CENTER FOR PUBLIC SAFETY MANAGEMENT, LLC

FIRE OPERATIONAL & ADMINISTRATIVE ANALYSIS REPORT

CITY OF EL CENTRO, CALIF.

Final Report: January, 2018

CPSM®

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Since its inception in 1914, ICMA has been dedicated to assisting local governments in providing services to their citizens in an efficient and effective manner. Our work spans all the activities of local government — parks, libraries, recreation, public works, economic development, code enforcement, Brownfields, public safety, etc.

ICMA advances the knowledge of local government best practices across a wide range of platforms including publications, research, training, and technical assistance. Its work includes both domestic and international activities in partnership with local, state, and federal governments as well as private foundations. For example, it is involved in a major library research project funded by the Bill and Melinda Gates Foundation and is providing community policing training in Panama working with the U.S. State Department. It has personnel in Afghanistan assisting with building wastewater treatment plants and has had teams in Central America providing training in disaster relief working with SOUTHCOM.

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CPSM's local government technical assistance experience includes workload and deployment analysis using our unique methodology and subject matter experts to examine department organizational structure and culture, identify workload and staffing needs, and identify and disseminate industry best practices. We have conducted more than 269 such studies in 37 states and 204 communities ranging in size from 8,000 population (Boone, Iowa) to 800,000 population (Indianapolis, Ind.).

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SECTION 1. INTRODUCTION

CPSM was retained by the City of El Centro to complete a comprehensive analysis of the city's fire department. This analysis is designed to provide the city with a thorough and unbiased review of services provided by the El Centro Fire Department (ECFD). The report further provides a benchmark of the ECFD's existing service delivery performance and community risk as analyzed in the accompanying comprehensive data analysis and community risk assessment, which were performed utilizing information provided by the city, the ECFD, and external sources such as the U.S. Census Bureau and Imperial County. *This data analysis in itself provides significant value to the city as it now has a workload analysis from which to move forward with future planning efforts.* Also included in this report is geographic information systems (GIS) data mapping to support the operational and risk analysis discussions and recommendations.

During the study, CPSM analyzed performance data provided by the ECFD and examined firsthand the department's operations. Fire departments tend to deploy resources utilizing traditional approaches, which are rarely reviewed. To begin the review, project staff asked the city for certain documents, data, and information. The project staff used this information/data to familiarize themselves with the department's structure, assets, operations and risk. The provided information was also used in conjunction with the collected raw performance data to determine the existing performance of the department and to compare that performance to national benchmarks. These benchmarks have been developed by organizations such as the National Fire Protection Association (NFPA), Center for Public Safety Excellence, Inc. (CPSE), Vision 20/20, and the ICMA Center for Performance Measurement. ECFD staff was also provided an electronic shared information folder to upload information for analysis and use by the CPSM project management staff.

Project staff conducted a site visit on September 4, 5, and 6, 2017, for the purposes of observing fire department and agency-connected supportive operations, interviewing key department and city staff, and reviewing preliminary data, operations, and community risk. Telephone conference calls were conducted as well as e-mail exchanges between CPSM project management staff, the city, and the ECFD so that CPSM staff could affirm the project scope, and elicit further discussion regarding this operational analysis.

The CPSM found the ECFD to be a highly skilled and progressive organization that is piloting an EMS first response program aimed at better managing the growing service demand and cost for emergency medical service (EMS) responses. The personnel with whom CPSM interacted are focused on managing all aspects of service delivery to the best of their abilities. A key aspect of CPSM's analysis is providing observations and recommendations regarding the delivery of fire and first response EMS services.

This report contains a series of observations and recommendations provided by CPSM that are focused on delivering services *more efficiently*, effectively, and in some cases, safer.

Recommendations and considerations for continuous improvement of services are presented below in the order they appear in the report. CPSM recognizes there may be recommendations and considerations offered that must be bargained, budgeted for, or for which processes must be developed prior to implementing.

RECOMMENDATIONS

1. The City of El Centro and El Centro Fire Department should consider replacing existing fire station 1 with a contemporary facility to accommodate the evolving mission and needs of the department (p. 14).
2. The city should develop a comprehensive long-range fire facilities capital plan to address the operational and personnel safety deficiencies currently found in stations 1 and 2, and generally update/modernize, or replace these facilities, as funding allows, to meet the current and future needs of the department and its customers (p. 16).
3. Should the city decide to maintain stations 1 and 2 for the short- and mid-term, the city should consider installing automatic fire alarm systems with heat, smoke, and carbon monoxide detection. These systems should not only be equipped with both audible and visible warning devices, they should automatically transmit an alarm to either the department's alarm room/dispatch center or an approved central monitoring station (p. 16).
4. Should the city decide to maintain stations 1 and 2 for the short- and mid-term, the city should consider equipping fire stations 1 and 2 with complete, automatic fire sprinkler systems for the protection of the occupants, buildings, and equipment, as well as complete, supervised smoke detection systems already recommended, that transmit an alarm to the fire dispatch center or central monitoring station (p. 16).
5. The El Centro Fire Department should install disconnect switches interfaced with alarm notification systems on all kitchen stoves to automatically shut them off to prevent kitchen fires during responses to alarms. The ECFD should consider installation of automatic fire suppression for the protection of cooking equipment at Stations 1 and 2. (p. 16).
6. The El Centro Fire Department should complete the installation of a vehicle exhaust extraction system at station 3, and should the City decide to maintain stations 1 and 2 for the short- and mid-term, the city should consider the installation of vehicle exhaust extraction system at these stations for all vehicles in all apparatus bays at all department fire stations (p. 16).
7. The 2002 Chevrolet utility truck being utilized as a squad at station 1 should have a mobile radio installed, and all emergency warning systems monitored to ensure it maintains its emergency response capabilities. (p. 19).
8. The City of El Centro and El Centro Fire Department should develop a long-range capital plan for funding the replacement of all fire apparatus and fire department support vehicles (p. 20).
9. The City of El Centro and El Centro Fire Department should take steps to ensure that only ASE and/or EVT certified personnel are performing maintenance on the apparatus fleet (p. 21).
10. The El Centro Fire Department should continue to ensure that all required apparatus and equipment testing such as on pumps, ladders, aerials, hose, and SCBA are performed at intervals no greater than 12 months (p. 21).
11. Using VISION, conduct a community risk assessment and continually analyze/utilize the results in the categorization and pre-incident planning of target hazards, the planning of fire station locations, apparatus needs, and staffing and deployment models (p. 31).
12. The ECFD should review the 2014 Public Protection Classification report, and create a plan to make improvements where fiscally feasible, and where improvements can be made through department planning and management directive such as company and officer training,

prefire planning, and the reported use of available mutual aid staffing on first alarm structure fires (p. 33).

13. Develop and implement an internal risk management plan following the standards of NFPA 1500, *Standard for a Fire Department Occupational Safety and Health Program* (p. 35).
14. The Fire Chief, with input from citizens, elected officials, and city management, should work with other key staff to develop a strategic plan to establish intermediate and long-term goals (three to five years). Ideally, this plan will link with the overall city strategic plan (p. 36).
15. Develop performance measures for each agency activity and implement a performance measurement system to be included in the department's strategic plan and fiscal/budget documents (p. 38).
16. The El Centro Fire Department should consider implementing EMD priority dispatching for EMS incidents, and further consider limiting fire department response to higher priority EMS incidents considered critical and/or life threatening (p. 41).
17. The El Centro Fire Department should formalize its current internal dispatch procedures and protocols into "run cards" or "response assignments" in order to standardize responses to various types of incidents and response modes (p. 42).
18. The El Centro Fire Department should adopt a deployment model that staffs two engines, one quint, and one squad on every shift with a minimum of 12 personnel including the Battalion Chief (p. 53).
19. The El Centro Fire Department should revise its response protocols to automatically request, at the time of dispatch, units from the Imperial County Fire Department (Imperial City and Heber stations) on any reported structural incident involving medium- and high-hazard occupancies (p. 53).
20. The ECFD should build at least a portion of its training regimens and tactical strategies around the exterior or transitional attack for when the fire scenario and the number of available units/responding personnel warrants this approach (p. 56).
21. In acknowledgement of the fact that the ECFD operates in a minimal staffing mode, and recognizing the potential for rapid fire spread particularly in the more densely developed areas of the city, the ECFD should equip all its apparatus with the appropriate appliances and hose. It should develop standardized tactical operations that will enable arriving crews to quickly deploy high-volume fire flows of 1200 to 1500 gallons per minute (if the water supply will permit this), utilizing multiple hose lines, appliances, and master stream devices. This flow should be able to be developed within four to five minutes after arrival of an apparatus staffed with three personnel (p. 56).
22. The El Centro Fire Department should work closely with Imperial County and the county ambulance provider to fully track and analyze ambulance response time statistics for all incidents that occur in the city (p. 60).
23. To improve EMS transport service levels, the City of El Centro should consider negotiating an agreement with the county ambulance provider for at least one dedicated 9-1-1 ambulance for the city (p. 60).
24. The City of El Centro and El Centro Fire Department should take steps to more aggressively collect bills for EMS first response, particularly from patients who are not residents of the city (p. 61).
25. To increase the Effective Response Force (ERF) initially deployed, and reduce response times for all units and personnel to arrive on location, the El Centro Fire Department should attempt

to enter into operational agreements with Imperial County for the simultaneous dispatch of specified resources from the Imperial City and Heber Stations for any reported structure fire that occurs in the City of El Centro. If the incident ends up being minor in nature the additional resources can be quickly returned to service (p. 82).

26. The El Centro Fire Department should take steps to improve both the dispatch time and incident turnout times for both fire and EMS incidents to reduce overall response times to emergency incidents (p. 85).
27. As stated in Policy 306, the ECFD should annually evaluate its level of service, deployment delivery, and response time objectives (p. 87).
28. To meet the demands of planned new residential construction in the southwestern portion of the city, it is recommended a fire prevention inspector position be added to the most appropriate department; NFPA 13D residential sprinkler inspection experience should be a requirement for this position (p. 91).
29. During its analysis, CPSM recognized that public fire and safety education has not been a priority for the department. It is recommended the ECFD continue its partnership with the Burn Institute, reenergize these vital programs, and once again make these programs an essential duty for each fire station and operational shift (p. 91).
30. The City of El Centro should consider the creation of a full-time position of Training and Safety Officer, at the rank of Captain, in the El Centro Fire Department (p. 93).
31. The El Centro Fire Department should conduct a comprehensive and formal training needs assessment involving a cross-section of department personnel to determine training program priorities (p. 94).
32. The El Centro Fire Department should prioritize the completion of two hours of training each duty day (p. 95).
33. All training that is conducted, no matter how brief or inconsequential it may seem, should result in the completion of a formal training report. The department should develop a formal operational procedure on the completion of training reports (p. 95).
34. The El Centro Fire Department should institute written and practical skills testing and proficiency evaluations as part of the department's comprehensive fire training program (p. 96).
35. The El Centro Fire Department should require all personnel aspiring for promotion to a higher rank to successfully complete all elements of that rank's task book to be eligible to participate in the formal promotional testing process (p. 96).
36. The El Centro Fire Department should continue to require its officers to complete rank appropriate fire officer training programs and obtain a certain level of fire officer certification as a job requirement. Recommendations would be: Company Officer for Captain, Chief Fire Officer for Battalion Chief, and Executive Chief Fire Officer for Fire Chief. (p. 96).
37. The El Centro Fire Department should implement a formal officer training and development program. There are several excellent programs available, including those from the International Association of Fire Chiefs and the Phoenix, Arizona, Fire Department (p. 97).
38. The El Centro Fire Department should conduct regular multicompany, in-house training evolutions and periodic joint training exercises with surrounding departments to test interoperability of training, communications, procedures, and operations (p. 97).

39. CPSM recommends that the City of El Centro develop an annual training and exercise schedule to educate, test, and gauge the effectiveness of the city's Emergency Operations Plan (EOP) (p. 99).
40. CPSM recommends that each city department develop and implement a Continuity of Operations Plan (COOP) that clearly defines how the agency will operate if staffing, resources, and/or facilities are compromised because of an emergency or unforeseen event (p. 99).
41. CPSM recommends that the City of El Centro conduct a Threat Hazard and Risk Assessment (THIRA) for the community that incorporates the top seven threats identified in the Hazard Annex section of the EOP (p. 99).
42. CPSM recommends that the fire department develop standard protocols for transfers and additional alarms that can be implemented by the Communications Center during an emergency (p. 100).
43. CPSM recommends that a member of the fire department senior staff or the Fire Chief continue to meet regularly with the Communications Center supervisor to discuss issues between the two agencies to improve overall service (p. 100).

SECTION 2. SCOPE OF PROJECT

The scope of this project is to provide a comprehensive independent review of the services provided by the El Centro Fire Department (ECFD) so that the department and city officials can obtain an external perspective regarding the department's service delivery system. This includes fire and EMS first response services, as well as ancillary services such as fire prevention, public education, and emergency management. This study provides a comprehensive analysis of the ECFD, including its organizational structure, response workload, staffing, deployment of assets, training, fire prevention, community risk, and planning and public education efforts. Local government officials often attempt to understand if their fire department is meeting the service demands of the community, and commission these types of studies to measure their department against industry best practices. In this analysis, CPSM provides observations and recommendations where appropriate, and provides input on administrative and operational matters for consideration by the department and the city.

Key areas evaluated during this study include:

- Forensic data analysis to analyze the fire department's unit workload and response times (using data from the city's computer-aided dispatch system and the ECFD records management system).
- Community risk assessment that supports the standard of cover (SOC) evaluation consistent with the Commission on Fire Accreditation.
- City of El Centro Fire Department services, capabilities, response times, staffing, fire station locations, external mutual aid assistance, apparatus, and information management systems.
- A comprehensive review of existing community plans, transportation models, and growth management policies to ensure that future fire and EMS service demands and the associated service networks are aligned with these planning projections.
- Organizational structure, planning and administration functions, financial resources, and managerial oversight.

SECTION 3. ORGANIZATION AND MANAGEMENT

GOVERNANCE AND ADMINISTRATION

The City of El Centro is located in Imperial County, California. Imperial County is located in the southeastern most portion of California and borders Riverside County to the North, Mexico to the South, Arizona to the east, and San Diego County to the west. El Centro was incorporated in 1908, and is in the south-central portion of Imperial County. The city encompasses just over 11 square miles. Interstate 8 and State Highway 86 intersect in the southern half of the city. According to the U.S. Census Bureau, the 2010 population in El Centro was 42,958. The 2016 estimated census is 44,201.[1]

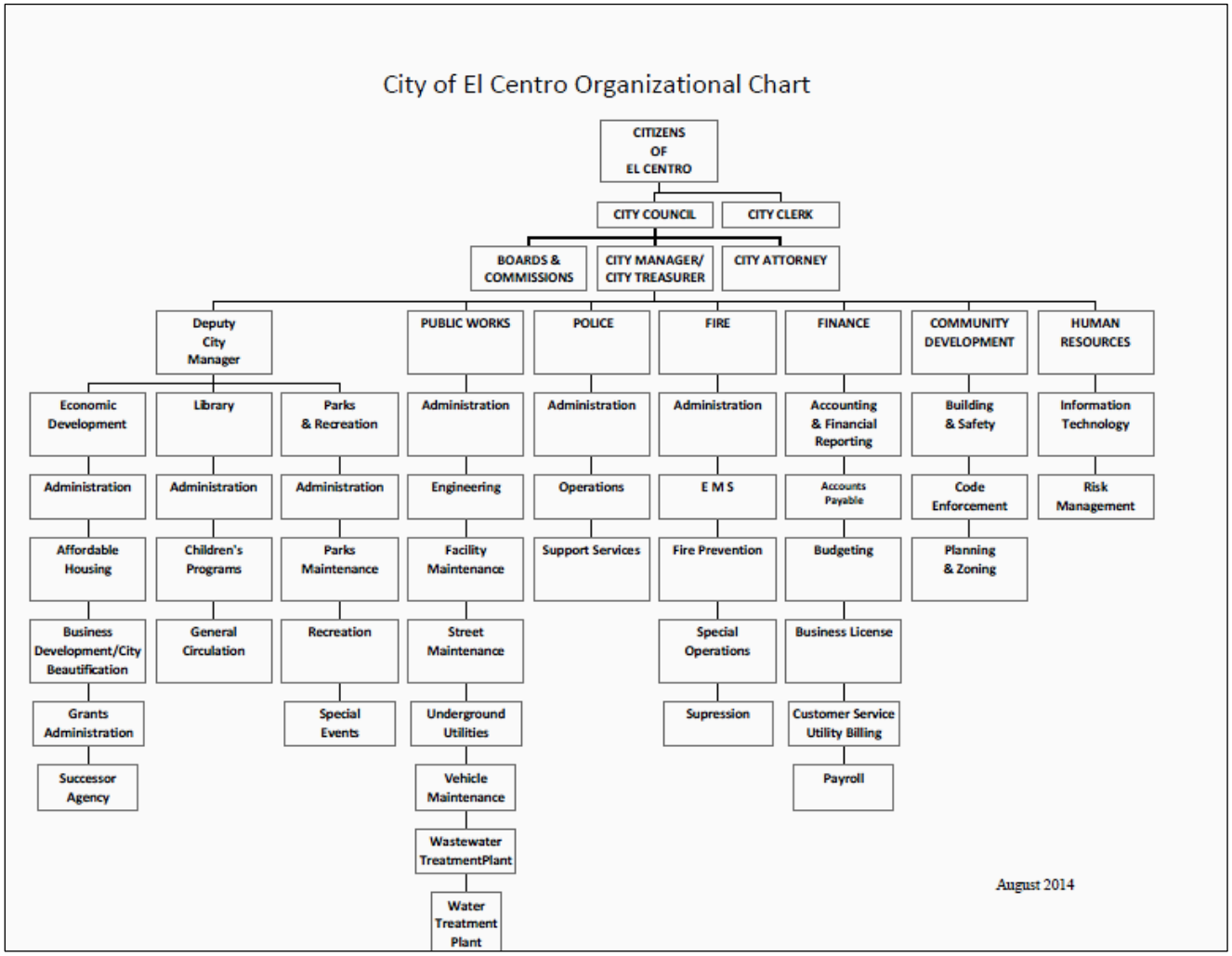
El Centro is a charter city, meaning voters can determine how their city government is organized and, with respect to municipal affairs, enact legislation different than that adopted by the state.[2] This is also referred to as Home Rule. Pursuant to Section 200 of the Charter of the City of El Centro, the city operates under a Council-Manager form of government. Under this form of government, the elected City Council establishes the policy for the city and the appointed City Manager carries out this policy. The City Council is composed of five elected members who serve four-year, staggered, terms. The City Council selects a Council member to serve as Mayor for a one-year term.

El Centro has an appointed City Manager and one Deputy City Manager. Administratively, there are seven departments and three divisions in the city. Figure 3-1 depicts the table of organization for the city. The fire department reports directly to the City Manager.

In 2013, the City Council approved a five-year strategic plan (2013-2018). The purpose of the strategic plan is to establish the City Council's vison and mission, with specific goals and objectives developed to guide the planning activities and tasks required to achieve the council's vision for the city. Regular updates are provided by each department for City Council review. In 2015 the City Council adopted the Vision 2050 Strategic Plan, which was developed to guide the community's vison for the next 35 years. The Vison 2050 plan includes elements from public participation, the five-year strategic plan, the El Centro General Plan, Project SHAPE, and the Parks and Recreation Master Plan.

[1] https://www.census.gov/quickfacts/fact/table/elcentrocitycalifornia,US/POP010210
[2] League of California Cities: http://www.cacities.org/Resources/Charter-Cities

FIGURE 3-1: City of El Centro Organizational Chart



EL CENTRO FIRE DEPARTMENT

The El Centro Fire Department is a public safety organization with a mission to protect life, property, and the environment through its mitigation, preparedness, response, and recovery actions. The department staffs three fire stations, 24 hours a day, 7 days a week, with a minimum of ten personnel on duty each day. Each station runs one Paramedic Assessment Engine with some shifts/stations, as discussed later in the report, deploying additional rescue apparatus.

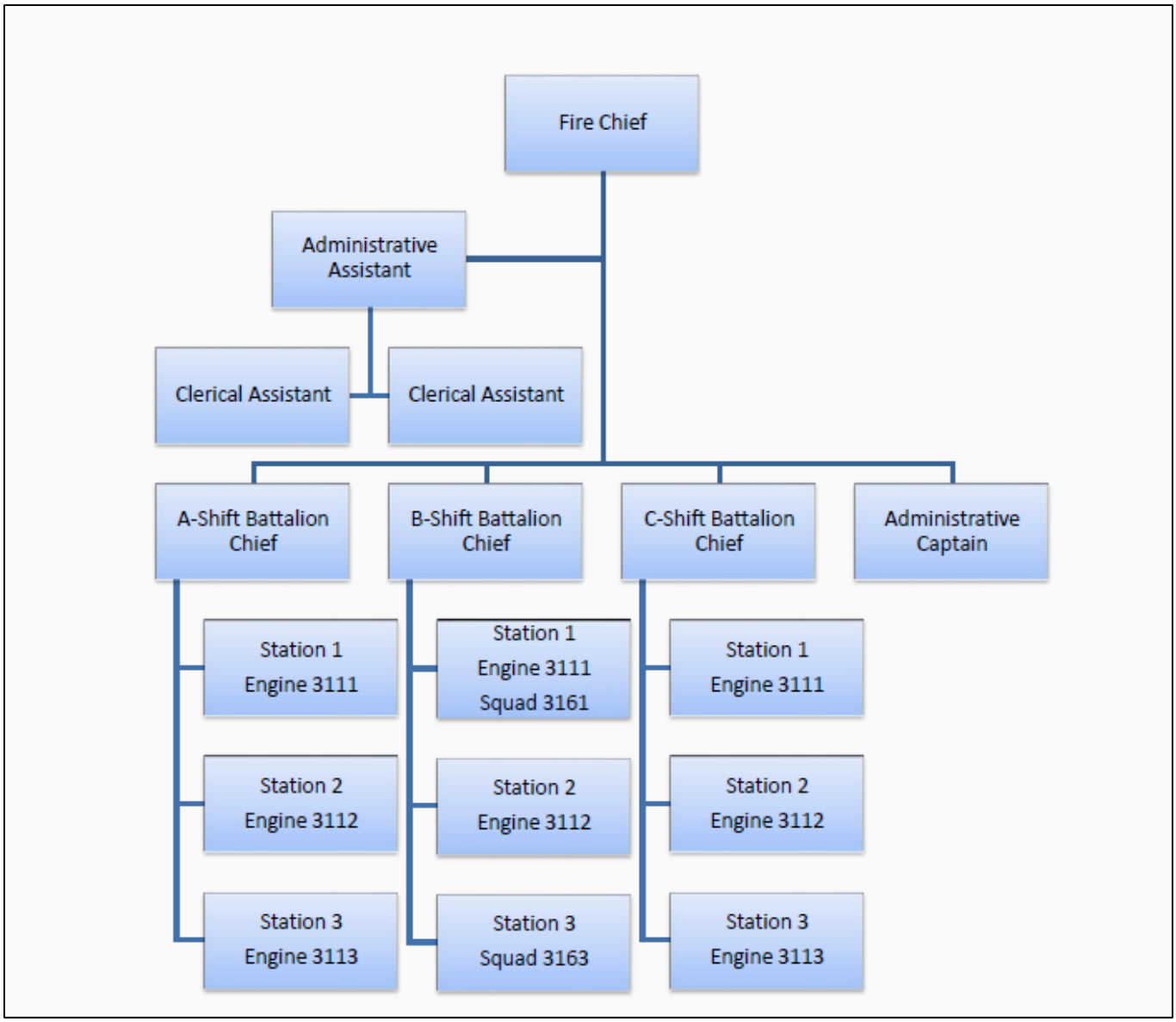
ECFD is currently budgeted for three nonsworn staff members and 41 sworn positions. The department is currently comprised of the following:

- **Fire Administration**, which is the administrative branch of the department where fiscal, human resources, planning, records management, and intergovernmental liaison functions of the agency are carried out.
- **Fire and Emergency Medical Services**, which is the operational branch of the department where emergency response to calls for assistance occurs, as well as company level training, fire prevention, and community-based programs.

- **Fire Prevention,** which is the life safety services branch of the department where fire prevention inspection, life safety education, and enforcement of new business development programs occur.

Figure 3-2 illustrates the organizational chart of the ECFD.

FIGURE 3-2: ECFD Table of Organization



Personnel Staffing/Rank Structure

As illustrated in Figure 3-2, the Fire Chief, as the Chief Executive Officer, is assisted by three Battalion Chiefs who provide operational supervision to three shifts as well as divided responsibility for several administrative and support functions, including personnel services, recruitment, human resources, public relations, and public education. Battalion Chiefs serve as program managers for emergency medical services (EMS), facilities maintenance, training, special operations, communications equipment, personal protective equipment, safety and wellness, communications, grants coordination, and Internet technology. The Fire Chief and Battalion Chiefs participate in numerous local and state committees including but not limited to: Imperial Valley Fire Chiefs Association, Imperial Valley Mutual Aid Committee, Imperial Valley Regional Occupational Program, California Fire Chiefs, Hazardous Incident Response Committee, Imperial County Disaster Council, and the Emergency Medical Care Committee (County EMS). The Fire Chief serves as the city's emergency manager and is responsible for the Emergency Operations Plan and the Local Hazard Mitigation Plan.

A civilian administrative assistant and two clerical assistants support the Fire Chief and Battalion Chiefs in managing the department. The Administrative Captain assists the Fire Chief with the preparation and coordination of the department budget; acts as the liaison with Human Resources for recruitment, promotions, and performance appraisals; administers the department's computerized records management systems; assists with strategic planning, research, and development; and prepares, reviews, and presents staff reports for the department to city staff and the City Council.

The operations staff and rank structure at the station/company level consists of Captains, Engineers (driver/operators), and Firefighters. Several Operations Captains, Engineers, and Firefighters have collateral duties assisting/managing day-to-day EMS functions, including: continuing education, equipment, infection control, and certification. Additionally, these company level staff manage fire extinguisher training for city employees, station supplies, fit testing, SCBA, air compressors, radios, pagers, physical fitness, annual physicals, generators, urban search and rescue (US&R), explosive ordinance disposal (EOD), hazardous materials operations, and apparatus and equipment.

Internal Communications

Effective communications systems are the key to successful operations in emergency services organizations. Standard operating procedures (SOPs)/standard operating guidelines (SOGs) and other orders are mission critical to consistent, effective, and safe operations. These policies are intended to ensure that consistency and safety are considered in all operations. Without them there is a tendency to "freelance" and personnel may not all be on the "same page" regarding a wide range of emergency and administrative operations.

The El Centro Fire Department should consider expanding the written communications system to include training bulletins, which would be issued to serve as reference about tested and approved methods of performing tasks, and safety bulletins, which are issued to serve as references regarding general and specific safety and health issues.

The department should also develop an effective system for ensuring that any new standard operating guidelines, training bulletins, and safety bulletins are distributed to all personnel and stations. Electronic communications are highly recommended as the method of choice for distributing departmental communications and documents. All city and department policies and department SOGs should be posted on the department intranet, in each station, and all personnel should be required to review this information and acknowledge their receipt and

understanding of it. All revisions should also be posted in each station and on the intranet and be e-mailed to every member. The Department recently began utilizing Lexipol as a means to achieve this goal, and should continue using this or a similar product.

Using captains, engineers, and firefighters to develop policies and procedures is a ***best practice*** that the department employs. The Fire Chief delegates authority to three operational shift Battalion Chiefs who carry out departmental policy, once approved. While providing the platform for professional growth and unity of command, it is essential that the rank and file have a direct connection to the top of the department, especially for significant policy changes. The Fire Chief should consider conducting regularly scheduled station visits with all personnel to discuss policy considerations and decisions. It would be an opportunity for the rank and file to understand the vision and direction of the department as well to as ask questions directly to the Fire Chief.

ECFD Facilities

Fire stations are an essential community public safety asset. The fire station facilities of a contemporary fire department are designed to do much more than simply provide a garage for apparatus and a place for firefighters to wait for a call. Stations serve as community safe houses, emergency operations centers, shared facilities with other governmental agencies, and public/private partnerships.

Fire department capital facilities are exposed to some of the most intense and demanding uses of any public local government facility, as they are occupied 24 hours a day.[3] The very nature of the fire department's operations necessitate that all stations be functional, adequate to fulfill the department's core missions, and be well maintained.

National best practices, such as guidance provided by the National Fire Protection Association (NFPA) and the Federal Emergency Management Agency (FEMA) recommend that among other items, the following features be included in modern fire station capabilities:

- Seismic-resistant construction (based on local risk assessment).
- Flood hazard protection (based on local risk assessment).
- Automatic fire sprinkler system and smoke detection system.
- Carbon monoxide detectors.
- Vehicle exhaust extraction system.
- Capability to decontaminate, launder, and dry personal protective equipment, station uniforms, and tools and equipment.
- Adequate facility security.
- Emergency power supply and system redundancy.
- Exercise and training area(s).
- Compliance with the Americans with Disabilities Act (ADA).
- Compliance with current fire and building codes.
- Adequate storage for supplies and equipment, including emergency medical and disaster supplies.

[3] Compton and Granito, eds., *Managing Fire and Rescue Services*, 219.

- Adequate parking for on-duty personnel, administrative staff, and visitors.
- Capability for future expansion.

Typically, fire stations have an anticipated service life of approximately 50 years, although some newer stations are being designed to remain functional for longer than that. In most cases, facilities require replacement because of the size constraints of the buildings, a need to relocate the facility to better serve changing population centers, the absence of needed safety features or service accommodations, and the general age and condition of the facility. The day-to-day cost of operating a fixed capital facility can burden the operating budget. Properly maintaining mechanical and structural components is critical to the longevity of the facility. Deferring routine maintenance creates inefficiencies of mechanical systems and increases costs for replacement and repairs. It can also shorten the station's serviceable life.

Sound community fire-rescue protection requires the strategic distribution of an adequate number of station facilities. Proper siting is essential to ensure that effective service area coverage is achieved, that predicted response travel times satisfy prevailing community goals and national best practices, and that the facilities can support mission-critical personnel and vehicle-oriented requirements.

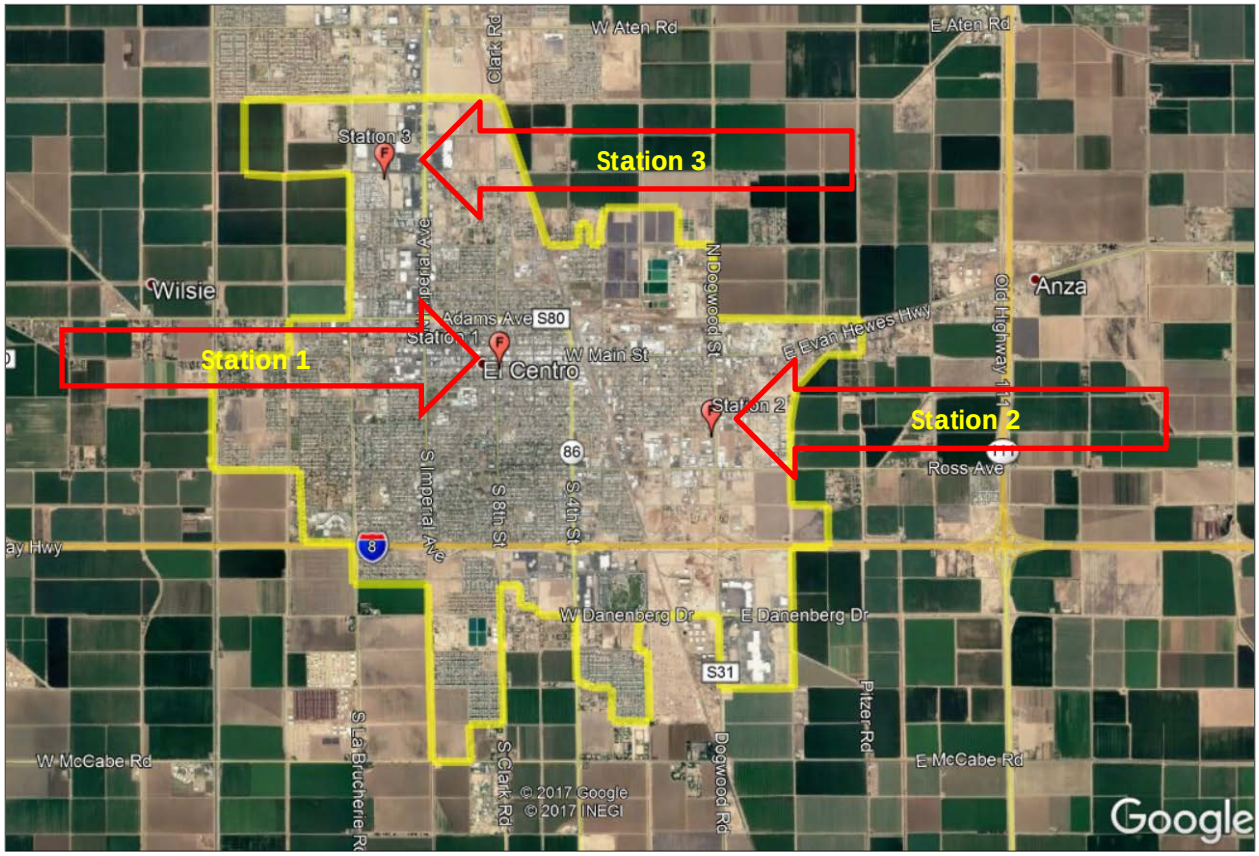
The City of El Centro operates three fire stations that are strategically located throughout the city. The stations range in age from 71 years old for station 1 in downtown El Centro to just five years old for station 3. The fire administration offices are located at the new fire station 3.

Table 3-1 lists the locations of ECFD fire stations and the operational units that are housed in each station, along with any specialty units/functions. Figure 3-3 illustrates the locations of the stations on a map of the city.

TABLE 3-1: City of El Centro Fire Department Station Locations and Units

Station	Address	Operations Units	Specialty Units/Functions
Station 1	775 State St.	Engine 3111 Quint 3191 Squad 3161	
Station 2	900 S. Dogwood Ave.	Engine 3112	OES USAR Type 2 Trailer
Station 3	1910 N. Waterman Ave.	Engine 3113 Engine 3114 Rescue Squad 3163 Battalion Chief 4	Fire Headquarters Mobile Air Compressor

FIGURE 3-3: City of El Centro Fire Department Station Locations



Site visits to all three stations by the CPSM team showed that the stations appear to be clean and orderly as maintained by the personnel assigned to them. All the stations are equipped with back-up emergency generators and electric shore lines for the units assigned there.

Fire station 1 (Figure 3-4) was built in 1946; it is a two-story station that encompasses 9,300 square feet. At 71 years of age, fire station 1 is in fair condition and is nearing the end of its useful life as an emergency services deployment facility.

FIGURE 3-4: Fire Station 1

Some specific concerns regarding this facility include, but are not limited to the following:

- There is only a single stairway to the second floor, which serves as the only means of egress from the first-floor apparatus bay area to the crew quarters and bunk room located on the second floor.
- The facility is not in full compliance with the requirements and recommendations of the National Fire Protection Association's (NFPA) 1500: *Standard on Fire Department Occupational Safety and Health Program*, 2013 edition, which provides requirements for facility safety, maintenance, and inspections.
- The facility is not in compliance with the requirements and recommendations of NFPA's 1581: *Standard on Fire Department Infection Control Program*, which has requirements on minimum criteria for infection control in fire stations.
- The apparatus bays are small for a contemporary fire station and may limit the size and type of future apparatus, should staffing and deployment of service deliverables change.
- Station 1 is not equipped with smoke or carbon monoxide detectors.
- The front and side aprons of the station are small, and when apparatus is parked in front of, or on the side of the station, the apparatus will block the walking area. This situation creates a potential pedestrian safety issue.

Recommendation:

- The City of El Centro and El Centro Fire Department should consider replacing existing fire station 1 with a contemporary facility to accommodate the evolving mission and needs of the department. (Recommendation 1.)

Fire station 2 (Figure 3-5), constructed in 1989, was originally built to be a temporary station. This facility is a metal "Butler" type building. Although it has less immediate concerns than station 1, and thus for the immediate future remains functional as a fire station, long-term consideration will need to be given to the costs versus benefits of significantly renovating/upgrading this facility compared to replacing it with a new facility.

FIGURE 3-5: Fire Station 2

- The facility is not in full compliance with the requirements and recommendations of NFPA 1500: *Standard on Fire Department Occupational Safety and Health Program*, 2013 edition, which provides requirements for facility safety, maintenance, and inspections.
- The facility is not in compliance with the requirements and recommendations of NFPA 1581: *Standard on Fire Department Infection Control Program*, which has requirements on minimum criteria for infection control in fire stations.

Station 2 appears to have a limited fire detection system in the old fire prevention office, but this system is apparently no longer operational. There are no smoke or carbon monoxide detectors in the bunk room area. This lack of even the most basic fire detection and protection is unacceptable in facilities of this type.

Station 3 (Figure 3-6) is in excellent condition and is rightfully the department's showcase station. It also serves as the department's administrative headquarters, and houses the training and fire prevention functions. The station was completed in 2012 after the city received a rural development grant in 2009 for its construction. At the time the grant was originally applied for, significant new development was proposed for the area west of this station. However, many of the projects were cancelled during the economic downturn which occurred around that time. The administrative portion of the building contains all the technological and administrative attributes found in most administrative facilities today. It also has classroom facilities to support the department's training function.

FIGURE 3-6: Fire Station 3 and Fire Administration

Station 3 is equipped throughout with complete automatic fire suppression and fire detection systems.

Fire and EMS station facilities should be an important component of El Centro's capital improvement plan (CIP). A long-term plan should be in place that takes into consideration the expected life expectancy of a facility, space needs, technology needs, and location requirements, based on response times, travel distance, changes in community development patterns, and overall emergency capabilities and standards of cover. The construction or renovation of fire stations is a costly proposition that should be planned well in advance to balance other community needs for capital projects.

Fire stations 1 and 2 are not equipped with vehicle exhaust extraction systems. Although only five years old, Station 3 is not equipped with a source capture system. CPSM received conflicting reports regarding whether the existing system was functional or not.

Vehicle exhaust extraction systems are designed to enable apparatus operators to attach a large flexible hose to the exhaust pipe before backing into the station. The system's fan then automatically discharges vehicle exhaust to the outside atmosphere. When the vehicle is driven out of the station, the discharge hose is automatically released once the apparatus clears the station. Because of the lack of this type of system, the department's personnel are exposed on a regular basis to the harmful effects of breathing in both diesel and gasoline engine exhaust emissions. This exposure occurs during response to, and return from, emergency responses, during training exercises, routine vehicle inspections, and, any other time that any vehicle in the station must be started and driven either out of, or backed into, the station.

■ ■ ■ ■

Recommendations:

- The city should develop a comprehensive long-range fire facilities capital plan to address the operational and personnel safety deficiencies currently found in stations 1 and 2, and generally update/modernize, or replace these facilities, as funding allows, to meet the current and future needs of the department and its customers. (Recommendation 2.)
- Should the city decide to maintain stations 1 and 2 for the short- and mid-term, the city should consider installing automatic fire alarm systems with heat, smoke, and carbon monoxide detection. These systems should not only be equipped with both audible and visible warning devices, they should automatically transmit an alarm to either the department's alarm room/dispatch center or an approved central monitoring station. (Recommendation 3.)
- Should the city decide to maintain stations 1 and 2 for the short- and mid-term, the city should consider equipping fire stations 1 and 2 with complete, automatic fire sprinkler systems for the protection of the occupants, buildings, and equipment, as well as complete, supervised smoke detection systems already recommended, which transmit an alarm to the fire dispatch center or central monitoring station. (Recommendation 4.)
- The El Centro Fire Department should install disconnect switches interfaced with alarm notification systems on all kitchen stoves to automatically shut them off to prevent kitchen fires during responses to alarms. The ECFD should consider installation of automatic fire suppression for the protection of cooking equipment at Stations 1 and 2. (Recommendation 5.)
- The El Centro Fire Department should complete the installation of a vehicle exhaust extraction system at station 3, and should the city decide to maintain stations 1 and 2 for the short- and mid-term, the city should consider the installation of vehicle exhaust extraction system at these stations for all vehicles in all of the apparatus bays at all department fire stations. (Recommendation 6.)

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Operational response times from each station, and the ability to ensure effective service area coverage, are discussed later in this report.

Apparatus and Fleet Maintenance

The resources that the fire department uses to perform its core mission and mitigate a wide range of emergency incidents are generally divided into two major categories: apparatus and tools/equipment. Apparatus generally includes the department's motorized vehicle fleet and includes the major emergency response apparatus such as pumpers (engines), tenders/tankers

(water supply vehicles), aerial apparatus/quints,[4] rescue vehicles, and ambulances. Specialized apparatus includes emergency units such as brush trucks and other off-road vehicles. They also often include trailers for unique applications such as technical rescue, hazardous materials response/ equipment, hazardous material decontamination, structural collapse rescue equipment, breathing air/light support units, foam units/supplies, and mass casualty incident supplies. Support vehicles that are critical to fire department operations, both routine and emergency, include command post and emergency communications units, command/staff vehicles, and maintenance trucks.

The mission, duties, responsibilities, demographics, geography, infrastructure, hazards protected, and construction features within the community the department is protecting all play a major role in the composition of a department's unique and individualized apparatus fleet and equipment inventory. The geography, infrastructure, and building construction characteristics of El Centro present the fire department with a wide variety of strategic and tactical challenges related to emergency response preparedness and mitigation. This includes firefighting, emergency medical incidents, motor vehicle accidents and rescues, and the potential for complex incidents requiring special operations capabilities such as technical rescue and hazardous materials emergencies. Large commercial buildings and an assortment of target hazards present much different hazards and challenges. Thus, apparatus and equipment needs and capabilities are different than those required for operations in single family dwelling fires. These factors, as well as projected future needs, must be taken into consideration when specifying and purchasing apparatus and equipment. Every effort should be made to make new apparatus as versatile and multifunctional/capable as is possible and practical.

The ECFD deploys a fleet of five fire suppression vehicles (Figures 3-7, 3-8, and 3-9) to accomplish the mission of the department. This includes four engines (pumpers) and one quint. In addition, the department operates two quick response vehicles, referred to as "squads," for EMS response duties. It also deploys several command and support vehicles.

FIGURE 3-7: Engine 3111 (2015 KME pumper) and Quint 3191 (2006 American LaFrance 75' quint)

[4] A "quint" serves the dual purpose of an engine and a ladder truck. The name "*quint*" refers to the five functions that these units provide: fire pump, water tank, fire hose, aerial device, and ground ladders.

FIGURE 3-8: Rescue Squad 3163 (2010 Ford Rosenbauer light rescue truck/quick response vehicle) and Battalion 4 (2016 Chevrolet Silverado)

The ECFD's current apparatus fleet make-up with regards to types and numbers of apparatus is very appropriate for a community of the size and demographics of the city. The department has the proper make-up of vehicles and in appropriate numbers. There is no area where we believe that the amount of apparatus is excessive. Overall, except for the 2002 Chevrolet squad at station 1, the fleet appears to be in very good condition. All units appear to be well maintained with all equipment properly mounted or stowed in compartments in an orderly fashion. All apparatus appears to be fully equipped according to NFPA and ISO recommendations commensurate with vehicles their age.

FIGURE 3-9: Squad 3161 2002 Chevrolet utility

The 2002 Chevrolet utility vehicle that is being utilized as the squad at station 1 when the pilot program of having two squads in service on B platoon is in effect does presents some challenges as an emergency response vehicle. First, it is basically a standard utility vehicle that was not specifically designed and built for emergency response. Additionally it is not outfitted with a mobile radio necessitating that all communications be done utilizing a portable radio.

Recommendation:

- The 2002 Chevrolet utility truck being utilized as a squad at station 1 should have a mobile radio installed, and all emergency warning systems monitored to ensure it maintains its emergency response capabilities. (Recommendation 7.)

The department's pumpers range in age from 2 years for Engine 3111 to 11 years for Engine 3123. Quint 3191 is also 11 years old. The oldest vehicle that is in service and regularly used for emergency response is the 2002 squad at 15 years of age. The department also maintains a total of eight other command and staff vehicles comprised of Ford, Chevrolet, and Honda models. One of these vehicles is a 2016 Chevrolet Silverado that is utilized by the on-duty battalion chief. Six of the other vehicles were acquired in 2002, making them more than 15 years old. The Honda is a 2007 model. These vehicles are assigned to the Fire Chief, as take-home vehicles for the Battalion Chiefs, and used for general purpose department business. Although none of the vehicles has an excessive amount of mileage (> 100,000 miles), their age indicates that they are likely nearing the end of their useful lives and replacement should be considered.

The department utilizes an in-house committee to evaluate needs, research options, and to develop specifications for the purchase of new apparatus. When possible, the committee is comprised of a cross-section of department personnel. Due to the higher level of response activity at station 1, the newest piece of apparatus is always initially assigned to that station.

NFPA 1901: *Standard for Automotive Fire Apparatus*, serves as a guide to the manufacturers that build fire apparatus and the fire departments that purchase them. The document is updated every five years, using input from the public/stakeholders through a formal review process. The committee membership is made up of representatives from the fire service, manufacturers, consultants, and special interest groups. The committee monitors various issues and problems that occur with fire apparatus and attempts to develop standards that address those issues. A primary interest of the committee over the past years has been improving firefighter safety and reducing fire apparatus crashes.

The Annex Material in NFPA 1901 contains recommendations and work sheets to assist the decision making involved in vehicle purchasing. With respect to recommended vehicle service life, the following excerpt is noteworthy:

> *"It is recommended that apparatus greater than 15 years old that have been properly maintained and that are still in serviceable condition be placed in reserve status and upgraded in accordance with NFPA 1912, Standard for Fire Apparatus Refurbishing, to incorporate as many features as possible of the current fire apparatus standard. This will ensure that, while the apparatus might not totally comply with the current edition of the automotive fire apparatus standards, many improvements and upgrades required by the recent versions of the standards are available to the firefighters who use the apparatus."*

The impetus for these recommended service life thresholds is that, despite good stewardship for maintaining emergency vehicles in sound operating condition, advances in occupant safety reflected in each revision of NFPA 1901 provide safer response vehicles for those providing emergency services within the community, as well those "sharing the road" with these responders.

The ECFD fleet is presently comprised of vehicles that are well within the NFPA 1901 recommendations for service life. However, the city's 75-foot quint and the oldest pumper will reach 15 years of service in 2020. The ECFD has previously requested funding to refurbish the 2006 pumper and 2006 quint. The funding for the pumper has reportedly been approved but that for the quint was denied. Normally, it would be our opinion that, based upon usage and mileage, these requests for refurbishment were premature, since both units are just 11 years old. However, the ECFD made a compelling argument for proceeding with the refurbishment of the 2006 pumper, ***which CPSM supports.*** This apparatus has experienced significant and ongoing electrical problems that impact various systems, some which could potentially be safety related. It also has been plagued by an inherent manufacturer issue of the fire pump. Significant work on both the electrical system and pump transmission have failed to correct the problem. The manufacturer ceased business operations in January 2014, compounding the issues. This situation has made it difficult to obtain either technical assistance with various problems, or replacement parts. The engine also has suspension problems and an air conditioner issue that does not cool the crew, which is critical to the crew in the El Centro environment.

Recommendation:

- The City of El Centro and El Centro Fire Department should develop a long-range capital plan for funding the replacement of all fire apparatus and fire department support vehicles. (Recommendation 8.)

One of the biggest factors that can impact serviceable life of a fire vehicle is the level of preventive maintenance it receives. NFPA 1915: *Standard for Fire Apparatus Preventive Maintenance Program* provides guidance on this important aspect of fire department support operations. Apparatus manufacturers also identify suggested programs and procedures to be performed at various intervals. As apparatus ages, it is reasonable to expect that parts will wear out and will need to be replaced. It follows then that maintenance costs and overall operating expenses will increase over time. As a result, cost history and projected costs for the future must be considered as a factor in determining when to replace or refurbish a fire apparatus. In addition, reliability of the apparatus must be considered. Experiencing low downtime and high parts availability are critical factors for emergency equipment maintenance and serviceability. A proactive preventive maintenance program can assist with holding costs to an acceptable level.

The ECFD fleet and maintenance program is overseen by a captain as an ancillary duty. The department has only recently began tracking vehicle maintenance records in the department's records management system, which has an appropriate module. It is trying to retroactively enter data on all vehicles currently in service to provide a more complete maintenance history. This is a commendable effort.

Engineers have a daily vehicle check sheet they are supposed to complete when they perform their daily apparatus inspection at shift change. Minor repairs to the apparatus should be noted on the sheet and be forwarded by e-mail to the apparatus captain. More significant issues are addressed to the battalion chiefs and apparatus officer.

Preventive maintenance is performed based upon engine hours (500 hours is the target) but no less than annually. Preventive maintenance such as oil changes are performed in the city shop.

All apparatus undergo a complete inspection every 90 days, an inspection similar to the safety inspections required for buses.

Due to its somewhat isolated location, there is no fire apparatus repair shop close to El Centro. Larger engine work, drive train, and suspension maintenance and repairs on the apparatus are performed at a truck repair facility in Heber. ECFD personnel were not aware if either the city mechanics or those at the shop in Heber were either ASE[5] certified or were emergency vehicle technicians (EVT).[6]

Recommendation:

- The City of El Centro and El Centro Fire Department should take steps to ensure that only ASE and/or EVT certified personnel are performing maintenance on the apparatus fleet. (Recommendation 9.)

There is an authorized fire apparatus manufacturer repair facility in Ontario that has recently started performing service and maintenance on fire pumps and aerial devices. However, this shop is about 175 miles away from the city, which is a three-hour drive each way. Annual fire pump testing is performed in-house by fire department personnel. Annual aerial and ground ladder testing is performed by Fail Safe, a company that is in the Los Angeles area.

Recommendation:

- The El Centro Fire Department should continue to ensure that all required apparatus and equipment testing such as on pumps, ladders, aerials, hose, and SCBA are performed at intervals no greater than 12 months. (Recommendation 10.)

CPSM was informed that the age of the department's fleet and maintenance issues are growing problems. One example cited by ECFD personnel is that of an engine that was out of service for several months waiting for parts. On another occasion the department had no spare apparatus available and was forced to run two squads. As has been noted previously, the department's apparatus fleet is not that old and appears to be in relatively good condition. The department's primary heavy vehicles are two, nine, and eleven years old. Parts availability should not be a problem for units of these ages. It is our opinion that the use of an authorized emergency vehicle repair facility would probably rectify this issue.

With three units being staffed daily and a total of five firefighting apparatus, the ECFD should normally have two apparatus available to utilize as spare units. In addition, if needed, there is a regional OES engine available for use that is stored at Imperial County station 1.

[5] According to its website, ASE, is short for the National Institute for Automotive Service Excellence. They state they test and certify automotive professionals so that shop owners and service customers can better gauge a technician's level of expertise before contracting the technician's services. ASE certification allows the automotive technician professional to offer tangible proof of their technical knowledge.
[6] The EVT Certification Commission, Inc., is a nonprofit corporation dedicated to improving the quality of emergency vehicle service and repair throughout the United States and Canada by means of a certification program that will provide technicians recognition for the education, training, and experience they have in the service and repair of emergency vehicles.

SECTION 4. ANALYSIS OF PLANNING APPROACHES

HAZARD ANALYSIS AND COMMUNITY RISK

The cost of providing fire protection and EMS to a community has the potential to escalate; therefore, the need to examine the planning processes and deployment models involved in providing services is paramount. The initial step in this planning process is determining the community's risk. Each jurisdiction decides what degree of risk is acceptable to the citizens it serves. This determination is based on criteria that has been developed to define the levels of risk (e.g., of fire) within all sections of the community.[7] To this end, a comprehensive planning approach that includes a fire risk assessment and hazard analysis is essential in determining local needs.

The term *integrated risk management* refers to a planning methodology that recognizes that citizen safety, the protection of property, and the protection of the environment from fire and related causes must include provisions for the reasonable safety of emergency responders. This means assessing the risk faced, taking preventive action, and deploying the proper resources in the right place at the right time. A fire department typically collects, organizes, and evaluates risk information about individual properties to derive a "fire risk score" for each property. The fire risk score is based on several factors, including:

- Needed fire flow if a fire were to occur.
- Probability of an occurrence based on historical events.
- The consequence of an incident in that occupancy (to both occupants and responders).
- The cumulative effect of these occupancies and their concentration in the community.

The community risk and vulnerability assessment evaluates community properties and assigns an associated risk as one of low, moderate, or high/maximum risk. The NFPA Fire Protection Handbook[8] defines these hazards as:

High-hazard Occupancies: Schools, hospitals, nursing homes, explosive plants, refineries, high-rise buildings, and other high life safety-hazard or large fire-potential occupancies.

Medium-hazard occupancies: Apartments, offices, and mercantile and industrial occupancies not normally requiring extensive rescue by firefighting forces.

Low-hazard Occupancies: One-, two-, or three-family dwellings and scattered small business and industrial occupancies.

As the rated properties are plotted on a map, fire station locations and staffing patterns can be considered to provide a higher concentration of resources for worst-case scenarios or, conversely, a lower concentration of resources based on a lower level of risk.[9] The ECFD has not

[7] Compton and Granito, *Managing Fire and Rescue Services*, 39.
[8] Cote, Grant, Hall & Solomon, eds., *Fire Protection Handbook* (Quincy, MA: NFPA 2008), 12-3
[9] *Fire and Emergency Service Self-Assessment Manual*, 8th edition (Center for Public Safety Excellence, 2009), 49.

completed a hazard analysis and evaluated the community's risk, and has not plotted risk by classification on a map for use in planning and operational response.

COMMUNITY CHARACTERISTICS, DEMOGRAPHICS AND TARGET HAZARDS

A critical aspect of community risk assessment is identifying the distinctive community characteristics and demographics that impact the type of risk, as well as the vulnerability to the population and property those risks present to the community. Census Bureau demographic data, national fire incident reports, city planning documents, housing survey data and reports, and local hazard maps all provide invaluable information that help identify and determine the degree of risk a community faces.

The U.S. Census Bureau estimates El Centro's 2016 estimated demographic data as follows:

- 10.7 percent of the population is over 65 years of age; 7.9 percent is under the age of 5; and 29.7 percent is under the age of 18.
- 25.2 percent of the population is below the poverty level.
- 33.6 percent are foreign born.
- 78.8 percent speak a language other than English at home.
- 49.8 percent are in owner-occupied housing.
- The average number of persons per household is 3.44.[10]

The U.S. Fire Administration, through the National Fire Incident Reporting System (NFIRS) and the National Fire Protection Association (NFPA), for example, issues annual reports on fire deaths and injuries and fire losses. Since they were initiated these annual reports have shown that the highest fire death rates are found to be among African-Americans, lower income groups, the indigent, and those that have less formal education. It is important to note that over one-quarter of El Centro's population (25.2 percent) lives below the poverty line. In addition, just 69.4 percent of El Centro's adult population (over 25 years of age) has a high school education or higher, while less than one-fifth (18.8 percent) has a bachelor's degree or higher. In addition, 9.2 percent of people under 65 have a disability. [11]

One risk factor in El Centro is its immigrant population: the U.S. Census Bureau indicates that more than one-third (33.6 percent) of the population is foreign born. In addition, more than three-quarters of the population (78.8 percent) speak a language other than English at home—a critical factor to consider when collecting data as well as planning and conducting public outreach campaigns. In addition, data show that children under 5 years of age (7.9 percent of El Centro's population) and adults over 65 years of age (10.7 percent of the population) face the highest risks of fire deaths. Identifying where high-risk populations are in the community is an important part of the community risk assessment process and resource allocation.

[10] U.S. Census Bureau, Quick Facts, https://www.census.gov/quickfacts/fact/table/elcentrocitycalifornia/AGE135216#viewtop.
[11] U.S. Census Bureau, Quick Facts, https://www.census.gov/quickfacts/fact/table/elcentrocitycalifornia/AGE135216#viewtop.

Every eight years the El Centro Community Development Department issues a Housing Element Report[12] to meet California state law requirements. This report provides detailed information on community demographics, a community economic profile, household characteristics, and housing stock that is invaluable in identifying and locating various potential fire risks and vulnerabilities that exist in the community.

El Centro has concentrated populations of individuals with access and functional needs, unaccompanied minors and children in daycare and school settings, and a large Hispanic population with limited English proficiency. Additionally, there are concentrated populations of homeless encampments. The 2010 U.S. Census indicates that over 25 percent of the population is below the poverty level, and there are roughly 100 homeless people.13 The city amended its zoning ordinance to allow temporary shelters in areas of need.

The city's housing is comprised of 14,547 units, including eight mobile home parks and one convalescent facility. There is a cross-section of housing types, from lower-cost apartments, to moderately priced condominiums, to higher cost single-family residences. There are 25 elementary, middle, high schools, charter schools, adult learning centers, and private schools located throughout El Centro. As discussed earlier, residential areas are categorized as low-level hazards, while schools are considered high-level hazards.

The housing stock includes many older homes, which represents a higher risk of fire or other emergency. 56.4 percent of the housing units in El Centro were built prior to 1980; units older than 40 years of age comprised about 34.6 percent of the housing stock. Approximately 21.7 percent of the housing stock is over 50 years of age and may require substantial repairs.

Housing age is an important indicator, but it cannot take into account the actions that property owners have or have not taken to maintain or upgrade their properties. According to a Housing Conditions Survey conducted by the city in 2008, the condition of housing units is generally good: about 69.1 percent of all housing units in the city were in sound condition and not in need of any repairs. Approximately 24.4 percent of units needed minor repairs and an additional 5.7 percent needed moderate repairs. Only 0.6 percent of the units surveyed needed substantial repair, and less than one percent of housing units were dilapidated.

The survey also identified specific areas where poor housing conditions predominate, with greater than 66 percent of the units in need of some rehabilitation. These areas are in the central and western central portions of the city, where housing in need of rehabilitation was found to have the highest densities. The areas and their corresponding rehabilitation needs include:

- Area bounded by Main Street on the north, 4th Street on the east, Heil Avenue on the south, and 8th Street on the west (73.1 percent rehabilitation).
- Area bounded by Treshill Road on the north, La Brucherie on the east, Imperial Avenue on the south, and the city Limits on the west (71.9 percent rehabilitation). This Block Group also contains an area of housing west of Imperial Avenue and north of Bradshaw Road at the north end of the city.
- Area bounded by Commercial Avenue on the north, the Southern Pacific Railroad tracks on the east, Ross Avenue on the south, and 4th Street on the west (71.7 percent rehabilitation).

[12] City of El Centro, 2013-2021 Housing Element Report, El Centro Community Development Department, September 2013.
[13] Ibid.

- Area bounded by Main Street on the north, 8th Street on the east, Heil and Hamilton Avenues on the south, and Imperial Avenue on the west (66.3 percent rehabilitation).

Additional areas of the city were identified where slightly less, 50 to 60 percent, of the housing units require some form of rehabilitation. These include:

- Area bounded by Adams Avenue on the north, 4th Street on the east, Main Street on the south, and 8th Street on the west (57.8 percent rehabilitation).
- Area bounded by the Southern Pacific Railroad tracks on the north, 1st Street on the east, Imperial Avenue on the south, and the Southern Pacific Railroad tracks on the west (52.8 percent rehabilitation).
- Area bounded by Imperial Avenue on the north, Dogwood Road on the east, Ross Avenue on the south, and the Southern Pacific Railroad tracks on the west (51.0 percent rehabilitation).

Another valuable reference for identifying community-wide risks is the City of El Centro Emergency Operations Plan,[14] which includes a Hazard Annex. The Hazard Annex identifies the major natural hazard risks (earthquakes, flooding due to its topography and the location of two reservoir dams), technological risks such as hazardous material incidents and man-made risks (terrorism) the community faces.

Specifically, the Hazard Annex addresses the following hazards:

- **Earthquake:** Historically, the Imperial Valley is one of the most seismically active regions in the State of California. An earthquake in Imperial County has the potential to lead to local emergencies as well as local and regional disasters that could result in a large number of casualties and widespread property damage, fires, and other ensuing hazards.
- **Hazardous materials:** Types of hazardous substance emergencies may be related to illegal drug manufacturing (especially methamphetamine manufacturing), transportation accidents by truck or railcar, fixed facilities that store hazardous materials or generate hazardous wastes, and agricultural entities that store fertilizers and pesticides.
- **Fire:** The City of El Centro is approximately 11 square miles in area. Urban fire is not considered a recurrent problem and the potential of having a major fire in the city is considered minimal (this internal assessment discussed later in the report). Fire responses are found in the El Centro Fire Department SOP. In event of a large fire, assistance may be required of various fire departments within the county. The threat of fire spreading and causing major problems to other areas of the county is minimal due to the city's isolated locations.
- **Flooding:** The City of El Centro is surrounded by a series of canals that provide water to municipalities and unincorporated areas of Imperial County. Failure of these canals or the system could result in flooding in the southern or western parts of the city, primarily residential areas. In addition, the city may be at risk of flash flooding following a sudden thunderstorm or heavy rain.
- **Power Outages:** The Imperial Irrigation District services the City of El Centro citizens. The City may be affected with power outages for various reasons, including high winds, storms, and damaged power poles. When a power outage occurs, every effort will be made to contact all affected residents. The city will identify the access and functional needs of the population affected and will work with them to develop a contingency plan.
- **Public Health Emergency:** During a public health emergency, state, local, and private stocks of medical supplies could be depleted quickly. Rapid access to large quantities of

[14] City of El Centro Emergency Operations Plan, May 2015, pp.174-181.

pharmaceuticals and medical supplies would be vital, although such quantities may not be readily available.

- **Terrorism:** Given its proximity to the border with Mexico and to military bases, Imperial County could become a target for terrorist attacks. Potential targets may include clinics, religious facilities, government offices, schools, utility infrastructure or water storage facilities, etc.

Target Hazards

Identifying high hazard occupancies or target hazards that would require a higher concentration of fire department resources is an important part of the fire risk assessment. The process of identifying target hazards and pre-incident planning are basic preparedness efforts that have been key functions in the fire service for many years. In this process, critical structures are identified based on the risk they pose. Then, tactical considerations are established for fires or other emergencies in these structures. Consideration is given to the activities that take place (manufacturing, processing, etc.), the number and types of occupants (elderly, youth, handicapped, imprisoned, etc.), and other specific aspects relating to the construction of the facility, or any hazardous materials that are regularly found in the building.

Target hazards are those occupancies or structures that are unusually dangerous when considering the potential for loss of life or the potential for property damage. Typically, these occupancies include hospitals, nursing homes, and high-rise and other large structures.

Figure 4-1 illustrates how one community plots medium and high risks in the community on a map for planning purposes.

Figure 4-2 illustrates as an example the mapping of high- and medium-hazard risks in the city of El Centro. The high-hazard risks located on the map are designated in red outline. The medium-hazard risks located on the map in yellow are principally commercial and business locations and include the city's two large malls in the far north area and the far southeast areas of the city.

FIGURE 4-1: Community Risk Mapping Example

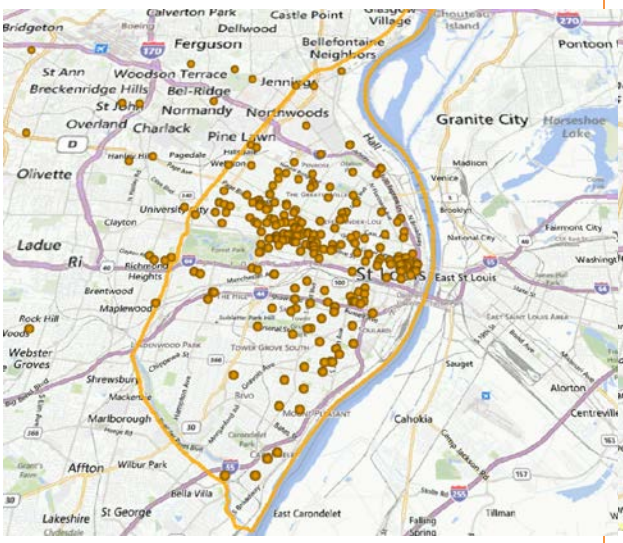
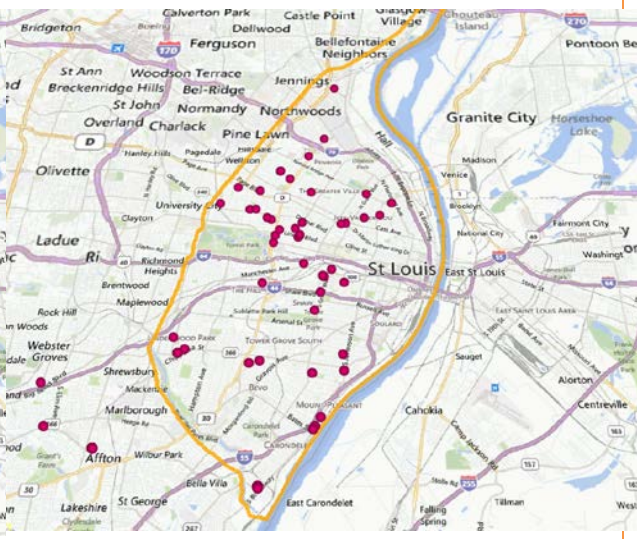
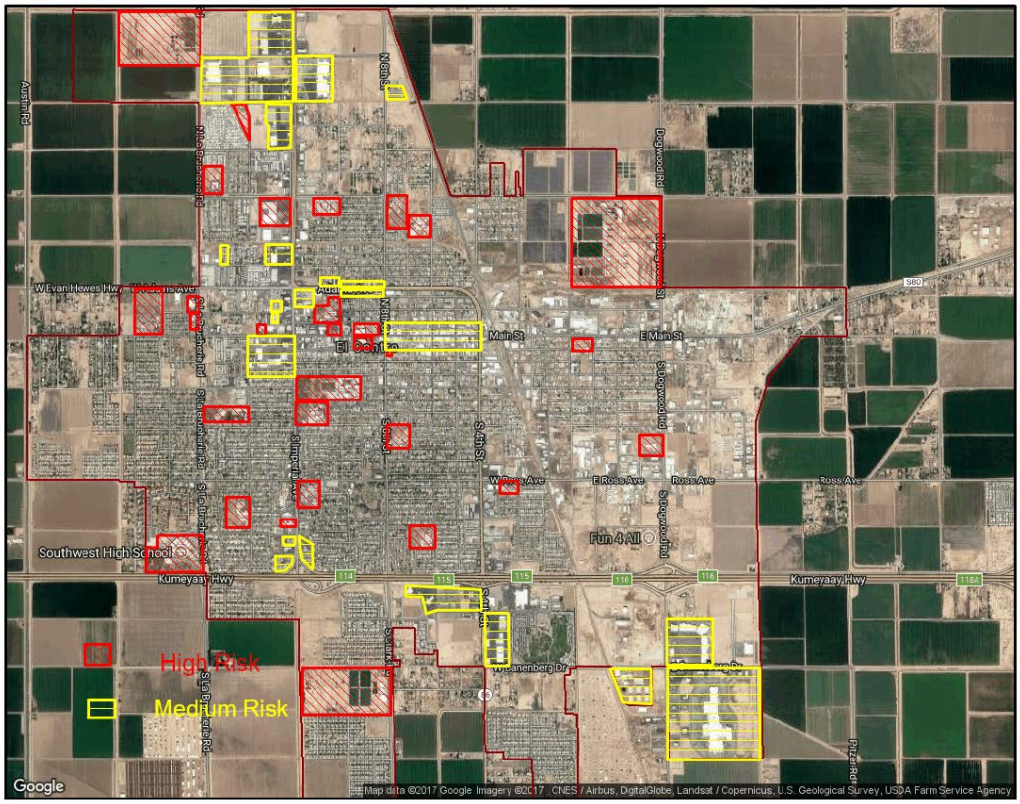
MEDIUM RISK	HIGH RISK
	

FIGURE 4-2: El Centro High- and Medium-hazard Occupancies



As described in the El Centro's Emergency Management Plan, the city's daytime workforce occupies approximately 9.9 million square feet of commercial and industrial space built on 920 acres of land. Nearly 95 percent of the city's built business space consists of retail shopping, office, and business park buildings. Commercial and industrial space is primarily concentrated in the Imperial Valley Mall, The Plaza, Downtown, and North Imperial Retail Area. Furthermore, the city owns and operates a 165-acute bed community hospital (El Centro Regional Medical Center) with a staff of more than 250 that provides health care to the entire region. These facilities and conditions represent high hazards that need to be tied into an overall risk analysis.

Each of these and other identified high-hazard locations require a pre-incident survey to determine the number of occupants, type of construction, hydrant locations, location of sprinkler shut-off valves, alarm system locations, utility shut-off locations, rooftop hazards, ventilation factors, etc.[15] The information contained in pre-incident fire plans allows firefighters and officers to have a familiarity with the building/facility, its features, characteristics, operations, and hazards, thus enabling them to more effectively, efficiently, and safely conduct firefighting and other emergency operations. Pre-incident fire plans should be reviewed regularly and tested by periodic table-top exercises and on-site drills for the most critical occupancies. The El Centro FD has not completed pre-fire surveys for its high- and medium-hazard occupancies and does not regularly hold on-site drills for its most critical occupancies. By utilizing the occupancy vulnerability assessment profile as discussed in the next section, the ECFD will be able to successfully analyze and categorize these community risks.

Occupancy Vulnerability Assessment Profile

The El Centro Fire Department has purchased and has begun using the VISION Records Management System (VISION). VISION includes as a part of its platform the ability to analyze and categorize a community's risk. VISION generates an Occupancy Vulnerability Assessment Profile (OVAP) that identifies and categorizes building risk based on type of construction, event history, life safety, water demand, fire load, and occupancy value. VISION can map the city's hydrant locations and identify the nearest hydrant, as well as that hydrant's fire flow, to calculate an OVAP risk score for each building. VISION uses a required fire flow calculation similar to the fire flow calculation used by the ISO.

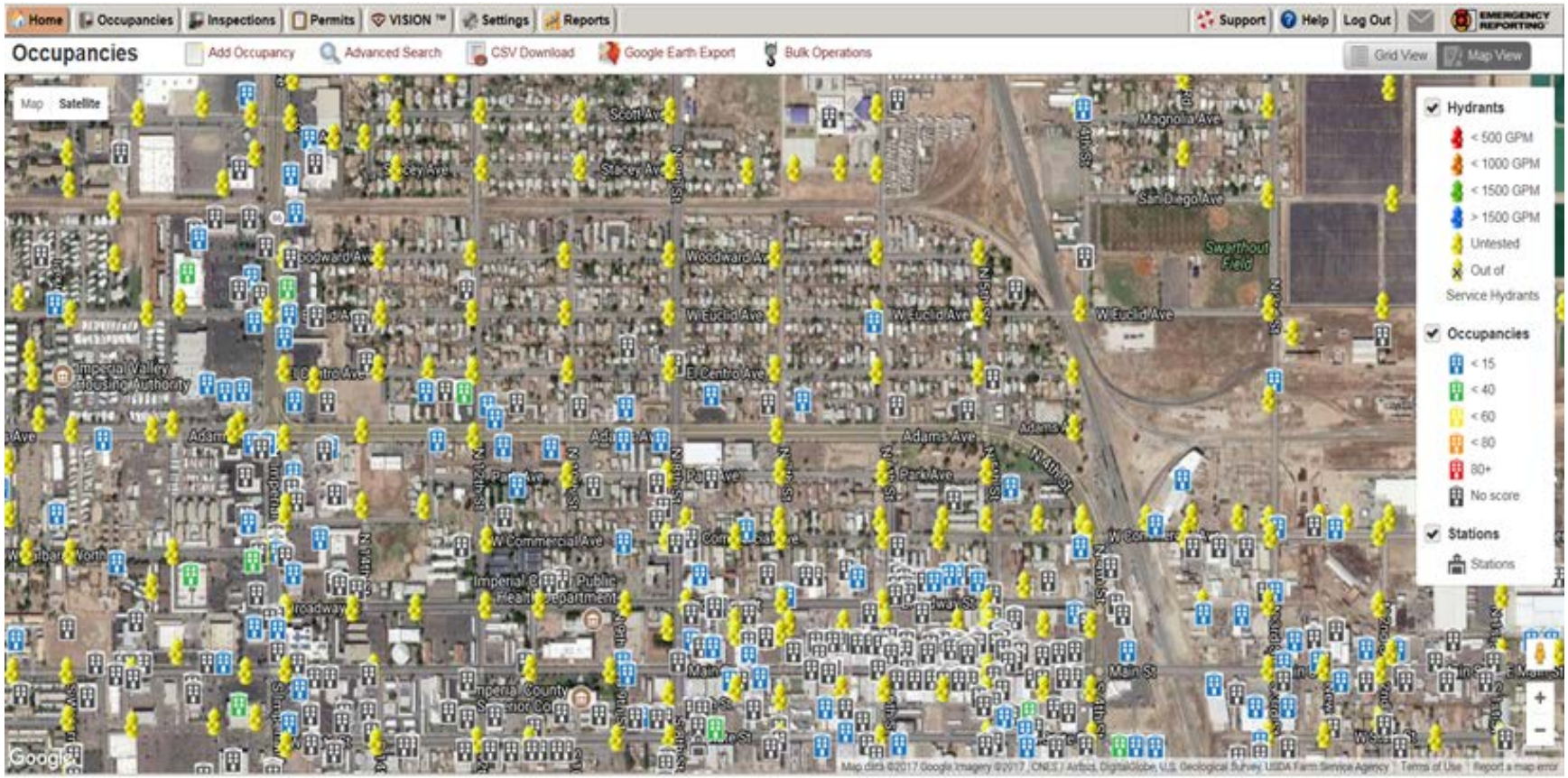
In a city-wide risk assessment, VISION can be used in combination with computer-aided dispatch (CAD) data (calls for emergency service and response times), the fire department's existing deployment model, and hydrant locations to analyze the distribution and concentration of a community's risks, and graphically highlight response capabilities. VISION has the capability to generate a standard of response coverage analysis that could provide evidence of compliance for fire department accreditation.

The VISION cloud platform can also be used on an ongoing basis to track the certifications of all fire personnel and assess compliance with NFPA 1500 and NFPA 1710. In October 2017, the ECFD was scheduled to train 10 fire department personnel in how to use VISION to determine an OVAP score for each building in the city.

Figure 4-3 is an example of how VISION plots occupancies and fire hydrants.

[15] NFPA 1620, *Recommended Practice for Pre-Incident Planning*, 2015.

FIGURE 4-3: El Centro Hydrant Locations and Occupancies



To assist the ECFD in organizing and completing these various aspects of a community risk assessment utilizing VISION, CPSM developed and presented to the ECFD for its consideration a template to complete the risk assessment process. Table 4-1 depicts the recommended template.

TABLE 4-1: Community Risk Assessment Template

TASK 1: Establish a Risk Assessment Team
■ Five to six members w/assorted skills. ■ Team leader. ■ Data analyst. ■ Tactical/command expertise. ■ City planning/growth management. ■ Financial/economic. ■ GIS/mapping.
TASK 2: Review and Plot Historical Workload (5 years)
■ Break out daily call distribution by type. □ Location/occupancy type. □ High volume/frequent use. ○ Hospital. ○ University. ○ Adult living center. ■ Identify high-dollar loss fire events (>$25K). □ Location/occupancy type. □ Cause & origin/demographic. ■ Identify high-manpower events (>20 people). ■ Identify high time-duration events (>2 hours). ■ Identify events with significant economic impact (>$1 million). ■ Identify events with multiple injuries or fatalities. ■ Identify events with significant environmental impacts (which require remediation).
TASK 3: Identify the Community Risks for High-profile Events
■ Transportation accidents (rail, air, roadway). ■ Occupancies with high OVAP scores. ■ Wildfire events. ■ Large, complex fire (dormitory, assisted living, jail, hospital, etc.). ■ Processing or manufacturing accident (chemical, radiologic, petroleum, electrical, etc.). ■ Mass casualty incident. ■ Weather, flooding, or seismic event. ■ Terrorist event. ■ Driven by a community profile or demographic.
TASK 4: Identify Capacity Issues or Incidents in which Insufficient Resources Resulted in a Negative Outcome
■ Related to daily activities. ■ Related to larger/significant events. ■ Related to incidents requiring the utilization of mutual aid or external resources. ■ Other incident types.
TASK 5: Identify Additional Service Demands Related to Anticipated Growth of the Service Area
■ Affecting daily activities

■ Related to larger/significant events ■ Incidents that required specialized services or currently unavailable expertise
TASK 6: Identify Risk Reduction or Prevention Efforts that can Reduce or Eliminate Future Workload
■ Related to daily activities. ■ Related to larger/significant events. ■ Related to new demand resulting from growth. ■ Develop cost/outcome analysis.
TASK 7: Identify Additional Training Needs to Better Manage Current or Anticipated Service Demand
■ Develop cost/outcome analysis.
TASK 8: Identify Organizational or Tactical Capabilities Needed to Meet Current Shortfalls
■ Develop cost/outcome analysis.

■ ■ ■ ■

Recommendation:

- Using VISION, conduct a community risk assessment and continually analyze/utilize the results in the categorization and pre-incident planning of target hazards, the planning of fire station locations, apparatus needs, and staffing and deployment models. (Recommendation 11.)

■ ■ ■ ■

ISO RATING

A final important factor in determining a community's risk profile is to determine the type and quality of resources a community has available to mitigate, prevent and respond to hazards. The ISO collects data for more than 48,000 communities and fire districts throughout the country. National statistical data on structural fire insurance losses bears out the relationship between excellent fire protection and low fire losses.

The ISO Public Protection Classification (PPC) program using the Community Grading Fire Suppression Rating Schedule (FSRS) measures the principal elements of a community's fire suppression system. These are:

Emergency Communications: Fire alarm and communication systems, including telephone systems, telephone lines, staffing, and dispatching systems.

Fire Department: The fire department, including equipment, staffing, training, and geographic distribution of fire companies.

Water Supply: The water supply system, including the condition and maintenance of hydrants and the amount of available water compared to the amount needed to suppress fires.

Fire Prevention: Programs that contain plan reviews; certificate of occupancy inspections; compliance follow-up; inspection of fire protection equipment; and fire prevention regulations related to fire lanes on area roads, hazardous material routes, fireworks, barbeque grills, and wildland-urban interface areas.

The schedule is performance based; it assigns credit points for each of the three main areas of a community's fire suppression system for a total score from 0 to 105.5. The fire department section of the schedule provides a maximum 50 points of the overall score. Water supply provides a maximum of 40 points and emergency communications consists of a maximum of 10 points. The 5.5 points above 100 recognizes additional community efforts to reduce losses with for example fire prevention, fire safety public education, and fire investigations.

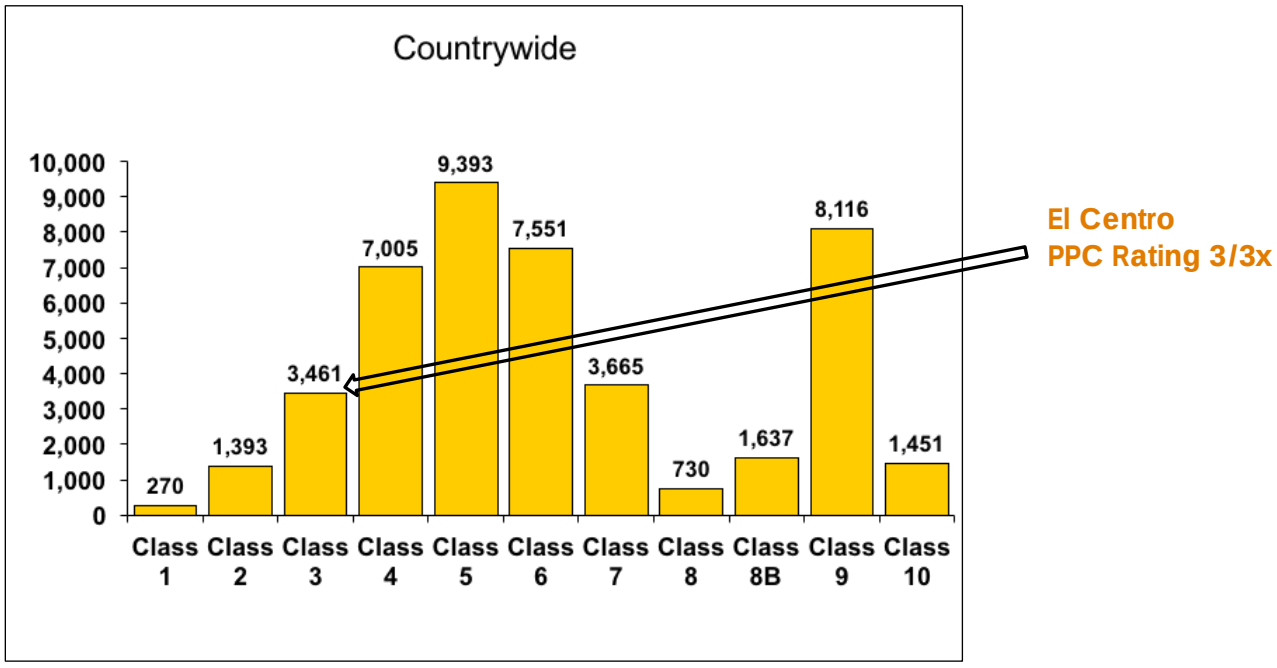
The City of El Centro was last evaluated by the ISO in June 2014 using the 2013 edition of the grading schedule, which includes the extra credit available for community loss reduction programs. The numerical grade or Public Protection Classification for the city of El Centro in this last ISO evaluation was determined to be a 3/3X.

The first number is the classification that applies to properties (small to average size buildings) with a needed fire flow of 3500 gpm (gallons of water per minute required for every 100 cubic feet of fire area) or less that are within five road miles of a fire station, and within 1,000 feet of a fire hydrant or alternative water supply. Properties that require more than 3500 gpm are evaluated separately and are assigned an individual classification.[16] The second number is the class that applies to properties within five miles of a fire station but beyond 1,000 feet of a credible water supply. In general, property insurance rates are based in part on a community's ISO classification, with a major determining factor being the access to water for fire suppression.

A Class 3/3X rating is a significant achievement for a community the size of El Centro and is a tribute to the fire department, the 911 communication system, and the water utility system. ISO estimated in 2014 that fewer than 3,500 agencies nationwide (out of 44,000 rated) received a Class 3 rating. This puts El Centro in the top approximately 11 percent of all agencies reviewed by ISO. Figure 4-4 illustrates the 2017 nationwide distribution of communities by public protection classification. El Centro is one of 3,461 Class 3-rated communities in the country.

[16] Public Protection Classification Summary Report. City of El Centro. Prepared by Insurance Services Office, Inc. Hydrant Fire Flow Data. June 2014.

FIGURE 4-4: Nationwide Distribution of Communities by Public Protection Classification



The actual scoring for the city in the 2014 review was in the lower end of the Class 3 designation, with the city receiving an overall score of 74.74. A class 3 rating is obtained with a score of between 70.00 and 79.99. It is important to note that ECFD has an opportunity to improve its scoring by increasing the number of credits it receives for company personnel or the average number of existing firefighters and company officers available to respond to reported first alarm structure fires in the city (ECFD obtained 5.08 out of a possible 15) and by receiving additional credits for company training (ECFD obtained 5.14 out of 9), specifically for officer training (ECFD received a deduction of 7.71 credits) and for prefire planning inspections (ECFD received a deduction of 7.5 credits).

Recommendation:

- The ECFD should review the 2014 Public Protection Classification report, and create a plan to make improvements where fiscally feasible, and where improvement can be made through department planning and management directive such as company and officer training, pre-fire planning, and the reported use of available mutual aid staffing on first alarm structure fires.

FIRE DEPARTMENT RISK MANAGEMENT PLANNING

In addition to examining risks faced by the community at large, the department needs to examine internal risks. The National Fire Protection Association's *Standard for a Fire Department Occupational Safety and Health Program* (NFPA 1500) requires the development of a separate risk management plan for fire departments; that is, separate from those incorporated in a local

government plan.[17] The El Centro Fire Department does not have a written internal risk management program in place.

A fire department risk management plan is developed and implemented to comply with the requirements of NFPA 1500. For this process to be effective, the following components must be included in the risk management plan (Figure 4-5):

- **Risk identification:** Actual or potential hazards.
- **Risk evaluation:** The potential of occurrence of a given hazard and the severity of its consequences.
- **Prioritizing risk:** The degree of a hazard based upon the frequency and severity of occurrence.
- **Risk control:** Solutions for elimination or reduction of real or potential hazards by implementing an effective control measure.
- **Risk monitoring:** Evaluation of effectiveness of risk control measures. [18]

FIGURE 4-5: Risk Management Plan Model

The fire department risk management plan establishes a standard of safety for the daily operations of the department. This standard of safety establishes the parameters in which the department conducts activities during emergency and nonemergency operations. The intent is for all members to operate within this standard or plan of safety and not deviate from this process.

As mentioned earlier, an important part of risk management in the fire service is prefire planning inspections by fire companies of large, high-hazard, and complex buildings in each fire station's

[17] Robert C. Barr and John M. Eversole, eds., *The Fire Chief's Handbook, 6th edition* (Penn Well Books, 2003), 270.
[18] NFPA 1500, *Standard for a Fire Department Occupational Safety and Health Program* (2007 ed.), Annex D.

response area. Conducting prefire surveys by fire companies can have a significant impact on potentially reducing structural fire loss and on reducing firefighter injuries. By improving firefighters' understanding of complex building layouts, standpipe locations, etc., as well as by identifying any structural changes and possible code violations, suppression ground activities can be improved and potential firefighter injuries avoided.

Recommendation:

- Develop and implement an internal risk management plan following the standards of NFPA 1500, *Standard for a Fire Department Occupational Safety and Health Program*. (Recommendation 13.)

ORGANIZATIONAL STRATEGIC PLANNING/PERFORMANCE MEASUREMENT

Strategic planning is a disciplined effort with a goal of producing fundamental decisions and actions that shape and guide what an organization is, what it does, and why it does it.[19] This process helps to ensure that an adequate and appropriate level of resources, including staffing and equipment, are allocated to meet the community's needs for the services delivered by the fire department as efficiently as possible.

Defining clear goals and objectives for any organization establishes the structure that ensures success or failure. Each program area must (1) define its goals; (2) translate the goals into measurable indicators of goal achievement; (3) collect data on the indicators for those who have utilized the program; and (4) compare the data on program participants and controls in terms of goal criteria.[20] Objectives should be **SMART: s**pecific**, m**easurable**, a**mbitious**/a**ttainable**, r**ealistic**,** and **t**ime-bound**.** This statement is an example: "To increase the number of working smoke detectors in homes by 5 percent within the next fiscal year."

The City of El Centro has developed a city-wide strategic plan covering the years 2013-2018; the plan includes several general objectives for the ECFD as illustrated in Figure 4-6. However, the ECFD, as a department, does not have a detailed and measurable comprehensive strategic plan.

[19] John M. Bryson, *Creating and Implementing Your Strategic Plan: A Workbook for Public and Nonprofit Organizations*, 2nd edition, (New York: Jossey-Bass, 2004), 3.
[20] Grover, Starling, *Managing the Public Sector*, Eighth Edition, (New York: Thompson/Wadsworth, 2008), 287.

FIGURE 4-6: City of El Centro 2013-2018 Fire Strategic Plan Objectives

Objective	Tasks	I, N, L, C	Target Completion Date	Responsible Party	Status
4. Fire Prevention	A. Increase Fire Educational Program Outreach	I	2014 Q2	FIRE	Working on updating Fire website to link educational resources. Our educational program will include Station Tours where educational material provided by the Burn Institute and additional literature supplied through the general fund will be distributed. Working on increasing/soliciting participation from volunteers through the Fire Corps. Volunteers will enable the department to reinstitute some educational programs.
	B. Disaster Plan	I	2014 Q2	FIRE	The disaster plan is currently being updated. The consultant hired by the County through grant funding is working on an update which will include a tie-in with all local communities' disaster plans. Fire Department will then meet with all City departments to distribute the plan and coordinate training.
	C. Fire Inspections	I	Ongoing	FIRE	Maintain Self Fire Inspection Program administered through El Centro Fire Department. Each year, 625 engine company inspections are conducted. These inspections are for businesses that are regulated by the State Fire Marshal's Office and or require permits as per California Fire Code.
5. Fire Suppression	A. Purchase New Fire Engine	I	2014 Q2	FIRE	Requested $462,000 in FY 2014 budget for the purchase of a new fire engine to replace a 1995 HME pumper fire engine.

Undertaking a strategic planning effort can seem overwhelming to a small department such as the ECFD, but it is as necessary for a small organization as a larger one. Citizens need to know that their money is being spent wisely on the risks that are most likely to impact the community and the priorities that are of the greatest concern to citizens. By providing an understanding of how the department is working to reduce these risks, the department can improve citizen satisfaction with the government and avoid negative criticism when things go wrong. Some departments have found that a sound strategic plan and visioning process has helped them build support in the community, thereby avoiding budget cuts during tough times and even finding new sources of revenue. Just as important is the effect that the strategic and long-term plan has on the department. These plans provide certainty for staff at all levels to know the organizational objectives and what is expected of them. This helps improve both productivity (because now personnel can spend their time on activities that help achieve pre-established goals) and morale (because now personnel know that they are part of a team working toward these goals).

Recommendation:

- The Fire Chief, with input from citizens, elected officials, and city management, should work with other key staff to develop a strategic plan to establish intermediate and long-term goals (three to five years). Ideally, this plan will link with the overall city strategic plan. (Recommendation 14.)

Performance Measurement

Fire safety and prevention programs need to be planned and managed to achieve specific, agreed-upon results. This requires establishing a set of goals regarding the activities any given program provides and the intended results. Determining how well an organization or program is doing requires that these goals be measurable and that they are measured against desired results. This is the goal of performance measurement.

Simply defined, performance measurement is the ongoing monitoring and reporting of progress toward pre-established goals as defined in the department's strategic plan. It captures data about programs, activities, and processes, and displays data in standardized ways that help communicate to service providers, customers, and other stakeholders how well the agency is performing in key areas. Performance measurement provides organizations with tools to assess performance and identify areas in need of improvement. Simply put, what gets measured gets improved.

The need to continually assess performance requires the addition of new words and definitions to the fire service lexicon. Fire administrators need to be familiar with the different tools available and the consequences of their use. In *Managing the Public Sector*, business professor Grover Starling applies the principles of performance measurement to the public sector. He writes that the consequences to be considered for any given program include:

- **Administrative feasibility:** How difficult will it be to set up and operate the program?
- **Effectiveness:** Does the program produce the intended effect in the specified time? Does it reach the intended target group?
- **Efficiency:** How do the benefits compare with the costs?
- **Equity:** Are the benefits distributed equitably with respect to region, income, sex, ethnicity, age, and so forth?
- **Political feasibility:** Will the program attract and maintain key actors with a stake in the program area?[21]

Performance measurement systems vary significantly among different types of public agencies and programs. Some systems focus primarily on efficiency and productivity within work units, whereas others are designed to monitor outcomes produced by major public programs. Still others track the quality of services provided by an agency and the extent to which citizens are satisfied with these services. The types of performance measures are shown in Table 4-3.

TABLE 4-3: The Five GASB Performance Indicators

Category	Definition
Input indicators	These are designed to report the amount of resources, either financial or other (especially personnel), that have been used for a specific service or program.
Output indicators	These report the number of units produced or the services provided by a service or program.
Outcome indicators	These are designed to report the results (including quality) of the service.
Efficiency (and cost-effectiveness) indicators	These are defined as indicators that measure the cost (whether in dollars or employee hours) per unit of output or outcome.
Explanatory information	This includes a variety of information about the environment and other factors that might affect an organization's performance.

Source: Harry P. Hatry, et al., eds. *Service Efforts and Accomplishments Reporting: Its Time Has Come* (Norwalk, CT: GASB, 1990).

Within the fire service, performance measures tend to focus on inputs—the amount of money and resources spent on a given program or activity—and short-term outputs—the number of

[21] Grover, 396.

fires in the community, for instance. One of the goals of any performance measurement system should be to also include efficiency and cost-effective indicators, as well as explanatory information that impacts how these measures should be interpreted.

The El Centro Fire Department measures some aspects of performance. For instance, it collects typical fire department data on response times, number of inspections, arson investigations, and response to structure fires and EMS calls by type. These statistics, although reflective of typical workload measures seen among fire service organizations today, should link department goals to specific target rates or percentages if they are to be used to justify program budgets and service delivery levels.

Recommendation:

- Develop performance measures for each agency activity and implement a performance measurement system to be included in the department's strategic plan and fiscal/budget documents. (Recommendation 15.)

SECTION 5. OPERATIONAL RESPONSE APPROACHES

OPERATIONAL RESPONSE PROTOCOLS

Response Matrix/Response Protocols

As a fire department that protects a relatively small city, the ECFD has a limited number of resources available for response, normally just three or four units and either 10 or 11 personnel. As such, it has a relatively simple response matrix for determining the number and types of units that are dispatched to each incident. The fact that a maximum of three fire suppression resources are staffed each day precludes the use of response matrixes utilized by larger departments that predicate the number of units initially dispatched to fire and other potentially serious incidents based upon the type of incident, the occupancy type, the potential for life hazard, and specific or real-time information provided by the caller(s). Most incidents in El Centro, including the clear majority of EMS incidents, receive an initial response of just a single resource (engine, quint, or squad). More serious incidents receive additional resources as deemed appropriate.

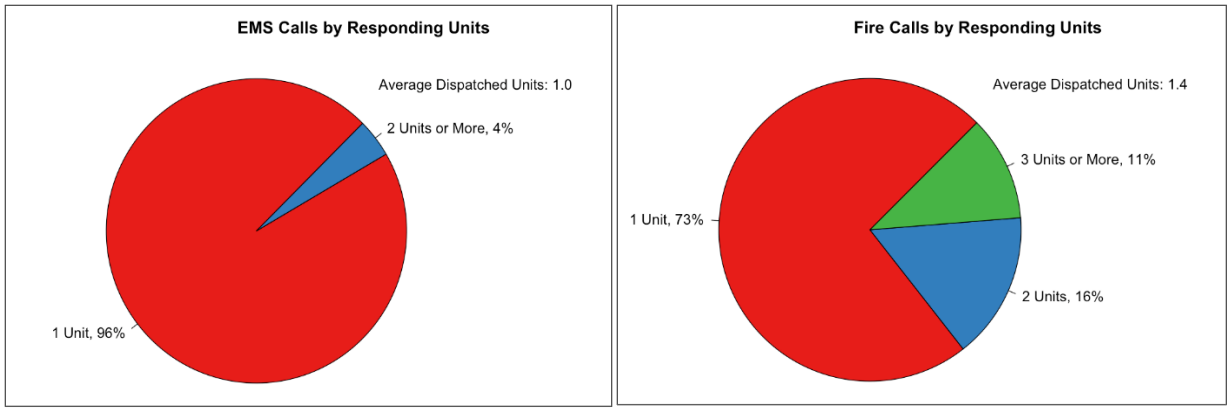
Table 5-1 is a summary of the average number of units responding to the various calls handled between May 1, 2016 and April 30, 2017. As noted in this table, more than 90 percent of all responses are handled by one ECFD unit. It is important to note, however, on most EMS responses there is a corresponding response from a Gold Cross unit. It is also important to note, particularly when looking at the fire responses, the frequency in which one unit is responding to those calls that are typically nonemergency (good intent: 86.2 percent; and public service: 94.6 percent). Compare this with structure fire calls, in which only 15.2 percent of the calls are handled with one unit. These outcomes are extremely commendable as they indicate proper screening at the dispatch level and an appropriate response by the fire department.

Figure 5-1 details by percentage the number of ECFD units dispatched to EMS calls and fire incidents.

TABLE 5-1: Number of Units Dispatched to Calls by Call Type

Call Type	Number of Units			Total Calls
	One	Two	Three or Four	
Breathing difficulty	268	7	0	275
Cardiac and stroke	382	15	0	397
Fall and injury	591	15	0	606
Illness and other	960	20	2	982
MVA	145	52	5	202
Overdose and psychiatric	473	11	0	484
Seizure and unconsciousness	401	10	0	411
EMS Total	**3,220**	**130**	**7**	**3,357**
False alarm	232	100	34	366
Good intent	107	8	9	124
Hazard	36	2	11	49
Outside fire	118	28	17	163
Public service	203	8	3	214
Structure fire	7	5	34	46
Fire Total	**703**	**151**	**108**	**962**
Canceled Calls	199	12	6	217
Mutual aid	15	4	1	20
Total	**4,137**	**297**	**122**	**4,556**

FIGURE 5-1: Number of Units Dispatched to EMS Calls



Analysis of Table 5-1 and Figure 5-1 tells us:

- On average, 1.1 units were dispatched to all calls; on 91 percent of all calls, only one unit was dispatched.
- Overall, three or more units were dispatched to 3 percent of calls.
- On average, 1.0 units were dispatched per EMS call.

- For EMS calls, one unit was dispatched 96 percent of the time, and two or three units were dispatched 4 percent of the time.
- On average, 1.4 units were dispatched per fire call.
- For fire calls, one unit was dispatched 73 percent of the time; two units were dispatched 16 percent of the time; and three or four units were dispatched 11 percent of the time.
- For structure fire calls:
  - Three units were dispatched 54 percent of the time
  - Four or more units were dispatched 20 percent of the time.

The majority of the incidents the department responds to are medical emergencies; which results in the dispatch of the closest available fire department unit along with a unit from Gold Cross ambulance, the city's EMS provider. On A shift and C shifts, this is done with the nearest available engine company. On B shift the department staffs just two engines, but also staffs two quick response squads to respond to EMS incidents. In this case, if the incident is in station 1 or 3 response zones, the squad responds for these incidents. However, if the incident occurs in station 2's area, the engine is dispatched along with the squad from station 1. At the same time the squad from station 3 is required to "post" to a more central location, thus three units actually move to handle this single incident. Depending upon which of its two staffing models the department is utilizing on a given day, and where in the city the incident occurs, the response is made with an engine and/or a squad. If the department is staffing just three engines as is done on A and C shifts, an engine will respond to the EMS incident.

CPSM was informed that the ECFD administration met with all three of the department's shifts both prior to, and after, implementation of the squad concept to discuss it and the department's staffing structure. Rank specific meetings were also held. According to the Fire Chief, this program's staffing model, response times, and cost savings are reported on a monthly basis. A revised staffing, deployment, and response protocol for these incidents is discussed in the Staffing and Deployment section of this report.

The city's emergency communications center has implemented only limited emergency medical dispatch (EMD) screening for medical emergencies. The EMD is utilized primarily for just critical life-threatening emergencies. However, there is no priority dispatching of incidents. The fire department is dispatched to all incidents regardless of severity and responds, in general under Code 3 (lights and sirens), although the officer has the discretion to modify the manner of response. This practice does not make the most effective use of the limited available resources and can increase the chances for an accident involving apparatus responding with lights and siren to a minor incident.

Recommendation:

- The El Centro Fire Department should consider implementing EMD priority dispatching for EMS incidents, and further consider limiting fire department response to higher priority EMS incidents considered critical and/or life threatening. (Recommendation 16.)

If there is no EMS unit is available for immediate response, or if there will be an extended response time for the ambulance to arrive, then the fire department should be dispatched on lower-priority incidents to ensure prompt patient care can be delivered. However, the response should be Code 2 (no lights and sirens).

Low-risk, fire-related incidents such as a small outside fire or a vehicle fire receive a response of one engine. Higher-risk Incidents such as an automatic fire alarm activation receive a response of multiple units. Per department protocol, the first due unit responds Code 3 while the second due unit responds Code 2. The third due unit has the discretion to either respond Code 2 or just monitor the incident from their station.

For the highest-risk incidents, such as a reported fire, or possible fire in a structure, all three engine company units are dispatched along with the on-duty Battalion Chief. All units respond Code 3. Except in cases where a city unit is unavailable to respond due to being committed on another incident, no external assistance is requested from mutual aid companies until the Battalion Chief arrives on scene. If an ECFD unit is unavailable for immediate response, mutual aid is generally requested from Imperial County. When the Battalion Chief requests a second alarm for a significant fire, this generates a recall of off duty El Centro personnel and the response of one Imperial County engine.

There is no protocol in place to automatically cover city stations when all units are committed on a significant incident. It was also reported by internal stakeholders to CPSM that there are no set protocols in place for handling major incidents and this is an issue throughout Imperial County. Requests for greater alarm or station covers are all generated by the incident commander and handled manually. However, the Imperial County mutual aid plan clearly shows the specified resources to be dispatched up to a fifth alarm assignment. This can be minimized through officer training and re-familiarization with the mutual aid plan.

Recommendation:

- The El Centro Fire Department should formalize its current internal dispatch procedures and protocols into “run cards” or “response assignments” in order to standardize responses to various types of incidents and response modes.

Staffing and Deployment

The fire service has experienced tremendous technological advances in equipment, procedures, and training over the past 50 years. Much improved personal protective equipment (PPE), the widespread and mostly mandatory use of self-contained breathing apparatus (SCBA), large diameter hose, advanced materials that make hand lines and nozzles lighter, compressed air foam, thermal imaging cameras, and advanced training and sophistication in the fire ground incident command system are just a few of the numerous advances in equipment and procedures that enable firefighters to perform their duties more effectively, efficiently, safer, and with fewer personnel. However, the fact remains that the emergency scene in general, and the fireground at a structure fire in particular, is a dynamic, dangerous, frequently unpredictable, and rapidly changing environment where conditions can deteriorate very quickly. The situation can place firefighters in extreme personal danger, particularly if there are not enough personnel on scene to handle all critical tasks.

The operations necessary to successfully extinguish a structure fire, and do so effectively, efficiently, and safely, requires a carefully coordinated, and controlled plan of action, where certain operations such as venting ahead of the advancing interior hose line(s) must be carried out with a high degree of precision and timing. Multiple operations, frequently where seconds count, such as search and rescue operations and attempting to cut off a rapidly advancing fire, must also be conducted simultaneously. If there are not enough personnel on the incident

initially to perform all the critical tasks, some will be delayed out of necessity and not due to the fault of the personnel on scene. This potentially may result in an increased risk of serious injury or death to building occupants and firefighters and increased property damage.

Staffing and deployment of fire services is not an exact science. While there are many benchmarks that communities and management utilize in justifying certain staffing levels, there are certain considerations that are data driven and reached through national consensus that serve this purpose as well. CPSM has developed metrics it follows and recommends that communities consider when making recommendations regarding staffing and deployment of fire resources.

Staffing is one component and the type of apparatus the staff is deployed on and from where (station locations) are the other two components that determine how fire and EMS service is delivered. Linked to these components of staffing and deployment are 11 critical factors that drive various levels and models from which fire and EMS departments staff and deploy. These factors are:

Fire Risk and Vulnerability of the Community: A fire department collects and organizes risk evaluation information about individual properties, and based on the rated factors then derives a "fire risk score" for each property. The community risk and vulnerability assessment is used to evaluate the community as a whole. With regard to individual property, the assessment is used to measure all property and the risk associated with that property and then segregate the property as either a high-, medium-, or low-hazard depending on factors such as the life and building content hazard and the potential fire flow, and the staffing and apparatus types required to mitigate an emergency in the specific property. Factors such as fire protection systems are considered in each building evaluation. Included in this assessment should be both a structural and nonstructural (weather, wildland-urban interface, transportation routes, etc.) analysis.

Population, Demographics, and Socioeconomics of a Community: Population and population density drives calls for local government service, particularly public safety. The risk from fire is not the same for everyone, with studies telling us age, gender, race, economic factors, and what region in the country one might live in contribute to the risk of death from fire. Studies also tell us these same factors affect demand for EMS, particularly population increase and the use of hospital emergency departments more frequently as many uninsured or underinsured patients rely on EDs for their primary and emergent care, utilizing pre-hospital EMS transport systems as their entry point.

Call Demand: Demand is made up of the types of calls to which units are responding and the location of the calls. This drives workload and station siting considerations. Higher population centers with increased demand require greater resources.

Workload of Units: The types of calls to which units are responding and the workload of each unit in the deployment model. This tells us what resources are needed and where; it links to demand and station location, or in a dynamic deployed system, the area(s) in which to post units.

Travel Times from Fire Stations: Looks at the ability to cover the response area in a reasonable and acceptable travel time when measured against national benchmarks. Links to demand and risk assessment.

NFPA Standards, ISO, OSHA requirements (and other national benchmarking).

EMS Demand: Community demand; demand on available units and crews; demand on non-EMS units responding to calls for service (fire/police units); availability of crews in departments that utilize cross-trained EMS staff to perform fire suppression.

Critical Tasking: The ability of a fire and EMS department to comprise an effective response force when confronted with the need to perform required tasks on a fire or EMS incident scene defines its capability to provide adequate resources to mitigate each event. Department-developed and measured against national benchmarks. Links to risk and vulnerability analysis.

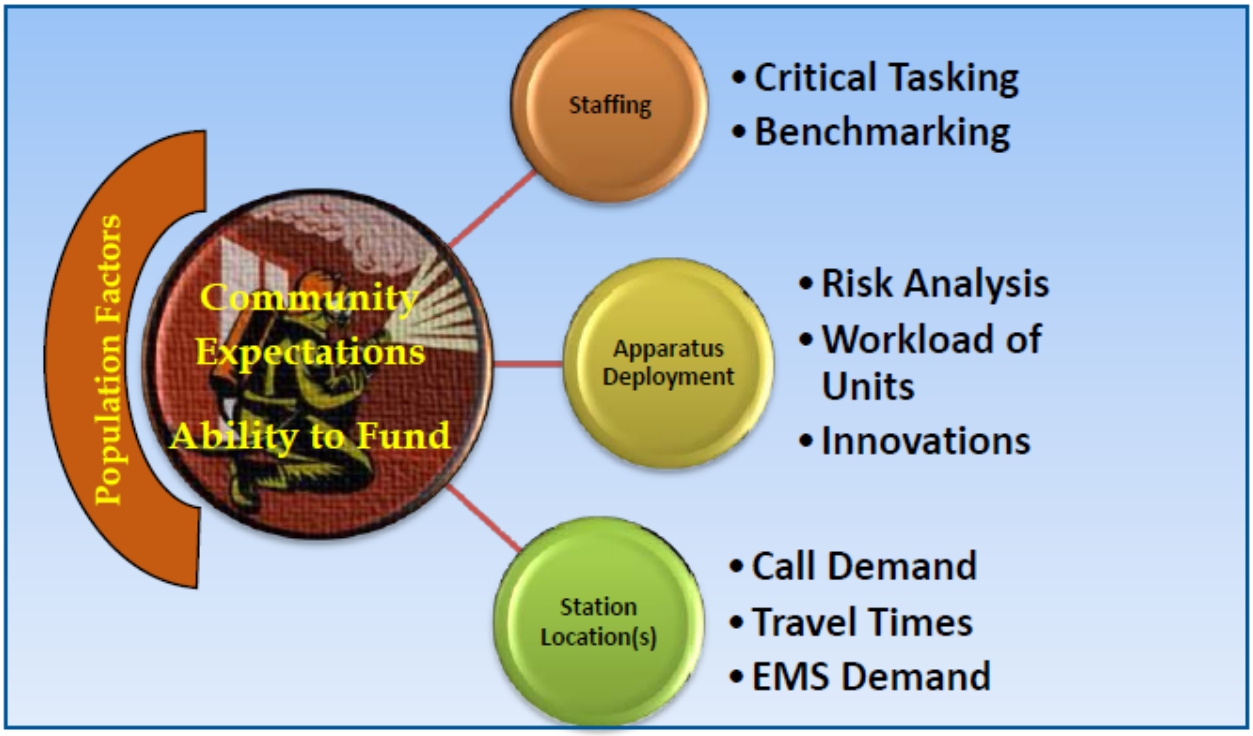
Innovations in Staffing and Deployable Apparatus: The fire department's ability and willingness to develop and deploy innovative apparatus (combining two apparatus functions into one to maximize available staffing, as an example). Deploying quick response vehicles (light vehicles equipped with medical equipment and some light fire suppression capabilities) on those calls (typically the largest percentage) that do not require heavy fire apparatus.

Community Expectations: Measuring, understanding, and meeting community expectations.

Ability to Fund: The community's ability and willingness to fund all local government services, and understanding how the revenues are divided up to meet the community's expectations.

These factors are further illustrated in Figure 5-2.

FIGURE 5-2: Staffing and Deploying Fire and EMS Departments



While each component presents its own metrics of data, consensus opinion, and/or discussion points, aggregately they form the foundation for informed decision making geared toward the implementation of sustainable, data- and theory-supported, effective fire and EMS staffing and deployment models that fit the community's profile, risk, and expectations.

The completion of a fire risk assessment and standard of cover are critical elements in the development of a staffing and deployment plan for a fire department. Developing and implementing such a plan should include critical components such as the completion of a community risk analysis, critical tasks for operational asset deployment for all emergency types identified in the plan (and against each risk type identified), and benchmarking of these tasks against national standards and include performance measurements.

The ECFD had not completed these elements prior to this analysis. However, part of this analysis involved the completion of a community fire risk and target hazard analysis. Regardless of the outcome of such an assessment, the ECFD's current on-duty staffing level of 10 or 11 personnel falls well below any of the minimum staffing benchmarks for incidents except the most minor of structural fire or rescue-type incident.

To effectively respond to and mitigate requests for emergency services, an agency must have a thorough understanding of its community's risk factors. Once identified and understood, each category or level of risk is associated with the necessary resources and actions required to mitigate it. This is accomplished through a critical task analysis. The exercise of matching operational asset deployments to risk, or critical tasking, takes into account multiple factors including national standards, performance measures, and the safety of responders. Fire departments that serve smaller communities, especially those that are somewhat isolated like El Centro, often face greater challenges attempting to handle higher risk and/or larger incidents because the necessary staffing resources are simply not immediately available or may have an extended response time when requested for assistance. For instance, the Imperial County Mutual Aid Plan lists units from the City of Yuma, Ariz., and the Yuma Marine Corps Air Station as being on the 4th alarm for major fires or other incidents in El Centro. Yuma is nearly 60 miles from El Centro, and there would be an extended response should these resources be needed.

Critical tasks are those activities that must be conducted in a timely manner by responders at emergency incidents to control the situation and stop loss. Critical tasking for fire operations is the minimum number of personnel needed to perform the tasks required to effectively control a fire. To be effective, critical tasking must assign enough personnel so that all identified functions can be performed simultaneously. However, it is important to note that secondary support functions may be handled by initial response personnel once they have completed their primary assignment. Thus, while an incident may end up requiring a greater commitment of resources or a specialized response, a properly executed critical task analysis will provide adequate resources to immediately begin bringing the incident under control.

The specific number of people required to perform all the critical tasks associated with an identified risk is referred to as an *Effective Response Force* (ERF). The goal is to deliver an ERF within a prescribed time frame. NFPA 1710 – *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments* (2016 Edition), as a nationally recognized consensus standard on staffing and deployment for career fire departments, provides a benchmark for ERF.[22]

Some of the key provisions of NFPA 1710 related to an Effective Response Force are as follows:

As a benchmark, NFPA 1710 states that the initial full alarm to a typical 2000 square-foot residential structure shall provide for the following critical tasks:

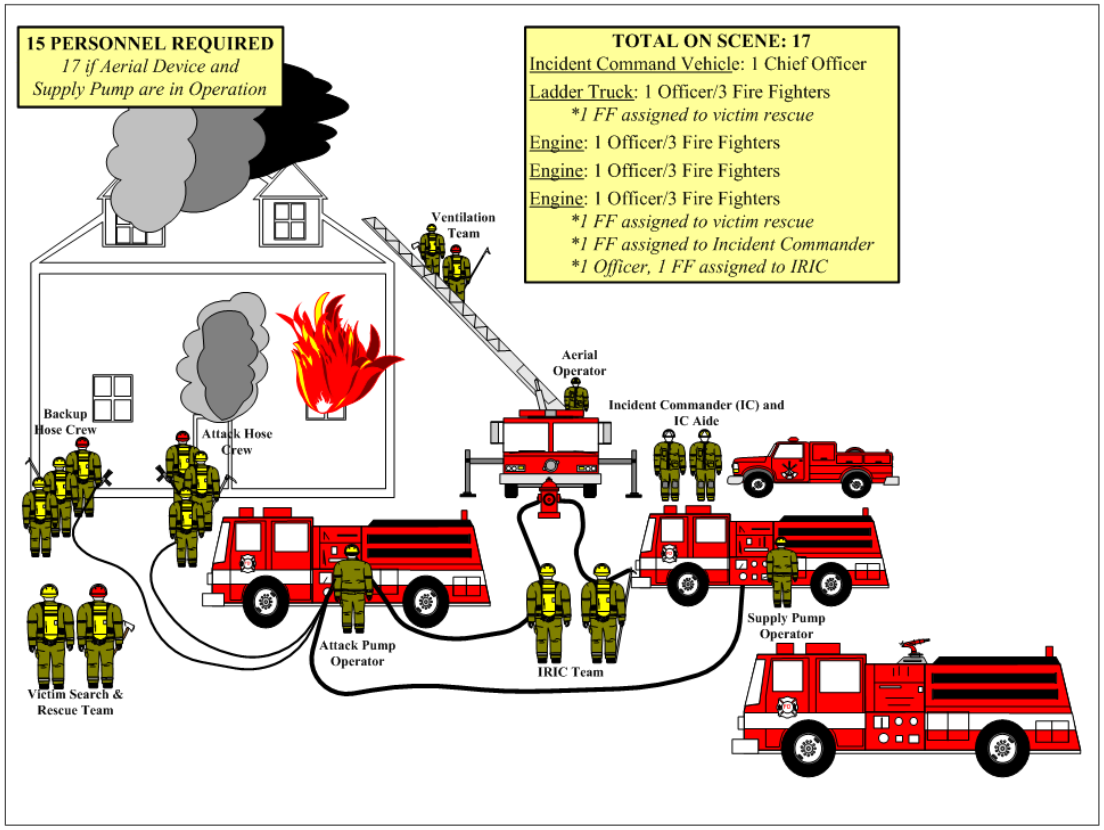
- Incident command.

[22] It is important to note that compliance with NFPA 1710 has not been mandated in the State of California or by the federal government. It is considered a "best practice" that fire departments strive to achieve.

- Continuous water supply.
- Hydrant hookup.
- Forcible entry.
- Fire attack via two handlines.
- Primary search and rescue.
- Establishment of an IRIT (initial rapid intervention team).

Thus, according to NFPA 1710, the ERF for this incident would be a minimum of 15 personnel deployed to the scene. This is illustrated in Figure 5-3.

FIGURE 5-3: NFPA 1710 First Alarm Assignment/ERF Recommendation



These are the proverbial "bread and butter" structural fire incidents that fire departments respond to, and which are, by far, the most common type of structure fire. Personnel requirements for fires involving large, more complex structures such as commercial or industrial facilities or multifamily residential occupancies will require a significantly greater commitment of personnel.

Regarding the implementation of an ERF and its aggregate effect on fireground operations, there has been much research done by a number of fire departments on the effects of various staffing levels. A recent comprehensive yet scientifically conducted, verified, and validated, study titled *Multiphase Study on Firefighter Safety and the Deployment of Resources* was performed by the National Institute of Standards and Technology (NIST) and Worcester Polytechnic Institute (WPI), in conjunction with the International Association of Fire Chiefs, the International Association of Fire Fighters, and the Center for Public Safety Excellence. For the first

time, quantitative evidence has been produced regarding the impact of crew size on accomplishing critical tasks. Additionally, continual research from UL has provided tactical insights that shed further light on the needs related to crew size and firefighter safety. This body of research includes:

- An April 2010 report on *Residential Fireground Field Experiments* from the National Institute of Standards and Technology (NIST).
- An April 2013 report on *High-Rise Fireground Field Experiments* from National Institute of Standards and Technology (NIST-HR).
- A December 2010 report on the *Impact of Ventilation on Fire Behavior in Legacy and Contemporary Residential Construction* (UL).

As stated, some of these study's findings have a direct impact on the exercise of critical tasking. For example, as UL studied the impact of ventilation on fire behavior, it was able to obtain empirical data about the effect of water application on fire spread and occupant tenability. The research clearly indicates that the external application of a fire stream, especially a straight stream, does not "push fire" or decrease tenability in any adjacent rooms. Therefore, during the deployment of resources for the critical task of fire attack, consideration must be given to the option of applying water to the fire from the exterior when able. This approach allows for a fire attack to begin prior to the establishment of an IRIT as well as decreasing the time to getting water on the fire, which has the greatest impact on occupant survivability.

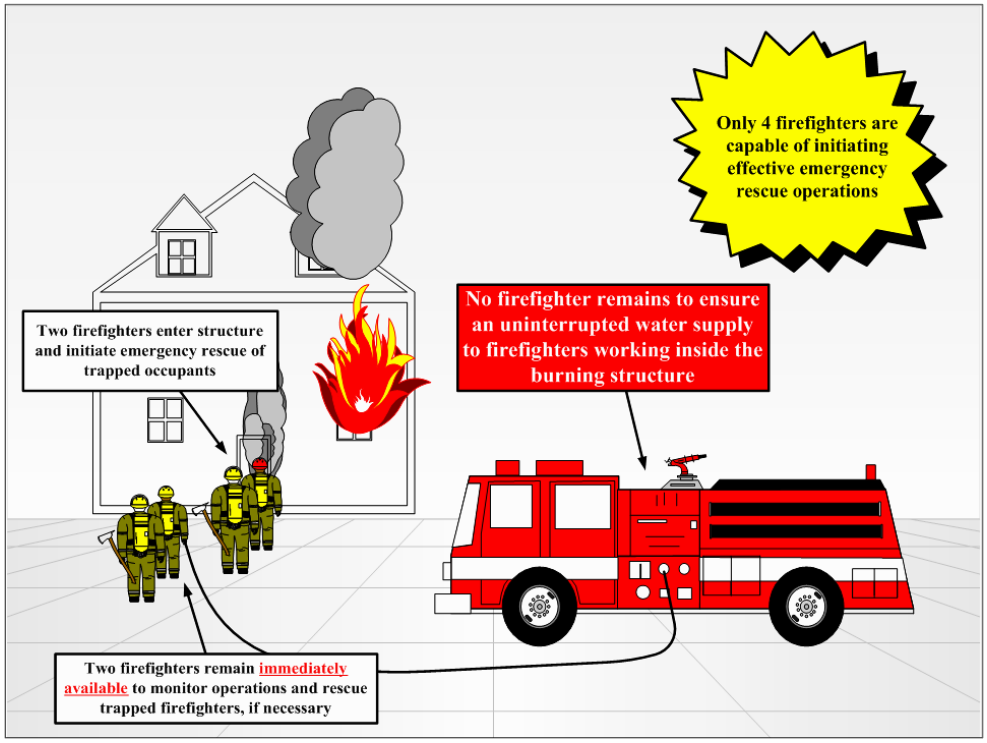
The NIST studies examined the impact of crew size and stagger on the timing of fire ground task initiation, duration, and completion. Although each study showed crew size having an impact on time-to-task, consideration must be given to what tasks were affected and to what extent. For example, four-person crews operating at a low-hazard structure fire completed all fire ground tasks (on average) 5.1 minutes or 25 percent faster than three-person crews. However, when considering the two tasks most influential in occupant survivability, the difference was minimal.

For "time of arrival" to "water on the fire," the four-person crew completed the task only 6 percent faster than the three-person crew, which represents a thirty-four (34) second difference. For "time of arrival" to "primary search," the four-person crew completed the task only 6 percent faster than the three-person crew, which represents a 23-second difference. The "rescue time" difference from a four-person to a three-person crew is only seven seconds.

When considering critical tasking for the deployment of an ERF, the ECFD will need to consider both its own limited resources, as well as the fact that even units from Imperial County dispatched simultaneously with El Centro may have extended response times. It is important to note that the impact of crew size as it relates to high-risk categories is greater than its low-risk implications and should be considered when staffing units that cover a greater amount of risk.

There is no California or federal requirement that specifies staffing levels on fire apparatus. The closest thing that approaches a requirement for staffing levels is the OSHA 29 CFR 1910.134 standard, often referred to as the ***"Two-in-Two Out"*** guideline. This standard, which is a safety mandate that has application to municipal firefighting, requires the use of four personnel (two inside the structure and two outside the structure) when conducting interior firefighting activities in a hazardous work environment (that is, an environment that is immediately dangerous to life or health, or IDLH). Figure 5-4 illustrates one example of how this guideline is intended to be implemented.

FIGURE 5-4: OSHA "Two-In-Two-Out"



The OSHA requirement has two key provisions that allow considerable flexibility regarding staffing:

- One provision specifies that the four personnel who engage in interior firefighting are required at the incident (assembled) and are not a staffing requirement for the individual responding unit.
- The second provision is that an exception is provided when crews are performing rescue operations where there is the **potential** for serious injury or death of the occupants. In this case the standard allows the entry of two personnel to conduct the rescue activity without two firefighters outside immediately available to monitor operations and rescue trapped firefighters, if necessary.

It was consistently reported to CPSM that the ECFD **does follow** the provisions of the OSHA Two-In/Two-Out regulation regarding waiting to initiate an interior fire attack until four personnel are assembled when there are no rescues to be made. The department should be commended for this adherence.

Ultimately, overall on-duty fire department staffing is a local government decision. It is also important to note that the OSHA standard (and NFPA 1710) specifically references "interior firefighting." Firefighting activities that are preformed from the exterior of the building are not regulated by this portion of the OSHA standard. However, in the end, the ability to assemble adequate personnel, along with appropriate apparatus to the scene of a structure fire is critical to operational success and firefighter safety. How and where personnel and companies are located, and how quickly they can arrive on scene play major roles also. The reality of El Centro's somewhat isolated location will continue to impact assembling sufficient personnel and resources to the scene.

ECFD Staffing

The ECFD currently has an authorized staff of 44 total personnel, 41 of whom are uniformed emergency response personnel. This staffing is comprised of:

- 1 – Fire Chief.
- 3 – Battalion Chiefs.
- 10 – Captains.
- 9 – Engineers.
- 18 – Firefighters (5 positions currently vacant).
- 3 – Administrative Support Staff (non-uniformed).

Of the department's uniformed personnel, 14 are certified paramedics and 7 are advanced emergency medical technicians (A-EMT).

The department delivers field operations and emergency response services through a clearly defined division of labor that includes a middle manager (Battalion Chief), first-line operational supervisors (Captains), technical specific staff (Engineers), and Firefighters. The entire city is considered a single operational battalion and is commanded each day by a Battalion Chief. Field personnel work a three-platoon, 56-hour work week that is comprised of 24-hour-long duty days.

At the time of this study, the ECFD was utilizing two different staffing and deployment models, depending upon the shift that is working that day. The A and C shifts utilize the traditional deployment model where three engines are staffed, each with three personnel, at least one of which must be a paramedic. Standard engine staffing is one Captain, one Engineer, and one Firefighter. When the Battalion Chief is included, total on-duty staffing for this model is 10 personnel.

For the B shift, the department has initiated a pilot program for an alternative deployment and staffing model. Utilizing this model, the department staffs two engines with a total of three personnel each, and also staffs two quick response EMS squads with two personnel each. Under the pilot program the engines respond from stations 1 and 2. Engine two will have a minimum of one paramedic in the crew while Engine 1 must have at least one advanced EMT. The squads, both of which must have at least one paramedic, are deployed from stations 1 and 3. When the Battalion Chief is included, total on-duty staffing for this model is 11 personnel.

The two different staffing models are illustrated in the matrix in Table 5-2.

TABLE 5-2: El Centro Fire Department Staffing and Deployment Matrix

A Shift and C Shift will utilize 3 Engine Staffing
B Shift will utilize 2 Engine and 2 Squad Staffing

A & C: 3 Engine Staffing – 10 personnel minimum		
Battalion Chief		
Station 1	Station 2	Station 3
Engine Company (with Personnel Rank)	Engine Company (with Personnel Rank)	Engine Company (with Personnel Rank)
Captain Engineer Firefighter (Minimum level of EMS coverage will be 1 Paramedic.)	Captain Engineer Firefighter (Minimum level of EMS coverage will be 1 Paramedic.)	Captain Engineer Firefighter (Minimum level of EMS coverage will be 1 Paramedic.)

B: 2 Engines and 2 Squad Staffing – 11 personnel minimum			
Battalion Chief			
Station 1		Station 2	Station 3
Engine Company (with Personnel Rank)	Squad (with Personnel Rank)	Engine Company (with Personnel Rank)	Squad (with Personnel Rank)
Captain Engineer Firefighter (Minimum level of EMS coverage will be 1 EMT-Advanced.)	Any rank Any rank (Minimum level of EMS coverage will be 1 Paramedic.)	Captain Engineer Firefighter (Minimum level of EMS coverage will be 1 Paramedic.)	Any rank Any rank (Minimum level of EMS coverage will be 1 Paramedic.)

Through its staffing practices, the El Centro Fire Department is responding to the reality that the majority of its requests for emergency service are medical related and that those types of incidents constitute the greatest number of true emergencies to which the department responds. The El Centro Fire Department should be commended for ensuring that every station is normally staffed with at least one paramedic. CPSM considers this to be a **Best Practice**.

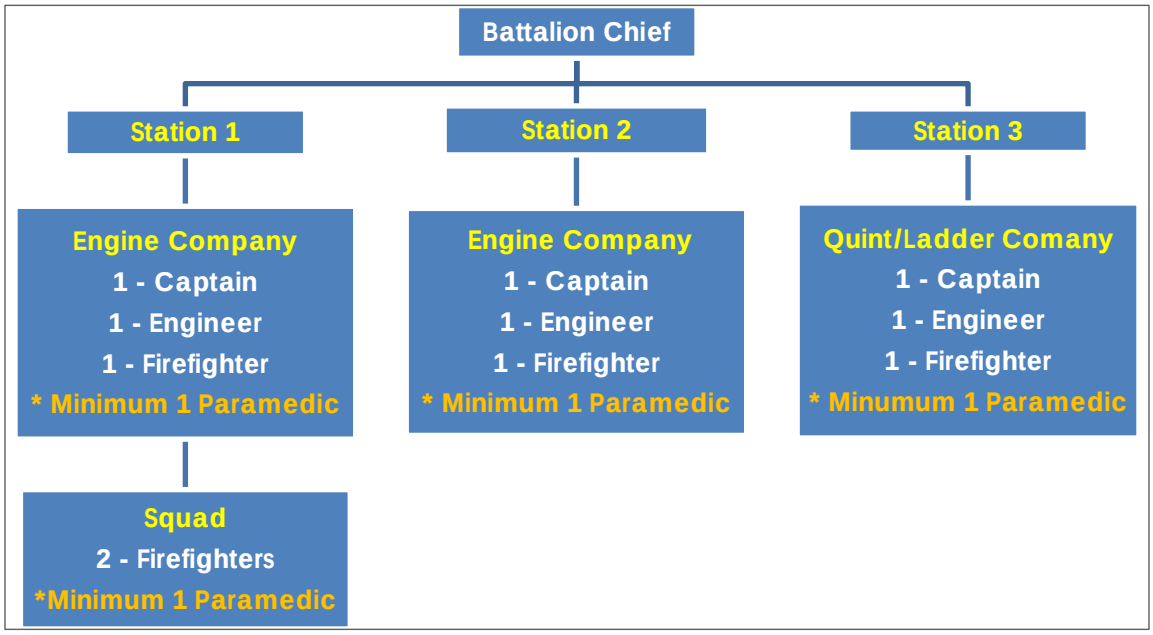
Despite the above acknowledgement of what CPSM believes is a best practice, we also have some significant concerns about the ECFD's current deployment models and levels of staffing. These are:

- When the alternative deployment model-pilot program is being utilized, the city has just two fire suppression units, both pumpers, staffed. Under this plan, station 3 has only a quick response squad for EMS incidents staffed for response, no fire suppression unit. This situation can certainly delay the initiation of fire suppression operations in at least certain portions of station 3's first due area. It can also place the firefighters assigned to the squad in the unenviable position of being first on the scene and having no fire suppression capability even if there is a life-safety concern. City-wide, the ability to quickly initiate a fire attack that delivers well-placed initial water streams and potentially large volumes of water to stop a rapidly developing fire can also be limited by having only two fire suppression units available.

- The ECFD normally staffs just two or three engines. It does not staff or respond the quint apparatus on a routine basis, but rather cross-staffs this unit with an engine crew to calls for service based on information received from the 911 caller. Responding to structural fire incidents (or potential fire incidents) with just the engines as opposed to a combination of engines and aerial ladders with elevated aerial devices and elevated water stream capabilities, limits the department's tactical options. It will not have aerial ladder (quint in this case) or even longer ground ladder capabilities immediately available on scene. On the fireground this can impact the ability to perform rescues, access roofs, and deliver elevated water streams.
- For any given emergency to which ECFD responds, there are critical tasks that must be completed. These tasks can range from the immediate rescue of trapped occupants within a burning structure to vehicle accidents with entrapment, to hazardous materials leaks and spills when needed. The department's minimum on-duty staffing level of either 10 or 11 personnel impacts its ability to handle a moderate risk structure fire effectively and safely. Although the more frequent use of automatic aid from Imperial County can help bridge this gap, this assistance will have built-in response time considerations.

CPSM recommends the ECFD plan for and adopt, when funding is available, an operational staffing model that deploys 12 operational personnel across all three shifts. Figure 5-5 illustrates this recommendation.

FIGURE 5-5: Recommended Deployment and Staffing Model – All Shifts



As discussed earlier in this report, a community risk and vulnerability assessment is employed to evaluate the community as a whole. With regard to individual properties, the assessment measures all property and the risks associated with each property, and then segregates a property as either a high-, medium-, or low-hazard. This is then further broken down into varying degrees of risk. Utilizing the current and recommended staffing and deployment model as discussed above, CPSM recommends the following operational response for medium- and low-hazard occupancies (high-hazard is not included as these are expected to require resources in the greater alarms section of the mutual aid plan discussed in this report):

Medium-hazard Occupancies: Apartments, offices, and mercantile and industrial occupancies, not normally requiring extensive rescue by firefighting forces.

> *Operational Response:* 3 pumpers, 1 ladder truck (or combination apparatus with equivalent capabilities such as a quint), 1 chief officer, and other specialized apparatus as may be needed or available; not less than 16 firefighters and 1 chief officer plus a safety officer and a rapid intervention team.

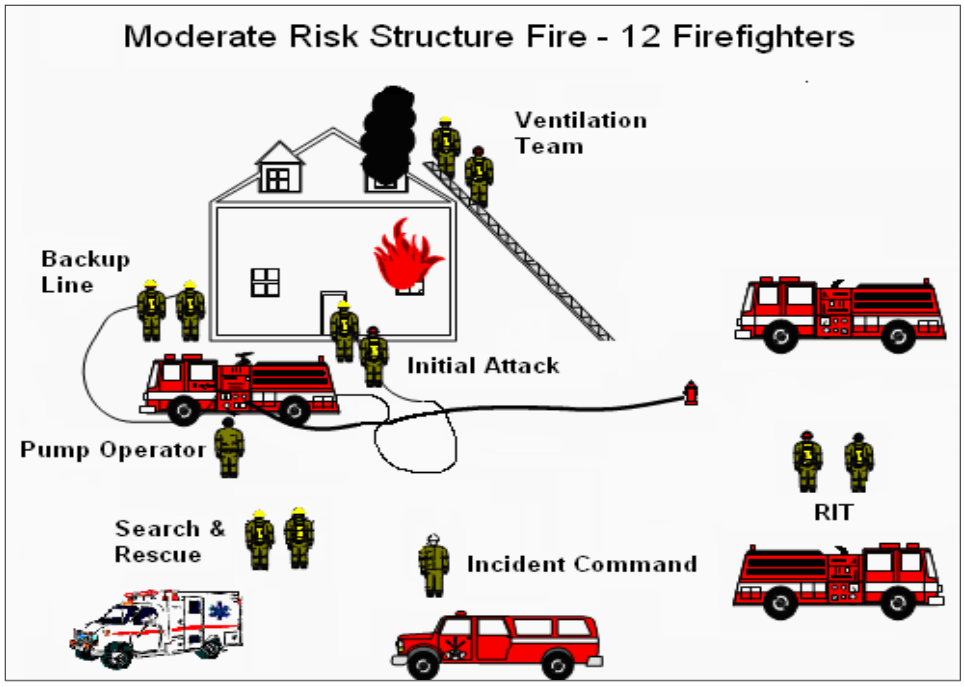
Low-hazard Occupancies: One-, two-, or three-family dwellings and scattered small business and industrial occupancies. This represents the majority of occupancies found in El Centro.

> *Operations Response Capability:* At least 2 pumpers, 1 ladder truck (or combination apparatus with equivalent capabilities such as a quint), 1 chief officer, and other specialized apparatus as may be needed or available; not less than 12 firefighters and 1 chief officer, plus a safety officer, and a rapid intervention team.

CPSM believes that the adoption of this deployment and staffing model will enable the ECFD to more effectively, efficiently, and safely handle a wider range of emergency incidents from medical emergencies to structure fires throughout the city. While this is still less than optimal staffing, with the possibility to quickly put 12 personnel on the scene of a low- to moderate-risk structure fire the department will be much more able to effectively and safely handle the myriad number of tasks that must be performed during the initial stages of these types of incidents. These types of fire incidents, primarily one- and two-family dwellings, comprise the largest percentage of structure fire incidents to which the ECFD responds.

Figure 5-6 illustrates this deployment model.

FIGURE 5-6: Moderate Risk Response – Interior Fire Attack



As was previously mentioned, even with the very limited current staffing levels, except in cases where a city unit is unavailable to respond due to being committed on another incident, no external assistance is requested for a reported structure fire until the Battalion Chief arrives on

scene. If an ECFD unit is unavailable for immediate response, mutual aid is then requested from Imperial County. When the Battalion Chief requests a second alarm for a significant fire, this generates a recall of off-duty El Centro personnel and the response of one county engine. There is no immediate, and simultaneous, dispatch of additional fire suppression resources through the use automatic aid. Regardless of the reason(s) behind it, the practical implication is a delay in getting a sufficient number of resources to the scene of a structure fire. The ECFD and Imperial County Fire Department should adopt revised automatic aid agreements that will benefit both jurisdictions. In fact, all potential mutual aid partners should also be included.

Recommendations:

- The El Centro Fire Department should adopt a deployment model that staffs two engines, one quint, and one squad on every shift with a minimum of 12 personnel, including the Battalion Chief. (Recommendation 18.)
- The El Centro Fire Department should revise its response protocols to automatically request, at the time of dispatch, units from the Imperial County Fire Department (Imperial City and Heber stations) on any reported structural incident involving medium- and high-hazard occupancies. (Recommendation 19.)

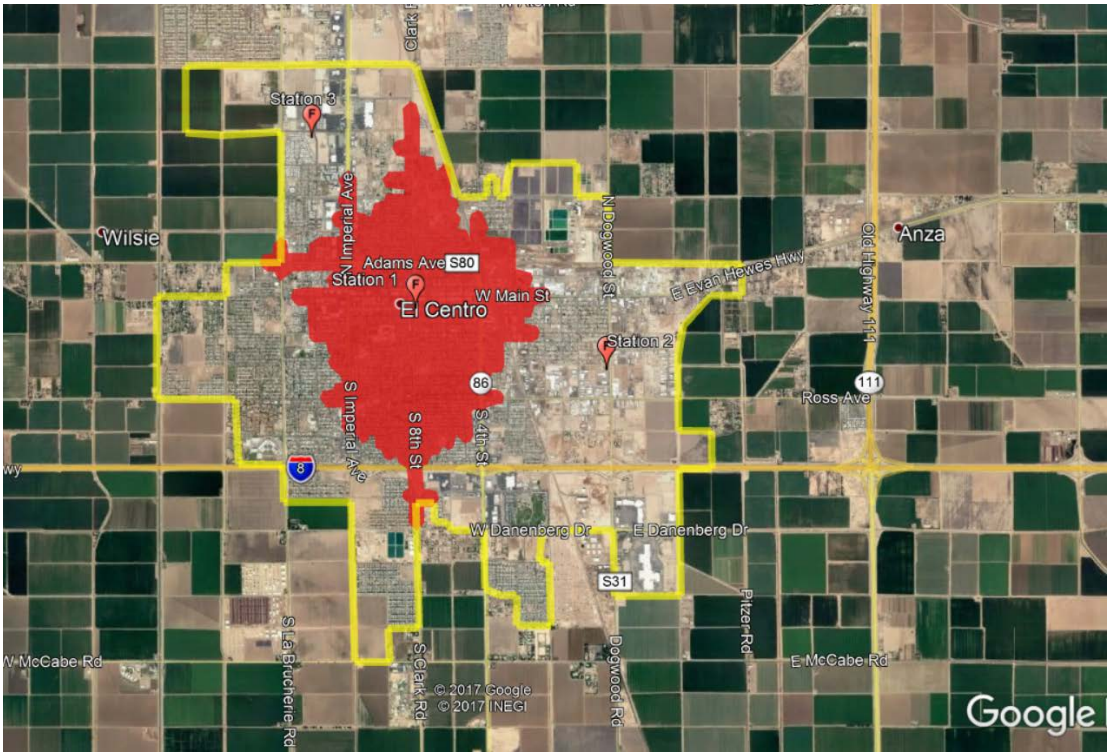
For EMS responses, the purpose of the squad concept is to provide response to medical emergencies with a smaller crew. The vehicle carries all the equipment necessary for treating medical emergencies of any severity. It provides a quicker, more efficient response to these types of emergencies while simultaneously doing so more cost effectively by reducing wear and tear, as well as fuel consumption, on the full-size fire apparatus. With 78 percent of the ECFD's responses being medical emergencies, this concept, which is growing in popularity in the fire service, makes good operational sense. In addition to the EMS supplies and equipment carried, Squad 3163 carries a full complement of vehicle extrication tools and some technical rescue equipment.

Deploying a single squad out of station 1 makes operational sense for several reasons. First, as Table 5-3 indicates, station 1 is by far the busiest of the city's three stations, with 60.2 percent of all incidents occurring in that district. That includes 61.9 percent of all EMS incidents. In addition, as illustrated in Figure 5-7, the squad from station 1 has a significant area of the city it can cover within the 240-second travel time benchmark. Finally, the squad provides two additional personnel that can be deployed for firefighting duties when necessary, helping to bolster the ERF.

TABLE 5-3: Calls by Type and Station Area

Call Location	Number of Calls				Percent of Calls
	EMS	Fire	Other	Total	
Station 1	2,080	530	131	2,741	60.2
Station 2	622	246	50	918	20.1
Station 3	655	186	31	872	19.1
Out of City	0	0	25	25	0.5
Total	**3,357**	**962**	**237**	**4,556**	**100.0**

FIGURE 5-7: 240-Second (Four-minute) Response (Drive) Time from Station 1



Fire Response

With a population density of nearly 4,000 people per square mile, El Centro is an urban community. Many areas in the city's center core area have very closely constructed structures. The newer areas of the city have an assortment of commercial, industrial, and residential buildings. If a fire grows to an area in excess of 2,000 square feet or extends beyond the building of origin, it is certain that additional personnel and equipment will be needed because initial response personnel will be taxed beyond their available resources. From this perspective it is critical that ECFD units respond rapidly and initiate extinguishment efforts as rapidly as possible after notification of an incident. It is, however, difficult to determine in every case the effectiveness of the initial response in limiting the fire spread and fire damage. Many variables will impact these outcomes, including:

- The time of detection, notification, and ultimately response of fire units.
- The age and type of construction of the structure.
- The presence of any built-in protection (automatic fire sprinklers) or fire detection systems.
- The contents stored in the structure and its flammability.
- The presence of any flammable liquids, explosives, or compressed gas canisters.
- Weather conditions and the availability of water for extinguishment.

Subsequently, in those situations in which there are extended delays in the extinguishment effort or the fire has progressed sufficiently upon arrival of fire units, there is actually very little that can be done to limit the extent of damage to the entire structure and its contents. In these situations, suppression efforts may need to focus on the protection of nearby or adjacent structures (exterior exposures) with the goal being to limit the spread of the fire beyond the building of origin, and sometimes the exposed building. This is often termed ***protecting exposures***. When the extent of damage is extensive, and the building becomes unstable, firefighting tactics typically move to what is called a ***defensive attack***, or one in which hose lines and more importantly personnel are on the outside of the structure and their focus is to merely discharge large volumes of water until the fire goes out. In these situations, the ability to enter the building is very limited and if victims are trapped in the structure, there are very few safe options for making entry.

Today's fire service is actively debating the options of interior firefighting vs exterior firefighting. These terms are self-descriptive in that an ***interior fire attack*** is one in which firefighters enter a burning building in an attempt to find the seat of the fire and from this interior position extinguish the fire with limited amounts of water. An ***exterior fire attack***, also sometimes referred to as a ***transitional attack***, is a tactic in which firefighters initially discharge water from the exterior of the building, either through a window or door and knock down the fire before entry in the building is made. The concept is to introduce larger volumes of water initially from the outside of the building, cool the interior temperatures, and reduce the intensity of the fire before firefighters enter the building. A transitional attack is most applicable in smaller structures, typically single family, one-story detached units which are smaller than approximately 2,500 square feet in total floor area. For fires in larger structures, the defensive type, exterior attacks generally involve the use of master streams capable of delivering large volumes of water for an extended period of time.

There are a number of factors that have fueled this debate. The first and most critical of these factors is the staffing level. Since fire departments may operate with reduced levels of staffing, and this staff may be arriving at the scene from greater distances, there is little option for a single fire unit with three personnel but to conduct an exterior attack.

When using an exterior attack, the requirement of having the four persons assembled on-scene, prior to making entry, as discussed earlier in the report, would not apply. Recent studies by UL have evaluated the effectiveness of interior vs. exterior attacks in certain simulated fire environments. These studies have found the exterior attack to be equally effective in these simulations.[23] This debate is deep-seated in the fire service and traditional tactical measures have always proposed an interior fire attack, specifically when there is a possibility that victims may be present in the burning structure. The long-held belief in opposition to an exterior attack is that this approach may actually push the fire into areas that are not burning or where victims may be located. The counterpoint supporting the exterior attack centers on firefighter safety.

[23] "Innovating Fire Attack Tactics", U.L.COM/News Science, Summer 2013.

The exterior attack limits the firefighter from making entry into those super-heated structures that may be susceptible to collapse. From CPSM's perspective, there is at least some likelihood that a single crew of three personnel will encounter a significant and rapidly developing fire situation. It is prudent that therefore that the ECFD build at least a component of its training and operating procedures around the tactical concept of the exterior fire attack when the situation warrants such an approach.

Recommendations:

- The ECFD should build at least a portion of its training regimens and tactical strategies around the exterior or transitional attack for when the fire scenario and the number of available units/responding personnel warrants this approach. (Recommendation 20.)
- In acknowledgement of the fact that the ECFD operates in a minimal staffing mode, and recognizing the potential for rapid fire spread particularly in the more densely developed areas of the city, the ECFD should equip all its apparatus with the appropriate appliances and hose. It should develop standardized tactical operations that will enable arriving crews to quickly deploy high-volume fire flows of 1,200 to 1,500 gallons per minute (if the water supply will permit this), utilizing multiple hose lines, appliances, and master stream devices. This flow should be able to be developed within four to five minutes after arrival of an apparatus staffed with three personnel. (Recommendation 21.)

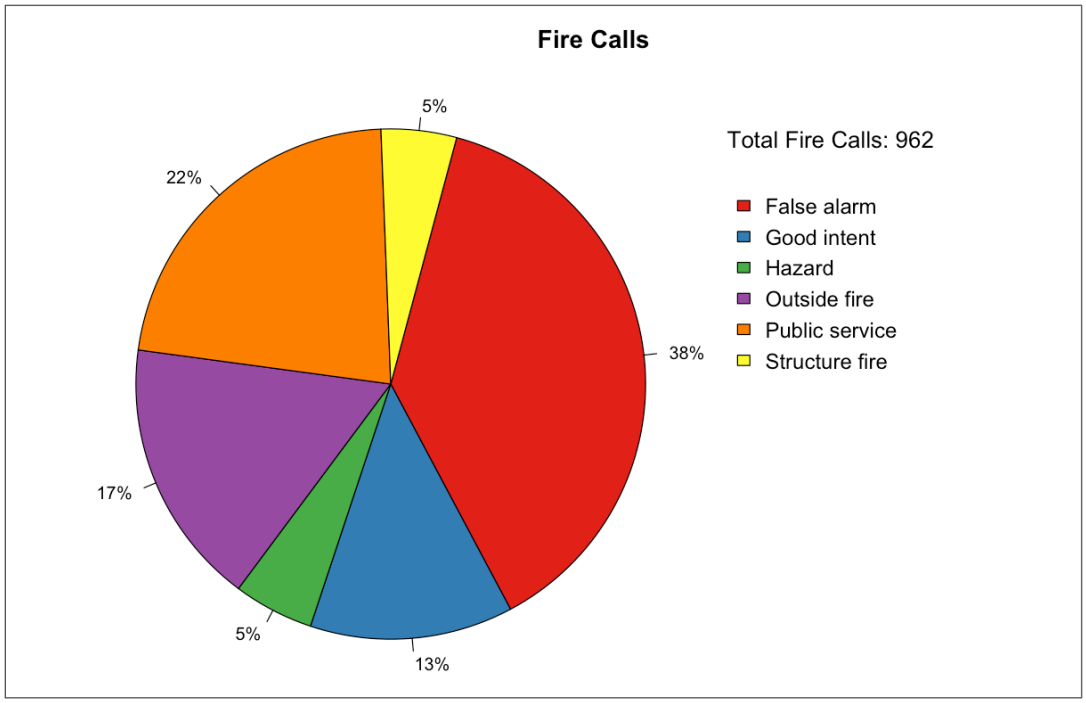
The ECFD should be (and we believe is) capable of fully handling fires in single-family dwellings that are limited in size and intensity. This goal has a greater chance of achievability provided that the increased staffing levels and apparatus deployment recommended in this report are implemented AND the fire department can arrive at the fire incident and take definitive action to mitigate the situation prior to flashover occurring. If flashover has occurred, holding the fire to the building of origin is achievable as well.

Table 5-4 and Figure 5-8 show the fire call totals for the 12-month period evaluated, including number of calls by type, average calls per day, and the percentage of calls that fall into each call type category. While fire call types were 21.1 percent of the total calls for service, actual fire calls (structural and outside) were only 4.6 percent of the overall calls for service (approximately 0.57 calls per day or one actual fire-type call every 1.7 days). The 209 actual fires represent 21.7 percent of the fire-related incidents. Hazardous conditions, false alarms, and good intent calls represent the largest percentage of fire-type calls for service. This experience is typical in CPSM data and workload analyses of other fire departments.

TABLE 5-4: Fire Calls by Type and Number, and Percent of All Calls

Call Type	Number of Calls	Calls per Day	Percentage of All Calls
False alarm	366	1.0	8.0
Good intent	124	0.3	2.7
Hazard	49	0.1	1.1
Outside fire	163	0.4	3.6
Public service	214	0.6	4.7
Structure fire	46	0.1	1.0
Fire Total	**962**	**2.6**	**21.1**

FIGURE 5-8: Fire Calls by Type and Percentage



The data in Table 5-4 and Figure 5-8 tell us that:

- Fire calls for the year totaled 962 (21 percent of all calls), an average of 2.6 per day.
- Structure and outside fires combined for a total of 209 calls during the year, an average of one call every 1.7 days.
- A total of 46 structure fire calls accounted for 5 percent of the fire calls.
- A total of 163 outside fire calls accounted for 17 percent of the fire calls.
- False alarm calls were the largest fire call category, with 38 percent of the fire calls.

Figure 5-9 illustrates the distribution of fire incidents throughout the city. Figure 5-10 shows the distribution of other fire-related incidents (not actual fires). Both maps utilize approximately .25 x .25 mile grid cells. For actual fires, the heaviest concentration of incidents is in about a 1.25 square-mile area of downtown El Centro just east of station 1. With this area's older construction

and higher density of population and structures, this call concentration could reasonably be expected. Several other pockets of heavy activity and a number of more moderate incident concentrations are scattered throughout the city. Nonfire-related calls match this same distribution; primarily in downtown El Centro just east of station 1.

FIGURE 5-9: Distribution of Actual Fire Incidents

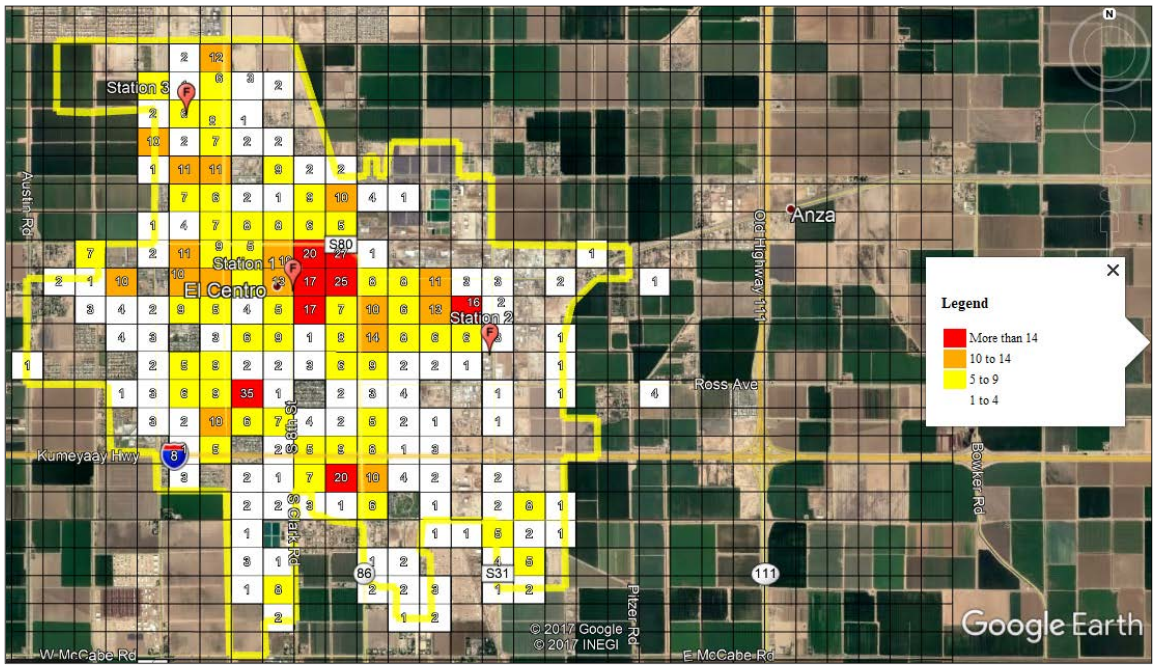
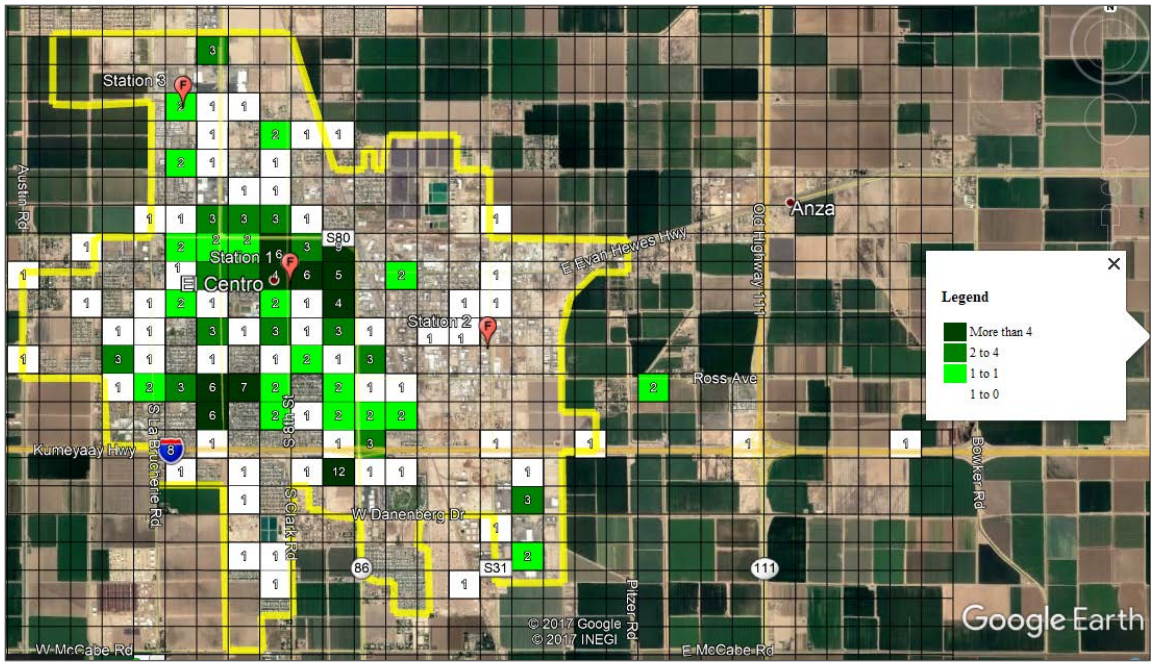


FIGURE 5-10: Distribution of Nonfire-Related Incidents



EMS Response and Transport

Pursuant to California statute, local control of EMS operations in the state is held at the county level. The agency or agencies that provide the service is legislated by the county board of supervisors. Cities and fire districts that were providing service prior to 1980 can retain administrative oversight as long as the existing service level is maintained. Section 1797.201 of the California Health and Safety Code allows communities to expand the level of service from basic life support (BLS) first responder to advanced life support (ALS) first responder. However, a community cannot change the type of service, for example from first responder to transport service, without county approval.

Medical direction, training, and certification is intended to be standardized across the entire state. Medical control for EMS operations is handled at the county level. All local standard operating procedures (SOPs) for EMS operations must be consistent with established county protocols.

The purpose of the EMS system as set up is to allow for the establishment of exclusive operating areas that enable providers to recoup unreimbursed costs, eliminate cherry-picking of more desirable calls, and assure the existence of a responsible, sustainable provider in each area. The law also allows counties to maintain existing contracts in place without the need to go out for competitive bidding. At the time this study was being conducted, Imperial County had issued an RFP that for the first time will lead to competitive bids for the county's ambulance transport service. Under this process, the county will also consolidate four of its five EMS zones into a single exclusive operating area.

As has been previously noted, the ECFD provides first responder EMS service to the city at the ALS level. Each ECFD station normally has a minimum of one paramedic on duty 24/7. The fire department responds to all medical emergencies in the city with either a fire suppression unit or a quick response squad. They perform patient stabilization and care of the patient until a transport ambulance arrives on scene. In most cases, patient care is then transferred to the ambulance personnel for transport to the hospital. In some situations, especially with critically injured or serious ill patients, a fire department paramedic may be requested to accompany the ambulance crew to the hospital.

The current ambulance provider for Imperial County Zone 1, which includes El Centro, is Gold Cross Ambulance. Gold Cross operates a station in the city at Imperial and Vine. Normal deployment from this facility is three ALS ambulances and one BLS unit. The next closest station is in Holtville; however, this station is outside of the established 12-minute response window for incidents in El Centro.

The ambulance contract does not specify a minimum number of ambulances that must be staffed at any given time or in any location. Instead, established performance standards set the number. Response time standards are based upon whole system needs rather than individual areas. For El Centro, the current performance standard is:

- An ALS ambulance on scene in less than 12 minutes, 90 percent of the time.

It was reported by the county that in actuality, the on-scene performance time for an ambulance is usually met more than 95 percent of the time. However, that level of compliance was disputed by the ECFD, which informed CPSM that response times have historically been slow. The county acknowledged that data reliability has been a problem at times. The problem is, as CPSM sees it, is that the CAD systems for various agencies involved in response are not

linked or interfaced with each other. According the Fire Chief, the ambulance on scene time is captured in a "special field" that is analyzed and reported out by staff on a monthly basis.

The RFP that the county had issued for EMS transport services while this study was ongoing includes a number of new provisions that will hopefully improve operations between the ECFD and whoever the ambulance provider is. Among the changes included are:

- Arrival of an ALS ambulance on scene in 11 minutes or under for high-priority calls.
- Better use of the automatic vehicle locator (AVL) system to send the closest available ambulance.
- CAD-to-CAD links and data interface.
- Tracking and reporting of response times off the AVL system.
- Better reporting and analysis of data.
- Replacement of BLS supplies for first responder agencies.

Recommendation:

- The El Centro Fire Department should work closely with Imperial County and the county ambulance provider to fully track and analyze ambulance response time statistics for all incidents that occur in the city. Recommendation 22.)

Under the county-administered EMS system, local jurisdictions can enter into sidebar agreements with the designated ambulance provider to provide a higher level of service to their community. For instance, El Centro could negotiate an agreement that would require one (or more, if necessary) dedicated 9-1-1 ambulances for the city.

Recommendation:

- To improve EMS transport service levels, the City of El Centro should consider negotiating an agreement with the county ambulance provider for at least one dedicated 9-1-1 ambulance for the city. (Recommendation 23.)

Even though the ECFD is not the EMS transport provider for the city, the department does bill for providing EMS first responder services. In accordance with resolution #05-23, each patient to whom the fire department provides medical assistance is billed $254.00. The department does what is known as "soft" billing, in that once the patient or their insurance company is billed the department does not aggressively pursue payment. Bills that are not paid are written off as uncollected debt. From FY 2013 through FY 2016, $192,382.56 was collected in EMS billing fees. Over a four-year period (September 2012 to October 2016), $1,881,563.31 was written off as uncollectible. This difference indicates a very low actual collection rate.

The fire department has traditionally used a third-party billing contractor to do the EMS billing. This is standard practice for fire and EMS agencies. There is a cost to this service. In the case of ECFD EMS billing, the billing company charges the ECFD $22.50 plus postage for each statement it sends out. As a result, over the FY 2013 through FY 2016 period, EMS billing expenses totaled $222,128.99 resulting in a net LOSS of nearly $30,000.00. At the time of this study the ECFD was in

the process of taking over the billing process internally. This effort should be fully supported by the City of El Centro.

Recommendation:

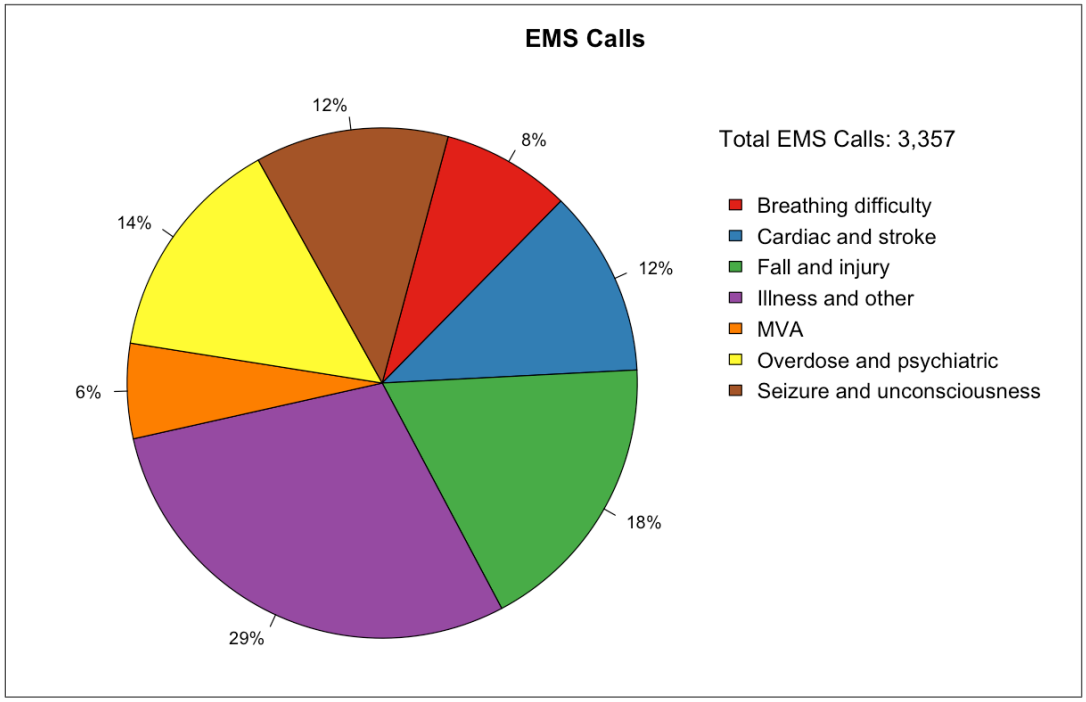
- The City of El Centro and El Centro Fire Department should take steps to more aggressively collect bills for EMS first response, particularly from patients who are not residents of the city. (Recommendation 24.)

Table 5-5 and Figure 5-11 show the EMS call totals for the 12-month period evaluated for this study, including number of calls by type, average calls per day, and the percentage of calls that fall into each call type category.

TABLE 5-5: EMS Calls by Type and Number

Call Type	Number of Calls	Calls per Day	Percentage of All Calls
Breathing difficulty	275	0.8	6.0
Cardiac and stroke	397	1.1	8.7
Fall and injury	606	1.7	13.3
Illness and other	982	2.7	21.6
MVA	202	0.6	4.4
Overdose and psychiatric	484	1.3	10.6
Seizure and unconsciousness	411	1.1	9.0
EMS Total	**3,357**	**9.2**	**73.7**

FIGURE 5-11: EMS Calls by Type and Percentage

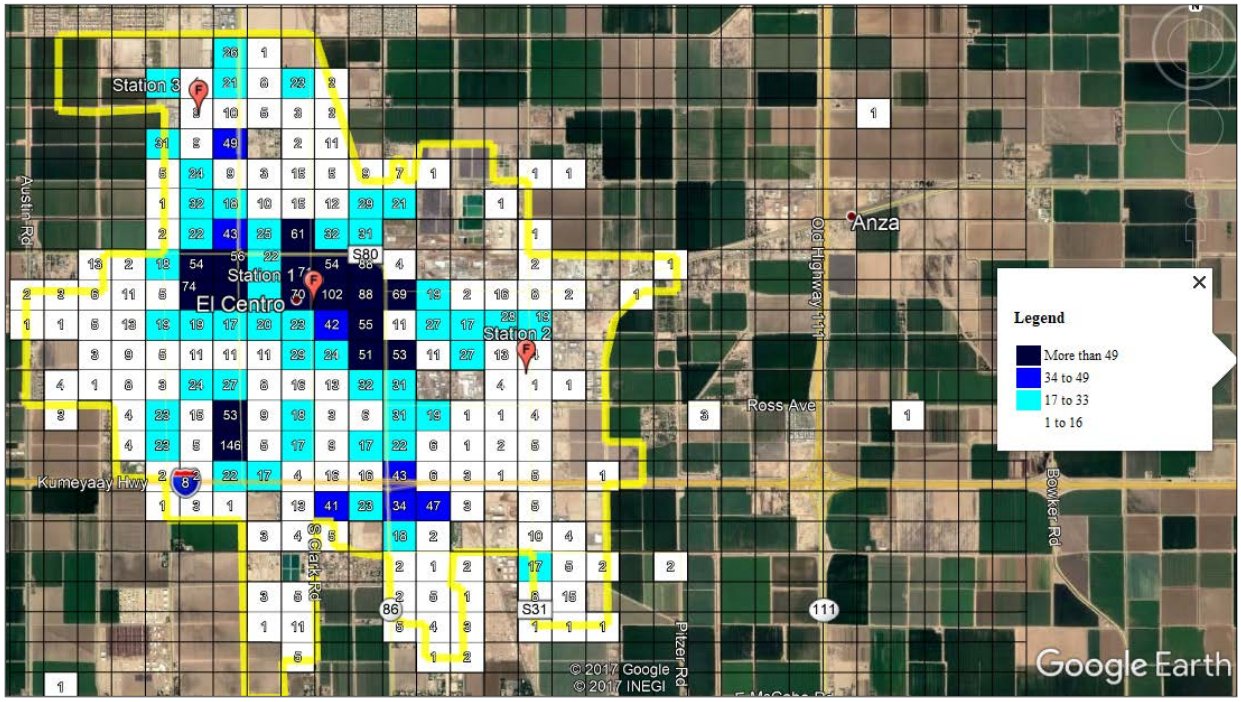


The EMS call data tell us that:

- EMS calls for the year totaled 3,357 (74 percent of all calls), an average of 9.2 per day.
- Illness and other calls were the largest category of EMS calls at 29 percent of EMS calls.
- Cardiac and stroke calls made up 12 percent of the EMS calls.
- Motor vehicle accidents made up 6 percent of the EMS calls.

Figure 5-12 illustrates the distribution of EMS incidents throughout the city. Once again, the heaviest concentration of incidents is primarily located in and around downtown El Centro.

FIGURE 5-12: Distribution of EMS Incidents



Workload Analysis/Fire Loss

Nationwide, fire departments are responding to more EMS calls and fewer fire calls, particularly fire calls that result in active firefighting operations by responders. This is well documented in CPSM fire studies. Improved building construction, code enforcement, automatic sprinkler systems, and aggressive public education programs have contributed to a decrease in serious fires and, more importantly, fire deaths among civilians.

Table 5-6 shows the aggregate call totals for the 12-month study period analyzed by CPSM. This includes call type, number, and percentage of overall calls. EMS calls represent the largest percentage of calls for service at almost 74 percent; this is not unusual and quite similar to many communities we observe. While fire call types represent 21.1 percent of the total calls for service, actual fire calls (structural and outside) represent only 4.6 percent of the overall calls for service (approximately 0.57 calls per day or one actual fire-type call every 1.7 days). The 209 actual fires represent 21.7 percent of the fire-related incidents. Hazard, false alarms, and good intent calls represent the largest percentage of fire type calls for service, which is also typical in CPSM data and workload analyses of other fire departments.

TABLE 5-6: Calls by Type, Number and Percentage

Call Type	Number of Calls	Calls per Day	Call Percentage
Breathing difficulty	275	0.8	6.0
Cardiac and stroke	397	1.1	8.7
Fall and injury	606	1.7	13.3
Illness and other	982	2.7	21.6
MVA	202	0.6	4.4
Overdose and psychiatric	484	1.3	10.6
Seizure and unconsciousness	411	1.1	9.0
EMS Total	**3,357**	**9.2**	**73.7**
False alarm	366	1.0	8.0
Good intent	124	0.3	2.7
Hazard	49	0.1	1.1
Outside fire	163	0.4	3.6
Public service	214	0.6	4.7
Structure fire	46	0.1	1.0
Fire Total	**962**	**2.6**	**21.1**
Canceled	217	0.6	4.8
Mutual aid	20	0.1	0.4
Total	**4,556**	**12.5**	**100.0**

The data further tell us that the ECFD received an average of 12.5 calls, including 0.6 canceled and 0.1 mutual aid calls, per day. As previously noted, EMS calls for the year totaled 3,357 (74 percent of all calls), an average of 9.2 per day. Fire calls for the year totaled 962 (21 percent of all calls), an average of 2.6 per day.

Table 5-7 shows the duration of calls by type and duration using four duration categories: less than 30 minutes, 30 minutes to one hour, one to two hours, and more than two hours.

TABLE 5-7: Calls by Type and Duration

Call Type	Less than 30 Minutes	30 Minutes to One Hour	One to Two Hours	More than Two Hours	Total
Breathing difficulty	240	32	2	1	275
Cardiac and stroke	334	45	18	0	397
Fall and injury	537	56	12	1	606
Illness and other	893	79	9	1	982
MVA	163	28	10	1	202
Overdose and psychiatric	423	53	8	0	484
Seizure and unconsciousness	343	55	12	1	411
EMS Total	**2,933**	**348**	**71**	**5**	**3,357**
False alarm	343	19	3	1	366
Good intent	118	5	1	0	124
Hazard	32	15	2	0	49
Outside fire	130	26	5	2	163
Public service	190	18	5	1	214
Structure fire	16	8	5	17	46
Fire Total	**829**	**91**	**21**	**21**	**962**
Canceled	211	2	3	1	217
Mutual aid	4	1	3	12	20
Total	**3,977**	**442**	**98**	**39**	**4,556**

Observations from this data tell us:

For EMS-related calls for service:

- A total of 3,281 EMS category calls (98 percent) lasted less than one hour, 71 EMS category calls (2 percent) lasted between one and two hours, and 5 EMS category calls (less than 1 percent) lasted more than two hours.
- A total of 379 cardiac and stroke calls (95 percent) lasted less than one hour, and 18 cardiac and stroke calls (5 percent) lasted more than an hour.
- A total of 191 motor vehicle accidents (95 percent) lasted less than one hour, and 11 motor vehicle accidents (5 percent) lasted more than an hour.

For fire-related calls for service:

- A total of 920 fire category calls (96 percent) lasted less than one hour, 21 fire category calls (2 percent) lasted between one and two hours, and 21 fire category calls (2 percent) lasted more than two hours.
- A total of 24 structure fires (52 percent) lasted less than one hour, 5 structure fires (11 percent) lasted between one and two hours, and 17 structure fires (37 percent) lasted more than two hours.
- A total of 156 outside fires (96 percent) lasted less than one hour, 5 outside fires (3 percent) lasted between one and two hours, and 2 outside fires (1 percent) lasted more than two hours.

During the study period of evaluation, ECFD responded to a total of 46 incidents that were classified as structure fires (Table 5-7). In analyzing the time spent on fire incidents, we found that on approximately 52 percent of all structure fire calls, the call duration for these incidents was one hour or less. This is indicative of minor occurrences. However, 22 structure fire calls lasted for durations of greater than one hour, 17 of which lasted for more than two hours. This would indicate more significant events.

On 29 of the 46 structure fires (63 percent), and 126 of 163 outside fires (77.3 percent), extinguishment was carried out by fire personnel.

TABLE 5-8: Actions Taken Analysis for Structure and Outside Fire Calls

Action Taken	Number of Calls	
	Outside Fire	Structure Fire
Fire control or extinguishment, other	12	3
Extinguishment by fire service personnel	126	29
Salvage & overhaul	16	18
Search	0	2
Provide basic life support (BLS)	1	0
Ventilate	0	8
Forcible entry	1	3
Evacuate area	0	1
Shut down system	0	1
Provide manpower	1	0
Information, investigation & enforcement, other	1	0
Enforce codes	1	0
Investigate	39	24
Investigate fire out on arrival	6	3
Standby	1	1
Total	**205**	**93**

Note: Totals are higher than the total number of structure and outside fire calls as some calls had multiple actions taken.

In examining the fire incidents in more detail, it was determined that a total of 38 incidents (22.2 percent) resulted in fire loss being recorded. For structure fires it was determined that for 26 (56.5 percent) of these events there was ***no fire damage*** reported to the structure involved. Only 13 incidents (28.3 percent) involved a damage amount exceeding $20,000. When looking at fire loss comparisons nationwide for structure fires, NFPA estimates that in 2016 the average fire loss for a structure fire was $16,609.[24] Although the fire loss in 2016-2017 was not exceptionally high, at any time a single fire can occur that results in millions of dollars in fire loss.

Tables 5-9 and 5-10 depict fire loss data for the study period.

[24] Hylton J.G. Haynes, "Fire Loss in the United States during 2016," NFPA September 2017, 19.

TABLE 5-9: Content and Property Loss – Structure and Outside Fires

Call Type	Property Loss		Content Loss	
	Number of Calls	Loss Value	Number of Calls	Loss Value
Outside fire	17	$34,150	6	$2,775
Structure fire	19	$1,530,414	15	$509,702
Total	**36**	**$1,564,564**	**21**	**$512,477**

Note: This includes only calls with recorded loss greater than 0.

For Outside Fires

- Out of 163 outside fires, 17 had recorded property loss, with a combined $34,150 in loss.
- 6 outside fires also had content loss with a combined $2,775 in loss.
- The highest total loss for an outside fire was $17,000.

For Structure Fires

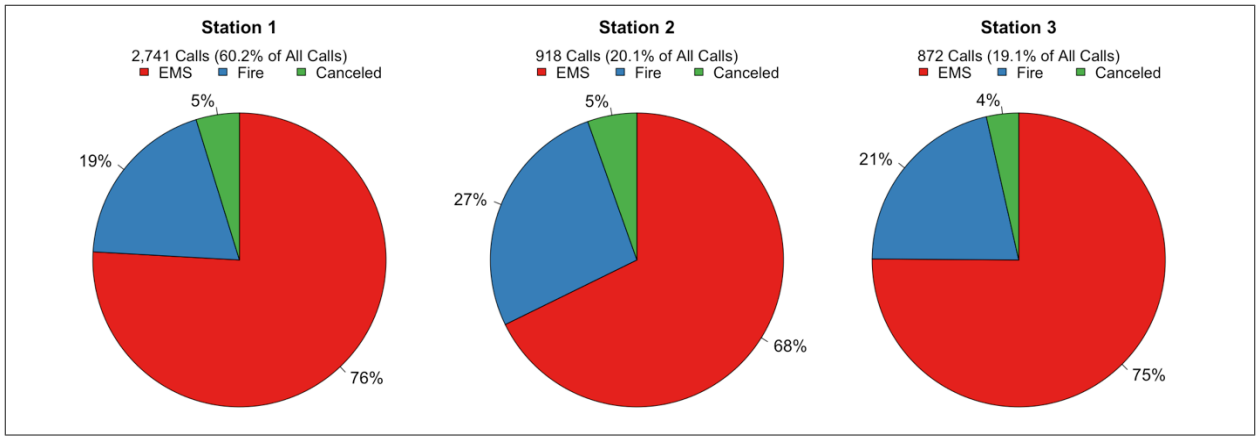
- Out of 46 structure fires, 19 had recorded property loss, with a combined $1,530,414 in loss.
- 15 structure fires also had content loss with a combined $509,702 in loss.
- The average total loss for all structure fires was $44,350.
- The average total loss for structure fires with loss was $102,006.
- The highest total loss for a structure fire was $500,000.

TABLE 5-10: Total Fire Loss Above and Below $20,000

Call Type	No Loss	Under $20,000	$20,000 plus
Outside fire	145	18	0
Structure fire	26	7	13
Total	**171**	**25**	**13**

During the year studied, ECFD responded to 4,556 calls. Each dispatched unit is a separate "run." As multiple units are dispatched to certain calls, there are more runs than calls. Figure 5-13 illustrates types of calls (fire and EMS) and percentage from each ECFD station.

FIGURE 5-13: Call Types by Station Area



From this figure we can see that:

- 60 percent of the department's calls are in station 1's first due area, with the remaining calls split evenly across station 2 (20 percent) and station 3 (19 percent).
- Fire calls make up a larger percentage of calls in station 2's first due area (27 percent) compared with station 1 (19 percent) and station 3 (21 percent).

Table 5-11 provides a summary of each unit's workload overall.

TABLE 5-11: Call Workload by Unit

Station	Unit	Unit Type	Avg. Deployed Min. per Run	Total Annual Hours	Avg. Deployed Mins. per Day	Total Annual Runs	Avg. Runs per Day
1	3111	Engine	19.6	710.9	116.9	2,174	6.0
	3121	Engine	423.3	14.1	2.3	2	0.0
	3161	Rescue Squad	20.7	233.5	38.4	676	1.9
	3191	Ladder	105.4	65.0	10.7	37	0.1
2	3112	Engine	22.0	409.3	67.3	1,117	3.1
3	3113	Engine	49.1	743.9	122.3	909	2.5
	3163	Rescue Squad	27.5	90.7	14.9	198	0.5
	Air-1	Mobile Air Unit	360.0	6.0	1.0	1	0.0
Total			**26.7**	**2,273.3**	**373.7**	**5,114**	**14.0**

Note: Some units had so few runs that the average runs per day, when rounded to the nearest one-tenth, appear to be zero.

This table tells us that:

- Engine 3111 made the most runs (2,174, or an average of 6 per day) and had the second-highest total annual deployed time (711 hours, or an average of 117 minutes per day).
  - EMS calls accounted for 67 percent of the runs and 69 percent of deployed time for Engine 3111.
  - Structure and outside fires combined accounted for 7 percent of the runs and 14 percent of deployed time for engine 3111.

- Engine 3112 made the second most runs (1,117, or an average of 3.1 per day) and had the third-highest total annual deployed time (409 hours, or an average of 67 minutes per day).
  - EMS calls accounted for 61 percent of the runs and 64 percent of deployed time for Engine 3112.
  - Structure and outside fires combined accounted for 10 percent of the runs and 17 percent of deployed time for Engine 3112.
- Engine 3113 made the fewest runs for an engine (909, or an average of 2.5 per day) but had the highest total annual deployed time of the three engines (744 hours, or an average of 122 minutes per day).
- While not shown in the table above, the on-duty Battalion Chief made 178 responses with a total deployed time of 147.4 hours.

An overlapping call is defined as a call that starts while another call is still active. The call that was already active is not counted as an overlapping call. A call's start time is based on the dispatch time for the first non-administrative unit and is considered active until the latest clear time of any non-administrative unit that responded to the call. Each call is counted only once, even if it overlaps with multiple other calls. In the analysis, if calls overlap for fewer than 30 seconds they are counted as non-overlapping calls.

Table 5-12 shows the number of overlapping calls and total hours spent on overlapping calls during the study period by first due area and for the department overall. The number of overlapping calls for the department overall includes mutual aid calls. Table 5-13 shows the frequency of overlapping calls.

TABLE 5-12 Number of Overlapping Calls

First Due Area	Number of Calls	Total Hours of Overlap	Percent of Hours in Year with Overlap
Station 1	279	41.5	0.5
Station 2	34	5.0	0.1
Station 3	33	6.3	0.1
Overall	**1,051**	**208.4**	**2.4**
Overall excluding multiday outside fires	**864**	**140.5**	**1.6**

Note: Because calls in two or more station first due areas may overlap, the overall number of overlapping calls is higher than the sum of the overlapping calls in each station's first due area. All multiday outside fires were mutual aid calls that occurred outside the city.

TABLE 5-13: Frequency of Overlapping Calls

Scenario	All Calls		Excluding Multiday Outside Fires	
	Number of Calls	Percent of All Calls	Number of Calls	Percent of All Calls
No overlapped call	3,505	76.9	3,689	81.0
Overlapped with one call	922	20.2	777	17.1
Overlapped with two calls	120	2.6	82	1.8
Overlapped with three calls	9	0.2	5	0.1

The tables depicting overlapped calls tell us that:

- During the year studied, station 1's first due area had the most overlapping calls (279) and the highest total hours of overlap (42 hours, or 0.5 percent of all hours in the year).
- Overall, 23 percent (1,051 calls) of the department's calls overlapped with at least one other call.
  - On average, 2.9 of the department's 12.5 calls per day overlapped with at least one other call.
- Every call that occurs in the city during a multiday mutual aid call for outside fires is considered an overlapping call. Excluding the three multiday mutual aid calls for outside fires, 19 percent (864 calls) of the department's calls overlapped with at least one other call.
  - Under this calculation, on average, 2.4 of the department's 12.5 calls per day overlapped with at least one other call.

Since just under three out of every four incidents to which the El Centro Fire Department responds are EMS in nature, as previously discussed the department is conducting a trial aimed at increasing the number of units available for calls and decreasing response times to medical calls.

To review, the trial consists of staffing two rapid response units on one of the department's three shifts (B shift). At Station 1, rescue squad 3161 is staffed in addition to engine 3111. At Station 3, rescue squad 3163 is staffed in place of engine 3113. As previously described, this staffing and deployment model results in two engines and two squads being staffed on those days. While on-duty staffing is also increased those days, with 11 personnel assigned rather than the normal 10, there is a net loss of one fire suppression unit. The department uses a shift schedule that results in each shift working 8 out of every 24 days. This results in 55 days in the trial during the period analyzed when only two engines were staffed.

Table 5-14 shows how the workload of the two engines where the squads operate in conjunction with changes when the squads are in service. The difference in workload for the squads is also shown because they were used prior to beginning the trial on shifts when enough staff were available.

Interestingly, on days when the squads were staffed, the average number of runs made by the department increased from 13.7 to 15.3, an average of 1.6 runs per day more. Conversely, the average number of minutes per day that units were deployed on incidents decreased from 366.4 minutes per day when the squads were not in service to 322.2 minutes when they were, a difference of 44.4 minutes.

TABLE 5-14: Engine and Rescue Squad Workload

Period	Unit	Avg. Deployed Min. per Run	Avg. Deployed Mins. per Day	Avg. Runs per Day
Nontrial	3111	19.3	126.8	6.6
	3161	20.9	19.8	1.0
	3112	22.1	69.5	3.1
	3113	49.2	143.9	2.9
	3163	93.8	6.4	0.1
	Total	**26.8**	**366.4**	**13.7**
Trial	3111	24.8	61.0	2.5
	3161	20.6	142.9	6.9
	3112	20.9	54.7	2.6
	3113	13.1	0.5	0.0
	3163	19.6	63.1	3.2
	Total	**21.1**	**322.2**	**15.3**

Note: Engine 3113 is not staffed on shift B when rescue squad 3163 is used; however, there were two runs recorded on two trial days. Engine 3121, Ladder 3191, and Air-1 are not included in this table.

MUTUAL AID

Basic to California's emergency planning is a local and area-wide system of mutual aid. In this system, each local jurisdiction relies first upon its own resources, with mutual assistance available from adjacent local jurisdictions and other jurisdictions within the area. In the case of El Centro, the resources of Region VI, the State of California, or beyond, are also available when necessary. The ECFD participates in the Imperial Valley Service and Rescue Mutual Aid Plan (Plan). The basis of the Plan is a recognition that no community has the ability or resources to handle every emergency.[25]

Fire and Rescue Mutual Aid, rendered pursuant to the Plan for Fire Departments and the California Master Mutual Aid Agreement, is based upon an incremental and progressive system of mobilization. Mobilization plans have been based on the concept of providing the local fire and rescue authority sufficient resources, without extraordinary depletion of the fire defenses outside of the area of disaster. Under normal conditions, fire mutual aid plans are activated in ascending order, i.e., local, area (county), region, and inter-region (state). Circumstances may prevail which make mobilization impractical and imprudent. Inter-regional (state) mutual aid is, therefore, not contingent upon mobilization of uncommitted resources within the region of the disaster.

In El Centro, local fire and rescue resources include resources available through automatic and/or day-to-day mutual aid agreements with neighboring jurisdictions. Local mobilization plans are activated by request to participating agencies. Mobilization of Operational Area resources is activated by the Operational Area Fire and Rescue Coordinator, or his/her representative, in response to a request of assistance from an authorized fire official of the participating agency in need.

[25] Imperial County Service and Rescue Mutual Aid Plan

Pursuant to the Plan, the ECFD's local mobilization plan is as follows:[26]

First Alarm

- El Centro Units.

Second Alarm

- Page Out Off-Duty Personnel – Total Recall, Imperial County/ City of Imperial.

Third Alarm

- One Engine Each from Imperial County/City of Imperial, Calexico, Brawley, NAF, Holtville, Cantilena Prison.

Fourth Alarm

- One Engine Each from Yuma, Westmorland, Imperial County, Calipatria, Calipatria State Prison, Yuma Marine Corps, Rural Metro (special request).

Fifth Alarm

- OES Region Dispatch Through El Centro Dispatch; Dispatch Order Number ECN__ R-5-6-7-8-9 Nearest Engine –Any Type, R – 10 Nearest Strike Team Leader

In California, the responsible local official whose jurisdiction in an incident requiring mutual aid has occurred, shall remain in charge at such incident, including the direction of personnel and equipment provided through mutual aid plans. Regarding financial responsibility for mutual aid, pursuant to the Plan, "The mutual aid extended under this operational plan as adopted pursuant to the Imperial County Mutual Aid Agreement, shall be without reimbursement unless otherwise expressed to the requesting parties to the mutual aid agreement, at the time of the request, or by prior agreement between the requesting and providing agencies."[27]

[26] Imperial County Service and Rescue Mutual Aid Plan.
[27] Ibid.

SECTION 6. RESPONSE TIME ANALYSIS

MEASURING RESPONSE TIMES

Response times are typically the primary measurement for evaluating fire and EMS services. Response times can be used as a benchmark to determine how well a fire department is currently performing, to help identify response trends, and to predict future operational needs. Achieving the quickest and safest response times possible should be a fundamental goal of every fire department. The actual impact of a speedy response time is limited to very few incidents. For example, in a full cardiac arrest, analysis shows that successful outcomes are rarely achieved if basic life support (CPR) is not initiated within four minutes of the onset. However, cardiac arrests occur very infrequently; on average they are 1 percent to 1.5 percent of all EMS incidents.[28] There are also other EMS incidents that are truly life-threatening and the time of response can clearly impact the outcome. These involve full drownings, allergic reactions, electrocutions, and severe trauma (often caused by gunshot wounds, stabbings, and severe motor vehicle accidents, etc.). Again, the frequencies of these types of calls are limited.

Regarding response times for fire incidents, the criterion is based on the concept of "flashover." This is the state at which super-heated gasses from a fire are released rapidly, causing the fire to burn freely and become so volatile that the fire reaches an explosive state (simultaneous ignition of the all combustible materials in a room). In this situation, usually after an extended period (often eight to twelve minutes after ignition but times as quickly as five to seven minutes), and a combination of the right conditions (fuel and oxygen), the fire expands rapidly and is much more difficult to contain. When the fire does reach this extremely hazardous state, initial firefighting forces are often overwhelmed, larger and more destructive fire occurs, the fire escapes the room and possibly even the building of origin, and significantly more resources are required to affect fire control and extinguishment.

Flashover occurs quicker and more frequently today and is caused at least in part by the introduction of significant quantities of plastic- and foam-based products into homes and businesses (e.g., furnishings, mattresses, bedding, plumbing and electrical components, home and business electronics, decorative materials, insulation, and structural components). These materials ignite and burn quickly and produce extreme heat and toxic smoke.

As a benchmark, for an urban community, NFPA 1710 recommends the entire initial response of 15 personnel be on scene within eight minutes of dispatch. It is also important to keep in mind that once units arrive on scene they will need to get set up to commence operations. NFPA 1710 recommends that units be able to commence an initial attack within two minutes of arrival, 90 percent of the time.

Although trying to reach the NFPA benchmark for travel time may be laudable, the question is at what cost. What is the evidence that supports such recommendations? NFPA 1710's travel times are established for two primary reasons: (1) the fire propagation curve (Figure 6-2); and (2) sudden cardiac arrest (Figure 6-3), where brain damage and permanent brain death occurs in four to six minutes.

According to fire service educator Clinton Smoke, the fire propagation curve establishes that temperature rise and time within in a room on fire corresponds with property destruction and

[28] Myers, Slovis, Eckstein, Goodloe et al. (2007). "Evidence-based Performance Measures for Emergency Medical Services System: A Model for Expanded EMS Benchmarking." *Pre-hospital Emergency Care.*

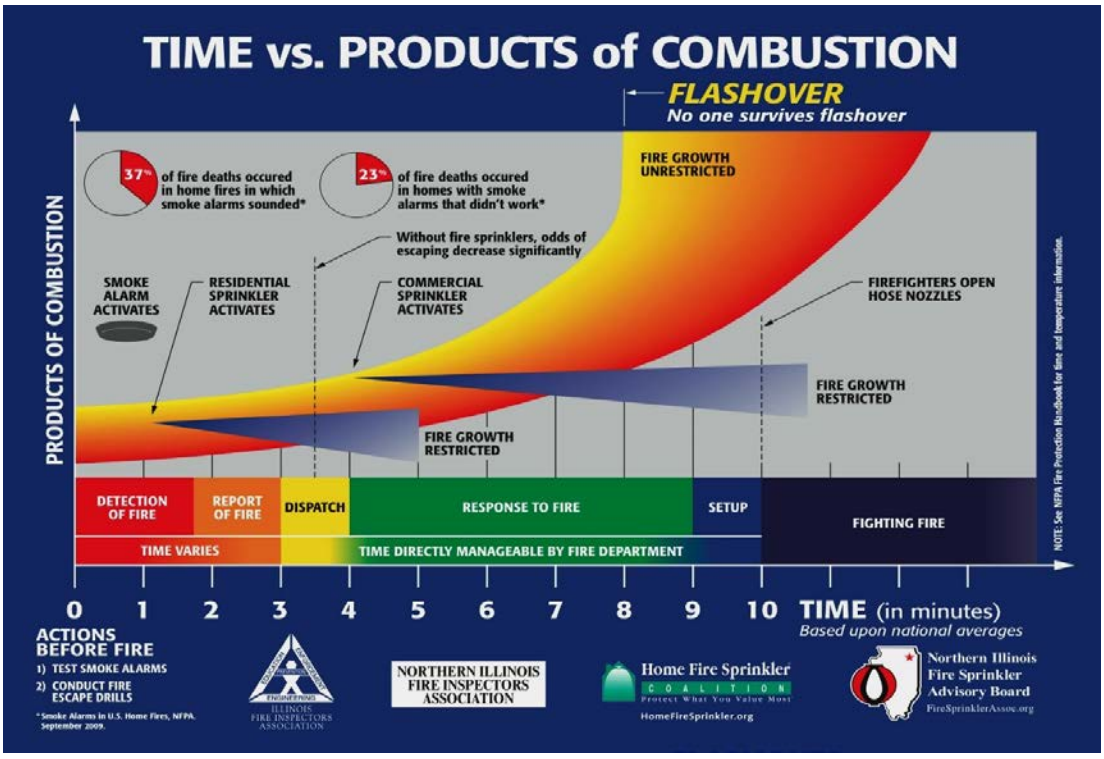
potential loss of life if present.[29] At approximately the ten-minute mark of fire progression, the fire flashes over (due to superheating of room contents and other combustibles) and extends beyond the room of origin, thus increasing proportionately the destruction to property and potential endangerment of life. The ability to quickly deploy adequate fire staff prior to flashover thus limits the fire's extension beyond the room or area of origin.

Regarding the risk of flashover, the authors of an IAFF report conclude:

> *Clearly, an early aggressive and offensive initial interior attack on a working structural fire results in greatly reduced loss of life and property damage. Consequently, given that the progression of a structural fire to the point of "flashover" (the very rapid spreading of the fire due to super-heating of room contents and other combustibles) generally occurs in less than 10 minutes, two of the most important elements in limiting fire spread are the quick arrival of sufficient numbers of personnel and equipment to attack and extinguish the fire as close to the point of its origin as possible.*[30]

Figure 6-1 illustrates the time progression of a fire from inception through flashover. The time versus products of combustion curve shows activation times and effectiveness of residential sprinklers (approximately one minute), commercial sprinklers (four minutes), flashover (eight to ten minutes) and firefighters applying first water to the fire after notification, dispatch, response, and set up (ten minutes). It also illustrates that the fire department's response time to the fire is one of the only aspects of the timeline that the fire department can exert direct control over.

FIGURE 6-1: Fire Growth from Inception to Flashover



From Northern Illinois Fire Sprinkler Advisory Board.

[29] Clinton Smoke, *Company Officer,* 2nd ed. (Clifton Park, NY: Delmar, 2005).
[30] *Safe Fire Fighter Staffing: Critical Considerations,* 2nd ed. (Washington, DC: International Association of Fire Fighters, 1995), 5.

Figure 6-2 shows the fire propagation curve relative to fire being confined to the room of origin or spreading beyond it and the percentage of destruction of property by the fire.

FIGURE 6-2: Fire Propagation Curve

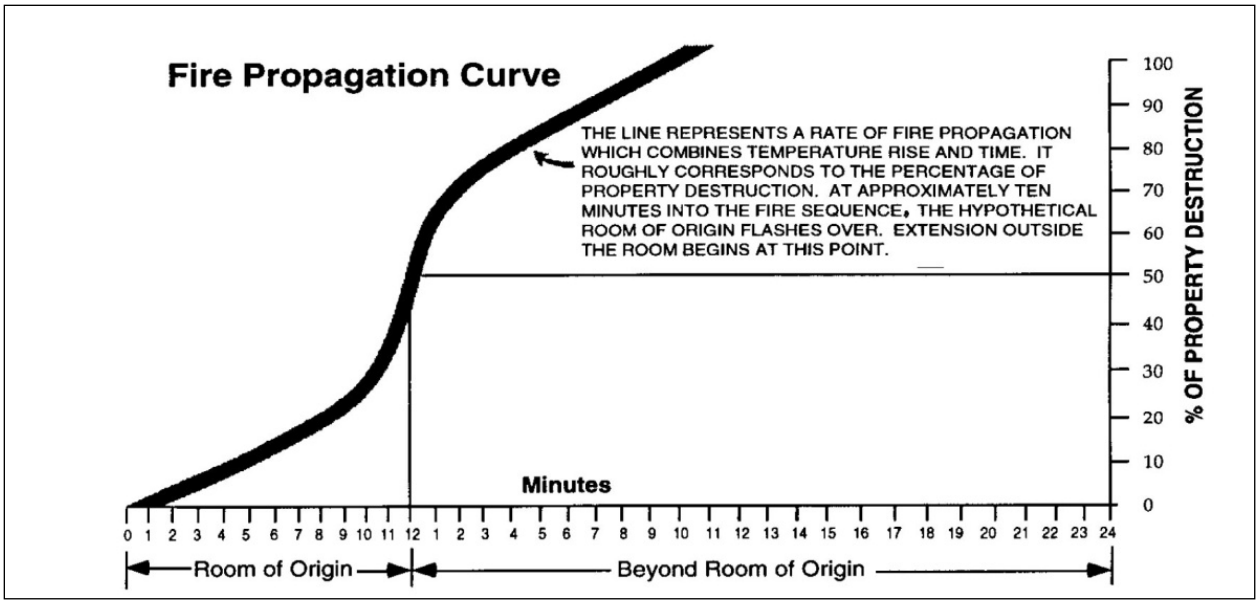
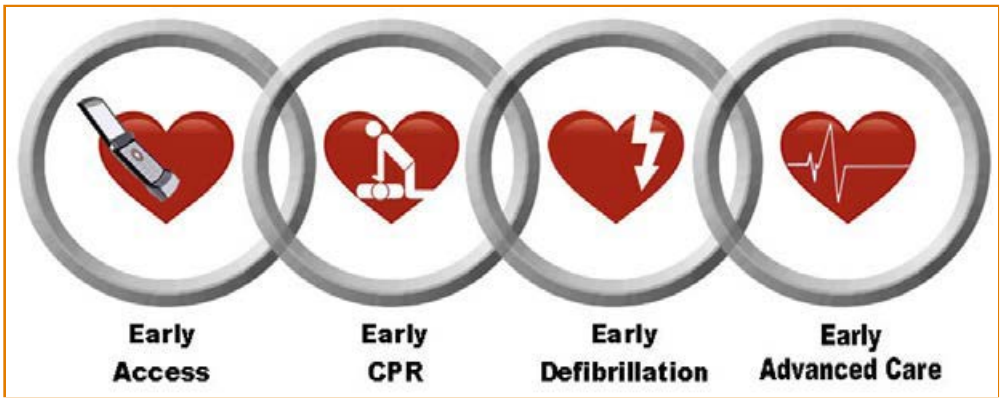


Figure 6-3 illustrates the chain of survival, which is a series of actions that, when put in motion, reduce the mortality of sudden cardiac arrest. Adequate response times coupled with community and public access defibrillator programs potentially can impact the survival rate of sudden cardiac arrest victims by deploying early CPR, early defibrillation, and early advanced care.

FIGURE 6-3: Sudden Cardiac Arrest Chain of Survival



From "Chain of Survival," http://en.wikipedia.org/wiki/Chain_of_survival.

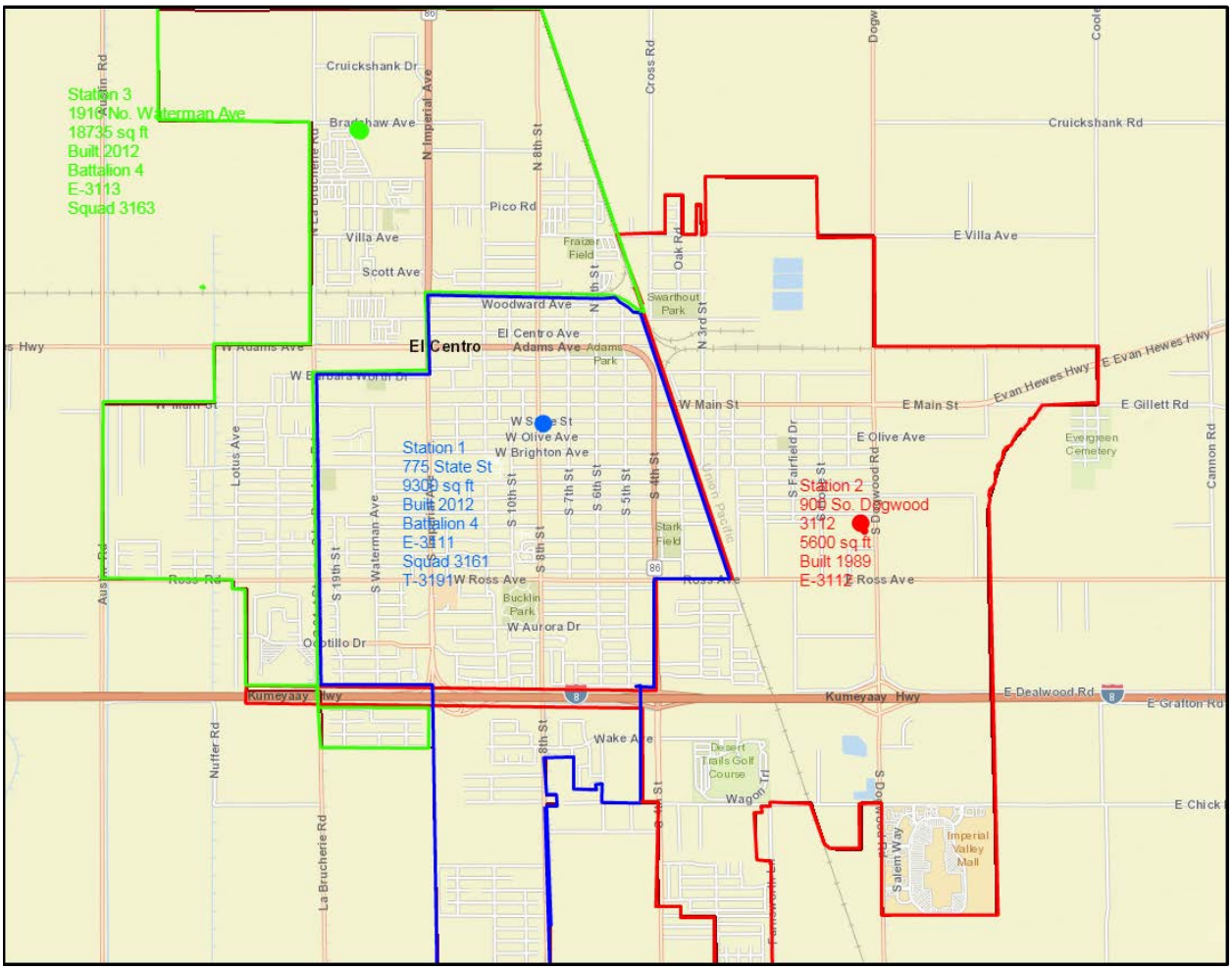
Another important factor in the whole response time question is what we term as "detection time." This is the time it takes to detect a fire or medical situation and notify 9-1-1 to initiate the response. In many instances, particularly at night or when automatic detection systems (fire sprinklers and smoke detectors) are unavailable or inoperable, the detection process can be extended.

STATION LOCATIONS

The fire station is a critical link in service delivery and where these facilities are located is the single most important factor in determining overall response times.

The ECFD serves an estimated 2016 population of 44,201 people and a service area of 11.19 square miles. This equates to an average service area for each fire station of approximately 3.73 square miles. Figure 6-4 shows the location and first due response districts of each ECFD station.

FIGURE 6-4: ECFD's Fire Station Locations and First Due Response Districts



In its FY 2011 ICMA Performance Measurement Data Report, ICMA tabulated survey information from 76 municipalities with populations ranging from 25,000 to 100,000 people. In this grouping the average fire station service area was 11 square miles.[31] The median service area for this grouping of communities was 6.67 square miles per fire station.[32]

[31] *Comparative Performance Measurement*, FY 2011 Data Report - Fire and EMS, ICMA Center for Performance Measurement, August 2012.
[32] Ibid.

In addition, the NFPA and ISO have established different indices in determining fire station distribution. The ISO Fire Suppression Rating Schedule, Section 560, indicates that first-due engine companies should serve areas that are within a 1.5-mile travel distance.[33] The placement of fire stations that achieves this type of separation creates service areas that are approximately 4.5 square miles in size, depending on the road network and other geographical barriers (rivers, lakes, railroads, limited access highways, etc.). The National Fire Protection Association (NFPA) references the placement of fire stations in an indirect way. It recommends that fire stations be placed in a distribution that achieves the desired minimum response times. NFPA Standard 1710, Section 5.2.4.1.1, suggests an engine placement that achieves a 240-second (four-minute) travel time.[34] Using an empirical model called the "piece-wise linear travel time function" the Rand Institute has estimated that the average emergency response speed for fire apparatus is 35 mph. At this speed the distance a fire engine can travel in four minutes is approximately 1.97 miles.[35] A polygon based on a 1.97-mile travel distance results in a service area that on average is 7.3 square miles.[36]

The average 3.73 square-mile service area in El Centro is significantly smaller than the average in the ICMA analysis. It is also smaller than both the ISO and NFPA references.

Illustrating response time is important when considering the location from which assets should be deployed. When historic demand is coupled with risk analysis, a more informed decision can be made. Figure 6-5 uses GIS mapping to illustrate the 240-second travel time bleed comparisons, utilizing the existing road network from each ECFD station. It should be noted that there are small areas relatively close to both stations 2 and 3 that appear to be outside of the 240-second travel time. This is a result of the road network in those areas. Also note that the 240-second response bleeds for both stations 2 and 3 extend well into Imperial County and Imperial City. This fact could provide the basis for the city and county increasing their use of automatic aid for a wide range of emergency operations.

[33] Insurance Services Office. (2003) Fire Protection Rating Schedule (edition 02-02). Jersey City, NJ: Insurance Services Office (ISO).
[34] National Fire Protection Association. (2010). 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*. Boston, MA: National Fire Protection Association.
[35] University of Tennessee Municipal Technical Advisory Service, *Clinton Fire Location Station Study*, Knoxville, TN, November 2012. p. 8.
[36] Ibid., p. 9.

FIGURE 6-5: 240-second Travel Time Bleed from Individual El Centro Fire Stations

Figures 6-6, 6-7, and 6-8 illustrate response time probabilities, showing city-wide 240-second, 360-second, and 480-second travel time bleed comparisons, respectively. The biggest area where the ECFD is not able to achieve the 240-second first unit on location response time is in the southwest corner of the city. This is an area where there is significant growth planned to include a large residential development that, if completed as proposed, will include 900 new homes. Virtually the entire city is covered within the 360-second response time along with portions of the county. The entire city and large areas of the county are within the 480-second response time.

FIGURE 6-6: 240-second Travel Time Bleed from ECFD Stations

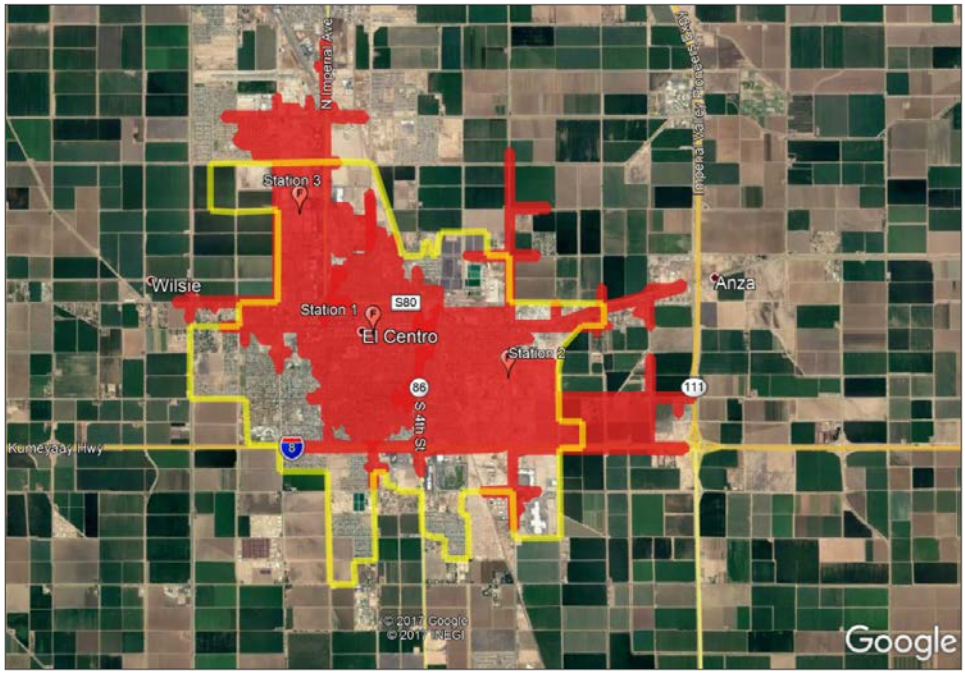


FIGURE 6-7: 360-second Travel Time Bleed from ECFD Stations

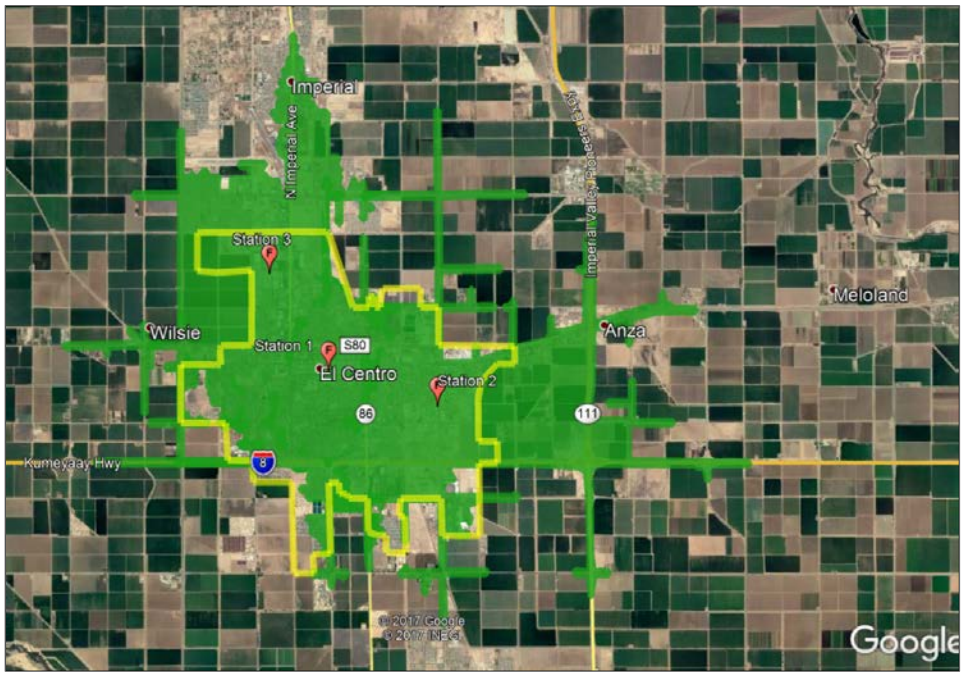


FIGURE 6-8: 480-second Travel Time Bleed from ECFD Stations

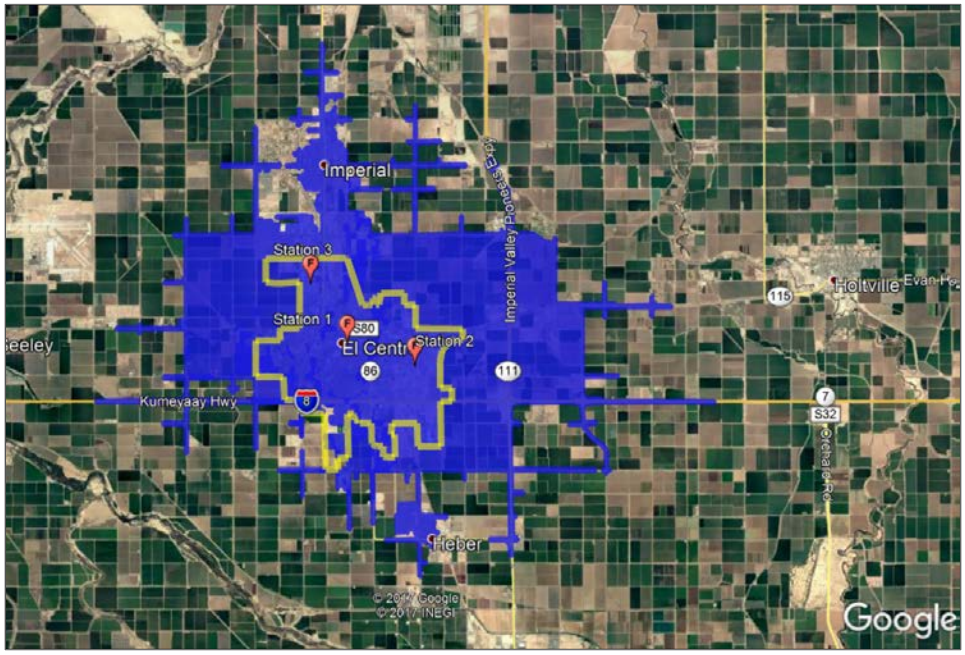


Figure 6-9 layers the 240-, 360-, and 480-second bleeds into one illustration. The 360- and 480-second bleed times both extend well into Imperial County, Imperial City, and the latter even to Heber.

FIGURE 6-9 240-, 360-, and 480-Second Travel Time Bleeds from ECFD Stations
Red=240 seconds Green = 360 seconds Blue = 480 seconds

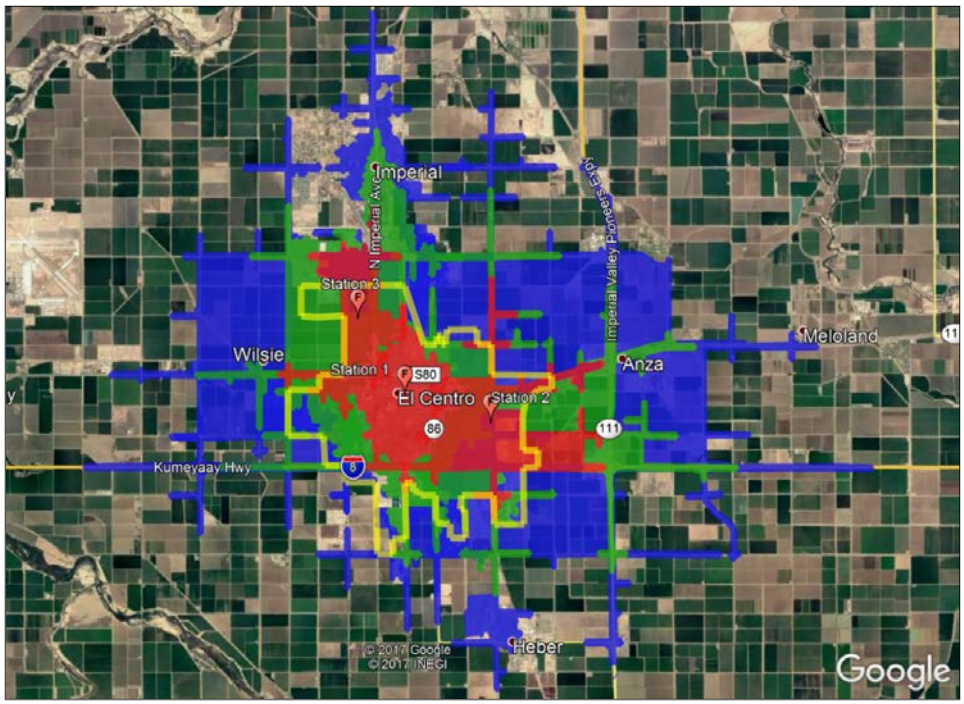


Figure 6-10 shows the three El Centro fire stations along with the Imperial County fire stations in Imperial City to the north and Heber to the south. Both stations have a Type I engine and a ladder truck. The Imperial City station is located at 2514 La Brucherie Rd. It is just 1.4 miles, and about a four-minute response time from ECFD station 3. The station in Heber is located at 1078 Dogwood Rd. This station is located just 3.8 miles from ECFD station 2, at about a nine-minute response time. However, there are a significant number of locations in the southern section of the city where this station is closer than station 2. For instance, the Imperial Valley Mall located at 3451 South Dogwood Avenue and the commercial development that surrounds it is just 2.4 miles and about a five-minute response time from the Heber station.

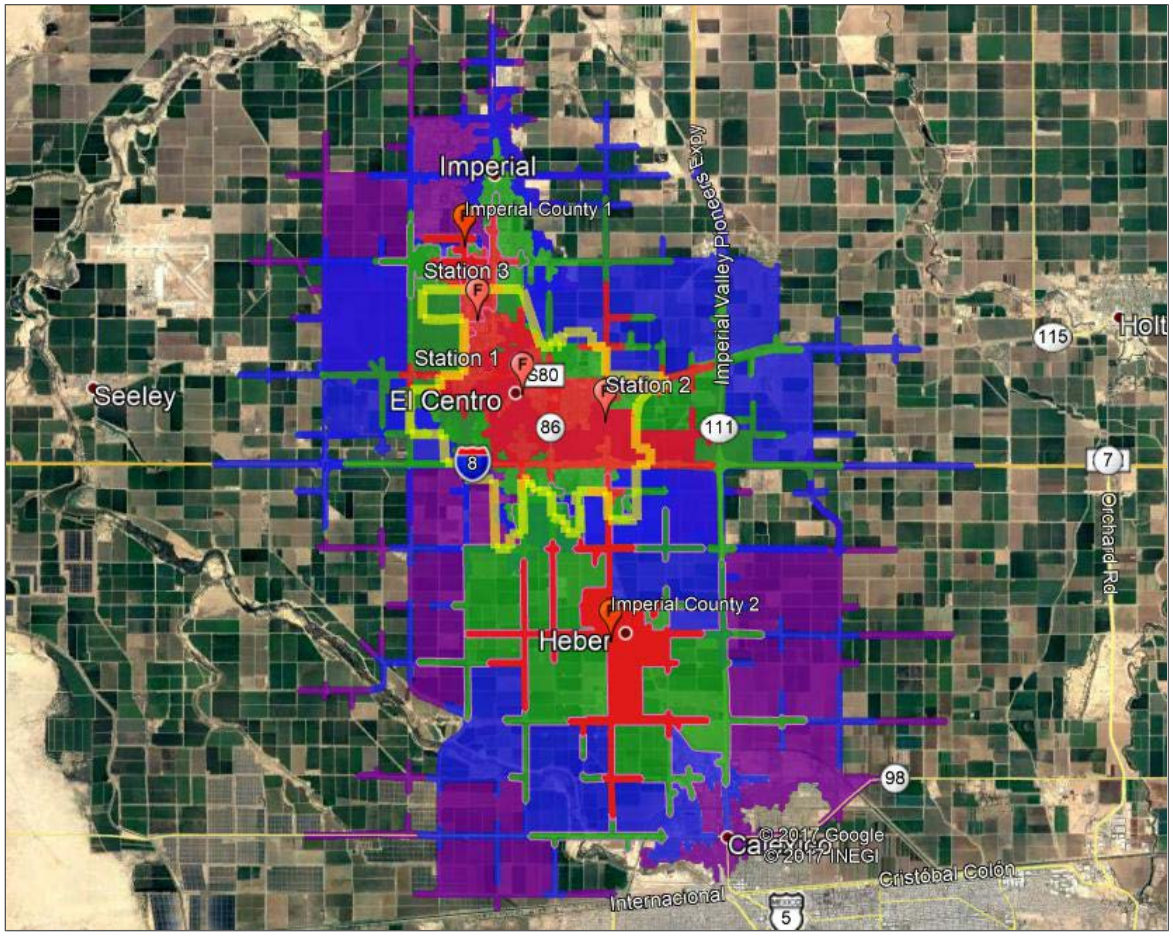
Although neither of these stations can have an impact on the 240-second response time into the city, both can have a positive impact at both the 360-second and 480-second response time marks, and could assist with assembling an Effective Response Force as discussed earlier in this report.

The Imperial City station is just 3.7 miles and about an eight-minute response time from ECFD station 1, which is located close to the center of the city. This means that most of the city north of that area will be well within the 480-second response time benchmark. The Heber station is 5.8 miles with a ten-minute response time to ECFD station 1. However, as was previously noted there are significant areas of the south end of El Centro where response times will be well under the 480-second benchmark for the Heber station.

Collectively, the five stations (three in El Centro, two in Imperial County) being dispatched simultaneously to structure fire incidents will serve to increase the Effective Response Force (ERF), particularly for fires in moderate-risk and high-risk occupancies. Deploying a larger ERF simultaneously to fire incidents would be beneficial to both the city and county.

FIGURE 6-10: 240-, 360-, and 480-second Travel Time Bleeds from ECFD and Imperial County Stations

Red=240 seconds Green = 360 seconds Blue = 480 seconds



Recommendation:

- To increase the Effective Response Force (ERF) initially deployed, and reduce response times for all units and personnel to arrive on location, the El Centro Fire Department should attempt to enter into operational agreements with Imperial County for the simultaneous dispatch of specified resources from the Imperial City and Heber Stations for any reported structure fire that occurs in the City of El Centro. If the incident ends up being minor in nature the additional resources can be quickly returned to service. (Recommendation 25.)

RESPONSE TIMES

There is no "right" amount of fire protection and EMS delivery. It is a constantly changing level based on such things as the expressed needs of the community, community risk, and population growth. So, in looking at response times it is prudent to design a deployment strategy around the actual circumstances that exist in the community and the fire problem that is identified to exist. The strategic and tactical challenges presented by the widely varied hazards that the department protects against need to be identified and planned for through a community risk analysis planning and management process as identified in this report. It is ultimately the responsibility of elected officials to determine the level of risk that is acceptable to their respective community. It would be imprudent, and probably very costly, to build a deployment strategy that is based solely upon response times.

For the purpose of this analysis ***Response Time*** is a product of three components: Dispatch Time, Turnout Time, and Travel Time.

- *Dispatch time* is the time interval that begins when the alarm is received at the initial public safety answering point (PSAP) or communications center and ends when the response information begins to be transmitted via voice and/or electronic means to the emergency response facility or emergency response units or personnel in the field.
- *Turnout time* is the time interval that begins when the notification process to emergency response facilities and emergency response personnel and units begins by an audible alarm and/or visual announcement and ends at the beginning point of travel time. The fire department has the greatest control over these segments of the total response time.
- *Travel time* is the time interval that initiates when the emergency response unit is actually moving in response to the incident and ends when the unit arrives at the scene.

Response time, also known as **total response time**, is the time interval that begins when the call is received by the primary dispatch center and ends when the dispatched unit(s) arrives on the scene of the incident to initiate action.

For this study, and unless otherwise indicated, response times and travel times measure the first arriving unit only. The primary focus of this section is the dispatch and response time of the first arriving units for calls responded to with lights and sirens (Code 3).

According to NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Departments*, 2016 Edition, the alarm processing time or dispatch time should be less than or equal to 60 seconds 90 percent of the time. NFPA 1710 also states that turnout time should be less than or equal to 80 seconds (1.33 minutes) for fire and special operations 90 percent of the time. As noted above, turnout time is the segment of total response time that the fire department has the most ability to control. Travel time shall be less than or equal to 240 seconds for the first arriving engine company 90 percent of the time. The standard further states the initial first alarm assignment should be assembled on scene in 480 seconds, 90 percent of the time. Note that NFPA 1710 response time criterion is a benchmark for service delivery and not a CPSM recommendation.

In our analysis of ECFD response times, we included all calls to which at least one ECFD unit responded with lights and sirens, excluding canceled and mutual aid calls, and those with an extended response time (more than 30 minutes). Based upon that criterion, a total of 4,066 calls are included in the analysis.

Table 6-1 provides average dispatch, turnout, travel, and total response time for the first arriving unit to calls in the city, by call type. Analysis of Table 6-1 tells us:

- The average dispatch time was 1.5 minutes.
- The average turnout time was 1.2 minutes.
- The average travel time was 3.0 minutes.

Further analysis shows the average response time for EMS calls was 5.6 minutes, and the average response time for fire category calls was 5.8 minutes. For actual fire calls, the average response time for structure fire calls was 5.2 minutes, and the average response time for outside fire calls was 5.7 minutes.

TABLE 6-1: Average Response Times of First Arriving Unit, by Call Type (Minutes)

Call Type	Dispatch	Turnout	Travel	Total	Number of Calls
Breathing difficulty	1.4	1.2	3.1	5.7	272
Cardiac and stroke	1.4	1.3	3.0	5.6	390
Fall and injury	1.5	1.3	3.0	5.7	593
Illness and other	1.4	1.2	3.1	5.7	958
MVA	2.2	1.1	2.6	5.9	191
Overdose and psychiatric	1.3	1.3	2.8	5.4	474
Seizure and unconsciousness	1.3	1.2	2.8	5.3	406
EMS Total	**1.4**	**1.2**	**3.0**	**5.6**	**3,284**
False alarm	1.6	1.2	3.1	5.9	273
Good intent	1.6	1.2	2.8	5.6	119
Hazard	2.0	1.3	3.5	6.7	46
Outside fire	1.7	1.3	2.7	5.7	155
Public service	1.6	1.3	3.1	6.0	144
Structure fire	1.4	1.3	2.4	5.2	45
Fire Total	**1.6**	**1.3**	**3.0**	**5.8**	**782**
Total	**1.5**	**1.2**	**3.0**	**5.7**	**4,066**

A more conservative and stricter measure of total response time is the 90th percentile measurement. Simply explained, for 90 percent of calls, the first unit arrived within a specified time, and if measured, the second and third unit. Table 6-2 depicts average dispatch, turnout, travel, and total response times of first arriving fire units for fire category calls. The table also includes the 90th percentile times for dispatch, turnout, travel, and total response time. Observations taken from Table 6-2 tell us:

- The 90th percentile dispatch time was 2.3 minutes. (Emergency medical dispatch has some impact on EMS call processing time; however, fire dispatch time is 0.3 minutes (18 seconds) longer than EMS and is well above the NFPA benchmark.)
- The 90th percentile turnout time was 1.9 minutes for both EMS and fire (well above the NFPA 1710 benchmark of 1.0 minutes for EMS and 1.33 minutes for fire). Remember, this is the one aspect of total response time the fire department has the most direct impact on.

- The aggregate fire and EMS 90th percentile travel time was 4.8 minutes. (Fire alone is 4.9 minutes, while EMS is 4.8 minutes, both slightly above the NFPA 1710 benchmark).
- The 90th percentile total response time for EMS calls was 7.8 minutes, and the 90th percentile response time for fire category calls was 8.0 minutes. Both exceed the NFPA 1710 benchmarks of 6.0 and 6.33 minutes respectively.
- The 90th percentile total response time for structure fire calls was 6.7 minutes.
- The 90th percentile total response time for outside fire calls was 7.8 minutes.

TABLE 6-2: 90th Percentile Response Times of First Arriving Unit, by Call Type (Minutes)

Call Type	Dispatch	Turnout	Travel	Total	Number of Calls
Breathing difficulty	1.9	1.9	4.7	7.8	272
Cardiac and stroke	2.1	1.9	4.7	7.6	390
Fall and injury	2.4	2.0	4.9	8.0	593
Illness and other	2.1	1.9	5.1	7.8	958
MVA	3.3	1.8	4.0	8.0	191
Overdose and psychiatric	2.2	2.0	4.6	7.6	474
Seizure and unconsciousness	1.9	1.9	4.5	7.4	406
EMS Total	**2.2**	**1.9**	**4.8**	**7.8**	**3,284**
False alarm	2.4	1.9	5.2	8.0	273
Good intent	2.8	2.0	4.7	8.3	119
Hazard	2.8	2.1	5.6	8.3	46
Outside fire	2.5	1.9	4.4	7.8	155
Public service	2.7	2.1	4.8	8.3	144
Structure fire	2.1	1.9	3.9	6.7	45
Fire Total	**2.5**	**1.9**	**4.9**	**8.0**	**782**
Total	**2.3**	**1.9**	**4.8**	**7.8**	**4,066**

Recommendation:

- The El Centro Fire Department should take steps to improve both the dispatch time and incident turnout times for both fire and EMS incidents to reduce overall response times to emergency incidents. (Recommendation 26.)

Tables 6-3 and 6-4 show the average and 90th percentile response times by station area. The station area is the area in which the call occurred, not the station from which a unit responded. Average and 90th percent dispatch and turnout times were similar for all stations. Travel time varies across station areas with average travel time ranging from 2.7 minutes (station 1) to 3.4 minutes (station 2), and 90th percentile travel time ranging from 4.4 minutes (station 1) to 5.3 minutes (station 2).

TABLE 6-3: Average Response Times by Station Area

First Due	Call Type	Dispatch	Turnout	Travel	Total	Number of Calls
Station 1	EMS	1.4	1.2	2.7	5.3	2,038
	Fire	1.6	1.3	2.7	5.6	427
	Total	**1.4**	**1.2**	**2.7**	**5.4**	**2,465**
Station 2	EMS	1.5	1.2	3.5	6.2	609
	Fire	1.7	1.2	3.4	6.3	208
	Total	**1.6**	**1.2**	**3.4**	**6.2**	**817**
Station 3	EMS	1.5	1.3	3.3	6.0	637
	Fire	1.7	1.2	3.1	5.9	147
	Total	**1.5**	**1.3**	**3.2**	**6.0**	**784**

TABLE 6-4: 90th Percentile Response Times by Station Area

First Due	Call Type	Dispatch	Turnout	Travel	Total	Number of Calls
Station 1	EMS	2.1	2.0	4.4	7.3	2,038
	Fire	2.4	2.0	4.6	7.9	427
	Total	**2.2**	**2.0**	**4.4**	**7.5**	**2,465**
Station 2	EMS	2.4	1.8	5.3	8.2	609
	Fire	2.6	1.9	5.2	8.4	208
	Total	**2.4**	**1.9**	**5.3**	**8.3**	**817**
Station 3	EMS	2.2	2.0	5.2	8.0	637
	Fire	2.6	1.9	5.1	8.1	147
	Total	**2.3**	**2.0**	**5.2**	**8.0**	**784**

Tables 6-5 and 6-6 show the average and 90th percentile response times to calls on the 55 trial days where the two squads were in service compared with response times on other days where they were not.

- The average response time to EMS calls on days with the squads in service was 5.3 minutes, which is 0.4 minutes faster than the average response time of 5.7 minutes to EMS calls on other days.
- The 90th percentile response time to EMS calls on days with the squads in service was 7.2 minutes, which is 0.6 minutes faster than the 90th percentile response time of 7.8 minutes to EMS calls on other days.
- Average and 90th percentile response times to fire calls remained about the same regardless of whether the squads were in service or not.

TABLE 6-5: Response Times – Trial Days vs. Non-Trial Days

Period	Call Type	Dispatch	Turnout	Travel	Total	Number of Calls
EMS	Nontrial	1.4	1.3	3.0	5.7	2,799
	Trial	1.3	1.0	2.9	5.3	485
Fire	Nontrial	1.6	1.3	3.0	5.8	665
	Trial	1.7	1.3	3.0	5.9	117

TABLE 6-6: 90th Percentile Response Times – With and Without Rapid Response Units

Period	Call Type	Dispatch	Turnout	Travel	Total	Number of Calls
EMS	Nontrial	2.2	2.0	4.9	7.8	2,799
	Trial	2.1	1.7	4.7	7.2	485
Fire	Nontrial	2.4	2.0	4.9	8.0	665
	Trial	2.7	1.9	4.8	8.1	117

The data from the days when the squads were in service and those when they are not supports the idea that they provide a quicker response to EMS incidents. However, the reduced response times are not as significant as might be expected. In addition, the fact remains that on the days when the squads are in service the city is left with just two fire suppression units in service and station 3's district is left without a fire unit. As has been previously recommended in the *Staffing and Deployment* section of this report, we believe that a model that utilizes three fire suppression units and one squad is the best one for the city to utilize and is one that will better balance both quicker EMS response and adequate firefighting capabilities.

The ECFD has implemented Policy 306–Response Time Standards, which appears to have been copied directly from some other benchmarking standard such as NFPA 1710. However, it does not specifically state that the performance objectives listed are the targets also established for El Centro. Policy 306 also contains a section on evaluation of performance, but it does not appear the data points are being analyzed on a regular basis.

Recommendation:

- As stated in *Policy 306*, the ECFD should annually evaluate its level of service, deployment delivery, and response time objectives. (Recommendation 27.)

SECTION 7. ESSENTIAL RESOURCES

HUMAN RESOURCES

The El Centro Human Resources Director is responsible for administering the personnel policies for the city. The HR Director also serves as the city's risk manager. The Human Resources Director serves as the lead negotiator for the city with the El Centro Firefighters Association (ECFA).[37]

The hiring and promotion process is initiated by the Fire Chief when there is a vacancy for an entry level firefighter or a fire officer. After the Fire Chief submits a vacancy form and both the Human Resources Director and the City Manager have approved the decision to hire or promote, the city advertises the position in local newspapers (the city makes a concerted effort to hire locally) as well as on the city and firefighter websites. Applications are screened for qualifications and work experience. The remaining application process consists of a written examination, physical fitness test, an oral interview, a background screening, and a medical physical to include a drug screening. The city maintains an eligibility list for both entry level and promotional positions for a one-year period; however, this time can be extended to two years. In its latest recruitment for entry level firefighter, the city received 48 applications. The city currently has six entry level firefighter positions vacant.

Time-in-position and fire officer certification qualifies one to take the fire officer promotional examination. The promotional process includes a written exam, an oral interview, and an assessment scenario. The assessment scenario is evaluated by three department captains. The Human Resources Director serves as a monitor in this process.

The fire department, like all the other departments in the city, requires each of its employees to have an annual performance appraisal. Both the Human Resources Director and the City Manager review and sign-off on these appraisals.

The department has an educational pay incentive. Firefighters, Engineers, and Captains receive specialty pay if they hold any of the following certifications: Fire Officer, Hazardous Material Technician or Specialist, Bomb Specialist, Confined Space Operations or Technician, Fire Investigator 1 or 2, Fire Instructor 1, 2, 3, Fire Prevention Officer, Fire Protection Specialist, Plans Examiner, Public Education Officer, Urban Search and Rescue, First Responder Operational Instructor, Driver/Operator, Fire Mechanic level 1,2,3, AA or AS Degree, BA or BS Degree. EMT Advanced or Paramedic. Battalion Chiefs track overtime pay for the department.

The city's Memorandum of Understanding (MOU)[38] with the ECFA governs the procedures to follow for any personnel grievances.

Finally, the city has a Health and Safety Committee as recommended in NFPA 1500 *Standard on Fire Department Occupational Health, Safety, and Wellness Program.* Fire department line personnel are required to have an annual medical physical and to take the annual physical fitness evaluation.

[37] Resolution No. 15-63, Terms and Conditions of Employment including Compensation for Fiscal Years 2015-2018.
[38] Ibid.

Fire Prevention

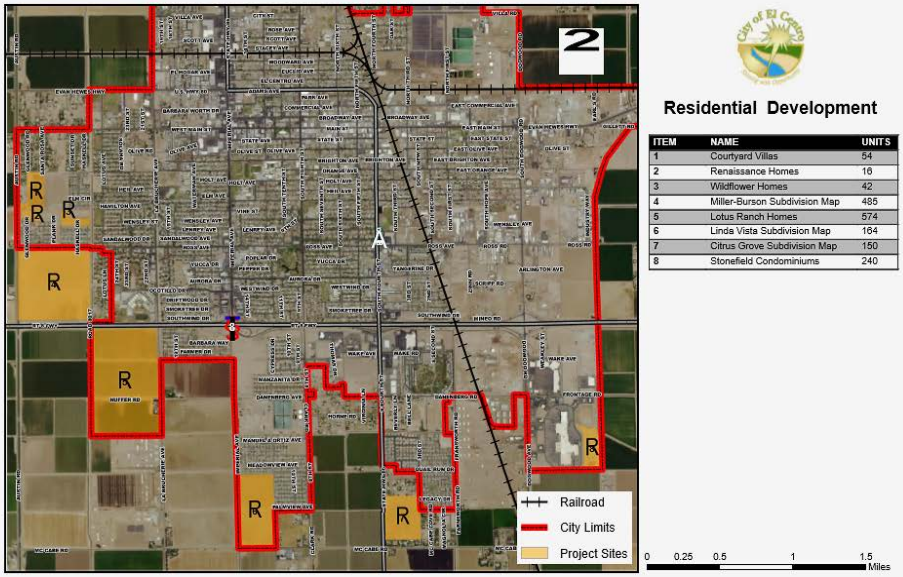
Fire suppression and response, although necessary to protect property, have little impact on preventing fire deaths and injury. Whereas public fire education, fire prevention, and built-in fire protection systems are essential elements in protecting citizens from death and injury due to fire, smoke inhalation, and carbon monoxide poisoning. Smoke alarms are a critical factor in saving thousands of lives from fires nationally every year. Without properly installed and working smoke alarms, fire victims usually die of smoke inhalation before structural fires are reported to fire departments or before first responders arrive on the scene.

Fire prevention and code enforcement services also can have an impact on the city's ISO Public Protection Classification number(s). The most recent edition of the ISO grading schedule, which was released in July 2013, now grants 5.5 additional credit points for fire prevention, public fire and life safety education, and code enforcement.

The City of El Centro has adopted the International Fire Code (IFC) and the International Building Code. As prescribed by the State of California Uniform Fire Code and Building Code, the city currently uses the 2013 edition of the International Fire Code (IFC) and the International Building Code (IBC).[39] The adoption by the city of the amended fire code contained the requirement that all new single-family residential construction include the installation of automatic extinguishing systems (AES), that is, fire sprinklers. Residential sprinklers have been shown to be highly effective in preventing fire deaths and injuries.[40] The anticipated large residential subdivision construction projects in the southwestern sections of the city will generate a significant increase in the number of NFPA 13D[41] fire inspections and occupancy permits, as illustrated in Figure 7-1.

[39] Ordinance No. 14-11. Amending Chapter 10 Article III of the El Centro City Code, June 17, 2014. Sec. 10-41-Adoption of California Fire Code, 2013 edition.
[40] US Experience with Sprinklers 2010-2014, NFPA. July 2017.
[41] NFPA 13D *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*, 2016.

FIGURE 7-1: Residential Development with Automatic Extinguishing Systems



The City of El Centro Building and Safety Division in the Community Development Department is responsible for non-permitted occupancies, initial inspection only upon receipt of business license, and code enforcement in the city. The Building and Safety Division employs one building inspector and one code enforcement officer. Some state insurance standards call for a city with the population size of El Centro to have at least one additional inspector and one additional code enforcement officer.[42] Plan examinations are also conducted by the Building Division, although some plan reviews, especially complex ones, are contracted for review to the EsGil Corp., a private firm in San Diego. In 2013, the position and responsibilities of the Fire Marshal were subsumed under the duties of the Fire Chief.

The ECFD supplements its fire permit and high-hazard inspections with a business self-inspection program. Fire permit and high-hazard inspections, as well as inspections for businesses that have opted out of the self-inspection program, are assigned to the company shift Captains on a quarterly basis. State-required inspections of state-licensed facilities such as day care facilities and group homes are assigned to the Administrative Captain for completion. Table 7-1 indicates completed inspections for 2016 and 2017. Permit and high-hazard inspections, as well as business self-inspections, showed slight increases from 2016 to 2017.

[42] See for example, the Texas Addendum to the Fire Suppression Rating Schedule. Texas Department of Insurance. (January 2004), 5-8.

TABLE 7-1: Fire Prevention Totals, 2016 and 2017

Inspection Type	FY 2016	FY 2017
Permit and high-hazard inspections	500	550
Business self-inspection	805	850
State-required inspections; State-licensed facilities	10	10

■ ■ ■ ■

Recommendation:

- To meet the demands of planned new residential construction in the southwestern portion of the city, it is recommended a fire prevention inspector position be added to the most appropriate department; NFPA 13D residential sprinkler inspection experience should be a requirement for this position. (Recommendation 28.)

■ ■ ■ ■

Public Fire and Life Safety Education

In addition to its regular school presentations, station tours, social media postings, and community public relations events, the ECFD has a contract with The Burn Institute to provide fire safety education. The Burn Institute, located in Imperial Valley, provides a fire safety trailer for use during open houses. Established in 1972, the Burn Institute provides fire and burn prevention education, burn survivor support programs, and the funding of burn care research and treatment. The trailer is equipped with numerous teaching props and includes kitchen safety, the use of fire extinguishers, and can also be used to conduct Exit Drills in the Home (EDITH) exercises. The Burn Institute partners with the Red Cross to install smoke detectors in the homes of the elderly. The ECFD also uses the Burn Institute for juvenile firesetter referrals. ECFD has not kept workload and performance indicators on the effectiveness of these public fire and safety programs.

■ ■ ■ ■

Recommendation:

- During its analysis, CPSM recognized that public fire and safety education has not been a priority for the department. It is recommended the ECFD continue its partnership with the Burn Institute, reenergize these vital programs, and once again make these programs an essential duty for each fire station and operational shift. (Recommendation 29.)

■ ■ ■ ■

Fire Investigations

Fire investigations are the responsibility of the ECFD. All fires are required to be investigated to determine cause and origin. Any suspicious fires are investigated by an ECFD Captain who has the appropriate investigator certifications. All ECFD Captains are certified (1A - Fire Origin and Cause Determination) to secure a scene and wait for a level 1B or higher certified fire investigator, if needed. If a fire is determined to be arson, a level 2 (120 hours of additional investigation training) fire investigator is assigned. Fire investigators work in coordination with the El Centro police department on all criminal arson cases. As previously mentioned, the ECFD contracts with the Burn Institute on juvenile firesetter issues. Tables 7-2 and 7-3 provide information on cause of ignition for the time periods indicated.

TABLE 7-2: Cause of Ignition, July 1, 2016 to June 30, 2017

Cause of Ignition	# Incidents	% of Total
Intentional	44	19.5%
Failure of equipment or heat source	8	3.5%
Cause undetermined after investigation	105	46.5%
Cause under investigation	14	6.2%
Unintentional	53	23.5%

TABLE 7-3: Cause of Ignition, July 1, 2016 to June 30, 2017

Cause of Ignition	# Incidents	% of Total
Intentional	30	13.2%
Failure of equipment or heat source	10	4.4%
Cause undetermined after investigation	116	51.1%
Cause under investigation	10	4.4%
Unintentional	56	24.7%

EDUCATION AND TRAINING PROGRAMS

An effective fire department training program must cover all the essential elements of that specific department's core missions and responsibilities. The program must include an appropriate combination of technical/classroom training and manipulative or hands-on/practical evolutions. Most of the training, but particularly the practical, standardized, hands-on training evolutions should be developed based upon the department's own operating procedures and operations, while remaining cognizant of widely accepted practices and standards that could be used as a benchmark to judge the department's operations for any number of reasons.

Certain Occupational Safety and Health Administration (OSHA) regulations dictate that minimum training must be completed on an annual basis, covering various topics that include:

- A review of the respiratory protection standard, self-contained breathing apparatus (SCBA) refresher and user competency training, SCBA fit testing (29 CFR 1910.134).
- Blood Borne Pathogens Training (29 CFR 1910.1030).
- Hazardous Materials Training (29 CFR 1910.120).
- Confined Space Training (29 CFR 1910.146).
- Structural Firefighting Training (29 CFR 1910.156).

In addition, National Fire Protection Association (NFPA) standards contain recommendations for training on various topics such as a requirement for a minimum of 24 hours of structural firefighting training annually for each fire department member.

Education and training programs also help to create the character of a fire service organization. Agencies that place a real emphasis on their training tend to be more proficient in carrying out day-to-day duties. The prioritization of training also fosters an image of professionalism and instills pride in the organization Overall, although the ECFD training program does have some very

good aspects to it, and there exists an effort focused on a wide array of training activities, there are still gaps in the system that need to be addressed.

The ECFD's training activities are currently coordinated by a Battalion Chief who performs this function as an ancillary duty in addition to his primary role as a shift commander. Although the chief is very dedicated to the training function, the reality is that trying to fulfill dual roles certainly limits the amount of time that he can dedicate to the mission-critical training function. He stressed to CPSM that he is more of a coordinator rather than the training officer. The distinction is that he provides the training to the other Chiefs and Captains; however, he does not usually deliver it personally and rarely has time to follow-up to ensure compliance. CPSM was informed that previously, the department's Administrative Captain served as the training officer and had much more time to dedicate to that aspect of the department's operations.

Training is, without question, one of the most important functions that a fire department should be performing on a regular basis. One could even make a credible argument that training is, in some ways, more important than emergency responses because a department that is not well trained, prepared, and operationally ready will be unable to effectively, efficiently, correctly, and safely fulfill its emergency response obligations and mission. A comprehensive, diverse, and ongoing training program is absolutely critical to the fire department's level of success.

In addition, many of the fire department's health and safety functions are closely tied to training. With the amount of work that must be accomplished in an ongoing manner in these important functions, and the number of personnel who must be trained, expecting the training program to be fully effective while being handled as a part-time duty is no longer reasonable and in the long term can have an impact on the department's operational readiness. The perception that this may already be occurring may best be illustrated by interactions that took place during the CPSM site visit. One of the main concerns that was brought to CPSM's attention by the department's Captains was that the ECFD "was" (with emphasis on the past tense) the best trained and most aggressive department in the Imperial Valley.

Recommendation:

- The City of El Centro should consider the creation of a full-time position of Training and Safety Officer, at the rank of Captain, in the El Centro Fire Department. (Recommendation 30.)

This Captain would be responsible for all fire department training and would develop, coordinate, and supervise the department's overall training program. The Captain's duties could include, but not necessarily be limited to, development of lesson plans, standardized evolutions, and skills proficiency evaluations; direct delivery of major and/or important training to bring consistency to the delivery across all three shifts; administering annual proficiency evaluations; ensuring that required certifications are maintained; coordinating and assisting other officers with training that they are going to deliver; and ensuring that all training related records and reports are completed and maintained.

During the on-site visit, CPSM received input from stakeholders regarding training such as, "*no real direction on practical drills*" and "*there are few critical task drills for probationary firefighters*." This indicates to us that there is a disconnect within the department regarding its training needs, and the direction of the overall training program. In addition, training sessions conducted by individual officers with their crews are typically based on what that officer determines is important. This process does not develop consistent and effective training experiences for department members. We believe that most of these issues can be resolved

through implementation of the recommendation on creating a full-time training and safety officer. However, determining what the needs of the department are is another important component of the process.

Recommendation:

- The El Centro Fire Department should conduct a comprehensive and formal training needs assessment involving a cross-section of department personnel for the purpose of determining training program priorities. (Recommendation 31.)

Newly hired probationary firefighters are required to have successfully completed a recognized Firefighter I and II level fire academy program. However, they may not necessarily be "certified." They are then required to complete an approximately four-week, in-house academy for the ECFD. The Battalion Chief responsible for training supervises the academy, but the instruction is primarily done by a cadre of Captains. The probationary firefighters are required to successfully complete both written and practical skills evaluations based on the widely used *Essentials of Firefighting* manual. They must also successfully complete a final evaluation at the end of the academy. They are then provided with a task book that requires them to achieve certain training and performance benchmarks at specified intervals during their first year in the field.

The ECFD utilizes *Target Solutions* as its platform for all department training. Target Solutions is a robust course catalog for fire and EMS training that can be utilized to meet all federal, state, and local public safety training mandates. Its inventory is comprised of more than 1,000 online courses. The department utilizes Target Solutions for all mandatory training such as OSHA requirements, EMS training, driver operator, and company officer development. Each firefighter's mandatory EMS training hours necessary for recertification can also be completed through Target Solutions. In addition, there are six hours per month of "random" training assigned. This can include training to achieve or maintain various certifications and a "topic of the month."

The department does publish an annual training schedule that breaks down the required training monthly and assigns hands-on and online topics that must be covered. The department has a stated goal of achieving annual compliance with the training hours specified by ISO. These include:

- 12 hours of driver training (for drivers only).
- 12 hours officer training (for company officers only).
- 6 hours of haz-mat training.
- Company training to 192 hours (16 hr. / month).
  - ECFD will do 20 hrs./month
- Annual requirement of 18 hours training at an approved training facility.
- Recruit Training in accordance with requirements of the state.
  - 240 additional hrs. in their probationary year
- 24 hours for EMT-1 / 36 hours for EMT-1A / 48 hours for EMT-Ps.

CPSM learned that compliance with the assigned training requirements is sporadic. Several stakeholders informed us that training is not completed as it is outlined. CPSM was also informed

that it is often "difficult to meet" the 20-plus hours of documented training each month that the department specifies and that ISO requires for maximum credit during an evaluation. It is clearly reasonable that some days it will be difficult to complete the required training as various operational and ancillary program demands compete with each other. Yet, in many fire departments less-than-efficient time management, and even past practice, can hinder attempts to provide training for on-duty personnel. We believe that this is at least partially true in El Centro. Every effort should be made to make completion of this daily task a priority.

Recommendation:

- The El Centro Fire Department should prioritize the completion of two hours of training each duty day. (Recommendation 32.)

Additional daily opportunities for training can be found during related activities such as daily/weekly apparatus and equipment inspections and building preplanning activities. Training can and should also be conducted during evening hours and on weekends.

CPSM was informed that the Battalion Chief who oversees training is unsure how reliable and up to date each member of the department's training records are. Although they are supposed to be, it is uncertain if training reports are being completed for all training that is conducted. This is a significant problem because any training that did take place, no matter how outstanding, in essence did not happen if it was not properly documented. This practice could lead to serious perception and/or liability issues for the department and the county for a wide range of reasons.

Better written documentation of all training is needed, and all members' individual skills and certificates need to be kept up to date. Target Solutions can also provide the platform for managing all training records and reports. Expanding (and mandating) the use of this program will help to ensure that there is a reliable and accurate database for tracking and retrieval of all department level training and for recording and tracking the status of certifications for all personnel.

Recommendation:

- All training that is conducted, no matter how brief or inconsequential it may seem, should result in the completion of a formal training report. The department should develop a formal operational procedure on the completion of training reports. (Recommendation 33.)

ECFD officers typically provide feedback to personnel regarding their performance but there is no formal testing or skills assessments for fire training in the department. Training is a required activity in the fire service and the ability to incorporate a formal testing process as part of the learning effort is essential. EMS skills assessments, both practical and written, are regularly incorporated into EMS training. Traditionally, fire departments are reluctant to incorporate skills testing into their fire training components. However, an increasingly common way to evaluate the department's training program is with annual skills proficiency evaluations where all members of the department are required to successfully perform certain skills and/or complete standardized evolutions, either individually, or as part of a team.

Recommendation:

- The El Centro Fire Department should institute written and practical skills testing and proficiency evaluations as part of the department's comprehensive fire training program. (Recommendation 34.)

The ECFD utilizes a formal Task Book process to provide training guidance and new rank orientation. Task books are in place for Firefighter, and are being developed for Engineer, and Captain. The new State requirement for certification includes the completion of a task book for these positions and must be completed prior to certification. The current job descriptions are in need of a re-write to address the new State educational requirements.

Recommendation:

- The El Centro Fire Department should require all personnel who aspire promotion to a higher rank to successfully complete all elements of that rank's task book to be eligible to participate in the formal promotional testing process. (Recommendation 35.)

Professional development for fire department personnel, especially officers, is also an important part of overall training. There are numerous excellent opportunities for firefighters and officers to attend training on a wide range of topics outside of El Centro, including the National Fire Academy in Emmitsburg, Maryland. Numerous, free on-line courses and training programs are also available. Beyond the practical benefits to be gained from personnel participating in outside training, encouraging, or if possible, requiring personnel to earn and/or maintain various specialized certifications such as fire instructor or fire officer increases the positive professional perception of the organization and can help to demonstrate a commitment to continued excellence.

As of the time of this assessment the ECFD has no formal professional development program in place. While some department officers have earned various professional certifications, this has primarily been on their own initiative. As identified in the department's job descriptions for each position, fire officer certification is required for fire captains and chief officer certification is required for battalion chiefs. In addition, personnel are encouraged to complete their task books. However, there is no system for professional development in anticipation of, or prior to, promotion. CPSM was informed that at one time the department was doing formal officer training. However, the program was discontinued when the city objected to paying personnel for both the training and the certification. The rationale behind this concern could not be determined and does not seem to make any sense.

Recommendation:

- The El Centro Fire Department should continue to require its officers to complete rank appropriate fire officer training programs and obtain a certain level of fire officer certification as a job requirement. Recommendations would be: Company Officer for Captain, Chief Fire Officer for Battalion Chief, and Executive Chief Fire Officer for Fire Chief. (Recommendation 36.)

Beyond the establishment of requirements to achieve certain levels of certification for promotion, the department should consider the implementation of a formal professional development program for all department personnel. The program should attempt to strike an appropriate balance between technical/practical task books, simulator training, formal certifications, mentor relationships, and outside influences. Where practical, best practices identified by the NFPA, ISO, California State Fire Marshal, and the Center for Public Safety Excellence (CPSE) should be incorporated.

Recommendation:

- The El Centro Fire Department should implement a formal officer training and development program. There are several excellent programs available, including those from the International Association of Fire Chiefs and the Phoenix, Arizona, Fire Department. (Recommendation 37.)

CPSM was also informed that the department conducts very few multicompany drills because of the need to keep units within their first due areas and available for response. While this concern is certainly reasonable for an emergency response agency, operational units that work together with each other daily need to train together and conduct joint exercises. Failure to do so can result in a lack of familiarity with each other, which can lead to effectiveness and efficiency issues on the emergency scene. The Imperial County Fire Department units from Imperial City and Heber (and the NAF El Centro) should also be included in periodic training sessions.

Recommendation:

- The El Centro Fire Department should conduct regular multicompany, in-house training evolutions as well as periodic joint training exercises with surrounding departments to test interoperability of training, communications, procedures, and operations. (Recommendation 38.)

EMERGENCY MANAGEMENT

The City of El Centro approved its all-hazards Emergency Operations Plan (EOP) in May 2015; it provides guidance for the City of El Centro's response to extraordinary emergencies associated with natural, manmade, and technological disasters. This plan is flexible enough to use in all emergencies and will facilitate response and short-term recovery activities. Developed in accordance with the Standardized Emergency Management System (SEMS) and the National Incident Management System (NIMS), this plan is a management document intended to be read, understood, and exercised before an emergency occurs. Additionally, this plan is designed to integrate into and support the County of Imperial's Operational Area Emergency Plan.

The EOP is consistent with the "whole community" approach proposed by the Federal Emergency Management Agency (FEMA). Whole community is a means by which private and nonprofit sectors, including businesses, faith-based, access and functional needs organizations, residents, visitors, and government agencies at all levels, collectively understand and assess the needs of their respective communities and determine the best ways to organize and strengthen their assets, capacities, and interests. The EOP should be understood by all personnel who could

be mobilized to staff the Emergency Operations Center. Understanding the plan, training, and exercising are critical to the success of implementation. The City of El Centro should conduct routine training for plan familiarization; then conduct drills, tabletop, and functional exercises to gauge proficiency. Each department should have a Continuity of Operations Plan (COOP) that clearly defines how the agency will operate if staffing, resources, and facilities are compromised as a result of an emergency or unforeseen event.

As discussed in the *Risk Assessment* section of this report, El Centro has identified the top seven threats to its jurisdiction, which are included in the EOP:

- Earthquake.
- Hazardous materials.
- Fire.
- Flooding.
- Power outages.
- Public health emergencies.
- Terrorism.

CPSM recommends that the City of El Centro conduct a Threat Hazard and Risk Assessment (THIRA) for the community that incorporates the top seven threats previously identified. THIRA is a four-step, common risk assessment process that helps the whole community—including individuals, businesses, faith-based organizations, nonprofit groups, schools and academia, and all levels of government—understand risks and estimate capability requirements. The THIRA process helps communities map their risks to the core capabilities, enabling them to determine whole-community informed:

- Desired outcomes.
- Capability targets.
- Resources required to achieve their capability targets.

The outputs of this process inform a variety of emergency management efforts, including: emergency operations planning, mutual aid agreements, and hazard mitigation planning. Ultimately, the THIRA process helps communities answer the following questions:

- What do we need to prepare for?
- What shareable resources are required to be prepared?
- What actions could be employed to avoid, divert, lessen, or eliminate a threat or hazard?

Comprehensive Preparedness Guide (CPG) 201, Second Edition, released in August 2013, provides communities additional guidance for conducting a THIRA. The first edition of this guide, released in April 2012, presented the basic steps of the THIRA process. Specifically, the first edition described a standard process for identifying community-specific threats and hazards and setting capability targets for each core capability identified in the National Preparedness Goal as required in Presidential Policy Directive (PPD) 8: National Preparedness.[43]

[43] Comprehensive Preparedness Guide (CPG) 201, Second Edition, Federal Emergency Management Agency, 2013

While the City of El Centro has a well-written Emergency Operations Plan, the success of execution is dependent on the knowledge, preparation, training, and exercising by each of those responsible for implementation. CPSM recommends that the City of El Centro develop an annual training and exercise schedule to educate, test, and gauge the effectiveness of the EOP.

Recommendations:

- CPSM recommends that the City of El Centro develop an annual training and exercise schedule to educate, test, and gauge the effectiveness of the EOP. (Recommendation 39.)
- CPSM recommends that each city department develop and implement a Continuity of Operations Plan (COOP) that clearly defines how the agency will operate if staffing, resources, and/or facilities are compromised because of an emergency or unforeseen event. (Recommendation 40.)
- CPSM recommends that the City of El Centro conduct a Threat Hazard and Risk Assessment (THIRA) for the community that incorporates the top seven threats identified in this report section. (Recommendation 41.)

EMERGENCY COMMUNICATIONS CENTER (ECC)

The El Centro Police Department Communications Center operates 24 hours a day and is the Public Safety Answering Point (PSAP) for all incoming calls for police and fire services, including all 9-1-1 calls. The duties of the police and fire dispatchers include, but are not limited to, California Law Enforcement Telecommunications (CLETs) entries, dispatching field units to calls for service, and assisting other agencies as directed through protocol. The El Centro Fire Department is a customer of the Communication Center and has the authority to determine Fire/EMS and related dispatch protocols. The center is staffed with a supervisor who generally works normal business hours. A minimum of two personnel staff the center 24/7; one for taking calls, the other for radio communications. All personnel receive a six-month, in-house training program, including a three-week academy at an external law enforcement agency. Emergency medical calls are processed using the Association of Public-Safety Communication Officials (APCO) Emergency Medical Dispatch program. Medical protocols are approved by the City of El Centro Public Health Physician.

The computer-aided dispatch system product was purchased from Spillman Technologies, a Motorola Solutions Company, and is integrated with fire station alerting via Plectron, but not integrated with the fire department records management system (RMS).

The center has an adequate generator and uninterrupted power supply capability. The center is in a secure facility managed by the El Centro Police Department. Although small compared to other like-size jurisdictions, the center is functional and meets the needs of the community.

The fire department notifies the center when transfers of outside agencies are needed to cover the city. The fire department also decides what units to dispatch on alarms past the initial alarm. Currently there are no standard protocols for transfers and for the dispatch/request for additional alarms that can be implemented by the center during an emergency. To ensure issues are minimized, and to identify solutions for effective and efficient delivery of fire services,

the Fire Chief should routinely maintain formal contact with the Communications Center supervisor. CPSM found this does not occur on a regular basis.

The Imperial Valley Emergency Communications Authority (IVECA) is partnered with the San Diego County Regional Communications System (RCS) to provide public safety voice and data communications to more than 200 local, state, and federal agencies in San Diego and Imperial counties. IVECA was formed in 1995 to provide secure interoperable communications to all public safety and service personnel in the Imperial Valley. The Board of Directors of the IVCEA includes the El Centro Police Chief and Director of Public Works. Considering the mutual aid relationship between the city and the county, the El Centro Fire Chief should ensure that the fire department's interests are represented, through regular meetings with the El Centro board members, so that issues may be properly represented and solutions sought to minimize interoperability issues.

Recommendations:

- CPSM recommends that the fire department develop standard protocols for transfers and additional alarms that can be implemented by the Communications Center during an emergency. (Recommendation 42.)
- CPSM recommends that a member of the fire department senior staff or the Fire Chief continue meet regularly with the Communications Center supervisor to discuss issues between the two agencies to improve overall service. (Recommendation 43.)

SECTION 8. DATA ANALYSIS

This data analysis examines all calls for service between May 1, 2016, and April 30, 2017, as recorded in the Imperial County Sheriff's computer-aided dispatch (CAD) system and the National Fire Incident Reporting System (NFIRS).

This analysis is made up of five parts. The first part focuses on call types and dispatches. The second part explores time spent and workload of individual units. The third part presents an analysis of the busiest hours in the year studied. The fourth part provides a response time analysis of ECFD units. The fifth and final part evaluates the impact of the trial of the rapid response unit on engine workload and response times to EMS calls.

During the year covered by this study, the El Centro Fire Department (ECFD) operated out of three stations utilizing three engines, two rapid response vehicles, one reserve engine, one reserve ladder, one mobile air unit, and administrative units.

During the year studied, the ECFD responded to 4,566 calls; of these, 74 percent were EMS calls. The total combined workload (deployed time) for the year for all ECFD units was 5,114 hours. The average dispatch time for the first arriving ECFD unit was 1.5 minutes and the average response time of the first arriving ECFD unit was 5.7 minutes. The 90th percentile dispatch time was 2.3 minutes and the 90th percentile response time was 7.8 minutes.

METHODOLOGY

In this report, CPSM analyzes calls and runs. A call is an emergency service request or incident, or a nonemergency transport request. A run is a dispatch of a unit. Thus, a call might include multiple runs.

We received CAD data and NFIRS data for the El Centro Fire Department. We also received additional data on mutual aid calls from the department. We first matched the NFIRS and CAD data based on incident numbers provided. Then, we classified the calls in a series of steps. We first used NFIRS incident type and the additional mutual aid data to identify canceled calls. We used the NFIRS mutual aid designation and additional mutual aid data to identify mutual aid calls. Five calls that are not counted as mutual aid under NFIRS definitions are counted as mutual aid in this report because they occurred outside of El Centro and our focus is on the department's primary response area.

NFIRS incident types were used to classify the remaining calls as EMS, motor vehicle accident (MVA), or one of six fire call types. Calls classified as EMS were then assigned to detailed call types based on CAD call natures. For nonspecific call natures, a detailed EMS call type was assigned using one of the following NFIRS fields, in order of priority: primary impression, chief complaint, and narrative.

We removed two units with only dispatch and clear times, and four calls with no responding ECFD units.

In addition, nine incidents to which only administrative units responded are not included in the analysis sections of the report. However, the workload of administrative units is documented in Attachment III.

In this report, canceled and mutual aid calls are included in all analyses other than the response time analyses.

AGGREGATE CALL TOTALS AND DISPATCHES

During the year studied, ECFD responded to 4,556 calls. Of these, 46 were structure fire calls and 163 were outside fire calls within ECFD's jurisdiction. Each dispatched unit is a separate "run." As multiple units are dispatched to a call, there are more runs than calls. The department's total runs and workload are reported in the second part of this analysis.

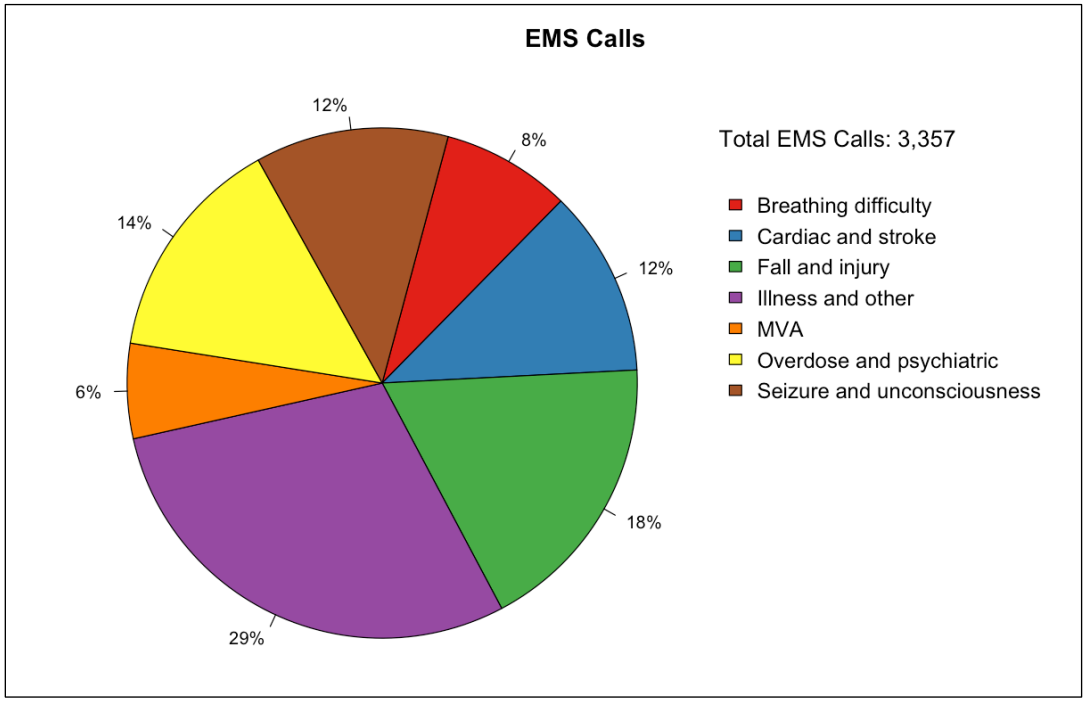
Calls by Type

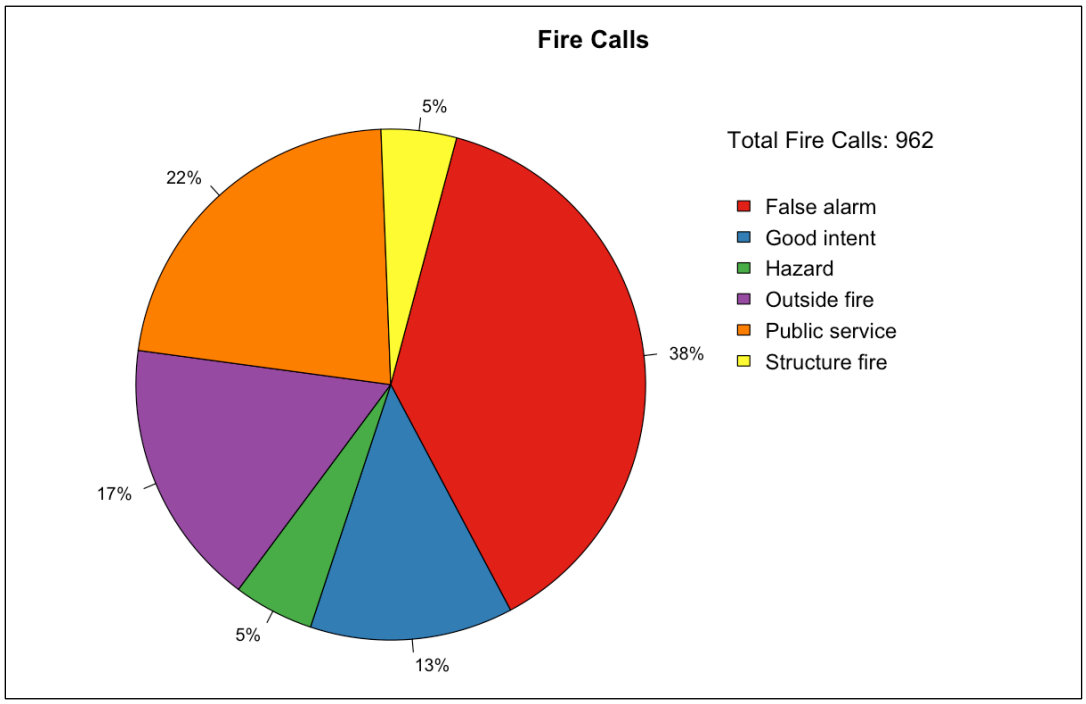
Table 8-1 and Figure 8-1 show the number of calls by call type, average calls per day, and the percentage of calls that fall into each call type category.

TABLE 8-1: Calls by Type and Location

Call Type	Number of Calls	Calls per Day	Call Percentage
Breathing difficulty	275	0.8	6.0
Cardiac and stroke	397	1.1	8.7
Fall and injury	606	1.7	13.3
Illness and other	982	2.7	21.6
MVA	202	0.6	4.4
Overdose and psychiatric	484	1.3	10.6
Seizure and unconsciousness	411	1.1	9.0
EMS Total	**3,357**	**9.2**	**73.7**
False alarm	366	1.0	8.0
Good intent	124	0.3	2.7
Hazard	49	0.1	1.1
Outside fire	163	0.4	3.6
Public service	214	0.6	4.7
Structure fire	46	0.1	1.0
Fire Total	**962**	**2.6**	**21.1**
Canceled	217	0.6	4.8
Mutual aid	20	0.1	0.4
Total	**4,556**	**12.5**	**100.0**

FIGURE 8-1: EMS and Fire Calls by Type





Observations:

Overall

- The department received an average of 12.5 calls, including 0.6 canceled and 0.1 mutual aid calls, per day.
- EMS calls for the year totaled 3,357 (74 percent of all calls), an average of 9.2 per day.
- Fire calls for the year totaled 962 (21 percent of all calls), an average of 2.6 per day.

EMS

- Illness and other calls were the largest category of EMS calls at 29 percent of EMS calls.
- Cardiac and stroke calls made up 12 percent of the EMS calls.
- Motor vehicle accidents made up 6 percent of the EMS calls.

Fires

- Structure and outside fires combined for a total of 209 calls during the year, an average of one call every 1.7 days.
- A total of 46 structure fire calls accounted for 5 percent of the fire calls.
- A total of 163 outside fire calls accounted for 17 percent of the fire calls.
- False alarm calls were the largest fire call category, with 38 percent of the fire calls.

Calls by Type and Duration

Table 8-2 shows the duration of calls by type using four duration categories: less than 30 minutes, 30 minutes to one hour, one to two hours, and more than two hours.

TABLE 8-2: Calls by Type and Duration

Call Type	Less than 30 Minutes	30 Minutes to One Hour	One to Two Hours	More than Two Hours	Total
Breathing difficulty	240	32	2	1	275
Cardiac and stroke	334	45	18	0	397
Fall and injury	537	56	12	1	606
Illness and other	893	79	9	1	982
MVA	163	28	10	1	202
Overdose and psychiatric	423	53	8	0	484
Seizure and unconsciousness	343	55	12	1	411
EMS Total	**2,933**	**348**	**71**	**5**	**3,357**
False alarm	343	19	3	1	366
Good intent	118	5	1	0	124
Hazard	32	15	2	0	49
Outside fire	130	26	5	2	163
Public service	190	18	5	1	214
Structure fire	16	8	5	17	46
Fire Total	**829**	**91**	**21**	**21**	**962**
Canceled	211	2	3	1	217
Mutual aid	4	1	3	12	20
Total	**3,977**	**442**	**98**	**39**	**4,556**

Observations:

EMS

- A total of 3,281 EMS category calls (98 percent) lasted less than one hour, 71 EMS category calls (2 percent) lasted between one and two hours, and 5 EMS category calls (less than 1 percent) lasted more than two hours.
- On average, there were 0.2 EMS category calls per day that lasted more than one hour.
- A total of 379 cardiac and stroke calls (95 percent) lasted less than one hour, and 18 cardiac and stroke calls (5 percent) lasted more than an hour.
- A total of 191 motor vehicle accidents (95 percent) lasted less than one hour, and 11 motor vehicle accidents (5 percent) lasted more than an hour.

Fire

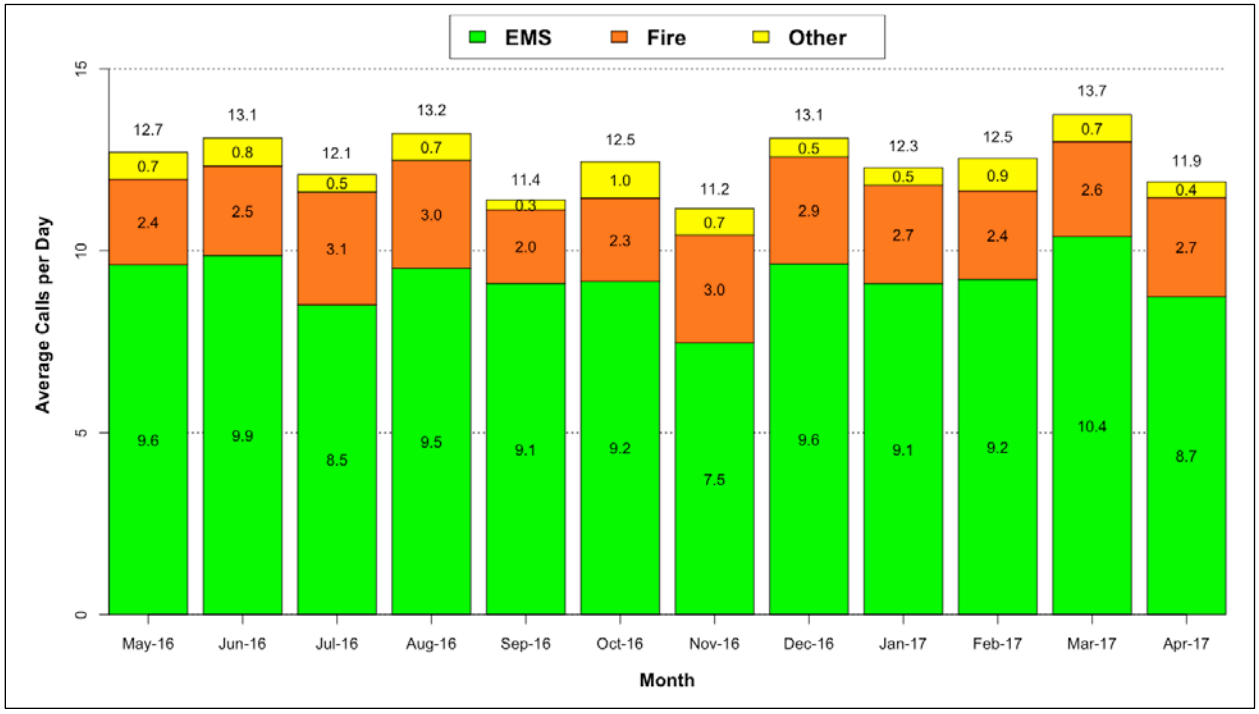
- A total of 920 fire category calls (96 percent) lasted less than one hour, 21 fire category calls (2 percent) lasted between one and two hours, and 21 fire category calls (2 percent) lasted more than two hours.
- On average, there were 0.1 fire category calls per day that lasted more than one hour.

- A total of 24 structure fires (52 percent) lasted less than one hour, 5 structure fires (11 percent) lasted between one and two hours, and 17 structure fires (37 percent) lasted more than two hours.
- A total of 156 outside fires (96 percent) lasted less than one hour, 5 outside fires (3 percent) lasted between one and two hours, and 2 outside fires (1 percent) lasted more than two hours.
- A total of 362 false alarms (99 percent) lasted less than one hour, and 4 false alarms (1 percent) lasted more than an hour.

Average Calls by Month and by Hour

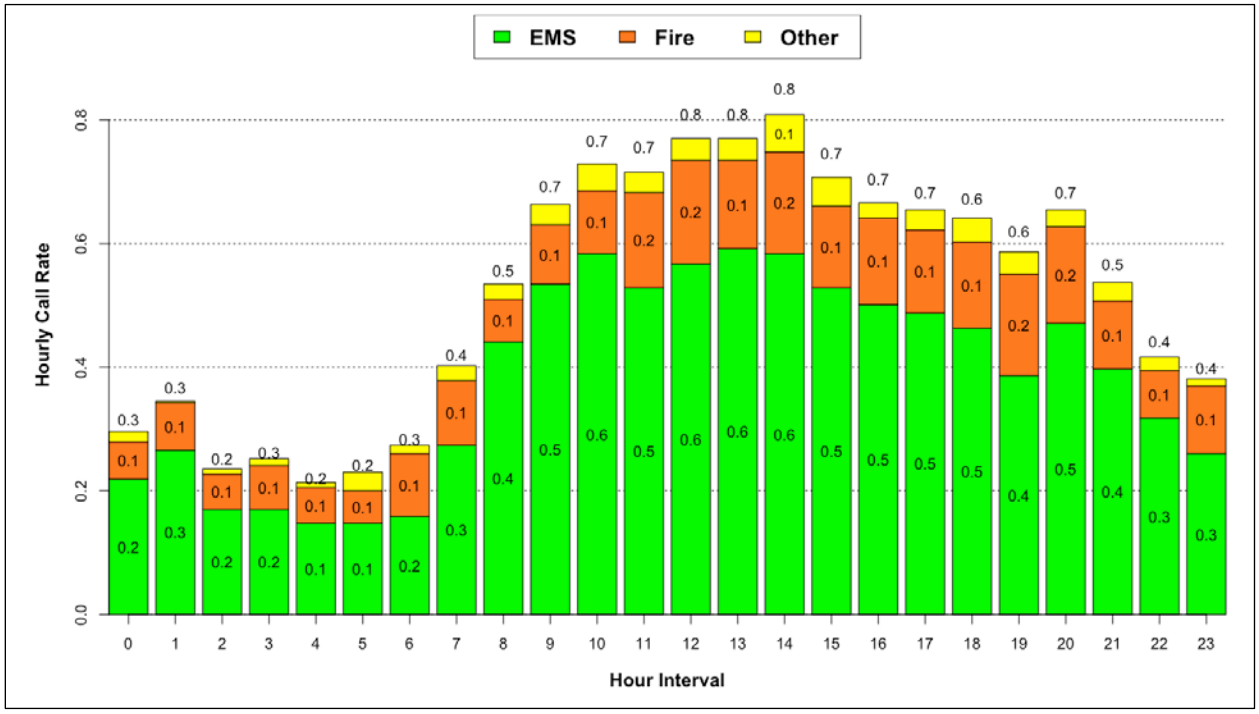
Figure 8-2 shows the monthly variation in the average daily number of calls handled by the ECFD during the year studied. Similarly, Figure 8-3 illustrates the average number of calls received each hour of the day over the course of the year.

FIGURE 8-2: Average Calls per Day, by Month



Note: The total of each call type may add up to more than the total shown for the month due to rounding.

FIGURE 8-3: Calls by Hour of Day



Note: The total of each call type may add up to more than the total shown for the hour due to rounding. Values less than 0.05 are not labeled. Hour interval 0 is 12:00 a.m. through 12:59 a.m., and hour interval 23 is 11:00 p.m. through 11:59 p.m.

Observations:

Average Calls per Day

- Average calls per day ranged from a low of 11.2 calls per day in November 2016 to a high of 13.7 calls per day in March 2017. The highest monthly average was 23 percent greater than the lowest monthly average.
- Average EMS calls per day ranged from a low of 7.5 calls per day in November 2016 to a high of 10.4 calls per day in March 2017.
- Average fire calls per day ranged from a low of 2.0 calls per day in September 2016 to a high of 3.1 calls per day in July 2016.
- Average other calls per day ranged from a low of 0.3 calls per day in September 2016 to a high of 1.0 calls per day in October 2016.
- The highest number of calls received in a single day was 32, which occurred on August 30, 2016.

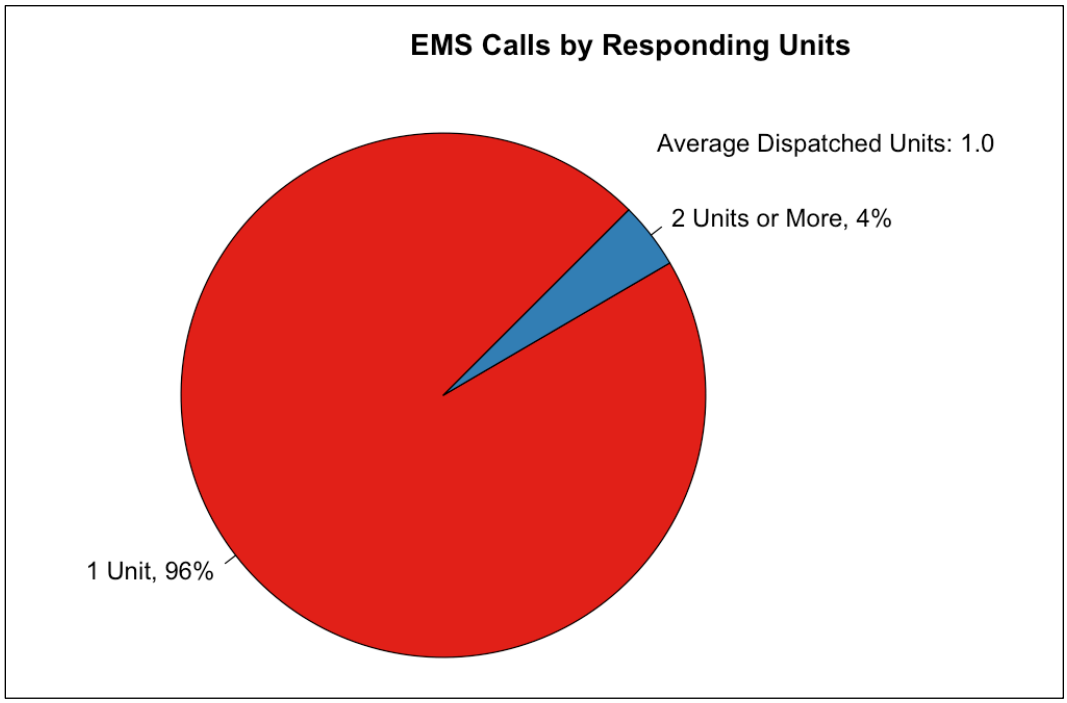
Average Calls per Hour

- Average hourly call rates ranged from 0.2 to 0.8 calls per hour.
- Call rates were highest between noon and 3:00 p.m., averaging 0.8 calls per hour.
- Call rates were lowest between 2:00 a.m. and 6:00 a.m., averaging 0.2 calls per hour.

Units Dispatched to Calls

Figure 8-4 and Table 8-3 detail the number of ECFD units dispatched to calls overall by call type.

FIGURE 8-4: Number of Units Dispatched to Calls



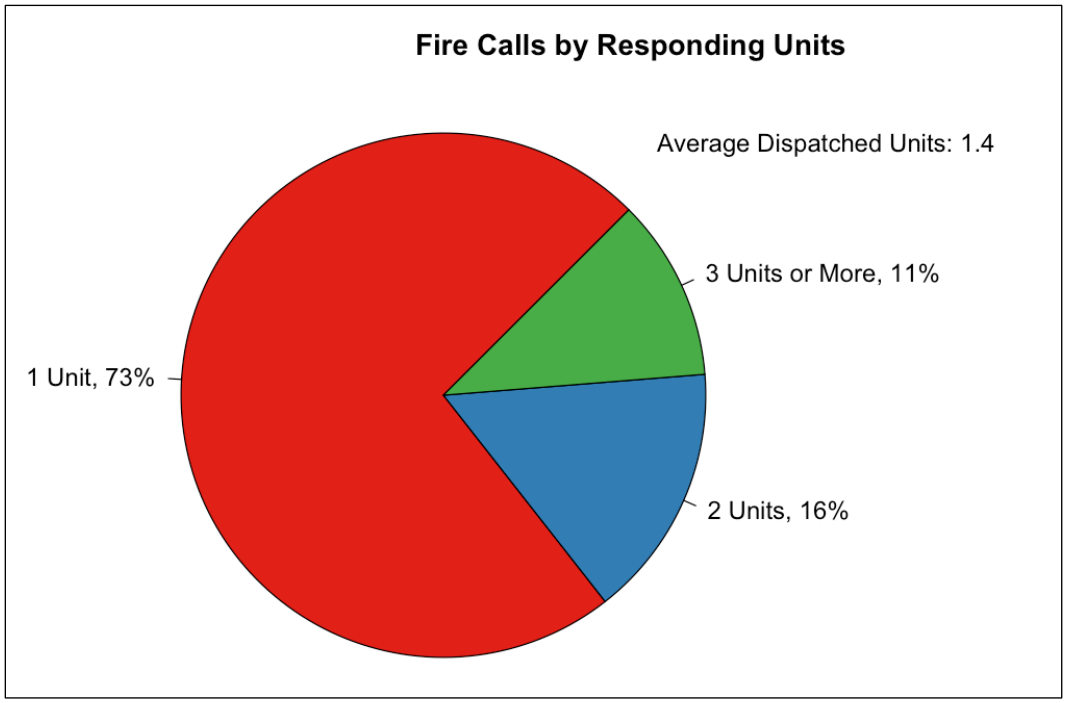


TABLE 8-3: Number of Units Dispatched to Calls by Call Type

Call Type	Number of Units			Total Calls
	One	Two	Three or Four	
Breathing difficulty	268	7	0	275
Cardiac and stroke	382	15	0	397
Fall and injury	591	15	0	606
Illness and other	960	20	2	982
MVA	145	52	5	202
Overdose and psychiatric	473	11	0	484
Seizure and unconsciousness	401	10	0	411
EMS Total	**3,220**	**130**	**7**	**3,357**
False alarm	232	100	34	366
Good intent	107	8	9	124
Hazard	36	2	11	49
Outside fire	118	28	17	163
Public service	203	8	3	214
Structure fire	7	5	34	46
Fire Total	**703**	**151**	**108**	**962**
Canceled	199	12	6	217
Mutual aid	15	4	1	20
Total	**4,137**	**297**	**122**	**4,556**
Percentage	**90.8**	**6.5**	**2.7**	**100.0**

Observations:

Overall

- On average, 1.1 units were dispatched to all calls, and for 91 percent of calls only one unit was dispatched.
- Overall, three or more units were dispatched to 3 percent of calls.

EMS

- On average, 1.0 units were dispatched per EMS call.
- For EMS calls, one unit was dispatched 96 percent of the time and two or three units were dispatched 4 percent of the time.

Fires

- On average, 1.4 units were dispatched per fire call.
- For fire calls, one unit was dispatched 73 percent of the time; two units were dispatched 16 percent of the time; and three or four units were dispatched 11 percent of the time.
- For structure fire calls, three units were dispatched 54 percent of the time and four or more units were dispatched 20 percent of the time.
- For outside fire calls, three units were dispatched 10 percent of the time and four or more units were dispatched 1 percent of the time.

CALLS BY LOCATION

Table 8-4 and Figure 8-5 show the number of calls by call type and call location. Figure 6 shows the percentage of call types by call location with the city. Call locations within the city are based on first due station areas.

TABLE 8-4: Calls by Type and Location

Call Location	Number of Calls				Percent of Calls
	EMS	Fire	Other	Total	
Station 1	2,080	530	131	2,741	60.2
Station 2	622	246	50	918	20.1
Station 3	655	186	31	872	19.1
Out of City	0	0	25	25	0.5
Total	**3,357**	**962**	**237**	**4,556**	**100.0**

FIGURE 8-5: Call Distribution Across City

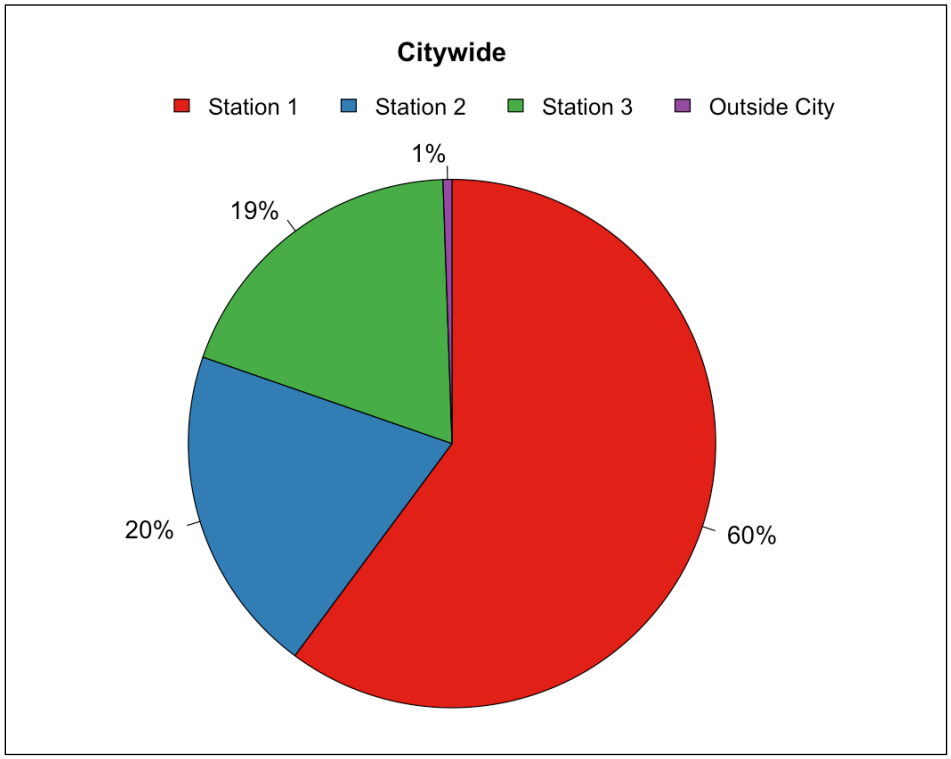
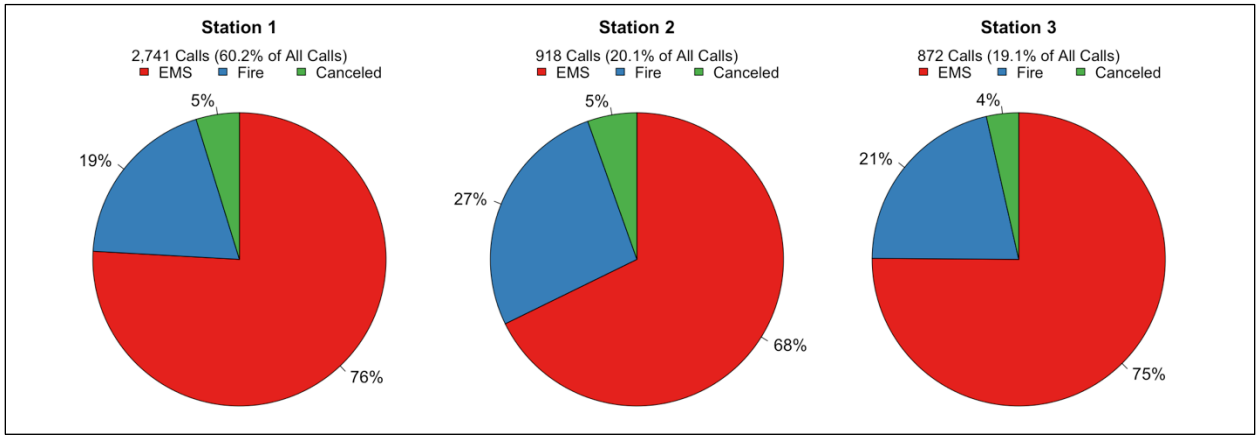


FIGURE 8-6: Call Types by Station Area



Observations:

- 60 percent of the department's calls are in station 1's first due area, with the remaining calls split evenly across station 2 (20 percent) and station 3 (19 percent).
- Fire calls make up a larger percentage of calls in station 2's first due area (27 percent) compared with station 1 (19 percent) and station 3 (21 percent).

WORKLOAD: RUNS AND TOTAL TIME SPENT

The workload of each unit is reported in two ways: deployed time and runs. A dispatch of a unit is defined as a run; thus, one call might include multiple runs, which results in a higher total number of runs than total number of calls. The deployed time of a run is from the time a unit is dispatched through the time the unit is cleared.

Mutual aid calls for outside fires are separated from other mutual aid calls in this section and omitted from the workload by hour analysis due to the effect they have on overall averages.

Runs and Deployed Time – All Units

Deployed time, also referred to as deployed hours, is the total deployment time of all the units deployed on all calls. Table 8-5 shows the total deployed time, both overall and broken down by type of call, for ECFD units during the year studied.

TABLE 8-5: Annual Runs and Deployed Time by Run Type

Run Type	Avg. Deployed Min. per Run	Total Annual Hours	Percent of Total Hours	Avg. Deployed Minutes per Day	Total Annual Runs	Avg. Runs per Day
Breathing difficulty	21.3	100.2	4.4	16.5	282	0.8
Cardiac and stroke	24.1	165.2	7.3	27.2	412	1.1
Fall and injury	21.2	219.1	9.6	36.0	621	1.7
Illness and other	19.5	326.3	14.4	53.6	1,006	2.8
MVA	23.6	103.9	4.6	17.1	264	0.7
Overdose and psychiatric	20.9	172.3	7.6	28.3	495	1.4
Seizure and unconsciousness	23.2	162.7	7.2	26.7	421	1.2
EMS Total	**21.4**	**1,249.7**	**55.0**	**205.4**	**3,501**	**9.6**
False alarm	10.2	90.6	4.0	14.9	535	1.5
Good intent	14.2	36.3	1.6	6.0	153	0.4
Hazard	25.2	31.1	1.4	5.1	74	0.2
Outside fire	20.8	78.2	3.4	12.9	226	0.6
Public service	24.3	92.6	4.1	15.2	229	0.6
Structure fire	72.3	154.2	6.8	25.4	128	0.4
Fire Total	**21.5**	**483.0**	**21.2**	**79.4**	**1,345**	**3.7**
Canceled	8.8	35.5	1.6	5.8	242	0.7
Mutual aid	64.5	10.7	0.5	1.8	10	0.0
Mutual aid–wildland	1,853.9	494.4	21.7	81.3	16	0.0
Total	**26.7**	**2,273.3**	**100.0**	**373.7**	**5,114**	**14.0**

Note: Mutual aid–wildland calls are mutual aid for outside fires. The number of mutual aid and mutual aid–wildland runs per day were so low that when rounded to the nearest one-tenth, they each appear to be zero.

Observations:

Overall

- Total deployed time for the year was 2,273 hours. The daily average was 6.2 hours for all units combined.
- There were 5,114 runs, including 26 runs dispatched for mutual aid calls. The daily average was 14.0 runs.

EMS

- EMS runs accounted for 55 percent of the total workload.
- The average deployed time for EMS runs was 21.4 minutes. The total deployed time for all EMS runs averaged 3.4 hours per day.

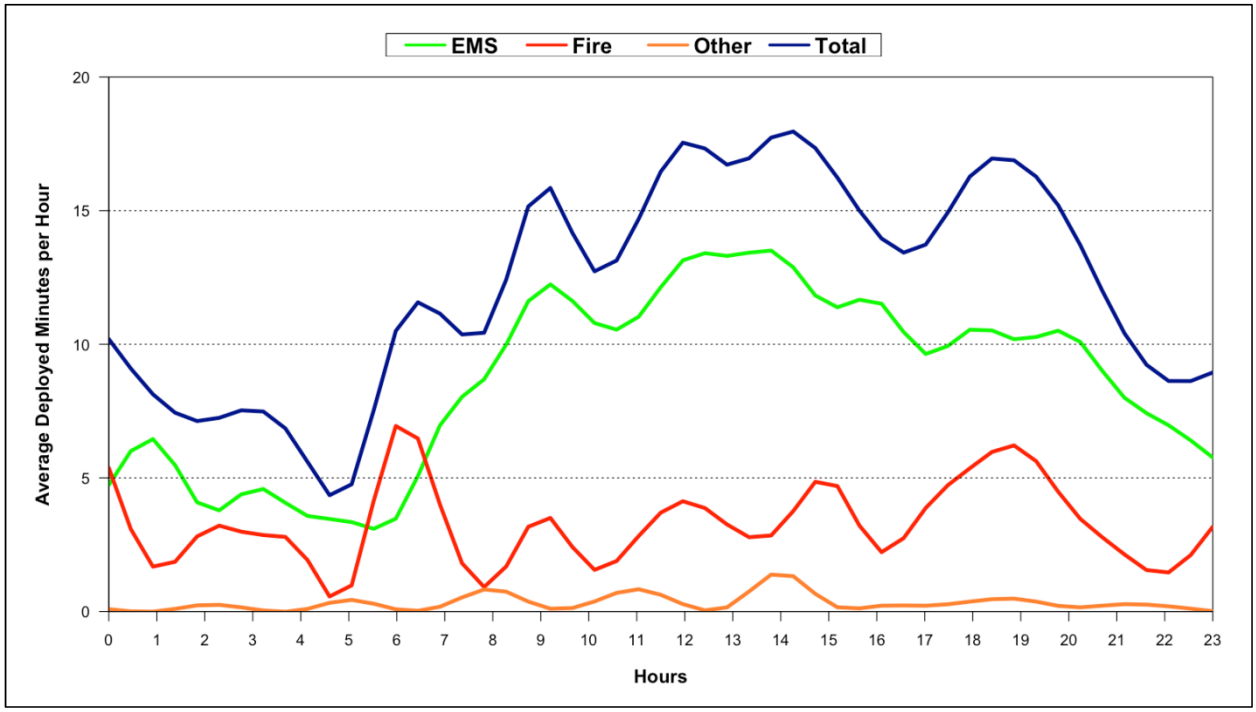
Fires

- Fire runs accounted for 21 percent of the total workload.
- There were 354 runs for structure and outside fire calls, with a total workload of 232 hours. This accounted for 10 percent of the total workload.
- The average deployed time for structure fire runs was 72.3 minutes, and the average deployed time for outside fire runs was 20.8 minutes.

Mutual aid – Wildland

- One mutual aid–wildland call lasted 13 days; one lasted 3 days; one lasted 2 days; 7 lasted between 4 and 8 hours, and 3 lasted under 4 hours.

FIGURE 8-7: Average Deployed Minutes by Hour of Day



Note: Excludes mutual aid for outside fires.

TABLE 8-6: Average Deployed Minutes by Hour of Day

Hour	EMS	Fire	Other	Total
0	4.7	5.4	0.1	10.2
1	6.4	1.6	0.0	8.0
2	3.8	3.1	0.3	7.1
3	4.6	2.9	0.1	7.6
4	3.7	2.3	0.0	6.0
5	3.4	0.7	0.4	4.6
6	3.5	7.0	0.1	10.6
7	7.3	3.4	0.2	11.0
8	9.1	1.0	0.8	11.0
9	12.2	3.6	0.2	16.0
10	11.0	1.7	0.3	12.9
11	11.0	2.7	0.8	14.5
12	13.2	4.1	0.2	17.6
13	13.3	3.1	0.3	16.7
14	13.3	3.1	1.5	18.0
15	11.4	5.0	0.3	16.7
16	11.6	2.3	0.2	14.2
17	9.7	3.8	0.2	13.7
18	10.6	5.4	0.4	16.4
19	10.2	6.1	0.5	16.8
20	10.4	3.9	0.2	14.5
21	8.3	2.4	0.3	10.9
22	7.1	1.4	0.2	8.7
23	5.8	3.2	0.0	8.9
Daily Avg.	**205.4**	**79.4**	**7.6**	**292.4**

Note: Excludes mutual aid for outside fires.

Observations:

- Hourly deployed time was highest during the day from noon to 4:00 p.m. and from 7:00 p.m. to 8:00 p.m., averaging between 17 and 18 minutes.
- Average deployed time peaked between 2:00 p.m. and 3:00 p.m., averaging 18 minutes.
- Hourly deployed time was lowest between 5:00 a.m. and 6:00 a.m., averaging 5 minutes.

Workload by Call Location

Table 8-7 shows the total deployed time for ECFD units based on the call location.

TABLE 8-7: Annual Runs and Deployed Time by Call Location

Call Location	Avg. Deployed Min. per Run	Total Annual Hours	Percent of Total Hours	Avg. Deployed Minutes per Day	Total Annual Runs	Avg. Runs per Day
Station 1	20.2	998.2	43.9	164.1	2,970	8.1
Station 2	20.0	375.0	16.5	61.6	1,125	3.1
Station 3	23.6	388.1	17.1	63.8	987	2.7
Out of City	66.3	17.7	0.8	2.9	16	0.0
Out of City–wildland	1,853.9	494.4	21.7	81.3	16	0.0
Total	**26.7**	**2,273.3**	**100.0**	**373.7**	**5,114**	**14.0**

Note: Runs to calls outside of the city does not equal runs for mutual aid calls because some canceled calls were outside of the city. The number of runs per day to calls outside the city were so low that when rounded to the nearest one-tenth appear to be zero.

Observations:

- Runs for calls in Station 1's area accounted for 44 percent of the department's deployed time and 58 percent of runs.
  - Excluding calls outside the city, runs for calls in station 1's area accounted for 57 percent of the department's deployed time and 58 percent of runs.
- Aside from runs to calls outside the city, runs to calls in station 3's area accounted for the second largest percentage of the department's work (17 percent) but the lowest percentage of runs (19 percent).

Workload by Unit

Table 8-8 provides a summary of each unit's workload overall. Tables 8-9 and 8-10 provide a more detailed view of workload, showing each unit's runs broken out by call type (Table 8-9) and the resulting daily average deployed time by call type (Table 8-10).

The impact of part-time staffing on engines and rescue squads is evaluated in the section on rapid response units.

TABLE 8-8: Call Workload by Unit

Station	Unit	Unit Type	Avg. Deployed Min. per Run	Total Annual Hours	Avg. Deployed Mins. per Day	Total Annual Runs	Avg. Runs per Day
1	3111	Engine	19.6	710.9	116.9	2,174	6.0
	3121	Engine	423.3	14.1	2.3	2	0.0
	3161	Rescue Squad	20.7	233.5	38.4	676	1.9
	3191	Ladder	105.4	65.0	10.7	37	0.1
2	3112	Engine	22.0	409.3	67.3	1,117	3.1
3	3113	Engine	49.1	743.9	122.3	909	2.5
	3163	Rescue Squad	27.5	90.7	14.9	198	0.5
	Air-1	Mobile Air Unit	360.0	6.0	1.0	1	0.0
Total			**26.7**	**2,273.3**	**373.7**	**5,114**	**14.0**

Note: Some units had so few runs that the average runs per day, when rounded to the nearest one-tenth, appear to be zero.

Observations:

- Engine 3111 made the most runs (2,174, or an average of 6 per day) and had the second-highest total annual deployed time (711 hours, or an average of 117 minutes per day).
  - EMS calls accounted for 67 percent of the runs and 69 percent of deployed time.
  - Structure and outside fires combined accounted for 7 percent of the runs and 14 percent of deployed time.
- Engine 3112 made the second most runs (1,117, or an average of 3.1 per day) and had the third-highest total annual deployed time (409 hours, or an average of 67 minutes per day).
  - EMS calls accounted for 61 percent of the runs and 64 percent of deployed time.
  - Structure and outside fires combined accounted for 10 percent of the runs and 17 percent of deployed time.
- Engine 3113 made the fewest runs for an engine (909, or an average of 2.5 per day) but had the highest total annual deployed time of the three engines (744 hours, or an average of 122 minutes per day).
  - Two mutual aid calls for outside fires accounted for 53 percent of the deployed time.

TABLE 8-9: Total Annual Runs by Call Type and Unit

Station	Unit	Unit Type	EMS	False Alarm	Good Intent	Hazard	Outside Fire	Public Service	Structure Fire	Canceled	Mutual Aid	Total
1	3111	Engine	1,454	258	68	29	107	112	42	100	4	2,174
	3121	Engine	0	0	0	0	0	0	0	1	1	2
	3161	Rescue Squad	581	10	22	1	2	20	10	30	0	676
	3191	Ladder	22	3	2	1	1	3	2	1	2	37
2	3112	Engine	679	149	39	25	74	41	37	66	7	1,117
3	3113	Engine	609	105	17	16	40	43	30	38	11	909
	3163	Rescue Squad	156	10	5	2	2	10	7	6	0	198
	Air-1	Mobile Air Unit	0	0	0	0	0	0	0	0	1	1
Total			**3,501**	**535**	**153**	**74**	**226**	**229**	**128**	**242**	**26**	**5,114**

TABLE 8-10: Daily Average Deployed Minutes by Call Type and Unit

Station	Unit	Unit Type	EMS	False Alarm	Good Intent	Hazard	Outside Fire	Public Service	Structure Fire	Canceled	Mutual Aid	Total
1	3111	Engine	80.1	7.3	2.7	1.8	5.9	5.9	10.4	1.8	1.0	116.9
	3121	Engine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.3	2.3
	3161	Rescue Squad	34.3	0.2	0.8	0.0	0.1	0.9	1.2	0.9	0.0	38.4
	3191	Ladder	1.5	0.1	0.1	0.1	0.0	0.1	0.3	0.0	8.5	10.7
2	3112	Engine	42.9	3.6	1.6	1.9	4.7	1.9	7.0	1.1	2.5	67.3
3	3113	Engine	37.4	3.5	0.5	1.3	2.1	1.8	5.9	0.9	68.8	122.3
	3163	Rescue Squad	9.3	0.2	0.2	0.1	0.0	4.6	0.5	0.0	0.0	14.9
	Air-1	Mobile Air Unit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0
Total			**205.4**	**14.9**	**6.0**	**5.1**	**12.9**	**15.2**	**25.4**	**5.8**	**83.0**	**373.7**

Note: Some units had such low total deployed time for a specific call type that the average deployed minutes per day, when rounded to the nearest one-tenth, appears to be zero.

ANALYSIS OF BUSIEST HOURS

There is significant variability in the number of calls from hour to hour. One special concern relates to the resources available for hours with the heaviest workload. We tabulated the data for each of the 8,760 hours in the year. Table 8-11 shows the number of hours in the year in which there were from zero to three or more calls during the hour. Table 8-12 shows the 10 one-hour intervals during the year with the most calls.

TABLE 8-11: Frequency Distribution of the Number of Calls

Calls in an Hour	Frequency	Percentage
0	5,330	60.8
1	2,537	29.0
2	696	7.9
3+	197	2.2

TABLE 8-12: Top 10 Hours with the Most Calls Received

Hour	Number of Calls	Number of Runs	Total Deployed Hours
06/20/2016 – 2:00 p.m. to 3:00 p.m.	5	9	16.5
02/06/2017 – 10:00 a.m. to 11:00 a.m.	5	5	1.5
08/15/2016 – 4:00 p.m. to 5:00 p.m.	5	5	0.8
12/26/2016 – 9:00 a.m. to 10:00 a.m.	4	7	2.0
04/01/2017 – 1:00 p.m. to 2:00 p.m.	4	7	1.8
12/16/2016 – 8:00 p.m. to 9:00 p.m.	4	6	1.7
12/22/2016 – 4:00 p.m. to 5:00 p.m.	4	6	1.3
08/30/2016 – 5:00 p.m. to 6:00 p.m.	4	6	1.2
12/21/2016 – 8:00 p.m. to 9:00 p.m.	4	5	3.7
11/28/2016 – 5:00 p.m. to 6:00 p.m.	4	5	2.5

Note: Total deployed hours is the total time spent responding to calls received in the hour, and which may extend into the next hour or hours. Number of runs and deployed hours only includes ECFD units.

Observations:

- During 197 hours (2 percent of all hours), 3 or more calls occurred; in other words, the department responded to 3 or more calls in an hour roughly once every two days.
- The highest number of calls to occur in an hour was 5, which happened three times.
- One hour with the most calls was 2:00 p.m. to 3:00 p.m. on June 20, 2016. The hour's 5 calls involved 9 individual dispatches resulting in 16.5 hours of deployed time. These 5 calls included two structure fire calls, one canceled call, one fall and injury call, and one mutual aid call.
- Another hour with the most calls was 10:00 a.m. to 11:00 a.m. on February 6, 2017. The hour's 5 calls involved 5 individual dispatches resulting in 1.5 hours of deployed time. These 5 calls included two cardiac and stroke calls, one illness and other call, one overdose and psychiatric call, and one public service call.

Overlapping Calls

An overlapping call is defined as a call that starts while another call is still active. The call that was already active is not counted as an overlapping call. A call's start time is based on the dispatch time for the first non-administrative unit and is considered active until the latest clear time of any non-administrative unit that responded to the call. Each call is counted only once, even if it overlaps with multiple other calls. In the analysis, if calls overlap for fewer than 30 seconds they are counted as non-overlapping calls.

Table 8-13 shows the number of overlapping calls and total hours spent on overlapping calls during the study period by first due area and for the department overall. The number of overlapping calls for the department overall includes mutual aid calls. Table 8-14 shows the frequency of overlapping calls.

TABLE 8-13: Number of Overlapping Calls

First Due Area	Number of Calls	Total Hours of Overlap	Percent of Hours in Year with Overlap
Station 1	279	41.5	0.5
Station 2	34	5.0	0.1
Station 3	33	6.3	0.1
Overall	**1,051**	**208.4**	**2.4**
Overall excluding multiday outside fires	**864**	**140.5**	**1.6**

Note: Because calls in two or more station first due areas may overlap, the overall number of overlapping calls is higher than the sum of the overlapping calls in each station's first due area. All multiday outside fires were mutual aid calls that occurred outside the city.

TABLE 8-14: Frequency of Overlapping Calls

Scenario	All Calls		Excluding Multiday Outside Fires	
	Number of Calls	Percent of All Calls	Number of Calls	Percent of All Calls
No overlapped call	3,505	76.9	3,689	81.0
Overlapped with one call	922	20.2	777	17.1
Overlapped with two calls	120	2.6	82	1.8
Overlapped with three calls	9	0.2	5	0.1

Observations:

- During the year studied, Station 1's first due area had the most overlapping calls (279) and the highest total hours of overlap (42 hours or 0.5 percent of all hours in the year).
- Overall, 23 percent (1,051 calls) of the department's calls overlapped with at least one other call.
  - On average, 2.9 of the department's 12.5 calls per day overlapped with at least one other call.

- Every call that occurs in the city during a multiday mutual aid call for outside fires is considered an overlapping call. Excluding the three, multiday mutual aid calls for outside fires, 19 percent (864 calls) of the department's calls overlapped with at least one other call.
  - Under this calculation, on average, 2.4 of the department's 12.5 calls per day overlapped with at least one other call.

RESPONSE TIME

In this part of the analysis we present response time statistics for different call types.

Different terms are used to describe the components of response time. Dispatch time is the difference between the time a call is received and the time a unit is dispatched. Turnout time is the difference between dispatch time and the time a unit is en route. Travel time is the difference between the time en route and arrival on scene. Response time is the total time elapsed between receiving a call to arriving on scene.

In this analysis, we focus on the highest priority calls. Call priority was determined by the response mode recorded in the NFIRS data. In this response time analysis, we included all calls to which at least one non-administrative ECFD unit responded with lights and sirens, excluding canceled and mutual aid calls. Calls with a total response time of more than 30 minutes were also excluded. Finally, we focused on units that had time stamps that resulted in dispatch, turnout, and travel times above zero seconds.

Based on the methodology above, we excluded 237 canceled and mutual aid calls; 153 calls responded to without lights and sirens; 7 calls with response times over 30 minutes; 37 noncanceled calls where no unit recorded an on-scene time; and 56 calls with time stamps that resulted in at least one response time segment of zero seconds. As a result, in this section, a total of 4,066 calls are included in the analysis.

Response Times by Type of Call

Table 8-15 provides average dispatch, turnout, travel, and total response time for the first arriving unit to each call in the city, by call type. Figures 8-8 and 8-9 illustrate the same information. Table 8-16 gives the 90th percentile times. A 90th percentile time means that 90 percent of calls had response times at or below that number.

FIGURE 8-8: Average Response Times of First Arriving Unit, by Call Type – EMS

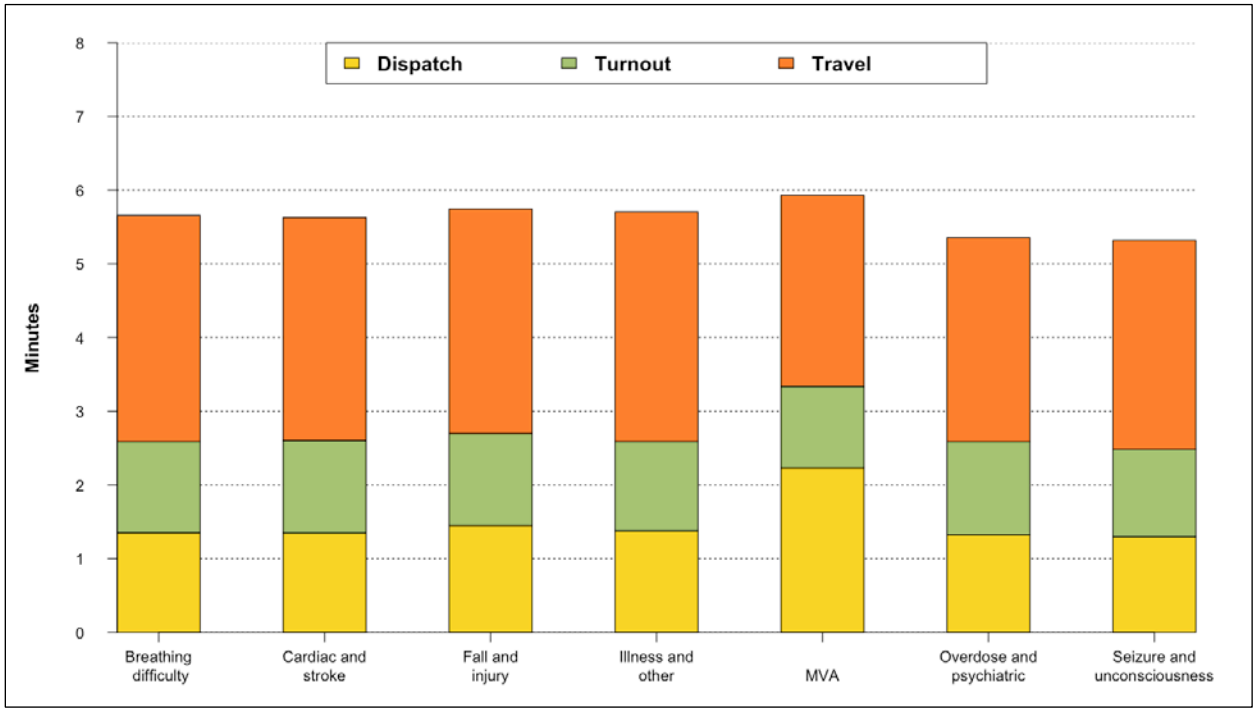


FIGURE 8-9: Average Response Times of First Arriving Unit, by Call Type – Fire

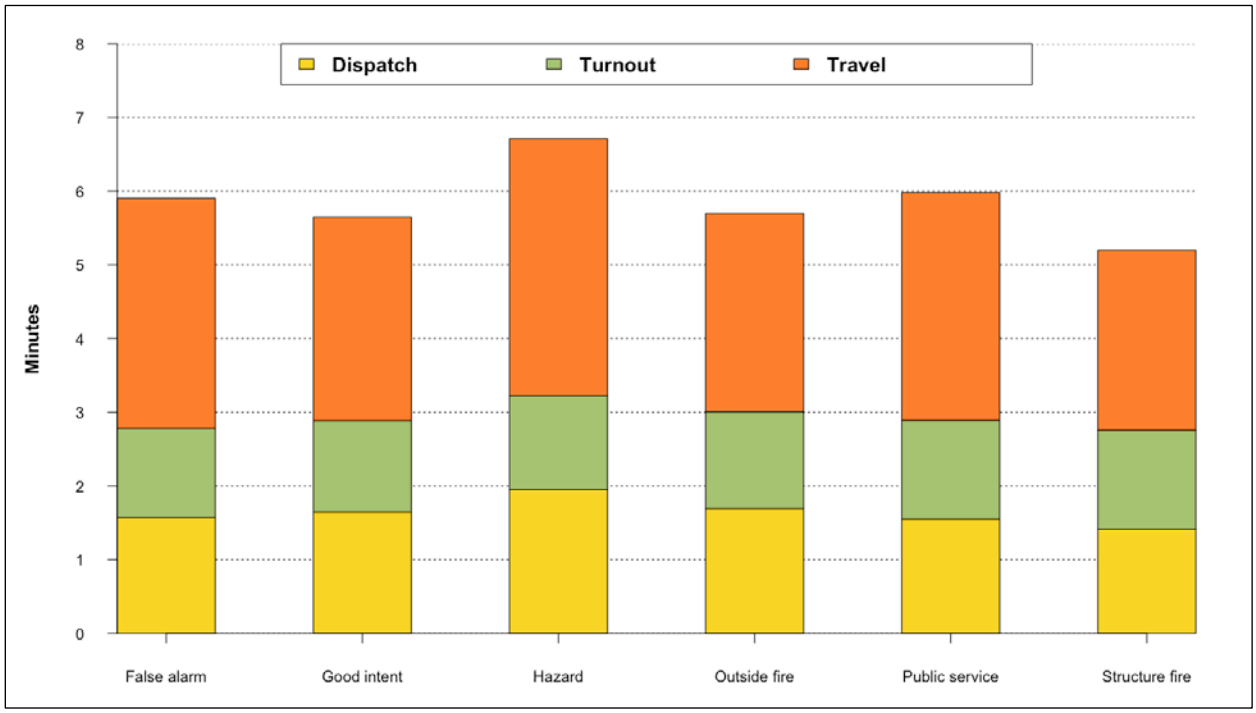


TABLE 8-15: Average Response Times of First Arriving Unit, by Call Type (Minutes)

Call Type	Dispatch	Turnout	Travel	Total	Number of Calls
Breathing difficulty	1.4	1.2	3.1	5.7	272
Cardiac and stroke	1.4	1.3	3.0	5.6	390
Fall and injury	1.5	1.3	3.0	5.7	593
Illness and other	1.4	1.2	3.1	5.7	958
MVA	2.2	1.1	2.6	5.9	191
Overdose and psychiatric	1.3	1.3	2.8	5.4	474
Seizure and unconsciousness	1.3	1.2	2.8	5.3	406
EMS Total	**1.4**	**1.2**	**3.0**	**5.6**	**3,284**
False alarm	1.6	1.2	3.1	5.9	273
Good intent	1.6	1.2	2.8	5.6	119
Hazard	2.0	1.3	3.5	6.7	46
Outside fire	1.7	1.3	2.7	5.7	155
Public service	1.6	1.3	3.1	6.0	144
Structure fire	1.4	1.3	2.4	5.2	45
Fire Total	**1.6**	**1.3**	**3.0**	**5.8**	**782**
Total	**1.5**	**1.2**	**3.0**	**5.7**	**4,066**

TABLE 8-16: 90th Percentile Response Times of First Arriving Unit, by Call Type (Minutes)

Call Type	Dispatch	Turnout	Travel	Total	Number of Calls
Breathing difficulty	1.9	1.9	4.7	7.8	272
Cardiac and stroke	2.1	1.9	4.7	7.6	390
Fall and injury	2.4	2.0	4.9	8.0	593
Illness and other	2.1	1.9	5.1	7.8	958
MVA	3.3	1.8	4.0	8.0	191
Overdose and psychiatric	2.2	2.0	4.6	7.6	474
Seizure and unconsciousness	1.9	1.9	4.5	7.4	406
EMS Total	**2.2**	**1.9**	**4.8**	**7.8**	**3,284**
False alarm	2.4	1.9	5.2	8.0	273
Good intent	2.8	2.0	4.7	8.3	119
Hazard	2.8	2.1	5.6	8.3	46
Outside fire	2.5	1.9	4.4	7.8	155
Public service	2.7	2.1	4.8	8.3	144
Structure fire	2.1	1.9	3.9	6.7	45
Fire Total	**2.5**	**1.9**	**4.9**	**8.0**	**782**
Total	**2.3**	**1.9**	**4.8**	**7.8**	**4,066**

Observations:

- The average dispatch time was 1.5 minutes.
- The average turnout time was 1.2 minutes.
- The average travel time was 3.0 minutes.
- The average response time was 5.7 minutes.
- The average response time was 5.6 minutes for EMS calls and 5.8 minutes for fire calls.
- The average response time for structure fires was 5.2 minutes and for outside fires was 5.7 minutes.
- The 90th percentile dispatch time was 2.3 minutes.
- The 90th percentile turnout time was 1.9 minutes.
- The 90th percentile travel time was 4.8 minutes.
- The 90th percentile response time was 7.8 minutes.
- The 90th percentile response time was 7.8 minutes for EMS calls and 8.0 minutes for fire calls.
- The 90th percentile response time for structure fires was 6.7 minutes, and for outside fires was 7.8 minutes.

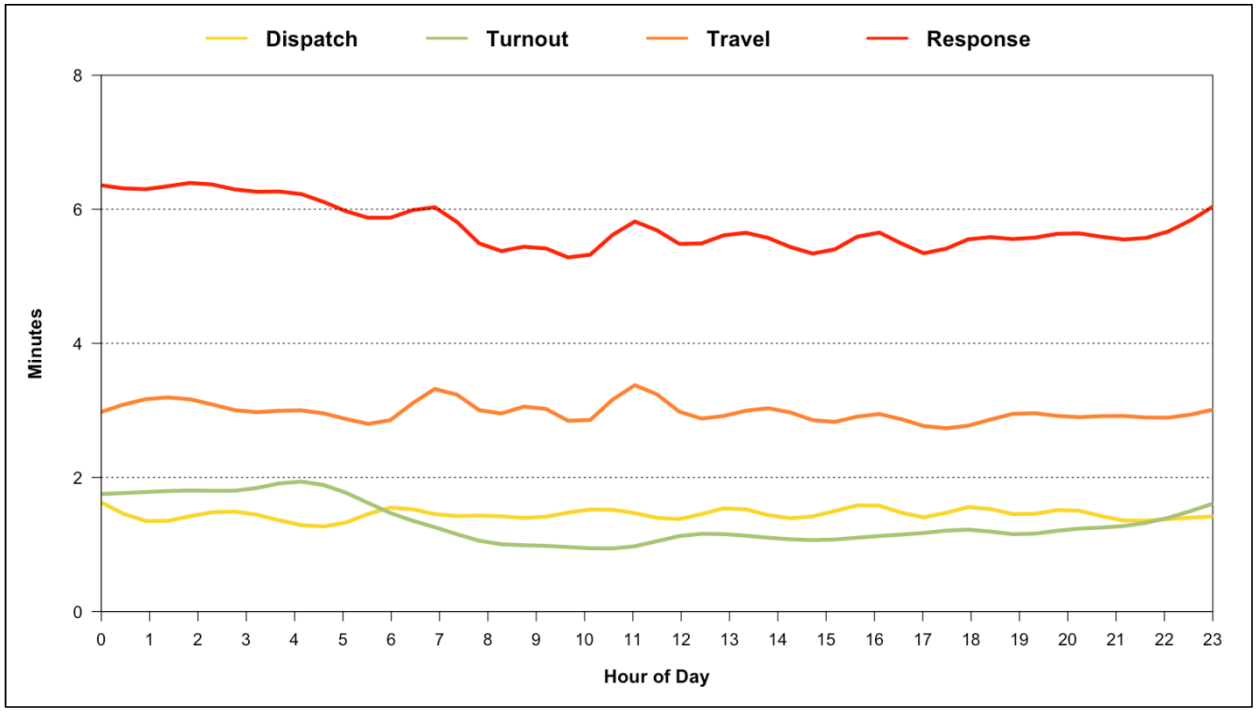
Response Times by Hour

Average dispatch, turnout, travel, and total response times by hour for calls are shown in Table 8-17 and Figure 8-10. The table also shows 90th percentile response times.

TABLE 8-17: Average and 90th Percentile Response Times of First Arriving Unit, by Hour of Day

Hour	Dispatch	Turnout	Travel	Response Time	90th Percentile Response Time	Number of Calls
0	1.6	1.8	3.0	6.4	8.6	94
1	1.3	1.8	3.2	6.3	7.8	121
2	1.4	1.8	3.1	6.4	9.0	78
3	1.5	1.8	3.0	6.3	8.1	83
4	1.3	1.9	3.0	6.2	8.1	71
5	1.3	1.8	2.9	6.0	8.2	67
6	1.6	1.5	2.9	5.9	8.5	90
7	1.4	1.2	3.3	6.0	7.9	129
8	1.4	1.0	2.9	5.4	7.7	177
9	1.4	1.0	3.1	5.5	8.0	216
10	1.5	0.9	2.8	5.3	7.7	236
11	1.5	1.0	3.4	5.8	8.6	229
12	1.4	1.1	3.0	5.5	7.5	255
13	1.5	1.1	2.9	5.6	7.8	255
14	1.4	1.1	3.0	5.5	7.8	259
15	1.5	1.1	2.8	5.4	7.4	226
16	1.6	1.1	2.9	5.7	7.7	218
17	1.4	1.2	2.8	5.3	7.3	217
18	1.6	1.2	2.8	5.6	7.5	201
19	1.4	1.2	3.0	5.6	7.9	188
20	1.5	1.2	2.9	5.6	7.8	216
21	1.4	1.3	2.9	5.6	7.6	171
22	1.4	1.4	2.9	5.6	7.6	138
23	1.4	1.6	3.0	6.0	8.1	131

FIGURE 8-10: Average Response Time of First Arriving Unit, by Hour of Day



Observations:

- Average dispatch time was between 1.3 minutes (1:00 a.m. to 2:00 a.m. and 4:00 a.m. to 6:00 a.m.) and 1.6 minutes (midnight to 1:00 a.m., 6:00 a.m. to 7:00 a.m., 4:00 p.m. to 5:00 p.m., 6:00 p.m. to 7:00 p.m.).
- Average turnout time was between 0.9 minutes (10:00 a.m. to 11:00 a.m.) and 1.9 minutes (4:00 a.m. to 5:00 a.m.).
- Average travel time was between 2.8 minutes (10:00 a.m. to 11:00 a.m., 3:00 p.m. to 4:00 p.m., and 5:00 p.m. to 7:00 p.m.) and 3.4 minutes (11:00 a.m. to noon).
- Average total response time was between 5.3 minutes (10:00 a.m. to 11:00 a.m. and 5:00 p.m. to 6:00 p.m.) and 6.4 minutes (midnight to 1:00 a.m. and 2:00 a.m. to 3:00 a.m.).
- 90th percentile total response time by hour ranged from 7.3 minutes (5:00 p.m. to 6:00 p.m.) to 9.0 minutes (2:00 a.m. to 3:00 a.m.).

Response Times by First Due Station

Tables 8-18 and 8-19 show the average and 90th percentile response times by station area. The station area is the area in which the call occurred, not the station from which a unit responded.

TABLE 8-18: Average Response Times by Station Area

First Due	Call Type	Dispatch	Turnout	Travel	Total	Number of Calls
Station 1	EMS	1.4	1.2	2.7	5.3	2,038
	Fire	1.6	1.3	2.7	5.6	427
	Total	**1.4**	**1.2**	**2.7**	**5.4**	**2,465**
Station 2	EMS	1.5	1.2	3.5	6.2	609
	Fire	1.7	1.2	3.4	6.3	208
	Total	**1.6**	**1.2**	**3.4**	**6.2**	**817**
Station 3	EMS	1.5	1.3	3.3	6.0	637
	Fire	1.7	1.2	3.1	5.9	147
	Total	**1.5**	**1.3**	**3.2**	**6.0**	**784**

TABLE 8-19: 90th Percentile Response Times by Station Area

First Due	Call Type	Dispatch	Turnout	Travel	Total	Number of Calls
Station 1	EMS	2.1	2.0	4.4	7.3	2,038
	Fire	2.4	2.0	4.6	7.9	427
	Total	**2.2**	**2.0**	**4.4**	**7.5**	**2,465**
Station 2	EMS	2.4	1.8	5.3	8.2	609
	Fire	2.6	1.9	5.2	8.4	208
	Total	**2.4**	**1.9**	**5.3**	**8.3**	**817**
Station 3	EMS	2.2	2.0	5.2	8.0	637
	Fire	2.6	1.9	5.1	8.1	147
	Total	**2.3**	**2.0**	**5.2**	**8.0**	**784**

Observations:

- Average and 90th percent dispatch and turnout times were similar for all stations.
- Travel time varies across station areas with average travel time ranging from 2.7 minutes (station 1) to 3.4 minutes (station 2), and 90th percentile travel time ranging from 4.4 minutes (station 1) to 5.3 minutes (station 2).
- Station 1 has the lowest travel and total response times while station 2 has the highest.

Response Time Distribution

We present a more detailed look here at how response times are distributed. The cumulative distribution of total response time for the first arriving unit to EMS calls is shown in Figure 8-11 and Table 8-20 and for structure and outside fires combined in Figure 8-12 and Table 8-21.

FIGURE 8-11: Cumulative Distribution of Response Time – First Arriving Unit – EMS

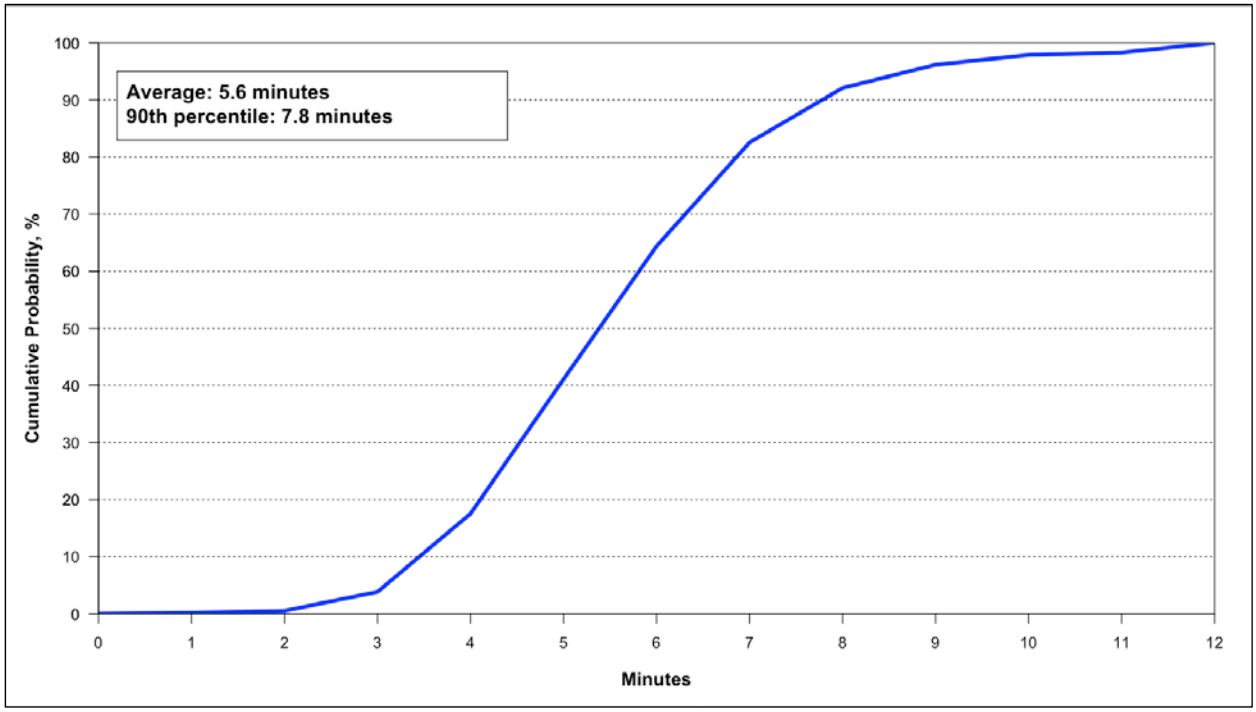


TABLE 8-20: Cumulative Distribution of Response Time – First Arriving Unit – EMS

Response Time (minute)	Frequency	Cumulative Percentage
< 1	6	0.2
1 - 2	11	0.5
2 - 3	109	3.8
3 - 4	450	17.5
4 - 5	773	41.1
5 - 6	765	64.4
6 - 7	597	82.6
7 - 8	313	92.1
8 - 9	134	96.2
9 - 10	56	97.9
10 - 11	14	98.3
11+	56	100.0

FIGURE 8-12: Cumulative Distribution of Response Time – First Arriving Unit – Fires

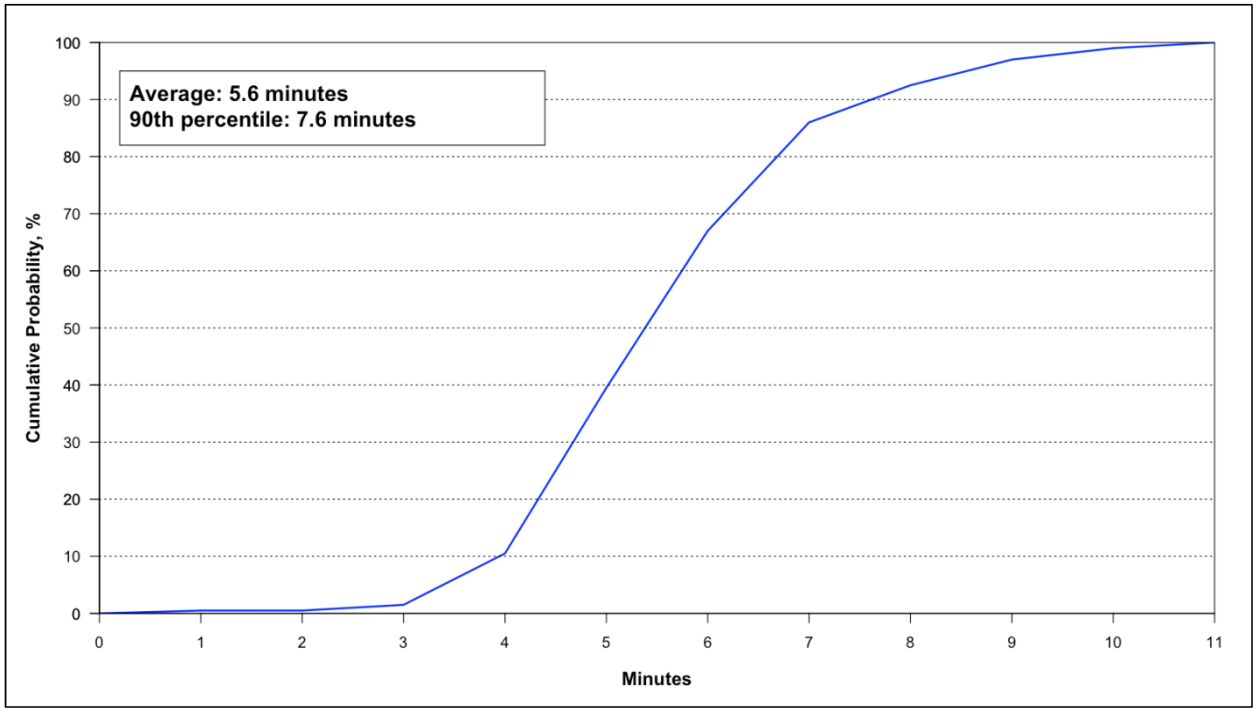


TABLE 8-21: Cumulative Distribution of Response Time – First Arriving Unit – Fires

Response Time (minute)	Frequency	Cumulative Percentage
< 1	1	0.5
1 - 2	0	0.5
2 - 3	2	1.5
3 - 4	18	10.5
4 - 5	58	39.5
5 - 6	55	67.0
6 - 7	38	86.0
7 - 8	13	92.5
8 - 9	9	97.0
9 - 10	4	99.0
10+	2	100.0

Observations:

- For 92 percent of EMS calls, the response time of the first arriving unit was less than 8 minutes.
- For 67 percent of fire calls, the response time of the first arriving unit was less than 6 minutes.

RAPID RESPONSE UNITS

Since 74 percent of the department's calls are medical in nature, the El Centro Fire Department is conducting a trial aimed at increasing the number of units available for calls and decreasing response times to medical calls.

The trial consists of staffing two rapid response units on one of the department's three shifts (shift B). At station 1, rescue squad 3161 is staffed in addition to engine 3111. At station 3, rescue squad 3163 is staffed in place of engine 3113. The department uses a shift schedule that results in each shift working 8 out of every 24 days. This results in 55 days in the trial during the period analyzed.

This section analyzes the impact of this change on workload and response times.

Workload

Table 8-22 shows how the workload of the engines changes when the rescue squads are in use. The difference in workload for the rescue squads is also shown because they were used prior to beginning the trial on shifts when enough staff were available.

TABLE 8-22: Engine and Rescue Squad Workload

Period	Unit	Avg. Deployed Min. per Run	Avg. Deployed Mins. per Day	Avg. Runs per Day
Nontrial	3111	19.3	126.8	6.6
	3161	20.9	19.8	1.0
	3112	22.1	69.5	3.1
	3113	49.2	143.9	2.9
	3163	93.8	6.4	0.1
	Total	**26.8**	**366.4**	**13.7**
Trial	3111	24.8	61.0	2.5
	3161	20.6	142.9	6.9
	3112	20.9	54.7	2.6
	3113	13.1	0.5	0.0
	3163	19.6	63.1	3.2
	Total	**21.1**	**322.2**	**15.3**

Note: Engine 3113 is not staffed on shift B when rescue squad 3163 is used; however, there were two runs recorded on two trial days. Engine 3121, Ladder 3191, and Air-1 are not included in this table.

Observations:

- On days when the rescue squads were staffed, there were an average of 15.3 runs per day, which is more than the average of 13.7 on other days.
- The average minutes per day when rescue squads were staffed was 332 minutes (5.5 hours) compared with the average of 366 minutes (6.1 hours) per day on other days.
  - When multiday outside fires are excluded, during nontrial days the average deployed time per day was 290 minutes (4.8 hours).

Response Times with and without Rapid Response Units

Tables 8-23 and 8-24 show the average and 90th percentile response times to calls on the 55 trial days compared with response times on other days.

TABLE 8-23: Response Times – Trial Days vs. Non-Trial Days

Period	Call Type	Dispatch	Turnout	Travel	Total	Number of Calls
EMS	Nontrial	1.4	1.3	3.0	5.7	2,799
	Trial	1.3	1.0	2.9	5.3	485
Fire	Nontrial	1.6	1.3	3.0	5.8	665
	Trial	1.7	1.3	3.0	5.9	117

TABLE 8-24: 90th Percentile Response Times – With and Without Rapid Response Units

Period	Call Type	Dispatch	Turnout	Travel	Total	Number of Calls
EMS	Nontrial	2.2	2.0	4.9	7.8	2,799
	Trial	2.1	1.7	4.7	7.2	485
Fire	Nontrial	2.4	2.0	4.9	8.0	665
	Trial	2.7	1.9	4.8	8.1	117

Observations:

- The average response time to EMS calls on days with rapid response units was 5.3 minutes, which is 0.4 minutes faster than the average response time of 5.7 minutes to EMS calls on other days.
- The 90th percentile response time to EMS calls on days with rapid response units was 7.2 minutes, which is 0.6 minutes faster than the 90th percentile response time of 7.8 minutes to EMS calls on other days.
- Average and 90th percentile response times to fire calls remained about the same on trial and nontrial days.

TABLE 8-25: Actions Taken Analysis for Structure and Outside Fire Calls

Action Taken	Number of Calls	
	Outside Fire	Structure Fire
Fire control or extinguishment, other	12	3
Extinguishment by fire service personnel	126	29
Salvage & overhaul	16	18
Search	0	2
Provide basic life support (BLS)	1	0
Ventilate	0	8
Forcible entry	1	3
Evacuate area	0	1
Shut down system	0	1
Provide manpower	1	0
Information, investigation & enforcement, other	1	0
Enforce codes	1	0
Investigate	39	24
Investigate fire out on arrival	6	3
Standby	1	1
Total	**205**	**93**

Note: Totals are higher than the total number of structure and outside fire calls because some calls had multiple actions taken.

Observations:

- A total of 126 outside fires were extinguished by fire service personnel, which accounted for 77 percent of outside fires.
- A total of 29 structure fires were extinguished by fire service personnel, which accounted for 63 percent of structure fires.

TABLE 8-26: Content and Property Loss – Structure and Outside Fires

Call Type	Property Loss		Content Loss	
	Loss Value	Number of Calls	Loss Value	Number of Calls
Outside fire	17	$34,150	6	$2,775
Structure fire	19	$1,530,414	15	$509,702
Total	**36**	**$1,564,564**	**21**	**$512,477**

Note: This includes only calls with recorded loss greater than 0.

Observations:

Outside Fires

- Out of 163 outside fires, 17 had recorded property loss, with a combined $34,150 in loss.
- 6 outside fires also had content loss with a combined $2,775 in loss.
- The highest total loss for an outside fire was $17,000.

Structure Fires

- Out of 46 structure fires, 19 had recorded property loss, with a combined $1,530,414 in loss.
- 15 structure fires also had content loss with a combined $509,702 in loss.
- The average total loss for all structure fires was $44,350.
- The average total loss for structure fires with loss was $102,006.
- The highest total loss for a structure fire was $500,000.

TABLE 8-27: Total Fire Loss Above and Below $20,000

Call Type	No Loss	Under $20,000	$20,000 plus
Outside fire	145	18	0
Structure fire	26	7	13
Total	**171**	**25**	**13**

Observations:

- 145 outside fires and 26 structure fires had no recorded loss.
- No outside fires and 13 structure fires had $20,000 or more in loss.

TABLE 8-28: Workload of Administrative Units

Unit ID	Unit Type	Annual Hours	Annual Runs
3101	Fire Chief	272.7	2
3103	Off-Duty Battalion Chief	121.1	4
3104	On-Duty Battalion Chief	147.4	178
3105	Off-Duty Battalion Chief	6.3	3