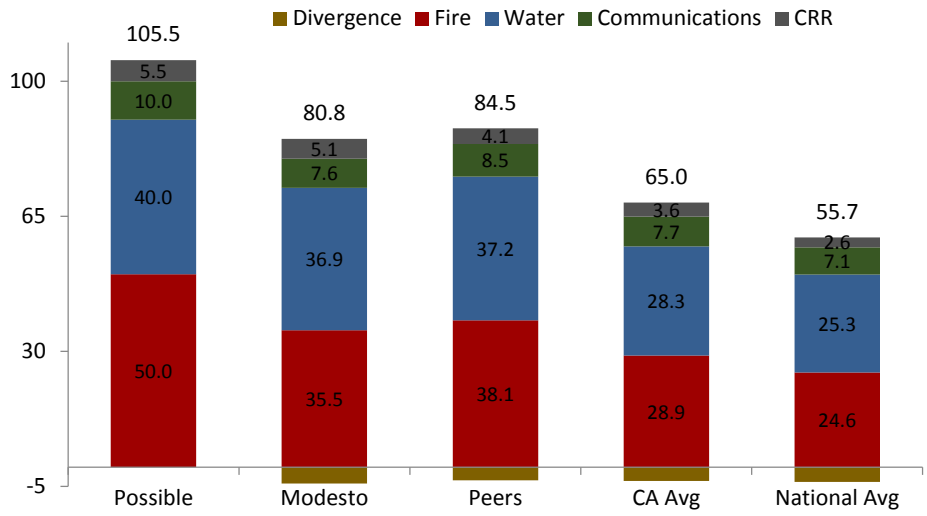
| Criteria | Modesto | Peer Group Range |
|---|---|---|
| Population | 205,000 | 153,000-244,000 |
| Coverage | 37 Square Miles | 31-128 Square Miles |
| Department Structure | 100% On-Duty Firefighters | 100%-100% On-Duty Firefighters |
| Region | CA | CA, AZ, OR, UT, NV |
| % Fire-Related Structure Calls | 1.19% | 0.4%-12% |
| % Buildings Residential | 95% | 83%-98% |

*Calculated using census households vs. ISO Commercial Property "risks." Note: Seven of the 16 peers have been evaluated under the 2012 version of the ISO schedule.

# 1.0 PUBLIC PROTECTION CLASSIFICATION

## *1.1 PPC™ Total Points Scored*

**Figure 28: Distribution of PPC™ Points**




Data source: ISO Fire Department survey.

**Description**

PPC™ is an aggregate measure of a community's fire suppression facilities to suppress structure fires. It does not evaluate other, equally important, services provided by the fire department (i.e. rescue, ambulance, EMT services, etc.). Total points include all elements captured to assign a Public Protection Classification (PCC): fire department (50 points), water supply (40 points), and emergency communications (10 points). A "divergence" adjustment is also applied to account for the limiting effect a lower fire/water score has on the other. Communities that earn more than 90 total points achieve the best class rating of a 1. Note that the sum of PPC™ components displayed in the previous figure may not add up to the total points scored due to the divergence adjustment.

### *1.2 Insurance Money Savings*

**Figure 29: Comparison of Potential Insurance Premium Savings**

| | Business Owners | | Commercial property | | | Homeowners | |
|---|---|---|---|---|---|---|---|
| PPC Class | Building | Contents | Frame, Joisted Masonry, Non-Combustible | Masonry Non-Combustible, Modified Fire Resistive, Fire Resistive | Sprinklered Risks | Frame | Masonry |
| 1 | 27% | 26% | 49% | 43% | 35% | 34% | 29% |
| 2 | 27% | 26% | 47% | 41% | 33% | 33% | 29% |
| 3 | 27% | 26% | 44% | 39% | 32% | 31% | 27% |
| 4 | 23% | 26% | 43% | 38% | 31% | 30% | 25% |
| 10 | 0% | 0% | 0% | 0% | 0% | 0% | 0% |

Data source: ISO insurance data.

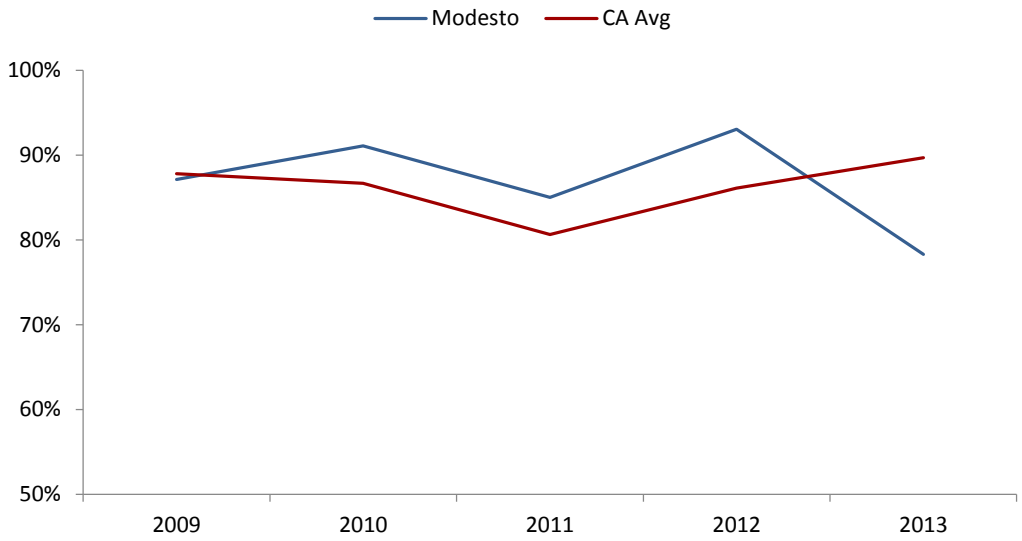
**Description**

Approximately 80 percent of fire insurance premiums take ISO's PPC Class into consideration. PPC class can therefore be used to approximate the money saved on property insurance due to a jurisdiction's level of fire protection. Percent savings is based on the isolated impact that PPC class has on the loss cost (ISO's prospective portion of the premium rate that covers projected claim payments and loss adjusting expenses).

## 2.0 PERFORMANCE

### *2.1 Fire Severity*

**Figure 30: Residential Dollars Saved (%) per Property Value at Risk (2009-2013)**




Data source: ISO insurance claim loss data.

**Description**

Fire severity is defined as the average dollar saved per property value at risk and is an indicator of fire suppression effectiveness.

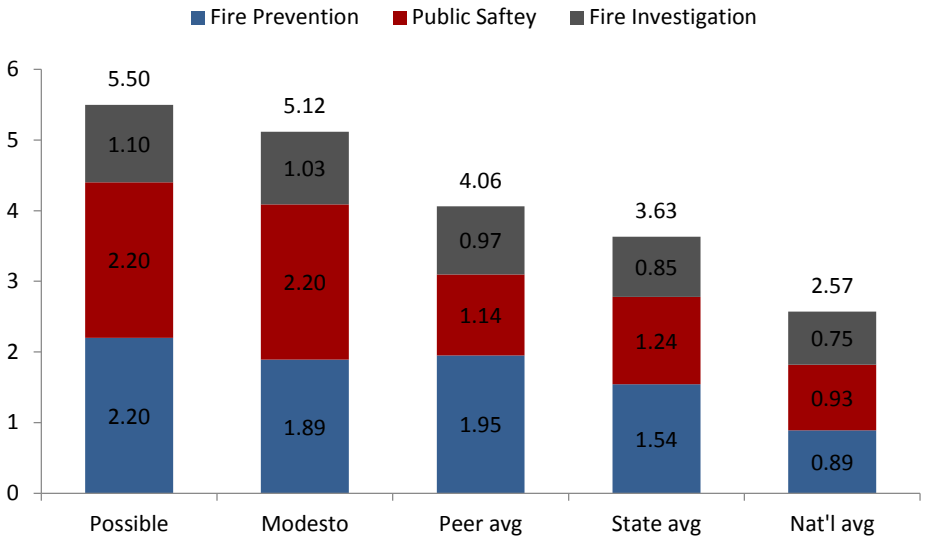
Notes:

- It is estimated that ISO has data on approximately 30 percent of homeowners' premiums and claims in California.
- Modesto property information comes from claims that occurred in zip codes 95350, 95351, 95354, 95355, 95356, 95357, 95358.
- There were between nine and 13 claims reported for each year within the Modesto zip codes.
- Losses attributed to catastrophes are excluded.

## 3.0 PREVENTION

### *3.1 PPC™ Points for Community Risk Reduction*

**Figure 31: PPC™ points for Community Risk Reduction**




Data source: ISO Fire Department survey.

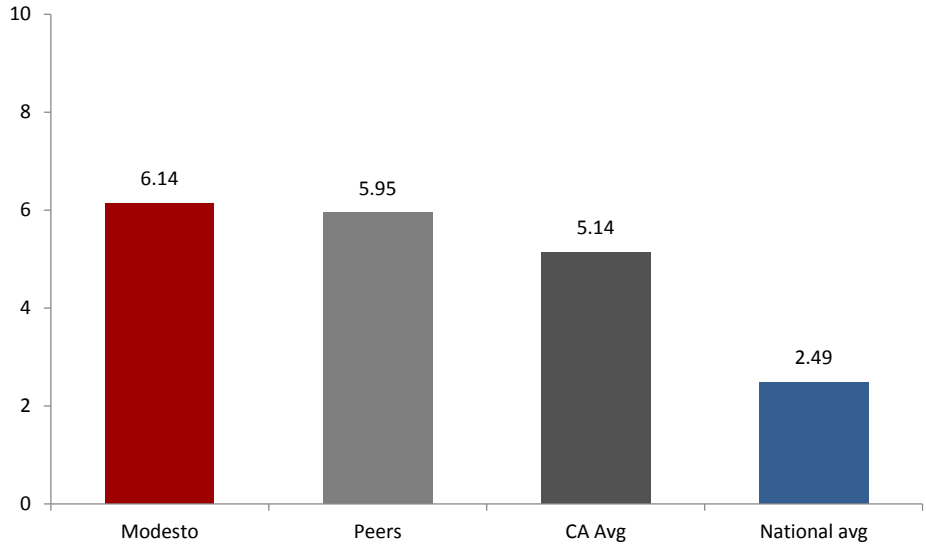
**Description**

This metric measures the community efforts to reduce losses through fire prevention, public fire safety education, and fire investigation. Maximum amount of points available = 5.5.

Note: The Modesto peer average only includes the seven peers that have been graded with the new FSRS schedule.

## *3.2 PPC™ Points for Distribution of Companies*

**Figure 32: PPC™ Points for Distribution of Companies**



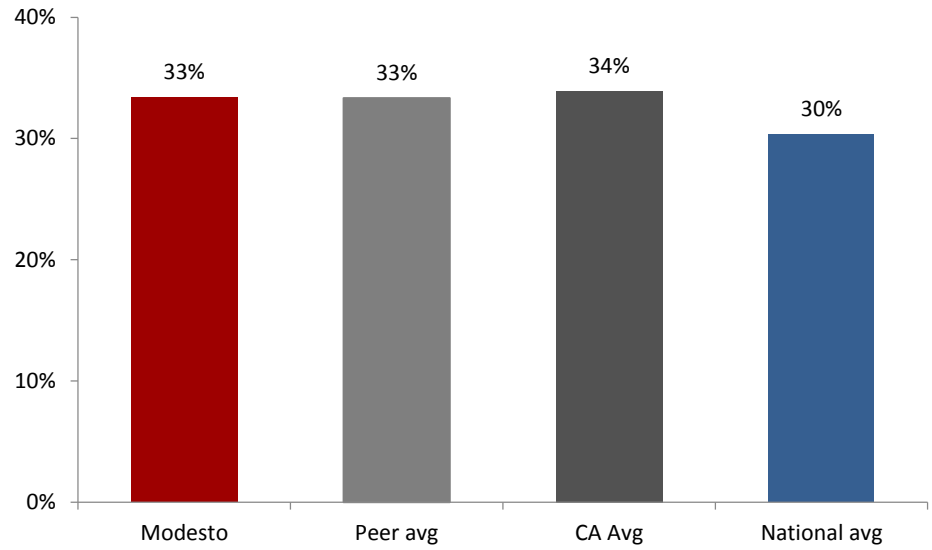

Data source: ISO fire department survey, ISO commercial property survey.

**Description**

This metric measures the number and adequacy of existing engine and ladder-service companies to cover built-upon areas of a jurisdiction. Maximum amount of points available = 10.

## *3.3 Commercial Property Sprinkler Adoption*

**Figure 33: Commercial Property Sprinkler Adoption**




Data source: ISO commercial property survey.

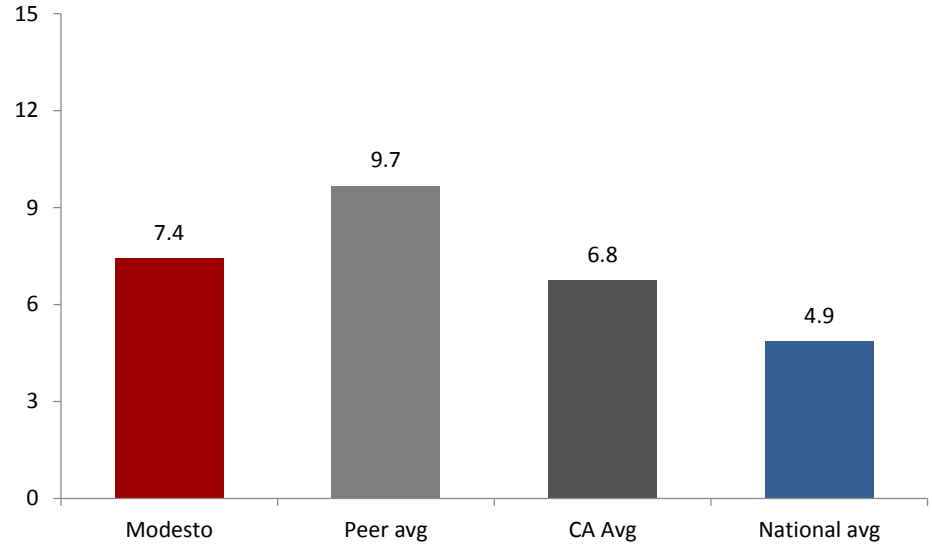
**Description**

Percentage of commercial properties with a partial or full sprinkler system. Numbers are estimated based on a representative sample of surveyed properties collected in ISO's commercial property database. Sprinkler systems are designed to mitigate property damage and allow potential victims to exit a hazardous situation quickly.

# 4.0 PERSONNEL

## *4.1 PPC™ Points FOR Personnel*

**Figure 34: PPC™ Points for Personnel**



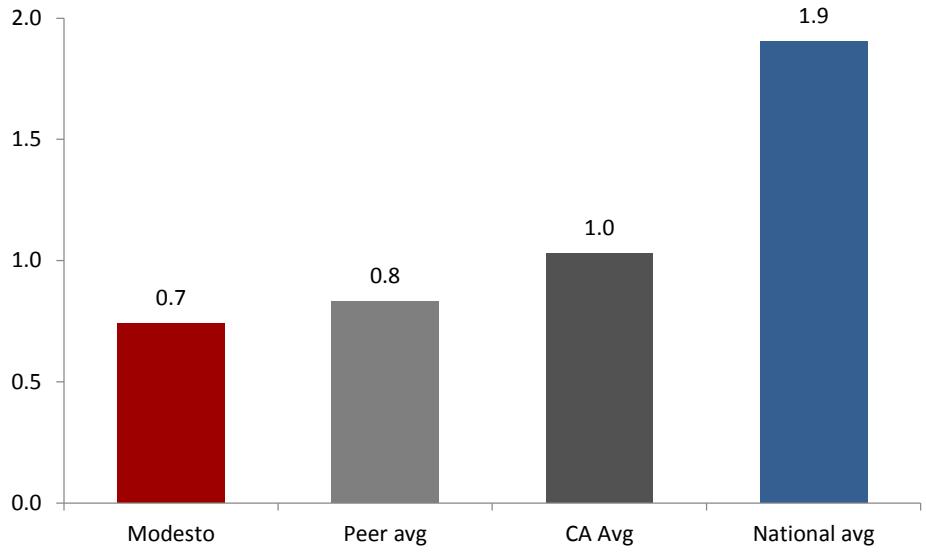

Data source: ISO fire department survey.

**Description**

This metric measures the adequacy of staffing for existing engine, ladder and service companies. The score is based on members staffing apparatus at stations, as well as off-duty, volunteer, and on-call members who respond when alerted. Maximum amount of points available = 15.

### *4.2 Firefighters per Population*

**Figure 35: Number of Firefighters per 1,000 People**




Data sources: ISO fire department survey, census.

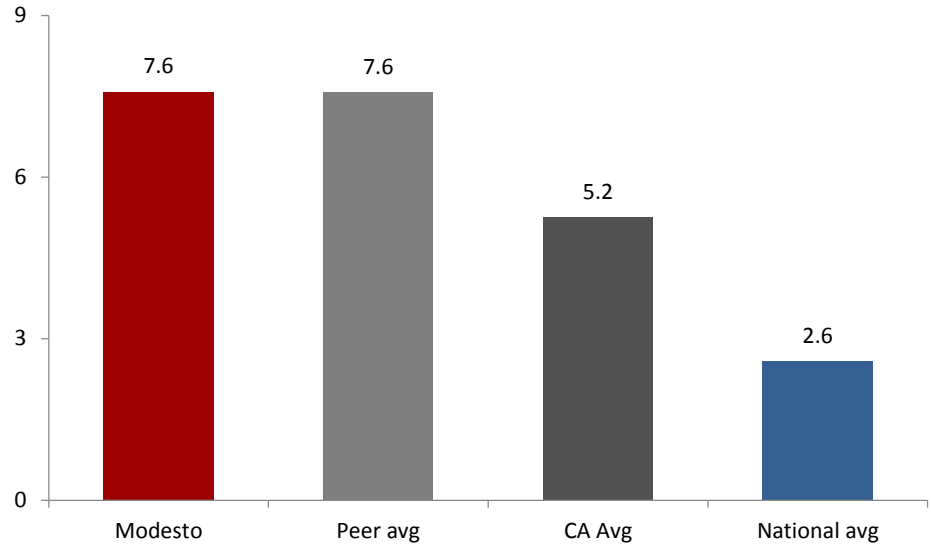
**Description**

Number of firefighters per 1,000 people. Firefighter enrollment is an indication of the community investment in fire protection. For this metric, firefighter enrollment is the sum of the average number of on-duty fire suppression personnel per day and 33 percent of the number of on-call, volunteer, and off-shift members responding to first alarms per day. This sum is divided by the jurisdiction population and then multiplied by 1,000.

# 5.0 TRAINING

## *5.1 PPC™ Points for Training*

**Figure 36: PPC™ Points for Training**



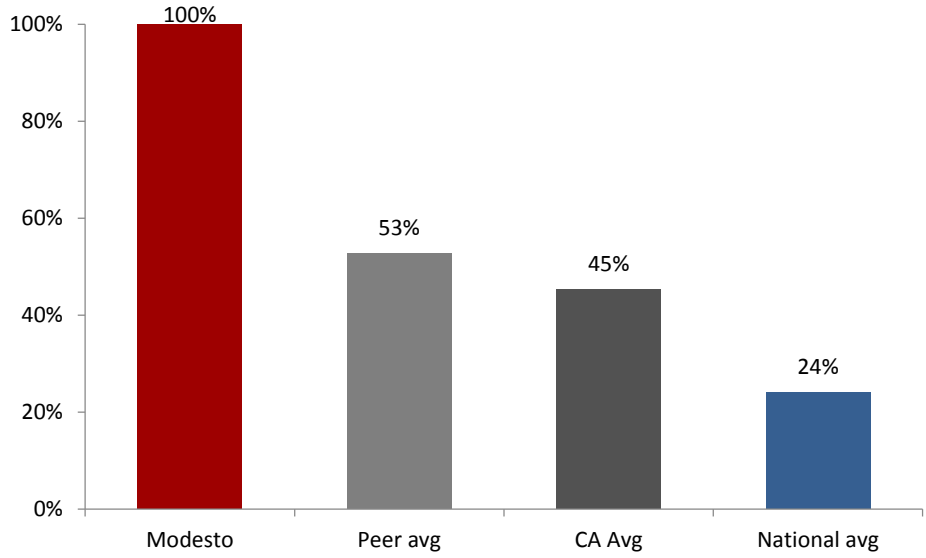

Data source: ISO fire department survey.

**Description**

Measurement of the adequacy of fire department training related to structure fires. Items in this evaluation include: department training using a fire training facility; company training at fire stations; fire officer training; driver and operator training; hazardous materials training, pre-incident planning, and training records. Maximum amount of points available = 9.

### *5.2 Pre-Plan Coverage*

**Figure 37: Pre-Incident Planning Coverage**



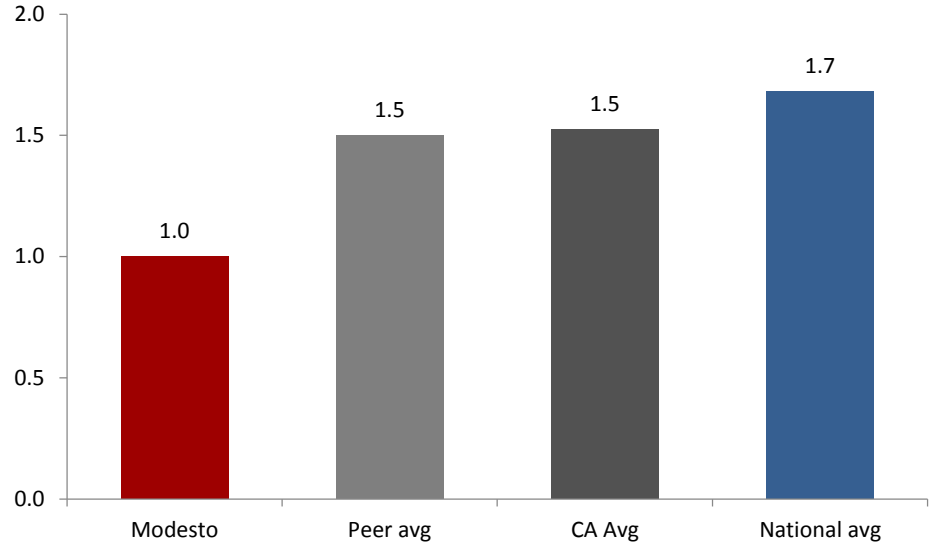

Data source: ISO fire department survey.

**Description**

Pre-plan coverage is calculated as the percentage of buildings with a pre-plan that has been updated in the last five years. Pre-incident planning coverage is a reflection of the extent of outreach for fire department preparedness.

### *5.3 Pre-Incident Planning Frequency*

**Figure 38: Average Age of Pre-Plans**




Data source: ISO Fire Department survey.

**Description**

The average age (in years) of existing pre-plans. This is a reflection of the currency associated with fire department preparedness.

## 9.0 DATA SOURCES AND NOTES

**Figure 39: List of Data Sources**

| | ISO Fire Dept. Survey[2] | ISO Commercial Property Survey[1] | ISO Insurance Data[4] | NFIRS (National Fire Incident Reporting System)[5] | US Census |
|---|---|---|---|---|---|
| **Public Protection Classification** | X | | X | | |
| **Performance** | X | | X | X | |
| **Prevention** | X | X | | X | X |
| **NFPA 1710 Analysis** | | | | X | |
| **Personnel** | X | | | | X |
| **Training** | X | | | | |
| **Commercial Property** | | X | | | |

**Annotated Notes:**

[1] ISO has comprehensive risk information on approximately 3.5 million commercial properties. While we believe this coverage is strong, it is certainly not complete. There may be commercial properties within your jurisdiction that are not included in this report's analyses. For the purposes of this report, each ISO "risk" is assumed to be the equivalent of a building.

[2] The PPC grading schedule was updated in 2013. While this revision incorporates newer technologies and fire prevention methodologies, it was designed so that a jurisdiction's classification would typically not change with an updated survey. All selected peer fire departments have surveys that were updated within the last 5 years. Peers that have not had an update within the last five years were excluded if it is believed there have been changes since the last grading.

[3] Insurance savings estimates are based on guidance that ISO provides to carrier customers. Insurance companies are not required to price premiums based on ISO guidance. Fire severity data is based on homeowner claims submitted to ISO.

[4] NFIRS data includes structural fire incidents defined by incident types 100-123 and reported by NFPA. It may include mutual and automatic aid responses.

## Management Components

As a service provider to a large community, MFD faces obstacles affecting organizational growth and management, including substantial financial challenges. The organization must assure that it is adequately prepared in terms of the fundamental components of its management configuration to keep pace with future needs.

In addition to the operational challenges of emergency response, the management of the business of a fire department always presents unique issues involving the administration of financial resources, the establishment of goals and objectives, effective internal and external communications, information management, and security. This section of the report examines the MFD's efforts in this area and preparation for the future health of the organization.

### FOUNDATIONAL ELEMENTS – MISSION, VISION, STRATEGIC PLANNING, GOALS, AND OBJECTIVES

The process of strategic planning involves clarifying an organization's mission, articulating its vision for the future, and specifying the values within which it will conduct itself.

**Figure 40: Survey Table – Foundational Elements**

| Survey Components | Modesto Fire Department Observations | Comments And Recommendations |
|---|---|---|
| **Mission, Vision, Strategic Planning, Goals, And Objectives** | | |
| Mission Statement Adopted | Yes | |
| Displayed | On Website Only | Post The MFD Mission Statement In Stations And On Written Communications. |
| Periodic Review | No | Establish A Process Of Periodic Review Of The Mission Statement. |
| Vision Established And Communicated | In Place, Generally Communicated Internally. | |
| Values Of Staff Established | In Place, Generally Communicated Internally. | |
| Strategic Or Master Plan | Strategic Plan In 2007 | Update The 2007 Strategic Plan. |
| Adopted By Elected Officials | Recognized But Not Adopted. | Once Updated, Formally Adopt The New Strategic Plan. |
| Published And Available | Yes | |
| Periodic Review | Not Reviewed Since Writing. | Scheduled To Review And Update A Part Of This Study Process. |
| Agency Goals And Objectives Established | In Place As Short Term Goals, Based On 2007 Strategic Planning Process. | Update Organizational Goals And Objectives During The Strategic Plan Update. |
| Date Developed | First Of The Year | |
| Periodic Review | To Be Reviewed As A Part Of This Study Process. | |
| Tied To Division/Personnel Performance Statements/Plans | No | |
| Objectives Linked To Programs | No | |

| Survey Components | Modesto Fire Department Observations | Comments And Recommendations |
|---|---|---|
| Performance Objectives Established | No | |
| Code Of Ethics Established | Included In Rules And Regulations | |

**Discussion**

MFD conducted a strategic planning process in 2007. The plan is outdated and is scheduled for update and revision as a component of this study process. The department's mission statement has been established, but is not prominently displayed or posted. A mission statement, institutionalizing the organization's core purpose should be displayed in fire stations and included on agency letterhead, business cards, etc.

A statement of organizational vision and one of the agency's values is also in place but is only communicated informally and internally. ESCI recommends that both statements, once updated in the upcoming strategic planning process be more effectively communicated.

Through its upcoming strategic planning process, the department will be identifying specific goals and objectives through which it intends to meet its mission. These goals and objectives will provide guidance in decision-making and focus the agency's efforts on the most critical issues that will impact its success in the future. In addition, the plan will provide the members with direction on the future and how they each fit in.

MFD is acknowledged for its proactive efforts in developing the past and upcoming Strategic Plan.

## MANAGEMENT DOCUMENTS AND PROCESSES

Similarly, an organization should develop appropriate documentation, policies, procedures, and identification of internal and external issues that affect the agency. Processes must also be established to address the flow of information and communication within the fire department as well as with its constituents.

**Figure 41: Survey Table – Foundational Documents and Processes**

| Survey Components | Modesto Fire Department Observations | Comments and Recommendations |
|---|---|---|
| **Availability Of SOPS, Rules And Regulations, Policies** | | |
| Copies Of Rules Provided | Rules And Regulations Provided To Personnel On Intranet. | |
| Last Date Reviewed | No Recent Review | |
| Copies Of SOGS Or Procedures Available | Included In The Policy And Procedure Manual As A Section. Provided To Personnel On Intranet. | Separate SOGS From Policy Manual As A Stand-Alone Document. |
| Regular Update | No Formal SOG Update Process | Establish A Practice Of Regular Review And Update Of SOGS. |
| Process For Development Of New SOGS | Defined Process Included In SOGS | |
| SOGS Used In Training Evolutions | Yes | |
| Policy Manual Available | Policy And Procedure Manual, Includes SOGS. | Separate Policy Manual From SOGS As A Stand-Alone Document. |
| Reviewed For Consistency | Not Regularly | Establish A Practice Of Regular Review And Update Of Policy And Procedure Manual. |
| Reviewed For Legal Mandates | No | Submit Policies And Procedures To Legal Review, As Appropriate. |
| Training On Policies Provided | Yes, Included In Ongoing Training. | |
| **Critical Issues** | | |
| Critical Issues Are Identified | Informally Only | |
| First Critical Issue | Staffing At All Levels, Operational, Administrative, Prevention. | |
| Second Critical Issue | Changing Dynamics In EMS | |
| Third Critical Issue | Financial Sustainability | |
| Internal Evaluation Of Critical Issues Process | No Structured Process Is In Place For Identifying Critical Issues. | Establish A Practice Of Regular, Periodic Identification Of Critical Issues Affecting The Organization. |
| **Challenges Of The Future** | | |
| Challenges Are Identified | Informally | Establish A Practice Of Periodic Identification Of Challenges Affecting The Organization. |
| First Challenge | Infrastructure Needs – Aging Stations And Apparatus. | Develop A Funded Capital Replacement Plan. |
| Second Challenge | Need For A Structured Professional Development Program. | Establish And Adopt A Succession Planning Process. |
| Third Challenge | Need To Explore Alternate Staffing Models. | Consider Contemporary Options Including Peak Activity Units (Paus), Community Paramedicine, And Alternative Response Units. |

| Survey Components | Modesto Fire Department Observations | Comments and Recommendations |
|---|---|---|
| **Internal And External Communications** | | |
| Internal Communications | | |
| Regularly Scheduled Staff Meetings (Fire Department) | Weekly Executive Team Meeting. Weekly Command Staff Meeting. Annual Company Officer Meeting. | |
| Written Staff Meeting Minutes | Maintained And Distributed | |
| Memos | Used Routinely And Archived. Loosely Defined Process. | Adopt A Memo/Email Policy. |
| Member Newsletter | Monthly Operational Newsletter Produced And Distributed To Personnel And Council. | |
| Member Forums | Daily Morning Brief Via Conference Call With All Stations By Battalion Chief, Also Fire Chief Or Fire Marshal As Needed. | |
| Open Door Policy | Liberal Open Door Policy In Place. | |
| Bulletin Board | Physical Bulletin Board At Each Station. | |
| Vertical Communication Path Clearly Identified | Identified Via The Organizational Chart. | |
| E-Mail | Used Regularly, City Use Policy Is In Place. | |
| Employee Mail Boxes | Company Officer Mailboxes Only. | |
| Voice Mail | In Place But Does Not Work Properly In Stations. No Voicemail Notification On Station Mailboxes. | Review And Improve Voicemail Systems. |
| Issues Taskforce | In Place | |
| External Communications | | |
| Community Newsletter | None | |
| Website | In Place, But In Need Of Updating. | Review And Update The Agency Website. |
| Advisory Committee(s) | None | |
| Complaint Process | No Defined Complaint Process. | Establish A Formalized, Tracked, Complaint System. |
| Social Media (Facebook/Twitter) | Active Facebook And Twitter Accounts Are In Place. | |
| Community Survey | Have Been Done In The Past, But Not Recently. | Reestablish Community Survey Processes. |
| Local Community Planning Organizations | Fire Marshal Attends Various Community Planning Meetings Regularly. | |
| Focus Groups | Fire Department Participates And Attempts To Host Groups At Fire Stations. Not Well Established Process, However. | Improve/Enhance Community Outreach And Community Forums Relating To Fire Department Services. |

**Key Recommendations:**

- Separate policies and procedures and Standard Operating Guidelines into stand-alone

documents.

- Conduct scheduled review and updating of rules and regulations.
- Complete regular review and update of Standard Operating Guidelines.
- Establish a practice of periodic identification of critical issues and challenges affecting the organization

**Discussion**

MFD policies and procedures and Standard Operating Guidelines (SOGs) reside in a single manual. The manual is provided to new personnel upon hire and is accessible to all via the agency intranet.

A review of the rules, procedures, and guidelines reveals that they are appropriate and generally comprehensive. However, some of the content is not current. The periodic review of foundational documents is essential and ESCI underscores the importance of establishing a regular schedule for future review of all foundational documents, which should be completed at least every three years.

SOGs and policy and procedure documents are in a single manual. The two differ in their applicability to agency operations and are more appropriately separated into two, stand-alone documents in the interest of ready accessibility.

### *Critical Issues*

The process of taking time periodically to list the issues that are facing an organization can be invaluable as a checkpoint for the agency as it moves forward. Doing so on a periodic basis is recommended. In the course of ESCI's fieldwork, the fire chief was asked to identify critical issues and challenges that face the organization.

The critical issues identified are listed in the previous figure. A primary concern is that of staffing. The concern exists at all levels including not only emergency response staffing, but administrative, support, training, and fire prevention administration, as well. ESCI discusses the staffing concerns in further detail in the subsequent Staffing section of this report.

Also identified was the need to address the source of MFD's greatest service demand – Emergency Medical Services. The face of EMS has changed substantially in recent years resulting in increased workload and financial challenges associated with cost recovery. ESCI concurs with the fire chief's concern regarding EMS services and encourages the organization to actively consider service delivery alternatives, which are explained in subsequent report sections.

Finally, but of no less importance, is the issue of long-term financial sustainability. MFD clearly struggles to meet existing citizen demands for services with limited funding. The organization's financial challenges are apparent in review of current staffing, facilities, and equipment and sustainable alternatives must be developed if the agency is to avoid future deterioration of its ability to serve its constituents appropriately.

### *Challenges*

Also discussed during ESCI's fieldwork were challenges that face MFD today. One concern is the condition of current infrastructure, specifically fire stations and response equipment. ESCI underscores the critical importance of appropriate and full comprehensive capital asset replacement planning, given

that fire stations and fire apparatus represent a substantial expense and have readily predictable life expectancies and replacement costs. The matter is discussed further in the Capital Assets and Capital Improvement Planning section.

An additional challenge identified is that of professional development and succession planning. ESCI advises the establishment of a broadly based professional development program that will prepare and encourage employees to move forward in the organization.

The third challenge identified is the need to seek alternative staffing and service delivery models that will mitigate the considerable impacts of growing service demand. The impacts are largely found in regard to Emergency Medical Services delivery, as the largest percentage of workload. A number of alternative strategies have evolved in recent years, including the implementation of community integrated health care programs, deployment of smaller, quick response vehicles, and use of peak activity response units (PAUs) during times of heightened workload.

## RECORD KEEPING AND DOCUMENTATION

In any organization, documentation of activities is of paramount concern. The following figure reviews the practices that are in place in the department.

**Figure 42: Survey Table – Record Keeping and Documentation**

| Survey Components | Modesto Fire Department Observations | Comments and Recommendations |
|---|---|---|
| **Document Control** | | |
| Process For Public Access Established | Defined Process In Place At Both Fire Department And At The City Level. | |
| Hard Copy Files Protected | Yes | |
| Computer Files Backed Up | Scheduled Backups Are In Place | |
| **Security** | | |
| Building Security | Key Locks On All Stations, Access To All Stations With A Single Key. | Implement A Combination Locking System To Eliminate One Key That Opens All Stations. |
| Office Security | Offices Are Locked When Not Occupied. | |
| Computer Security | Password Protection Is In Place. | |
| Vehicle Security | No Policy In Place. Narcotics On Ambulances Are Locked. | Establish Vehicle Security And Locking Policy. |
| Capital Inventory Maintained | City Wide Annual Inventory System Is In Place. | |
| Asset Security System Used | Barcode System | |
| Inventory Interval | Annual | |
| Monetary Controls Used | | |
| Cash Access Controls | Petty Cash Controls Are In Place And Tracked Appropriately. | |
| Credit Card Controls | Monthly Reconciliation With Receipts. | |
| Purchasing Controls | Purchase Order Process For Local Vendors. Both City And Department Level Controls Are In Place. | |
| **Reporting And Records** | | |
| Records Kept By Computer | | |
| Type Of Platform | PC Based, Server System. | |
| Operating System | Windows Based | |
| Periodic Report To Elected Officials | | |
| Financial Report | Regular Financial Report To City Manager | |
| Management Report | No Formal Report | Establish Regular Management And Operational Report Format For City And Department Distribution. |
| Operational Report | Monthly Report To The City Manager, Passed On To City Council And Includes Management Elements. | |

| Survey Components | Modesto Fire Department Observations | Comments and Recommendations |
|---|---|---|
| Distributed To Others | To City Council Via City Manager | |
| Annual Report Produced | Yes | |
| Distributed To Others | Annual Report Distributed Publicly And Throughout City Government | |
| Analysis Of Data Provided | Not Formally | |
| Required Records Maintained | | |
| Incident Reports | Completed And Tracked | |
| Patient Care Reports | Completed For All Patients Treated | |
| Exposure Records | Maintained Appropriately | Enhance And Automate Exposure Records Practices. |
| SCBA Testing | Annually | |
| Hose | Annually | |
| Ladder | Annually | |
| Pump | Annually. Have Been Interruptions. | Assure That All Fire Pump Tests Are Completed Annually Per NFPA[2] Standards. |
| Breathing Air | Tested Quarterly, Consistent With OSHA Requirements. | |
| **Information Technology** | | |
| Computer Platform | PC/Windows Based | |
| Maintenance/IT Support Provided By | Provided By The County, Currently Transitioning Back To The City IT Department. | |
| Computer Security | All Computers Are Password Protected | |

**Key Recommendation:**

- Implement the use of programmable combination locks on fire stations.
- Establish regular management and operational report format for city and department distribution.

**Discussion**

MFD's reports and records practices are generally appropriate, with a few recommendations noted above. The importance of effective record keeping cannot be overstated and it was apparent from the data provided to ESCI in the course of this project that the agency has effective records management practices in place.

In regard to security practices, building security was noted as an area of concern. Currently, all 11 fire stations are locked with a common key. Should that key fall into the wrong hands, access could be made to any, or all, of the fire stations. Use of combination locks, which can be readily changed for security purposes, is recommended.

[2] National Fire Protection Association.

## STAFFING AND PERSONNEL MANAGEMENT

Although management and organization of an emergency services agency is important, the personnel that deliver those services are the backbone of the system. Without proper administrative and support personnel to handle supervision, command and control, operational personnel may not be able to perform satisfactorily.

### *Administrative and Support Staffing*

One of the primary responsibilities of a fire organization's administration and support staff is to ensure that the operational entities of the organization have the ability and means to accomplish their responsibilities on an emergency incident. Efficient and effective administration and support are critical to the success of a fire agency.

Like any other part of a fire department, administration and support require appropriate resources to function properly. Analyzing the administrative and support positions of a fire department facilitates an understanding of the relative number of resources committed to this important function. The appropriate balance of the administration and support components to the operational component is critical to the success of the department's mission and responsibilities.

This section reviews the staffing within MFD and provides evaluation of the historical staffing performance.

**Figure 43: Survey Table – Administrative and Support Staffing**

| Survey Components | Modesto Fire Department Observations | Comments And Recommendations |
|---|---|---|
| **Administration And Other Support Staff** | | |
| Fire Chief | 1 | |
| Division Chief | 1 | Consider Addition Of A Second Division Chief For The Purpose Of Managing And Administration Support Services. |
| Administrative Battalion Chief | 1 | |
| Training Captain | 1 | Add Additional Training Personnel To Ensure Training Mandates Are Met And Proper Documentation And Certification Status Is Maintained. |
| EMS Coordinator | 1 | Consider Addition Of A Dedicated Ems Chief Officer To Ensure Adequate Authority And Policy Administration Elements Are In Place For Current And Future Ems Delivery. |
| Fire Marshal | 1 | |
| Deputy Fire Marshal | 1 | |
| Fire Inspector | 3 | |
| Executive Assistant | 1 | |
| Finance Manager | 1 | |

| Survey Components | Modesto Fire Department Observations | Comments And Recommendations |
|---|---|---|
| Administrative Analyst | 1 | |
| Administrative Office Assistant | 2 | Payroll And FP |
| It Assistant | 1 | |
| Stores Keeper | 1 | Logistics |
| **Total Administrative & Support Staff** | **17** | |
| **Percent Administrative & Support Staff To Total** | **11.3 Percent** | |

**Key Recommendations:**

- Consider addition of a second division chief for the purpose of managing and administration of support services.
- Consider addition of a dedicated EMS chief officer to ensure adequate authority and policy administration elements are in place for current and future EMS delivery.
- Add additional training personnel to ensure training mandates are met and proper documentation and certification status is maintained.
- Add additional fire prevention staff to address increased fire occurrences and loss.
- Consider a dedicated public education or specialist position.
- Consider adding a second captain FTE to the training division and establish shift training coordinators.
- Consider creation of a dedicated emergency manager at a regional level.

**Discussion**

ESCI notes that currently the level of administrative and support staffing represents 11.3 percent of MFD total membership. It is our experience that typically effective administrative of high volume paid department staffing totals range from 12 percent to 15 percent of agency totals. After reviewing the functions and responsibilities assigned to the work group, ESCI concludes that the number of FTEs assigned is below what is needed to appropriately accomplish the responsibilities of the support services division.[3]

[3] ESCI recognizes organizational goals, regulatory environment, and workloads are the actual drivers that determine the number of administrative personnel required to deliver support services. The 15 to 20 percent ratio is the range ESCI typically sees in fire service organizations and is used for comparison purposes.

### *Fire Prevention*

The fire prevention functions of the MFD appear to have an insufficient number of personnel assigned to match the risk, inspection, and enforcement workload. Given the on-going workload, combined with increased fire occurrences and fire loss, it is reasonable to conclude that additional prevention and education measures are necessary to help control and ultimately reduce the number of fires and the subsequent loss being experienced by the MFD.

The primary new construction plan review function is handled by fire prevention staff and includes large sprinkler and alarm system review. This task is currently being accomplished in a reasonable time frame with good quality of the review and appropriate plan revisions. However, if additional inspection and prevention measures are implemented to address the significant fire problem or significant development and growth were to occur, consideration should be given to utilizing contract plan review services that can be expanded or contracted with the corresponding workload.

Education of the public regarding relevant risks – including fire, disaster, and emergency medical – and their appropriate mitigation strategies is an essential component of a fire department's mission. MFD does not have a defined public education strategy and there are not enough personnel resources dedicated to this effort to provide the desired level of service. ESCI encourages MFD to evaluate this component of their overall prevention strategy and take the requisite steps to bolster this initiative. We also note that this is a very appropriate function wherein MFD should consider a regional cooperative strategy for these services. The need to provide this service at the local and regional level justifies the need to establish a dedicated public education specialist or coordinator.

### *Training*

MFD assigns a captain to the function of fire training. This places the functions of program needs assessment, design, coordination, and evaluation with the same single personnel resource. This position is also responsible for program development and delivery of fire suppression as well as EMS and all other training mandates, and must ensure appropriate curriculum, drills, and training plans are in place. This results in a significant workload and difficulty in meeting training mandates and MFD training goals. As discussed further in the Training section, ESCI encourages MFD to reevaluate the resources and assign a second FTE position to the training division and establish shift-training coordinators to assist with the administration of training and compliance with training mandates.

### *Emergency Management*

Currently, the city and MFD are committed to the development of an appropriate strategy to deliver emergency management functions and services to their community. Within MFD, the fire chief's designee manages this function as part of "other duties." The MFD acknowledge this is an issue and is ready and willing to consider potential methodologies to best serve the community. To reach that goal, the City will need to place additional emphasis on the program, including that establishment of an emergency management oversight position, as is discussed later in this report. We note this also is a very appropriate function wherein MFD should consider a regional cooperative approach to meeting emergency management needs.

## EMERGENCY RESPONSE STAFFING

It takes an adequate and properly trained staff of emergency responders to put the appropriate emergency apparatus and equipment to its best use in mitigating incidents. Insufficient staffing at an operational scene decreases the effectiveness of the response and increases the risk of injury to all individuals involved.

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, their location, status, and ability to take self-preservation action. Life safety related tasks involve 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 command officer must prioritize the tasks and complete some in chronological order, rather than concurrently. These tasks include:

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

The first 15 minutes is the most crucial period in the suppression of a fire. How effectively and efficiently firefighters perform during this period has a significant impact on the overall outcome of the event. This general concept is applicable to fire, rescue, and medical situations. Critical tasks must be conducted in a timely manner in order to control a fire or to treat a patient. MFD is responsible for assuring that responding companies are capable of performing all of the described tasks in a prompt, efficient, and safe manner. The following figure lists MFD's emergency response staffing configuration.

**Figure 44: Survey Table – Emergency Response Staffing**

| Survey Components | Modesto Fire Department Observations | Comments and Recommendations |
|---|---|---|
| **Emergency Service Staff – Fire** | | |
| Battalion Chief | 3 | Need Additional Battalion Coverage, Current Span Of Control Is To Large. |
| Captain | 36 | |
| Engineers | 51 | |
| Firefighters | 39 | |
| Fire Investigators | 3 | |
| **Emergency Service Staff - EMS** | | |
| Shift Paramedic | 14 | |
| EMT-I | 115 | |
| EMT-P | 16 | |
| Total Operational Staff | 132 | |

| Survey Components | Modesto Fire Department Observations | Comments and Recommendations |
|---|---|---|
| Fire Department Total | 150 | |
| Percent Of Operational Officers To Firefighters | 40 Percent | Approximately 1 To 3. |
| **Use Of Career And Volunteer Personnel** | | |
| Career Scheduling Methodology | 2 On 4 Off | |
| Length Of Normal Duty Period | 48 Hours | |
| FLSA Period | 56 Work Week | |
| Residency Requirements | No | |
| Operational Career Services | | |
| Fire Suppression | Yes | |
| EMS/Rescue, First Response | Yes | |
| EMS, Advanced Life Support | Yes | |
| Specialized Rescue | Yes | |
| Fire Prevention Inspections | Yes | |
| Emergency Management | Yes | Fire Prevention |
| Public Education | Yes | Fire Prevention |
| Hazardous Materials Response (Level) | Yes | |
| Volunteer Services | | |
| Chaplain | No | |
| Civilian Administrative Volunteer | 1 | Fire Prevention, Plan Checks. |
| **Responsibilities And Activity Levels Of Personnel** | | |
| Assignment Of Routine Duties: | | |
| By Position | | |
| By Areas Of Personal Interest | Yes | |
| Special Duties Assigned By: | | |
| Duty Assignment | Some | e.g. Hose Management |
| Work Groups/Committees | | |
| EMS Quality Management | No | |
| Chaplain | No | |
| Training | No | Have JAC Committee |
| Safety | Yes | |
| Building Development | No | |
| Operations Committee | Yes | |
| Uniform Committee | Yes | |
| Apparatus Committee | Yes | |
| Standards/SOGS | Yes | Sub Committee Of Operations Committee |

**Key Recommendations:**

- Consider the addition of a second battalion chief within the city.
- Consider addition of a second truck company to increase unit reliability and effective firefighting force capabilities.
- Continued expansion of local cooperative service agreements to enhance truck company and battalion chief response capabilities.

Considerable ongoing local, regional, and national discussion and debate draws a strong focus and attention to the matter of firefighter staffing. Frequently, this discussion is set in the context of firefighter safety. While there are published national standards regarding firefighter staffing, they generally speak in terms of the number of firefighters assigned to a particular response apparatus, often characterized as a "minimum of four personnel per engine-company." ESCI notes that the more critical issue is the number of firefighters that are assembled in a timely manner at the scene of an incident in conjunction with the scope and magnitude of the job tasks expected of them, regardless of the type or number of vehicles upon which they arrive.

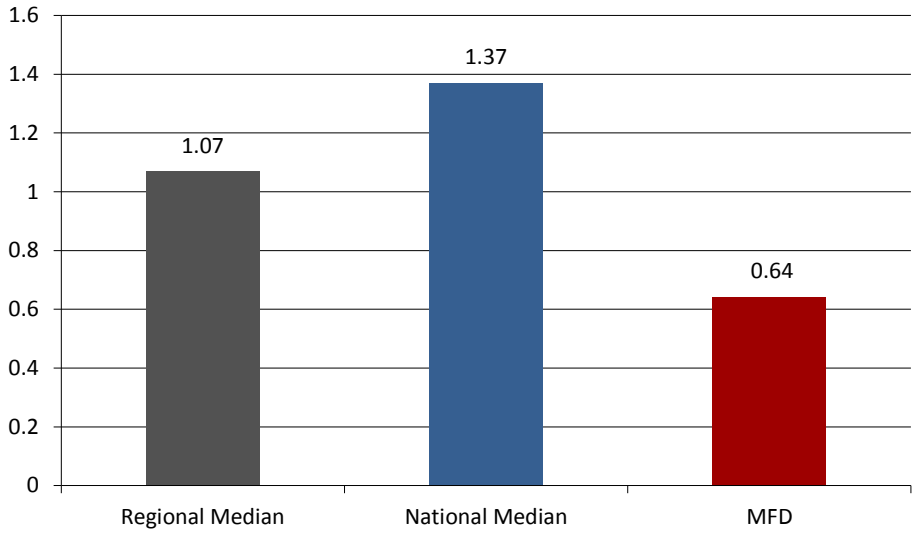
It is important to understand that the assembly of firefighters on an incident, also called an "Effective Firefighting Force" or "Effective Response Force," is a determination that is made at the community level based on risk, capability, and citizen expectations. There is not mandated requirement, though there are standards that are discussed in detail in this report. In the Service Delivery section, resource concentration is evaluated in detail, finding that MFD is capable of establishing an effective response in a timely manner in many areas of the response area, but also challenged to do so in other areas. In addition, the MFD is faced with the somewhat unique factor that due to the call volume and high amount of fire incidents, there is a significant percentage of time multiple units are busy or out of position impacting the ability of the MFD to assemble the necessary number of personnel and equipment.

As noted in the Service Delivery section of this report, the MFD has a significant deficit in its ability to provide adequate truck company, battalion command, and control response. This also creates a challenge with an adequate span of control and general oversight and administration of emergency response and suppression forces within the city.

Another means of comparison, also used on a national basis, is that of measuring the number of firefighters on staff per 1,000 population of the service area. The following figure illustrates the current comparison of MFD staffing with both national and regional norms.[4]

[4] Data drawn from NFPA reports "U.S. Fire Department Profile- 2011" and "U.S. Fire Loss- 2011" (most recent available).

**Figure 45: Firefighters per 1,000 Population**




At minimum daily staffing levels, MFD has 39 emergency personnel available to respond to all emergencies. MFD has the capability to respond to one or two house fires at a time with the likelihood of simultaneous structures being higher than most in similar jurisdictions. As will be seen later in this report, a majority of the department's workload is medical in nature and, given the current resources and service demand; the department is frequently stretched and utilizing a number of resources simultaneously to meet the existing EMS and fire response workload.

Using this comparison, MFD has a relatively low number of firefighters per capita. The MFD does appropriately staff each of its engine and truck companies but struggles with meeting established response time standards based on volume and frequency of resource utilization. In addition, as noted in the Service Delivery Analysis, the MFD has a significant deficit in its ability to provide adequate Battalion and truck coverage within the city.

It is recommended that an additional truck company and battalion chief be added within the city limits to ensure an adequate effective firefighting force, command and control is available and general unit reliability can meet local standards and industry practices. It is also recommended that the MFD continue to finalize and enhance local cooperative service agreements with surrounding jurisdictions to contribute to enhanced unit reliability, truck company response and command, and control functions.

ESCI notes that, given the slow and incremental financial recovery from the recession that the rapid addition of resources with the associate increased costs present a financial challenge for the MFD and city. Given this financial reality the MFD should begin an incremental approach to increasing response staffing in the context of the projected growth and the deployment analysis. Given the limited training and support function resources currently in place, and the incremental growth in revenue that often lags actual recession recovery and development, we recommend MFD avoid attempting to staff an entire fire station facility at a single point in time, but rather build resources and capacity incrementally to parallel revenue and service demand growth.

## Service Delivery and Performance

The delivery of fire suppression, rescue, and emergency medical services is no more effective than the sum of its parts. It requires efficient notification of an emergency and rapid response from well-located facilities in appropriate apparatus with a sufficient number of well-trained personnel following a well-practiced plan of action. This section of the report provides an analysis of the current service delivery components of the MFD. National Fire Incident Records System (NFIRS) data, incident response data, and apparatus response data collected by the department is used in this section of the report.

**Figure 46: Service Delivery and Performance**

| Survey Components | Modesto Fire Department Observations | Comments and Recommendations |
|---|---|---|
| **Service Demand** | | |
| Current Service Demand | | |
| Tracked By Incident Type And Temporal Variation | Yes | Conduct Regular Review And Include In An Annual Report. |
| Geographical Call Distribution | No | Consider GIS Display And Tracking Incident By Response Zones. |
| Demand Zones Based On Population | No | Consider Adopting Urban, Suburban, And Rural, Response Zones And Standards. |
| **Resource Distribution** | | |
| Facilities | | |
| Total Area Protected | 42 Square Miles | |
| Number Of Fire Stations | 11 | |
| Number Of Stations Staffed | 11 | |
| Number Of Stations Unstaffed | Airport Station Staffed In 1 | |
| Apparatus | | |
| Apparatus Appropriate To Risk (Fire, Medical, Special) | No | Address Additional Truck And Battalion Chief Coverage Needs To Meet Adopted Standards, Implement Additional ALS/BLS Response Utilizing Quick Response Units To Decrease Engine/Truck Response To Non-Emergent Medical Calls. |
| Staffing | 3-0 On Engines, 4-0 On Trucks | |
| Adequate For Initial Attack Of Predominant Risk | 17 On Scene But Not In 10 Minutes | Evaluate Auto-Aid, Additional Resources, And Other Adjustment Of Reconfiguration To Meet 10 Minute Standard. |
| **Resource Concentration** | | |
| Effective Response Force | | |
| Defined By Call Type | Yes And Determined By SOC | |
| Actual Performance Monitored | Yes | |
| **Response Reliability** | | |
| Workload Analysis | | |

| Survey Components | Modesto Fire Department Observations | Comments and Recommendations |
|---|---|---|
| Unit Hour Utilization (UHU) | No | Given High EMS And Fire Call Volume, Consider Measuring UHU For All Units To Better Understand And Address Workload And Unit Reliability Concerns. |
| Failure Rate By Station Area Or Response Zone | In SOC But Not Real Time | Report Unit Reliability As Part Of A Standard System Performance Report. |
| Concurrent Calls | SOC Not Real Time | Report As Part Of A Standard System Performance Report. |
| **Response Performance** | | |
| Response Performance | | Measure And Distribute Turn Out And Travel Time By Shift And Station To Engage Work Force In A Reducing Response Time Intervals. |
| Call Processing Time | No | Establish Regular Call Processing Time Report From SR 911. |
| Turnout Time | No, Working On A Process. | |
| Travel Time | Yes, With 90% Fractal. | |
| Total Response Time | No | |
| Response Time Goals | | |
| By Response Zone | Yes, Citywide By Call Type. | Establish Demand Zones With Associated Response And Dynamic Deployment Standards. Include Response Performance In An Annual Report For Distribution To All Internal And External Stakeholders. |
| By Incident Type | Effective FF Force | |
| Actual Response Performance Documented And Published | Yes, City Managers' Office | |
| **Mutual/Automatic Aid** | | |
| Given/Received Balance | Yes | |
| Automatic Aid Incorporated In Run Cards/Dispatch Procedures | Yes | |
| Inter-Agency Training And SOP's | Yes, For Auto Aid Only. | |
| Signed Mutual Aid Agreements And County Plan | Yes | |
| **Incident Control And Management** | | |
| Incident Command System | | |
| Incorporated In All Emergency Operations | Yes | |
| Addressed In SOP Or SOG | Yes | |
| Addressed In Training | Yes | |

**Key Recommendations:**

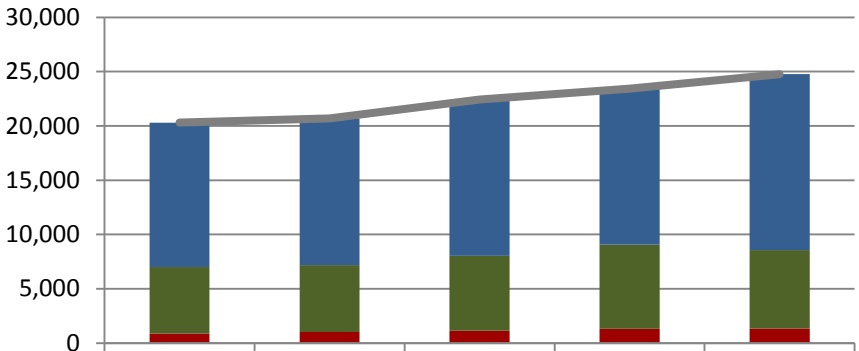
- Measure and distribute turn out and travel time by shift and station to engage work force in a reducing response time intervals.
- Establish demand zones with associated response and dynamic deployment standards.
- Establish regular call processing time report from SR 911.

**Discussion**

## DEMAND ANALYSIS

Service demand is defined as the workload experienced by an emergency services organization. This workload can be emergency and/or non-emergency depending on the mission of the organization. The following figure demonstrates historical service demand over the last five calendar years for MFD.

**Figure 47: MFD Service Demand, 2010 through 2014**




| | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| EMS | 13,306 | 13,495 | 14,369 | 14,354 | 16,193 |
| Other | 6,105 | 6,159 | 6,894 | 7,757 | 7,222 |
| Fire | 894 | 1,024 | 1,156 | 1,313 | 1,347 |
| Total | 20,305 | 20,678 | 22,419 | 23,424 | 24,762 |

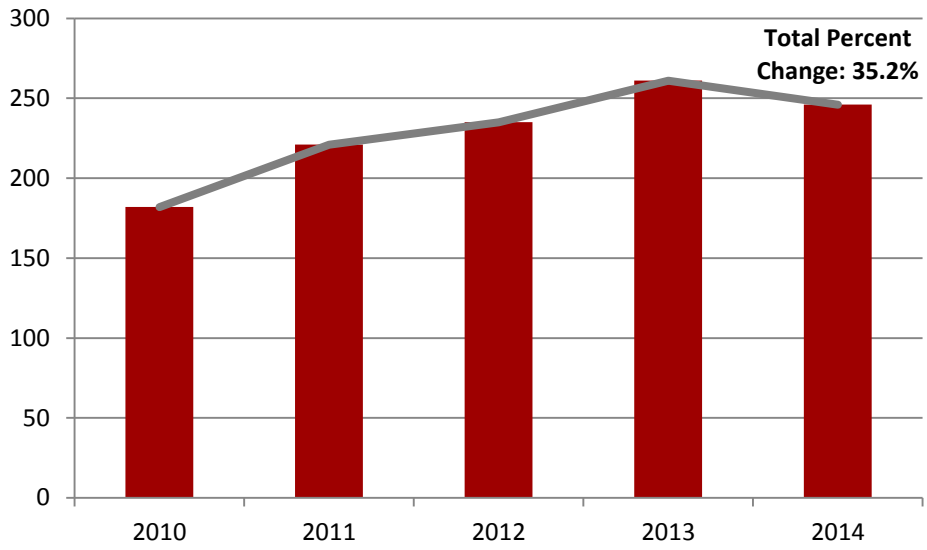
This figure demonstrates that MFD service demand increased every year from 2010 through 2014. Overall, service demand increased by approximately 22 percent. Using the NFIRS incident type definitions, ESCI categorizes incidents as “Fires” (structures, vehicle, brush, any 100 series incident in NFIRS), “EMS” (all calls for medical service including MVA’s and rescues, any 300 series incident in NFIRS), and “Other” (false alarms, hazmat incidents, service calls, all other NFIRS incident series). The next figure demonstrates the percent change in service demand for fire, EMS, and other incident categories from 2010 through 2014.

**Figure 48: MFD Percent Change by Incident Category, 2010-2014**

| Category | Fire | EMS | Other |
|---|---|---|---|
| Percent Change 2010-2014 | 50.7% | 21.7% | 18.3% |

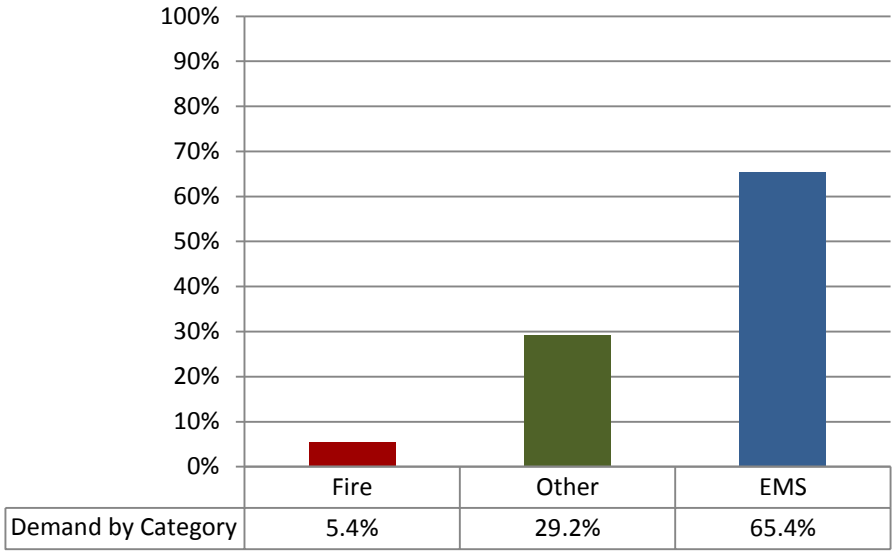
As opposed to many fire jurisdictions which have experienced a steady decrease in the number of fire incidents; MFD experienced an over 50 percent increase in all types of fire incidents over the last five years. The following figure illustrates number of actual building fires (NFIRS code 111) from 2010 through 2014.

**Figure 49: Building Fires from 2010-2014**




Although the number of building fires decreased between 2013 and 2014; building fires increased by over 35 percent in the time period illustrated. The following figure summarizes MFD service demand by incident category during 2014.

**Figure 50: MFD Service Demand by Incident Category, 2014**



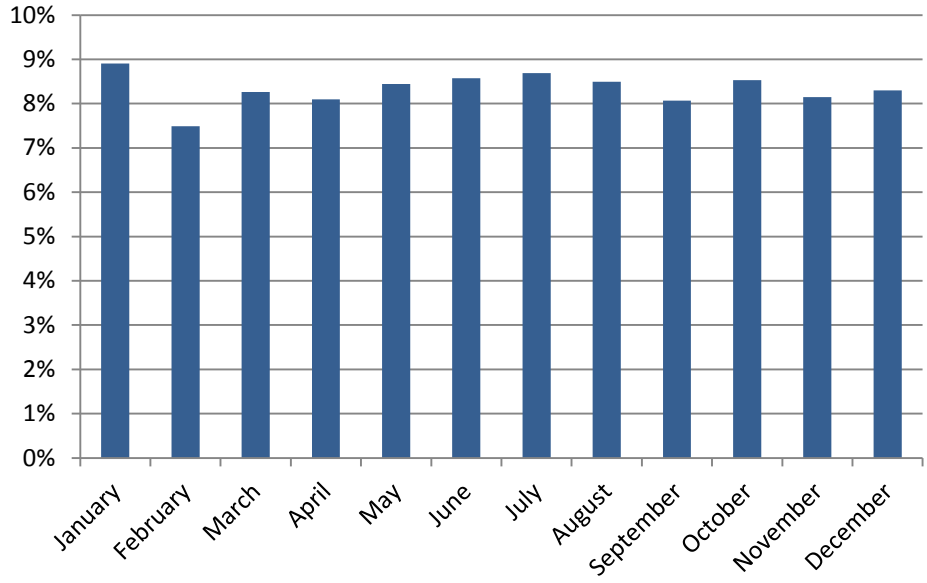

| | Fire | Other | EMS |
|---|---|---|---|
| Demand by Category | 5.4% | 29.2% | 65.4% |

The previous figure displays the nature of service demand in the MFD study area in 2014. EMS incidents represent the largest portion (65.4 percent) of 2014 service demand. Even with the increase in fire incidents between 2010 and 2014, fires represent 5.4 percent of total service demand during 2014. Incidents such as hazardous material responses, service calls, and false alarms comprise the remainder of MFD service demand. The data displayed is similar to that of other all hazard fire jurisdictions in the region and nationwide.

## TEMPORAL VARIATION

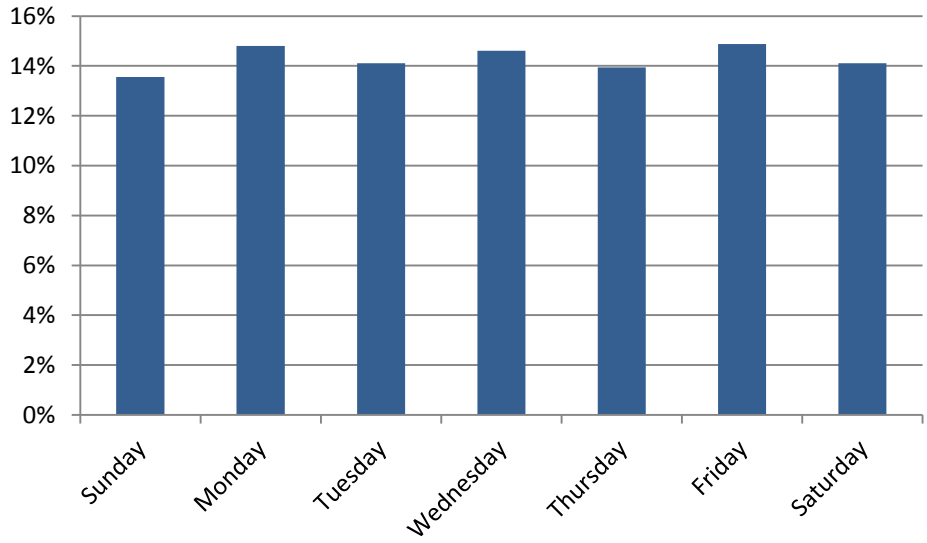
Service demand is not static, and the workload within the study area varies by temporal variation. The following figures illustrate how MFD service demand varied by month, day of week, and hour of day during 2014 in order to identify any periods of time that pose significantly different risks and hazards. This analysis begins by evaluating service demand by month.

**Figure 51: MFD Service Demand by Month, 2014**



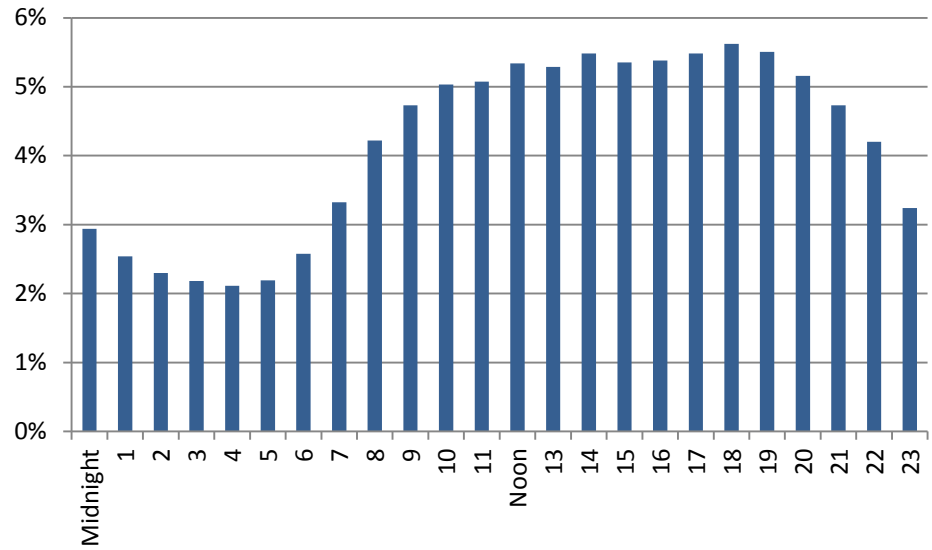

Overall service demand varies throughout the year, with the lowest demand in February (7.49 percent) and the highest percentage (8.9 percent) of incidents in January 2014. This represents a range of 1.4 percent. The next figure looks at service demand by day of the week.

**Figure 52: MFD Service Demand by Day of the Week, 2014**



As with monthly service demand, service demand by day of the week varies within a narrow range throughout the week. The last analysis of temporal variation demonstrates workload by hour of the day.

**Figure 53: MFD Service Demand by Hour of the Day**

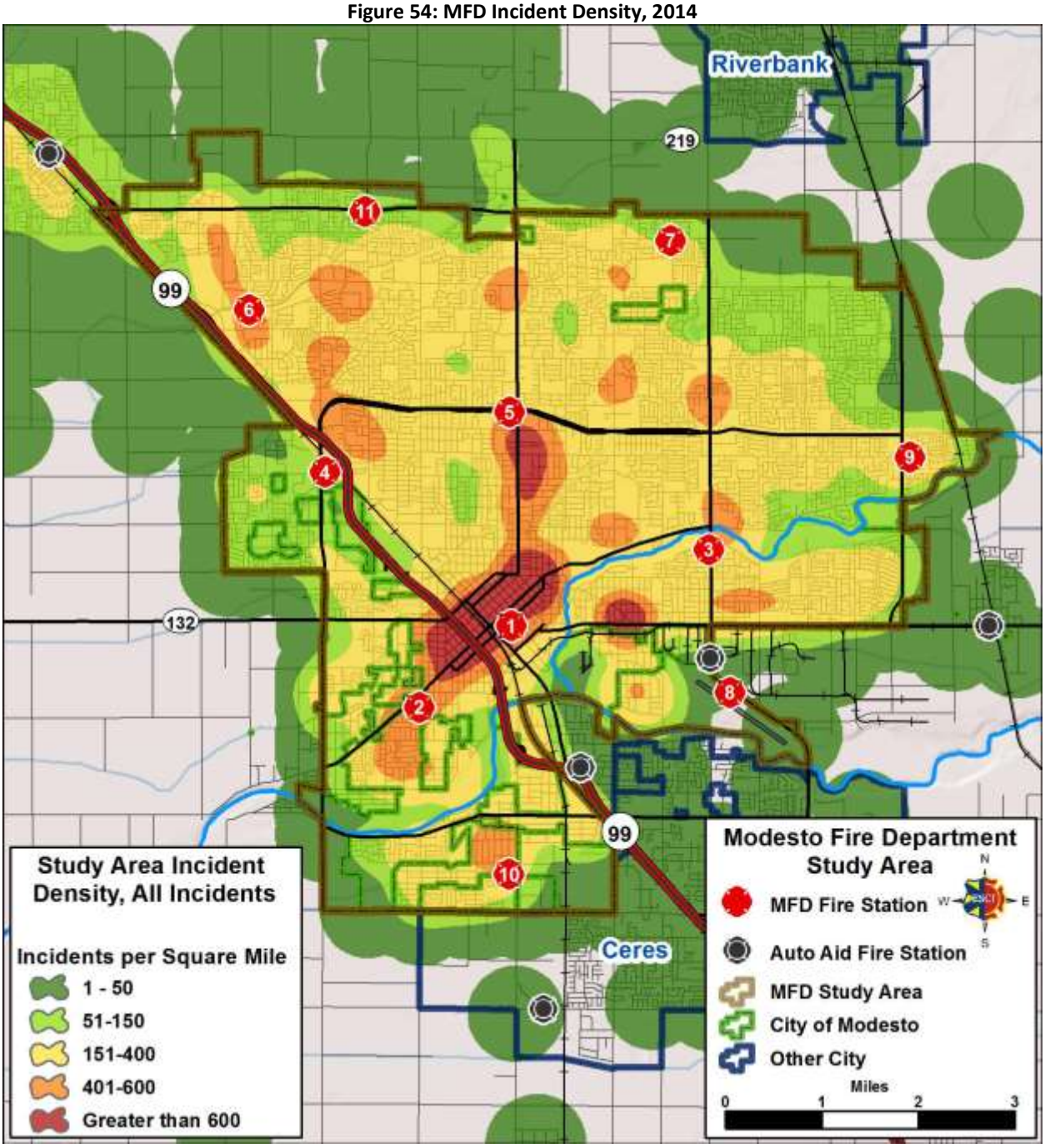



Service demand directly correlates with the activity of people, with workload increasing during daytime hours and decreasing during nighttime hours as shown in the preceding figure. Over 65 percent of MFD service demand in 2014 occurred between 9:00 AM and 9:00 PM. The increase in service demand during the day is significant and predictable. There is an opportunity to anticipate increased workload and improve response performance by deploying additional apparatus or personnel during the busiest times of the day.

## GEOGRAPHIC SERVICE DEMAND

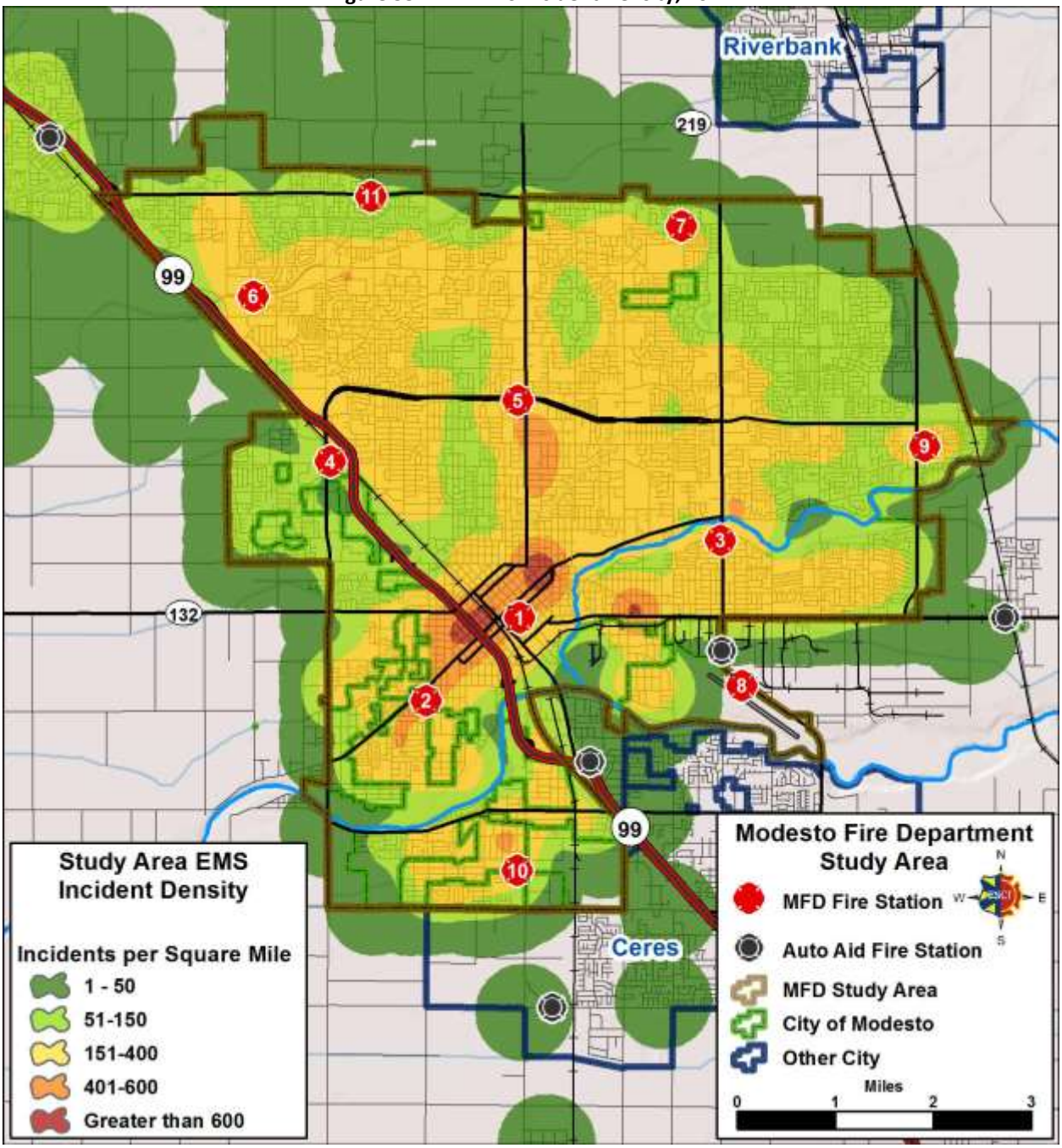
In addition to the temporal analysis of service demand, it is useful to examine the geographic distribution of service demand. In the following figure, ESCI plots incident locations and calculates the mathematical density of 2014 service demand in the MFD service area.

**Figure 54: MFD Incident Density, 2014**



Service demand is distributed throughout the MFD service area. The highest incident density occurs in the downtown core area, primarily in the first due areas of Stations 1, 2, and 5. As discussed earlier, EMS incidents represent the majority of MFD service demand. The next figure illustrates 2014 EMS incident density.

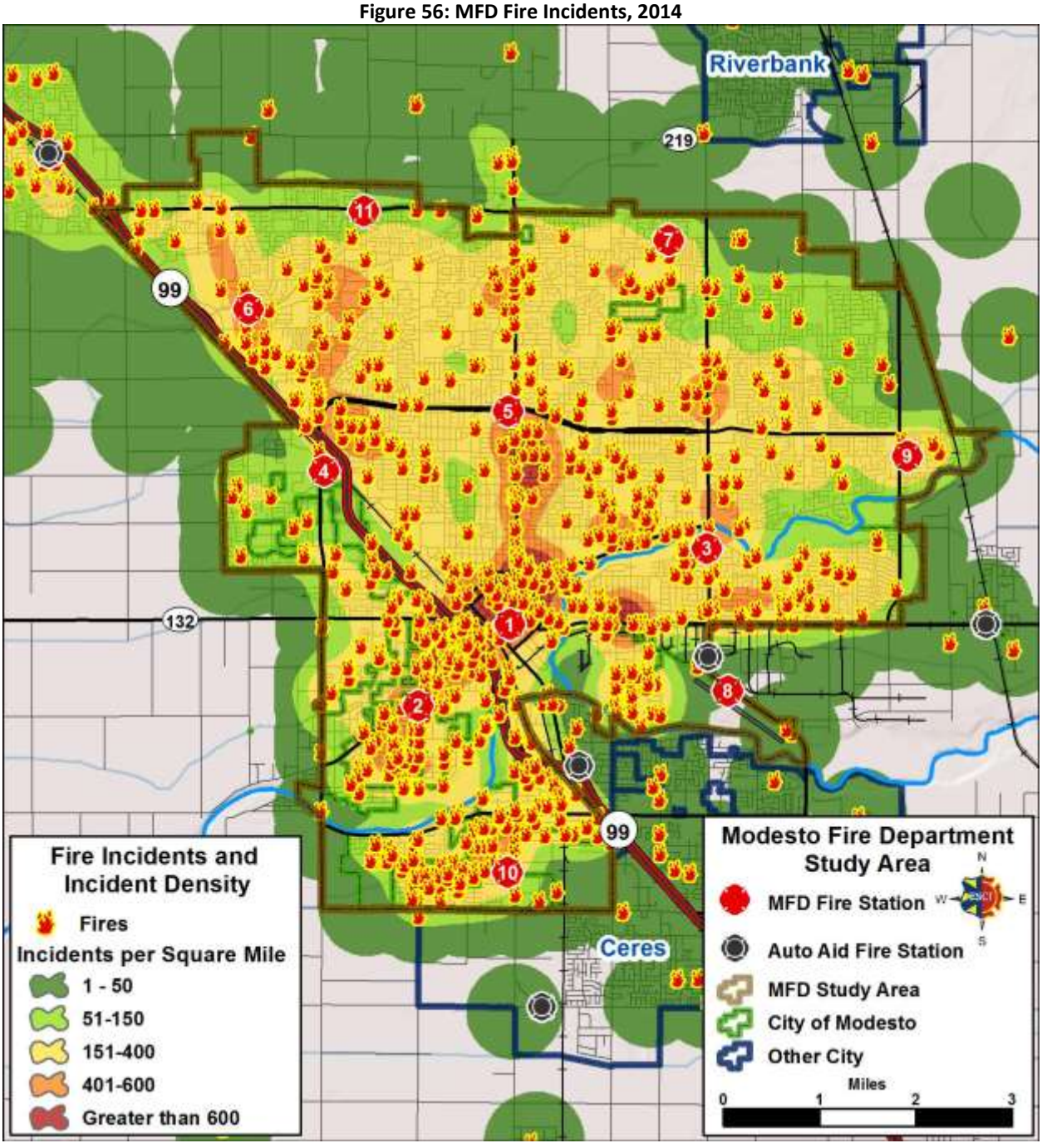
**Figure 55: MFD EMS Incident Density, 2014**




Not surprisingly, EMS incident density is similar to the overall density displayed in the Figure 54. However, removing “Fire” and “Other” incidents from the data set eliminates several areas of higher

incident density throughout the service area; and decreases incident density in the downtown core area. The last figure in the demand analysis pinpoints fire incidents in the 2014 MFD data set.

**Figure 56: MFD Fire Incidents, 2014**

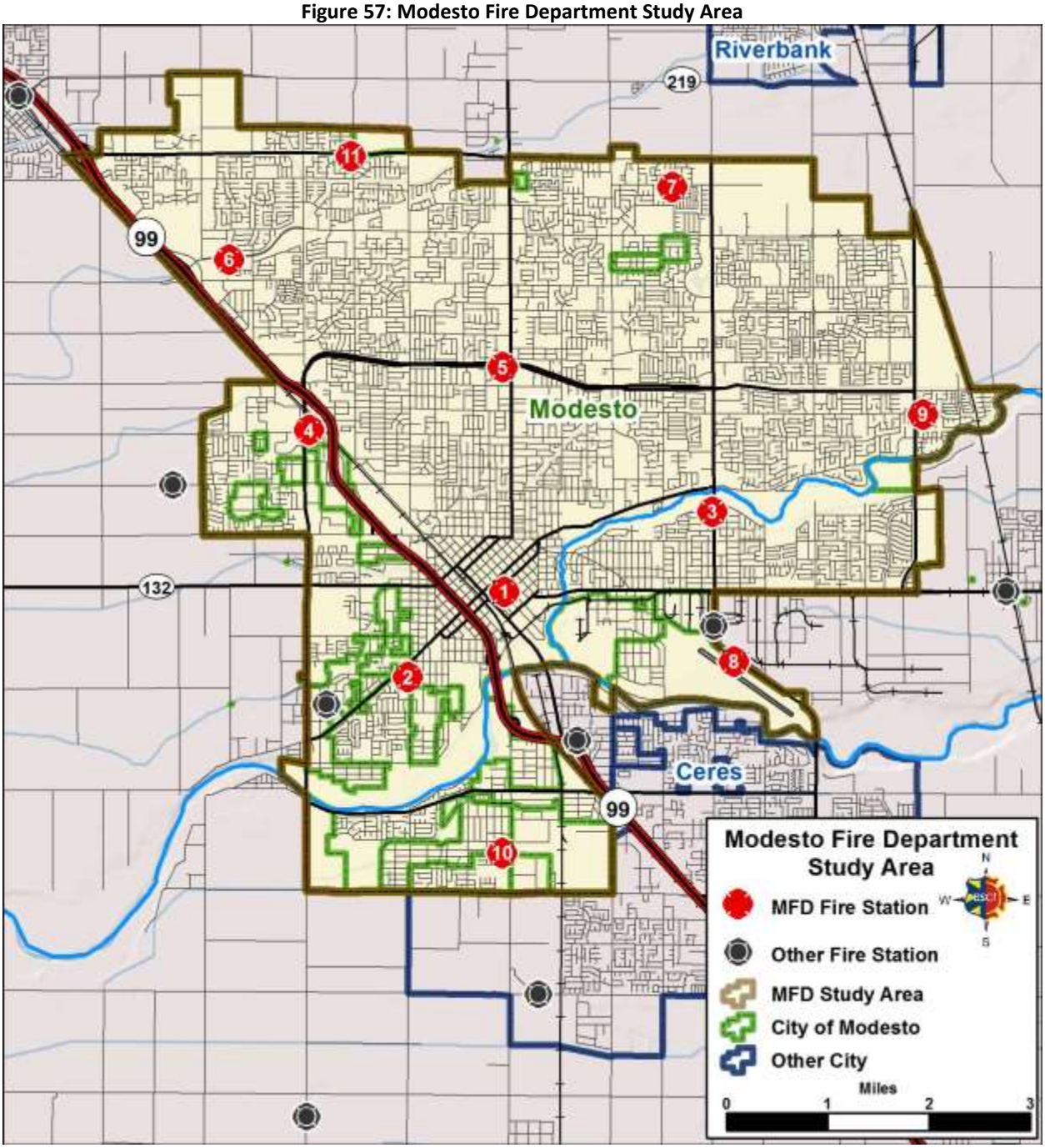



This figure illustrates the distribution of fire incidents throughout the study area. Examination of the GIS data reveals that over 62 percent of 2014 fire incidents occurred in the first due areas of Stations 1, 2, 5, and 10.

## DISTRIBUTION ANALYSIS

The analysis of distribution of resources presents an overview of the current deployment of fire department facilities, equipment, and personnel within the MFD service area.

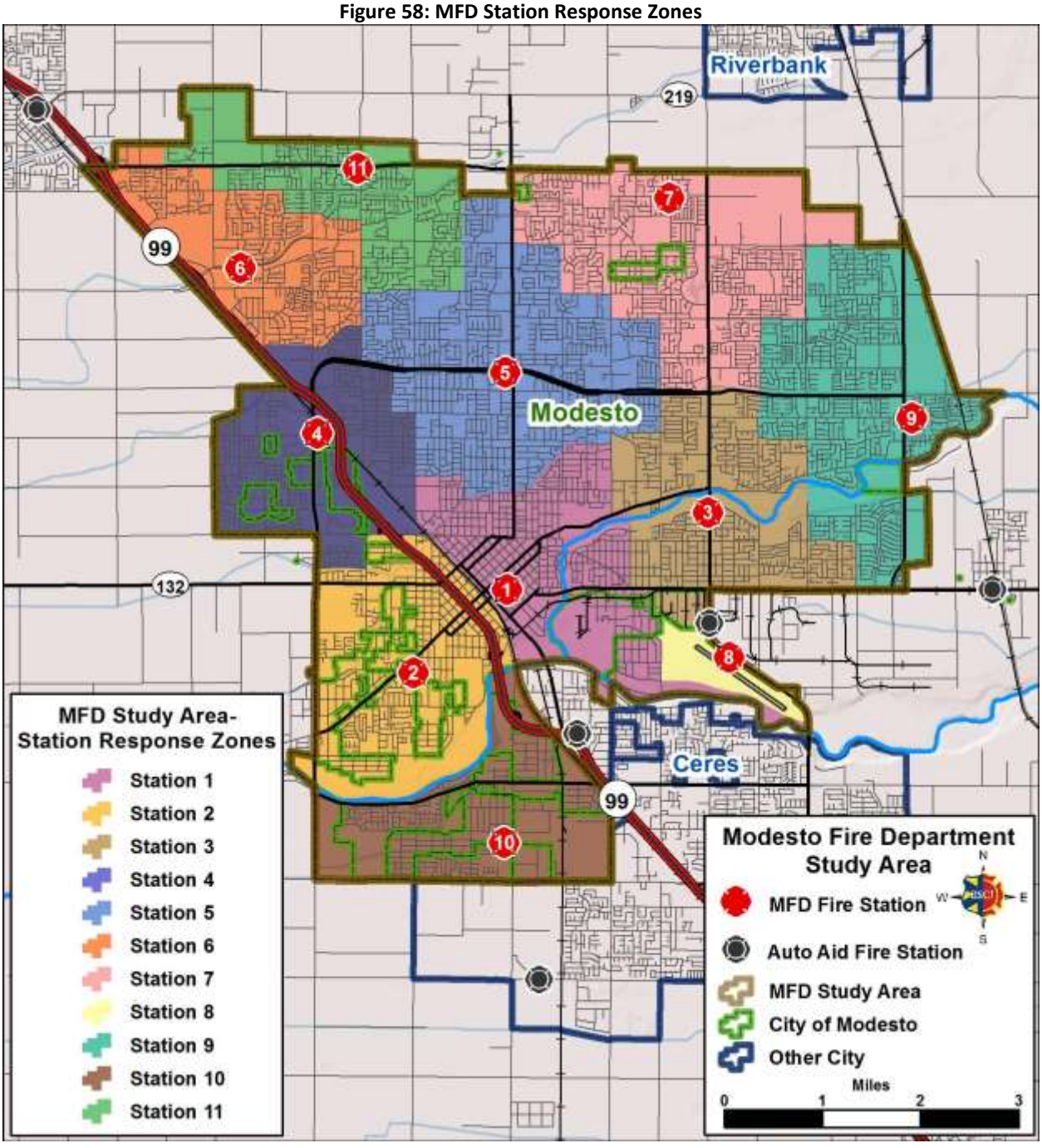
**Figure 57: Modesto Fire Department Study Area**




MFD currently provides fire protection, EMS first response (ALS and BLS), hazmat, and rescue services within the City of Modesto and unincorporated areas around Modesto. The MFD service area encompasses approximately 42.5 square miles, (37.2 square miles inside the City of Modesto); and is

bounded by the City of Ceres to the south, the unincorporated community of Salida to the northeast, and unincorporated Stanislaus County to the east and west.

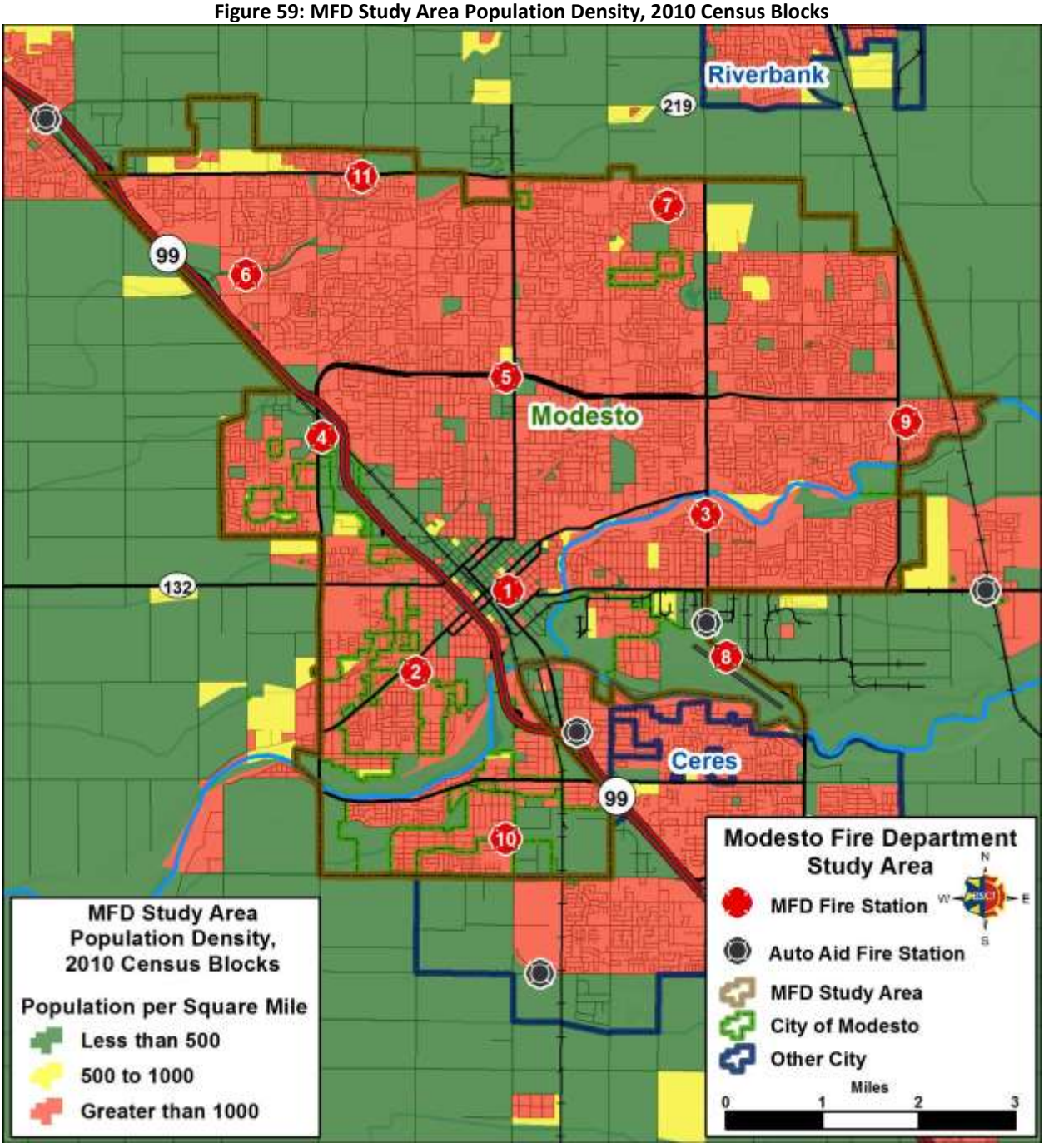
**Figure 58: MFD Station Response Zones**




MFD currently operates from the 11 stations displayed in this figure. The stations are staffed with career firefighters on a 24 hour basis. Note that Station 8, located at the Modesto Airport, is staffed by a single engineer, who operates a specialized aircraft fire fighting apparatus. This apparatus does not routinely respond outside the airport. Station 8 is not included in the travel distance and travel time models later

in the distribution analysis. The following figure displays population density throughout the study area using 2010 US Census Bureau census block data.

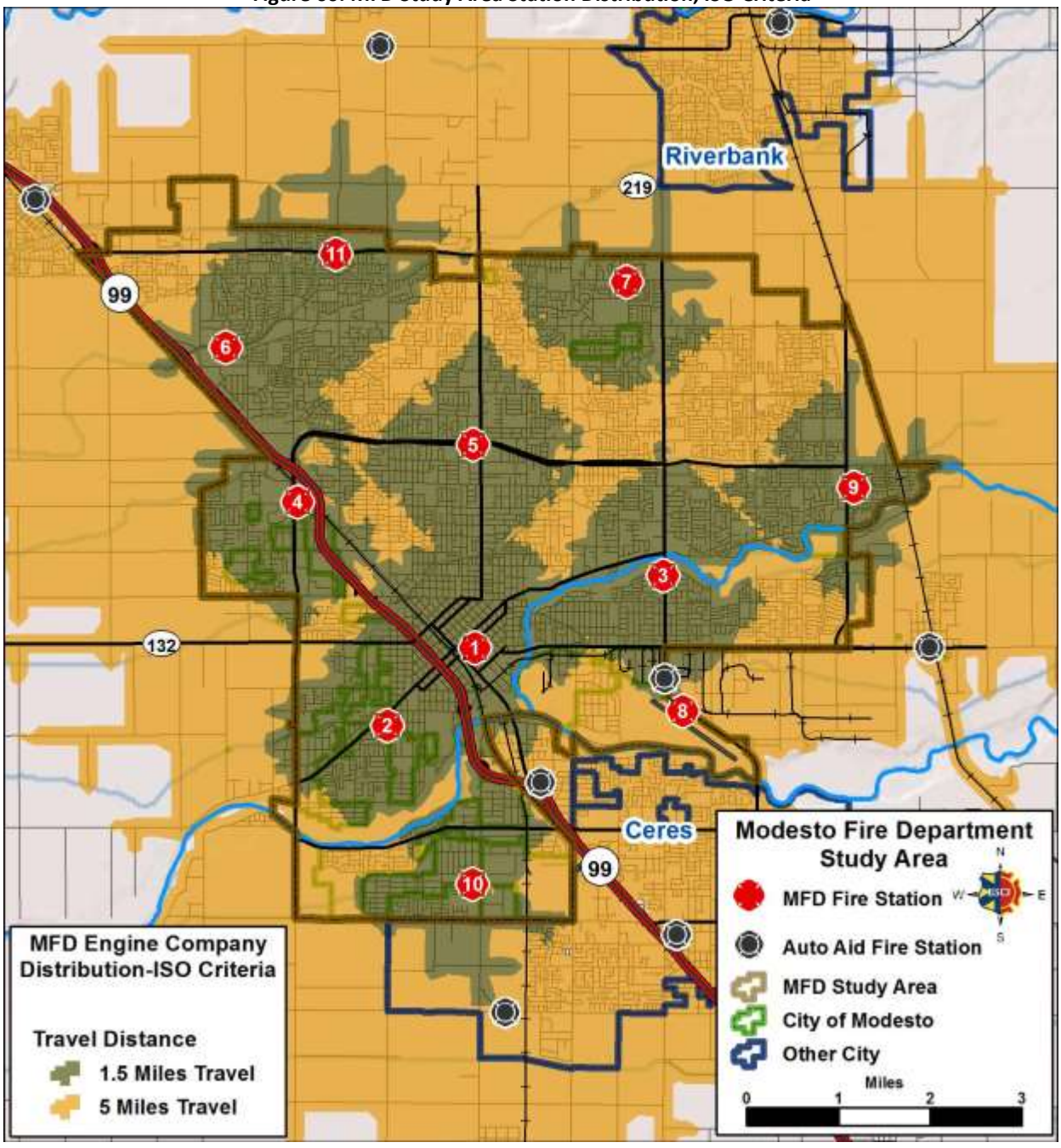
**Figure 59: MFD Study Area Population Density, 2010 Census Blocks**




The population density inside the study area is largely urban in nature. The estimated population of the City of Modesto as of January 2015 (California Department of Finance Demographic Research Unit – most recent estimate available) was 209,186. The overall population density within the MFD service area is over 4,900 per square mile.

The Insurance Services Organization (ISO) is a national insurance industry organization that evaluates fire protection for communities across the country. A jurisdiction's ISO rating is an important factor when considering fire station and apparatus distribution; since it can affect the cost of fire insurance for individuals and businesses. For ISO purposes, response areas are measured at 1.5 miles of travel distance for each engine company; and 2.5 miles for a ladder company (aerial apparatus) on existing roadways. For a structure to be in a protected rating for insurance purposes, it must be within five miles of a fire station. The next two figures examine current MFD station and apparatus distribution based on the rating criteria of the Insurance Services Organization (ISO).

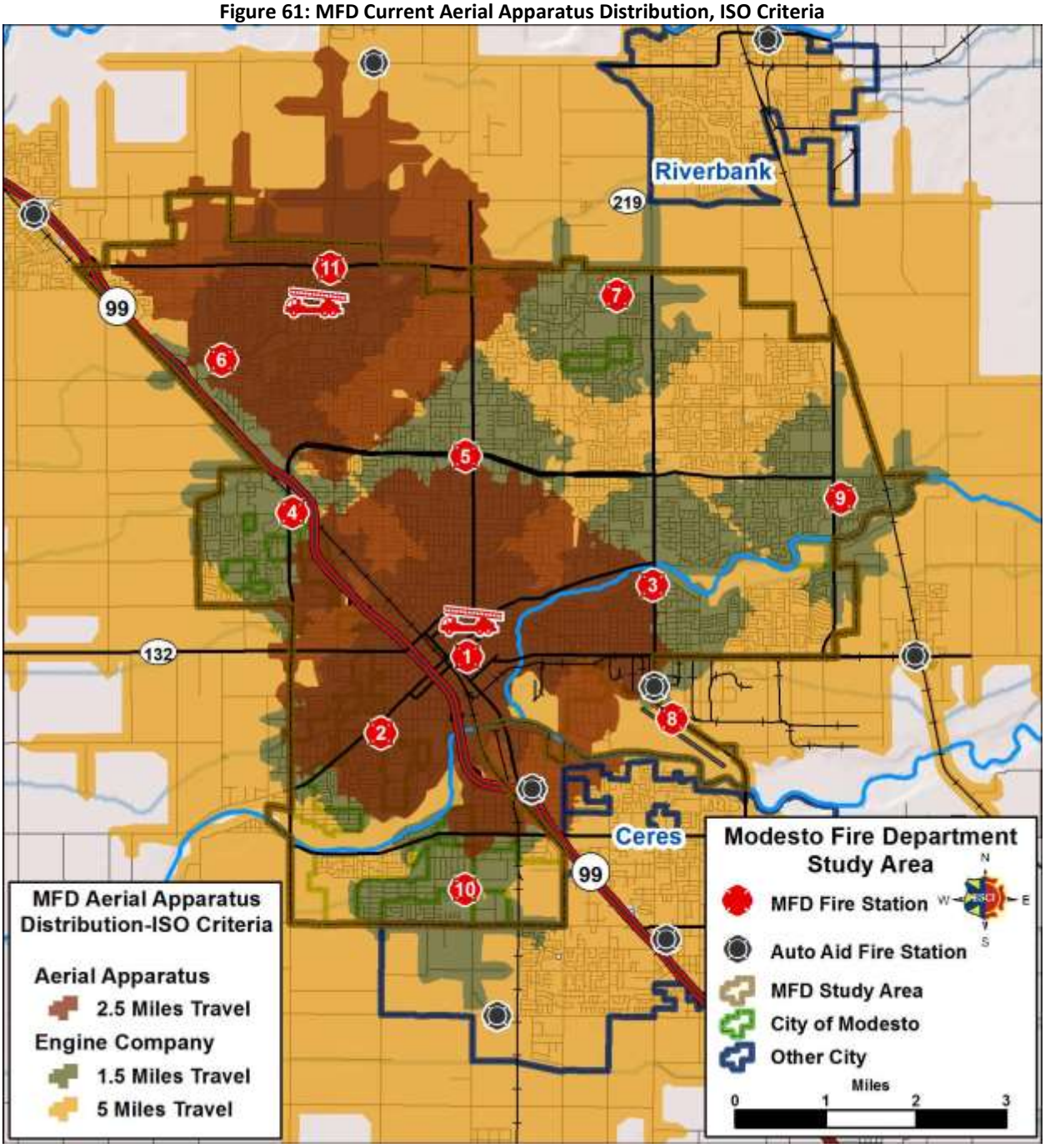
**Figure 60: MFD Study Area Station Distribution, ISO Criteria**



Approximately 64 percent of the current road network within Modesto is within 1.5 miles of a MFD fire station. All of the MFD service area is within five miles of a fire station.

Similar to engine company criteria, ISO recommends that ladder companies (aerial apparatus) be placed at 2.5-mile intervals in areas with buildings over three stories in height.

**Figure 61: MFD Current Aerial Apparatus Distribution, ISO Criteria**



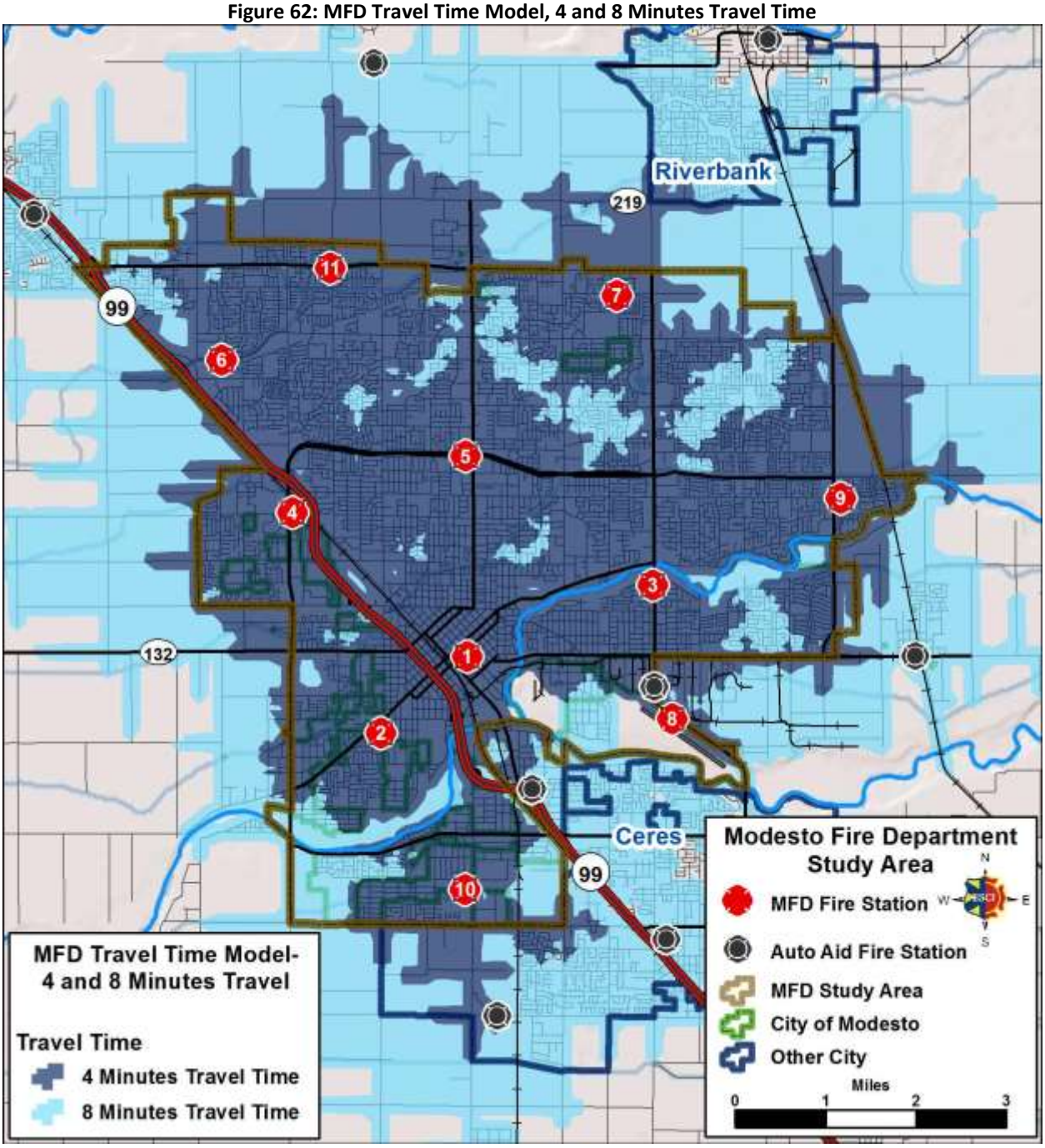

Currently MFD houses aerial apparatus at Station 1 and Station 11. Four personnel at Station 1 staff the aerial at Station 1. The aerial at Station 11 is cross-staffed by the three personnel stationed at this station and respond as an aerial or engine company based on call type and need.

The most recent ISO rating assigned a Public Protection Classification (PPC) of Class 2 (with 1 being the best and 10 being the worst) for the MFD. Based on the ISO rating criteria, the MFD stations and apparatus are distributed effectively within the service area with the exception of aerial apparatus coverage not meeting the ISO 2.5 mile travel time in the northeast portion of the city.

It is worth noting that aerial apparatus coverage is limited and outside the ISO and adopted response time standards in the response areas bordered by stations 3, 5, 7, and 9.

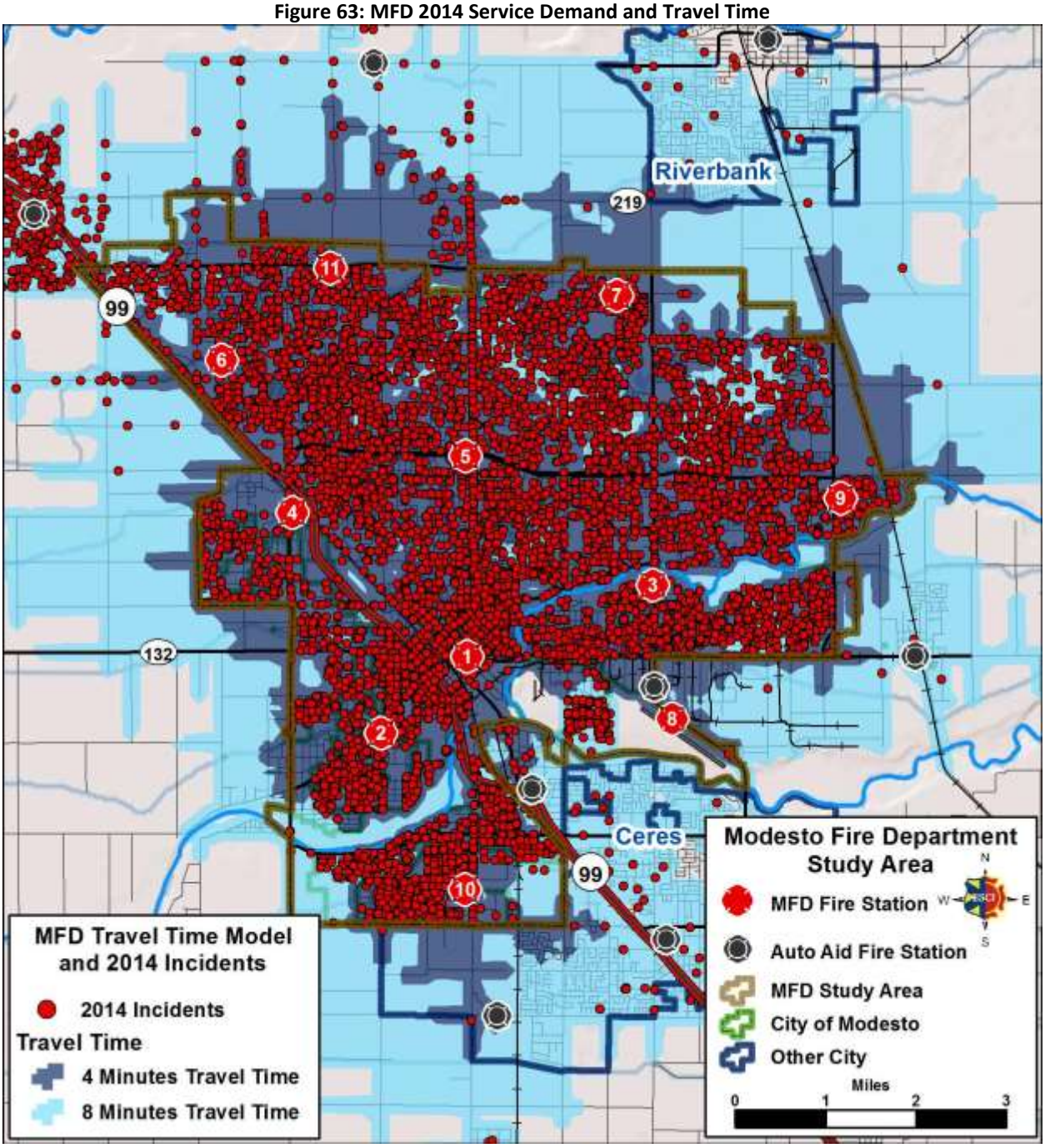
The ISO Public Protection Classification program only addresses fire suppression activities and is primarily concerned with the geographic coverage of property. For fire jurisdictions such as MFD, that respond to all types of emergencies, the travel time required to respond from a fire station to any emergency call for service is of equal importance. The following figures demonstrate travel time over the existing road network. Travel time is calculated using the posted speed limit and adjusted for negotiating turns and intersections.

**Figure 62: MFD Travel Time Model, 4 and 8 Minutes Travel Time**




This previous figure demonstrates that the majority of the MFD service area is within four minutes travel of a currently staffed MFD fire station. More significantly, the following figure demonstrates the percentage of current service demand (2014) that is within four minutes travel of a MFD fire station.

**Figure 63: MFD 2014 Service Demand and Travel Time**



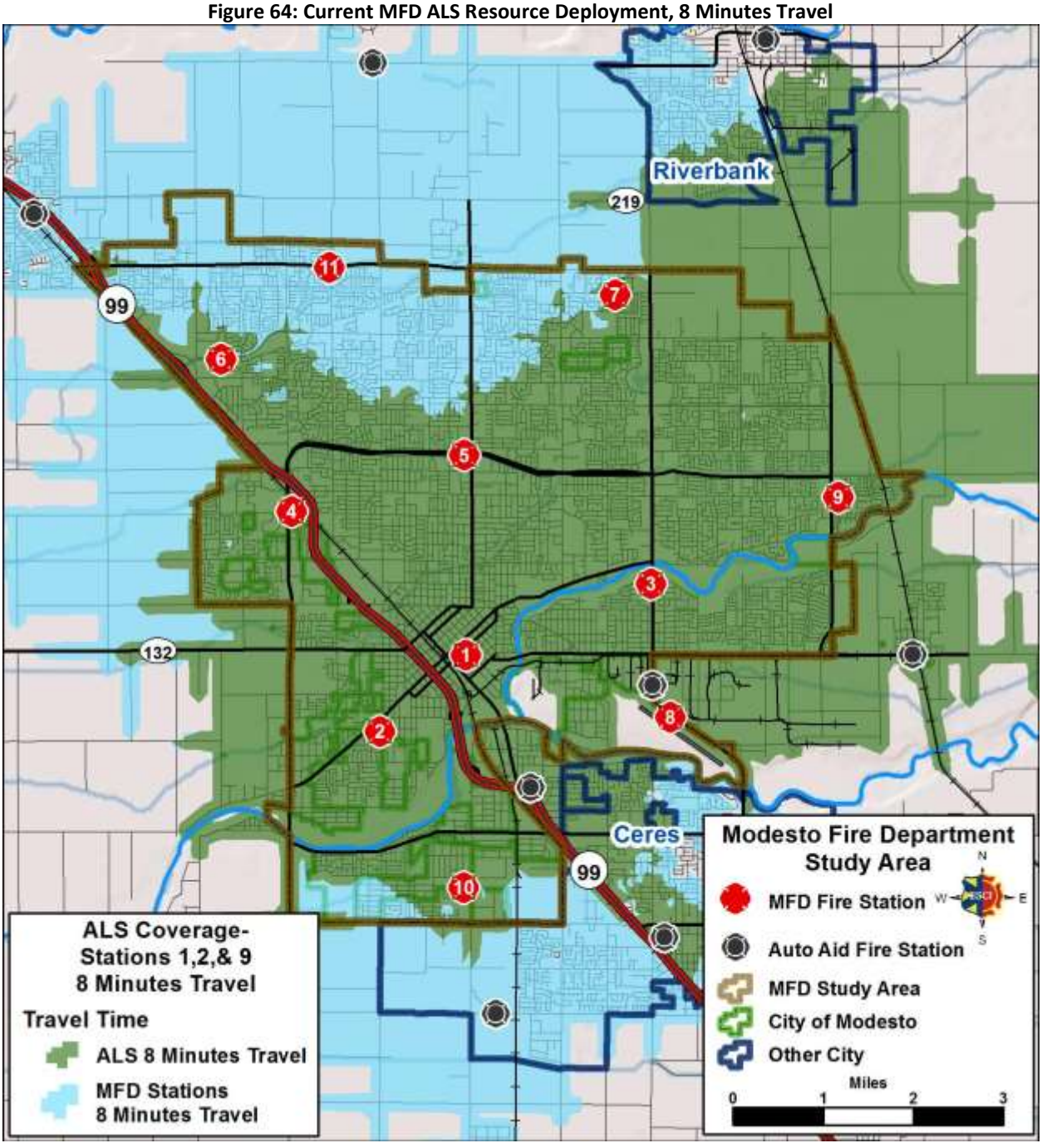

National consensus standards, such as *NFPA 1710,*[5] specify that career staffed, urban fire departments should deploy resources such that 90 percent of emergency service demand can be reached in four minutes travel or less.

[5] *NFPA 1710*, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments* (National Fire Protection Association 2010).

Figure 63 illustrates that based on the four-minute travel time model; MFD apparatus can theoretically reach approximately 88 percent of current service demand in 4 minutes or less travel time. Note this analysis does not incidents outside the MFD study area. Actual MFD travel time and response time performance is discussed in the Response Performance Analysis later in this report.

MFD provides EMS first responder service utilizing the engine companies from the ten stations modeled in the travel time maps displayed above. The department delivers Advanced Life Support (ALS) service from three stations. The following figure demonstrates the portions of the service area within 8 minutes travel of an ALS equipped and staffed MFD station.

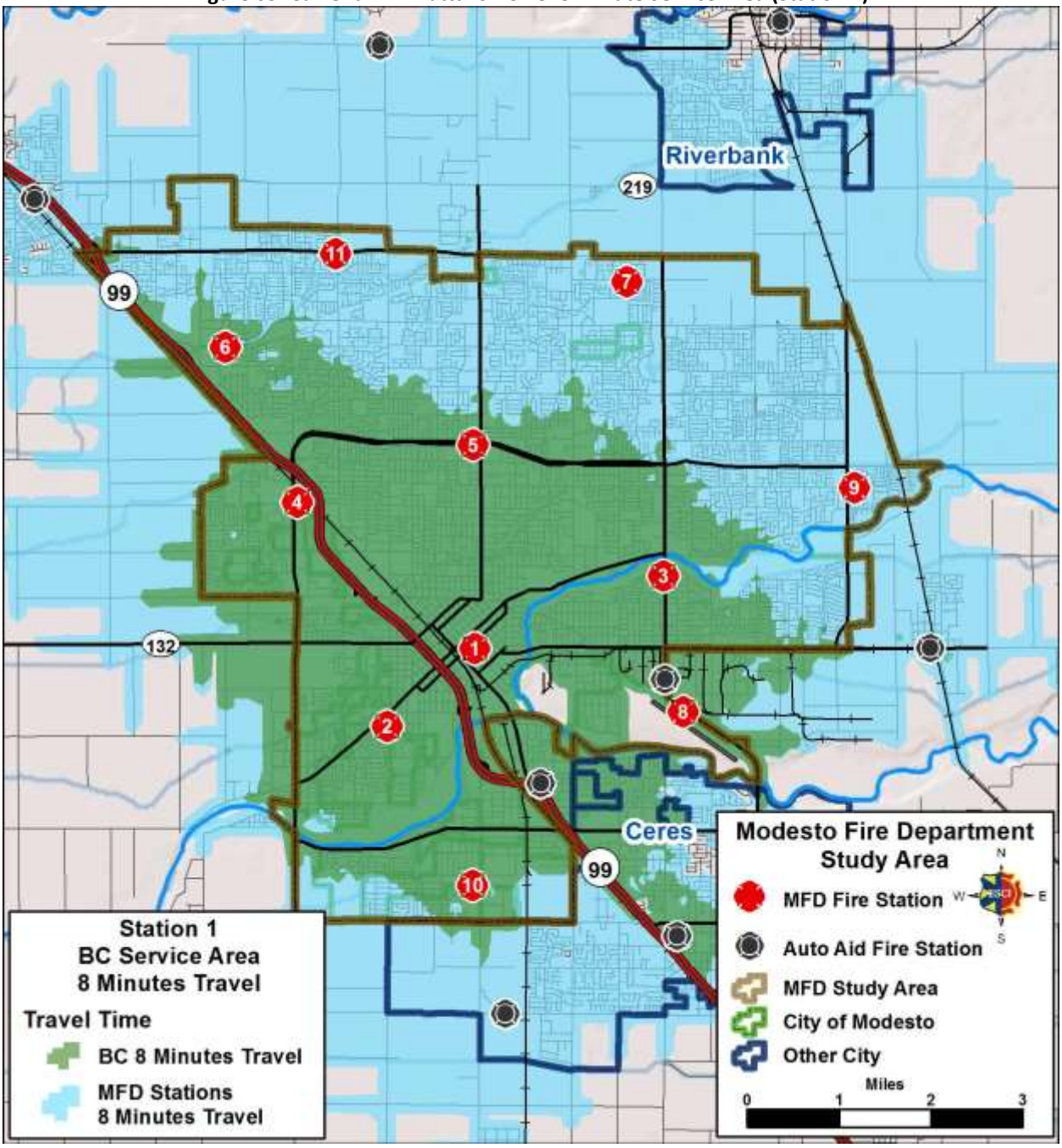
**Figure 64: Current MFD ALS Resource Deployment, 8 Minutes Travel**




Industry best practices call for the arrival of the first ALS responder within eight minutes travel time for ALS incidents. 87.3 percent of 2014 EMS incidents are within 8 minutes travel of a MFD ALS resource. ESCI was unable to distinguish ALS incidents from BLS incidents with the data provided. It is recommended additional ALS first response units be implemented to ensure complete ALS coverage within adopted response times and integration with ambulance response standards.

Currently a single battalion chief (BC), located at Station 1, runs daily emergency operations within the MFD service area. The span of control and the size of the service area for this single command officer has been identified as an area of concern. The following figure demonstrates the eight-minute travel time service area for the battalion chief at Station 1.

**Figure 65: Current MFD Battalion Chief 8 Minute Service Area (Station 1)**



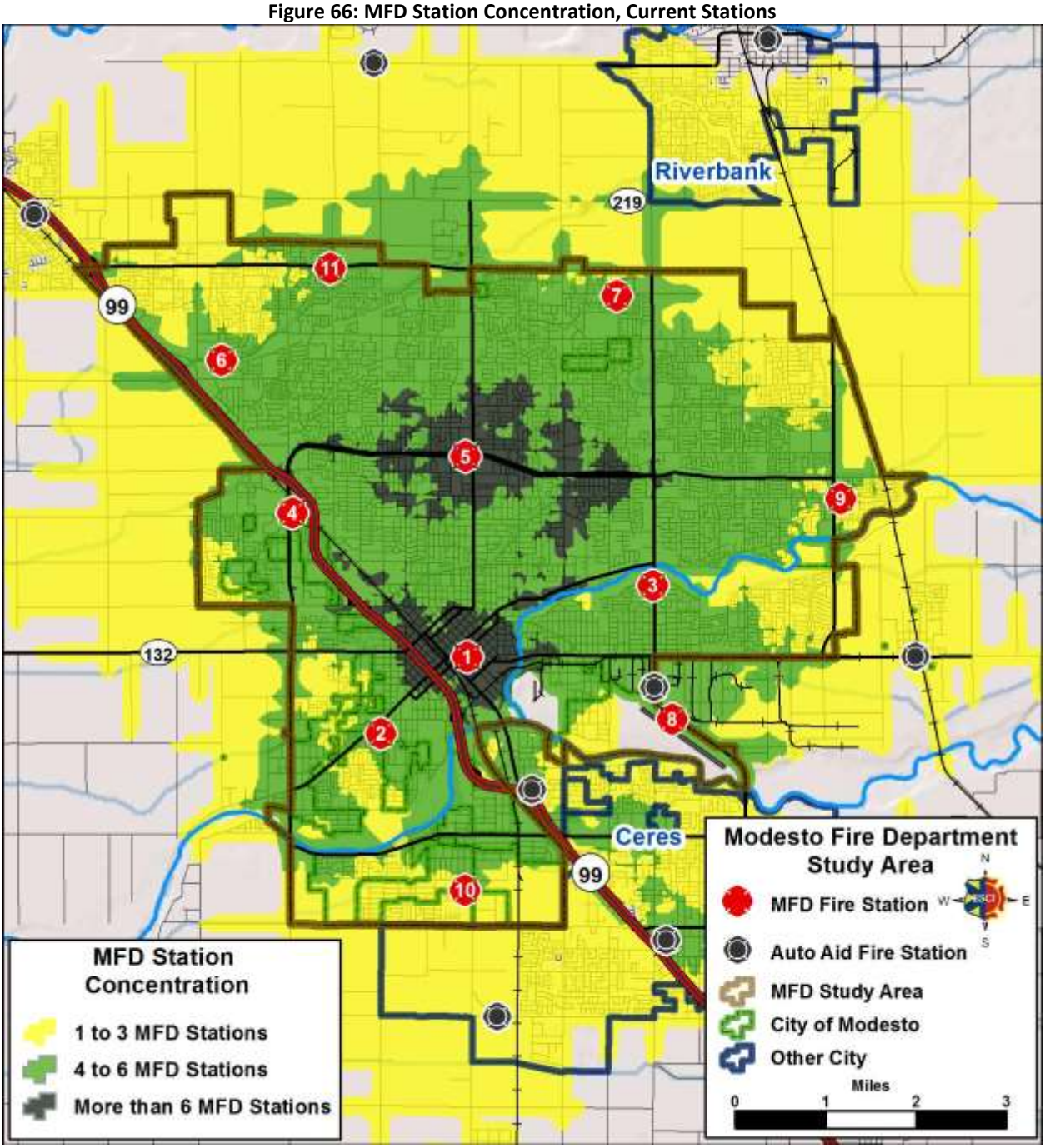

A command officer is part of the initial MFD first alarm assignment for incidents requiring more than one or two apparatus to mitigate the emergency. The previous figure demonstrates that the northern and eastern portions (Stations 11, 7, and 9 first due) of the MFD service area is beyond eight minutes

travel of the BC at Station 1. This affects the department's ability to assemble an effective response force (ERF) in a timely manner for more complex incidents. Further discussion of effective response force occurs in the concentration analysis.

### CONCENTRATION ANALYSIS

The concentration analysis examines MFD's ability to assemble multiple resources (both apparatus and people) such that sufficient resources to safely and effectively mitigate an emergency arrive in a timely manner. The following figure displays the concentration of MFD stations in the study area in eight minutes or less travel time. The eight-minute travel time criteria used for this analysis is based on the National Fire Protection Association (NFPA) Standard 1710. The 1710 standard specifies that the full first alarm assignment for a moderate risk structure fire (single story residential structure) should arrive within eight minutes' travel.

**Figure 66: MFD Station Concentration, Current Stations**




The demonstrated service demand in the MFD service area requires a high concentration of stations to assure that additional apparatus are available to respond when the first due unit is committed to an incident. The highest concentration of stations occurs in the center of Modesto around Station 1 and Station 5. The majority of the service area is within eight minutes travel of 4 to 6 MFD stations. MFD relies on automatic aid resources to provide additional coverage throughout the service area. The following figure displays the station concentration within the MFD service area including automatic aid resources.

**Figure 67: Station Concentration, MFD and Automatic Aid Stations**

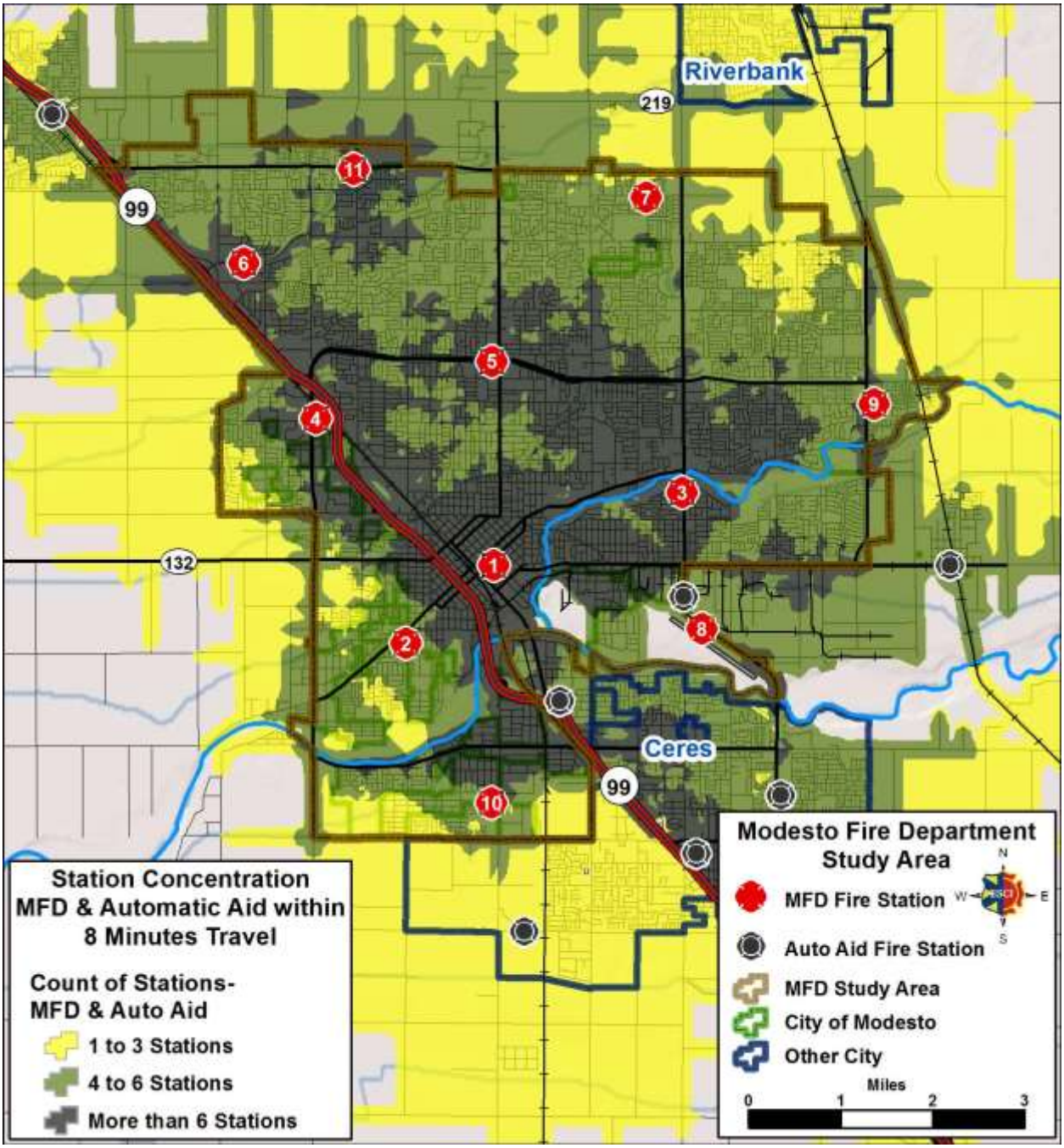
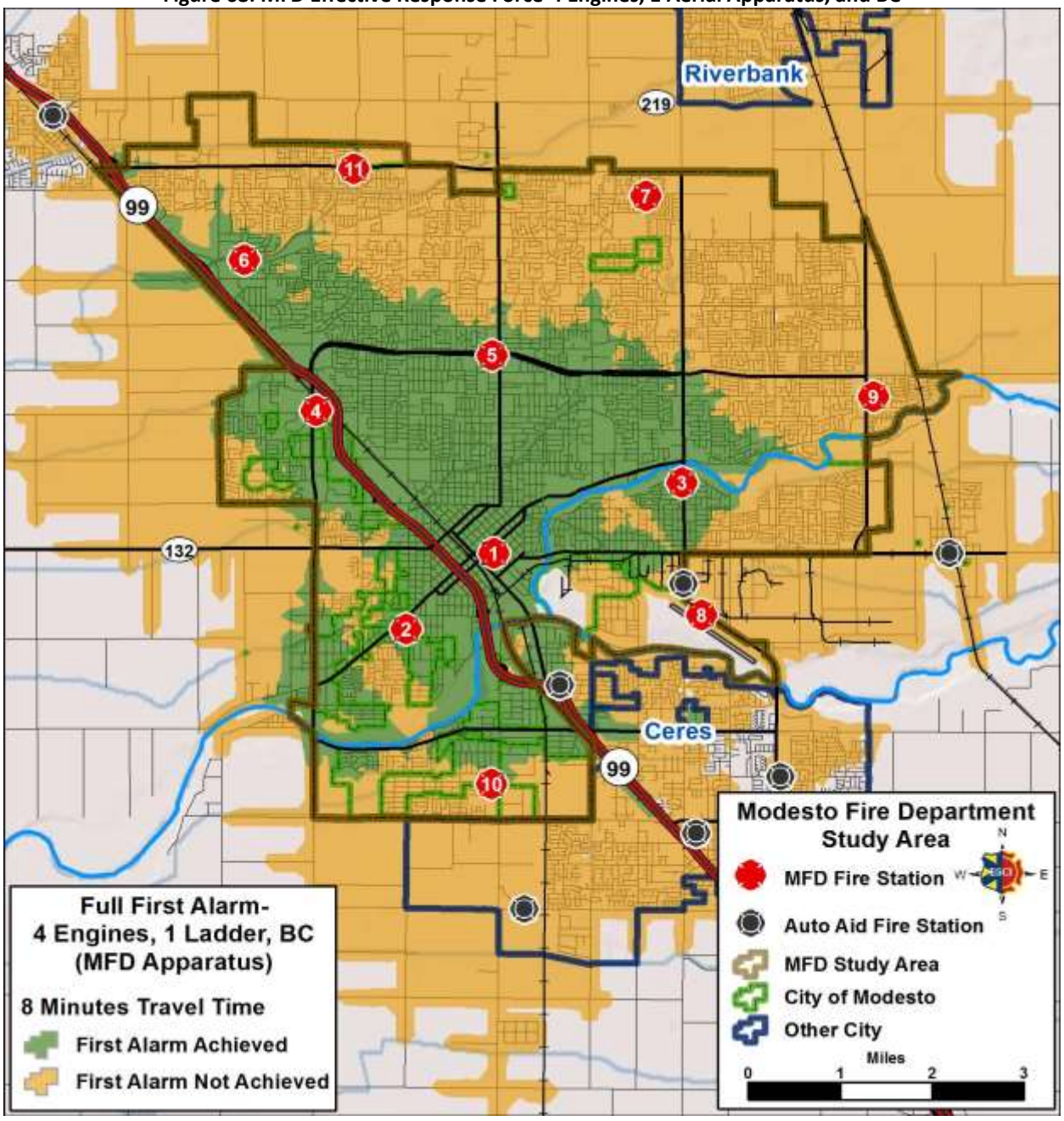



Figure 67 demonstrates that automatic aid resources increase the concentration of resources available in eight minutes travel around the fringes of the MFD service area. Also, examination of the GIS data reveals that large portions of the core area (Stations 1 through 5), are within eight minutes travel of eight to ten stations.

The MFD full first alarm assignment for a working structure fire consists of one ladder truck, four engines, and a battalion chief. The NFPA 1710 standard recommends that the first alarm assignment for

a moderate risk fire incident arrive within eight minutes travel time. This figure displays the portions of the MFD service area within eight minutes travel of a full first alarm assignment.

**Figure 68: MFD Effective Response Force-4 Engines, 1 Aerial Apparatus, and BC**




The current first alarm contingent for a moderate risk structure fire brings 16 personnel on five apparatus and a command officer to the scene, in 8 minutes travel time; for a total of 17 personnel. Note that number of personnel meets industry best practice recommendation of 14-16 personnel for an effective response force for a moderate risk fire suppression incident.[6] While the core area of Modesto is within eight minutes travel of a full first alarm assignment; much of the MFD service area north of

[6] Center for Public Safety Excellence/Commission on Fire Accreditation (CPSE/CFAI) *Standards of Cover, 5th Edition*.

Briggsmore Avenue is beyond eight minutes travel of a full first alarm assignment. Factors that limit the department's ability to assemble a full first alarm are the travel time limitations of the single battalion chief and the lack of an additional fully staffed ladder truck at Station 5.

### RELIABILITY

The workload of emergency response units can be a factor in response time performance. The busier a given unit, the less available it is for the next emergency. If a response unit is unavailable, then a unit from a more distant station (or mutual/automatic aid department) must respond, increasing overall response time. 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.

Simultaneous or concurrent incidents can affect a fire department's ability to muster sufficient resources to respond to additional emergencies. The following figure demonstrates the percentage of the time that MFD resources were committed to more than one incident at the same time in 2014.

**Figure 69: MFD Concurrent Incidents, 2014**

| Concurrent Incidents | Percentage |
|---|---|
| Single Incident | 33.94% |
| 2 | 35.39% |
| 3 | 18.62% |
| 4 | 8.13% |
| 5 or More | 3.92% |

Nearly 34 percent of 2014 service demand within the MFD service area occurred as a single event. Over **66 percent** of the time, two or more incidents were in progress in the MFD service area. The percentage of concurrent incidents experienced by MFD is higher than that experienced by similar fire jurisdictions. The high overall service demand, high volume of working fires, and the number of EMS assists contribute to the high percentage of concurrent incidents.

Unit hour utilization (UHU) measures the amount of time that a unit is committed to an incident. The larger the number, the greater the unit's utilization and the less available it is for assignment to subsequent calls for service. The following figure displays the total time MFD first out apparatus were committed to an incident in 2014 and expresses this as a percentage of the total hours in the year.

**Figure 70: MFD Unit Hour Utilization, 2014 Incidents**

| Apparatus | Average Time Committed | UHU |
|---|---|---|
| Engine 1 | 16:55 | 11.62% |
| Truck 1 | 20:24 | 6.32% |
| Engine 2 | 21:00 | 12.43% |
| Squad 3 | 18:57 | 9.28% |
| Engine 4 | 20:11 | 9.37% |
| Engine 5 | 15:32 | 11.72% |
| Engine 6 | 16:37 | 6.89% |

| Apparatus | Average Time Committed | UHU |
|---|---|---|
| Engine 7 | 18:25 | 7.50% |
| Engine 9 | 20:27 | 6.63% |
| Engine 10 | 21:11 | 7.26% |
| Squad 11 | 20:16 | 4.88% |
| Truck 11 | 21:12 | 3.24% |

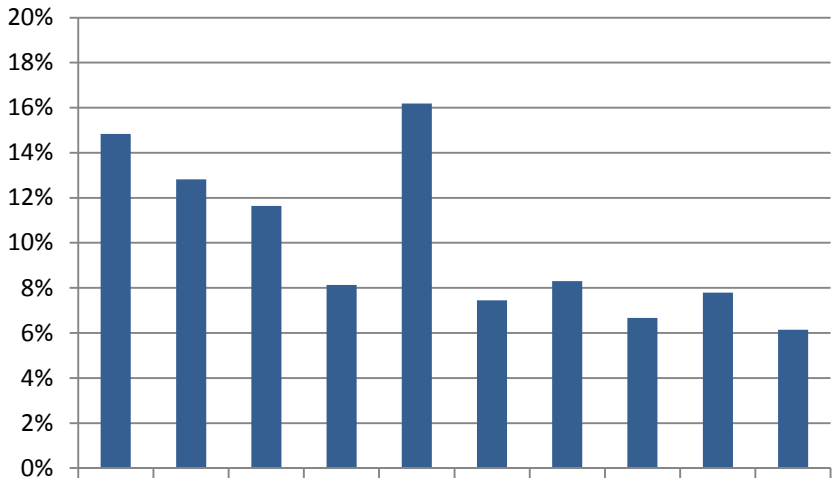
Although MFD apparatus responded to over 24,700 incidents in 2014; the previous figure reveals that the average time an apparatus is committed to an incident is relatively low. Fire service publications such as the Commission on Fire Accreditation (CFAI) *Standards of Cover, 5th Edition*, suggest that UHU rates in the range of 25 to 30 percent can negatively affect response performance and lead to personnel burnout issues. In addition, as the UHU rate increases, companies are less able to perform other duties such as training, public education, or company inspections. MFD apparatus do not demonstrate excessive UHU rates currently; however the first out apparatus respond to a substantial number of incidents per apparatus. The next figure displays the workload per first out apparatus.

**Figure 71: MFD Apparatus Workload-First Out Apparatus, 2014**

| Apparatus | Count of Incidents |
|---|---|
| BC 1 | 1,626 |
| Engine 1 | 3,611 |
| Truck 1 | 1,628 |
| Engine 2 | 3,112 |
| Squad 3 | 2,574 |
| Engine 4 | 2,440 |
| Engine 5 | 3,966 |
| Engine 6 | 2,180 |
| Engine 7 | 2,141 |
| Engine 9 | 1,705 |
| Engine 10 | 1,801 |
| Squad 11 | 1,265 |
| Truck 11 | 804 |

The data in this figure demonstrates that the single engine company at Station 5 is the busiest MFD apparatus. The companies stationed at Station 1 (BC 1, Engine 1, and Truck 1) combined, responded to the highest number of incidents in 2014. Note that this table reflects multiple apparatus responses to the same incident. While MFD responded to over 24,762 incidents within the service area in 2014, the apparatus displayed above responded over 28,800 times which reflects multiple unit responses to the same incident. Note that cancelled incidents, mutual/automatic aid outside of the MFD service area, and incidents with invalid time stamps are not included. The following figure demonstrates the workload per station within the MFD service area.

**Figure 72: MFD Station Workload, 2014**




| | St 1 | St 2 | St 3 | St 4 | St 5 | St 6 | St 7 | St 9 | St 10 | St 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| Percent of Incidents | 14.8% | 12.8% | 11.6% | 8.1% | 16.2% | 7.5% | 8.3% | 6.7% | 7.8% | 6.1% |

Over 55 percent of MFD service demand occurred in the Stations 1, 2, 3, and 5 first due areas. Service demand ranged from 11.6 percent in the Station 3 service area to slightly over 16 percent in the Station 5 area. The remainder of 2014 service demand was distributed within a range of 6.1 percent in the Station 11 response zone to 8.3 percent in the Station 7 service area. Note Station 8 is not included in this analysis.

The ability of a fire station's first-due unit(s) to respond to an emergency incident within its assigned response area is known as unit or station reliability. The following figure demonstrates the percentage of incidents that a first-due apparatus from each of the MFD response zones was the first apparatus on the scene of an emergency incident in their particular station area.

**Figure 73: MFD Station Reliability, 2014 Emergency Incidents**

| MFD Station Reliability-2014 Emergency Incidents | |
|---|---|
| Station 1 | 88.2% |
| Station 2 | 83.4% |
| Station 3 | 87.1% |
| Station 4 | 86.7% |
| Station 5 | 83.3% |
| Station 6 | 87.8% |
| Station 7 | 89.3% |
| Station 9 | 87.4% |
| Station10 | 87.6% |
| Station 11 | 82.1% |

Response performance can be negatively affected by apparatus from a more distant station responding into another station response zone, due to the commitment of assigned apparatus to different incident. To meet a 90$^{th}$ percentile response goal, the optimum station reliability rate should be 90 percent. As seen in the previous figure, station reliability within the MFD service area varies between approximately 82 percent in the Station 11 response zone to slightly over 89 percent in the Station 7 response zone. Actual response performance is discussed in the Response Performance analysis that follows.

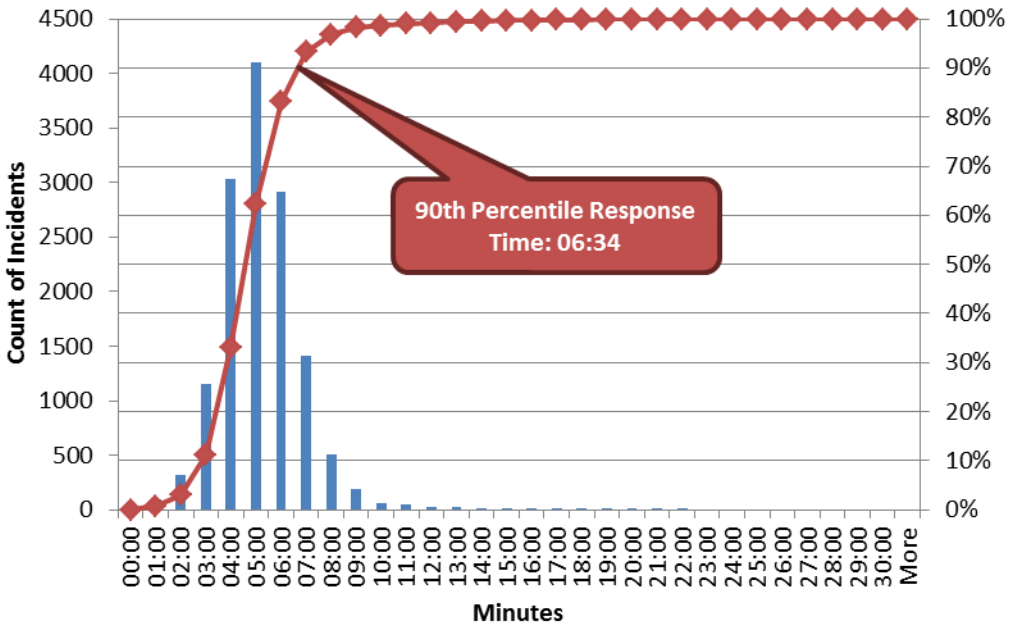
## RESPONSE PERFORMANCE

Perhaps the most publicly visible component of an emergency services delivery system is that of response performance. Policy makers and citizens want to know how quickly they can expect to receive emergency services. In the performance analysis, ESCI examines emergency response performance within the MFD service area. The data used for this analysis is 2014 emergency responses extracted from the MFD records management software (RMS). Non-emergent incidents, mutual/automatic aid incidents outside the MFD service area, incidents cancelled prior to arrival, data outliers, and invalid data points are removed from the data set.

Response time is measured from the time the fire department is notified on the emergency to when the first MFD apparatus arrives on the scene of an emergency. Response performance is calculated using "percentile" measurement. The use of percentile calculations for response performance follows industry best practices and is considered a more accurate measure of performance than "average" calculations.

The first figure in the performance analysis displays overall emergency response performance throughout the MFD service area in 2014.

**Figure 74: MFD Overall Emergency Response Frequency, 2014**




The mean (average) response time is 4 minutes 44 seconds, which represents approximately 54 percent of emergency incidents. Ninety percent of the time (90th percentile), the first MFD apparatus arrived at the scene of an emergency incident in 6 minutes 34 seconds or less during 2014.

Total response time is comprised of several different components:

- Call Processing Time – The amount of time between when a dispatcher answers the 911 call and resources are dispatched.
- Turnout Time – The time interval between when units are notified of the incident and when the apparatus are enroute.
- Travel Time – The amount of time the responding unit actually spends travelling to the incident.
- Total Response Time – Total Response Time equals the combination of "Processing Time," "Turnout Time," and "Travel Time."

Industry best practices documents[7] recommend tracking and recording all of the components of total response time listed above. Currently call-processing time is not consistently recorded in the MFD RMS data. ESCI encourages MFD leaders to work cooperatively with the regional dispatch center to insure that accurate, complete response time data is available and recorded.

Tracking all components of the total response time continuum allows fire departments to identify deficiencies and areas for improvement.

[7] Center for Public Safety Excellence/Commission on Fire Accreditation (CPSE/CFAI) *Standards of Cover, 5th Edition*.

The following figure examines MFD 2014 emergency response performance for the components of total response time that are currently available in Modesto Fire Department response data. For this analysis response time is the interval from when the fire department is notified to the arrival of the first fire department apparatus.

**Figure 75: MFD Emergency Overall Response Time Performance, 2014**

| | Turnout Time | Travel Time | Response Time |
|---|---|---|---|
| **90th Percentile** | 02:49 | 04:34 | 06:34 |

ESCI notes that MFD response performance reported in the MFD 2014 Annual Report states that MFD apparatus arrived at the scene of Fire and EMS emergencies in 6 minutes or less, 92 percent of the time. The performance analysis presented here includes all emergency responses and the results may differ somewhat from the MFD analysis. Additionally, differences in the methodology ESCI used to filter the data set may differ from the methodology employed by MFD. ESCI commends MFD leaders for establishing response performance goals and monitoring response performance. MFD should continue to work toward developing performance goals for all components of total response time performance.

The following figure displays the response performance reported by the MFD records management software (RMS) for Fire and EMS emergencies during 2014. The report is summarized by station area.

**Figure 76: MFD Response Time Report-Fire and EMS Emergencies, 2014**

| Station | Count of Incidents | Total Under 6 Minutes | Percentage |
|---|---|---|---|
| 1 | 2,264 | 2105 | 92.98% |
| 2 | 2,265 | 2126 | 93.86% |
| 3 | 1,779 | 1651 | 92.80% |
| 4 | 1,352 | 1295 | 95.78% |
| 5 | 2,497 | 2374 | 95.07% |
| 6 | 1,215 | 1169 | 96.21% |
| 7 | 1,120 | 1009 | 90.09% |
| 8 | 5 | 3 | 60.00% |
| 9 | 1,037 | 856 | 82.55% |
| 10 | 1,296 | 1177 | 90.82% |
| 11 | 946 | 896 | 94.71% |
| **Overall** | **15,776** | **14,661** | **92.93%** |

According to the MFD report, nearly 93 percent of the time the first MFD apparatus is on the scene of a Fire or EMS emergency incident in six minutes or less. Station 9 and Station 8 do not meet the departmental response performance goal of six minutes (measured from time dispatched to arrival of the first unit). Station 9 is located on the edge of the MFD service area and travel time performance may affect response time performance. Station 8 is the airport firefighting and rescue station; ESCI would suggest that Station 8 response data be considered an outlier.

### *Turnout Time*

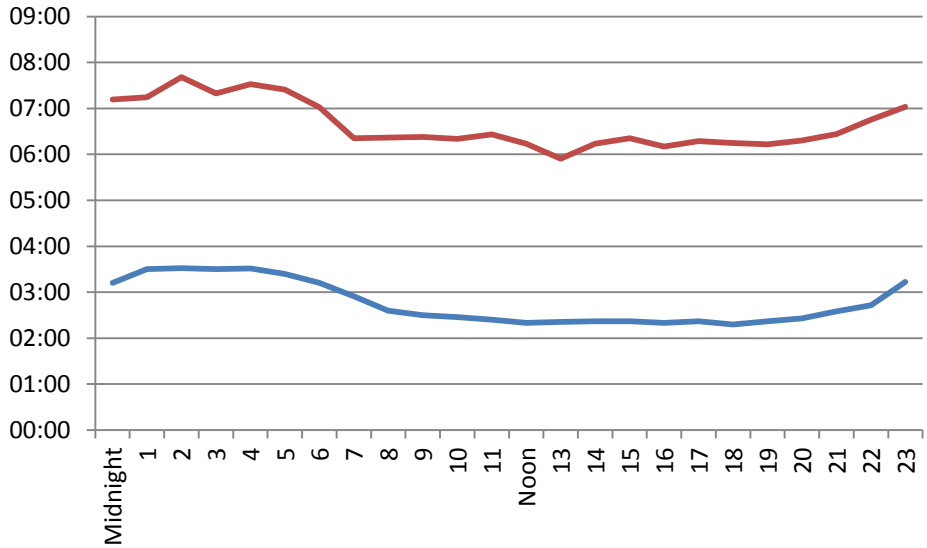
The first component of the response continuum in the figure above, and one that is directly affected by fire department personnel is turnout time. Turnout is the time it takes personnel to receive the dispatch information, don personal protective equipment as appropriate, move to the appropriate apparatus and proceed to the incident. The following figure demonstrates MFD turnout time performance for 2014, summarize by station area.

**Figure 77: MFD Turnout Time Performance by Station Area, 2014**

| Station | Turnout Time 90th Percentile |
|---|---|
| 1 | 03:07 |
| 2 | 02:45 |
| 3 | 02:46 |
| 4 | 02:52 |
| 5 | 02:28 |
| 6 | 02:44 |
| 7 | 02:46 |
| 9 | 03:03 |
| 10 | 02:41 |
| 11 | 02:50 |

Overall MFD turnout time performance is 2 minutes 49 seconds; the figure above demonstrates that turnout time performance ranges from 2 minutes 28 seconds in the Station 5 response area to over 3 minutes at Stations 1 and 9. Turnout time appears excessive for a career staffed fire agency; and does not meet national consensus standards such as the NFPA 1710 Standard for Career Fire Departments. The figure below displays the almost direct correlation between turnout time and total response performance.

**Figure 78: MFD Turnout Time (Blue) and Response Performance (Red), 2014**



The rise in turnout time at night is a nationwide phenomenon and is reflected in an increase in total response time during the same period. Turnout time is one component of total response time that fire department personnel have some ability to control; given training, information, and proper facilities that allow for the rapid and efficient movement of responders. ESCI encourages MFD to monitor turnout time performance and provide performance information to response personnel for self-correction.

### *Travel Time*

Travel time is potentially the longest component of total response time. The distance between the fire station and the location of the emergency influences total response time the most. The quality and connectivity of streets, traffic congestion, and geography all play crucial roles in travel time.

**Figure 79: MFD Emergency Travel Time Performance by Station Area, 2014**

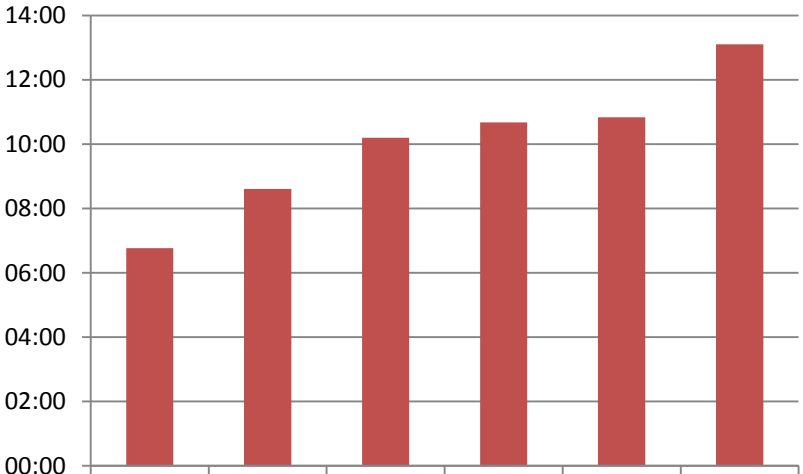
| Station | Travel Time 90th Percentile |
|---|---|
| 1 | 04:29 |
| 2 | 04:19 |
| 3 | 04:24 |
| 4 | 03:54 |
| 5 | 04:29 |
| 6 | 03:56 |
| 7 | 04:53 |
| 9 | 05:25 |
| 10 | 05:00 |
| 11 | 04:17 |

Travel time varies throughout the MFD service area. Stations 4 and 6 demonstrate the best travel time performance; while Stations 9 and 10 experienced the longest travel times during 2014. Referring to

**Figure 76**,, ESCI notes that in the MFD service area total response time performance by station area mirrors travel time performance by station area. This illustrates the importance of recording and monitoring all components of the response time continuum.

Up to this point, the performance analysis has been concerned with response time performance for the first arriving apparatus. The last analysis in the performance summary examines response performance as it pertains to the assembly of multiple apparatus at a structure fire. As discussed in the concentration study, a full first alarm assignment for a working structure fire consists of four engines, one aerial device, and a command officer. This brings 17 personnel to the scene of a structure fire. This compliment of personnel and apparatus would be considered a full first alarm or Effective Response Force (ERF). The figure below examines MFD's response performance for the first though the sixth apparatus on scene at structure fires in 2014.

**Figure 80: MFD Structure Fire Response Performance by Arrival Order, 2014**




| | First | Second | Third | Fourth | Fifth | Sixth |
|---|---|---|---|---|---|---|
| 90th Percentile | 06:46 | 08:36 | 10:12 | 10:40 | 10:50 | 13:06 |

For this analysis, ESCI examines 2014 incidents classified as a structure fire in the MFD incident data. The first arriving apparatus generally waits less than two minutes for the second apparatus to arrive. The difference between the first unit and the sixth unit is over 6 minutes. MFD has established a response performance goal of 10 minutes for the arrival of an Effective Response Force (ERF) measured at the 90$^{th}$ percentile. The figure above demonstrates that MFD does not meet the established performance goal for the arrival of a full first alarm for a working structure fire. There are various factors that can affect a jurisdiction's ability to assemble multiple resources. The excessive travel time required to assemble multiple resources (especially the BC and ladder companies) and a lack of availability due to service demand and concurrent incidents are most probably the two factors that have the greatest negative affect on MFD's ability to meet the department's response performance goal for an effective response force.

## Support Programs – Training

Providing safe and effective fire and emergency services requires a well-trained workforce. Training and education of personnel are critical functions. Without quality, comprehensive training programs emergency outcomes are compromised and the safety of emergency personnel may be at risk. One of the most important jobs in any department is the thorough training of responders.

Initial training of newly hired firefighters is essential, requiring a structured recruit training and testing process. Beyond introductory training, personnel need to be actively engaged on a regular basis and tested regularly to ensure skills and knowledge are maintained. To accomplish this task, the fire department must either have a sufficient number of instructors within its own organization or work with their regional partners to provide those resources. The training program should be based on a structured annual plan and educational sessions should be formal and follow prescribed lesson plans that meet specific objectives.

In the following pages, ESCI reviews MFD training practices, compares them to national standards and best practices, and recommends modifications where they are found to be appropriate.

## GENERAL TRAINING COMPETENCIES

For training to be fully effective, it should be based on established standards. There are a variety of sources for training standards. MFD uses the NFPA and the International Fire Service Training Association (IFSTA) as the basis for its fire suppression training practices. California Emergency Medical Services continuing education and MFD Medical Director's standards are used as the baseline for medical training coursework.

**81: Survey Table – General Training Competencies**

| Survey Components | Modesto Fire Department Observations | Comments and Recommendations |
|---|---|---|
| **General Training Competency** | | |
| Incident Command System | NIMS Based System Is Used | |
| Accountability Procedures | "Passport" System Is In Place | |
| Policy And Procedures Training | Yes | |
| Safety Procedures | Yes | |
| Special Rescue (High Angle, Confined Space, Etc.) | High Angle, Confined Space, Trench, Water Rescue | |
| Hazardous Materials | Technician And Specialist Levels | |
| Wildland Firefighting | Red Card | |
| Vehicle Extrication | Yes | |
| Defensive Driving | Via Drivers Training Target Solutions Coursework. Annual Skills Proficiency Component. | |
| EMS Skills And Protocol | Consistent With Continuing Education Requirements. 24 Hours BLS, 48 Hours ALS Annually Plus Local Change In Protocol Or Related Training. | |
| **Entry Level Recruit Training** | | |
| Required Minimum Entry Training | Required To Have Completed An Accredited Firefighter I Academy Plus EMT-Basic Level Certification. | |
| Minimum Recruit Training Requirement | A "Firefighter Trainee" Completes A 10 Week Training Period. Some Hired Directly As A Firefighter At Step A And At Reduced Recruit Training Requirement. Tied To Immediacy Of Need To Get The New Hire On Line. Not Well Defined, Not Standardized. | Develop A More Structured, Standardized New Recruit Training Protocol With More Clearly Defined Recruit Requirements And Practices. |
| Delivery Methodology | Loosely Defined And May Be Independently Structured Based On How Quickly The Department Needs To Get A New Hire On Line. Not Adequately Tied To Minimum Standard Requirement | Same As Above |
| Probationary Practices | One Year Probationary Period. Task Book Sign Off Required. Based To The Complete Firefighter I And II Requirements. | Probationary Process Is Well Defined And Effective. |

**Key Recommendations:**

- Review, update and provide greater structure to the current process of new-hire training and response qualification.
- Provide additional focus on firefighter safety in training activities.
- Incorporate pre-incident planning into the ongoing training program.
- Develop more clearly defined minimum annual training requirements.

**Discussion**

ESCI first reviews the baseline competencies that are addressed as a part of a fire department's training program, as listed in the first section of the above figure. Based on that review, it is apparent that MFD is including the appropriate fundamental elements in its training program.

### *New Personnel Training*

Proper training of emergency services personnel starts prior to being hired or joining an agency. Specific knowledge and skills must be obtained to achieve a basic understanding of the roles and responsibilities of an emergency responder. MFD has addressed this need by requiring Firefighter I certification level training at a recognized regional or state fire academy, along with certification at the EMT-Basic level, as a minimum qualification for hire. Doing so enables the agency to hire new personnel that are qualified at a minimum standard and avoids the need to conduct time-consuming recruit training programs.

Subsequent to initial hire, new personnel are placed on a ten-week training schedule that is MFD-specific training and supplemental to what they have obtained to meet the minimum requirements of Firefighter I education. The additional training is conducted to insure that the new hire is adequately familiarized with equipment and practices specific to the MFD.

However, it was indicated to ESCI that the new-hire training practice is not adhered to consistently. At times when the department is shorthanded and needs to get a new firefighter on-line quickly, the process may be shortened and the time requirement reduced. Indications are that the process of training and qualifying new personnel is not well developed or consistent in its application, which may result in compromised skill development and, potentially, safety concerns. ESCI recommends that the training of new personnel be reviewed and more effectively structured.

### *Firefighter Safety Training*

Firefighter safety is generally incorporated into routine training activities addressed in the course of regular training, but is not separated specifically as dedicated safety training. Safety education could be more effectively delivered by incorporating the national "Fire Safety Initiatives" and the "Firefighter Close Call" reporting system. A close call reporting and review system should be in place to ensure release of initial observation and recommendations relating to any significant safety or close call incident within 72 hours of occurrence. A program such as the California Department of Forestry and Fire Protection (Cal Fire) "green sheet" near miss reporting system is a good model to review and replicate.

### *Pre-Incident Planning*

A pre-incident (or pre-fire) plan is a simple document that is developed for commercial occupancies and target hazard buildings for the purpose of providing firefighters with information about a building, should a fire occur there. Information is typically gathered regarding a building's configuration, exiting, protection systems, and hazards that may present themselves to a firefighter in the event of an incident. Pre-incident plans help to make firefighting more effective and to provide for increased firefighter safety. MFD has established a pre-incident planning process in its fire prevention division; however, it does not appear to be incorporated into ongoing training practices. ESCI recommends the department develop a pre-incident planning training component.

### *Minimum Training Requirements*

The MFD personnel are generally trained to the Firefighter I and II level as defined by the California State Fire Marshall's Office and NFPA standards. The department has indicates that baseline training requirement are aligned with the minimum requirements necessary to local state and federal continuing education requirements. Beyond that minimum standard, there is not a well-developed departmental minimum standard in regard to annual or periodic training requirements. Additional development of minimum requirements is recommended.

### *Training Program Management and Administration*

To function effectively, a training program needs to be managed. Administrative program support is important, though frequently weakly addressed. An additional element of effective administration is the development of program guidance in the form of training planning, goals, and defined objectives.

The next figure reviews the MFD training program administration and management practices.

**Figure 82 : Survey Table – Training Program Management and Administration**

| Survey Components | Modesto Fire Department Observations | Comments and Recommendations |
|---|---|---|
| **Training Administration** | | |
| Director Of Training Program | Training Officer Is Currently A Captain, Designated As Training Officer. His Is The Only Training Position, With No Delivery Or Administrative Support. | Provide Greater Training Program Support. Establish Shift-Level Training Delivery Personnel And Administrative Support Measures. Consider At Least One Additional Dedicated Training Program Position. |
| EMS Training | EMS Coordinator Is Responsible For Oversight Of EMS Training, Collaboratively With Training Officer. | Establish Shift And Administrative Support Measures. |
| Program Goals And Objectives Identified | 2-Year Training Plan In Place. Goals To Meet Local State And Federal Continuing Education Requirements. | |
| Governing Body Support And Concurrence | Limited Awareness Of Training Need. Recent “Fire 101” Event Raised Awareness. | |
| **Recordkeeping** | | |
| Individual Training Files Maintained | Yes | |
| Records And Files Computerized | Yes, But In Dual Platforms. Mainly Captured In Fire EMS. Target Solutions Used For EMS CE Primarily, But Attempting To Move All To Target Solutions. | Centralize All Training Recorded Keeping In A Single Platform. |
| Daily Training Records | Yes | |
| Company Training Records | Yes | |
| Lesson Plans Used | Lesson Plans In Place For Most Areas | |
| Pre-Fire Planning Included In Training | Through Fire Prevention Division | |
| **Administrative Priority** | | |
| Budget Allocated To Training | Program Is Not Funded Adequately. Program Budgeting In Limbo Due To The MRFA Separation – Undetermined At This Time. | Increase Budget To Meet Mandates And Annually Adopted Training Schedule And Standards. |
| Using Certified Instructors | Yes | |
| Annual Training Report Produced | No Formal Report | |
| Adequate Training Space/Facilities And Equipment | Inadequate. Most Stations Do Not Have Classrooms And Do Not Have Connectivity To Video Conferencing Resources. Access To Use Of Training Center Is Declining. | Establish Adequate Video-Conferencing For Training Delivery. |
| Maintenance Of Training Facilities | Via Regional Training Center | |
| Training Program Clerical Support | No Dedicated Clerical Support | |

| Survey Components | Modesto Fire Department Observations | Comments and Recommendations |
|---|---|---|

**Key Recommendations:**

- Provide an additional, dedicated, position to assist in managing the training program.
- Appoint shift-level training delivery positions.
- Establish a Training Advisory Committee (TAC) that produces an annual training plan.

**Discussion**

The MFD training program operates under the oversight of a single captain. The assigned captain is well qualified and experienced and has an appropriate background for training program management.

### *Training Program Administration*

The training program is inadequately staffed. The captain is the only position dedicated to training and must perform all aspects of the administration and coordination of the department's training program, absent dedicated assistance with training delivery, program management, or administrative support. This staffing model results in a significant workload, considering the need to provide requisite training for fire, EMS and other response services, professional development, and operational oversight. ESCI encourages MFD to reevaluate the resources assigned to this function and add personnel and funding, as needed.

It is recommended that the city consider dedicating a minimum of one additional FTE position to the training division. Further, it is advised that a training position be established on each of the three shifts, serving in a role of shift training officer to provide for the delivery of educational content identified by the program administrators.

### *Training Program Planning*

While the training program operates effectively overall, it does so in the absence of a structured program planning process with input and contributions from members of the organization. To be fully effective, training delivery should be based on:

- Periodic training needs assessments
- Defined annual program goals based on the needs assessment
- Specific delivery objectives addressing program goals
- A process of performance measuring and monitoring
- Periodic re-evaluation and modification

ESCI recommends a "Training Advisory Committee" be utilized to develop the annual training plan based on the above criteria including clearly defined program goals and objectives. The committee should be comprised of a diverse representation from various ranks, stations, and subject matter experts. This group can be very effective identifying training needs as well as recommending relevant strategies to meet departmental, shift, company, and individual needs.

## TRAINING RESOURCES AND METHODOLOGY

In order to deliver effective training to fire and EMS personnel, some resources are necessary to arm the trainer with the tools needed to provide adequate educational content. In addition to tools, effective methodologies must be employed for delivery to be sufficient to meet needs.

**Figure 83 : Survey Table – Training Resources and Methodology**

| Survey Components | Modesto Fire Department Observations | Comments and Recommendations |
|---|---|---|
| **Training Facilities And Resources** | | |
| Training Facilities (Tower, Props, Pits) | Modesto Regional Fire Training Center Includes Multiple Props. State Of The Art Training Facility, But Access For Training Use Is Problematic Due To Availability. | Crews Are Often Unable To Schedule, And Have To Use Alternative Locations. |
| Live Fire Prop | Offsite At Wastewater Treatment Plant | |
| Fire And Driving Grounds | At Training Center | |
| Classroom Facilities | Three Classrooms At Training Center, But Difficult To Access. Many Stations Do Not Have Classrooms. | Need To Develop Options For "Overflow" Training Needs. Having To Move Classes Offsite Due To Scheduling Conflicts. |
| AV, Projectors, Computer Simulations | Training Center Is Well Equipped. There Are Very Limited AV Resources In The Stations And No Effective Video Conferencing. | |
| Books, Magazines, Instructional Materials | Adequate Supply. Centralized Library At The Training Center. | |
| **Training Procedures Manual** | | |
| Manual Developed And Used | A Training Manual Is Accessible On The Intranet. However The Content Is Very Dated And Not Maintained In A Current State. | Prioritize Development And Maintenance Of An Appropriately Developed Training Manual And Lesson Plans. |
| IFSTA Manuals Used | Yes | |
| **Training Scheduling** | | |
| Career Training Schedule | 2 Hours Training Per Day Required And Enforced – Incident Volume May Interfere, However. | |
| Volunteer Training Schedule | N/A | |
| Minimum Training Hours, Competencies | Meet 2 Hour Daily Training Requirement And Mandated Training Requirements. | |
| **Methodology Used For Training** | | |
| Manipulative | Yes | |
| Task Performances | In Task Books For Probation Only | |
| Annual Training Hours | 2 Hour Per Shift Requirement | |
| Use Of Lesson Plans | Yes | |
| Night Drills | Yes | |
| Multi-Agency Drills | Frequently | |
| Inter-Station Drills | Frequently | |

| Survey Components | Modesto Fire Department Observations | Comments and Recommendations |
|---|---|---|
| Physical Standards Or Requirements | None | |
| Annual Performance Evaluation Conducted | No Periodic Skills Competency | Establish And Implement Skills Competency Program And Requirements (Utilize Same Standards For Return To Duty). |
| Employee Development Program | None | Was In The Past. Implement A Succession Planning Process And Requirements. |
| **Operations And Performance** | | |
| Disaster Drills Conducted | Mass Casualty And Similar Drills Annually | |
| Attention To Safety | High | |
| Post Incident Critique(After Action Review) | Completed By Operations And Battalion Chiefs. Scalable Based On Incident Significance. | |
| Priority By Management Toward Training | High | |

**Key Recommendation:**

- Pursue improved access to the Modesto Regional Training Center.
- Improve fire station classroom facilities.
- Implement an effective video conferencing system to share training between stations.
- Review and update the department's training manuals and other foundational program documents.
- Implement an employee professional development program.
- Establish a program of periodic skills proficiency testing.
- Consider a competency-based training program design.

**Discussion**

ESCI finds that the MFD training program lacks many of the foundational structural elements that are expected to be seen in a fully effective program in an organization serving a community the size of Modesto. This is not to say that personnel are not capable and appropriately educated, but that a need exists for improved structure, management, and establishment of clear standards and requirements. The department is encouraged to assign a high level of priority to training program improvements.

Modesto firefighters are also significantly challenged in regard to their access to necessary training. While a standard is in place requiring that personnel undertake a minimum of two training hours per day, meeting the requirement is difficult due to the high volume of emergency responses that the department sees. As a result, personnel are not able to meet minimum needs.

### *Training Facilities and Resources*

A training facility or drill ground is an indispensable element. Training facilities provide a controlled and safe environment to simulate emergencies, developing and testing the skills of emergency workers. ESCI learned that hands-on training facilities are challenging for MFD. The Modesto Regional Training Center (MRTC) is a state of the art training facility with extensive drill grounds, props, and classroom resources. However, access to the center was reported to be an ongoing problem, largely because the resource is shared with other agencies, competing for scheduling opportunities. In addition, the current level of call volume and unit hour utilization impacts the ability of MFD units to assemble and perform hands-on training without interruption. As a result, much training has to be completed using alternative buildings and parking lots.

Classroom instruction is an essential component of preparing emergency responders with knowledge and skills. At MFD, classroom facilities in the existing fire stations are limited and generally inadequately equipped with audio-visual equipment. Finally, there is not an adequate video-conferencing system in place between stations.

It is recommended that the MFD work with the MRTC and its regional partners in addressing the shared needs of the various organizations, while improving access to the training center's resources. In addition, ESCI recommends that classroom facilities in the existing fire stations be updated and that an effective video conferencing system be established.

### *Training Manual*

A departmental training manual is the foundation upon which the delivery of educational content is based. In the absence of this kind of document, personnel will tend to train in "the way we do it here," rather than in a manner that is consistent with the department's established operational practices and standards.

Some components of a training manual are in place and accessible over the city intranet. However, information developed in the course of stakeholder interviews indicates that the content is out dated. The development of a current and comprehensive departmental training manual is essential to the organizations ability to meet current and growing training demands. ESCI recommends the MFD identify the revision and update of the existing document to a current state as a high priority. It is further recommended that the training manual be reviewed in coordination with the previously recommend training advisory committee.

### *Professional Development*

Beyond the regular training offered to general staff, certain individuals should be offered specific officer development training in order to prepare them for more responsibility as they progress through the agency's command structure. Placing individuals in positions of authority without first giving them the tools to succeed often ends in failure and discouragement by both the officer and their subordinates. A professional development program was reportedly in place in the past, but was discontinued. ESCI recommends that the MFD restore or establish standardized professional development programs.

### *Performance Standards and Periodic Skills Evaluation*

It is important that a fire department adopt appropriate standards that set minimum physical capability levels and that demonstration of skills competence is required periodically. Regular testing of hands-on

skills competency is essential to assure not only that personnel are receiving adequate training, but they also are able to put their knowledge and skills into practice. A program of periodic skills testing not only enables the department to verify that its personnel possess the necessary capabilities, but it also provides a valuable tool for assessing the effectiveness and subsequent training calendar needs of the organization's training program.

MFD does not routinely undertake a skills testing process. Doing so can be accomplished by completing an annual evaluation process. Alternatively, skills assessment can be incorporated into the ongoing training plan on a weekly or monthly basis. ESCI recommends a system of annual individual skills proficiency testing be established.

### *Training Delivery Methodology – Competency-Based Training*

The amount of training delivered to MFD personnel is currently based on contact hours. The fundamental objective is to deliver two hours of training during each shift. Other minimums are in place including those related to state certification maintenance and emergency medical continuing education.

An hours-based approach is appropriate and generally effective. However, the shortcoming of this methodology is that sometimes training will be delivered simply to meet minimum hour requirements when, in fact, the individuals receiving the training are already well versed in the subject matter. Time in this instance would be better spent by: 1) subjecting the students to a skills performance demonstration; and 2) once competency in the skill area is demonstrated, use the remaining time to address new skills or subject areas.

Under a competency-based system, an evaluation of skill performance is conducted at scheduled intervals to determine if the person being evaluated can perform the tasks in accordance with pre-determined standards. Those skills that are performed well require no additional training. Those skills not performed well are practiced until the standard is met. This approach maximizes the time used for effective training. Further, it ensures that members are performing at an established level. Specialty skills can be evaluated in the same manner with further training provided as needed. Ideally, the competency-based training approach is used on an ongoing basis. For example, each quarter different skills are evaluated on an individual basis.

To institute a competency-based approach to training, all of the needed skills must be documented to describe the standard of performance expected. This would include all skills such as hose handling, apparatus operation, EMS procedures and protocols, use of equipment and tools, forcible entry, ventilation, tactics and strategy, and others. Implementation of a competency-based approach to identify training needs, customize course content accordingly, and maximize the effective use of very valuable training time is recommended.

## Support Programs – Life Safety Services (Fire Prevention)

An aggressive risk management program, through active fire and life safety services, is a fire department's best opportunity to minimize the losses and human trauma associated with fires and other community risks.

> The National Fire Protection Association recommends a multifaceted, coordinated risk reduction process at the community level to address local risks. This requires engaging all segments of the community, identifying the highest priority risks, and then developing and implementing strategies designed to mitigate the risks.[8]

A fire department, especially in a city like Modesto, needs to review and understand the importance of fire prevention and public education, appreciating their role in the planning process of a community with diversified zoning including residential, commercial, and industrial properties.

The fundamental components of an effective fire prevention program are listed in the following figure, accompanied by the elements needed to address each component.

**Figure 84: Fire Prevention Program Components**

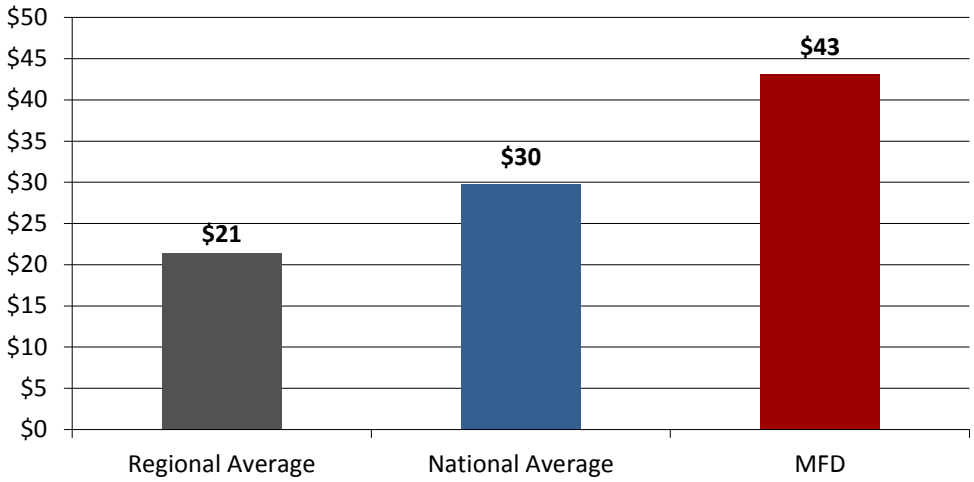
| Fire Prevention Program Components | Elements Needed To Address Program Components |
|---|---|
| Fire Code Enforcement | Proposed Construction And Plans Review<br>New Construction Inspections<br>Existing Structure/Occupancy Inspections<br>Internal Protection Systems Design Review<br>Storage And Handling Of Hazardous Materials |
| Public Fire And Life Safety Education | Public Education<br>Specialized Education<br>Juvenile Fire Setter Intervention<br>Prevention Information Dissemination |
| Fire Cause Investigation | Fire Cause And Origin Determination<br>Fire Death Investigation<br>Arson Investigation And Prosecution |

MFD has developed a healthy appreciation for the importance of fire prevention and public education. The fire marshal understands that, through assertive code enforcement, a fire department should actively promote the use of fire resistive construction, built-in warning and fire suppression systems and maintenance of fire safe buildings to minimize risk to fire and health challenges.

As a point of reference, ESCI compared fire loss data provided by MFD with similar data that is made available by the National Fire Protection Association (NFPA) based on an annual process of surveying fire departments nationally. The following chart depicts MFD's fire losses relative to national and regional averages on a per-capita basis.

[8] Kirtley, Edward, *Fire Protection Handbook*, 20th Edition, 2008, NFPA, Quincy, MA.

**Figure 85 : Comparison of Fire Loss per Capital**




Based on available data, MFD's fire loss per capital falls well above both national and regional averages. The comparison underscores the importance of effective fire prevention efforts.

In the following figures, the program components listed are compared to the initiatives under way in Modesto.

## FIRE AND LIFE SAFETY CODE ENFORCEMENT

The most effective way to combat fires is to prevent them. A strong fire prevention program, based on locally identified risk and relevant codes and ordinances, reduces loss of property, life, and the personal and community-wide disruption that accompanies a catastrophic fire.

**Figure 86 : Survey Table – Fire Prevention Code Enforcement**

| Survey Components | Modesto Fire Department Observations | Comments And Recommendations |
|---|---|---|
| **Code Enforcement** | | |
| Fire Codes Adopted | State Fire Code | |
| Code Used – Year/Version | State Of California 2013 Model Fire Code | |
| Local Codes Or Ordinances Adopted, Amendments | Additional Key Amendments – Sprinkler Requirement About 5,000 Sq. Ft. Commercial. Fireworks Requirements, Require UL Alarm Systems. Above Ground Flammable Liquids Tank Restrictions. Propane Storage Limitations. | |
| Sprinkler Ordinance In Place | Statewide Residential Sprinkler Requirement Is In Place And Mandatory. Applies To All New Construction Residential. | |
| Number Of Personnel Devoted To Program | 1 Fire Marshal<br>1 Deputy FM<br>3 Inspectors<br>1 Administrative Support<br>Also 3 Investigators (Not Involved In Inspection Work) And 4 Shift Personnel That Are Also Investigators. | Used To Have 4 Inspectors, Plus 1 PT Plan Checker And 1 PT Admin Support. Has Developed A System Of Prioritizing Based On Risk Exposure. |

**Key Recommendation:**

- Review and evaluate current fire prevention division staffing.
- Identify workload shortcomings and modify staffing accordingly.

**Discussion**

The city of Modesto has adopted the most current edition of the State Fire Code and has, appropriately, supplemented the code with a variety of local code amendments or ordinances.

Fire code enforcement and administration is the responsibility of a full-time fire marshal. Reporting to the fire marshal is one deputy fire marshal, three inspectors, and one administrative support position. In addition, three full time fire investigator positions are assisted by four shift personnel that are assigned fire investigation as an additionally assigned duty.

The prevention division faces multiple, and difficult, challenges and is working with limited personnel resources. A key factor is that the State of California mandates a large number of annual fire inspections,

including those of apartment, residential care facilities, institutional occupancies, jails, high-rise buildings, hotels, and schools. The state requires that the local fire department complete these inspections, resulting in a considerable impact on workload. The prevention division is unable to fully comply with the state mandates due to staffing limitations, which, while the failure to do so does not result in penalties, may expose the city to resultant liability.

In addition to the state-mandated inspection work, multiple other occupancies should be inspected, based on best practices. These include hazard classified occupancies as well as mercantile, restaurant, and others that are considered as moderate risk occupancies, along with others. ESCI was informed that the above listed inspections are not performed, or are performed only on a complaint related basis, because a priority has to be placed on the inspections that are required by the state.

Staffing of the prevention division has been reduced. In the past, there was one additional fire inspector and one part time plan review position, as well as a part time administrative support employee. The staffing reductions have left the division short of an adequate number of personnel and, as a result, the fire marshal has found it necessary to alter the priorities of various prevention function, which is compromising the program's effectiveness, as is further discussed below. A comprehensive review and evaluation of fire prevention division staffing is recommended.

## NEW CONSTRUCTION PLAN REVIEW AND INSPECTION

An essential component of a fire prevention program is new construction plan reviews. When a new building is proposed within the city of Modesto's boundary, the MFD will have the responsibility to protect the structure for the life of the building. The city and fire department have a fundamental interest and duty to ensure all building within its jurisdiction is properly constructed.

**Figure 87 : Survey Table – New Construction Plan Review and Inspection**

| Survey Components | Modesto Fire Department Observations | Comments And Recommendations |
|---|---|---|
| **New Construction Inspections And Involvement** | | |
| Consulted In Proposed New Construction | Consulted In All New Construction. | |
| Perform Fire And Life Safety Plan Review | Fire Marshal's Office Completes Plan Reviews On All New Construction Building Permit Applications And Change Of Occupancy Tenant Improvements. | |
| Sign-Off On New Construction | Required For Building Permit Issuance. | |
| Charges For Inspections Or Reviews | Permit Fee Includes Inspections Pursuant To The Permit. Installed Systems Have Additional Cost For Inspections Based On Type. | |

**Discussion**

MFD new construction code enforcement activities consist of regular review of submitted plans for commercial building permits as well as change of occupancy permits. The fire marshal is provided with the plans for review and sign off is required prior to the city issuing a building permit. The fire marshal and/or a fire inspector complete a variety of inspections that are related to the new construction permitting process.

The existing practices are appropriate and adequately address the need for proper new construction code enforcement efforts. It is noted that the process of reviewing and approving plans, as well as the inspections that are necessary pursuant to the issuance of a building permit, are labor intensive, further challenging the prevention division staffing resources.

## EXISTING OCCUPANCY INSPECTION PROGRAM

Existing property inspections, to find and eliminate potential life hazards, are an essential part of the overall fire protection system. These efforts are most effective when completed by individuals having the proper combination of training and experience, and when completed with appropriate frequency.

**Figure 88 : Survey Table – Existing Occupancy Inspection Program**

| Survey Components | Modesto Fire Department Observations | Comments and Recommendations |
|---|---|---|
| **General Inspection Program** | | |
| Performance Of Existing Occupancy Inspections | High Rise, Assembly, Schools, And Institutions Are To Be Inspected Annually. | |
| Special Risk Inspections | Residential Care Facilities Inspected Per State Requirement And As-Needed/Required. | State Mandated Inspections. |
| Storage Tank Inspections | Only On New Construction. Existing Tanks Are Not Inspected. Only Permit-Related. | |
| Key-Box Entry Program In Place | Knox Box System Is In Place And Required On Commercial Occupancies. | |
| Hydrant Flow Records Maintained | Fire Prevention Division Maintains Flow Test Records. | |
| Self-Inspection Program In Place | None | Program In Place In The Past. Discontinued. |
| Frequency Of Inspections | Goal Of Annual For All Commercial, Apartments, Institutional, Assembly, And Other High Risk Occupancies. | Annual Inspection List Of 1,467 Occupancies. Able To Inspect Only 740 In 2014 Due To Staffing Limitations. |
| Citation Process In Place And Formally Documented/Adopted | Process In Place, Citations Issued By Fire Prevention Division. | |
| Court-Cited To | Administrative Citation Process | |
| Inspections Computerized | Zoll Fire RMS® Inspection Module Used | |
| Community Feedback System In Place | None | |

**Key Recommendation:**

- Provide the fire prevention division with sufficient resources to achieve annual commercial occupancy and state-mandated inspection goals.
- Consider utilization of contact plan checking services to accommodate peak demand and provide ability for fire inspector's to meet code enforcement and fire prevention initiatives.

**Discussion**

MFD completes existing occupancy inspections, as described earlier, per the mandated requirements of the State of California. In addition, the fire prevention division attempts to inspect the occupancies that are not required by the state, but that need to be reviewed as an appropriate fire prevention practice.

The fire marshal maintains a list of 1,467 existing occupancies in the city that are subject to inspection. The prevention division's goal is to inspect all occupancies on an annual basis, at a minimum, which is consistent with best practices. However, it is reported that only 740, or 50% of the buildings that should be inspected each year are actually visited, due to staffing limitations. As a result the fire marshal has established a system of prioritizing inspections based on risk, appropriately, but a significant number of buildings go without an annual review.

Of particular concern is the City of Modesto's recent structure fire history. ESCI was informed by MFD that they have experienced an increase of approximately 35 percent in structure fires in the last five years. If accurate, that number is extremely concerning and clearly exceeds comparable norms. While the cause of the increase cannot be verified without additional analysis, shortcomings in fire prevention and code enforcement activities should be considered as at least a potential factor.

Achieving the fire marshal's goal of annual inspection of all commercial occupancies at a minimum, as well as addressing the state-mandated inspection requirements should be identified as a high priority in Modesto. While doing so will likely necessitate additional personnel resources, the importance is significant. ESCI recommends that steps be taken to address the need to achieve an acceptable existing occupation inspection standard.

## FIRE AND LIFE SAFETY PUBLIC EDUCATION PROGRAMS

Providing fire and life safety education to the public to minimize the number of emergencies while training the community to take appropriate actions when an emergency occurs is essential to a fire and life safety program. Life and fire safety education provides the best chance for minimizing the effects of fire, injury, and illness to the community. Public education outreach in the MFD is discussed in the following figure.

**Figure 89 : Survey Table – Fire Safety and Public Education**

| Survey Components | Modesto Fire Department Observations | Comments And Recommendations |
|---|---|---|
| **Fire Safety And Public Education** | | |
| Public Education/Information Officer In Place | One Inspector Is Assigned To Public Education As Additionally Assigned Duty. Delivers School Programs, Book Readings, Etc. With Engine Companies When Available. | |
| Feedback Instrument Used | | |
| Public Education In The Following Areas: | | |
| Calling 9-1-1 | Yes | |
| EDITH (Exit Drills In The Home) | Yes | |
| Smoke Alarm Program | Yes | |
| Fire Safety (Heating Equipment, Chimney, Electrical Equipment, Kitchen/Cooking, Etc.) | Yes | |
| Injury Prevention (Falls, Burns/Scalding, Bike Helmets, Drowning, Etc.) | Included In The Clown Program. | |
| Fire Extinguisher Use | Some. Just Received A Grant For Extinguisher Training Prop. | |
| Fire Brigade Training | None | |
| Elderly Care And Safety | Limited, On Request. | |
| Curriculum Used In Schools | NFPA | |
| Baby-Sitting Classes Offered | No | |
| CPR Courses, Blood Pressure Checks Offered | Provided By Engine Companies. | |
| Publications Available To Public | Multiple | |
| Bilingual Information Available | Yes, And Expanding Supply. | |
| Annual Report Distributed To Community | Overview Is Included In The Fire Department Annual Report. | |
| Juvenile Fire Setter Program Offered | Yes. Two Department Personnel Are Trained. | |
| Wildland Interface Education Offered | None | |

**Discussion**

Public education and outreach is viewed by the organization as an important undertaking, however, staffing limitations compromise the level of attention that can be paid to the program. Despite limited career and dedicated public outreach staffing, the majority of fundamental community outreach elements are being addressed. Of note is a highly active clown program, which in 2014 was estimated to reach 3,300 children as a part of annual Fire Prevention Week school activities. Additional school outreach is not routinely conducted, but is completed on a request basis. When available, on duty fire personnel also assist with public education outreach.

Public education and outreach is assigned to one of the three fire inspectors as an additionally assigned duty. The program is approximated to involve about 50 percent of the inspector's time. That time, however, is taken away from the inspector's other fire prevention work. It is recommended that public education be prioritized and that one FTE position be established to manage the program. In addition, use of community volunteers to assist with public education outreach be incorporated to mitigate workload impacts on line personnel.

**Key Recommendation:**

- Seek to provide a dedicated full time public education officer position.
- Identify opportunities to make use of citizen volunteers and other alternative public education staffing resources.

## FIRE CAUSE AND ORIGIN INVESTIGATION

Accurately determining the cause of a fire is an essential element of a fire prevention program. When fires are set intentionally, identification and/or prosecution of the responsible offender is critical in preventing additional fires and potential loss of life. Further, if the cause of fires is accidental, it is also of great importance because of knowing and understanding how accidental fires start is the most effective way to identify appropriate fire prevention and public education measures to prevent a reoccurrence.

**Figure 90 : Survey Table – Fire Investigation**

| Survey Components | Modesto Fire Department Observations | Comments and Recommendations |
|---|---|---|
| **Fire Investigation** | | |
| Fire Origin And Cause Determination | 3 On-Duty Investigators, One Assigned To Each Shift. Also 4 On-Call Investigators That Are Engine Company Personnel. | |
| Arson Investigation And Prosecution | Investigation And Prosecution Is Handled By Fire Investigation Staff. Investigators Are Certified, Armed, And Carry Law Enforcement Authorization. | |
| Arson Investigation Training Provided | Investigators Are Trained To NFPA 1033 Standards. | |
| Person Responsible For Investigations | On Duty Investigator And Fire Marshal. | |
| Local FIT Membership (Fire Investigation Team) | County Level Investigation Task Force Is Under Development. | |

| Survey Components | Modesto Fire Department Observations | Comments and Recommendations |
|---|---|---|
| Process For Handling Juvenile Suspects | Processed Through District Attorney And County Juvenile Court. | |
| Liaison With Law Enforcement | Fire Marshal | |
| Scene Control Practices In Place | Yes | |
| Adequate And Appropriate Equipment Issued/Supplied | Yes | |
| Evidence Collection Process In Place | Process In Place And Processed Through State Lab Analysis And Processing. | |
| Reports And Records Of All Incidents Made | Yes | |
| File, Record, And Evidence Security | Hard Copies Secured In Building, Electronic Access Restricted Appropriately. | |
| **Pre Incident Planning** | | |
| Pre-Plans Completed | Engine Companies Do Some, "Detail Pages" But Limited. Program Had Been Reduced And Is Being Re-Instituted. | Prioritize Pre Planning Program To Include A Standardized Format And Regularly Scheduled Drills Utilizing Plans. |
| Frequency Of Review | Annual But In Transition To Restore Previous Program. | |
| Accessibility Of Plans | Hard Copies On Engines. No Electronic Access At This Point. | Recorded Electronically |
| **Statistical Collection And Analysis** | | |
| Records Kept By Computer | Yes | |
| Type Of Operating Platform | PC/Windows | |
| Software Used | Zoll RMS® | |
| Information Collected In The Following Areas: | | |
| Fire Incidents | Yes | |
| Time Of Day And Day Of Week | Yes | |
| Method Of Alarm (How Received) | Yes | |
| Dispatch Times | Yes | |
| Response Times | Yes | |
| Information Analyzed & Used For Planning | Reviewed Periodically For Trends, Compliance. | |
| Reports Made & Distributed | State Required NFIRS Reporting Completed. | |
| FTES Used In Data Collection & Analysis | No Dedicated Position | |

**Discussion**

The results of fire investigations, if used accordingly, identify public education focus areas, the need for code modifications, and adjustment of fire deployment and training. Definition and mitigation of a community's fire problem can be achieved via an effective fire cause and determination program.

### *Fire Investigation*

Fire cause and origin determination in MFD starts with the fire officer on the scene of a fire. At a small incident, a company officer may determine whether a fire has an obvious cause or is suspicious. If on-scene personnel view the fire as questionable or are unsure about the fire's cause, they will request assistance from one of the investigators in the fire marshal's office to conduct the cause and origin investigation. Suspected arson cases are processed directly by the fire inspectors, as opposed to being referred to local law enforcement for processing and criminal charges, which is a more common practice.

The investigation function is staffed by three, full time investigators who are also certified as law enforcement officers. In addition, four line firefighter personnel serve as investigators as an additionally assigned duty.

The fire marshal's office handles data entry and processing of fire response and investigation data. Hard copy reports are forwarded for entry into the department's RMS software suite. The fire marshal submits National Fire Incident Response data from the RMS software program.

## Emergency Medical Services Support and Systems Oversight

EMS incidents constitute 65.4 percent of all responses for MFD. The MFD serves as the primary first responding agency and provides basic life support (BLS) first response with defibrillation capabilities and three First Responder Advanced Life Support (FRALS) units within the City of Modesto. First Responder BLS and ALS services are provided in accordance with the California Health and Safety Code, California Code of Regulations, and Mountain Valley EMS policies, procedures, and protocols.

American Medical Response provides advanced life support ambulance transportation services to the City of Modesto. Ambulance transportation services in the City of Modesto are authorized under an exclusive contract for services with the Mountain Valley Emergency Medical Services Agency via statutory authority provided in the California Health and Safety code sections 1797.201 and 1797.224.

The MFD has a long and established history as the first responder agency in the city. This integrated first responder and ambulance transportation system represents a large and vital component of the overall emergency services provided to the City of Modesto. The recommendations are intended to ensure the MFD EMS program provides a high level of management, performance, quality, and integration of system components.

**Figure 91 : Survey Table – EMS Medical Control and Quality Assurance**

| Survey Components | Modesto Fire Department Observations | Recommendations |
|---|---|---|
| **Medical Control** | | |
| EMS Service Delivery Level | 3 FRALS Units, 2 PAU's Not 24/7, Slight Increase With Ambulance Response Times On Month To Month Basis Fines Are Way Up, Fines 80-120 Per Month, System Enhancement Fund 1.3 Balance, SEMSA, Patterson Going FRALS, SCFPD Wants A Rig Asap, Modesto Expanding FRALS, Will Work On Redesign In Next 6 Months For Next Contract, Pit Crew Responses Way Up With Great Results, 38 Percent Save Rate For Witnessed Arrest, State CP Pilots Going Well Stanislaus EMTALA Issue Slowing Stanislaus Behavioral Health Project, Interoperability Both VHF, Hospitals UHF, Turlock 800mhz, Work AB 678 Options, EMT Intermediate, Smaller Response Vehicles For Non-Emergency Calls, Peak Demand Staffing. BLS Transport Vs. ALS Transport. | Establish A FRALS Expansion Plan To Address ALS Unit Expansion And The Use Of ALS Alternative Response Vehicles.<br><br>Begin To Work With MVEMS On Future Community Para Medicine Services That Can And Should Be Provided By The MFD.<br><br>Explore Ambulance Transportation Partnership Options To Allow System To Collect AB 678, HHS Supplemental Ambulance Transportation Funding. |
| Written Protocols Adopted | Yes In Place And Consistent | |

| Survey Components | Modesto Fire Department Observations | Recommendations |
|---|---|---|
| Case Reviews Conducted Regularly | EMS Coordinator Does 100%, No Focused Audits, PEER Review Done At Specialty Centers For Surgeons, TAC Committee For Trauma Centers. | Conduct Internal PEER Review Of Calls, Conduct Focused Audits And Identify Trends Relating To System Strengths, Weaknesses, Opportunities, And Threats. PEER Committee Should Assist With Development And Delivery Of Subsequent Training And Education. |
| EMS Officer Conducts In Service Training | EMS Coordinator, Protocol Updates As Needed. | |
| **Q.A./Q.I. – (Quality Assurance/Quality Improvement)** | | |
| Internal Committee | All ALS Crews Brought In | |
| Lessons Learned Are Shared? | No Process In Place Yet Because Of Small Numbers, Address Through Local Training, No PIP Process Yet, Use AMR Template. | Establish A PEER Review Committee And Process To Handle Larger ALS Service Delivery Program. |
| Medical Program Director Participates? | Dr. Donovan, Narcotics Only. | Pursue Medical Director Involvement In QA/QI Processes And CE Development And Delivery |
| Charts Spot Evaluated For Accuracy? | Check All Reports Twice A Week, Automatically Sent To EMS Coordinator Changes Made And Sent Back. | |

**Key Recommendations:**

- Consider creation of a dedicated EMS chief officer or EMS director to oversee the MFD EMS programs.
- Consider utilization of shift EMS coordinator to assist the MFD EMS administrator with oversight, accountability, training, and education within the EMS Division.
- Establish a FRALS expansion plan to address ALS unit expansion and the use of ALS alternative response vehicles during peak demand hours (1100-2300 hours).
- Begin to work with MVEMS on future mobile integrated health care (Community Paramedicine) services that can and should be provided by the MFD.
- Explore ambulance transportation partnership options that allow system to collect CA, AB 678, supplemental ambulance transportation funding.
- Establish a PEER review committee and process to handle larger ALS service delivery program.

### *EMS Program Services*

The MFD is at a place where a determination will need to be made as it relates to the manner and scope in which it provides emergency medical services to the City of Modesto. The current EMS environment

in California (CA) is in a state of change. As with EMS system nationally, CA EMS systems are working to develop mobile integrated health care systems in a manner that will improve patient care and routing while ensuring the 911 response safety net is preserved and sustainable into the future.

The MFD should address three key areas as they relate to the EMS services provided by the MFD:

- First responder ALS services (FRALS) are currently provided from three units and cannot meet the current City of Modesto adopted six-minute response time citywide. If this response time standard is to be met, FRALS units will need to be implemented for all first responding units. This level of expansion of the FRALS program should be undertaken as part of an EMS system design committed to utilizing these services and recognizing this level of response at it relates to response time standards and subsequent ambulance staffing requirements and unit hour requirements.
- Given the high volume of EMS and fire incidents within the City of Modesto, a reduction in responding engine and truck companies to non-emergent medical calls will contribute to increased unit reliability and an enhanced effective force response. MFD should consider the utilization of two peak demand alternative EMS first responder units to handle non-emergency calls identified through the emergency medical dispatch system (EMD). Alternative response units should be in service from 1100-2300 hours and should be staffed by a minimum of one ALS provider. Fore optimized response and coverage, these units should be located at station one and five to handle all non-emergency EMS responses within the city.
- These services should be coordinated with American Medical Response (AMR) to stop the clock on non-emergent calls and assist with ambulance response time compliance for non-emergent calls in accordance with the existing ambulance contract for service. The MFD should work with AMR and MVEMS to receive reimbursement from AMR for handling these calls. These alternative response vehicles should also be available and utilized for current and future mobile integrated health care services provided by MVEMS within the City of Modesto.
- As a result of CA assembly bill 678, fire-based ambulance transportation services can access supplemental Medicaid funding for ambulance transportation services provided to patients that quality for medical or are uninsured. This funding can significantly impact the amount of revenue collected in a system with a significant medical and or uninsured payer mix. The MFD should begin working with AMR and MVEMS to explore models that would result in a public private partnership that would capture this additional revenue not being collected under the current ambulance transportation system.

### *EMS Program Supervision*

Currently, a single department staff member, holding the rank of engineer, predominantly oversees the department's advanced life support and EMS program. This presents challenges as it relates to all aspects of supervision of an expanding advanced life support responder program. Issues such as required on going continuing medical education, quality improvement, equipment, and clinical research and development, infectious disease management, and on-scene supervision all compete for supervisory attention. The department may consider dedicated EMS chief officer, given that EMS

represents a significant amount of the call volume. Consideration should also be given to identifying shift EMS coordinators to assist with the administration and oversight of the MFD EMS program.

### *Agency Based EMS Medical Director and Clinical Protocols*

MFD technically receives agency medical director oversight from the American Medical Response (AMR) medical director, including authorization for the purchase and management of controlled substances/drugs. The department's EMS coordinator has limited to no interaction with the AMR office of medical director in providing input in medical procedures, interventions, and protocols. The medical director is not active in MFD emergency medical services training, oversight, research and clinical innovations.

It is recommended the MFD work with American medical response to memorialize and expand the scope and manner in which medical director services will be provided. The MFD EMS Administrator should have consistent and regular interaction with the designated MFD medical director. The MFD should participate in training, education, research and innovation that is directed and managed by the MFD medical director.

### *EMS Quality Improvement*

The department's EMS coordinator currently reviews all paramedic EMS reports in the records management system and reviews other EMS data on a targeted or as needed basis. The EMS coordinator provides informal feedback to crews.

The department is able to get some community out-of-hospital outcomes, but is only upon request and is not a regular reporting element. There exists further opportunity to identify key performance areas that are essential to successful outcomes of EMS cardiac arrest survival and other system outcome performance indicators. Examples of such outcome-based measurements may include utilizing the well-accepted Utstein reporting template, STEMI, stroke and trauma system outcomes, reduction of pain scores for cardiac patients, and improvement in shortness of breath in difficulty breathing populations.

The department should establish a peer review and committee process that makes recommendations of reports and trends for medical director review and establish monthly reporting metrics to include key performance indicators for EMS activities. Proper medical control, oversight, and proactive quality measures should include a prospective, real time, and retrospective elements.

### *Prospective (Pre-Incident) Medical Control*

The EMS administrator and/or assigned staff should participate in the development of local and state policy and procedures as well as data collection elements and system design. Staff should ensure the current and future needs of the MFD and the growing service scope and manner are addressed. This will reduce the risk of the department being mandated to adhere to standards and system requirements that may be lacking input, customization, or key service elements for the MFD service area.

### *Concurrent (Real-Time) Medical Control*

The EMS administrator should ensure the EMS system provides real-time feedback with relevant training and education. Having assigned and trained staff that can observe the integrated first responder and ambulance transportation system will provide valuable data on areas of strengths, deficiencies, and opportunities for the MFD. Early identification of trends and field performance will reduce potential for

clinical mistakes and provide for early intervention with responding personnel to create a proactive and cooperative learning environment.

### *Retrospective (Post Incident) Medical Control*

The EMS administrator or assigned staff should implement and monitor an internal review committee and retrospective medical control measures. The MFD should implement a PEER review committee that performs random patient care report reviews and evaluates calls and trends to offer constructive feedback and educational improvement programs to individuals and the department as a whole. This committee should also take a leadership role in the development of patient documentation, transfer of care, and EMS operational policies. The MFD should participate in appropriate pilot projects and focused studies approved by the department and medical director. Audits and study results need to be reported in a manner that clearly demonstrates the benefits to the patients and communities served.

## EMS SYSTEM INTEGRITY

The department participates in a two-tiered EMS oversight system. First, the State of California provides statutory authority that enables counties/EMS Regions to establish local treatment protocols, EMS certification and other system components. Secondly, the MVEMS under the direction of the medical director adopts localized policies and procedures to meet the needs of the Stanislaus County and the City of Modesto. These requirements are adhered to by the MFD and managed and monitored at the department level.

**Figure 92 : Survey Table – EMS System Integrity and Logistical Support Services**

| Survey Components | Modesto Fire Department Observations | Recommendations |
|---|---|---|
| **Certification/Recertification** | | |
| Ongoing Training & Evaluation System In Place? | CE Through Target Solutions, Infrequently Used Skills Every Few Months. | |
| Skills Assessment Performed By Qualified Evaluators? | PHI, Use Local Helicopter Crews, ALS ITLS/PHTLS, ACLS, PALS/PEP AMR Classes Available, Will Need To Grow For Expansion Of FRALS | Explore ALS CE Training Consortium With Air Ambulance, AMR, And Fire ALS Providers. |
| Recertification Exams Administered By Qualified Testing Center? | EMT Skills Done On Multi Company Drills, Written Exam Administered On Duty. | |
| **Medical Supplies** | | |
| Inventory Controls In Place | EMS Coordinator Does All Ordering, Supply Cache At Training Center. Each Engine Carries Enough For Three Codes. Order As Needed Resupplied By EMS Coordinator. | |
| Controlled Meds Security | Done Through DEA Safe, Wi-Fi Safe, Waste At The Hospital, AMR Replaces The Complete NARC Pack. | |
| Replenishment System In Place | AMR And EMS Coordinator Handle All Supplies. | Consider Alternative Delivery System That Is Not Dependent On One Position Conducting Supply Delivery And Replenishment. |
| Temperature Controlled Environment For Liquids | No, Use Hot And Cold Packs. | Establish Temperature Control Measures On All ALS Response Units. |

**Key Recommendations:**

- Explore ALS CE training consortium with Air Ambulance, AMR, and Fire ALS providers.
- Consider alternative delivery system that is not dependent on one position conducting supply delivery and replenishment.

**Discussion**

Maintenance and currency of EMS certification, training, and equipment records is a vital component of an EMS program. Providing centralized control and monitoring of these functions reduces the risk of lapsed certifications and unnecessary costs of training and equipment to meet State of California and MVEMS requirements.

The process of initial certification and recertification involves a variety of education and performance requirements at the department and state level. ESCI's review of the current certification, EMS training records, and equipment tracking identified a number of areas that warrant review and system modifications or enhancements.

### *Certification and Recertification Recordkeeping*

The department has maintained training and certification records in accordance with existing MFD recordkeeping systems and policies. ESCI recommends MFD centralize the responsibility for certification and EMS training and continuing education records under the EMS administrator as a single point of contact and centralized recordkeeping for all EMS certification, recertification, and continuing education records. ESCI further recommends MFD conduct a detailed audit of all EMS continuing education and certification records to ensure currency and compliance. There needs to be established written policies that establish the procedures for certification and continuing education recordkeeping requirements by the EMS administrator and individual personnel.

### *Training and Continuing Education*

The MFD provides EMS training in a decentralized manner and utilizes supplements training with a centralized classroom instruction. Skills testing is a crucial part of ensuring EMS personnel have a proper understanding of their scope of practice and protocols. Scenario-based training ensures personnel have an adequate understanding of their EMS roles and responsibilities with the capacity to translate that from an understanding to demonstrated hands-on skills performance.

ESCI recommends MFD conduct one third (30%) of EMS training in a centralized classroom environment. Hands-on, skill-based testing and training should be a significant portion of the classroom training requirements for BLS and ALS personnel. MFD should also provide scenario-based training to simulate actual field conditions and enhance operational effectiveness and coordination between assigned engine/truck company and ambulance personnel.

### *Supplies and Materials Management*

MFD maintains disposable EMS supplies in each station that are periodically inventoried and resupplied by AMR via a contract for restock and resupply. Inventories are not currently based on utilization or anticipated call or patient volume. There are differing levels of restock occurring from a single ordering point and authority. Heart monitors/defibrillators are on each apparatus but are not separately maintained as part of an amortized internal service replacement fund.

ESCI recommends station supply par levels be established based on historical volume and utilization. Regular inventories should be conducted with single-point ordering and distribution coordinated by the EMS administrator to AMR. ESCI recommends the MFD establish a capital inventory and replacement program for EMS capital equipment with a regularly scheduled inventory. An amortized capital

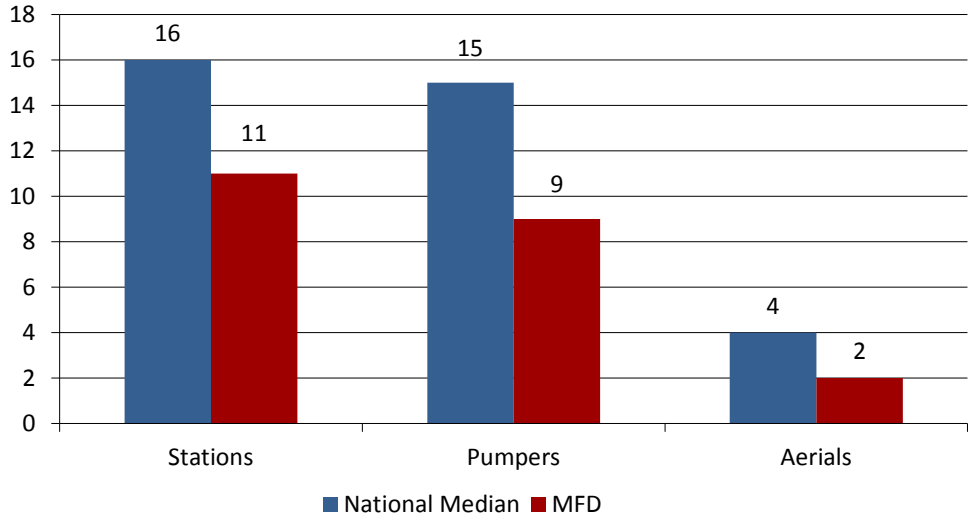
replacement program should be established that is annually funded to ensure adequate revenue exists for replacement of these items when they have reached their projected equipment life cycle.

## Capital Assets and Capital Improvement Programs

Regardless of an emergency service agency's financing, if appropriate capital equipment is not available for the use by responders, it is impossible for a fire department to deliver services effectively. MFD maintains a balance of three basic resources that are needed to carry out its emergency mission: People, equipment, and facilities. The adequacy of personnel resources is a primary concern, as discussed in the Staffing section of this report; but no matter how competent or numerous the firefighters are, the fire department will fail to execute its mission if it lacks sufficient equipment and apparatus distributed in an efficient manner.

The MFD maintains 11 fire stations and millions of dollars-worth of capital assets. These assets are necessary to provide service and must be maintained and replaced as needed. A comparison of major capital assets, including fire engines, aerial ladder trucks, and fire stations is provided in the following figure.

**Figure 93 : Capital Assets per 1,000 Population**




MFD's major capital asset inventory falls below national medians for the region.

### FACILITIES

Appropriately designed and maintained facilities are critical to a fire department's ability to provide services in a timely manner and with appropriate deployment of assets. ESCI observed and reviewed the fire stations operated by MFD. The findings are summarized in the following pages and any areas of concern observed are identified.

**Figure 94 : Modesto Fire Department Station 1**

Modesto's Fire Station 1 houses a fire engine, a ladder truck, a grass vehicle, a heavy rescue truck and a battalion chief, along with several reserve units. The vehicles are housed in four bays of double depth. Crews housed in the station include staffing for the engine and the ladder truck, along with the battalion chief.

Station 1 is dated and has undergone little updating since it was constructed in 1939. It exhibits deterioration and significant signs of deferred maintenance. The station is due for replacement.

| | |
|---|---|
| **Structure** | |
| Construction type | Masonry construction with wood frame, flat roofing system. |
| Date Built | 1939 |
| Seismic protection/energy audits | A seismic audit was reportedly completed in the past, but no upgrades were performed as a result. |
| Auxiliary power | Undersized, older generator is not configured to automatically start. |
| Condition | Poor |
| Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.) | The station is not ADA compliant, nor is it configured appropriately for dual gender staffing. Storage is adequate. |
| **Facilities Available** | |
| Exercise/workout | An exercise room is located in the basement. |
| Kitchen/dormitory | A small kitchen is present but very dated. Sleeping for up to 10 is accommodated in two, shared dorm rooms. |
| Lockers/showers | One very small bath and shower room is substantially outdated and in poor condition. |
| Training/meetings | A small conference room seats 10. |
| **Protection Systems** | |
| Sprinkler system | Fire sprinklers are present only in the basement. Residential areas are not protected. |
| Smoke detection | Only battery powered smoke alarms are present in the residential areas. |
| Security | A single key lock provides access to the building. The same key opens all fire stations. |
| Apparatus exhaust system | Installed on front line apparatus only. |

**Figure 95 : Modesto Fire Department Station 2**

Station 2 is Modesto's newest fire station. It is smaller, consisting of two apparatus bays of drive-through configuration. Two fire engines are found in the building, one of which is staffed, the other in reserve. Quarters are present for six responders in single bed rooms. The station is staffed with three personnel.

Station 2 is in excellent condition, having been constructed in 2008. While it has little room for future expansion, it will serve the fire department as intended for many years.

| | |
|---|---|
| **Structure** | |
| Construction type | Masonry construction with a steel frame, steel clad, pitched roof design. |
| Date Built | 2008 |
| Seismic protection/energy audits | A seismic and energy considerations were factored into the building design in 2008. |
| Auxiliary power | An automatically starting generator is provided for emergency backup power. |
| Condition | Excellent |
| Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.) | The station is ADA compliant and appropriately configured for dual gender staffing. Storage is adequate. |
| **Facilities Available** | |
| Exercise/workout | An exercise room is well equipped and accessible for public use. |
| Kitchen/dormitory | A kitchen is equipped with commercial grade appliances. Six individual sleeping rooms are available for responders. |
| Lockers/showers | The station includes three individual restrooms with single showers. |
| Training/meetings | Training and meetings are held at the kitchen table. The adjacent community center offers additional meeting space. |
| **Protection Systems** | |
| Sprinkler system | Fully protected by a fire sprinkler system. |
| Smoke detection | The building is also protected with a smoke detection system. |
| Security | A single key lock provides access to the building and all fire stations. |
| Apparatus exhaust system | Installed on all apparatus. |

**Figure 96 : Modesto Fire Department Station 3**

The smallest of its facilities, Station 3 consists of two, double depth apparatus bays of drive-through configuration. A single fire engine is housed in the station along with a grass fire unit that is cross staffed with the engine crew.

Residential accommodations include three bedrooms with two beds in each.

Station 3 is in fair to good condition but has no room for future growth or expansion.

| | |
|---|---|
| **Structure** | |
| Construction type | Concrete block construction with a wood framed, flat roof. |
| Date Built | 1967 |
| Seismic protection/energy audits | No seismic or energy audits have been performed. |
| Auxiliary power | An automatically starting generator is provided for emergency backup power. |
| Condition | Fair to good |
| Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.) | The station is not ADA compliant. Storage is limited. |
| **Facilities Available** | |
| Exercise/workout | There is no workout room. Exercise equipment is in the apparatus bays. |
| Kitchen/dormitory | A small, residential type kitchen is present with a small day room. 3 individual sleeping rooms are configured with two beds each. |
| Lockers/showers | There are two, individual, bathrooms, each with a single shower. |
| Training/meetings | Training and meetings are held at the kitchen table in the absence of a conference room. |
| **Protection Systems** | |
| Sprinkler system | The station is not protected by a fire sprinkler system. |
| Smoke detection | Batter powered smoke alarms are present in the sleeping area only. |
| Security | A single key lock provides access to the building and all fire stations. |
| Apparatus exhaust system | Installed on the engine. |

**Figure 97 : Modesto Fire Department Station 4**

Station 4 was constructed in 1976 and consists of two, drive-through apparatus bays that are double in depth. The station houses an engine and the department's hazardous materials response team vehicle. A crew of three responders staffs the station.

Station 4 is small and adequately meets current needs. However there is little room for expanded future use. The building is in generally good condition.

| | |
|---|---|
| **Structure** | |
| Construction type | Concrete block construction with a wood framed roof structure. |
| Date Built | 1976 |
| Seismic protection/energy audits | No seismic or energy audits have been performed. |
| Auxiliary power | An emergency backup generator is in place but does not start automatically. |
| Condition | Good |
| Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.) | The station is not ADA compliant. Storage is limited. |
| **Facilities Available** | |
| Exercise/workout | A small exercise area is well equipped. |
| Kitchen/dormitory | The kitchen area, though small, is adequate for its current use. Three individual sleeping rooms are provided for crews. |
| Lockers/showers | There is one, individual bathroom/shower. |
| Training/meetings | Training and meetings are held at the kitchen table in the absence of a conference room. |
| **Protection Systems** | |
| Sprinkler system | The station is not protected by a fire sprinkler system. |
| Smoke detection | Hard wired smoke alarms are present in the residential portions of the station. |
| Security | A single key lock provides access to the building and all fire stations. |
| Apparatus exhaust system | Installed on the engine. |

**Figure 98 : Modesto Fire Department Station 5**

Station 5 is a 1965 vintage building and is the fire department's busiest station. It occupies an optimal location in regard to response, providing ready access to incidents in several directions.

A single engine company is housed at the station, which consists of four, single depth, drive-through apparatus bays. A fire investigator is also housed in the facility.

Station 5 is good sized, but is aging and showing signs of deterioration. Unrepaired plumbing problems have resulted in water damage.

| | |
|---|---|
| **Structure** | |
| Construction type | Concrete block construction with a wood framed, flat roof structure. |
| Date Built | 1965 |
| Seismic protection/energy audits | No seismic or energy audits have been performed. |
| Auxiliary power | An emergency backup generator is in place but does not start automatically. |
| Condition | Fair to poor |
| Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.) | The station is not ADA compliant nor is it configured for dual gender occupancy. Storage space has reached capacity. |
| **Facilities Available** | |
| Exercise/workout | No exercise room is present. Work out equipment is in one of the dorm rooms. |
| Kitchen/dormitory | A small kitchen is equipped with residential grade appliances. Two dorm rooms are in place, one with beds for three and another with beds for sleeping five. |
| Lockers/showers | A single locker/shower room is present and is not dual gender appropriate. |
| Training/meetings | There is no training room, training and meetings are held at the kitchen table. |
| **Protection Systems** | |
| Sprinkler system | The station is not protected by a fire sprinkler system. |
| Smoke detection | Smoke alarms are present in the residential portions of the station. |
| Security | A single key lock provides access to the building and all fire stations. |
| Apparatus exhaust system | Installed on the engine. |

**Figure 99 : Modesto Fire Department Station 6**

Built in 1979, Station 6 is in generally good condition. It houses a single engine company and crew and has two, double depth apparatus bays. It is a smaller, neighborhood station.

The station is small and can accommodate only three responders in the residential portion of the building. There are no meeting areas and only a single office, which is in the main entry.

| | |
|---|---|
| **Structure** | |
| Construction type | Wood frame construction with a wood framed, pitched roof. |
| Date Built | 1979 |
| Seismic protection/energy audits | No seismic or energy audits have been performed. |
| Auxiliary power | An emergency backup generator is in place but does not start automatically. |
| Condition | Fair to good |
| Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.) | The station is not ADA compliant nor is it configured for dual gender occupancy. Storage is maximized. |
| **Facilities Available** | |
| Exercise/workout | No exercise room is present. Work out equipment is in the apparatus bays. |
| Kitchen/dormitory | A small kitchen is equipped with residential grade appliances. Three, single sleeping rooms are present. |
| Lockers/showers | A single bath/shower room is present. |
| Training/meetings | There is no training room, training and meetings are held at the kitchen table. |
| **Protection Systems** | |
| Sprinkler system | The station is not protected by a fire sprinkler system. |
| Smoke detection | Smoke alarms are present in the residential portions of the station. |
| Security | A single key lock provides access to the building and all fire stations. |
| Apparatus exhaust system | Installed on the engine. |

**Figure 100 : Modesto Fire Department Station 7**

Constructed in 1981, Modesto Station 7 is another smaller, neighborhood station that houses only one fire engine and response crew.

The facility has two, single-depth back-in apparatus bays. The bays are smaller in overall size and will not accommodate a larger fire engine or a ladder truck, as currently configured.

Station 7 is located on a small building lot. Space in the station is maximized and there is not room for future expansion. The station is also suffering from deferred maintenance. Unrepaired plumbing issues have resulted in water damage.

| | |
|---|---|
| **Structure** | |
| Construction type | Concrete block construction with a wood framed, pitched roof structure. |
| Date Built | 1981 |
| Seismic protection/energy audits | No seismic or energy audits have been performed. |
| Auxiliary power | An emergency backup generator is in place but does not start automatically. |
| Condition | Fair |
| Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.) | The station is not ADA compliant nor is it configured for dual gender occupancy. Storage space has reached capacity. |
| **Facilities Available** | |
| Exercise/workout | No exercise room is present. Work out equipment is in one of the apparatus bays. |
| Kitchen/dormitory | A small kitchen is equipped with residential grade appliances. Three, single sleeping rooms are present. |
| Lockers/showers | Two single locker/shower rooms are present. |
| Training/meetings | There is no training room, training and meetings are held at the kitchen table. |
| **Protection Systems** | |
| Sprinkler system | The station is not fully protected by a fire sprinkler system. |
| Smoke detection | Smoke alarms are present in the residential portions of the station. |
| Security | A single key lock provides access to the building and all fire stations. |
| Apparatus exhaust system | Installed on the engine. |

**Figure 101 : Modesto Fire Department Station 8**


Station 8 is located at the Modesto Airport. The station is staffed by a single responder, trained in aircraft emergency response and staffing a specialized aircraft fire response. There are no structural fire vehicles in the station and only one crew member.

The station consists of two, double-depth apparatus bays, with a drive-through configuration. The building is in generally good condition, considering its age of 35 years, but is showing signs of aging. Dry rot, paint, and roof leak issues were reported.

| | |
|---|---|
| **Structure** | |
| Construction type | Stucco covered wood frame building with a wood framed, pitched roof structure. |
| Date Built | 1980 |
| Seismic protection/energy audits | No seismic or energy audits have been performed. |
| Auxiliary power | An emergency backup generator is in place but does not start automatically. |
| Condition | Fair to good |
| Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.) | The station is not ADA compliant nor is it configured for dual gender occupancy. |
| **Facilities Available** | |
| Exercise/workout | No exercise room is present. Work out equipment is in a separate, adjacent building. |
| Kitchen/dormitory | A small kitchen is equipped with residential grade appliances. Three, sleeping rooms are present with two beds each. |
| Lockers/showers | A single bath/shower room is provided. |
| Training/meetings | There is no training room, training and meetings are held at the kitchen table. |
| **Protection Systems** | |
| Sprinkler system | The station is not protected by a fire sprinkler system. |
| Smoke detection | Smoke alarms are present in the residential portions of the station. |
| Security | A single key lock provides access to the building and all fire stations. |
| Apparatus exhaust system | Installed on the engine. |

**Figure 102 : Modesto Fire Department Station 9**

As another smaller, neighborhood fire station, Station 9 was built in 1985. It houses a single engine company and response crew and has two, double depth apparatus bays.

The station has residential accommodations for only three responders and is marginally appropriate for dual gender occupancy. Although older, the building is in generally good condition.

| | |
|---|---|
| **Structure** | |
| Construction type | Wood frame structure with a wood framed, pitched roof, finished with composition roofing. |
| Date Built | 1990 |
| Seismic protection/energy audits | No seismic or energy audits have been performed. |
| Auxiliary power | An emergency backup generator is in place but does not start automatically. |
| Condition | Good |
| Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.) | The station is generally ADA compliant. Storage is very limited. |
| **Facilities Available** | |
| Exercise/workout | No exercise room is present. Two machines are in the day room and additional work out equipment is in the apparatus bays. |
| Kitchen/dormitory | A small kitchen is equipped with residential grade appliances. Three, individual, single sleeping rooms are present. |
| Lockers/showers | Two bath/shower rooms serve the on duty crews. |
| Training/meetings | There is no training room, training and meetings are held at the kitchen table. |
| **Protection Systems** | |
| Sprinkler system | The station is not protected by a fire sprinkler system. |
| Smoke detection | Smoke alarms are present in the residential portions of the station. |
| Security | A single key lock provides access to the building and all fire stations. |
| Apparatus exhaust system | None |

**Figure 103 : Modesto Fire Department Station 10**

Station 10 serves the city as well as the Industrial Fire District and is an aging facility that was constructed in 1950. It has three apparatus bays, all of which are single depth, back-in bays.

There are accommodations for five responders.

Station 10 is clearly aging and its future viability will be limited by maintenance challenges. The apparatus bays and front apron demonstrate serious deterioration.

| | |
|---|---|
| **Structure** | |
| Construction type | Wood frame structure with a flat, wood framed, roof. |
| Date Built | 1950 |
| Seismic protection/energy audits | No seismic or energy audits have been performed. |
| Auxiliary power | None |
| Condition | Poor |
| Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.) | The station is not ADA compliant. Storage is filled to capacity. Facility is not configured for dual gender use. |
| **Facilities Available** | |
| Exercise/workout | No exercise room is present. Work out machines are in the day room. |
| Kitchen/dormitory | A good sized kitchen is equipped with residential grade appliances. Two sleeping rooms have two beds each and the captain's office includes sleeping accommodations. |
| Lockers/showers | There is a single bath/shower room. |
| Training/meetings | There is no training room, training and meetings are held at the kitchen table. |
| **Protection Systems** | |
| Sprinkler system | The station is not protected by a fire sprinkler system. |
| Smoke detection | Smoke alarms are present in the residential portions of the station only. |
| Security | A single key lock provides access to the building and all fire stations. |
| Apparatus exhaust system | None |

**Figure 104 : Modesto Fire Department Station 11**

Station 11 is in excellent condition, having been constructed in 2005. It is well designed for its current use and includes two, drive-through, apparatus bays, housing an engine and a ladder truck company and their crews.

The station can sleep eight in single bedrooms and is dual gender appropriate.

| | |
|---|---|
| **Structure** | |
| Construction type | Wood frame structure, with stucco finish and a wood framed, pitched roof, finished with tile. |
| Date Built | 2005 |
| Seismic protection/energy audits | When originally designed in 2005. |
| Auxiliary power | An emergency backup generator is in place and starts automatically. |
| Condition | Excellent |
| Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.) | The station is ADA compliant and consistent with current applicable construction codes. Storage is very limited. |
| **Facilities Available** | |
| Exercise/workout | A well-equipped exercise room is present. |
| Kitchen/dormitory | A large kitchen is equipped with commercial grade appliances. Eight, individual, single bed sleeping rooms are provided. |
| Lockers/showers | Three individual bath/shower rooms serve the on duty crews. |
| Training/meetings | There is no training room, training and meetings are held at the kitchen table. |
| **Protection Systems** | |
| Sprinkler system | The station is fully protected by a fire sprinkler system. |
| Smoke detection | Smoke alarms are present in the residential portions of the station. |
| Security | A single key lock provides access to the building and all fire stations. |
| Apparatus exhaust system | None |

**Discussion**

MFD fire stations range from some that are in good condition to others that are well past due for replacement. Stations 2 and 11, for example is in excellent condition and several of the other stations can be described as in fair to good condition. Station 5 is aging and due for upgrading or replacement.

Station 1 of particular concern, the building is deteriorated and areas of significant water damage were observed. The station has clearly exceeded its reasonable service life and is well past due for replacement. Addressing the condition of Station 1, specifically, should be considered a high priority.

## APPARATUS

MFD maintains a sizeable fleet of response vehicles that are used frequently and run relatively hard. A small number of the units are fairly new and all are well maintained. The overall condition of the fleet was found to be good with a number of units requiring replacement. An inventory of fire apparatus, configuration, and condition is provided in the following figures.

**Figure 105 : Major Apparatus Inventory**

| Apparatus Designation | Type | Year | Make/Model | Condition | Minimum Staffing | Pump Capacity (GPM) | Tank Capacity (GAL) |
|---|---|---|---|---|---|---|---|
| **Station 1** | | | | | | | |
| Engine 1 | Type 1 Pumper | 2013 | Pierce Velocity | Good | 3 | 1500 | 500 |
| Truck 1 | Aerial | 2006 | Pierce Quantum | Fair | 4 | 0 | 0 |
| Grass 1 | Type 6 Brush | 2004 | Ford F550 | Fair | 3 | 125 | 250 |
| Brush 1 | Type 3 | 2014 | Pierce | Good | 3 | 1000 | 500 |
| Rescue 5 | Heavy Rescue | 2007 | Pierce Quantum | Good | Cross Staffed | 0 | 0 |
| **Station 2** | | | | | | | |
| Engine 2 | Type 1 Pumper | 2009 | Pierce Velocity | Good | 3 | 1500 | 500 |
| **Station 3** | | | | | | | |
| Squad 3 | Type 1 Pumper | 2004 | Pierce Quantum | Fair | 3 | 1500 | 500 |
| Grass 3 | Type 6 Brush | 2004 | Ford F550 | Fair | 3 | 125 | 250 |
| **Station 4** | | | | | | | |
| Engine 4 | Type 1 Pumper | 2001 | Pierce Quantum | Fair | 3 | 1500 | 500 |
| Haz Mat 4 | Specialty Haz-Mat Unit | 2004 | Ford F450, Featherweight Trailer | Good | 3 | | |
| **Station 5** | | | | | | | |
| Engine 5 | Type 1 Pumper | 2007 | Pierce Quantum | Very good | 3 | 1500 | 500 |
| OES 321 | Light rescue | 2005 | HME | Good | 4 | 1250 | 800 |
| **Station 6** | | | | | | | |
| Engine 6 | Type 1 Pumper | 2005 | Pierce Quantum | Fair | 3 | 1500 | 500 |
| **Station 7** | | | | | | | |
| Engine 7 | Type 1 Pumper | 2004 | Pierce Quantum | Fair | 3 | 1500 | 500 |
| **Station 8** | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Airport Rescue | ARRF Rescue | 2010 | Oshkosh | New | 1 | 1500 | 1500 |
| Reserve AP | ARRF Rescue | 2000 | E-0ne Titan | Good | 1 | 1500 | 1500 |
| **Station 9** | | | | | | | |
| Engine 9 | Type 1 Pumper | 1994 | Pierce Arrow | Poor | 3 | 1500 | 500 |
| **Station 10** | | | | | | | |
| Engine 10 | Type 1 Pumper | 2003 | Pierce Quantum | Fair | 3 | 1500 | 500 |
| Reserve 30 | Type 1 Pumper | 1989 | Pierce Arrow | Poor | 3 | 1500 | 500 |
| **Station 11** | | | | | | | |
| Truck 11 | Light Rescue | 2002 | Pierce Quantum | Fair | 3 | 0 | 0 |
| Reserve 31 | Type 1 Pumper | 1990 | Pierce Dash | Poor | 3 | 1500 | 500 |

**Discussion**

ESCI found MFD's vehicles to vary widely in condition. As listed in the previous figure, some are in relatively good condition, while a considerable number of units are considered to be fair to poor. Overall, the fleet consists of vehicles that range in age from two to 25 years, with an average age of just over 12 years. When the two reserve engines are removed from the calculation, the average comes to 10.375 years. It is also noted that two new fire engines have been ordered and are scheduled for delivery as this report is being completed. The new equipment will improve the situation, but does not fully address the apparatus challenges.

Accepted service lives for fire apparatus vary widely, depending on type, maintenance and amount of use. Generally, a fire engine is expected to last a maximum of 15 years; however, in Modesto the high volume of responses reduces the expected service life, which the department considers to be 10 to 12 years.

Given the age, condition and high use of MFD's fire vehicles, maintenance and replacement is viewed as a critical issue and one that needs to be more effectively addressed. ***Error! Reference source not found.***

## CAPITAL REPLACEMENT PLANNING

Long range capital replacement planning is always a challenge, and one that is of particular concern in Modesto. Fire apparatus are unique pieces of equipment, often highly customized to operate efficiently in a narrowly defined mission. A pumper may be designed such that the compartments fit specific equipment and tools, with virtually every space on the truck is designated in advance for functionality. This same vehicle, with its specialized design, cannot be expected to function in a completely different capacity. For this reason, fire apparatus is very expensive and offers little flexibility in use and reassignment. As a result, communities across the country have sought to achieve the longest life span possible for these vehicles.

Fire department vehicles also have a readily predictable life span, and replacement costs can be accurately forecast. Because of their large cost, it is essential that a community plan ahead for the cost of replacement. In fact, ESCI advises that, as soon as a new vehicle is delivered, a fire department immediately start to dedicate funding for its future replacement. To properly do so, agencies are advised to undertake the practice of establishing a life cycle for the apparatus that results in a replacement date being anticipated well in advance. Forward thinking organizations then set aside incremental funds during the life of the vehicle so replacement dollars are ready when needed.

The following figure summarizes MFD's capital replacement planning:

**Figure 106 : Survey Table – Capital Assets and Capital Improvement Planning**

| Survey Components | Modesto Fire Department Observations | Recommendations |
|---|---|---|
| **Fire Stations/Structures** | | |
| Replacement Plan Maintained | No Structured Plan Is In Place | |
| Period Of Plan (From – To) | N/A | |
| Funding Mechanism | N/A | |
| **Apparatus** | | |
| Replacement Plan Maintained | No Structured Apparatus Replacement Plan Is In Place | |
| Period Of Plan (From – To) | N/A | |
| Funding Mechanism | N/A | |
| Purchase Or Refurbishment Schedule | None | |
| 2015, Planned | Two Engines Are On Order, To Be Delivered In October, 2015 | |
| 2016, Planned | None Scheduled | |
| 2017, Planned | None Scheduled | |
| **Support Equipment** | | |
| Replacement Plan Maintained | No Structured Plan Is In Place | |
| Period Of Plan (From – To) | N/A | |
| Funding Mechanism | N/A | |
| **Methods Of Financing** | | |
| General Fund Revenue | Current Purchases Are Being Funded From General Operating Budget | |

| Survey Components | Modesto Fire Department Observations | Recommendations |
|---|---|---|
| B. Reserve Fund(S) | No Reserve Funds Are Dedicated | |
| Revenue Fund(S) | No Revenue Funds Are Dedicated | |
| General Obligation Bond | GO Bonds Are Not Used Typically | |
| Lease-Purchase | Used For Apparatus Purchases | |
| Grants Or Gifting | When Available | |
| Special Fees | | |

MFD does not maintain a formal schedule that places all apparatus on a specified replacement cycle from date of primary service. The department does maintain a list of apparatus and projected replacement dates, but there is no formalized or funded plan in place. ESCI recommends that the department develop a vehicle replacement schedule, including a funding strategy that will fully meet future needs. Additional discussion is provided below.

No piece of mechanical equipment can be expected to last forever. As a vehicle ages, repairs tend to become more frequent, parts are more difficult to obtain, and downtime for repair increases. Given the emergency mission that is so critical to the community, downtime is one of the most frequently identified reasons for apparatus replacement.

Because of the expense of fire apparatus, most communities develop replacement plans. To enable such planning, establishing a life cycle for the apparatus identifies an anticipated replacement date for each vehicle. Funding is then set-aside during the life of the vehicle so cash is available when needed. This decision is influenced by many factors:

- Actual hours of use of any specific piece of equipment can vary significantly in comparison to other similar apparatus, even within the same fire department. Attempts to shuffle like apparatus among busy and slower fire stations to distribute hours of use more evenly will prove to be difficult in Modesto because all stations are busy. Further, frequent changes in apparatus create familiarity and training challenges.
- Actual hours of use, even if evenly distributed, do not necessarily equate to intensity of use. For example, a pumper making mostly emergency medical responses will not age as rapidly as a pumper with a high volume of working fire incidents that require intense use of the pump or hydraulics. However, for every hour you idle an engine it is equivalent to driving 33 to 35 miles of wear and tear. Likewise, road mileage can also be a poor indicator of deterioration and wear.
- Technology, which is increasingly a factor in fire equipment design, becomes outdated even if the apparatus wear is not as significant. In some departments, crews at different fire stations deal with widely different technology on pumpers simply because of the age of the equipment. These differences can be significant, affecting everything from safety and lighting systems to automated digital pump pressure controls and injection foam generation.

*NFPA 1901: Standard for Automotive Fire Apparatus* is a nationally recognized standard for the design, maintenance, and operation of fire suppression apparatus.[9] The issue of replacement cycles for various

[9] *NFPA 1901: Standard for Automotive Fire Apparatus*, 2009 edition.

types of apparatus has been discussed in the committee that develops the standard for many years. In developing its latest edition, the NFPA Fire Department Apparatus Committee called for a life cycle of 15 years for front-line service and five years in reserve status for engines; 15 years in front-line service and five years in reserve status for ladder trucks.

Does this mean that a fire engine cannot be effective as a front-line pumper beyond 15 years? A visit at many departments in the United States might prove otherwise. Small, volunteer fire departments with only a hundred or so calls per year often get up to 25 years from a pumper, though the technology is admittedly not up to date. Likewise, busy downtown fire stations in some urban communities move their engines out of front-line status in as little as eight years.

MFD has developed a listing of anticipated service lives for its apparatus, as listed below:

- Front line engines 10 to 12 years
- Front line trucks (aerials) 15 years
- Reserve equipment 20 years

Service lives and replacement costs are highly variable and are subject to multiple interpretations based on what kind of apparatus is purchased and how it is configured. With this in mind, ESCI developed an example replacement schedule, using the MFD service lives listed above, estimated service lives for other apparatus types, and conceptual replacement prices. It is understood that the assumptions used below may be subject to change, including projected pricing, so this is offered as an example only. ESCI will revise the schedule at any time, should the department prefer to use different numbers.

The schedule is based on the following service life estimates:

**Figure 107 : Apparatus Life Expectancies**

| Vehicle Type | Life Expectancy | Replacement Cost |
|---|---|---|
| Engines | 12 | $550,000 |
| Aerial Truck | 15 | $1, 200,000 |
| Reserve engines | 20 | $550,000 |
| Custom Pumper | 12 | $550,000 |
| Airport Rescue | 10 | $1,500,000 |
| Wildland | 15 | $140,000 |

Using these life expectancies, the following replacement schedule was developed.

**Figure 108 : Apparatus Replacement Schedule**

| Unit | Year | Current Age | Life Expectancy | Replacement Year | Replacement Cost | Annual Fund Contribution | Current Cash Requirement |
|---|---|---|---|---|---|---|---|
| Engine 1 | 2013 | 2 | 12 | 2025 | $550,000 | $45,833 | $91,670 |
| Truck 1 | 2006 | 9 | 15 | 2021 | $1,200,000 | $80,000 | $720,000 |
| Grass 1 | 2004 | 11 | 15 | 2019 | $140,000 | $9,333 | $102,668 |
| Brush 1 | 2014 | 0 | 15 | 2029 | $350,000 | $23,333 | $23,338 |
| Rescue 1 | 2007 | 8 | 15 | 2022 | $340,000 | $22,667 | $181,333 |
| Engine 2 | 2009 | 6 | 12 | 2021 | $550,000 | $45,833 | $275,002 |
| Squad 3 | 2004 | 11 | 12 | 2016 | $550,000 | $45,833 | $504,167 |
| Grass 3 | 2004 | 11 | 15 | 2019 | $140,000 | $9,333 | $102,668 |
| Engine 4 | 2001 | 14 | 12 | OVERDUE | $550,000 | NA | $550,000 |
| Haz Mat 4 | 2004 | 11 | 15 | 2019 | $125,000 | $8,333 | $91,668 |
| Engine 5 | 2007 | 8 | 12 | 2019 | $550,000 | $45,833 | $366,668 |
| Engine 6 | 2005 | 10 | 12 | 2017 | $550,000 | $45,833 | $458,334 |
| Engine 7 | 2004 | 11 | 12 | 2016 | $550,000 | $45,833 | $504,167 |
| Engine 9 | 1994 | 21 | 12 | OVERDUE | $550,000 | NA | $550,000 |
| Engine 10 | 2003 | 12 | 12 | OVERDUE | $550,000 | NA | $550,000 |
| Reserve 30 | 1989 | 26 | 20 | OVERDUE | $550,000 | NA | $550,000 |
| Truck 11 | 2002 | 13 | 15 | 2017 | $1,200,000 | $80,000 | $1,040,000 |
| Reserve 31 | 1990 | 25 | 20 | OVERDUE | $550,000 | NA | $550,000 |
| Airport ARRF | 2015 | 0 | 20 | 2035 | $1,500,000 | $75,000 | $0 |
| Reserve Airport ARFF | 2000 | 15 | 20 | 2020 | $2,115,000 | $75,000 | $1,125,000 |
| **TOTALS** | | | | | | **$657,997** | **$8,336,683** |

Based on the above example, were the City of Modesto to *fully* fund their apparatus replacement planning, a current cash on hand balance of $8,119,001 would be needed, with an additional annual contribution planned in the amount of $662,831. While may be unrealistic to expect that these levels will be readily set aside in the immediate future, the figure serves as an example of the level of funding that is involved and the shortfall that it represents to the city.

## APPARATUS MAINTENANCE AND REPAIR

Fire apparatus, by its very nature, is expensive and complex to operate and maintain. The more specialized a piece of equipment is, the higher its maintenance costs can be expected. A prime example is an aerial ladder or quint apparatus as compared to more typical fire engines. For this reason, the deployment of ladder and quint apparatus should be carefully reviewed for necessity in regard to risk exposure that necessitates elevated (ladder) devices and insurance rating effects of changing current deployment.

Maintenance of fire department vehicles in Modesto was being performed by the previously consolidate fire protection district and remained so after the city separated from the district. However, at the time of ESCI's fieldwork, the city and fire department were considering moving that function under the city's maintenance department umbrella.

A key component of an adequate apparatus and equipment maintenance program, in addition to the technicians that perform the work, is the availability of needed parts, supplies and the logistics associated with managing a repair and maintenance operation. ESCI visited the Modest Fleet Services facility and met with the supervisor. The vehicle and equipment maintenance shop was found to be a modern, state of the art, facility that is well equipped and professionally operated. ESCI supports the concept of relocating fire department maintenance services to the city facility.

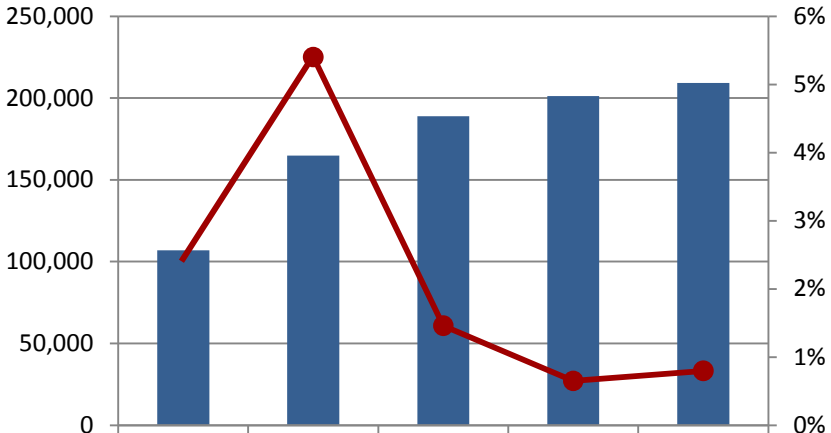
## FUTURE SYSTEM DEMAND PROJECTIONS

Future service demand for fire department services is largely dependent on changes to the population in and around the service area; and the activity of that population. It is desirable to evaluate the population history of the response area and attempt to predict how the population will change in the future. ESCI utilizes data from the US Census Bureau, the California Department of Finance (Demographics Division), the Modesto Urban Area General Plan, and the Stanislaus Council of Governments (Stancog) to project population change within the MFD service area.

### *Population History*

Population growth in the City of Modesto and Stanislaus County has varied over the last 35 years. The population of Modesto has nearly doubled from 106,963 to over 205,000 according the Department of Finance (DOF) January 2015 estimate; and the population of Stanislaus County has increased from 265,900 in 1980 to nearly 532,300 in 2015. The following figure demonstrates the historical population growth in Modesto from 1980 to 2015.

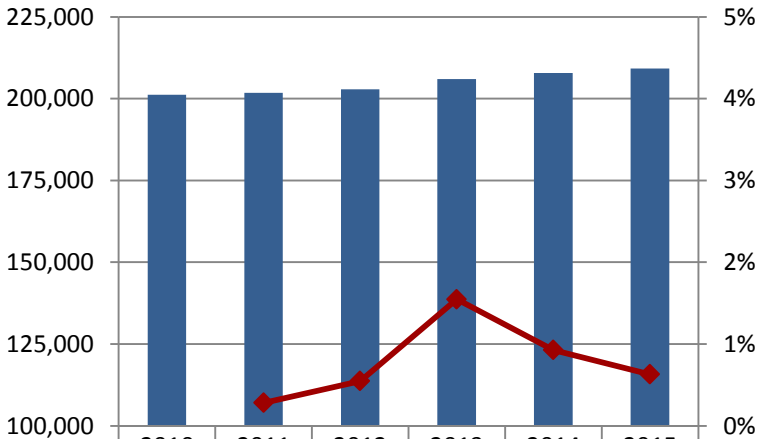
**Figure 109 : City of Modesto Historical Population Change, US Census Data 1980-2015**




| | 1980 | 1990 | 2000 | 2010 | 2015 |
|---|---|---|---|---|---|
| Population | 106,963 | 164,730 | 188,856 | 201,165 | 209,186 |
| AAGR | | 5.4% | 1.5% | 0.7% | 0.8% |

Although the average annual growth rate (AAGR) has decreased since 1980, the population of Modesto has increased for each of the decennial census periods shown in this figure. The following figure illustrates population growth within Modesto from the last decennial census to January 2015.

**Figure 110 : Modesto Population Growth, 2010-2015 California DOF Data**



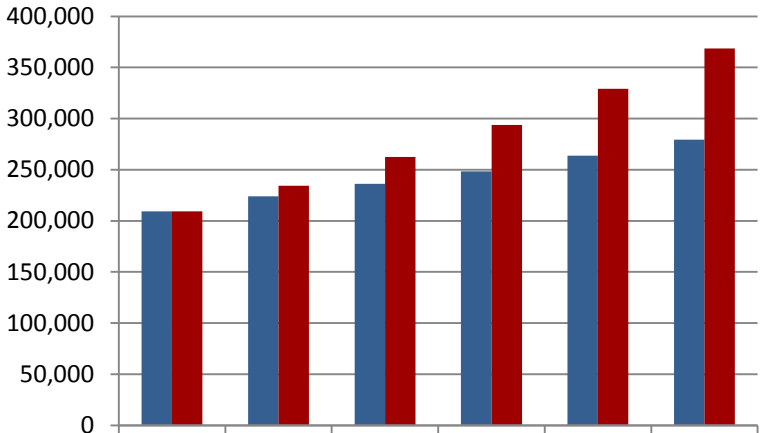

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|
| Population | 201,165 | 201,730 | 202,834 | 205,972 | 207,878 | 209,186 |
| Annual % Change | | 0.28% | 0.55% | 1.55% | 0.93% | 0.63% |

The population of Modesto continued to grow between 2010 and 2015, according to the Department of Finance estimates. This figure demonstrates that the population has grown by approximately four percent in the time period displayed. During the same time period the population of Stanislaus County grew by nearly 3.5 percent.

### *Population Projection*

Using population projections and information from the Modesto Urban Area Growth Plan and California Department of Finance (DOF); ESCI calculates and displays two possible population projections for the Modesto Fire Department service area in the following figure.

**Figure 111 : MFD Study Area Population Projections 2015 through 2040**



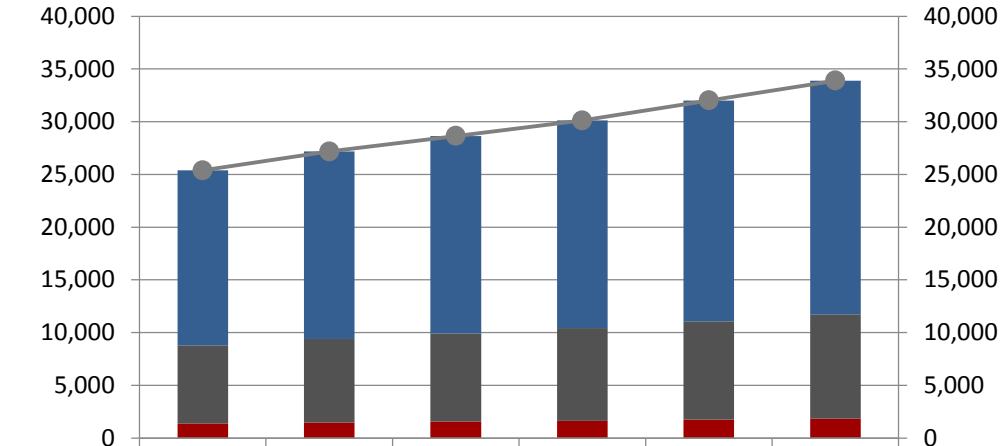

| | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|---|
| DOF (1.3% AAGR) | 209,186 | 223,966 | 236,119 | 248,272 | 263,802 | 279,331 |
| Modesto GP (2.4%) | 209,186 | 234,288 | 262,403 | 293,891 | 329,158 | 368,657 |

In the projections displayed, ESCI began with the current estimated population estimate of the Modesto and then applied the projected growth rate for each of the projections to this number. The Modesto Urban Area General Plan (Modesto GP) forecast the population of Modesto to reach approximately 334,000 by 2025; which is higher than the population projection seen in the figure. The growth rate was expected to average 2.4 percent annually. The Modesto GP was published in 2008 prior to the 2008 recession and the resultant down turn in economic and population growth. Note that a 2015 review of the general plan acknowledges that growth has not occurred at the rate projected in the original plan. The DOF projection was published in 2014 and is based on revisions to the annual estimates which reflect current trends and data. This projection shows the population of Modesto increasing to nearly 280,000 by 2040.

### *Service Demand Projections*

For the purposes of this study, ESCI utilizes the 1.3 percent average annual growth rate from the DOF projection; and multiplies this by a forecasted incident rate (incidents per capita) derived from MFD historical service demand for the last five years (2010 through 2014). This information is employed to identify workload potential, based on population, through the year 2040. The results are displayed in the following figure.

**Figure 112 : MFD Study Area Service Demand Projection, 2015 through 2040**




| | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|---|
| EMS | 16,598 | 17,771 | 18,736 | 19,699 | 20,931 | 22,163 |
| Other | 7,403 | 7,926 | 8,356 | 8,786 | 9,335 | 9,885 |
| Fire | 1,381 | 1,478 | 1,559 | 1,639 | 1,741 | 1,844 |
| Total | 25,381 | 27,174 | 28,651 | 30,123 | 32,008 | 33,892 |

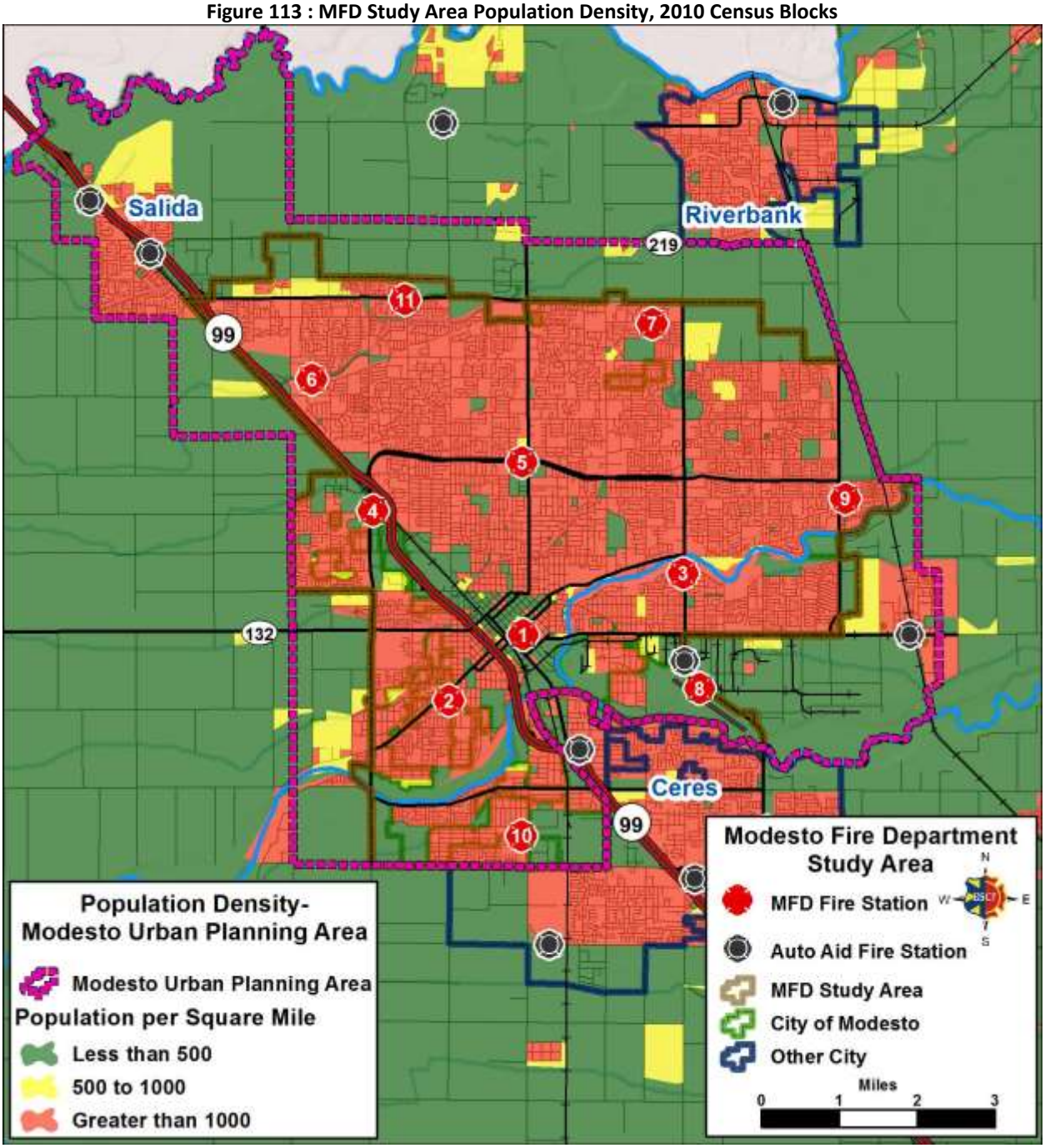
This figure displays projected service demand (summarized as “Fire,” “EMS,” and “Other” incident categories) through 2040. Fires (includes all types of fires) demonstrate the lowest rate of increase. This reflects a national trend attributed to improvements in building codes and fire prevention over the last several decades. EMS incidents are expected to continue to be the predominant factor affecting service demand in the MFD service area. This projection demonstrates a nearly 34 percent increase in service demand over the next 25 years. Note that using the 2.4 percent AAGR from the 2008 Modesto General Plan results in a projection of possible future service demand of over 43,600 incidents by 2040.

It is not the intent of this study to be a definitive authority for the projection of future population in the service area, but rather to base recommendations for future fire protection needs on a reasonable association with projected service demand. Since human activity is a primary driver of emergency service demand, it is important to have a population-based projection of the future size of the community.

## COMMUNITY RISK REVIEW

Community risk is assessed based on a number of factors: the service area population and population density, the demographics of the population, local land use and development, and the geography and natural risks present within the community. These factors affect the number and type of resources (both personnel and apparatus) necessary to mitigate an emergency. The following figure, examines population density in the MFD service area.

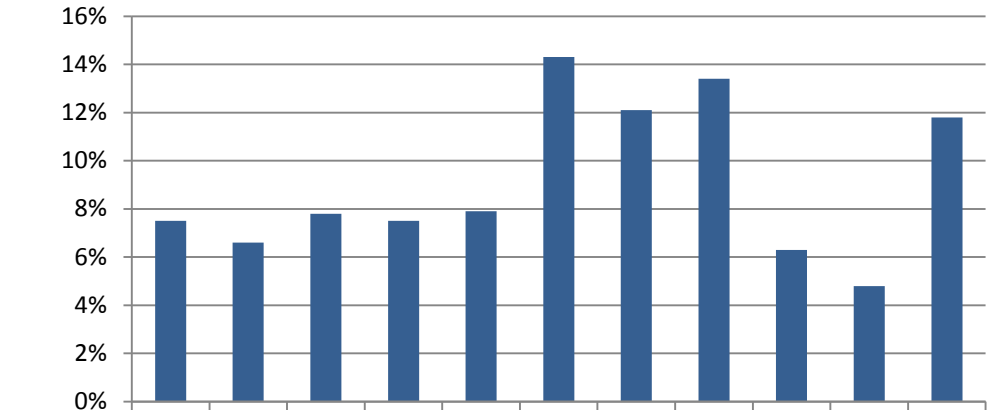
**Figure 113 : MFD Study Area Population Density, 2010 Census Blocks**



As discussed in the Distribution analysis, the population density within the current MFD service area is predominantly urban. With an estimated population of over 209,000 and a population density of over 4,900 per square mile, Modesto is considered a metropolitan community. Approximately 40 percent of the population of Stanislaus County resides in Modesto. In the previous figure, ESCI displays the Modesto Urban Area Planning boundary. This represents the area in and around Modesto addressed in the Modesto Urban Area General Plan. The portions of the planning area around the perimeter of the current boundaries of Modesto are expected to absorb substantial urban development in the future. That growth will be guided by the Modesto Urban Area General Plan. Note that the unincorporated community of Salida is included in the Modesto planning area, but maintains a separate community general plan. The Modesto General Plan (published in 2008) forecasts that the planning area has the capacity for a potential population of 428,000. Growth and increased population density inside the Modesto planning area will change the nature of the community risk within the MFD service area.

In addition to the distribution of the population, the demographics of the population can affect the amount of service demand and the risk within a community. The following figure displays the population by age group within the MFD service area.

**Figure 114 : MFD Study Area Population by Age, 2013 Census Data**




| | Under 5 years | 5-9 years | 10-14 years | 15-19 years | 20-24 years | 25-34 years | 35-44 years | 45-54 years | 55-59 years | 60-64 years | Over 65 Years |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Age Group | 7.5% | 6.6% | 7.8% | 7.5% | 7.9% | 14.3% | 12.1% | 13.4% | 6.3% | 4.8% | 11.8% |

According to the 2013 Census Bureau American Community Survey (ACS) estimate, nearly 12 percent of the population of Modesto is over 65 years of age. This is similar to the same metric within in Stanislaus County and California. However, examination of the California DOF population projections reveals that the population of this age group in Modesto is expected to grow at over three times the rate of the general population over the next 25 years. This is a trend that is increasing EMS service demand for fire jurisdictions across the country. Also note that NFPA studies indicate the population over 65 or less than 5 is at higher risk for fatalities in residential fires.

In the following figure, ESCI displays other demographic values for Modesto from the 2013 ACS estimates; and compares these values to those of Stanislaus County and California.

**Figure 115 : MFD Study Area Demographics, 2013 Census Data**

| Demographic | Modesto | Stanislaus County | California |
|---|---|---|---|
| Median Household Income, 2009-2013 | $47,060 | $49,297 | $61,094 |
| Owner-Occupied Housing, 2009-2013 | 54.5% | 58.1% | 55.3% |
| Persons Without Health Insurance, Under Age 65 Years | 17.5% | 17.8% | 17.8% |
| Personal Income Below Federal Poverty Level | 20.8% | 20.3% | 15.9% |

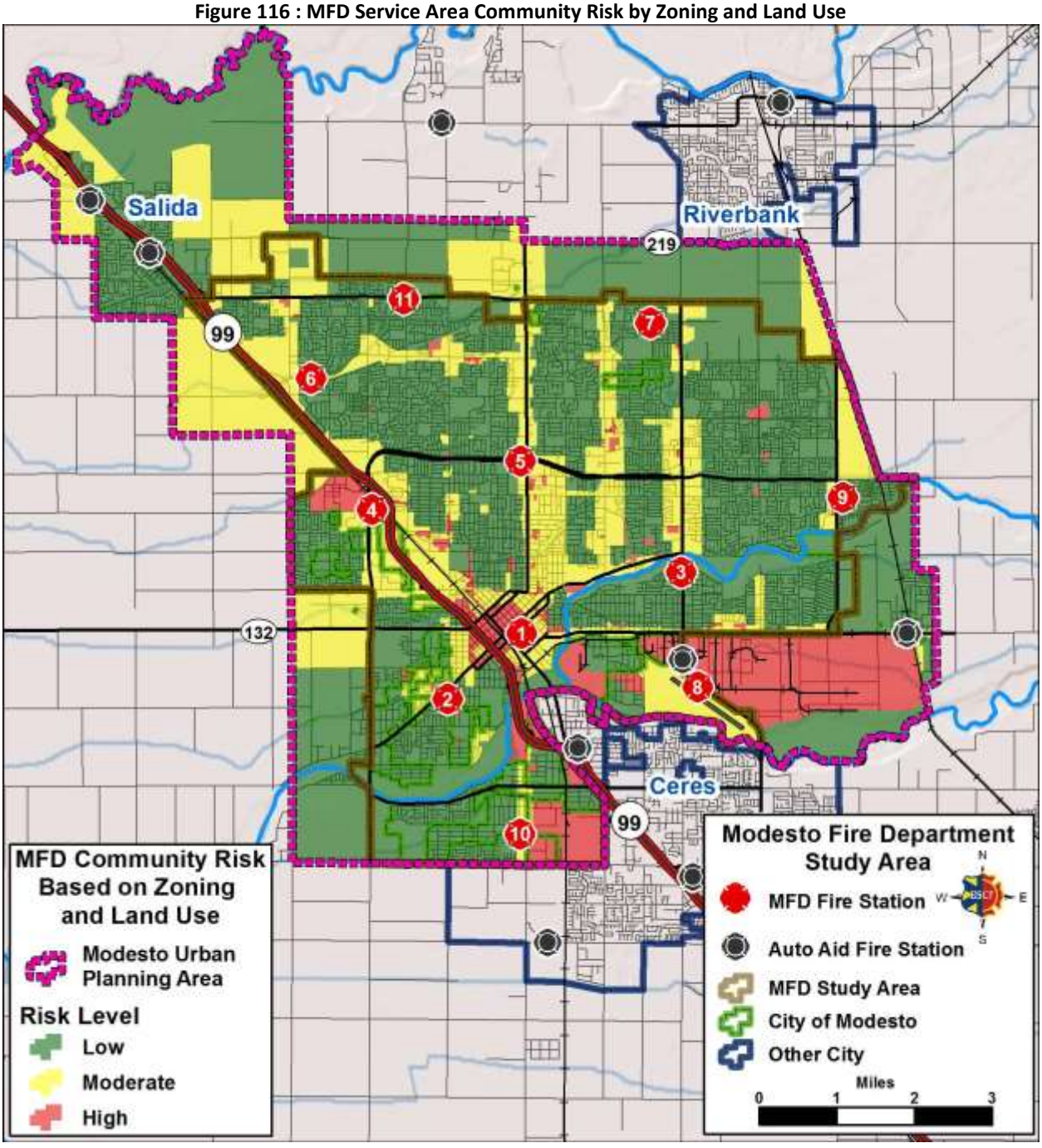
The demographics displayed above, are factors that may indicate a population that is more or less likely to use fire department services than other populations. Individuals with lower incomes and no health insurance are more likely to use local EMS resources than individuals with health insurance and a personal physician. A high percentage of owner occupied homes generally equates to wage earners willing to invest in the community.

ESCI uses GIS software and land use and zoning classifications from the Modesto Urban Area General Plan to examine current and future land use. Risk is assigned to the land use and zoning classifications to present a view of relative community risk.

- **Low Risk** – Areas zoned for agricultural purposes, open space, low-density residential and other low intensity uses.
- **Moderate Risk** – Areas zoned for medium-density single-family properties, small commercial and office uses, low-intensity retail sales, and equivalently sized business activities.
- **High Risk** – Higher-intensity business districts, mixed use areas, high-density residential, industrial, warehousing, and large mercantile centers.

The following figure maps relative community risk within the MFD service area using the criteria listed above.

**Figure 116 : MFD Service Area Community Risk by Zoning and Land Use**




The Modesto service area is a mix of low, moderate, and high risk properties. Residential properties are primarily single family dwellings (approximately 72 percent). While single family dwellings are usually categorized as a moderate fire risk, they represent a lower risk when compared to commercial and industrial properties; and low density residential areas are classified as low risk in this analysis. Areas classified as moderate risk are predominantly commercial properties or mixed use areas; and tend to be distributed along the major transportation routes through the Modesto planning area. Areas classified as high risk are primarily zoned for manufacturing and industrial uses. Areas zoned for high density multi-family residential structures are also included in the high risk category. The downtown core area is

classified as a high risk area due to multi-story structures, building density, and commercial activity in this area.

The land use planning districts and zoning classifications displayed above are intended to accommodate growth and in fill within the Modesto Urban Planning Area. Increased development and activity inside the planning area will result in additional service demand inside the current MFD service area. Additionally, when growth occurs in the portions of the planning area outside of the current MFD service area; MFD must be prepared to address new service demand in these areas.

### *Natural and Manmade Hazards*

The Modesto Urban Area General Plan identifies earthquake, flood, dam failure, wildland fire, and landslide, or hazardous material spills (contamination of soil or groundwater) as the most likely natural disasters with the potential to affect public safety in and around the planning area. The city has adopted a Local Hazard Mitigation Plan (LHMP), which addresses public safety and the reduction of losses from natural or manmade disasters. ESCI encourages MFD to work with city planners to identify the impact on public safety and the fire department's ability to mitigate effects of these hazards.

## Future Delivery System Models

Although the foregoing sections of this report focused primarily on the conditions that currently exist within the MFD, the intent of this study is to combine that evaluation with a look into the future and provide policy makers with information necessary to carry the system forward over the next 10 to 20 years. This portion of the report provides recommendations related to the deployment of facilities, apparatus, and personnel with a focus on future service delivery and an improvement in overall efficiency within the system.

### DEVELOPMENT OF RESPONSE STANDARDS AND TARGETS

Throughout this report, ESCI has emphasized the importance of the establishment of response performance metrics by the MFD. Once established, these standards establish measurable goals for service delivery, which then form the baseline upon which planning for deployment of resources is based. Absent these processes, the organization is not able to determine where it needs to go, nor is it able to know when it is achieving its goals and meeting its community's expectations.

Response standards must be developed by the individual community, based on the expectations of elected officials and citizens, balanced against the financial aspect of what a community is able and willing to afford. For this reason, ESCI cannot establish these standards for MFD, but rather will provide guidance and examples of what we consider to be acceptable metrics.

#### *Critical Tasks, Risk, and Staffing Performance*

As explained earlier, 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 actions. Life safety-related tasks involve 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 actions, the command officer must prioritize the tasks and complete some in chronological order, rather than concurrently. These tasks include:

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

The fire service assesses the relative risk of properties and occurrences based on a number of factors. Properties with high fire risk often require greater numbers of personnel and apparatus to effectively mitigate the fire emergency. Staffing and deployment decisions should be made with consideration of the level of risk involved. The level of risk categories used by Commission for Public Safety Excellence (CPSE) relate as follows:

- **Low Risk** – Areas and properties used for agricultural purposes, open space, low-density residential and other low intensity uses.

- **Moderate Risk** – Areas and properties used for medium density single-family residences, small commercial and offices uses, low intensity retail sales and equivalently sized business activities.
- **High Risk** – Higher density business districts and structures, mixed use areas, high density residential, industrial, warehousing, and large mercantile structures.

The CPSE has a sample critical tasking analysis for the number of personnel required on scene for various levels of risk. This information is illustrated in the following figure as an example of critical tasking only and is not intended to conclusively define the actual personnel necessary based on risk.[10]

**Figure 117 : Sample of Critical Task Staffing by Risk**

| Sample Critical Tasking Analysis<br>Firefighter Personnel Needed Based On Level of Risk | | | | |
|---|---|---|---|---|
| | **Structural Maximum Risk** | **Structure Significant Risk** | **Structure Moderate Risk** | **Non-Structure Low Risk** |
| Attack Line | 4 | 4 | 2 | 2 |
| Back-Up Line | 4 | 2 | 2 | (2) |
| Support For Hose Lines | 4 | 3 | 2 | |
| Search And Rescue | 4 | 4 | 2 | |
| Ventilation | 4 | 2 | 2 | |
| Rapid Intervention Team | 4 | 4 | 2 | |
| Pump Operator | 2 | 1 | 1 | 1 |
| 2nd Apparatus/Ladder Operator | 1 | 1 | (1) | |
| Command | 2 | 1 | 1 | 1# |
| Safety | 2 | 1 | 1# | |
| Salvage | 4 | | | |
| Rehabilitation | 2 | | | |
| Division/Group Supervisors | (2) | | | |
| **Total** | **37-39** | **23** | **14-16** | **3-6** |

*() indicates tasks may not be required at all such incident.*
*# indicates task may, at times, be completed concurrently with other position.*

The first 15 minutes is the most crucial period in the suppression of a fire. How effectively and efficiently firefighters perform during this period has a significant impact on the overall outcome of the event. This general concept is applicable to fire, rescue, and medical situations.

Critical tasks must be conducted in a timely manner to control a fire or to treat a patient. Three scenarios of commonly encountered emergencies are routinely utilized by fire departments when conducting field validation and critical tasking: a moderate risk structure fire, a traffic collision with a trapped victim, and a cardiac arrest. Each scenario is conducted using standard operating procedures and realistic response times based on actual system performance. Each scenario is normally run multiple times with a variety of fire companies to validate and verify observations and times.

[10] Note: Based on examples provided in the publication Commission on Fire Accreditation International, Inc. (now Center for Public Safety Excellence), *Creating and Evaluating Standards of Response Coverage for Fire Departments*, 4th edition.

To further validate the analysis process, results are compared with records from actual working fires and similar incidents from previous years. Overall results are reviewed to determine if the actions taken within the early minutes of an incident resulted in a stop loss or not, and if additional resources were required. The critical task analysis process demonstrates the rate in which the current deployment plan results in stopping loss a high percentage of time within initial critical time goals.

Again, critical tasks are those activities that must be conducted in a timely manner by firefighters at emergency incidents in order to control the situation, stop loss, and to perform necessary tasks required for a medical emergency. The MFD is responsible for assuring that responding companies are capable of performing all of the described tasks in a prompt, efficient, and safe manner.

### *All Risk Critical Resource Tasking*

Fire departments respond to many incidents other than structure fires, including hazardous materials (dangerous goods) releases, motor vehicle collisions, basic and advanced life support medical emergencies, and non-structural fires. Personnel responding to these types of incidents should be assigned tasks similar to structure fires.

The following figures are provided as an example for these types of incidents, although ESCI recommends MFD conduct field validation exercises with its crews to verify the critical tasking analysis provided. After field validation is complete, the department may find that the critical tasking can be adjusted appropriately upward or downward for each incident type.

**Figure 118 : Non-Structure Fire Critical Tasking**

| Task | Personnel |
|---|---|
| Command | 1 |
| Pump Operator | 1 |
| Primary Attack Line | 2 |
| **Total** | **4** |

**Figure 119 : Hazardous Materials Incident Critical Tasking**

| Task | Personnel |
|---|---|
| Command | 1 |
| Pump Operator | 1 |
| Primary Attack Line | 2 |
| Back-Up Line | 2 |
| Support Personnel | 7 |
| **Total** | **13** |

**Figure 120 : Motor Vehicle Collision with Entrapment Critical Tasking**

| Task | Personnel |
|---|---|
| Command | 1 |
| Pump Operator | 1 |

| | |
|---|---|
| Primary Attack Line | 2 |
| Extrication | 3 |
| Patient Care | 2 |
| **Total** | **9** |

**Figure 121 : Emergency Medical Incident Critical Tasking**

| Task | Personnel |
|---|---|
| Ambulance Transport | 2 |
| First Responder | 4 |
| **Total** | **6** |

The aforementioned minimum staffing criteria should be used in setting specific service level objectives for each of the incident types.

### *Response Time Performance Objectives*

The process of setting response time performance objectives will include two sets of questions:

- What are the expectations of the community and elected officials in regard to initial response times of the fire department to an emergency incident? What is the public's perception of quality emergency services where response time is concerned?
- What response time performance would be reasonable and effective in containing fire, stopping the loss, and saving lives when considering the common types of incidents and fire risks faced by the MFD?

To initiate the process of considering the expectations of the customer, the historical travel time and loss history needs to be examined from the data that was submitted by the MFD. Then, historical service levels are compared to known and anticipated service demand and community growth projections. Considering these projections, suggested response time standards are created to ensure MFD is meeting local service demand expectations in accordance with relevant industry standards and best practices.

The MFD is a fully career department and therefore references the industry standard for the Center of Public Safety Excellence (CPSE) and the *NFPA 1710* performance measures. These response time measures are displayed in the following figure:

**Figure 122 : NFPA Performance Measurement Recommendations**

| Response Element | NFPA Recommendation |
|---|---|
| Call Processing[11] | 0:60 @ 95th% |
| Turnout | 0:60 @ 90th % for Medical<br>1:20 @ 90th % for Fire |
| Response | 4:00 @ 90th % |
| Effective Response Force | 8:00 @ 90th % |

*NFPA 1720* provides direction for variable density response performance measures that are intended for volunteer or combination fire departments, but can be used as guidelines for career departments that provide services to a wide range of population densities and geographic areas.

**Figure 123 : Additional NFPA Response Performance Objectives by Population Density Categories**

| Response Element | Response Performance Objective |
|---|---|
| Call Processing | 0:60 @ 95th Percentile |
| Turnout | 0:60 @ 90th Percentile for Medical<br>1:20 @ 90th Percentile for Fire |
| Urban Zone | 4:00 @ 90th Percentile |
| Suburban Zone | 8:00 @ 80th Percentile |
| Rural Zone | 14:00 @ 80th Percentile |

Although NFPA performance recommendations are considered an industry standard, departments working with their governing bodies have the authority to implement performance measures that are better suited to their communities. This is known as the Authority Having Jurisdiction (AHJ). The MFD 90th turnout time is 2 minutes 49 seconds and travel time is 4 minutes 34 seconds resulting in a 6 minutes 34 seconds overall response time. Given the current response time performance, ESCI recommends the Modesto adopt performance measures that, for the most part, adhere to *NFPA 1710/1720* standards methodology although some of the adopted measures deviate from those standards as illustrated in the following figures.

To most accurately reflect system performance in accordance with identified risk, ESCI recommends tiered response performance objectives for the city based on population density. This methodology will effectively segregate the service area into three distinct response zones: urban, suburban, and rural.

The first example is the “first due” response of a single utilizing standard reflex time from dispatch to arrival 90 percent of the time:

[11] *NFPA 1221: Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*.

**Figure 124 : First Due Response Standard Example**

| First Due, Single Unit Response | |
|---|---|
| Urban (> 1000 Per Square Mile) | 7 Minutes To 90 Percent Of Incidents |
| Suburban (500-1000 Per Square Mile) | 7 Minutes To 90 Percent Of Incidents |
| Rural (<500 Per Square Mile) | 15 Minutes To 90 Percent Of Incidents |

The next example represents a first alarm response to a moderate risk structure fire, utilizing standard reflex time from dispatch to arrival 90 percent of the time:

**Figure 125 : First Alarm Response Standard Example**

| First Alarm, Response of 3 Engines, 1 Truck and 1 Battalion Chief | |
|---|---|
| Urban (> 1000 Per Square Mile) | 10 Minutes To 90 Percent Of Incidents |
| Suburban (500-1000 Per Square Mile) | 10 Minutes To 90 Percent Of Incidents |
| Rural (<500 Per Square Mile) | 15 Minutes To 90 Percent Of Incidents |

This discussion is intended to provide the MFD with the information necessary to begin the process of establishing response standards and targets. The department is encouraged to begin the process as soon as possible, especially in light of the potential for the addition of a fire station and personnel in the future.

## SHORT- AND MID-TERM STRATEGIES

The previous sections of this report detail a considerable volume of observations and recommendations relating to the MFD current conditions relating to management and operations. The process of understanding, prioritizing, and implementing the recommended enhancements can be daunting simply due to the amount of work that may be involved. To help the organization navigate through the process, the following discussion further defines the short- and mid-term priorities that ESCI has identified.

### *Response Deployment*

Population growth projections for the City of Modesto continue to be strong and current activity supports that picture. ESCI concludes that the current service demands and the projected growth and expected service demand justifies an increase in response resources. Specifically, there is an immediate need to address truck company, battalion chief, and alternative response capabilities for non-emergency EMS calls. Response times are lengthening and unit reliability is decreasing with the significant call increase and 32 percent increase in fire over the past five years. Incident outcomes are generally acceptable but there is notable increase in fire loss and EMS response times. Unit reliability is dropping below the 90 percentile standard in most response areas raising concern over timely and effective response to an increasing call volume and increasing number of fire incidents. The following are short-term recommendations that will enhance current response and service delivery levels and efficiencies until additional City of Modesto resources can be funded and implemented.

- It is recommended that the MFD pursue an enhanced cooperative service agreement with the Stanislaus Consolidated and Ceres fire departments to coordinate and provide adequate truck and battalion responses to meet effective firefighting force standards and response times. These services should be utilized until additional Modesto truck and battalion resources can be funded

and implemented. These services can continue to support responses in the City of Modesto after the implementation of an additional battalion and truck company.

- There is opportunity to enhance automatic aid by implementing the negotiated complete boundary drops between Modesto, Stanislaus Consolidated, Ceres, and Turlock fire departments. Full implementation of this cooperative service agreement will provide increased unit concentration and reliability for the MFD service area, which is experiencing a high level of service demand and response time challenges. Currently, unit requests are based on CAD recommendation utilizing geographic coordinates and run cards. The technology does exist to utilize GIS based CAD recommendations for the closest unit to respond. This technology should be accessed and complete boundary drops implemented as soon as possible.
- Current dispatch call-processing time exceeds the 60-second industry standard goal. Stanislaus County Regional Dispatch (SR 911) is a regional multi-agency, multi-disciplinary (law enforcement, Fire, EMS) agency; and call-processing time is generally not under the direct control of the fire department. Fire department leaders need to be aware of call processing time and work cooperatively with the dispatch agency to meet standards. It is recommended the MFD identify and implement a dispatch model that eliminates the current number of call transfers, interrogation points, and delay in EMD call classification and dispatch.

### *Fire Prevention*

Consistent with its general mission, the MFD is responsible to manage a significant portion of public safety risk within its service area. In managing the risk, a well-designed and properly managed fire prevention program has consistently served communities well and measurably reduced risk.

As has been discussed in detail in the Fire Prevention and Public Education section, the MFD fire prevention program will need to adapt to the ever-increasing workload and address the existing fire problem as well as future anticipated growth. ESCI recommends that MFD undertake a comprehensive planning process that will:

- Identify and assess pertinent risks.
- Prepare and staff the Fire Prevention Division to ensure they have the ability to manage the additional workload that will come with projected growth and regional and community impacts to fire and life safety programs.
- Incorporate a blended strategy of education, engineering, and enforcement to mitigate as much of the risk as practical.
- Work aggressively with city planning and abatement services to identify and mitigate fire and life safety issues with a focus on abandoned and high-risk structures and buildings.
- Seek to achieve an inspection frequency of at least annual completion and more frequently for higher risk occupancies.
- Provide strong direction for the program; and
- Appropriately staff the program to maintain the existing inspection compliance rate and continue to work toward the 100 percent goal.

Within the fire prevention program, ESCI recommends the MFD specifically explore cooperative services initiatives in the areas of public education and maintain control and leadership of regional fire/arson investigation.

### *Emergency Medical Services (EMS)*

Advanced life support (ALS) emergency medical transportation is provided under a contract for service with American Medical Response. The MFD EMS response system includes three ALS FRALS units staffed by one credentialed paramedic under medical supervision, strategically stationed throughout the city. In addition to the FRALS units, there are nine first responder BLS engine companies that respond within their service areas to provide rescue and clinical care.

The MFD is the primary provider of first responder EMS services within its service area; and there is one fire engineer dedicated to the planning, delivery, evaluation, and overall effectiveness of MFD resources. The EMS delivery system overall within the city is very well integrated and provides a high level of EMS. the MFD has not established identified outcome based EMS system performance benchmarks, which could serve as a measure of efficiency and effectiveness.

EMS response constitutes a very significant portion of MFD's response activity and is also a critically important service. ESCI recommends MFD enhance the current EMS program and planning process that will:

- Identify and assess system performance benchmarks, training requirements, equipment requirements, and skills gaps.
- Incorporate a blended strategy of system integration, outcome based performance measures, training, and skills development and assessment.
- Prioritize implementation and utilization of a Medical Priority Dispatch System (MPDS) and an appropriate tiered response to medical calls for service (right resource, right patient, right time).
- Incorporate first responder Peak Activity Units (PAUs) from 1100-2300 hours as ALS Quick Response Units to maintain adopted response time standards.
- In coordination with local health care providers and related stakeholders, conduct a community needs assessment to identify future integrated community health care (community paramedicine) and health care services that can and should be provided by the MFD.
- Work with the cooperative service partners to fully integrate, training, equipment/supplies, quality assurance, and EMS administrative functions.
- Provide strong direction for the program; and
- Appropriately staff the program with the establishment of an EMS chief officer and shift EMS coordinators or lead personnel to ensure adequate oversight and supervision are present for current and future EMS delivery needs.

With EMS services representing 64.5 percent of the calls for service, it is imperative that the MFD adequately staff and manage this vital community service.

### *Emergency Management*

The MFD is responsible to manage a significant portion of public safety risk within its service area that results from disaster preparedness. In managing the risks resulting from both natural and human-caused

disasters, a well-designed and properly managed emergency management program has consistently served communities well and measurably mitigated risks and improved public preparedness.

Currently, the MFD emergency management program lacks planning, design, and staffing. ESCI recommends that the MFD undertake a comprehensive planning process that will:

- Identify and assess pertinent disaster risks.
- Incorporate a blended strategy of planning, mitigation, response, and recovery initiatives such as active Community Emergency Response Teams (CERT), Federal Emergency Management Agency "Map Your Neighborhood," as well as other appropriate programs to address the identified risks.
- Provide strong direction for the program; and
- Appropriately staff the program with, minimally, a program manager or coordinator.

Within the context of the emergency management program, ESCI recommends the MFD aggressively explore cooperative services initiatives with neighboring jurisdictions to ensure area-wide planning, interoperable plans and equipment, common public messages, and distributed program cost.

### *Comprehensive Cooperative Service Agreement*

The MFD has done a significant amount of groundwork and development of a regional cooperatives service agreement that results in closest unit response with complete boundary drops with like staffed departments. ESCI commends the MFD for these efforts and these exceptional foundational elements.

ESCI had identified and shared concern with the MFD that the program has not been implemented. The MFD lacks some critical support resources necessary to effectively support and facilitate consistent fire protection and EMS delivery as the department experiences future growth and increased service demand. We strongly recommend the MFD take the opportunity now to bolster and solidify these programs and resources even as they prepare to strengthen their response resources in the future.

Several of these key programs can be significantly improved and fortified through building upon the currently developed cooperative services initiatives with the MFD's adjacent jurisdictions and service partners. ESCI encourages the MFD to develop a "formal" multi-faceted cooperative services agreement that will equitably serve the MFD and their partners alike; and will produce consistent and defined support programs and services at a reduced cost for all partners the address at a minimum:

- Regional EMS administration, quality assurance/medical direction, training, supplies, and supervision in the field.
- Vehicle maintenance and repair services at an identified location with mobile capabilities to meet the needs of department vehicles in the field.
- Continued fire investigation services to ensure trained, certified fire investigators available 24/7/365 days a year.
- Emergency management functions to address preparedness, mitigation, response and recovery plans, and services to all participating agencies.
- Joint training staff and facility services to meet the training mandates and needs of all participating agencies.

- A regional purchasing cooperative that ensures competitive bidding and purchasing requirements are in place resulting in economies of scale and timely purchase and delivery of goods and services.

### *Training*

The MFD has devoted significant focus and attention to the enhancement of training programs and standards within the organization. The program staffing, however, lacks the depth necessary to handle the significant mandated training standards and anticipated influx of new response personnel due to turnover and growth. ESCI believes the existing training staff model will rapidly exceed its capabilities based on anticipated growth, recommended service enhancements, and the need to handle the ongoing training, skills maintenance, recertification, and the expectations for professional development within a very busy and growing organization.

Successful fire and EMS training programs typically incorporate a leadership/managerial component and also a delivery and evaluation specialist. ESCI recommends the MFD work to ensure effective incorporation of both components within their training program.

ESCI recommends that The MFD undertake a comprehensive planning process that will:

- Identify and assess training requirements, developmental needs, and skills gaps.
- Establish, implement, and manage a comprehensive training and professional development program for all MFD employees.
- Incorporate a blended strategy of education, training, and practical skills development and assessment.
- Provide strong leadership for the program.
- Provide effective training delivery and skills assessment; and
- Appropriately staff the program with the addition of at least one additional FTE training captain position and designated shift training coordinators.

Within the training program, ESCI recommends the MFD specifically explore cooperative services initiatives in the areas of recruit training, Multi-Company Tactical Operations (MCTO), technical rescue programs, incident command system (NIMS) training, and special operations training e.g. hazardous materials, technical rescue, etc.

### *Administrative Support Staff*

The roles of administrative support personnel include the critical functions of:

- Planning
- Data and information analysis
- Documentation and reporting
- Logistical support
- Process guidance and support

As noted, the present roster of support staff represents 11.3 percent of the MFD total staffing and ESCI regards this as a minimal amount. Successful municipal organizations more typically use a roster totaling 12 percent to 15 percent of agency total staffing.

Currently, the MFD office/administrative staffing functions are carried out by two FTE safety positions with operational and policy level responsibilities and, three administrative staff and two administrative assistants. ESCI notes that, while these employees are flexible and capable in multiple areas, they are frequently stretched to accomplish the range of tasks and duties before them. There is a significant deficit in managing support services division activities. The fire chief and operations chief are not able to administer their primary responsibilities and support service functions. In such circumstances, the functions of data/information analysis, reporting, and vital support service functions such as fleet maintenance and administrative support supervision are most frequently short-changed; we believe this is also true at the MFD.

ESCI also notes a majority of fire and EMS agencies focus training, educational, and development resources on operational response personnel, often to the exclusion of key support staff personnel. It is not uncommon for capable administrative support personnel to enlarge skill sets and improve efficiencies, given agency support for their development. The MFD is encouraged to look for opportunities to further develop incumbent support personnel.

It is further recommended the MFD undertake a comprehensive planning process that will:

- Identify and assess administrative support functional requirements, developmental needs, and skills gaps.
- Incorporate a blended strategy of education, training, and practical skills development and assessment.
- Provide strong leadership for the program.
- Appropriately staff the program; and
- Specifically consider adding one division chief of support services with primary responsibility to administer and manage support service functions within the MFD.

### *Organizational Development*

The MFD is in a state-of-transition, in part due to recent the re-establishment of City of Modesto Fire Department. As a result, the membership is in the process of navigating its way through a set of new priorities and paradigms, which is often a difficult process.

To assist in the transition, ESCI recommends internal communications be enhanced in an effort to increase ownership in decisions and appreciation for organizational changes. The establishment of internal advisory committees is recommended in areas such as:

- Training Advisory Committee
- Special issues Task Force
- Operations/Special Operations Committee
- Apparatus Committee
- EMS Committee

Committees should include the participation and oversight of a departmental chief officer as well as labor representation.

Another identified area of concern by City leadership, the MFD management, labor representatives, and the community is the issue of current and potential turnover at the firefighter rank. This is universally believed to be in response to a base pay schedule compared to available salaries in the San Francisco Bay area market and the amount of call volume and work hours being experienced at the MFD. While the MFD personnel tend to focus on earnings and take home pay as the dominant measurement of funding, work place desirability, workload, and appropriate employee satisfaction are contributing factors to recently experienced turnover.

- ESCI recommends the City of Modesto and the MFD explore a realignment of spending priorities as well as the pursuit of new revenue and efficiencies as recommended in this report. It is recommended the city establish a pay policy that maintains pay scales in the “median” or “average” of the established Central Valley and Bay Area comparable agencies. ESCI has observed that departments that develop pay policies that keep pay rates in the medium or average for the comparable areas and agencies tend to not have excessive turn over based on pay scales and wages.

## RECOMMENDED LONG-TERM STRATEGIES

### *Add an Additional Ladder Truck Company at Station 5*

Currently ladder truck coverage within the City of Modesto does not meet adopted response time criteria or ISO truck coverage criteria. A delay in truck company response can result in delays in performing critical fire ground tasks such as search, rescue, and ventilation that contribute to increased life safety and reduced fire loss. Current ladder truck company response comes from Station 1 from a dedicated truck company, and Station 11, which also responds as an engine company, reducing its ability to operate as a ladder truck on many of its responses.

Currently, much of the eastern portions of the city are outside a ladder truck response area that meets Modesto's current response time standards. Portions of this service area represent some of Modesto's most dense population and highest service demand areas. Due to the lack of street network connectivity, Stations 1 and 11 ladder truck resources cannot serve much of the eastern first due areas within a city's six-minute travel time and does not meet industry best practices. A comparison of coverage of 2014 emergency incidents shows that the addition of a ladder truck is capable of reaching all fire occurrences in the east Modesto area that does not currently meet city and industry response standards.

The proposed relocation of an additional ladder truck will serve a much larger portion of the city's response area and provide a significant enhancement that can be reached within eight minutes for a first alarm assignment: four engines, one ladder truck, and one battalion chief. In addition, the additional truck company will significantly increase the number of personnel available to respond to the high frequency and high life safety target hazard responses seen in the downtown and core Modesto areas. In addition, Stations 1, 2, 3, 4, 5, and 6 can receive a commercial response of five engines, two ladder trucks, and two battalion chiefs to target hazards located within their districts. The proposed relocation area of Station 5 (located at Briggsmore and McHenry) is an intersection of major east-west and north-south routes through Modesto. This location will not only increase service levels to the Station 5 area, but will also allow good access to the east side of the city.

The following figures display the enhanced response capabilities based on the addition of a ladder truck at Station 5.

**Figure 126 : 3rd Ladder Truck at Station 5, 8-Minute Travel Time**

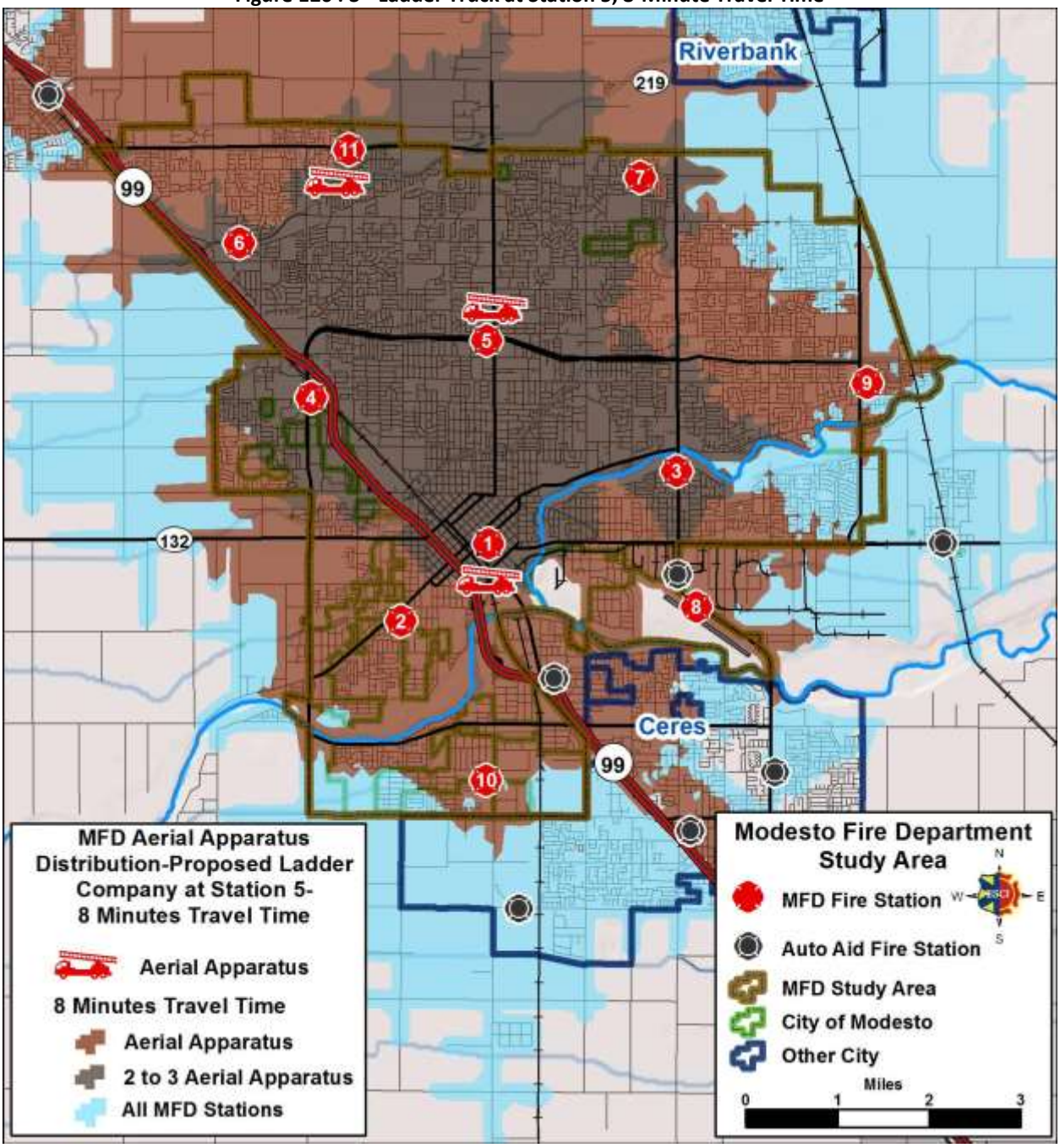


**Figure 127 : 3rd Ladder Truck at Station 5 Full First Alarm 8-Minute**

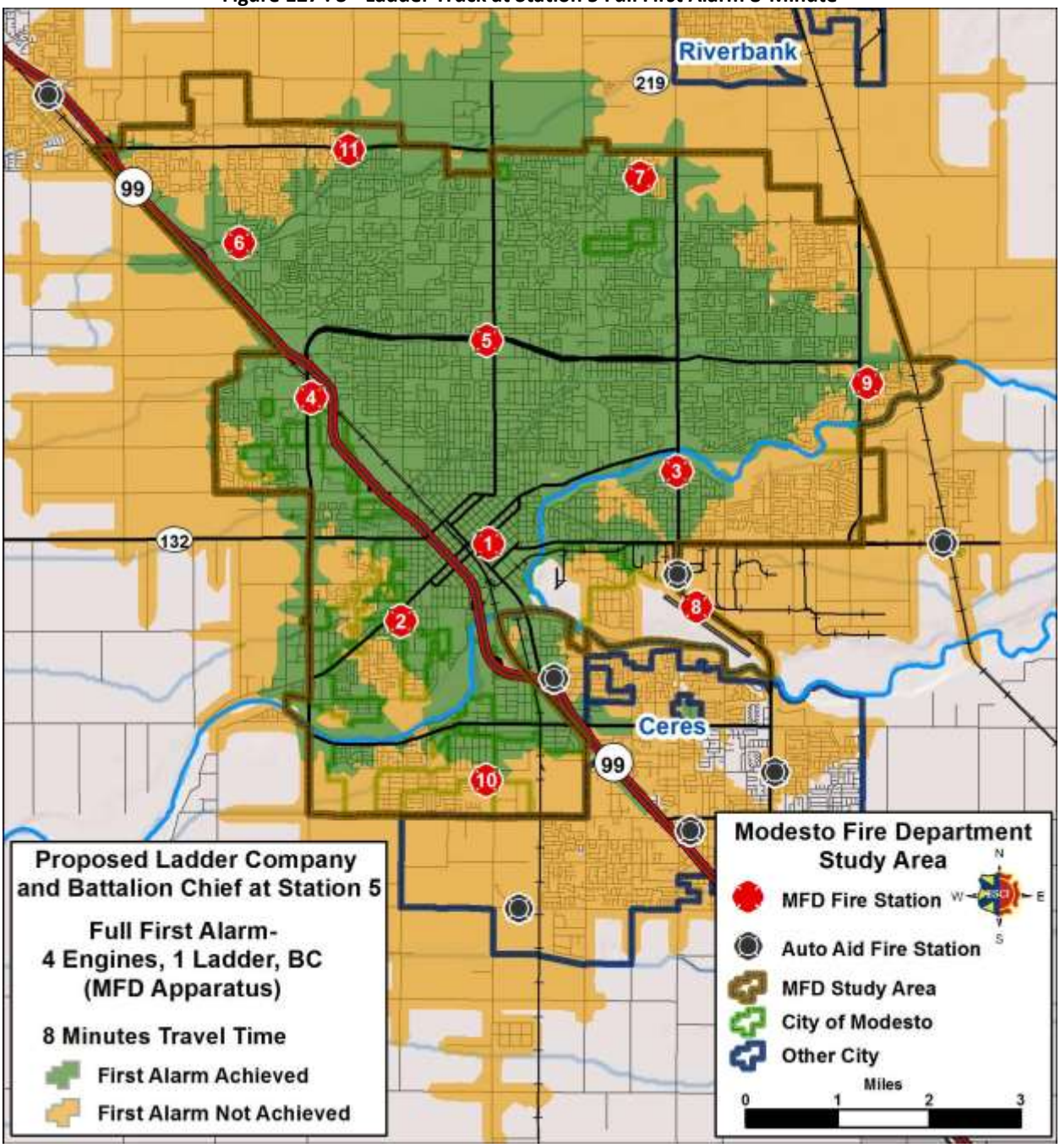
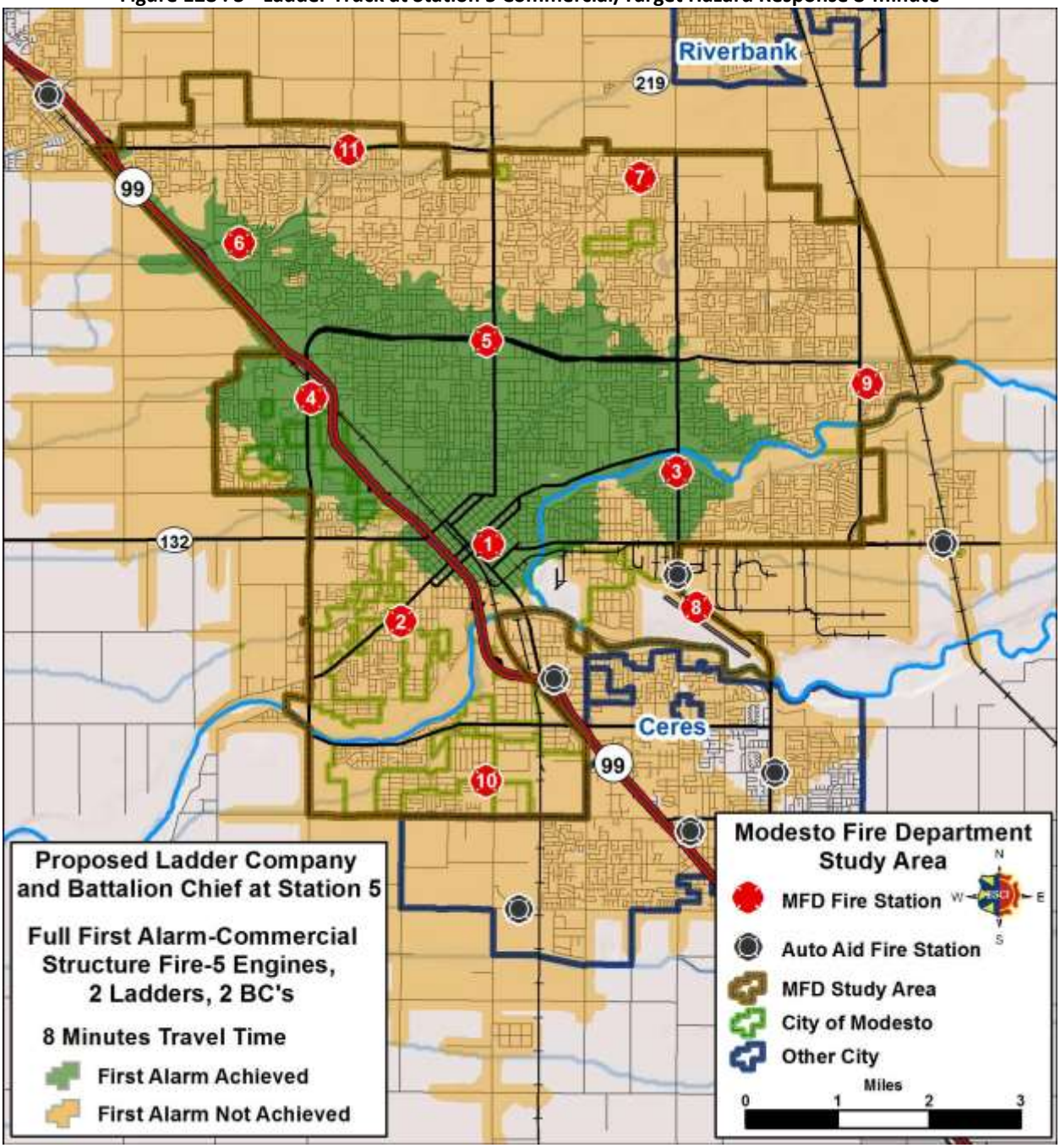


**Figure 128 : 3rd Ladder Truck at Station 5 Commercial/Target Hazard Response 8-minute**



### *Add an Additional Battalion Chief at Station 5*

Battalion chief response and supervision is a key element of an all risk fire based response system. On a day-to-day basis, battalion chiefs provide supervision of company officers and suppression personnel. This includes daily oversight of staffing, training, performance and command, and control on emergency scenes.

A critical part of any emergency scene is having appropriate oversight and supervision. The fire service best practice for a supervisor to company officer ratio is 5 to 7:1. Currently with one battalion chief the MFD supervisor to company officer is 12:1. This ratio is too large and does not allow for adequate supervision, accountability emergency scene oversight, and command functions. By adding a second battalion chief, the supervisor to company officer ratio will be 6:1, well within accepted industry best practices.

This level of oversight and supervision is in compliance with industry best practices and significantly reduces the potential for error and injury as a result of inadequate oversight and overextended command and control practices. In addition, having two battalion chiefs on the scene of a structure fire or complex incident will allow for one chief officer to directly handle incident operations and or safety officer functions. This segregation of tasks will allow the company officers to conduct their tasks in an uninhibited manner and focus on the delivery of operational tasks and supervision of their assigned personnel. This will directly impact the capabilities of on scene crews and result in expanded capabilities and effectiveness of emergency operations

The following figures show the current response capabilities of one battalion chief in eight minutes and the response capabilities of two battalion chiefs in eight minutes. As the figures show, in many portions of the city battalion chief response time will be cut in half. This configuration will also allow for a timely response of two battalion chiefs to working fire and large complex incidents in the high call volume and high life safety risk areas of the city.

**Figure 129 : Single Battalion Chief Response from Station 1**

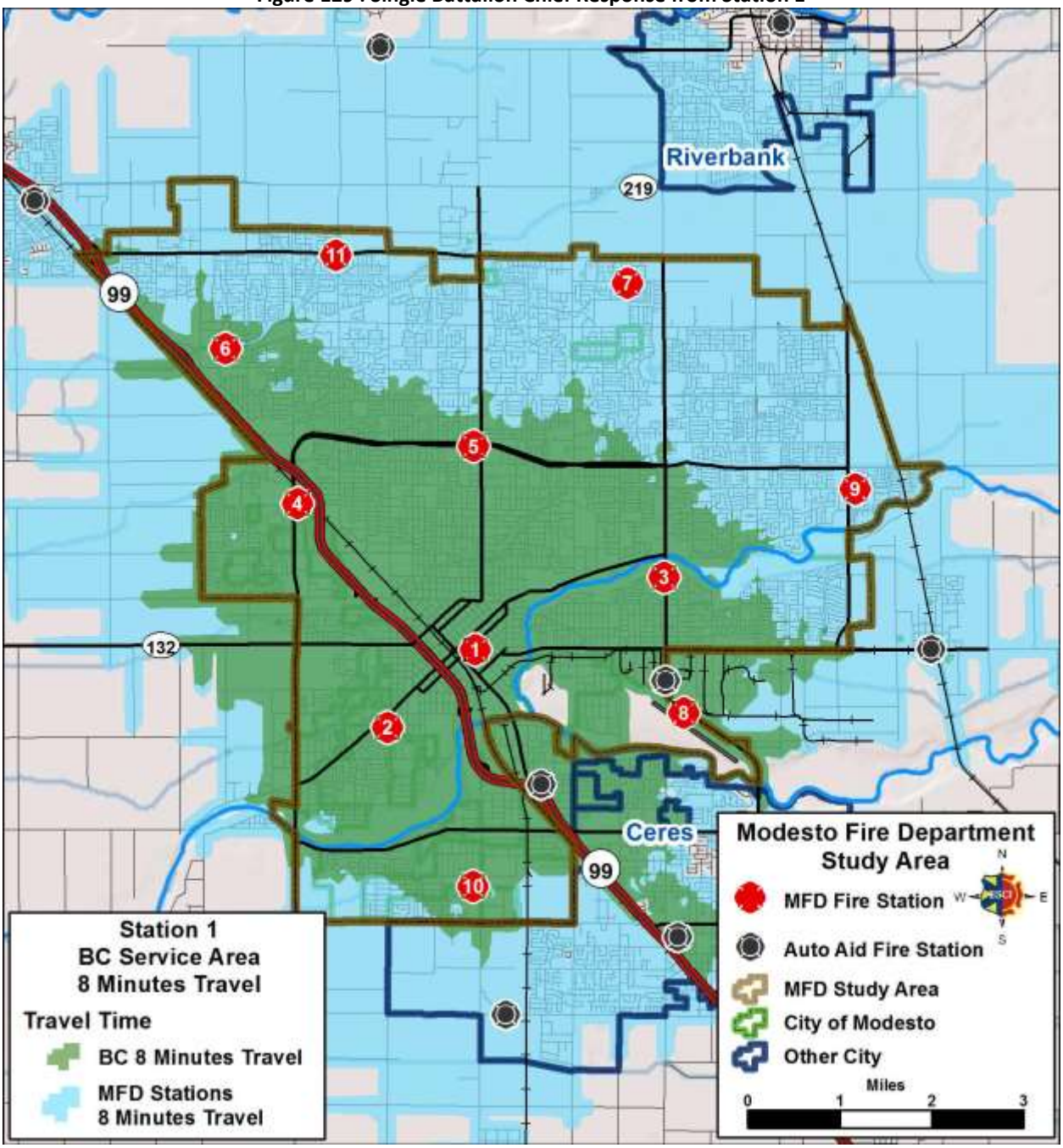
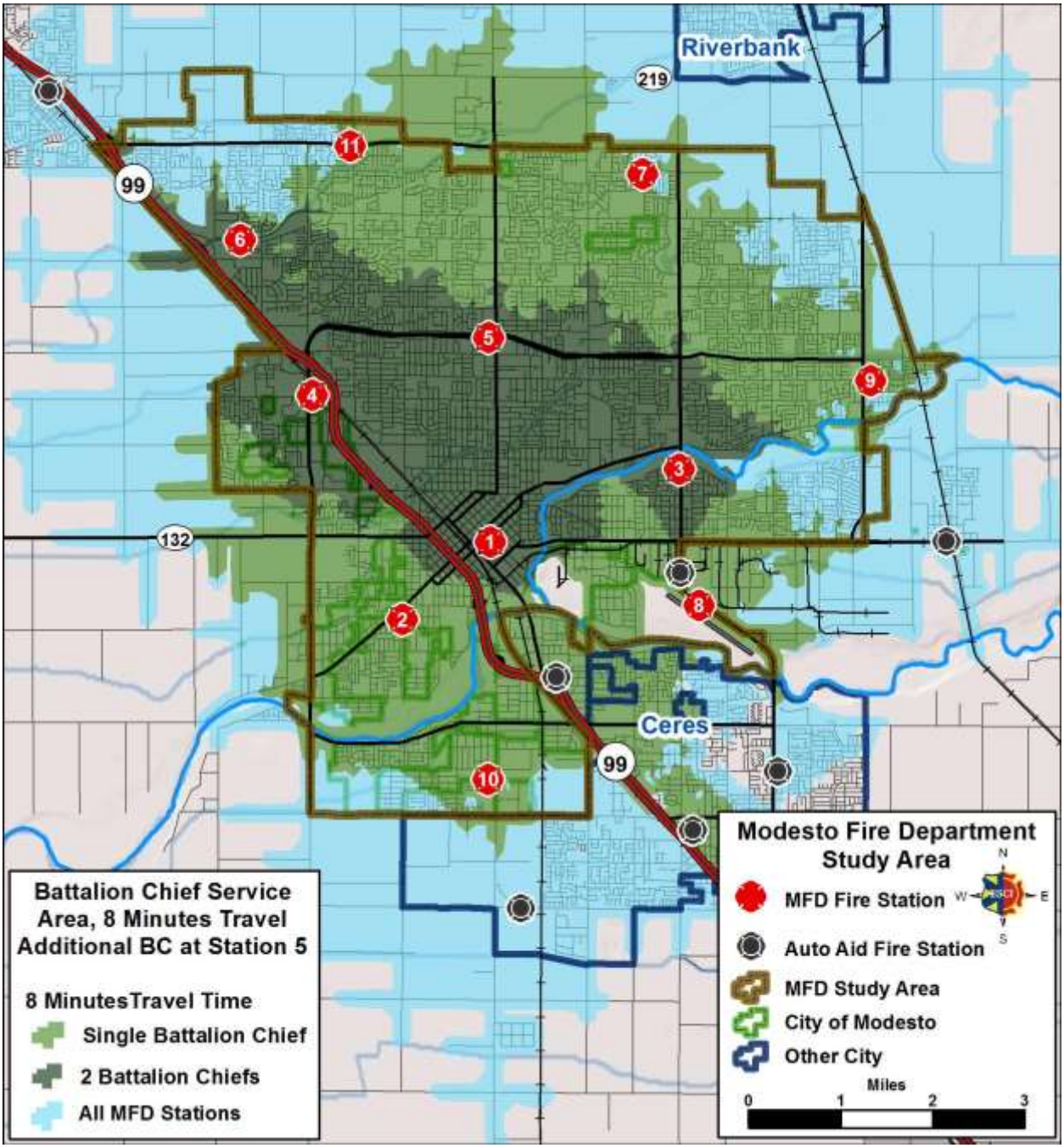



**Figure 130 : 2nd Battalion Chief Located at Station 5 8-minute response**


Riverbank
219
99
11
7
6
5
4
9
3
132
1
8
2
Ceres
99
10
Battalion Chief Service Area, 8 Minutes Travel Additional BC at Station 5
8 MinutesTravel Time
Single Battalion Chief
2 Battalion Chiefs
All MFD Stations
Modesto Fire Department Study Area
MFD Fire Station
Auto Aid Fire Station
MFD Study Area
City of Modesto
Other City
Miles
0
1
2
3

### *Industry Best Practices and Standards*

As the MFD continues to move toward a high performing agency that meets or exceeds system best practices, ESCI recommends the following programs and accreditations be implemented and maintained. These programs will ensure the MFD is at the forefront of industry innovation and efficiencies. In addition, these best practices will position the department to minimize risk while maximizing opportunities for partnerships and grant programs as well as maintaining and/or increasing ISO ratings, supplement funding, resources, and services provided.

- **Commission on Fire Accreditation recognition of accreditation:**
  An accreditation process that provides well defined internationally recognized benchmark system for measuring the delivery of fire and emergency services in relation to industry best practices.
- **International Academies of Emergency Dispatch Accreditation (ACE Accreditation):**
  An established high standard of excellence for emergency dispatch, by providing the tools to achieve this high standard at both the dispatcher level through certification, and at the communication center level through the accreditation program. While the EMS dispatch center currently has this designation it is recommended MFD either pursue this level of capabilities in the current SR 911 center or consider utilizing the EMS dispatch center to receive timely EMD response categorization and realize the full benefit of an integrated EMD and tiered response program.

## Conclusion

This document provides an enormous amount of technical data, much of which was provided by the department, and allows the reader to gain a clear understanding of the services provided by MFD as well as an indication of how well those services are being provided. This document is not intended to be a critical evaluation of the organization but rather provide fire department personnel and city policymakers' information from which to make informed decisions about the future of the department.

Based on information obtained throughout this process, MFD is functioning at a level commensurate with community expectations and providing services to the city in line with adopted objectives. While response performance analysis indicates that the department could improve, it is possible that the adoption of the tiered performance recommendations will show that the department is performing much better than presented here based on a single objective. Given the method of funding the fire department, the organization is well resourced and should be commended for undertaking this project to initiate a formal plan for future service delivery.

ESCI began collecting data and information for this project in March 2015 and the analysis presented in this report is comprised of months of data review and evaluation including one-on-one interviews with department and city personnel, evaluation of internal documents, policies, rules and regulations, assessment of current service delivery, and the creation of projected service demand and alternative service delivery models. It is ESCI's sincere hope that the information contained within this document is found to be useful and provides policymakers with the information necessary to meet the emergency services needs of the citizens of Modesto.

# Appendices

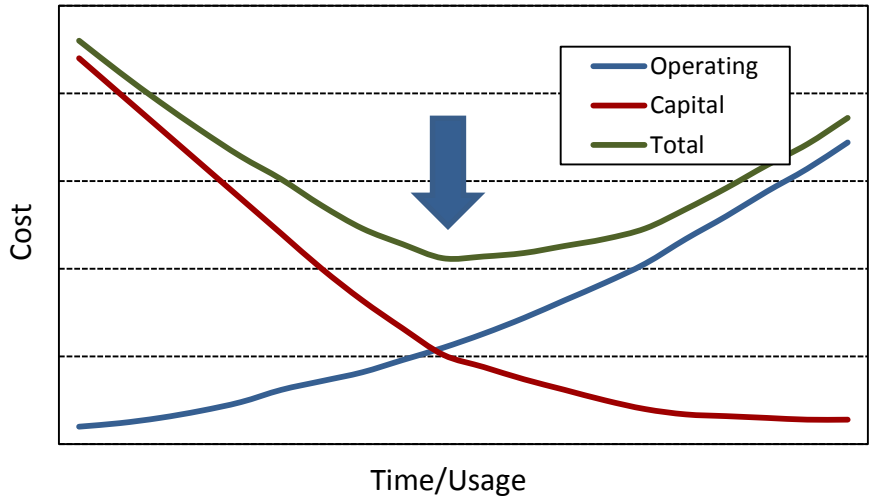
## APPENDIX A: ECONOMIC THEORY OF VEHICLE REPLACEMENT

### *Economic Theory of Vehicle Replacement*

The previous analysis used vehicle age as the sole measure of replacement timing. It can be argued that mileage, engine hours, and a variety of other factors could be used, as well.

A conceptual model that may be used when a replacement cycle is considered is the *Economic Theory of Vehicle Replacement*. The theory states that, as a vehicle ages, the cost of capital diminishes and its operating cost increases. The combination of these two costs produces a total cost curve. The model suggests the optimal time to replace any piece of apparatus is when the operating cost begins to exceed the capital costs. This optimal time may not be a fixed point, but rather a range of time. The flat spot at the bottom of the total curve in the following figure represents the replacement window.

**Figure 131 : Economic Theory of Vehicle Replacement**




Shortening the replacement cycle to this window allows an apparatus to be replaced at optimal savings to the department. If an agency does not routinely replace equipment in a timely manner, the overall reduction in replacement spending can result in a quick increase of maintenance and repair expenditures. Officials who assume that deferring replacement purchases is a good tactic for balancing the budget need to understand two possible outcomes that may happen because of that decision:

1. Costs are transferred from the capital budget to the operating budget.
2. Such deferral may increase overall fleet costs.

Regardless of its net effect on current apparatus costs, the deferral of replacement purchases unquestionably increases future replacement spending need.

Given the magnitude of the needs, no easily achievable solutions exist and the city does not have the financial resources on hand to achieve an adequate level of stability in terms of vehicle replacement.

Apparatus replacement costs are not the only financial deficits that the district is experiencing. Additional facility repair and replacement needs have been identified earlier in this report. Some opportunities exist to pursue grants or other options however, in reality; the city is likely to find it necessary to seek additional general fund, financing and or other revenue sources to actively address the capital replacement needs of the MFD.

## APPENDIX B: TABLE OF FIGURES