

## **Contra Costa County Fire Protection District Analysis of Service Delivery Models**

The Contra Costa County Fire Protection District is an “all hazards” organization that provides fire, rescue, and emergency medical services (EMS), to 600,000 residents over a 304 square mile service area. Additionally, the District provides a number of community safety or support functions such as fire prevention (code enforcement, plans review, fire protection system checks, and vegetation management), life safety education, regional dispatch services, training, apparatus repairs, logistics, etc. The District protects the cities of Antioch, Clayton, Concord, Lafayette, Martinez, Pittsburg, Pleasant Hill, San Pablo, and Walnut Creek as well as unincorporated areas of the County including Bay Point, El Sobrante, and Pacheco. In 2011, the District responded to 41,500 incidents.

The Fire District is a government entity and not a business. As such, we do have to consider more than enhancing shareholder wealth, maintaining profit margins, and ensuring return on investment. As a government organization, our highest priority is providing quality fire protection, emergency medical care, and rescue services for our community. However, we do subscribe to basic business principles such as providing the best service and value to our customers, conducting operations and utilizing our resources in an effective and efficient manner, and controlling/reducing costs where possible. We constantly evaluate industry standards, best practices, and other business models to help ensure that we are providing the appropriate level of services in an efficient and cost effective manner. Additionally, we benchmark against other organizations to evaluate our service delivery and support operations.

Each community has unique characteristics such as threats/risks, demographics and population density, environmental factors (area served, topography, water supply, weather, transportation corridors, etc.), stakeholder groups, baseline resources, availability of mutual and automatic aid, etc. that must be evaluated before service delivery decisions are made. Service delivery options or solutions that are appropriate for one community may be unacceptable for another community as many of the relevant factors are different.

The area served by the District contains a number of high risk occupancies including, refineries and bulk storage facilities, chemical plants, hazardous materials transportation (rail, ship, pipeline, and highway), high rise buildings, large commercial and industrial buildings, multiple-family dwellings, health care facilities, and institutional and educational facilities. Additionally, the area presents a significant wildland fire-urban interface threat, as well as potential for natural disasters such as floods and earthquakes. The District routinely responds to structure fires, vegetation fires, medical emergencies, vehicle accidents, rescue calls, utility emergencies, etc. As such, the District’s “all-hazards” approach provides added value to the services we provide to the community.

Fire and emergency medical service delivery is predicated on community threat/risk, local standards, industry standards, and best practices. Based on the County’s General Plan, the current performance measure for the District is to respond within five minutes 90 percent of the time for urban areas. This measure relates to travel time only. The Contra Costa County EMS

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Agency requires a 7.5 minute response time for medical emergencies. The National Fire Protection Association (NFPA) recommends a response time of six minutes 90% of the time. This includes dispatch, turnout, and travel time. In 2010, with 30 fire companies, our response time averaged 6 minutes and 16 seconds. Currently, with 28 companies, our average (not the 90 percentile goal) response time is 6 minutes and 36 seconds. Although the time has increased by 20-seconds, more significant impacts have not been realized yet due to all 28 fire stations remaining open and staffed. However, these statistics indicate that we do not meet the performance standards established by the General Plan or national standards.

Response times are a critical element for public safety. A standard time-temperature curve model indicates that a fire will double in size every two (2) minutes and flashover (rapid fire growth to full involvement of the structure with no chance of survival) will occur in less than eight (8) minutes. From an emergency medical services perspective, clinical brain damage occurs in four to six (4 – 6) minutes without oxygen and brain death occurs in eight (8) minutes. Multiple incidents occurring simultaneously and/or large scale/long-term (multiple alarm) incidents will quickly deplete available resources and exacerbate the extended response times. Another factor that affects our response time and overall capacity is the availability of mutual and automatic aid from neighboring jurisdictions. Currently, a number of our assisting agencies have closed fire stations and reduced capabilities. This reduces their ability to support the District and increases their requests for assistance.

When discussing service delivery options, it is important to review industry standards and best practices and benchmark against other similar jurisdictions when evaluating staffing requirements and models. The International City/County Management Association (ICMA) recommends one firefighter per 1,000 population as a standard for adequate staffing levels. The LAFCO Municipal Service Review from August of 2009 indicated that the District staffing level was .6 per 1,000 residents. This is below the County average of .7/1000 and the Bay Area average of .9/1,000 residents. Due to the de-staffing of two units, the current ratio is .44 firefighters/1,000 residents. This is an extremely low staffing/resource level to protect 600,000 residents, especially considering the community risk and urban setting. Any reduction in fire companies and staffing will only exacerbate our current staffing deficiencies. Cities of comparable populations, (e.g. Denver, Portland, and Tucson) and smaller cities (e.g. Fresno, Oakland, Sacramento, Tulsa, Virginia Beach, Long Beach, Cleveland, and Kansas City) all have ratios of one firefighter per 1,000 residents or greater. The NFPA also recommends four-person minimum staffing on each unit. The District currently staffs each unit with three personnel.

This data demonstrates the significant staffing shortages and lack of capacity that already exists within the District. A number of other jurisdictions across the nation have been forced to remove fire companies from service due to budget constraints. However, as noted, many of those jurisdictions have much greater depth, capacity, and staffing levels for their baseline resources. As such, the impact is not as severe and they have greater flexibility to reallocate resources or consider alternative delivery models. Organizationally, the District is flat and lean and does not meet industry standards or best practices. Although we provide excellent service to the community, there are a significant number of capacity and infrastructure needs that are unmet.

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Due to the current staffing and capacity baseline levels, any reduction in service delivery will present a serious threat to the community. Every effort should be made to prevent this to the extent possible. A deliberative analytical process must be utilized to determine if service delivery options are viable and appropriate for the community. To this end, the District has explored the following service delivery options:

- Service adjustment based on emergency incidents that occur during different times of day and days of the week.
- Reduction in staffing per unit
- Different configurations to respond to emergency medical incidents
- Use of reserve firefighters or volunteers

**It is important to note that every option evaluated reduces the protection and service to the community and diminishes an already insufficient response capability.**

### Service Adjustment Model (SAM):

The SAM would maintain minimum protection/service to all portions of the community until funding is available to restore full service. The statistics for the District indicate that approximately 80% of our incidents were EMS related. Additionally, the majority of incidents occur from approximately 8 A.M. to 8 P.M. on Monday through Friday with some peak periods on Saturday as well. Similar to many businesses, it is possible to align our resources with service delivery demands. However, this is not the ideal model for public safety agencies as the risk of miscalculations, deviations from statistical norms, or outliers will suffer much greater consequences than in the private sector. The District must maintain some additional capacity in the event of significant incidents or multiple emergencies occurring simultaneously. Many residential fires occur during non-peak nighttime and early morning hours when the residents are most vulnerable. In fact, the District has experienced a number of fires where rescues were required during the off-peak time periods. It is critical to maintain some level of presence in all areas of our community in order to provide protection and service and maintain acceptable response times. This is not a traditional approach for the fire service in light of our fixed facilities and 24-hour shift. However, compared to station closures, it demonstrates the ability to adapt to changing environments and subscribe to business principles. Due to low staffing and resource baseline levels, this model should only be a temporary solution that avoids fully closing fire stations. The five versions of the SAM that were evaluated provide financial savings ranging from \$1.5M to \$2M which is the equivalent to the closure of a fire station.

Certainly there are a number of specific challenges and risks related to the SAM. However, the basic concept of the SAM is outlined below:

- This is a temporary solution to a severe fiscal challenge. All units should be restored to a 3-person engine based platform as soon as fiscal conditions permit.
- 28-functional units will be staffed during peak service demand periods on Monday through Saturday from 8 A.M. to 8 P.M.
- At 8 P.M. on Monday through Saturday and all day Sunday, five units will transition from engine companies to “squads” and be reduced to 2-person staffing. This service

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adjustment is based on service demands (call volume and type of incidents) in the affected areas.

- The reduction in staffing will be facilitated by releasing personnel on overtime at 8 P.M.
- All squads will be staffed with a minimum of one paramedic.
- Policies, procedures, training and management controls would be implemented to limit the risk and ensure the safety of the 2-person units.
- Squads will be prohibited from engaging in any interior fire operations (search and rescue and suppression) until the arrival of a fully-staffed engine company.

Pro:

- All stations remain staffed at some level 24/7
- Resources are adjusted based on service demands
- Savings of \$1.5 - \$2M

Con:

- A number of residential structure fires occur at night or non-peak hours. Residents are typically sleeping and at their most vulnerable time during this period. Recognition that the fire is occurring and subsequent notification may be delayed due to the public sleeping. This leads to more significant fire growth and need for search and rescue operations.
- 2-person squads are not permitted to conduct interior search and rescue or fire suppression operations due to safety concerns and OSHA regulations.
- It will take a longer time period to assemble an adequate firefighting force and meet NFPA-1710 recommendations.
- Flexible staffing models are most appropriate when adequate baseline resources exist. Units are added to the baseline during peak demands and de-staffed during non-peak periods.
- Savings are not adequate to eliminate the fiscal deficit.

### Reduction in Staffing Levels from 3 to 2 per Unit:

The NFPA recommends a staffing level of four persons per unit in order to provide safe and effective operations and assemble an adequate firefighting capability in a timely manner. Currently, the District staffs all functional units with three firefighters/ paramedics.

Pro:

- Each of the three positions on the apparatus (includes all three shifts) equates to approximately \$500K to staff for a year. Reduction in staffing on a portion or all of the functional units would save \$500K per position per year.

Con:

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- In 2010, the National Institute of Standards and Technology (NIST) issued a study entitled “Report on Residential Fireground Field Experiments.” The study addressed 22 operational performance tasks based on staffing levels and response time to structure fires in a “typical” 2,000 square foot single family dwelling. The study concluded the following:
  - A 2-person crew took 10% longer than a 3-person crew to apply hose streams to the seat of the fire.
  - A 2-person crew took 25% longer than a 3-person crew to ladder and ventilate the structure.
  - A 2-person crew took 25% longer than a 3-person crew to conduct search and rescue operations.
  - A 2-person crew took 57-seconds longer than a 3-person crew to advance hose lines to the building.
  - Both 3-person and 2-person crews failed to meet the NFPA-1710 recommendations of assembling an adequate firefighting force of 15 personnel on-scene within 8 minutes. However, the 2-person crew took a longer time period and required more units to assemble the 15 personnel. The 8-minute time frame is a critical factor in order to intervene before flashover of the structure when rapid fire spread with no chance of victim survival occurs.
- The fire will grow and intensify and the safety of the public and responders will be compromised as additional units and response time is required to attack the fire. Currently, we dedicate five units and a command officer to obtain the required firefighting force. With 2-person staffing, eight units and a command officer would be required to obtain the same staffing. Since these units would be required to respond from further distances so overall fire operations will be delayed.
- The NIST study only addresses residential fires in an average sized single-family dwelling. The District serves a highly urban area with significant risk levels including heavy industry, hazardous materials, large commercial and high rise buildings, multiple-family dwellings, etc. Currently, the District operates with only 44% of the recommended staffing levels and I am unaware of any urban department that protects a population of 600,000 that operates with this staffing level or 2-person fire crews.
- A study conducted by San Diego State University in 2010 entitled “Initial Attack Effectiveness” addressed staffing for wildland firefighting. The study evaluated 2, 3, 4, and 5 persons on each hose line. This did not include the pump operator/officer in charge. Due to safety concerns and failure to execute the task, they did not even attempt to study one person advancing the hose line which is what would occur with a 2-person crew.

### Different Configurations to Respond to Emergency Medical Incidents:

The Contra Costa County Emergency Medical Services (EMS) Plan identifies an integrated response with fire-based first responders and private transportation providers. The two entities collaborate and complement each other to provide the highest quality and most reliable service to the public with acceptable response times. While this mission for the fire service is clearly articulated in the County EMS plan, it also provides added value by fire resources that are

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geographically distributed to provide fire protection for the community. All life-threatening medical emergencies such as cardiac arrest, heart attacks, difficulty breathing, allergic reactions, trauma, stroke, etc. require rapid response and medical intervention. Fire-based EMS provides highly trained paramedics and EMTs for these patients in a timely manner. Additionally, the fire units remain in the community and are available for subsequent emergencies while the medic unit transports the patient to the hospital. In many cases, it can take an hour for the medic unit to transfer the patient to hospital staff, complete reports, clean and restock the unit. The fire-based units continue to provide EMS and other services during this time period.

It is important to note that any transfer of service from the public sector to the private sector will result in additional costs for the consumers. None of the stakeholders have the additional capacity to absorb a loss of resources. Additionally, increases in private sector EMS units will be single dimensional as they cannot provide fire suppression and rescue services.

The District is often asked why large fire apparatus is dispatched to emergency medical incidents. Residents question the use of a fire engine or ladder truck for this response as opposed to a smaller more fuel efficient model. The large fire apparatus provides a very flexible and versatile platform to conduct our “all-hazards” mission. The entire team can respond to an incident and provide medical care. In many life threatening emergencies (cardiac arrest, trauma, etc.) when carrying heavy patients or when dealing with limited access, all three members of the crew, as well as the medic unit personnel, are needed to provide care. If another serious emergency occurs (structure fire, rescue, etc.) while the crew is on the scene of the initial medical emergency, the entire crew can respond once the initial patient is stabilized and care is transferred to the medic unit. The engine with full staffing can be diverted to higher priority calls (e.g. structure fire instead of a BLS medical emergency or heart attack instead of a fire alarm) if necessary to provide the best service. Again, this highlights the flexibility of the system when limited and inadequate resources are available.

### Pro:

- Smaller units are more fuel efficient.
- Less mileage and maintenance on the large apparatus
- 2-person crews can treat many of the non-life threatening patients
- This is an effective model if the 2-person units are in addition to and augment the fire suppression units. Units assigned to selected fire stations could handle the majority of the EMS incidents and the suppression units would assist on life-threatening emergencies. During fire and rescue incidents both units may be available to respond to provide adequate staffing for operations.

### Con:

- Need to purchase up to 28 light response vehicles equipped with emergency warning devices, radios, computer-aided dispatch, etc. This equates to a minimum of \$30K per vehicle.
- Significant increase in fleet size, maintenance, insurance, etc.

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- When a subsequent incident occurs, the crew will be fragmented. The smaller EMS vehicle may not be available and the fire apparatus will have to respond with one crew member. It is unsafe for a lone operator to drive under emergency conditions, talk on the radio, look at the map or the CAD display, etc. Additionally, once he/she arrives, operational effectiveness is either non-existent or delayed until the remainder of the crew arrives.
- With a very low and lean staffing/resource baseline, the existing units must be flexible, able to divert, and have the ability to respond from incident to incident to perform our all-hazard mission. Other jurisdictions have been able to implement this solution; however, they are starting with a higher per unit staffing level and a greater number of resources so the baseline is not eroded.

### Use of Volunteers or Reserve Firefighters:

Volunteers or reserve firefighters could be utilized to staff out of service units, reduce overtime costs, or augment existing staffing levels. The District currently sponsors a reserve program; however, participation has been limited and unreliable.

#### Pro:

- Volunteers and reserves function at a lower per hour rate for training and emergency response.
- Additional resources or units may be available to supplement or augment existing career units.
- Residents have an opportunity to contribute to and serve their community.
- Volunteers should be recruited to assist with administrative and other support functions that will reduce costs or free uniformed staff to work in front-line operational positions.
- A systematic approach where explorers, cadets, and graduates from community college fire academy programs are utilized as supplemental staffing would enhance their experience and provide additional support personnel.

#### Con:

- Beginning in 2004, Senate Bill (SB) 1207 and Assembly Bill (AB) 2118 required extensive training for volunteers/reserves. SB 1207 mandates that all training required by Cal-OSHA for career personnel also applies to volunteer/reserve firefighters. AB 2118 provides for penalties for non-compliance. This includes initial, as well as on-going, refresher training which is required on an annual basis.
- Each volunteer/reserve must complete a background check, physical examination, and training prior to participating. The estimated cost \$10K to prepare each volunteer.
- Each volunteer/reserve must be equipped with structural and wildland personal protective clothing, fitted SCBA face piece, etc. The approximate cost is \$5,000 per person.
- Inconsistent attendance to training by our current reserve participants affects our ability to adequately train the personnel and maintain required standards.
- Generally, the number of volunteer and reserve programs have been declining across the nation. Due to training requirements, legal liability, general economic conditions and

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pressures, societal norms, and turnover, the volunteer/reserve programs have not been reliable or cost effective in many instances.

- Again, this is an urban area with significant community threats/risks, and significant service delivery demands. Full-time, reliable resources are necessary to ensure a safe and effective public safety system.

In summary, the Contra Costa County Fire Protection District has evaluated a number of alternative service delivery models. As noted before, each community has unique characteristics that must be evaluated to determine if specific options and solutions, or variations are appropriate. Due to the low staffing and resource baseline levels, all of the options that were evaluated actually reduce the performance, flexibility, and service levels of the District.

The District will continue to evaluate industry standards, best practices, and other business models and benchmark against other organizations to help ensure that we are providing the appropriate level of services in an efficient and cost effective manner.