Organizational Assessment

Aspen Fire Protection District

May 2020

Emergency Services Consulting International

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ACKNOWLEDGMENTS

Emergency Services Consulting International (ESCI) extends its sincere appreciation to the City of Aspen, Aspen Fire Protection District, and each of the other individuals that contributed to the completion of this project.

Aspen Fire Protection District Board of Directors

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Aspen Fire Protection District

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Parker Lathrop, *Fire Marshal/Deputy Chief.*

Jan Legersky, Deputy Fire Marshal

Nikki Lapin, District Administrator

Jan Schubert, Finance

Ken Josselyn, Fleet Manager

Charles Curtis, *Training*

…and each of the firefighters, leaders, and support staff of Aspen Fire Protection District, who daily serve the citizens and visitors throughout the area!

Section I:
THE ASPEN FIRE PROTECTION DISTRICT

OVERVIEW OF THE ASPEN VOLUNTEER FIRE DEPARTMENT

The following section is a general overview of the basic structure and services provided by the Aspen Fire Protection District (AFPD), which operates as the Aspen Fire Protection District (AFPD). In addition, ESCI also utilizes the terms "District" and "Department" to describe the agency.

History & Formation of the District

The City of Aspen was founded as a mining camp during the Colorado Silver Boom and later named for the abundance of Aspen trees in the area (it was named Ute City originally). The *Panic of 1893* led to a collapse in the silver market, and the town began to decline after that. Around 1881, the City devoted $200 to establish the Aspen Volunteer Fire Department.

Figure 1: Early Days of the AVFD

Compliments of Aspen Volunteer Fire History Images

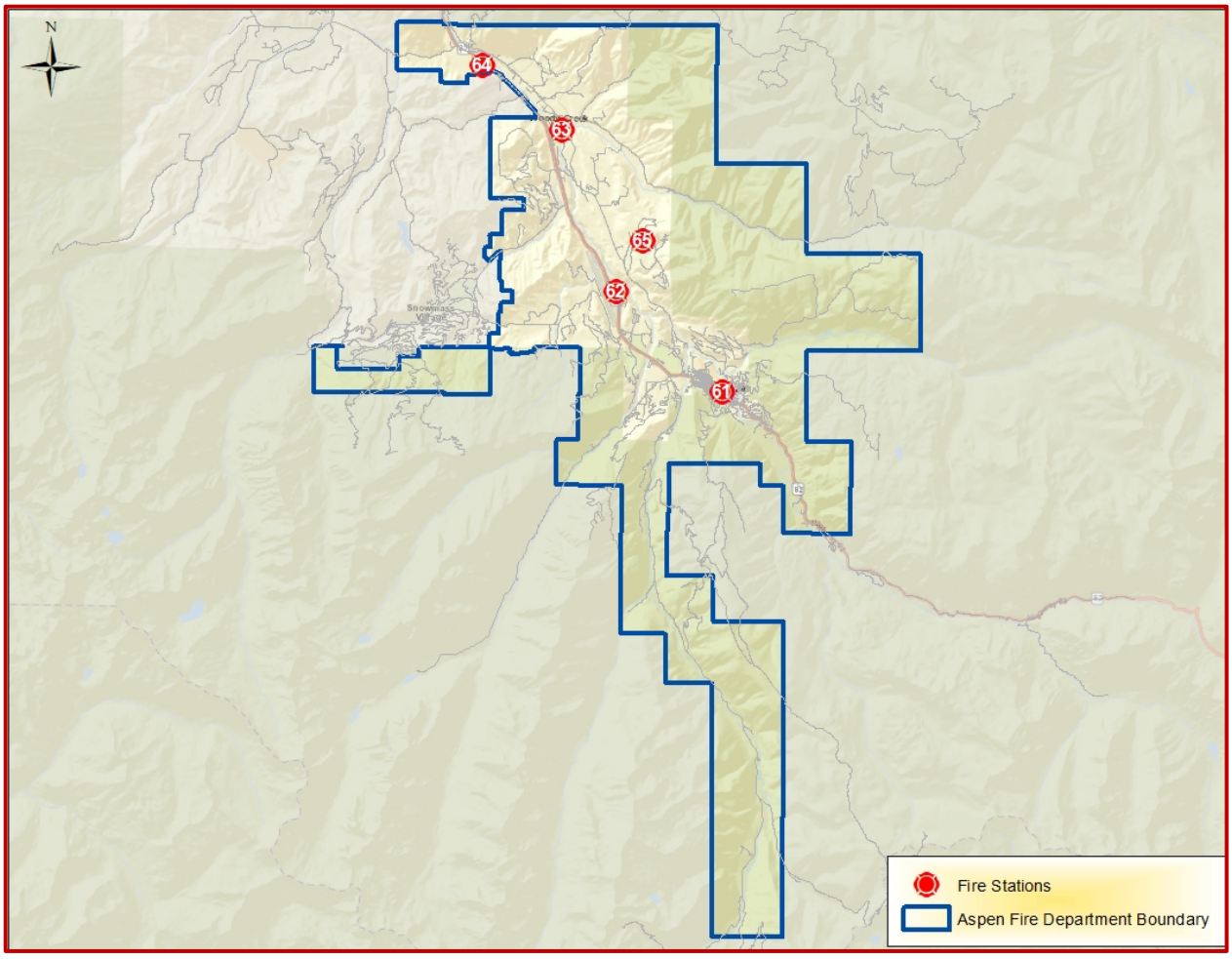
The community began to improve in the mid-20th century when Roaring Fork Valley pioneers developed Aspen Mountain into a ski resort. Today, Aspen remains a popular tourist resort for both winter and summer activities, which includes recreation in the White River National Forest. It has some of the most expensive real estate in the United States.

In this section of the report, ESCI provides an overview of the District's current conditions, including a summary of the AFPD's organizational structure, management, staffing and personnel, service delivery and performance, and various services that it provides. ESCI combined the data provided by AFPD with information collected during our fieldwork to develop the following overview.

General Description

Aspen Fire Protection District protects the City of Aspen and provides emergency services to areas outside the city including Aspen/Pitkin County Airport, which is still considered in the response area. Aspen remains a popular tourist resort for both winter and summer activities, which includes recreation in the White River National Forest and the annual X-Games. During the summer months, service is also provided to Aspen Mountain, adjacent USFS lands, and Aspen Mountain Rescue. The following figure reflects the study area.

Figure 2: AFPD Project Study Area



The AFPD service area encompasses 87 square miles, including the City of Aspen and unincorporated areas of Pitkin County, including Woody Creek, Aspen Village, Brush Creek, and Starwood. The population served consists of an estimated 7,461 full-time residents with a seasonal population of up to approximately 14,000 residents.

Governance and Lines of Authority

Special districts serve local governmental entities or quasi-municipal corporations as political subdivisions of the State of Colorado. Special districts are typically formed to provide special services the town/city or local county cannot otherwise provide. The Board of Directors—elected by the District's voters—governs the structure of the District and issues the responsibility and authority upon which the agency may act. In most special districts, including Aspen Fire Protection District, those policies lie within governing documents adopted by the Board of Directors.

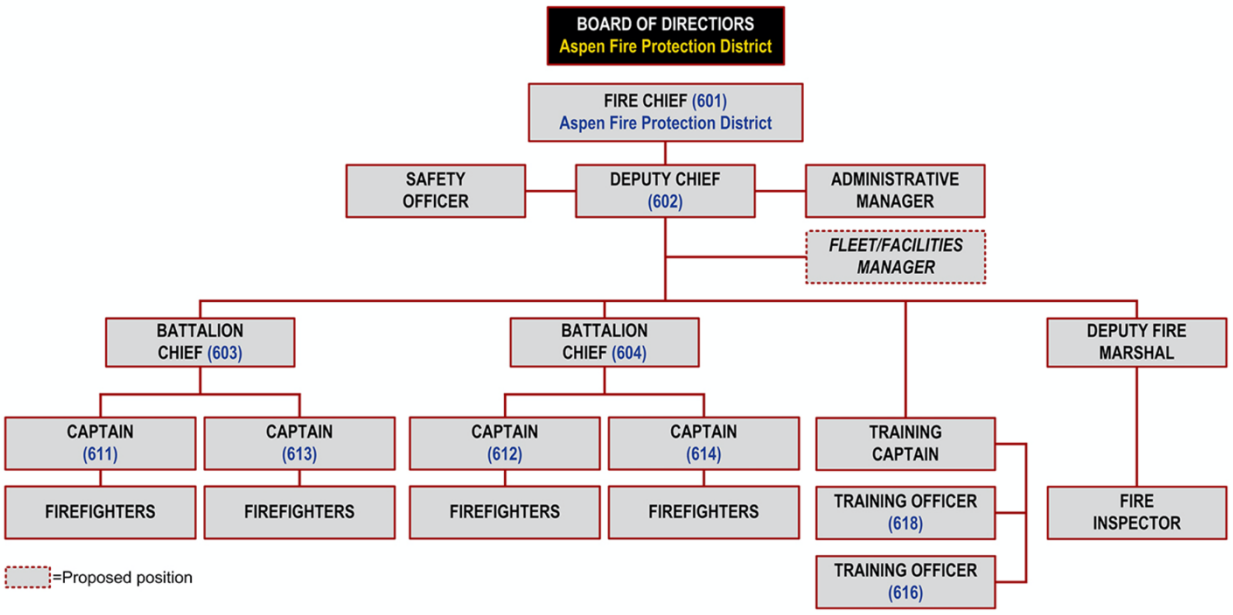
The AFPD is typical of most special districts in Colorado regarding structure and design. A five-member Board of Directors provides governance of AFPD. AFPD also engages an attorney that provides legal direction and general policy direction to the Board of Directors. AFPD Board members hire a Fire Chief/CEO under contract, who is charged with ensuring that the fire department meets its prescribed mission. The Fire Chief reports to the Board of Directors.

Organizational Design

The organizational design of any emergency services agency is vitally important. This design composes the structure needed to maintain an agency's ability to deliver optimal service to its community in an efficient and timely manner. The infrastructure must also provide the necessary level of safety and security to the members of the organization, whether career, part-time, paid-on-call, or volunteer. For example, during an emergency, an individual's ability to supervise multiple personnel takes on diminished capacity. Understanding this lessened ability has led to industry standards recommending a span of control of only four to six personnel under stressed situations. This practice stemmed from military history and has shown to be an effective leadership tool in emergency service situations and an important aspect of an agency's organizational design.

Another example of a strong organizational design comes into play when assessing fire station location alternatives. The analysis should not be limited to the physical location of a building but must also include consideration of how the department staffs the station. Not only is it important that a new or alternative facility accommodates enough responders, but also that an organizational structure is in place to adequately supervise staff. The following figure summarizes the organizational design components observed at AFPD.

Figure 3: AFPD Organizational Structure



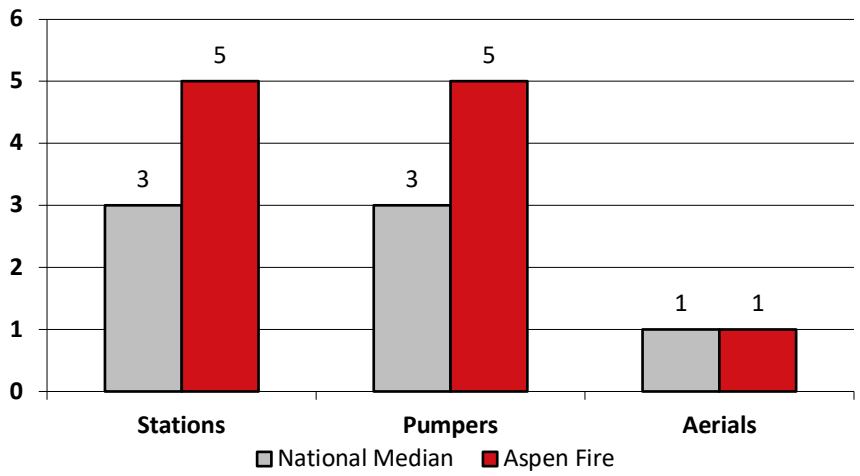
The fire department is configured in a top-down hierarchy, as is typical of most fire departments. The configuration is defined appropriately in an organizational chart, which reflects an appropriate span of control for the administration.

AFPD Service Area & Demographics

The size and composition of a fire department's service area affect the type and number of personnel, fire stations, and vehicles that are needed to provide efficient services. The agency must make complex decisions regarding the deployment strategies employed to properly position resources based on land area, geography, risk, as well as the unique travel patterns along with geographical and seasonal barriers found in AFPD's response area.

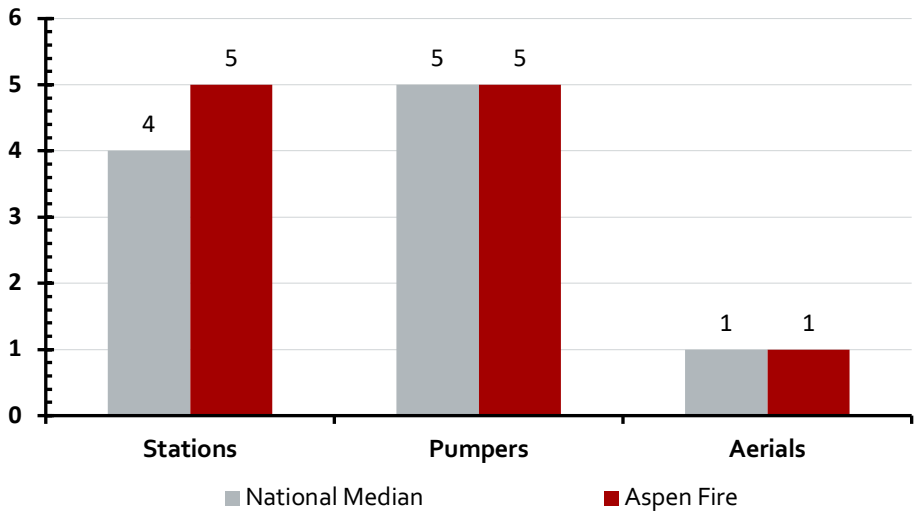
Aspen Fire Protection District operates out of five fire stations. The *Service Delivery and Performance* section of this report provides more discussion on the effectiveness of location and response performance. ESCI provides a comparison of fire stations, pumpers (engines), and aerial trucks mirrored against national median data in the following figure.

Figure 4: Capital Asset Comparison Permanent Residents



Relative to national comparators, AFPD has a reasonable amount of capital assets when compared to similar-sized organizations servicing areas based on a full-time population of approximately 7,464. However, based on seasonal population growth up to 12,758 residents, the following figure shows a balance of resources to assets.

Figure 5: Capital Asset Comparison Seasonal Population



Service-Delivery Infrastructure

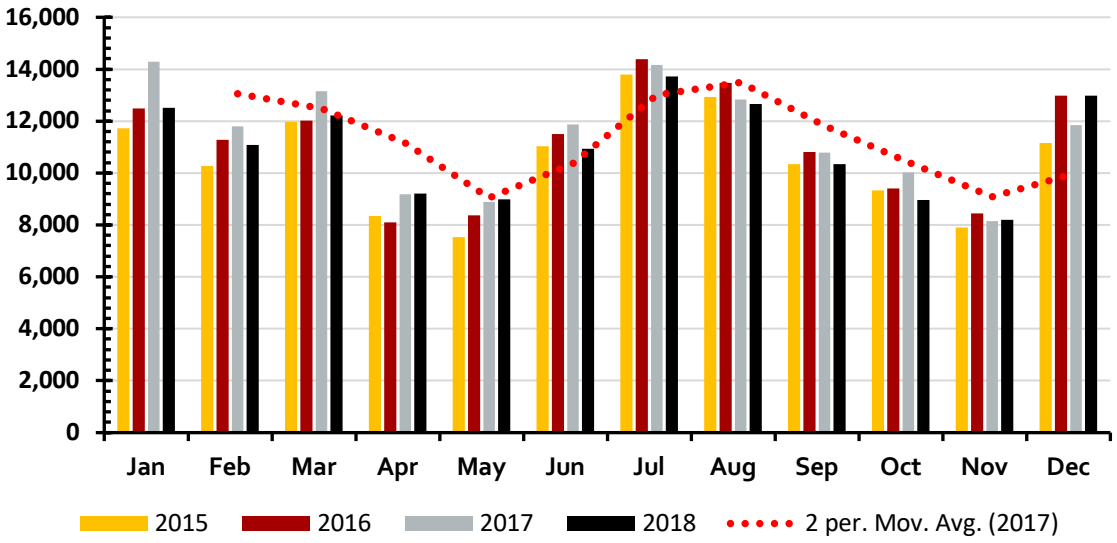
The department responded to 1,893 incidents in the 2018 reporting year. AFPD is unique compared to other fire departments in that the highest call volume is in response to fire alarms, listed under good intent calls. The typical breakdown is a high percentage of incidents relating to emergency medical services. AFPD currently responds to approximately 2% of EMS calls (excluding motor vehicle accidents) compared to what is generally found in similarly sized fire departments.

Figure 6: Emergency Response Type and Frequency

Response Type	Frequency	Percent of Total
Fire	14	0.7%
Rupture or Explosion	1	0.1%
EMS/Rescue	102	5.4%
Hazardous Condition	85	4.5%
Service Call	53	2.8%
Good Intent Call	730	38.6%
False Call	668	35.3%
Severe Weather	1	0.1%
Other	239	12.6%
Total	**1,893**	**100%**

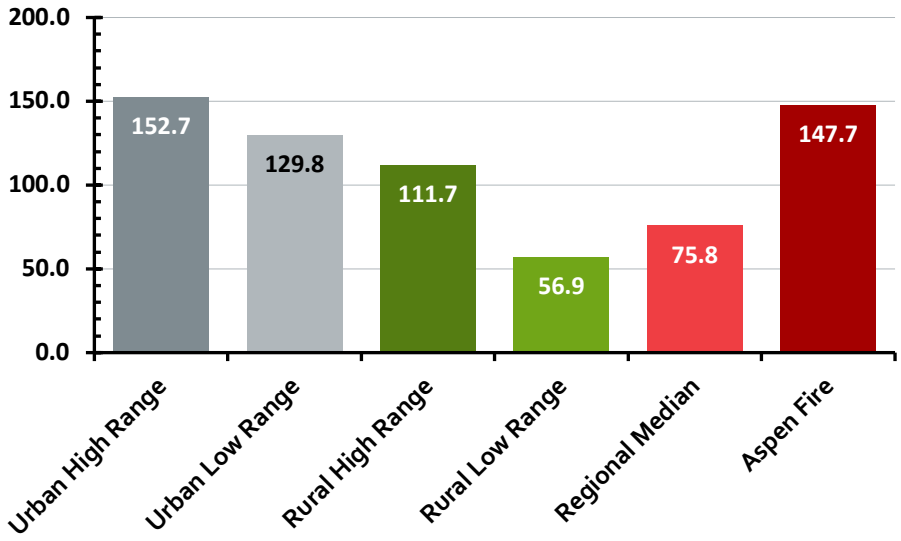
AFPD is similar to many resort communities in Colorado and has a significant variation in population depending on the season. The following figure shows the seasonal population changes by month from 2015 through 2018.

Figure 7: AFPD Seasonal Population Changes (2015–2018)



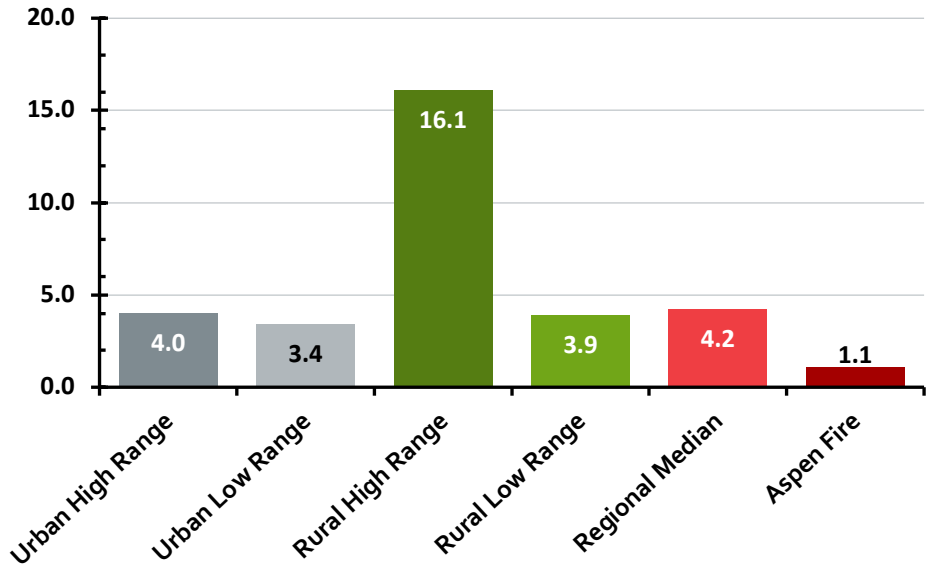
ESCI compared the number of total emergency incidents to which the Aspen Fire Protection District responded in 2018 to a variety of regional comparators based on data provided by the National Fire Protection Association (NFPA), as shown in the following figure. The analysis includes the average seasonal increase in population.

Figure 8: Total Incidents per 1,000 Population (2018)



In total emergency incidents, the study area is higher than all other population groups. The following figure offers a similar comparison, but this considers only fires that occurred in AFPD's jurisdiction, again based on a per 1,000 population.

Figure 9: Fires per 1,000 Population (2018)



The rate of fires is lower than the regional comparators. Incident frequency is highly variable based on multiple factors and, in this instance, may be reflective of effective fire prevention efforts, or simply a small data set.

Section II:
EVALUATION OF CURRENT CONDITIONS

MANAGEMENT COMPONENTS

Mission, Vision, and Values

The modern fire service faces numerous challenges. Departments are required to respond to an ever-increasing variety of complex emergencies, ranging from medical emergencies, rescues, structure fires, and hazardous materials incidents. Meeting these challenges can be complicated by limited financial resources and competing community priorities. To be successful, today's fire department must develop and deploy a laser-like focus on service delivery priorities. Creating and maintaining this focus requires strong leadership bolstered by competent and cohesive management. Theodore Roosevelt once said, "People ask the difference between a leader and a boss. The leader leads and the boss drives." In today's fire department, balancing these management tenants is as much art as it is science.

Given the complexities and competing priorities in delivering fire and emergency services, creating, understanding, and supporting the mission, vision, and values of the organization is critical. In order to ensure safe, effective, and efficient service delivery, all aspects of department funding, administration, and operations should be closely aligned with these tenants.

AFPD's current mission is to:

> *"Ensure the safety of citizens, visitors, and their property through education, prevention, and suppression while recognizing our fiscal responsibility to the citizens."*

During the ESCI site visit, several volunteers appeared unaware of the adopted AFPD mission statement, nor do department training and operational deployment strategies align with this mission statement. For example, the department provides limited EMS training and response. However, there is no mention of EMS in the mission statement. ESCI also noted that the District does not have a contemporary vision statement, adopted values, or short, mid, or long-term organizational goals that are clearly communicated and understood by internal and external stakeholders.

AFPD will undoubtedly face numerous future challenges, including potential funding limitations, staffing shortages, and increasing service demands. Addressing these challenges will require a focused and unified understanding, vision, and agreement on how the department moves forward. ESCI recommends that AFPD conduct a comprehensive strategic planning process to develop, adopt, and support a contemporary mission statement, vision, values, and goals for the next three to five years. This effort should include the participation and input of various key community stakeholders and outside agencies to be successful.

The need for a contemporary strategic planning effort cannot be overemphasized. Support, participation, and formal adoption of the planning work products by the Board of Directors is critical as well. Without this formal approval, the efforts of the key stakeholders will likely stymie the ability of the District to nimbly and efficiently address changing community needs and expectations.

Critical Issues

As a part of this study, ESCI conducted interviews with internal and external customers. These customers were asked to list the top four critical issues facing the organization. ESCI evaluated the responses, looking for commonality that could lead to more cohesive planning for the future. The next figure summarizes the issues facing AFPD.

Figure 10: Critical Issues Identified During Site Visit

Issue No.	Aspen Fire Protection District
1	Staffing Models
2	Interagency Cooperation
3	EMS Delivery Model
4	Financial Considerations

Identifying the scope of service delivery and interagency cooperation were two common themes discovered during the site visit interviews facilitated by ESCI. As previously mentioned, these themes indicate the necessity for the development of a strategic plan soon.

Internal & External Communications

In today's "hyper-speed" world of communications, the public expects strategic, frequent, responsive, and transparent communication from government agencies. Likewise, employees expect the same when disseminating internal messages. Without good communication, public and employee confidence in the organization can be severely damaged, and informal communication channels may be created to spread false and misleading information throughout the community and organization. AFPD uses basic tools to communicate internally and externally. The following figure lists the various internal and external communication tools used by the organization.

Figure 11: Communication Methods Used by AFPD

Communication Method	AFPD
Regularly Scheduled Staff Meetings	Yes
Agency Intranet	No
Written Memos	No
Internal Newsletters	No
All-Hands Meetings	Yes
Community Newsletter	Yes
Department Website	Yes
Social Media Accounts	Yes
Community Surveys	No

Specific to internal communications, ESCI noted that AFPD holds regular meetings with administrative and operational staff. However, there appeared to be limited documentation provided to staff concerning the various meetings. ESCI recommends an additional focus on documentation and distribution of meeting minutes. Currently, shift captains and company officers disseminate information to employees.

AFPD has an active Facebook® social media account, with approximately 3,000 followers. AFPD appears to maintain an active presence on Facebook® and frequently posts safety and general public-interest information on social media.

Internal/External Communications Discussion

Many emergency response agencies are using interactive social media tools. These tools are now entrenched in the fabric of the American social structure, with the potential to harness (or unleash) tremendous community support, concern, and action.

To be most effective in using social media channels to communicate department activities, a pragmatic and strategic approach is necessary. Historically, many departments have allowed their social media presence to develop organically, and often by experimentation. This haphazard approach frequently results in multiple social media accounts, conflicting or missing information, inconsistent messaging, and an occasional posting of inappropriate material.

Establishing clear expectations of how department members should conduct themselves on social media, both on and off the job, is critical to ensuring the community holds the department and its members in high regard. Over the past few years, public employees and their agencies have been criticized for inappropriate social media posts. Examples include but are not limited to the sharing of confidential patient information, derogatory racial slurs, discriminatory or slanderous statements, and even and inappropriate jokes. In many cases, employees have received significant discipline, including termination with the fire department's reputation needlessly damaged.

To address these issues, many departments have adopted and enforced social media policies prohibiting public statements by employees that:

- Are defamatory, obscene, discriminatory, slanderous, or unlawful, and/or
- Tend to compromise administration of agency discipline, and/or
- Damage or impugn the reputation and/or efficiency of the department or member.

An employee's First Amendment rights must be taken into consideration when drafting a social media policy. However, many available examples of policies exist that legally balance First Amendment rights with fire department requirements and responsibilities.

Regulatory Documents & Recordkeeping

Government agencies depend on written policies, standard operating guidelines (SOG), and reports as components of effective management and legal compliance. The following figure summarizes AFPD's various policies and how they are utilized.

Figure 12: Regulatory Documents

Regulatory Documents	AFPD
Rules available for review	Yes
SOGs available for review	Yes
SOGs regularly updated	N/A
SOGs used in training evolutions	No
Department policies available for review	Yes
Internally reviewed for consistency	Needs updating
Internally reviewed for legal mandates	Needs updating
Training on policies provided	No

AFPD has baseline department policies and rules and SOGs related to its various administrative and operational tasks and evolutions. These policies must be updated and reviewed more frequently to ensure they are contemporary and meet legal requirements. Some departments now outsource policy maintenance through online vendors, such as the *Lexipol Knowledge Management System*® (KMS). Regardless of the approach used, reviewing and updating policies and procedures is critical to ensuring efficient, legally compliant, and safe operation of the department.

Documentation & Compliance Testing

Proper recordkeeping and secure record archiving are essential components when meeting legal, regulatory, and business best-practices for government agencies. Secure document archiving can also assist in addressing legal or other administrative actions confronting a fire department. AFPD's recordkeeping is summarized in the next figure.

Figure 13: Reporting & Recordkeeping by the Fire Agencies

Report Type	AFPD
Electronic Reports	Yes
Software used–Fire	Emergency Reporting®
Software used–EMS	No
Periodic Reports to Elected Officials	
Financial Reports	Yes
Management Reports (Verbal)	Yes
Operational Reports	No
Annual Report Produced	Yes
Required Records Maintained & By Whom	
Incident Reports	Yes
Patient Care Reports	No
Exposure Records	No
SCBA Testing	External
Fit Testing	No
Hose Testing	Internal
Ladder Testing	Yes
Pump Testing	Yes
Atmospheric Monitors	Internal
Vehicle Maintenance Records	Limited

CURRENT STAFFING ANALYSIS

An organization's greatest asset is its people. Special attention must be paid to managing human resources in a manner that achieves maximum productivity while ensuring a high level of job satisfaction for the individual. Consistent management practices combined with a safe working environment, equitable treatment, the opportunity for input and recognition of the workforce's commitment, and sacrifice are key components impacting job satisfaction.

The size and structure of an organization's staffing are dependent upon the specific needs of the organization. These needs must directly correlate to the needs of the community, and a structure that works for one entity may not necessarily work for another agency. This section provides an overview of the AFPD's staffing configuration.

Fire district staffing can be divided into two distinctly different groups. The first group is what the citizens typically recognize and is commonly known as the operations unit, which can be generally classified as the emergency response personnel. The second group typically works behind the scenes to provide the support needed by the operation's personnel to deliver effective emergency response and is commonly known as the administrative section. AFPD is unique in that even though there are distinct administrative staff designations, they are still required to perform operationally if the need arises.

The staffing levels at AFPD are the primary impetus for conducting this study. In this section, ESCI will explore the District's current staffing levels and evaluate them against the mission, identifying potential gaps.

Administration and Support Staffing

One of the primary responsibilities of the response team's administration is to ensure that the operations segment of the organization has the ability and means to respond to and mitigate emergencies safely and efficiently. An effective administration and support services system is critical to the success of AFPD.

Like any other part of a municipal fire district or rural agency, administration and support need appropriate resources to function properly. By analyzing the administrative and support positions within an organization, we can create a common understanding of the relative resources committed to this function compared to industry best-practices and similar organizations. The appropriate balance of administration and support compared to operational resources and service levels is critical to the success of the District in accomplishing its mission and responsibilities.

Typical responsibilities of the administration and support staff include planning, organizing, directing, coordinating, and evaluating the various programs within the District. This list of functions is not exhaustive, and other functions may be added. It is also important to understand these functions do not occur linearly and more often happen concurrently. This requires the Fire Chief and administrative support staff to focus on many different areas at the same time. The following figure reviews the administration and organizational support structure of AFPD.

Figure 14: AFPD Administrative and Support Staffing

Position Title	Number of Positions	Hours Worked per Week	Work Schedule
Paid, Full-time Administrative or Support	Individuals considered full-time employees and who provide services mainly intended to manage, plan, or support the activities of the AFPD and its programs.		
Fire Chief	1	40	0800–1700
Deputy Chief/Fire Marshal	1	40	0800–1700
Fire Prevention Specialist	1	40	0800–1700
Finance/Payroll Manager	1	40	0800–1700
District Administrator/HR Manager	1	40	0800–1700
Training Coordinator	1	40	0800–1700
Fleet/Facility Manager	1	40	0800-1700
Deputy Fire Marshal	1	40	0800-1700
Total Administrative or Support Staff	**8**		
Percent of Total Staff	**22.8%**		

ESCI notes that the current level of administrative and support staffing represents roughly 22.8% of the AFPD total staffing. It is our experience that effective administrative staffing totals for a fire district operation range from 12 to 15% of agency totals. After reviewing the functions and responsibilities assigned to the workgroup, ESCI concludes that the number of full-time equivalents (FTEs) assigned is appropriate to support the responsibilities of District administration. However, several of these administrative positions are also tasked with operational duties. Inappropriately staffing the administrative and support functions creates a situation in which important organizational activities are at best delayed, but in worst-case scenarios, get completely missed. When administrative members are engaged in operational duties, their administrative duties are placed on hold during the emergency.

Administration

The main administrative function within the District is established with the position of Fire Chief and Deputy Chief/Fire Marshal position. Some of the typical responsibilities of the Fire Chief include planning, organizing, directing, and budgeting for all aspects of the District's operations. The current number of positions assigned to this activity is enough to meet these expectations. However, the daily operational needs can detract from the ability to focus only on administrative needs. The Fire Chief's ability to provide future planning is limited because of operational duties. These duties remove the Fire Chief and his administrative staff from the office, along with their ability to focus on planning, organizing, directing, and budgeting needs while committed elsewhere.

Finance

A Finance/Payroll Manager position handles the District's finance and budgeting. One concern for the future of the District's budgeting and finance is the establishment of funding and budgeting priorities. As AFPD moves forward with the considerations of hiring full-time career staff, it should strive to develop and establish clear funding priorities that support those initiatives. The lack of funding and budgeting priorities make it difficult to plan if funding revenues should shift or are reduced.

Emergency Response Staffing

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

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

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

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

The first 15 minutes are the most crucial period in the suppression of a fire. The timing of this 15-minute period does not start when the firefighters arrive at the scene but begins when the fire initially starts. How effectively and efficiently firefighters perform during this period has a significant impact on the overall outcome of the event. This general concept is applicable to all fire, rescue, and medical situations. Critical tasks must be conducted in a timely manner in order to control a fire or to treat a patient. AFPD is responsible for ensuring that responding companies can perform all the described tasks in a prompt, efficient, and safe manner.

Considerable ongoing local, regional, and national discussion and debate draws a strong focus and attention to the matter of firefighter staffing. Frequently, this discussion is set in the context of firefighter safety. Aspen has areas with a population density of fewer than five people per square mile and other areas with a population density that exceeds 443 people per square mile in the City of Aspen. The jurisdiction may choose to establish response demand zones and use criteria outlined in the National Fire Protection Agency (NFPA) standards. 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* specifies the number of firefighters assigned to a particular response apparatus, often characterized as a "minimum of four personnel per engine company." ESCI notes that the more critical issue is the number of firefighters that are assembled at the scene of an incident in conjunction with the scope and magnitude of the job tasks expected of them, regardless of the type or number of vehicles upon which they arrive. Setting the staffing levels is a determination that is made at the community level based on risk, capability, and citizen expectations.

There is not a mandated requirement that fits all situations, although NFPA 1720: *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments*, has objectives to meet regarding the number required for some typical scenarios. AFPD can use either standard to determine the appropriate resources; however, NFPA 1720 would be most appropriate. Additionally, there is a process for AFPD to conduct its own critical staffing analysis later in this report. Once completed, AFPD should adopt a national standard to measure performance. Some terms are used interchangeably, such as the assembly of firefighters on an incident, may be called the "Initial Full Alarm Assignment," or an "Effective Firefighting Force" (EFF), or "Effective Response Force" (ERF).

NFPA 1720 uses specific demand zones to determine the necessary responders needed. When a fire escalates beyond what can be handled by the initial assignment, or the fire has unusual characteristics such as a wind-driven fire, or has been accelerated with a highly flammable compound, additional personnel will be needed. There are also types of scenarios that may not be fires, but mass casualty incidents, explosions, tornadoes, etc., that may need additional staffing. It is difficult or impossible to staff for these worst-case incidents. These incidents require a strong mutual aid or automatic aid plan to be set in place. The following figure depicts the emergency staffing used by AFPD.

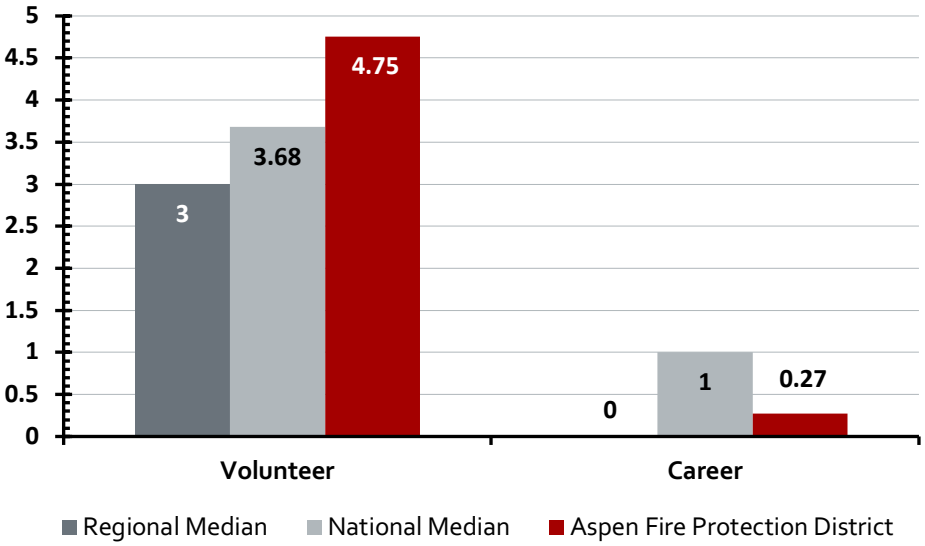
Figure 15: AFPD Total Emergency Response Staffing

Position Title	Number of Positions	Hours Worked per Week	Work Schedule
Volunteer, Operations Staffing	Individuals considered volunteer employees and who provide emergency services at the operational level.		
Battalion Chief	2	N/A	Volunteer
Captain	4	N/A	Volunteer
Safety Officer	1	N/A	Volunteer
Firefighter	28	N/A	Volunteer
Total Operations Staff	**35**		
Percent of Officer-to-Firefighter Total Staff	**20%**		

AFPD utilizes two career and 35 volunteer staff to achieve the ERF required to satisfy incident requirements. Current officer-to-firefighter ratios are below the normal ratios experienced by ESCI in other departments when considering the total number of staff. AFPD currently has a ratio of roughly 20%, and normal ratios experienced by ESCI are between 25% and 33%.

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

Figure 16: Firefighters per 1,000 Population



The 2016 National Fire Experience Survey provides a comparison of paid-on-call/volunteer firefighters and career firefighters per 1,000 population. Within AFPD, the rate of volunteer firefighters per 1,000 citizens is 4.75. When comparing career firefighters, the regional median is 1 firefighter per 1,000 population, and AFPD's rate of career firefighters per 1,000 population is .27. This comparison does not indicate a necessary change in staffing, but it does serve as a point of reference for analysis of current operational endeavors. AFPD operations are accomplished using an all-volunteer staff with the exception of the Chief and Deputy Chief. Daily administrative control is achieved by the Fire Chief and Deputy Chief, who also serve operational roles when needed.

AFPD operates with two volunteer Battalion Chiefs assigned to a rotating duty coverage in addition to the full-time career chiefs. These individuals are responsible for all aspects of the shift operations and serve as the Fire Chief's representative at significant incidents when he is unavailable. One drawback of these volunteer Battalion Chiefs occurs when they are not available. Daily staffing is achieved using these volunteers. AFPD does not have promoted Apparatus Operators who serve as the individuals responsible for all aspects of maintaining and operating fire engines. This position is filled on an as-needed basis, depending on the availability of staffing. Total District daily staffing is limited to two career employees, including the Fire Chief and Deputy Chief, during the 0800-to-1700-hour time frame who could engage in firefighting activities. After 1700 hours, staffing is reduced to volunteer staff to cover the entire District. The Occupational Health and Safety Administration (OSHA) has established guidelines and regulations in OSHA CFR 29 1910.134(g)(4)(i) that require two firefighters outside the hazard area while two firefighters are inside the hazard area. AFPD cannot meet this OSHA requirement without volunteer staff.

As a volunteer fire district, AFPD's structure utilizes District personnel who are not currently working a shift to respond when "paged" from their places of residence or work. Once the call is completed, these individuals return to their place of residence or work. This system does not work well for AFPD and has been riddled with challenges. As with volunteer fire departments across the country, the life demands (i.e., careers, family functions) of volunteer staff negatively impact their abilities to consistently respond in support of the District's needs and meet national standards.

With such a lean career staff, volunteer staff are a critical element of the response system for AFPD. When conducting the site visit, ESCI found that AFPD has an authorized volunteer staff level of roughly 35 employees, but at the time of ESCI's site visit, many of the members expressed concern for the lack of participation of rostered members. The volunteer members expressed that over half of the rostered members are not active and cannot be counted on for response. This can be collaborated by the amount of activity recorded in training and response hours for everyone. This is not an unusual ratio for fire districts that rely heavily on volunteers. However, with such a large service area and such a lean organization, it is necessary to redouble efforts to recruit and retain volunteer staff. One of the challenges facing AFPD is the ability to recruit and retain individuals willing to commit to be a volunteer firefighter. AFPD Standard Operating Procedures directs the following first alarm assignment for structure fires.

Figure 17: Initial 1st Alarm

Initial Full Alarm Assignment—2,000 ft² Residential Structure Fire	
Fire Chief	1
Deputy Fire Chief	1
Volunteer Staff	2 On-Call

It is important to note that the Chief and Deputy Chief may or may not be on-duty and would respond from home. There is no on-duty staffing to meet the need for a routine house fire, and responders must respond to the call for service from home. Furthermore, even if all available staff responds, the numbers responding may not be sufficient for a strip shopping mall or an apartment building unless there is fire protection built into these structures. This type of fire is likely to occur within the jurisdiction and represents a higher level of risk than the typical medium-size residential dwelling. Because AFPD does not staff response units with full-time firefighters, an initial full alarm force for this level of hazard would commit the entire volunteer staff to one fire. Furthermore, due to the geographical size of the jurisdiction, it is not reasonable to expect or plan on this response as a means of providing coverage for such an event and still provide required services to the jurisdiction as a whole.

Staff Allocation to Various Functions

AFPD can allocate its volunteer staff between five fire stations. However, in all reality, most of the staff is concentrated between two stations. The staff for these stations are responsible for receiving calls for service and then responding to the station to pull the appropriate apparatus. For example, a fire call would require the fire engine, whereas a rescue call for service would require a rescue vehicle. Some of the stations are also equipped with a tanker and/or brush truck apparatus. If required to respond in either of these apparatuses, staff must choose the required or requested apparatus. The Fire Chief and Deputy Chief are located at the headquarters station to provide necessary command and control coverage during incidents and manage the administrative duties for the shift during the daytime. This allocation of staff across the stations and units is a typical staffing model across the United States for volunteer organizations. The minimum staffing available in the District could be as low as the two career personnel until volunteer personnel arrive.

Staff Scheduling Methodology

AFPD utilizes a traditional volunteer system. Members are required to respond or schedule their attendance at their respective fire stations. The Aspen Staff Member Handbook outlines volunteer requirements to remain an active volunteer member. A Volunteer Firefighter staff member who holds and maintains minimally the following certifications (or can attain within the agreed time frame):

- State of Colorado Firefighter I or Firefighter II
- State of Colorado Hazmat Operations
- BLS Healthcare CPR /AED
- Emergency Medical Responder (or higher)
- ICS-100 and -200, to be familiar with and operate under the basic tenets of the Incident Command System

AND meets the following annual requirements:

- Maintains certifications listed above (per scheduled re-certification time frames).
- Completes a minimum of 36 hours of approved firefighter training annually, of which at least 18 hours shall be In-House JPR-based. The remaining 18 hours may be JPR-based and/or operational skills-based, as approved by his/her supervisor.
- Completes a minimum of eight truck checks, of which at least four must be in the first six months of the year and four in the last six months of the year.
- Responds to a minimum of 25% of all calls.
- Attends a minimum of four Firefighter/Operational staff meetings.

In accordance with the Aspen Staff Member Handbook, Active Volunteer Firefighter staff assigned to fire suppression and/or on-call duties shall normally be scheduled in recurring work periods of seven consecutive days, each beginning at 6:00 p.m. on Thursday and ending the following Thursday at 6:00 p.m. OCO (On-Call Officer)/Truck Teams will rotate On-Call weeks. During this time, if a call for service comes in, the crew assigned to on-call duty is required to respond to the emergency. Although required, this does not always happen. If available, other volunteer members can respond as well.

The total number of firefighters required per jurisdiction becomes a policy decision based on the needs of the jurisdiction. The jurisdiction also establishes the number of employees needed above the minimum to allow for vacancies due to vacation, sick, and other types of leave. In the case of AFPD, members are required to attend 25% of all calls. This means they may choose not to respond to 75% of the calls. This becomes a troublesome statistic if all 35 volunteers are unable to respond, leaving AFPD with a very minimal response.

In a review of AFPD's current practices, the volunteer staff is split between four shifts. Each contains roughly 8 responders required to cover for a week at a time on a rotating basis. Each of the four shifts, are required to staff the department's response for their week of on-call status. During the week, two of the 8 members must be available to respond to calls for service 24 hours a day. As the calls for service come in, these two members begin the response matrix and determine if further call outs are necessary. It was noted during the evaluation that response data shows a very poor response for EMS and fire alarm type calls for service. In most cases, when the AFPD received a fire alarm, the responsible members chose not to respond at all. Data shows this happens 71% of the time. Based on the type of occupancies and risk involved, failing to respond and investigate fire alarms could have catastrophic outcomes.

Deployment Methods and Staffing Performance for Incidents

Typical fire department responses across the nation include structure fires, vehicle fires, wildland fires, vehicle accidents, hazardous materials response, technical rescue responses, general calls for service, and emergency medical calls. The latter is the most frequent reason for activating the 911 system.

Emergency Fire Incidents

The current daily staffing of operations is based on available volunteers. It is important to note that adequate staffing is only achieved if the volunteers respond. Traditional vacation and sick leave regularly impact response numbers. If everyone responds, this equates to a force barely capable of meeting the response needs of the community. Fire departments across the United States typically establish a "minimum staffing" level. This number reflects the minimum number of personnel a department will have on duty. AFPD is a volunteer system and has no set number upon which to rely. AFPD's current staffing levels limit the ability of the District to consistently and effectively respond with an appropriate number of personnel to mitigate medium to large-scale incidents.

During the evaluation, it was noted that in many cases the department is inappropriately responding to carbon monoxide alarms. Often in AFPD, one member responds to these calls for service. As discussed previously, the Occupational Health and Safety Administration (OSHA) has established guidelines and regulations in OSHA CFR 29 1910.134(g)(4)(i) that require two firefighters outside the hazard area while two firefighters are inside the hazard area. These responders should be equipped with proper personal protective gear and self-contained breathing apparatus. Carbon monoxide is a deadly odorless gas and is immediately dangerous to life and health at very low levels of concentration. In many cases, AFPD is responding one member with no protective equipment or self-contained breathing apparatus. The response to service calls related to carbon monoxide alarms with one member is irresponsible and could have catastrophic results if not treated appropriately.

The periods of time when a station is unable to respond to calls within its assigned area is an issue of response reliability and is covered in greater detail later in this report.

Emergency Medical Incidents

Aspen Ambulance District provides EMS ALS transport services for the citizens of Aspen and the surrounding areas within AFPD and AAD combined districts. Their daily operations are conducted throughout Pitkin County. Although the local EMS system provides advanced life support transport, AFPD is occasionally called upon to supply additional staffing or to mitigate the incident until the local EMS arrives. AFPD only responds to these calls 1.5% of the time. Often AFPD chooses not to respond per current protocol. Across the nation, most emergency systems provide some first responder care until advanced life support measures arrive if the agency does not provide those services. This support of the EMS system can have very beneficial effects for the citizens of the response jurisdiction. Most systems are designed to work together in tandem or a tiered response, and AFPD should be no different.

Special Operations Incidents

Aspen has the potential occurrence of incidents that involve hazardous materials and technical rescues. The resort industry in the local area creates special rescue hazards that require additional training and human resources when responding to those incidents. AFPD can call for regional assets from the Colorado State Patrol Hazardous Material Team; however, the sheer geographic location of these incidents can make resources delayed in arrival. Hazardous materials by their physical nature prove to be difficult to mitigate and are even more difficult with limited staff. These operations are described in NFPA 472: *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*. The majority of AFPD members have Hazardous Materials Operations level training.

Furthermore, the mining, resort, and backcountry/outdoor activities in the jurisdiction can pose complicated rescue situations. These types of rescues are so involved they require their own standard for operations—NFPA 1006: *Standard for Technical Rescue Personnel Professional Qualifications* and NFPA 1670: *Standard on Operations and Training for Technical Search and Rescue Incidents*. These incidents include vehicle machinery rescue, rope rescue, confined space rescue, wilderness search, trench and excavation rescues, water rescues, and structural collapse rescue incidents.

Aircraft Rescue and Fire Fighting (ARFF)

The Aspen/Pitkin County Airport is owned and operated by Pitkin County. This airport is equipped to handle multiple sizes and classifications of aircraft. It does not allow the following types of aircraft.

- Has a tip-to-tip wingspan of greater than 95 feet.
- Has a Maximum Allowable Gross Landing Weight in excess of 100,000 pounds dual wheel or 160,000 pounds dual tandem wheel.

While Pitkin County runs aircraft rescue operations on airport property, the proximity of the airport is within the AFPD jurisdiction. Therefore, AFPD could expect and should be prepared for incidents involving aircraft. ESCI noted that in recent training at the airport, the AFPD needs additional coordinated response with the Pitkin County Airport Fire Rescue. To prepare for these types of incidents AFPD should ensure personnel receive training outlined in NFPA 1003: *Standard for Airport Fire Fighter Professional Qualifications* and NFPA 402: *Guide for Aircraft Rescue and Fire-Fighting Operations*. Officers should receive training in accordance with NFPA 422: *Guide for Aircraft Accident/Incident Response Assessment*. This training will provide AFPD the ability to assist Pitkin County when needed for on-property emergencies and ensure the ability to provide initial response capabilities during off-property incidents if encountered.

Wildland Firefighting

In recent years, wildland fires have caused danger and damaging effects across the Midwest and West Coast of the United States. The dangers of wildland fires are no different within Aspen. With a service area of 87 square miles, much of the area is susceptible to wildland fires. These fires usually last for days and require extensive periods of time to mitigate and bring under control. Furthermore, the resources usually needed are expensive and require the agency to expend additional funds when outside resources are requested, such as air assets and deployable fire retardants.

Responsibilities and Activity Levels of Personnel

Every fire department must complete several other activities outside of the "regular" duties of responding to emergency incidents. These activities typically involve general maintenance of self-contained breathing apparatus (SCBA), hose testing, air monitor calibration, EMS quality assurance, and various committees. AFPD relies upon contracted services to accomplish these tasks. The District completes hose testing internally.

Personnel Management

Although the delivery of emergency services to the citizens and visitors of a community is critical, effective management and organization of an emergency services agency are just as critical to its success. The personnel that deliver those services are the backbone of the system. However, without the proper administrative and support personnel to handle supervision, command, and control, operational personnel may not be able to perform satisfactorily.

It is commonly understood that an organization's greatest asset is its people. While the purchase of capital equipment can appear to be expensive when viewed as a one-time expense, the reality is that personnel expenses typically account for more than 70% of an organization's expenses.

In this section, ESCI will review and analyze the policies, procedures, job descriptions, and other personnel management related activities of AFPD.

Policies, Rules and Regulations, and Guidelines

The AFPD Staff Member Handbook provides guidance and direction for human resources issues affecting AFPD. This handbook is in the process of receiving updates. The AFPD also uses Standard Operating Policies (SOP) and Standard Operating Guidelines (SOG). SOGs should be arranged in an easily referenced way for review. AFPD has an extensive policy and standard operating guideline manual. ESCI recommends creating a guideline that directs the process of periodic review and changes. A good way to ensure this review will occur is to have a committee of AFPD members review one-third of the guidelines each year and recommend changes. This process should also trigger changes, once a guideline has been modified due to a new method or a technology change.

Job Descriptions

AFPD employs several different job descriptions that are not unlike other agencies of similar size and organization. The District currently employs the positions of Fire Chief, Deputy Chief/Fire Marshal, Fire Prevention Specialist, Finance/Payroll Manager, District Administrator/HR Manager, and Training Coordinator. The District also has job descriptions for volunteer positions as well. The volunteer positions are Battalion Chief, Safety Officer, Captain, and Volunteer Firefighter. A review of current job descriptions reveals that some of the descriptions are dated and in need of review and possible revision if the duties described are different from actual practices. Most of the job descriptions have not been reviewed in over three years. Job descriptions should receive periodic reviews and revisions.

Compensation

An agency's ability to attract, hire, and retain employees has a direct impact on its ability to effectively and efficiently provide the desired services. AFPD is no different. Agencies should provide periodic reviews of current compensation structures, market competitiveness, and agency compensation philosophies. These internal and external comparisons of equitable positions and workloads ensure the agency can attract and maintain an effective workforce. If AFPD in the future seeks to add additional career staff, compensation philosophies and practices will determine its ability to attract qualified individuals.

Disciplinary Process

Under the existing organizational configuration, personnel-related decisions are made at different levels. For example, the Fire Chief can hire, discharge, and promote. Discipline can be issued at several levels of the organization based on the severity of the infraction. The policy is outlined in section 8.00 of the AFPD Staff Member Handbook. The handbook describes the use of a Volunteer Disciplinary Board. This group of firefighters will consist of the Deputy Chief, one of the two Battalion Chiefs, and three Active Firefighters elected annually from the Career Firefighter or Active Volunteer Firefighter staff. This Board may:

- Take disciplinary action for a sub-standard performance issue, violation of policy/procedure, or incident of misconduct by a Volunteer staff member(s).
- Act as the appeals advisory board for all disciplinary actions regarding general violations.
- Be called upon by an Officer/Supervisor to advise on disciplinary action for general violations.

Members of this Board must maintain strict confidentiality concerning any disciplinary action proposed or taken. Personnel related decisions can, and often do, subject an organization to potentially extensive liability exposure. Risk is presented that can result from a hiring mistake, improperly processed disciplinary actions, wrongful termination claims, and more. Access to legal counsel can reduce this liability. The employees are afforded an appeal process for discipline through the established appeal policy outlined in section 8.20 of the AFPD Staff Member Handbook.

Counseling Services

Our nation's firefighters are faced with emotional needs that are very different and unique to the occupation. The percentage of firefighters struggling with career-related stress is very high, with suicide rates climbing each year. These issues manifest themselves through higher divorce rates and addictions such as alcohol, drugs, or gambling. Frequently seen in recent studies, another major concern is Post-Traumatic Stress Disorder (PTSD). As these symptoms occur, employees need support systems in place that are readily accessible and provide access to a qualified professional who truly understands the employee's circumstances.

Several programs can assist in critical incident stress management, employee assistance programs, and intervention programs, to name a few. The District offers Critical Incident Stress Management as needed. AFPD should strive to develop a structured critical incident stress debriefing program for its members. The District should communicate this program to make each member aware of the availability of resources.

The District provides staff members with an employee assistance program service through a third-party provider. Counseling in the areas of work-life balance, relationship, and financial issues are available on a limited basis at no cost to the staff member. Staff members and their immediate family members are eligible for this benefit. The District Administrator/HR provides information on accessing this service. This is an excellent benefit for staff members and is outlined in the Aspen Staff Member Handbook section 3.60.

Application, Recruitment, and Retention Process

AFPD recruitment and hiring processes are outlined in section 4.00 of the Aspen Staff Member Handbook. The process uses a Recruitment/Hiring Advisory Board for Volunteer Staff. This group of Active Volunteer Firefighters, advised by District Administrator/HR, will consist of the Battalion Chiefs and the Captains. A member may nominate another Active Volunteer Firefighter as his/her substitute as needed for any meeting of this Board. This Board, at the direction of the CEO/Fire Chief, will be responsible for:

- Recruitment of new Volunteer Firefighters.
- Review of recruits' applications and selection of new probationary Volunteer Firefighter staff members.
- Making recommendations to the CEO/Fire Chief to offer conditional employment (or not).
- Review of performance by newly recruited staff members during their six-month probationary period.

Members of this Board must maintain strict confidentiality regarding applicants' personal information. AFPD periodically advertises on their website and sends notifications to localities and affiliations to advertise openings within the AFPD.

The AFPD uses support members and has a Support Member Training Program. The Aspen Fire Support Member Program consists of three phases and culminates with a final test challenging the recruit's firefighter knowledge and skills. Each phase will require the recruit, along with his/her assigned FF Mentor, to complete a position Task Book of various skills and knowledge-based activities in the two-month time allotment for each phase. The successful completion of each phase and the ability to move on to the next phase are based on an evaluation of the recruit's performance by the Recruit Coordinator, Training Officer, and the recruit's Mentor.

STAFFING RECOMMENDATIONS

Although the previous sections of this report focused primarily on the conditions that existed at the time of ESCI's site visit to AFPD and the projected population and service demand increases, this portion of the report provides comments and recommendations related to the deployment of personnel with a focus on future service delivery and an improvement in overall efficiency within the system.

Development of Response Standards and Targets

ESCI emphasizes the importance of establishing and regularly monitoring performance metrics for the deployment of resources. These metrics serve as the foundation for determining whether the organization is meeting the expectations of the community that it serves. Without regular and consistent performance evaluation, it is impossible to set and achieve goals established to meet community expectations.

AFPD has not established formalized response standards and targets that are advised as a tool with which to make the best future deployment decisions. In the absence of established standards, ESCI offers the following discussion to AFPD leadership and decision-makers.

ESCI emphasizes the importance of AFPD establishing response performance metrics. Once established, these standards provide measurable goals for service delivery. These form the foundation upon which the District should base the planning for deployment of personnel. Absent these processes, the organization is not able to determine where it needs to go, nor is it able to know when it is achieving its goals and meeting the community's expectations.

Response standards must be developed by the individual community, based on the expectations of elected officials and citizens balanced against the financial aspect of what a community is able and willing to afford. For this reason, ESCI cannot establish these standards for AFPD but rather will provide guidance and examples of what we consider to be acceptable metrics. In the following figure, ESCI offers sample statements that are representative of community expectations for common types of emergencies in the AFPD service area.

Figure 18: Example Community Expectations, Response Goals[1]

Service	Community Outcome Expectations
Fire Suppression	For all fire incidents, responders shall arrive in a timely manner with sufficient resources to stop the escalation of the fire and keep the fire to the area of involvement. An effective concentration of resources shall arrive within time to be capable of containing the fire, rescuing at-risk victims, and performing salvage operations while providing for the safety of the responders and general public.
Wildland Fire Suppression	For all wildfire incidents, the department shall arrive in a timely manner with sufficient resources to first protect homes and other buildings, then begin controlling the rate of fire spread.
Emergency Medical Services	For emergency medical incidents, the department shall arrive in a timely manner with sufficiently trained and equipped personnel to provide medical services that will stabilize the situation, provide care and support to the victim, and reduce, reverse, or eliminate the conditions that have caused the emergency while providing for the safety of the responders. When warranted, timely transportation of victim(s) to appropriate medical facilities shall be accomplished in an effective and efficient manner.
Vehicle Extrication	For vehicle accidents where the rescue of victims is required, responders shall arrive in a timely manner with sufficient resources to stabilize the situation and extricate the victim(s) from the emergency situation without causing further harm to the victim, responders, public, and the environment.

Note that the response goals presented do not address specific staffing or response time performance. Defining and identifying the critical tasks, the staff, and the response time necessary to meet the response goals is something that should be accomplished by the fire jurisdiction in consultation with the policymakers.

Critical Tasks, Risk, and Staffing Performance

The goal of any fire service organization is to provide adequate resources within a period of time to mitigate an emergency event reasonably. However, all emergency events inherently carry their own set of special circumstances and will require varying levels of staffing based upon factors surrounding the incident. Properties with high fire risk often require greater numbers of personnel and apparatus to mitigate the fire emergency effectively. Staffing and deployment decisions should be made with consideration of the level of risk involved. The level of risk categories used in the fire service industry are as follows:

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

The Center for Public Safety Excellence (CPSE) has a *sample* critical tasking analysis for the number of personnel required on the scene for various levels of risk. This information is shown in the following figure, illustrating an example of critical tasking only and is not intended to define the actual personnel necessary based on risk conclusively.

Figure 19: Sample of Critical Task Staffing by Risk[2]

Firefighter Personnel Needed Based on Level of Risk				
	Structural Maximum Risk	Structure Significant Risk	Structure Moderate Risk	Non-Structure Low Risk
Attack line	4	4	2	2
Back-up line	4	2	2	(2)
Support for hose lines	4	3	2	
Search and rescue	4	4	2	
Ventilation	4	2	2	
Rapid intervention team	4	4	2	
Pump Operator	2	1	1	1
2nd apparatus/ladder operator	1	1	(1)	
Command	2	1	1	1#
Safety	2	1	1#	
Salvage	4			
Rehabilitation	2			
Division/group supervisors	(2)			
Total:	**37–39**	**23**	**14–16**	**3–6**

() indicates tasks may not be required at all such incidents

# indicates task may, at times, be completed concurrently with other position

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

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

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

All Risk Critical Resource Tasking

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

The following figures are provided as an example for these types of incidents, although ESCI recommends that AFPD conduct its own field validation exercises with its crews, including mutual aid resources, to verify the critical tasking analysis provided.

As the actual or potential risk increases for any particular emergency, the need for higher numbers of personnel and apparatus also increases. The number and types of tasks needing simultaneous action will dictate the minimum number of firefighters required to combat different types of incidents. In the absence of adequate personnel to perform concurrent actions, the commanding officer must prioritize the tasks and complete some in chronological order, rather than concurrently. The following figures are provided as an example of critical tasking.

Figure 20: Sample Emergency Medical Incident Critical Tasking

Task	Personnel
Command	1
Patient Care	2
Total	**3**

Figure 21: Sample Structure Fire-Interior Attack Critical Tasking

Task	Personnel
Command	1
Pump Operator	1
Water Supply[3]	1
Primary Attack Line	2
Backup Line	2
Rapid Intervention Team (RIT)	2
Ventilation	2
Search and Rescue	2
Utilities/Exposures	2
Safety	1
Total	**16**

Figure 22: Sample Nonstructure Fire Critical Tasking

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

Figure 23: Sample Hazardous Materials Incident Critical Tasking

Task	Personnel
Command	1
Pump Operator	1
Primary Attack Line	2
Backup Line	2
Support Personnel	7
Total	**13**

Figure 24: Sample Motor Vehicle Collision with Entrapment Critical Tasking

Task	Personnel
Command	1
Pump Operator	1
Primary Attack Line	2
Extrication	3
Patient Care	2
Total	**9**

Again, critical tasks are those activities that must be conducted in a timely manner by firefighters at emergency incidents to control the situation, stop-loss, and perform necessary tasks required for a medical emergency. AFPD is responsible for ensuring that responding companies are capable of performing all of the described tasks in a prompt, efficient, and safe manner to protect the life safety of both victims and emergency responders. AFPD should conduct field validation exercises with its crews to verify the critical task analyses provided. After field validation is complete, the department may find that the critical tasking can be adjusted appropriately upward or downward.

Response Time Performance Objectives

Once AFPD has established response goals and identified the critical tasks and number of personnel necessary to achieve those critical tasks, the District can begin the process of defining emergency response time performance objectives.

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

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

National consensus standards, such as NFPA 1720, contain response time goals for combination/volunteer fire jurisdictions (NFPA 1720).[4] The NFPA 1720 standard recognizes that many fire jurisdictions are combination departments (paid/volunteer) and serve diverse areas with varying levels of risk. The CPSE *Community Risk Assessment: Standards of Cover* is a fire service best practices document that recommends response performance objectives are developed considering the capabilities of the jurisdiction, current response time performance (baseline), risks present, and the expectations of the community.[5] Although none of these standards are mandates, the overarching goal of all these documents is to provide fire departments with a methodology to develop response time objectives that provide for the arrival of the appropriate fire department resources in time to safely and effectively mitigate the emergency.

Figure 25: NFPA 1720 Deployment Model

Demand Zone	Demographics	Minimum Staff to Respond	Response Time (minutes)	Meets Objective (%)
Urban Area	> 1,000 people/mi²	15	9	90
Suburban Area	500–1,000 people/mi²	10	10	80
Rural Area	< 500 people/mi²	6	14	80
Remote Area	Travel distance ≥ 8 miles	4	Dependent on travel distance	90
Special Risks	Determined by AHJ	Determined by AHJ based on risk	Determined by AHJ	90

* A jurisdiction can have more than one demand zone.
* Minimum staffing includes members responding from AHJ's department and automatic aid.
* Response time begins upon completion of the dispatch notification and ends at the time interval shown in the figure.

The following figure provides examples of response performance objectives based on demand zones and incident categories. Response performance objectives are presented for the first unit on the scene and a full first alarm.

Figure 26: Emergency Response Performance Objectives Example

Response Performance Objectives by Incident Category and Demand Zone		Fire	EMS	Other
Response Time—First Unit On-scene	Rural 80th Percentile	11:00	11:00	11:00
Response Time—Full First Alarm (ERF)	Rural 80th Percentile	14:00	13:00	13:00

Emergency response performance objectives are stated as percentiles, meaning if the stated objective for the first unit on the scene is 7 minutes response time (90th percentile), the first unit arrived at 90% of emergency incidents in 7 minutes or less. This follows the recommendations of industry best practices documents such as NFPA 1720, or the CPSE Standards of Cover document.

Response time for the first unit on the scene is measured from when the fire department is dispatched to the arrival of the first unit on the scene. Response time for the full first alarm, often referred to as the effective response force (ERF), is measured from the time units are dispatched to the arrival of the full first alarm assignment based on the incident category and the level of risk. AFPD should utilize critical task analysis to determine the resources (apparatus and personnel) that comprise a full first alarm assignment based on risk for the various types of incidents.

The critical task figures and the emergency response objectives in the previous figure are presented as examples. The previous discussion provides AFPD with the information necessary to begin the process of establishing response objectives and targets. Critical tasking and establishing response performance objectives based on risk should be viewed as a strategic planning tool for community loss control. The District is encouraged to begin the process as soon as feasible to assist with future planning needs.

Resource Deployment Options and Financial Analysis

The results of the preceding analysis provide several salient considerations for the deployment strategies utilized by AFPD. The analysis confirmed that the current fire stations are appropriately located based on population and call demand, and that the greatest need faced by AFPD now and in the foreseeable future is not the addition of additional fire station(s). Rather, the greatest need indicated by the preceding evaluation is the addition of firefighters in the existing stations. The analysis demonstrates that a volunteer-staffed fire station, with as few as two firefighters assigned on call from home per 24-hour period, does not provide the level of effectiveness that could be obtained by increasing the number of career dedicated staff. The following general considerations are provided from the staffing analysis:

- The addition of two firefighters to Stations 61 and 62 during hours of operation will ensure the required minimum of four required for OSHA and NFPA regulations.
- Maintaining at least four firefighters at Stations 61 and 62 provides AFPD with the ability to respond to multiple calls from the same location within the respective fire station service area and potentially reduces the frequency of units not available for service.

- Due to limited staffing and distribution across a large and sparsely populated geographic area, it is not currently possible for AFPD to meet any national consensus standards for response time, coverage, or the assembly of an effective response force (ERF). Therefore, ESCI recommends either an increase of volunteers and/or establishing dedicated career staff in these stations.
- Due to the practice of minimal staffing, and the complete depletion of available units when any one apparatus is committed to a call, response times are relatively high.

Based on the analysis conducted during this study, ESCI has provided several options for consideration that would improve AFPD's ability to enhance service demand, either with currently available resources or with additional resources. These options would each enhance firefighter safety and effectiveness. The following analysis of these options will provide the AFPD with the information necessary to select the most appropriate and sustainable option and provide prioritization for future funding decisions.

To provide realistic alternatives to the current service delivery model, the following series of figures present several options illustrating alternative approaches to the current service delivery model. Although these are by no means the only options, the following discussion provides AFPD with a sense of the range of models available and the impacts on service delivery.

Options identified during this report will be presented in the following order:

- **Option 1:** Maintain the status quo with no additional staff added.
- **Option 2A:** Add two career staff Firefighter/EMTs to Stations 61 and 62 to provide four full-time staff members between Stations 61 and 62 for 24/7 coverage.
- **Option 2B:** Add two career staff firefighters to Stations 61 and 62and require two volunteer staff members for coverage at each to provide four staff members at Stations 61 and 62 for 24/7 coverage.
- **Option 3:** Add four career staff Firefighter/EMT to Stations 61 and 62to provide eight full-time staff members between Stations 61 and 62 for 24/7 coverage.

It is important to recognize that the options presented are based upon the data available at the time of this report, and ESCI did not consider additional factors not readily available when forming the options. Detailed analysis, including extensive financial modeling of options, is beyond the scope of this study. Further, AFPD may find that it would prefer to implement some variation of the options presented here.

Decision Unit Determination and Cost

When developing a cost methodology for various service level improvement options, it is customary to discuss financial modeling in terms of decision units. A decision unit can be defined as a resource having some impact on service level at some initial and recurring cost. In the case of the following options, specifically Options 2A, 2B, and 3, the decision unit is defined as the fully equipped and on-boarded Firefighter/EMT position staffed 24 hours per day, seven days per week. For every riding position or decision unit added, it will require the District to hire a total of at least three FTEs to provide coverage for each of the three shifts (there are other schedules which could be evaluated that may require more FTE).

Each of these options envisions adding a certain number of decision units at some aggregate cost. Since AFPD currently does not employ career Firefighter/EMTs, there is no existing salary structure that can be used to model future costs. However, the resort community of Vail, Colorado, employs career personnel, and their current firefighter salary structure can be used as a starting point.

Figure 27: Firefighter Annual Salaries in Vail, Colorado

Position	Annual Salary		
	Starting	Top End	Average
Firefighter	$59,042	$73,818	$63,473
Engineer	$68,124	$85,176	$78,292

Prior to taking the significant step of hiring career firefighters, the AFPD should undertake its own benchmark study of comparable community firefighter salaries and benefits. For this study, ESCI has used a starting salary of $65,000 to be competitive and attract the best employees. Benefit rates can be determined using the District's proposed FY 2020 budgeted staff costs. Total staff benefits for FY 2020 are proposed at $362,495, with salaries of $876,772 for a benefit rate of 41.3%. Therefore, the approximate total compensation cost for one FTE (a single Firefighter/EMT) for FY 2020 is $91,845 (annual salary of $65,000 plus $26,845 benefits). Career staff costs for the District have historically increased at an average annual rate of 8% from FY 2014 through FY 2018. When adding positions, it is also important to include first-year onboarding costs along with the recurring cost of each new position.

These costs generally vary from department to department but typically include such items as background checks/polygraphs, physicals based upon the NFPA 1582 firefighter standard, recruit school costs, uniforms, SCBA facepieces, Personal Protective Equipment (PPE) or turnout gear, and may include radio/technology packages or other items. For this study, an estimated onboarding cost of $7,500 was used for FY 2020. After the initial year, these costs would not continue with the added position, and the only recurring costs associated would be the total annual compensation. However, it is also understood that the department's annual operating costs over time would increase due to added PPE replacement, training, and other associated employee costs.

AFPD must consider an additional factor when evaluating the potential cost of adding positions. As with any other District employee, firefighters will receive time off for various reasons such as vacation, sick, and funeral leave, among others. Minimum staffing requirements for various response units must be determined based upon risk and response protocols to emergency incidents. These minimum daily staffing needs require that when any firefighter is on leave, and daily staffing drops below the minimum, another firefighter must cover his or her position. This leave coverage is required to maintain minimum daily staffing and is termed the "relief factor."

Since the District currently has no career firefighters, there is no historical leave accrual and actual usage information available to determine the relief factor. Therefore, for this study, ESCI uses a relief factor of 1.25 to calculate the needed FTE to cover each riding position or decision unit that is proposed in the options that follow. Although this may seem high, it is not atypical of career-staffed fire departments. For example, a shift staffing schedule of 24 hours on-duty followed by 48 hours off-duty means that for every minimum daily riding position on an apparatus, an agency will require three FTEs before considering any leave time (1 FTE x 3 shifts). The relief factor of 1.25 applied to each riding position means that 3.75 FTEs are required to maintain that position and meet minimum staffing requirements.

Figure 28: Estimated Firefighter/EMT Compensation for FY 2020 with Relief Factor Included

Resource	Base Salary	Estimated Benefits	Cost FY 2020	Cost w/ Relief Factor	Actual FTE Hired
1 Firefighter/EMT (1 FTE)	$65,000	$ 26,650	**$91,650**	$114,563	1.25
1 Firefighter/EMT Decision Unit (1 FTE x 3 shifts = 3 FTEs)	$195,000	$ 79,950	**$274,950**	$343,688	3.75

Figure 28 shows the estimated FY 2020 cost of a single Firefighter/EMT and the total cost to cover the relief factor of 1.25. The District needs three full FTE at a total FY 2020 personnel cost of $343,688 to fill one riding position of the decision unit, which would include a fractional FTE. In reality, if only one decision unit were needed, the District would either incur that additional amount in overtime or would need to hire an additional firefighter for each three needed to fill one riding position. The following figure shows the estimated staff recurring costs and first-year onboarding cost for a single decision unit at an 8% and a 4% annual staff cost increase, respectively.

While the historical annual staff cost increase has averaged 8%, if that were reduced, it would have a significant impact on the recurring cost of the decision unit, as shown.

Figure 29: Estimated Future Cost to Fill Firefighter/EMT Decision Unit with Relief Factor Included

Decision Unit	Personnel Recurring Costs					
	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
1 Firefighter/EMT Position (8% annual increase)[1]	$343,688	$371,183	$400,877	$432,947	$467,583	$504,990
1 Firefighter/EMT Position (4% annual increase)[2]	$343,688	$357,435	$371,732	$386,602	$402,066	$418,148
Decision Unit	**Personnel On-Boarding Costs[3]**					
	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
1 Firefighter/EMT Position	$22,500	$22,928	$23,363	$23,807	$24,259	$24,720

[1]Cost increase based upon historical staff annual salary and benefit increase of 8%; includes a relief factor of 1.25.

[2]Cost increase based upon historical staff annual salary and benefit increase of 4%; includes a relief factor of 1.25.

[3]Cost increase based upon estimated Dec 2019 Denver-Aurora-Lakewood area CPI-U of 1.9%.

Option 1: Maintain the Status Quo

Maintaining the current service delivery model is an option for AFPD. As previously discussed, under the current deployment model, AFPD cannot comply with the national consensus standard, NFPA 1720, for providing fire and EMS services.

If the department continues to operate in this manner, AFPD should consider the previously discussed factors in *Future Service Delivery Models* as it will fail to meet national consensus standards outlined in NFPA 1720. Upon immediate dispatch, AFPD does not have the proper staff to commence interior firefighting operations in conjunction with industry standards and OSHA 29 CFR 1910.134(g)(4)(i) guidelines. These guidelines and industry standards require two firefighters to be on-scene and available outside the hazard area while two are inside. As the population and call volume increase, AFPD's ability to provide the same level of service will decrease.

Option 1A: Financial Impact

The financial impact of Option 1A is a status quo projection since there would be no additional costs incurred with continuing the status quo staffing and deployment model.

Option 2A: Add two career staff firefighter/EMTs to Stations 61 and 62 to provide four full-time staff members for 24/7 coverage.

Maintaining the current service delivery model is an option for AFPD. However, an immediate need to increase the number of firefighters exists. As previously discussed, under the current deployment model, AFPD cannot comply with the national consensus standard, NFPA 1720, for providing fire and EMS services. Furthermore, it does not provide the proper staff to commence interior firefighting operations in conjunction with industry standards and OSHA 29 CFR 1910.134(g)(4)(i) guidelines throughout the jurisdiction. The proposed staffing for Option 2A is listed in the following figure.

Figure 30: Staffing Option 2A

	Station 61		Shift	Shift Total
Engine	2	FTE	24/7	2
	Station 62		**Shift**	**Shift Total**
Engine	2	FTE	24/7	2
			TOTAL	**4**

As shown in Figure 30, AFPD would staff Stations 61 and 62 with two full-time career firefighters. These full-time staff would be first-due for all calls for service. Current peak time analysis shows that AFPD experiences busiest peak call times between the hours of 8:00 a.m. to 8:00 p.m. The current total demonstrated response time (turnout plus travel) at the 80th percentile exceeds the expected performance by 9 minutes at 14 minutes, 19 seconds. Should the District determine that it will implement this change, the ability to assemble an increased ERF will be available.

AFPD can reach 63.9% of the city limits within four to eight minutes. The daily staffing assigned becomes the ERF for AFPD. This option increases the ability to assemble consistently greater ERF but still does not meet NFPA 1720 recommendations for urban and suburban population demands. However, it does provide a greater ability to handle concurrent calls if units are called to respond. The District has areas that meet the qualifications for urban and suburban demand zones and requires 15 firefighters for urban and 10 firefighters for suburban population demands to meet NFPA 1720 recommendations. Volunteers would continue to supplement these numbers but are not guaranteed.

Option 2A: Financial Impact

The financial impact of Option 2A would include the cost of adding full-time staff for the 24/7 hours of coverage.

Figure 31: Financial Impacts of Option 2A

Position	Option 2A					
	Decision Units	Unit Cost	Actual FTEs	Staff Cost	Onboarding	Total Cost
Station 61 (2 FF/EMT per shift)	2	$343,688	7.50	$687,375	$56,250	$743,625
Station 62 (2 FF/EMT per shift)	2	$343,688	7.50	$687,375	$56,250	$743,625
District Total FY 2020	**4**		**15**	**$1,374,750**	**$112,500**	**$1,487,250**

As discussed above, adding one 24/7 position is a decision unit that is estimated to cost $343,688 in FY 2020, which excludes onboarding costs. Each decision unit requires 3.75 FTE; therefore, adding two decision units or positions per stations would require a total of 15 FTE at a total staff cost the first year of $1.37 million. Adding the first-year onboarding costs of $112,500 would give a total cost of $1.49 million in FY 2020 to add 24/7 career coverage of two Firefighter/EMTs per shift in two stations.

Option 2B: Add two career staff firefighters to Stations 61 and 62 and require two volunteer staff members for coverage at each to provide four staff members for 24/7 coverage.

Maintaining the current service delivery model is an option for AFPD. However, an immediate need to increase the number of firefighters exists. As previously discussed, under the current deployment model, AFPD cannot comply with the national consensus standard, NFPA 1720, for providing fire and EMS services. Furthermore, it does not provide the proper staff to commence interior firefighting operations in conjunction with industry standards and OSHA 29 CFR 1910.134(g)(4)(i) guidelines throughout the jurisdiction. The proposed staffing for Option 2B is listed in the following figure.

Figure 32: Staffing Option 2B

Station 61			Shift	Shift Total
Engine	2	FTE	24/7	2
	2	Volunteers	24/7	2
Station 62			**Shift**	**Shift Total**
Engine	2	FTE	24/7	2
	2	Volunteers	24/7	2
			TOTAL	**8**

As shown in Figure 32, AFPD would staff Stations 61 and 62 with two full-time career firefighters. These full-time staff would be first-due for all calls for service. In addition to the two career firefighters, current volunteers would be required to staff 24-hour shifts. These volunteers would be required to stay at the station during their 24-hour shift to provide an immediate response. Should the District determine that it will implement this change, the ability to assemble a consistently increased ERF will be available. Upon immediate dispatch, AFPD would have the proper staff to commence interior firefighting operations in conjunction with industry standards and OSHA 29 CFR 1910.134(g)(4)(i) guidelines. These guidelines and industry standards require two firefighters to be on scene and available outside the hazard area while two are inside (two-in/two-out).

Option 2B: Financial Impact

The financial impact of Option 2A would include the cost of adding full-time staff for the 24/7 hours of coverage.

Figure 33: Financial Impacts of Option 2B

Position	Option 2B					
	Decision Units	Unit Cost	Actual FTEs	Total Cost	Onboarding	Total Cost
Station 61 (2 FF/EMT per shift)	2	$343,688	7.50	$687,375	$56,250	$743,625
Station 62 (2 FF/EMT per shift)	2	$343,688	7.50	$687,375	$56,250	$743,625
District Total FY 2020	**4**		**15**	**$1,374,750**	**$112,500**	**$1,487,250**

The cost for Option 2B would essentially be identical to Option 2A, although there might be slightly higher station operating costs with additional volunteers responding to or from the fire stations in addition to the career staff.

Option 3: Add four career staff firefighter/EMTs to Stations 61 and 62 to provide eight full-time staff members for 24/7 coverage.

As previously discussed, under the current deployment model, AFPD lacks the ability to comply with the national consensus standard, NFPA 1720, for providing fire and EMS services. The following figure displays the proposed staffing for Option 3.

Figure 34: Staffing Option 3

Station 61			Shift	Shift Total
Engine	2	FTE	24/7	2
	2	FTE	24/7	2
Station 62			**Shift**	**Shift Total**
Engine	2	FTE	24/7	2
	2	FTE	24/7	2
			TOTAL	**8**

As shown in the above figure, AFPD would staff Stations 61 and 62 with four full-time career firefighters. These full-time staff would be first-due for all calls for service. In addition to the four career firefighters, current volunteers would be required to supplement when called. Should AFPD implement this option, it will increase the ERF on duty 24/7. This option will also serve to increase the ability to handle concurrent calls during the 24-hour shift. Although this option does not bring AFPD into full compliance with NFPA 1720 or ISO criteria, it does provide a significant improvement in the ability to handle both current and future service demand. It also represents an entry point for AFPD to begin the development of a deployment system based upon industry best practices.

Whether or not AFPD implements this option today or in the near future, some variant of this deployment model should be adopted for the District to operate more effectively, safely, and efficiently. This option represents the absolute minimum staffing levels advisable in a fire rescue system. However, it also represents a significant increase in overall staffing levels and annual expenditures. Because of the factors discussed, this is a realistic option enabling AFPD to establish a solid operational framework for current and future deployment and development of fire rescue resources within the system that will eventually lead to conformance with industry standards and best practices.

Option 3 requires the hiring of four FTE employees per shift for a total of 12 positions (excluding relief coverage). Many departments develop a plan to increase FTEs incrementally over several years to ease financial impacts. ESCI has provided a sample staffing schedule for providing the recommended option. The future decision unit costing table provided previously (cross-reference figure) could be used to estimate the incremental cost of adding decision units in whatever manner the District chose. The following figure depicts sample plans to achieve this staffing based on the chosen term limit.

Figure 35: Option 3 Schedule of Full-Time FTEs

	Year 1	Year 2	Year 3	Year 4	Total
One Year	12 FTE				12 FTE
Two Year	6 FTE	6 FTE			12 FTE
Three Year	4 FTE	4 FTE	4 FTE		12 FTE
Four Year	3 FTE	3 FTE	3 FTE	3 FTE	12 FTE

Impact on Fire Suppression

This option provides for several improvements to the fire suppression capabilities of AFPD. The increases in staffing would directly result in additional credit for the ISO categories evaluating deployment and staffing. Additionally, this option increases AFPD's ability to assemble an effective response force based upon additional staffing of units, respectively.

Impact on EMS Response

This option provides for several improvements to the emergency medical response capabilities of AFPD. Possessing the ability to dispatch additional units while another is committed to a call will greatly enhance AFPD's capabilities to reduce travel times and be more likely to achieve positive outcomes for medical responses. The increases in staffing would directly result in available trained responders to provide basic life support measures while awaiting advanced life support units from the Aspen Ambulance District. National standards recommend initiation of basic life support with automated external defibrillator access within four minutes. Currently, 31.4% of the jurisdiction is within four minutes of a fire station.

Option 3: Financial Impact

The financial impact of Option 3 would include the cost of adding full-time staff for the 24/7 hours of coverage. The following figure provides the estimated cost of adding all eight decision units in FY 2020. As mentioned above, however, decision units could be added incrementally over the years to spread out the initial financial impact.

Figure 36: Financial Impacts of Option 3

Position	Option 3					
	Decision Units	Unit Cost	Actual FTEs	Total Cost	Onboarding	Total Cost
Station 61 (4 FF/EMT per shift)	4	$343,688	15.00	$1,374,750	$112,500	$1,487,250
Station 62 (4 FF/EMT per shift)	4	$343,688	15.00	$1,374,750	$112,500	$1,487,250
District Total FY 2020	**8**	**$687,376**	**30**	**$2,749,500**	**$225,000**	**$2,974,500**

Additional Staffing Considerations

Separate from the options presented, AFPD should consider and employ the follow recommendations either independently or in conjunction with the previous options for enhanced staffing.

Pursue SAFER Grant Funding for Increased Career Firefighters

The Staffing for Adequate Fire and Emergency Response (SAFER) grants are a part of the Assistance to Firefighters Grant Program (AFG) administered by the Federal Emergency Management Agency (FEMA). The program has two primary elements: increasing career firefighters who provide direct response services to their community and providing grant funding to establish a volunteer recruitment and retention program.

One of the stated goals of SAFER is to "assist local fire departments with staffing and deployment capabilities in order to respond to emergencies and assure that communities have adequate protection from fire and fire-related hazards."

Many fire departments nationwide bolster staffing and deployment using funds from the SAFER program, and AFPD has that same opportunity. There are various approaches used, and ESCI cautions that some funding strategies carry with them requirements to continue to employ personnel after the grant funds expire. The Notice of Funding Opportunity (NOFO) has yet to be announced for FY 2020 AFPD should review the NOFO when released and identify opportunities to address staffing needs based on its content. ESCI recommends that AFPD apply for SAFER grant funding to provide for additional personnel in the upcoming grant round.

FINANCIAL ANALYSIS

Financial analysis is an important part of determining the long-term financial health and sustainability of the Aspen Fire Protection District (AFPD) and its ability to maintain and sustain an acceptable level of service. ESCI developed a model for the AFPD budget, which was designed to fairly and consistently represent the monetary policies of the District. Modeling is designed to neutralize the normal differences usually found in unilateral fiscal practices and to account for any financial peculiarities. This approach allows an estimation of the public cost of the AFPD's operation and provides a means for the financial evaluation of sustainability under status quo conditions. The modeled budget yields a baseline estimate of the current and projected public cost of services.

The following section provides background information on the historical and current financial condition of the AFPD. Understanding of fire service financial resources and costs within the overall study area begins with an overview of the current operating conditions. This overview includes an analysis and discussion of the financial structure for the AFPD. Also included is a multi-year historical review of revenues and expenses, followed by a status quo financial forecast from FY 2019 through FY 2023 utilizing historical trend data and key assumptions about future trajectory. This analysis relies on the extensive financial documentation provided by staff, including actual and projected budgets for the period 2014 through 2018 and 2019, respectively. Additionally, external annual financial audits for the years 2014 through 2018 were available and used as a comparative basis and check of budget data.

The District is a stand-alone entity formed under the Colorado Special District Act and, as such, is a quasi-municipal corporation that is neither a component of any other level of government nor does it have any component units. The District maintains three major governmental funds, including the General Fund (GF), the Debt Service Fund, and the Capital Acquisition Fund. While each fund maintains its own fund balance, the GF and Debt Service Funds have separate, dedicated millage rates, as shown in Figure 37.

Figure 37: Aspen Fire Protection District Ad Valorem Summary (2019)

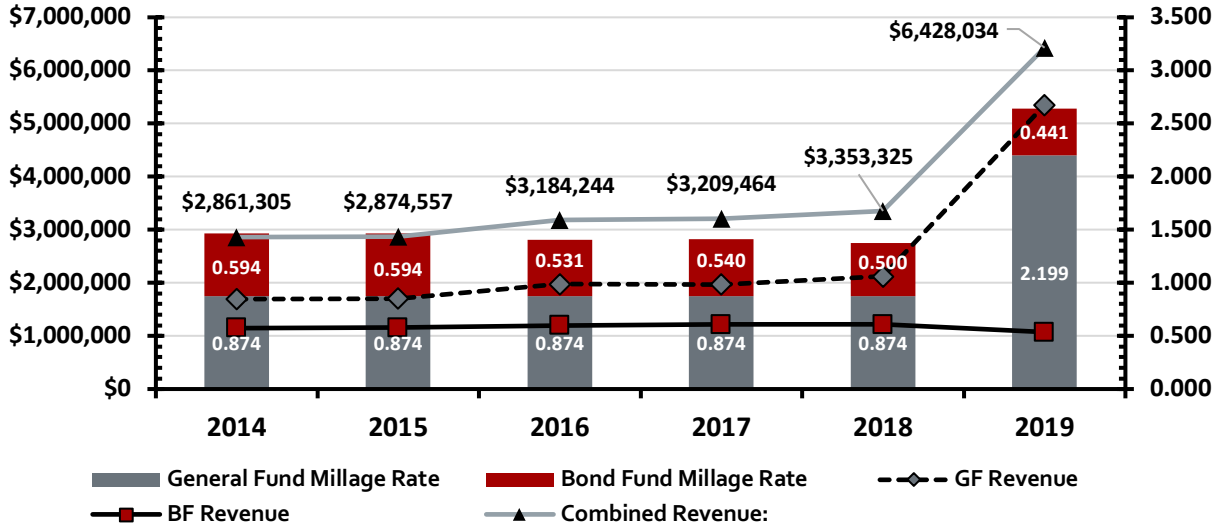
Component	Description
Fiscal Year	Jan 1–Dec 31
Taxable Value (8/23/19)	$2,723,518,790
Ad Valorem Tax Levy (Estimated)	$6,424,230
Millage Rate (GF/Debt Service Fund)	2.202/0.441(2.643 total)

Although there are transfers between the three funds, they are considered together for the purposes of this analysis, and the fund transfers cancel each other out, so they are not included. Classification and use of the various fund reserves are discussed later in this section. The District also maintains one fiduciary fund to account for its volunteer pension program and LOSAP. This fund also maintains its own discrete fund balance, and revenue is primarily derived from annual transfers from the GF, which are shown as annual expenses in the GF budget. As of 2020, the District will add a fourth major fund, the Housing Fund, to account for GF tax revenue transfers, COPS Series 2019 debt service, and capital costs of the District's Firefighter Housing Program. In this analysis, the Housing Fund is considered together with the three other major funds.

The General Fund (GF) is the District's principal operating and administrative fund used for day-to-day operations and to account for the receipt of ad valorem taxes and other revenues and expenditures. The District uses a modified accrual basis of accounting with a current financial focus. District employees are enrolled in the Statewide Defined Benefit Plan, which is administered by the Fire and Police Pension Association of Colorado. Both the District and its employees contribute annually to this plan. The plan is not discussed further here. As mentioned, the District also maintains a defined benefit plan for its volunteers, the assets and liabilities of which are accounted for in a separate fiduciary fund. The District's fiscal year coincides with the calendar year running from January 1 to December 31.

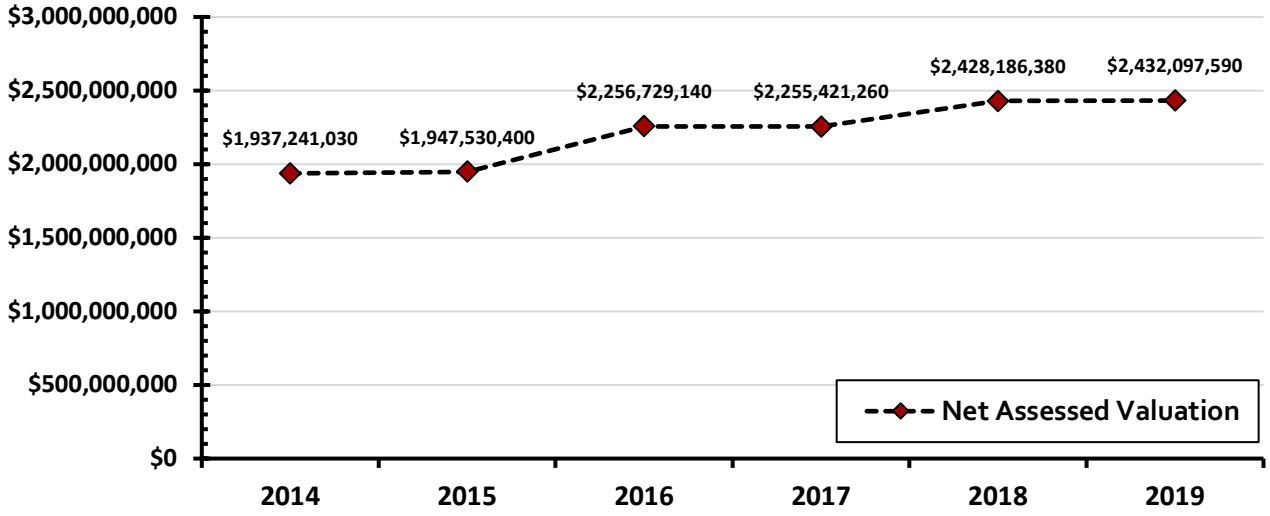
The District's primary funding source (over 90%) is ad valorem tax revenue through the GF and Debt Service or Bond Fund revenue streams. The District's GF millage rate is constrained by the requirements of Article X, Section 20 of the Colorado Constitution known as the Taxpayer Bill of Rights or TABOR amendment approved by voters in 1992. Aspen voters made some changes to the original requirements of TABOR and authorized a District GF millage rate at 0.874 mills at that time, where it had remained until 2019 when an increase was approved by voters as shown in Figure 38.

Figure 38: GF/Bond Fund Mill Rates/Revenue vs. Total District Tax Revenue Summary (2014–2019)



Voter approval for the 1.325 GF millage increase on November 6, 2018, was based upon the District's stated need for additional capital facilities, apparatus, training as well as maintaining adequate dedicated staff and volunteer firefighters. This increased millage rate was approved through 2038 and is primarily intended to service the debt for the Certificate of Participation Series 2019 (COPS) program used to fund the North 40 Firefighter Housing Project fully. In 2038 the millage increase will be lowered to .90 in perpetuity. The bond fund millage rate, shown in Figure 38, has fluctuated over the period, decreasing from 0.594 mills in 2014 to 0.441 mills in 2019 as the District taxable value has increased from $1.937 billion to $2.432 billion, an increase of 25.5%, showing an average annual growth rate of approximately 4.66%.

Figure 39: Historical Aspen Fire District Property Valuation (2014–2019)



District budget documents and audits both group expenditures more in functional areas rather than related expense categories. For example, capital items are shown in various areas, such as Administration and Firefighting, rather than all in Capital. The audits sometimes split these items out. Some personnel costs such as employer Medicare, social security, and contract labor are shown under Administration rather than Personnel costs. The audit, on the other hand, includes these with Personnel, so the audit does not always match the actual budget documents. The following analysis uses the audit as the basis for tracking revenue and expense. This analysis attempts to break out costs and place them into expenditure classes while still preserving the functional groupings as much as possible.

The following snapshot of historical financial results and the status quo projection for the District, assuming no changes in organizational structure and working conditions, sets the stage for modeling various alternatives to the status quo should the District wish to do so in the future. The status quo projection utilizes a series of revenue and expenditure assumptions based upon historical trajectory and known or expected future conditions in the community.

Historical Revenue and Expense

Revenue

Figure 40 shows actual revenues for the District, General, Debt Service, and Capital Funds for the period 2014 through 2018 and estimated or projected revenues for 2019. Revenues are divided into recurring and non-recurring revenues. Recurring revenues include ad valorem and specific ownership taxes, investment/interest income, charges for services, and other revenues that are reasonably predictable. These revenues are expected to continue yearly. Non-recurring revenues are more sporadic and difficult to predict. These revenues include grant funds, insurance proceeds, donations, sales of surplus property and equipment, transfers, and miscellaneous sources. Bond or loan proceeds are also considered non-recurring revenue sources.

Figure 40: Aspen Fire Protection District Revenues (2014–2018 Actual, 2019 Estimated)

Revenue	2014 Actual	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 Estimated
Property Taxes	2,843,847	2,861,569	3,157,639	3,192,097	3,345,976	6,424,230
Specific Ownership Taxes	95,082	100,658	105,199	117,385	122,380	200,000
Interest/Invest. Income	6,070	6,775	15,009	21,251	69,620	111,400
Charges for Services	96,089	125,554	170,525	193,699	247,826	126,806
Other	169,897	11,597	76,123	76,050	84,825	93,500
Recurring Revenue:	**$3,210,985**	**$3,106,153**	**$3,524,495**	**$3,600,482**	**$3,870,627**	**$6,955,936**
Grants/Contributions	-	-	-	5,584	172,733	56,906
Sale of Assets	-	-	31,173	-	42,300	
Bond Proceeds	-	-	-	-	-	16,000,000
Non-Recurring Revenue:	**$0**	**$0**	**$31,173**	**$5,584**	**$215,033**	**$16,056,906**
Total Revenue:	**$3,210,985**	**$3,106,153**	**$3,555,668**	**$3,606,066**	**$4,085,660**	**$23,012,842**

Recurring revenue for the District has increased at an average annual rate of approximately 4.8% between 2014 and 2018. The 2019 voter-approved increase in GF millage comes from several sources outlined in the following:

- *Ad Valorem (Property) Tax*—This tax has two distinct components, the General Fund, whose millage rate has remained fixed at 0.874 mills from 2014 through 2018 and the Debt Service Fund whose millage rate has declined from 0.594 mills in 2014 to 0.5 mills in 2018 as property values increased. The GF millage rate can be increased with voter approval, as in 2019, and is used for operational expenses, while the Debt Service Fund millage rate varies in order to provide sufficient funding to service the debt. GF revenue increased from $1,700,147 in 2014 to $2,130,243 in 2018, which is a 25.3% increase over the period. This represents an average annual increase of approximately 5.8%, which has been driven both by growth and rising property values in the District.

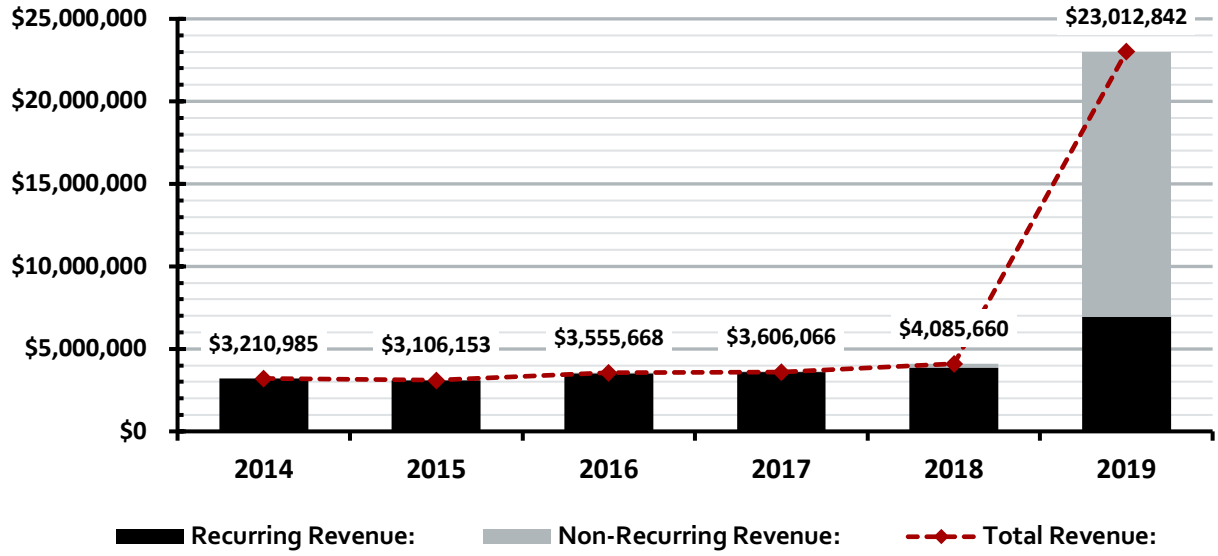
- *Specific Ownership Tax*—This tax also has two distinct components; a GF component and a Debt Service Fund component. The GF tax has risen from approximately $57,000 in 2014 to approximately $78,000 in 2018 for a 36.8% increase over the period, which is an average annual increase of 8.2 %. In the Debt Service Fund, this revenue source has increased from $38,000 to $45,000, which is a 16.5% increase and represents an average annual increase of approximately 4%.
- *Interest/Investment Income*—Each of these three funds maintains its own reserves and accrues interest each year. Between the various cash reserves and annual revenues from tax receipts and other sources, the combined interest and investment income for the District has grown significantly from $6,070 in 2014 to $69,620 in 2018.
- *Charges for Services*—These are a GF revenue source and are comprised of payments from Pitkin County for the North 40 lease and shared expenses, cooperator fees, use of the District conference room, and plans review fees. This source increased from approximately $96,000 in 2014 to almost $250,000 in 2018 or 74% for the period. This represents an average annual increase of 26.7%.
- *Other Recurring Revenue*—This is also a GF revenue stream that fluctuated from a high of almost $170,000 in 2014 to a low of $11,600 in 2015, after which it jumped to $76,000 in 2016 and grew steadily from there to a projected $93,500 in 2019.

Non-recurring revenue for the District is sporadic and, as expected, has varied considerably from $0 in 2014 and 2015 to a high of just over $16 million as projected in 2019, due primarily to the receipt of proceeds from the Certificate of Participation Series 2019 (COPS) program. Non-recurring revenue sources are outlined as follows:

- *COPS/Bond Proceeds*—The District received $16 million in bond proceeds on December 10, 2019, for construction of firefighter housing through the Certification of Participation Series 2019 (COPS) program. An additional $211,645 generated from this program goes towards the cost of issuance and the underwriter's discount. The repayment schedule on the bonded debt runs through 2038, with two annual payments totaling just under $1.1 million due in June and December of each year. Repayment is secured by GF millage revenue, which will be transferred into the new Housing Fund as of the 2020 budget.
- *Grants/Contributions*—These have been sporadic, ranging from $0 in 2014 through 2016 to a high of $172,733 in 2018. Revenue is projected at almost $57,000 in 2019.
- *Sale of Surplus Property*—In 2016 and 2018, the District earned $31,173 and $42,300 through the sale of surplus equipment, respectively. This source is projected at $0 in 2019.

The following figure compares recurring to non-recurring and total revenue for the District as a whole and shows the impact of steadily increasing ad valorem tax revenue on total revenue. Similarly, the large infusion of non-recurring revenue comprised primarily of bond proceeds is as projected for 2019.

Figure 41: Relationship of Recurring to Non-Recurring Revenues (2014–2018 Actual, 2019 Estimated)



Expense

Figure 42 shows actual expenditures for the District General, Debt Service, and Capital Funds for the period 2014 through 2018 and estimated or projected expenditures for 2019, which are divided into recurring and non-recurring expenses. Recurring expenses are those such as employee wages and benefits, volunteer personnel costs, materials and services costs, and debt service (P & I) that are reasonably predictable and expected to continue from year-to-year. As mentioned previously, the District normally groups expenditure items into functional groupings.

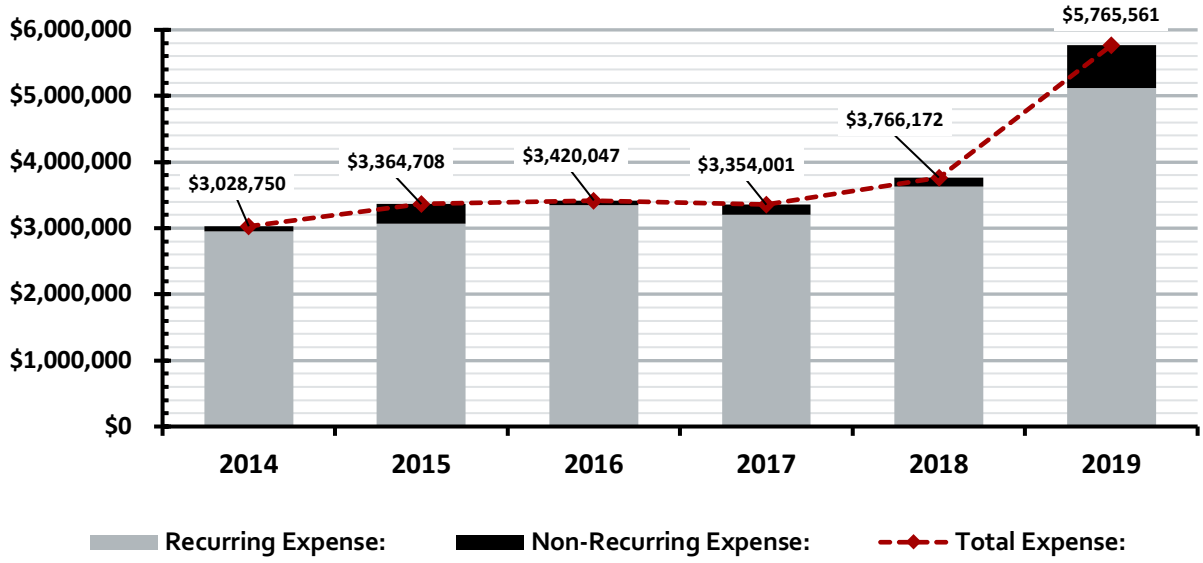
In some cases, larger fire departments have such a large fleet that they can spend a predictable amount each year on apparatus and equipment replacement. Typically, they consider this a recurring cost and can budget such with an offsetting recurring revenue. Non-recurring expenses, on the other hand, are more sporadic and may be difficult to predict, such as land acquisition, facility construction and major renovation, and large-scale equipment or apparatus purchases. In this analysis, all capital expenditures are shown as non-recurring.

Figure 42: Aspen Fire Protection District Expenses (2014–2018 Actual, 2019 Estimated)

Expense	2014 Actual	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 Estimated
Personnel Services	**1,069,238**	**1,112,113**	**1,312,604**	**1,237,373**	**1,489,161**	**1,861,812**
Staff	*658,763*	*736,300*	*706,145*	*766,622*	*850,657*	*966,783*
Volunteers	*410,475*	*375,813*	*606,459*	*470,751*	*638,504*	*895,029*
Materials & Services	**811,170**	**880,183**	**969,911**	**897,070**	**1,069,409**	**1,122,568**
Firefighting	*126,539*	*115,896*	*105,102*	*124,334*	*137,147*	*144,591*
Administrative	*327,227*	*369,661*	*366,744*	*355,238*	*423,073*	*583,825*
FF Coop. Agreement	*7,511*	*21,269*	*40,622*	*58,053*	*98,499*	-
Fire Prevention	*42,512*	*40,984*	*39,771*	*38,308*	*28,149*	*29,500*
Training	*46,089*	*30,390*	*37,548*	*36,242*	*35,794*	*44,500*
Communications	*41,582*	*45,484*	*103,224*	*71,143*	*70,253*	*80,683*
Repair Services	*51,551*	*102,846*	*100,601*	*89,406*	*147,931*	*84,746*
Buildings & Grounds	*168,159*	*153,653*	*176,299*	*124,346*	*128,563*	*154,723*
Debt Service	**1,070,888**	**1,073,038**	**1,069,025**	**1,068,950**	**1,073,475**	**2,137,059**
Recurring Expense:	**2,951,296**	**3,065,334**	**3,351,540**	**3,203,393**	**3,632,045**	**5,121,439**
Capital	77,454	299,374	68,507	150,608	134,127	644,122
Buildings				*3,574*		*179,197*
Apparatus	*29,730*	*283,645*			*126,483*	*375,000*
Equipment	*47,724*	*15,729*	*68,507*	*147,034*	*7,644*	*89,925*
Non-Recurring Exp.:	**$77,454**	**$299,374**	**$68,507**	**$150,608**	**$134,127**	**$644,122**
Total Expense:	**$3,028,750**	**$3,364,708**	**$3,420,047**	**$3,354,001**	**$3,766,172**	**$5,765,561**

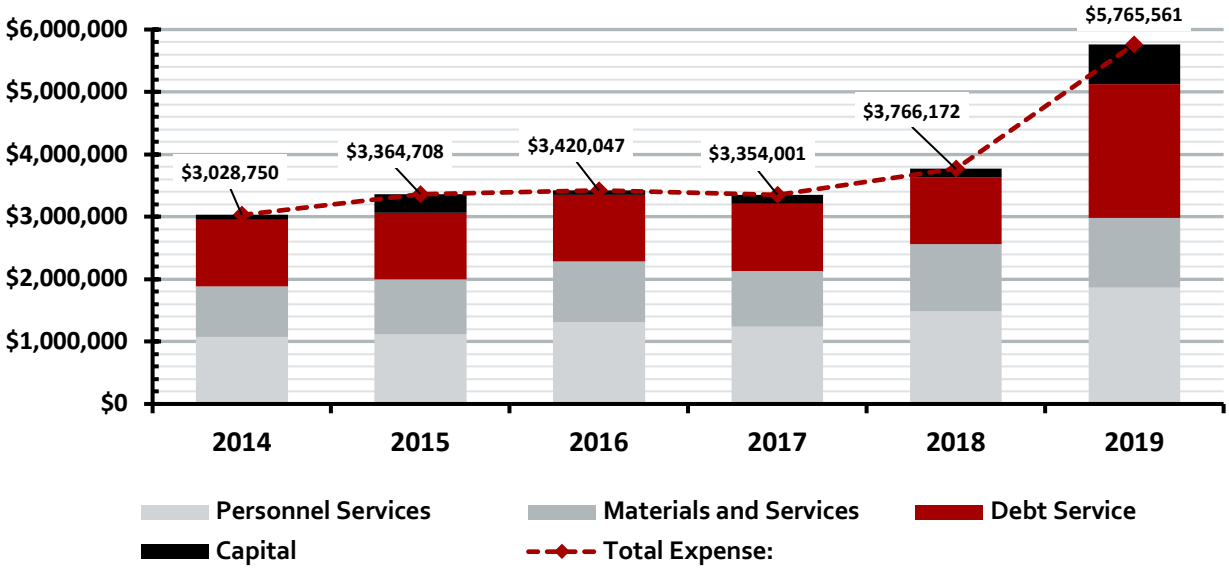
The following figure compares recurring, non-recurring, and total District expenses from 2014 through 2018 actual, and with 2019 projected. The non-recurring expense for the District has varied from lows averaging $75,000 in 2014 and 2016, to highs of $300,000 in 2015 and $640,000 projected in 2019 as the District acquired capital apparatus.

Figure 43: Relationship of Recurring to Non-Recurring Expenses (2014–2018 Actual, 2019 Estimated)



Recurring expenses for the District have increased gradually over the period, rising at an average annual rate of 5.3% between 2014 and 2018 before climbing significantly in 2019 as projected (with the first COPS debt service payment).

Figure 44: Major Expenditures vs. District Expenses (2014–2018 Actual, 2019 Estimated)



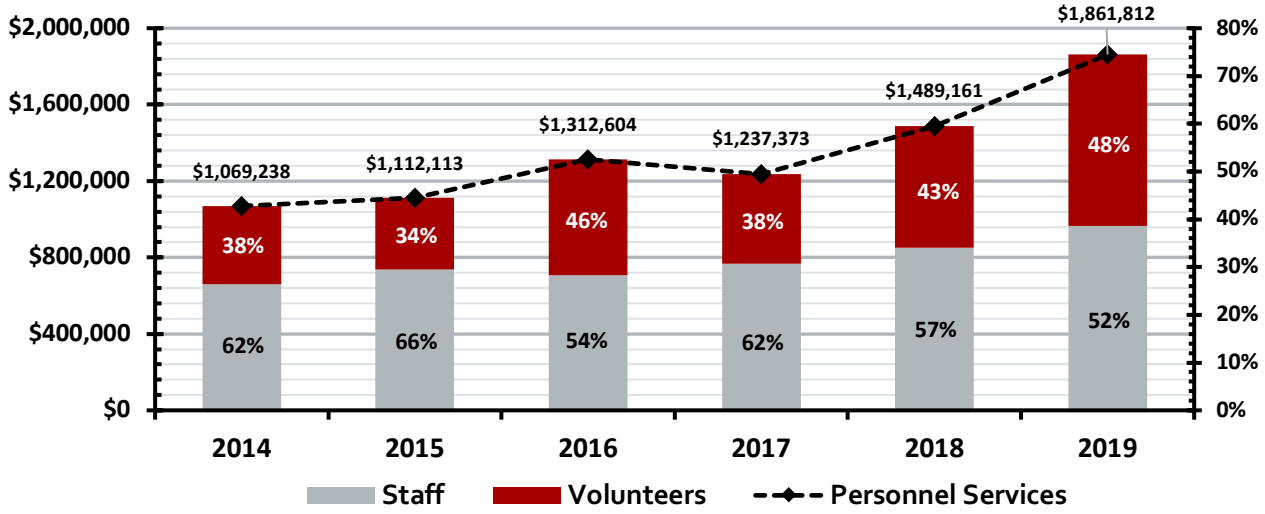
Another way to view District expenditures is to compare major expense categories to total District expense, as shown in the preceding figure. Capital expenditures have varied from 2% to 11% of total expenditures with the higher percentages occurring with capital apparatus purchases and/or building system renovations. Generally, background capital expense for the District has not been a significant percentage of the total, and most expenses through 2018 have been recurring in nature.

This will change with the firefighter housing project in 2020. Personnel costs have typically run 36% to 41% of recurring expenses. However, since the debt service related to the COPS program is for construction of firefighter housing, this expense could be considered a benefit and included in personnel costs. Therefore, the personnel component of recurring expenses would be much higher. This high personnel cost is a significant point for the District Board's consideration since the firefighting force is currently all volunteer. Materials and Service costs generally run between 20% and 30% of recurring costs, while debt service runs between 30% and 42% of recurring costs.

Recurring expenses can be divided into major categories described as follows:

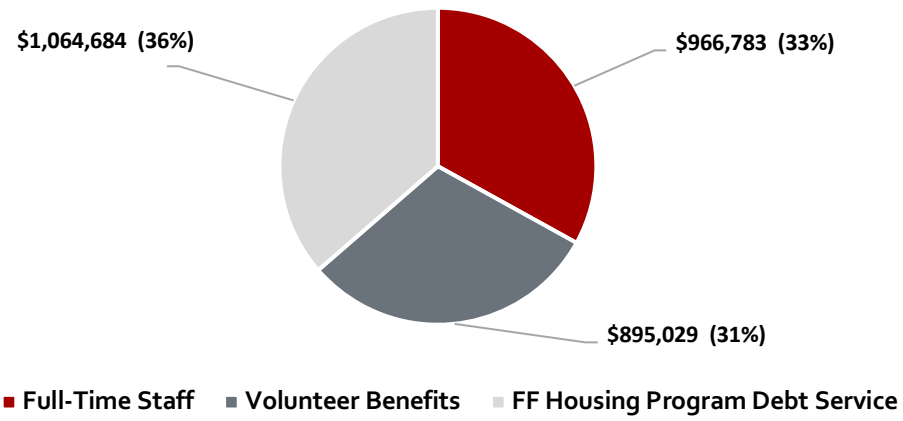
- *Personnel Services*—Included in this category are expenses found in the following District functional budget groupings: Personnel (which are primarily costs associated with eight full-time administrative or staff positions), Administration (Medicare, Social Security, SUI, Wellness Program costs, and contract labor costs), and Volunteer Benefits. Figure 45 shows the increase in total Personnel costs from 2014 actual to 2018 actual, and 2019 as projected and the split between full-time and volunteer staff along with the percentage of the total for each. In 2014, volunteer costs were 38% of total Personnel costs of $1.07 million. This percentage increased to 43% of the total by 2018, while actual costs increased 39% over the period, which is an average of 8.7% per year. This ratio of volunteer to career expense is projected to be almost 50/50 in 2019, and the overall costs are projected to increase by 25%. Much of the increase is due to increased costs for volunteer benefits.

Figure 45: Relationship of Full-Time & Volunteer Staff Cost to Total Personnel Costs (2014–2018 Actual, 2019 Estimated)



The following figure shows the relationship between fulltime and volunteer staff costs compared with the debt service cost of the firefighter housing program. If this program is considered a personnel benefit, it significantly increases the human resources costs of the District. Thus, total Personnel costs increased by just over $1 million annually due to the housing program debt service annual payments. The ratio of volunteer operational to full-time administrative costs has increased to roughly two-thirds volunteer and one-third full-time cost.

Figure 46: Relationship of Full Time & Volunteer Staff Cost to Firefighter Housing Debt Service Cost (2019 Estimated)



During the ESCI site visit, concerns were raised in the public discussion about various specific benefits provided to volunteer staff. While input was given about some questionable costs, such as food and beverage, social functions, housing subsidies, and health care benefits, it was not clear from the financial data provided what these specific costs were and where they could be identified in the budget. This lack of transparency leads to public suspicion and places it in jeopardy. The District should provide much greater transparency regarding all benefits provided in the budget presentation.

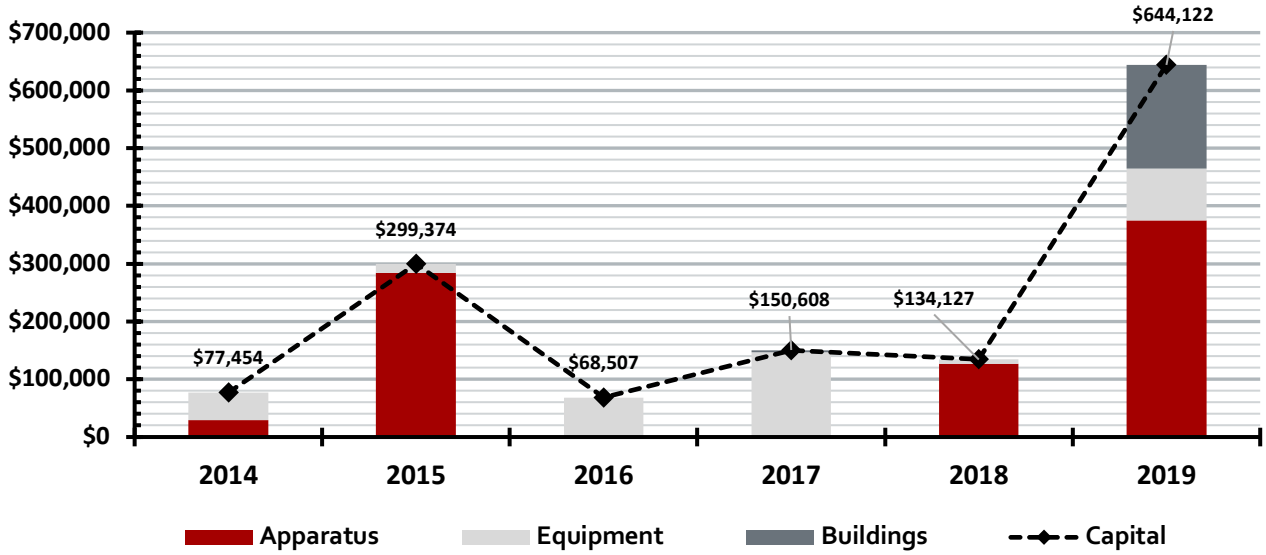
- *Materials and Services*—This category of expenditures is comprised of the following functional areas: Firefighting, Administrative (this also includes County Treasurer Fee), FF Cooperative Agreement, Fire Prevention, Training, Communications, Repair Services, and the costs associated with Stations, Buildings, and Grounds. All capital costs have been removed and placed with non-recurring capital costs below to better match the annual audit and industry budget practice. This category has increased from $811,170 in 2014 to $1,069,409 in 2018 or 31.8%, an average annual increase of 7.1%.

  The largest functional component of this category is the Administrative Services area. This area has increased from $327,227 (40% of the category total) in 2014 to $423,073 in 2018 or 29.3% over the period, for an average annual growth rate of approximately 6.7%. While still comprising almost 49% of the category in 2018, Administrative Services is expected to comprise 52% by the end of 2019. Concern has been raised about how training funds are expended. For example, it is not clear under the current budget how much of the annual training budget is spent on the department, or merely a small number of members. Therefore, the District should provide greater transparency in this area.

- *Debt Service*—The District is currently servicing the debt on General Obligation Refunding Bonds issued in 2012 for the purpose of advance refunding the remainder ($7.93 million) of an earlier bond issue from 2006 (totaling $14.04 million). The amount of the Series 2012 refunding bonds was $8,775,000. Two annual payments totaling just under $1.1 million are due on June 1 and December 1 until 2026 and are paid from the Debt Service Fund, which has its own millage rate. As discussed earlier, the District just received $16.2 million in bond proceeds for construction of firefighter housing through the Certification of Participation Series 2019 (COPS) program. The repayment schedule on this bond series runs through 2038, with two annual payments totaling just under $1.1 million due in June and December of each year. Repayment is secured by GF millage revenue, which will be transferred into the new Housing Fund as of the 2020 budget. The Housing Fund will not have a dedicated millage rate. Total debt service for the District increased from $1.07 million annually in 2018 to $2.14 million as expected in 2019.

As mentioned previously, non-recurring expenses for the District have varied from lows averaging $75,000 in 2014 and 2016, to highs of $300,000 in 2015, and $640,000 projected in 2019 as the District acquired capital apparatus. The District generally spends less than $150,000 annually on capital items, including equipment and apparatus. However, when larger apparatus such as engines are replaced, this amount can reach over $3–400,000 in any given year. In 2020, the District will enter the major construction phase for its Firefighter Housing Project. Figure 47 shows non-recurring expenses by category where the major increase in 2019 is due to facility construction and the purchase of an engine.

Figure 47: District Capital Expenses by Category (2014–2018 Actual, 2019 Estimated)



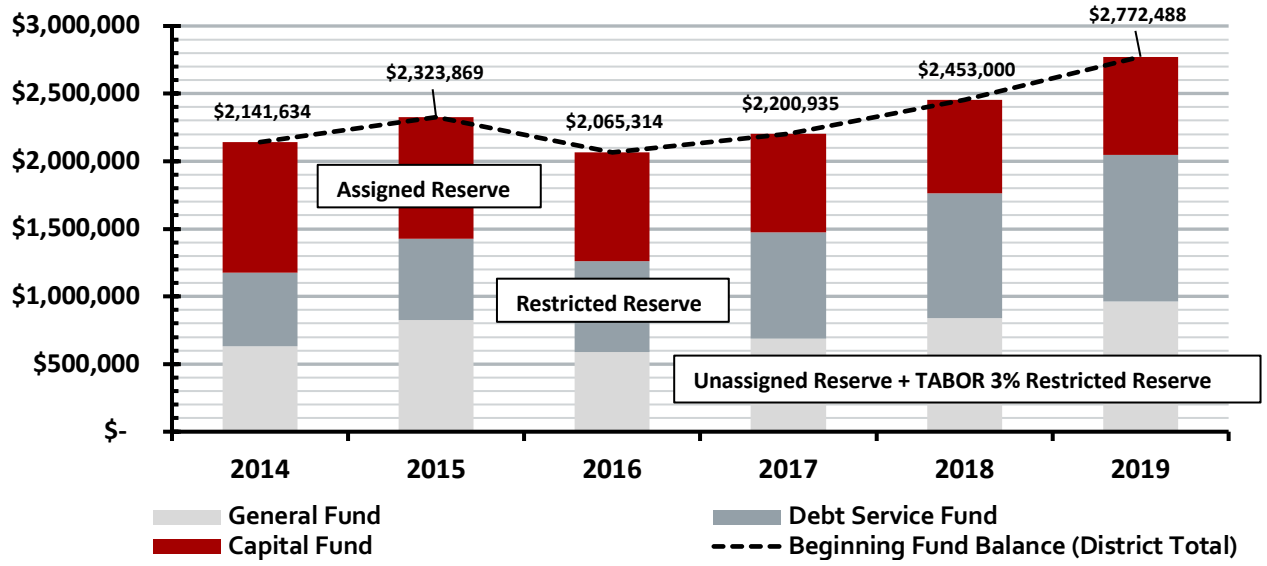
Net Change in Fund Balance

District fund balance falls into two major categories, non-spendable and spendable. Spendable fund balance can be further sub-divided depending upon various external and internal requirements. Un-spendable fund balance includes amounts that are either not in spendable form, or which are legally or contractually required to be maintained intact. The "not in spendable form" criterion includes items that do not convert to cash. Examples include inventories, deposits, and prepaid items. The District has no un-spendable fund balance.

Spendable fund balance falls into several categories which include, restricted, committed, assigned, and unassigned. Restricted reserves are utilized for a specific purpose and are generally constrained by external requirements. For example, TABOR requires that the District retain an emergency reserve equal to 3% of annual expenditures excluding bonded debt service. This TABOR emergency reserve is part of the General Fund reserve. The entire Debt Service Fund reserve is restricted for debt service payments. Committed reserves are those that can only be spent for specific purposes as formally adopted by Board action. The Board currently has no committed reserves. Assigned reserves are those intended for specific purposes where formal action has not been taken, but a purpose has been identified. The entire Capital Fund reserve is identified for future capital construction projects and apparatus purchases and is considered an assigned reserve. As of 2020, the Housing Fund will become a fourth District fund whose reserve will be assigned to the Firefighter Housing Project. The final category of spendable reserves is the residual positive fund balance in the general fund, which is categorized as unassigned.

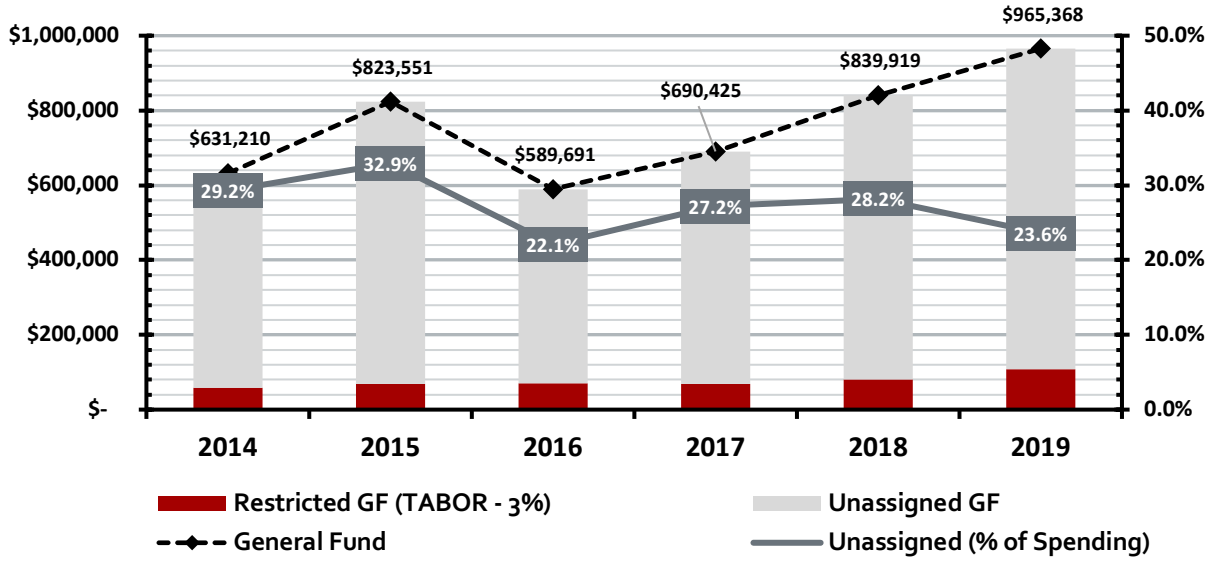
The following figure shows the total District beginning fund balance with reserves broken out by major fund and labeled as assigned, restricted, or unassigned.

Figure 48: District Beginning Fund Balance by Major Fund (2014–2018 Actual, 2019 Projected)



Unassigned fund balance serves as a reserve for cash carried forward each year. The District's unassigned portion of the General Fund beginning fund balance, shown in Figure 49, increased from $572,474 or 29.2% of District spending in 2014 to $823,551 or 33% of spending in 2015 before dropping back to $589,691 (22% of spending) in 2016. From 2016 through 2019 as expected, GF unassigned beginning fund balance has risen steadily to $965,368 and reaching 28% of total spending in 2018 before dropping back in 2019 to 23.6%.

Figure 49: Use of General Fund Beginning Fund Balance (2014 Actual–2019 Projected)

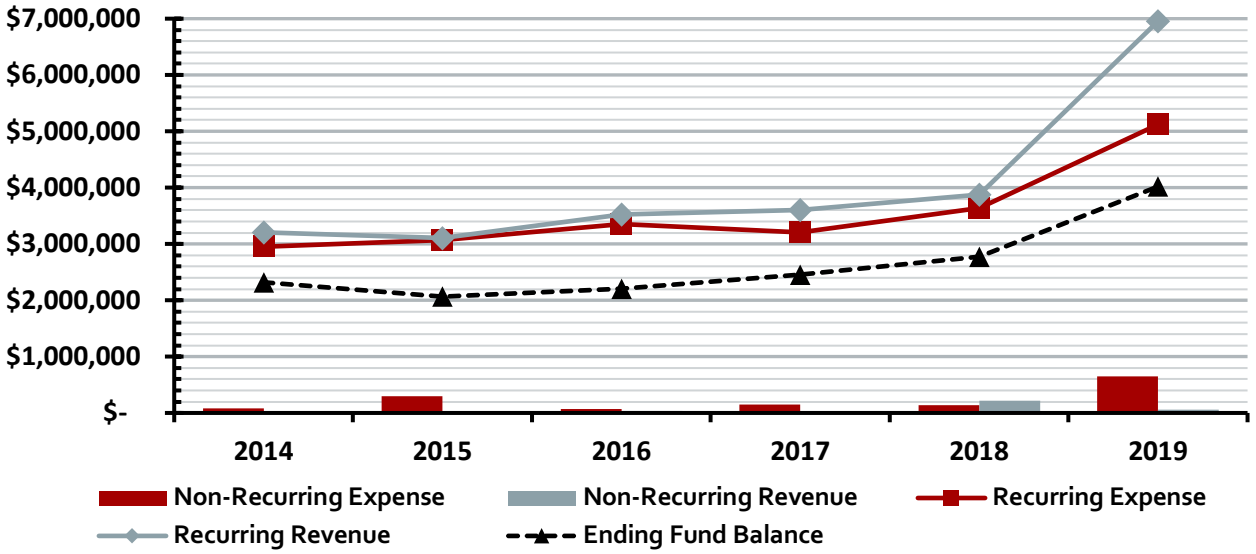


It is a sound financial practice to maintain a cash reserve equal to or in excess of 2 to 2.5 months, or 17% to 21% of recurring expenses. The Government Financial Officers Association (GFOA) guides how to account for fund balance and how much is recommended for various purposes.[6] Specifically, GFOA recommends that governments maintain at a minimum of two months or just under 17% of operating revenues or expenditures.

The District should adopt a formal fund balance policy explaining the level of unrestricted fund balance to be maintained, how it should be used, and over what period it should be restored if used. Risk of various types, whether natural or man-made, should be accounted for when developing a fund balance policy. If the unassigned reserve amount can be considered as a cash carried forward amount and used to cover a portion of recurring operating expense, then the District has maintained a healthy reserve which reached its lowest levels of 22.1% and 23.6% in 2016 and 2019.

Figure 50 shows both recurring and non-recurring revenue (grey), recurring and non-recurring expense (red) and ending fund balance for 2014 through 2018 actual, and as projected in 2019, excluding the $16,000,000 in COPS 2019 bond proceeds received in December. Recurring revenue is shown as a grey line, while recurring expense is shown as a red line. Non-recurring revenue is shown in grey bars, and non-recurring expense is shown in red bars. Ending fund balance is shown as a dashed black line. If total expense exceeds total revenue in any given year, then the net loss is covered using reserve funds, and the ending fund balance decreases.

Figure 50: Relationship of Recurring/Non-Recurring Revenue/Expense and Ending Fund Balance (2014–2018 Actual and 2019 Projected)



From 2014 through 2018 actual, except in 2015, revenue has slightly exceeded expense each year and fund balance has grown. With the voter-approved millage increase for 2019, recurring revenue has begun to exceed recurring expense significantly by just under $2 million. This net positive is added to the District's beginning fund balance. Between 2015 and 2018, the District total ending fund balance increased from just under $2.1 million to just under $2.8 million (again excluding the impact of the bond proceeds which are committed to the Firefighter Housing Project).

Status Quo Projection

ESCI evaluated the historical information provided by the District and its external auditor, as well as portions of the proposed 2020 budget to prepare a status quo forecast for the District. The forecast relies on trends previously developed through the historical review period along with forecast information available from the District and Pitkin County, to understand potential anomalies due to personnel changes, apparatus acquisitions, and other major events. ESCI made certain assumptions about revenue and expenses. These assumptions are described in each section.

Revenue Assumptions

Figure 51 shows the revenue assumptions used in the AFPD forecast.

Figure 51: AFPD Revenue Forecast Assumptions (2020–2024)

Revenue Source	Assumptions
Ad Valorem Tax	The Debt Service Fund millage rate fluctuates to provide sufficient revenue to service bonded debt. The model assumes only enough revenue in that fund to fully fund the annual debt service. General Fund millage revenue has increased historically from 2014–2018 at an average annual rate of 5.8%, Pitkin County has projected countywide growth and inflation at between 3.2% and 3.5% annually through 2024.[7] The projection uses the 2020 GF proposed revenue amount and increases it annually at 4.5% while maintaining the current original 0.874 mill levy plus the newly voted additional 1.325 mill levy.
Specific Ownership Tax	The GF component of the specific revenue tax has risen at an average annual rate of 8.2% while the Debt Service Fund component has risen at an average annual rate of approximately 4%. The forecast assumes this revenue stream will increase at a combined annual rate of 4.5% using the 2020 proposed budget as a basis.
Interest/Investments	Combined District interest/investment income more than doubled from 2014 through 2017 and then quadrupled by 2019 as expected. The forecast assumes that this rate of increase will not continue and that the average annual increase will be closer to 5% for the forecasted period. The large increase due to interest on bond proceeds will not continue, and the forecast uses the 2019 amount as the basis for the projection.
Charges for Services	Charges for services have increased rapidly between 2014 and 2018 at an approximate annual rate of 50% driven by cooperator incident payments. The category fell considerably in the 2019 projection and is budgeted near flat for 2020. The forecast assumes an average annual increase of 2% using the 2020 budget as a basis for the projection.
Other Recurring	Other recurring revenues have varied considerably over the period. The forecast assumes an average annual increase of 2% using the 2020 proposed budget figure as a basis.
Grants/Contributions	No additional grants or contributions are forecasted.
Sale of Assets	The forecast assumes an average sale of $35,000 using the historically observed frequency and the average amount received.
Bond Proceeds	No further bond programs are projected for the forecast period.

Figure 52 displays the revenue projection for the AFPD for the period 2019 through 2024 forecast.

Figure 52: District Revenue Forecast (FY 2019 Projected–2024)

Revenue	2019 Estimated	2020 Proposed	2021 Forecast	2022 Forecast	2023 Forecast	2024 Forecast
Property Taxes	6,424,230	7,067,978	7,336,998	7,621,853	7,916,548	8,224,504
Specific Ownrshp. Taxes	200,000	160,000	167,200	174,724	182,587	190,803
Interest/Invest. Income	111,400	384,400	122,819	128,959	135,407	142,178
Charges for Services	126,806	129,100	131,682	134,316	137,002	139,742
Other	93,500	55,000	56,100	57,222	58,366	59,534
Recurring Revenue:	**$6,955,936**	**$7,796,478**	**$7,814,799**	**$8,117,074**	**$8,429,910**	**$8,756,761**
Grants/Contributions	56,906	55,000	-	-	-	-
Sale of Assets	-	-	35,000	-	35,000	-
Bond Proceeds	16,000,000	-	-	-	-	-
Non-Recurring:	**$16,056,906**	**$55,000**	**$35,000**	**$0**	**$35,000**	**$0**
Total Revenue:	**$23,012,842**	**$7,851,478**	**$7,849,799**	**$8,117,074**	**$8,464,910**	**$8,756,761**

Expense Assumptions

Figure 53 shows the expense assumptions used in the AFPD forecast.

Figure 53: Aspen Fire Protection District Expenditure Forecast Assumptions (2020–2024 Forecast)

Expense Source	Assumptions
Personnel Services	Career staff costs have historically increased at an average annual rate of 8% from 2014–2018, while volunteer staff costs have increased at a slightly higher rate of 8.7% annually through 2018, with a significant jump in 2019 as projected, and leveling off in 2020 as proposed. The forecast shows both respective rates of increase will continue through 2024. The forecast uses the 2020 proposed amounts as the basis for the projection.
Materials and Services	The various functional components in this category have historically increased at different rates as follows: • Firefighting: 2% • Administrative: 6.7% • FF Cooperative Agreement: Not budgeted after 2018 • Fire Prevention: negative 9.8% until 2018, a slight increase to 2019 • Training: fluctuates around $38,000 annual average • Communications: 14.2% • Repair Services: fluctuated around an annual increase of 8.5% • Stations, Building, and Grounds: fluctuated around an annual average of $150,000 The forecast assumes historical growth rates using 2020 proposed amounts as the basis unless fluctuation has occurred, in which case the average is used as a basis and increased at 2% annually.
Debt Service	Fixed repayment schedules govern debt service payments for two separate bond programs, the 2012 General Obligation Refunding Bonds at just under $1.1 million annually and the Certification of Participation Series 2019 (COPS) program, also at just under $1.1 million annually. These payments are budgeted in the GF and Debt Service Funds and will be combined throughout the forecast period.
Capital	Capital apparatus and facility costs are taken from the Capital Improvement plan provided by the department with the exception that the remainder of the $16 million bond revenue not budgeted in 2020 ($10 million) is forecast to be spent in 2021 to complete the Firefighter Housing Project along with scheduled CIP spending. Equipment spending is forecast to increase at an average of 2% each year with 2020 as the basis.

Figure 54 displays the expenditure forecast for the AFPD for 2019 projected through the 2024 forecast.

Figure 54: District Expenditure Forecast (2019 Projected–2024 Forecast)

Expense	2019 Estimated	2020 Proposed	2021 Forecast	2022 Forecast	2023 Forecast	2024 Forecast
Personnel Services	**1,861,812**	**2,162,366**	**2,341,453**	**2,535,398**	**2,745,436**	**2,972,903**
Staff	*966,783*	*1,291,199*	*1,394,495*	*1,506,055*	*1,626,539*	*1,756,662*
Volunteers	*895,029*	*871,167*	*946,959*	*1,029,344*	*1,118,897*	*1,216,241*
Materials & Services	**1,122,568**	**1,269,646**	**1,313,397**	**1,389,528**	**1,471,536**	**1,559,958**
Firefighting	*144,591*	*199,700*	*203,694*	*207,768*	*211,923*	*216,162*
Administrative	*583,825*	*625,396*	*667,298*	*712,006*	*759,711*	*810,612*
Fire Prevention	*29,500*	*35,000*	*35,700*	*36,414*	*37,142*	*37,885*
Training	*44,500*	*43,500*	*38,000*	*38,000*	*38,000*	*38,000*
Communications	*80,683*	*77,500*	*88,505*	*101,073*	*115,425*	*131,815*
Repair Services	*84,746*	*120,000*	*130,200*	*141,267*	*153,275*	*166,303*
Buildings & Grounds	*154,723*	*168,550*	*150,000*	*153,000*	*156,060*	*159,181*
Debt Service	2,137,059	2,136,309	2,163,275	2,164,625	2,167,675	2,164,275
Recurring Expense:	**$5,121,439**	**$5,568,321**	**$5,818,125**	**$6,089,551**	**$6,384,647**	**$6,697,136**
Capital	644,122	7,292,000	11,013,695	788,372	798,502	730,901
Buildings	*179,197*	*6,372,000*	*10,218,098*	*204,422*	*209,527*	*153,105*
Apparatus	*375,000*	*850,000*	*724,197*	*511,122*	*514,690*	*502,026*
Equipment	*89,925*	*70,000*	*71,400*	*72,828*	*74,285*	*75,770*
Non-Recurring Exp:	**$644,122**	**$7,292,000**	**$11,013,695**	**$788,372**	**$798,502**	**$730,901**
Total Expense:	**$5,765,561**	**$12,860,321**	**$16,831,820**	**$6,877,923**	**$7,183,148**	**$7,428,037**

Status Quo Forecast

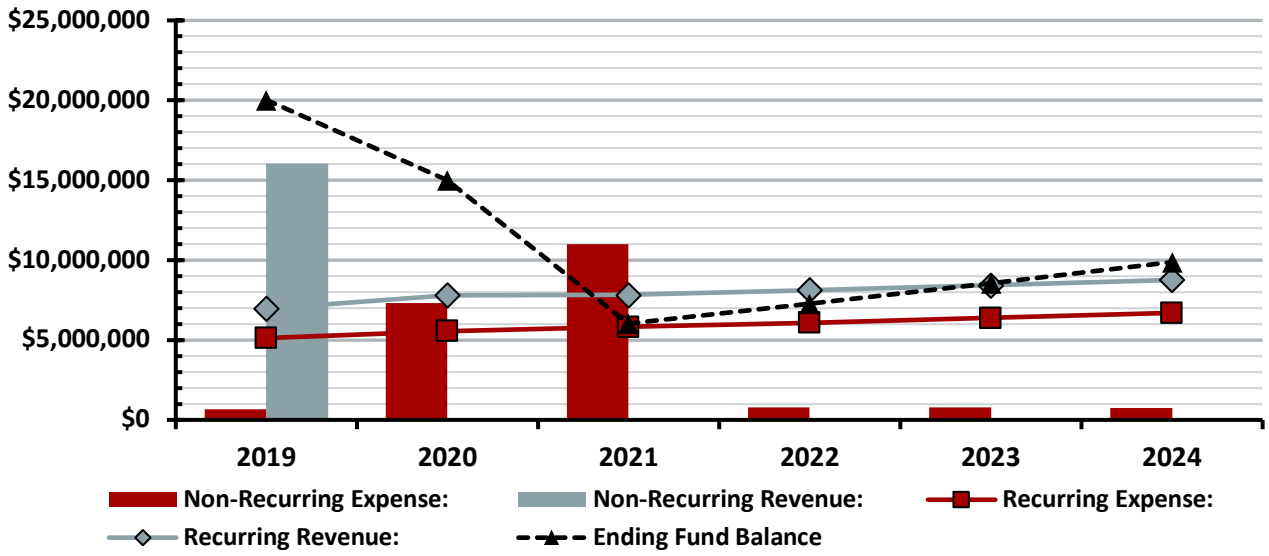
Based upon a series of revenue and expenditure assumptions as outlined, and assuming no further changes to service level other than known capital expenditures from the CIP and the Firefighter Housing Project, a status quo forecast is provided to give the District Board and fire department administration some idea of what the financial outlook might be over the next five years. ESCI understands that many factors may affect this and that various other assumptions might be made. However, this can be considered a first-order glimpse of where the District may be headed financially with no changes.

The following figure shows both recurring and non-recurring revenue (grey), recurring and non-recurring expense (red), and ending fund balance for the period 2019 expected through 2024 as forecast. Recurring revenue is shown as a grey line, while recurring expense is shown as a red line. Non-recurring revenue is shown in grey bars, and non-recurring expense is shown in red bars. Ending fund balance is shown as a dashed black line. If total expense exceeds total revenue in any given year, then the net loss is covered using reserve funds and ending fund balance decreases.

The major changes shown in 2019 through 2021 involve the receipt of $16 million in bond revenue in 2019 and its expenditure over the next two years to complete the Firefighter Housing Project (FHP). The impact on total fund balance is seen with the ending fund balance at close to $20 million in 2019 due to bond proceed receipt and its rapid decline over the next two years as those funds are used to build the FHP. After 2021, non-recurring expenses reflect those shown in the CIP and are less than $1 million annually. Recurring revenue throughout the forecast period is projected to exceed recurring expense by approximately $2 million annually. As a result, the total District ending fund balance increases annually from $6 million in 2021 to almost $9.9 million by 2024.

This analysis suggests the District has sufficient capacity within the GF recurring revenue stream at the current, voter authorized, millage rate to add recurring expenses such as limited career staffing should the District wish to do so. Further, adequate reserves are maintained in all major funds throughout the period.

Figure 55: Relationship of Recurring/Non-Recurring Revenue/Expense and Ending Fund Balance (2014–2018 Actual and 2019 Projected)



CAPITAL FACILITIES & APPARATUS

Three basic resources are required to successfully carry out the mission of a fire district, trained personnel, firefighting equipment, and fire stations. No matter how competent the firefighters, if appropriate capital equipment is not available for use by responders, it would be impossible for the Aspen Fire Protection District to deliver services effectively. The most essential capital assets for use in emergency operations are facilities and apparatus (response vehicles). Of course, the District's financing ability will determine the level of capital equipment it can acquire and make available for use by emergency personnel. This section of the report is an assessment of the respective capital facilities, vehicles, and apparatus.

Facilities

Fire stations play an integral role in the delivery of emergency services for several reasons. A station's location will dictate, to a large degree, response times to emergencies. A poorly located station can mean the difference between confining a fire to a single room and losing the structure. Fire stations also need to be designed to adequately house equipment and apparatus, as well as meet the needs of the organization and its personnel. It is important to research needs based on service-demand, response times, types of emergencies, and projected growth prior to making a station placement commitment.

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

- The housing and cleaning of apparatus and equipment, including decontamination and disposal of biohazards.
- Residential living space and sleeping quarters for on-duty personnel (all genders).
- Kitchen facilities, appliances, and storage.
- Bathrooms and showers (all genders).
- Administrative and management offices; computer stations and office facilities for personnel.
- Training, classroom, and library areas.
- Firefighter fitness area.
- Public meeting space.

In gathering information, ESCI asked AFPD to rate the condition of each of its fire stations using the criteria in the following figure.

Figure 56: Criteria Utilized to Determine Fire Station Condition

Excellent	Like new condition. No visible structural defects. The facility is clean and well maintained. Interior layout is conducive to function with no unnecessary impediments to the apparatus bays or offices. No significant defect history. The building's design and construction match the building's purposes. Age is typically less than 10 years.
Good	The exterior has a good appearance with minor or no defects. Clean lines, good workflow design, and only minor wear of the building interior. Roof and apparatus apron are in good working order, absent any significant full-thickness cracks or crumbling of apron surface or visible roof patches or leaks. The building's design and construction match the building's purposes. Age is typically less than 20 years.
Fair	The building appears to be structurally sound with weathered appearance and minor to moderate non-structural defects. The interior condition shows normal wear and tear but flows effectively to the apparatus bay or offices. Mechanical systems are in working order. Building design and construction may not match the building's purposes well. Showing increasing age-related maintenance, but with no critical defects. Age is typically 30 years or more.
Poor	The building appears to be cosmetically weathered and worn with potentially structural defects, although not imminently dangerous or unsafe. Large, multiple full-thickness cracks and crumbling of concrete on apron may exist. The roof has evidence of leaking and/or multiple repairs. The interior is poorly maintained or showing signs of advanced deterioration with moderate to significant non-structural defects. Problematic age-related maintenance and/or major defects are evident. May not be well suited to its intended purpose. Age is typically greater than 40 years.

Figure 57: AFPD Station 61

Address/Physical Location:	420 East Hopkins Avenue, Aspen, CO 81611

General Description:

Headquarters station with the Fire Chief, Deputy Chief, Fire Marshall, Training Officers, and Administrative Assistant. The facility is in very good condition with four back-in bays, separate day room and quarters for all personnel, offices, conference room, and private bedrooms. Station has red/green bay door lights and a BAUER compressor to fill SCBA bottles.

Structure						
Construction Type	Type 1					
Date of Construction	2010					
Seismic Protection	Unknown					
Auxiliary Power	Yes					
General Condition	Good					
Number of Apparatus Bays	0	Drive-through bays			4	Back-in bays
Special Considerations (ADA, etc.)	ADA Yes, Elevator					
Square Footage	14,500					
Facilities Available						
Separate Rooms/Dormitory/Other	2	Bedrooms	2	Beds	0	Dormitory Beds
Maximum Station Staffing Capability	5					
Exercise/Workout Facilities	Yes					
Kitchen Facilities	Yes					
Individual Lockers/Storage Assigned	Yes, located in apparatus bays.					
Shower Facilities	Yes					
Training/Meeting Rooms	Yes					
Washer/Dryer	Yes					
Safety & Security						
Sprinklers	Yes					
Smoke Detection	Yes					
Decontamination/Biohazard Disposal	No					
Security	Yes					
Apparatus Exhaust System	Yes					

Figure 58: AFPD Station 62 (North 40)

Address/Physical Location:	43 Sage Way, Aspen, CO 81611

General Description:
Overall, the station is in very good condition structurally. The 911 Comms Center is located upstairs with no AFS personnel access. Roof replacement is scheduled for 2020 due to multiple roof leaks. No apparatus exhaust removal in the station and the individual gear lockers are located in the bays exposed to vehicle exhaust and other contaminants.

Structure						
Construction Type	Type 1, Concrete and Steel Construction					
Date of Construction	2008					
Seismic Protection	Unknown					
Auxiliary Power	Yes					
General Condition	Good					
Number of Apparatus Bays	3	Drive-through bays			3	Back-in bays
Special Considerations (ADA, etc.)	ADA					
Square Footage	16,000					
Facilities Available						
Separate Rooms/Dormitory/Other	4	Bedrooms	4	Beds	0	Dormitory Beds
Maximum Station Staffing Capability	8					
Exercise/Workout Facilities	Yes					
Kitchen Facilities	Yes					
Individual Lockers/Storage Assigned	Yes, located in apparatus bays.					
Shower Facilities	Yes					
Training/Meeting Rooms	No					
Washer/Dryer	Yes					
Safety & Security						
Sprinklers	Yes					
Smoke Detection	Yes					
Decontamination/Biohazard Disposal	No					
Security	Yes, Code Panels for all man doors.					
Apparatus Exhaust System	No					

Figure 59: AFPD Station 63 (Woody Creek)

Address/Physical Location:	7907 Upper River Road, Woody Creek, CO 81656

General Description:
The station is in good shape overall. Upstairs living quarters are designated for the Station Caretaker (CT Volunteer FF) and family who pays AFPD $500 per month that is put in AFPD savings and reimbursed back to the CT for a down payment on a home. West station apparatus bay is approved storage for POV motorcycles, ATVs, small trailers, etc. Behind this bay is a small garage for the Caretaker and is used for personal items storage. CT not required to respond while off schedule.

Structure						
Construction Type	Type 5, Wood Frame					
Date of Construction	1999					
Seismic Protection	No					
Auxiliary Power	No					
General Condition	Good					
Number of Apparatus Bays	1	Drive-through bays			1	Back-in bays
Special Considerations (ADA, etc.)	*Not reported*					
Square Footage	2,050					
Facilities Available						
Separate Rooms/Dormitory/Other	0	Bedrooms	0	Beds	0	Dormitory Beds
Maximum Station Staffing Capability	0					
Exercise/Workout Facilities	No					
Kitchen Facilities	No					
Individual Lockers/Storage Assigned	No					
Shower Facilities	No					
Training/Meeting Rooms	No					
Washer/Dryer	No					
Safety & Security						
Sprinklers	Yes					
Smoke Detection	Yes					
Decontamination/Biohazard Disposal	No					
Security	Yes					
Apparatus Exhaust System	No					

Figure 60: AFPD Station 64 (Aspen Village)

Address/Physical Location:	31350 Highway 82, Aspen, CO 81611

General Description:
The station is in fair condition with no furnishings other than one bathroom and shower. One apparatus bay, tool room, and overhead storage loft are approved for POV maintenance and repair shop, tire storage, some machine and fabrication work, and outside vehicle/RV storage.

Structure						
Construction Type	Type 5, Wood Frame					
Date of Construction	1998					
Seismic Protection	No					
Auxiliary Power	No					
General Condition	Good					
Number of Apparatus Bays	2	Drive-through bays			0	Back-in bays
Special Considerations (ADA, etc.)	No					
Square Footage	Unknown					
Facilities Available						
Separate Rooms/Dormitory/Other	0	Bedrooms	0	Beds	0	Dormitory Beds
Maximum Station Staffing Capability	0					
Exercise/Workout Facilities	No					
Kitchen Facilities	No					
Individual Lockers/Storage Assigned	No					
Shower Facilities	Yes					
Training/Meeting Rooms	No					
Washer/Dryer	No					
Safety & Security						
Sprinklers	Yes					
Smoke Detection	Yes					
Decontamination/Biohazard Disposal	No					
Security	Yes					
Apparatus Exhaust System	Yes, Polymovent haphazardly routed in the bays.					

Figure 61: AFPD Station 65 (Starwood)

Address/Physical Location:	65 Kessler Court, Aspen, CO 81611

General Description:
The station was built and donated by the Starwood Gated Community. It is in Starwood and is very well kept and structurally sound. Two separate living areas upstairs for department Caretakers (CT volunteer FFs) not required to respond while off schedule. Board and community unity decided not to include apparatus exhaust removal because the newer vehicles run cleaner. The apparatus bays have opposite facing ventilation fans in bays and are manually operated.

Structure						
Construction Type	Type 5, Wood Frame					
Date of Construction	2019					
Seismic Protection	No					
Auxiliary Power	No					
General Condition	New/Excellent					
Number of Apparatus Bays	0	Drive-through bays			2	Back-in bays
Special Considerations (ADA, etc.)	ADA					
Square Footage	1,250					
Facilities Available						
Separate Rooms/Dormitory/Other	0	Bedrooms	0	Beds	0	Dormitory Beds
Maximum Station Staffing Capability	0					
Exercise/Workout Facilities	No					
Kitchen Facilities	No					
Individual Lockers/Storage Assigned	No					
Shower Facilities	No					
Training/Meeting Rooms	No					
Washer/Dryer	No					
Safety & Security						
Sprinklers	No					
Smoke Detection	Yes					
Decontamination/Biohazard Disposal	No					
Security	Yes					
Apparatus Exhaust System	No					

Facilities Summary & Discussion

The fire stations in the study area vary in size, facilities, and condition. The following figure lists the fire stations, as well as the general condition of each. As shown, there are five fire stations with Station 61 housing the administrative building distributed throughout the study area. Of these, one was new, which ESCI rated as excellent (20%), and the other four of the stations (80%) were described as good condition.

Figure 62: Condition of the Fire Stations and in the Study Area

Aspen Fire District	Condition
Fire Station #1	Good
Fire Station #2	Good
Fire Station #3	Good
Fire Station #4	Good
Fire Station #5	New/Excellent
Total Fire Stations:	**5**

Facility visits for AFPD also included the following. Pitkin County 9-1-1 Comms Center is in good condition, housed upstairs at Station 62 and is included in Figure 62. Logistics accurately inventorying and tracking the needed EMS, operations, wildland, and station supplies were not thoroughly answered and questionable.

Definitive plans have been determined at the time of this report; the Aspen Fire District is planning to replace the leaking roof at Station 62. AFPD is in the design and architect process for a new standalone fire housing project approved by a bond mill levy vote. This may be an opportune time to consider planning for the facility to staff firefighters, administrative and support staff, and 9-1-1 comms staff. ESCI noted during the site visit that the bond mill levy would focus on housing for the Fire Chief as a part of the housing project.

Figure 63: Planned Aspen Fire New Housing Facility Drawing

Fire Apparatus Fleets

Fire apparatus are unique and expensive pieces of equipment customized to operate for a specific community and defined mission. Other than firefighters, officers, and support staff, emergency apparatus and vehicles are the most important resource in a fire department.

Apparatus must be sufficiently reliable to transport firefighters and equipment rapidly and safely to an incident scene. Such vehicles must be properly equipped and function appropriately, to ensure that the delivery of emergency services is not compromised. For this reason, they are very expensive and offer little flexibility in use and reassignment to other missions.

AFPD Fleet

The following figure lists the frontline apparatus maintained by the Pitkin County Fleet Maintenance Facility.

Figure 64: AFPD Frontline Apparatus (2019)

Unit	Type	Manufacturer	Year	Condition	Features
Engine 61	Type I	Pierce	2000	Good	800-gal, 1,250 gpm
Engine 62	Type I	Pierce	2000	Good	800-gal, 1,250 gpm
Engine 63	Type I	Pierce	2005	Good	1,000 gal, 1,750 gpm, CAFS, 2,000-gal Port-a-Tank
Engine 64	Type I	Pierce	2005	Good	1,000-gal, 1,750 gpm, CAFS, 2,000-gal Port-a-Tank
Engine 65	Type 1	SVI	2019	Excellent	750 gal, 1,000 gpm, NWCG Type I
Ladder 61	Type I	Rosenbauer	2011	Good	105' METZ Aerial, 300-gal, 1,500 gpm
R 61	Rescue	Pierce	2016	Good	PTO Driven Extrication Pump
R 62	Rescue	Pierce	2012	Good	PTO Driven Extrication Pump
B 61	Type 6	Ram 5500	2018	Good	450-gal, 100 gpm, NWCG Type VI
B 63	Type 6	Ford F-550	2008	Good	450-gal, 150 gpm, NWCG Type VI
B 69	Type 3	Westmark	1999	Good	500-gal, 5,000 gpm, NWCG Type III
Tender 62	Type II	US Tanker	1999	Good	3,000-gal,150 gpm
UTV 61	UTV	Polaris	2019	Excellent	70-gal, 50 gpm, thermal imaging camera, tracks in winter

AFPD maintains no reserve apparatus (Engines, Aerials, Brush, Rescue), which requires cross staffing or moving apparatus from one station to another. The District also maintains a fleet of staff vehicles and other utility vehicles. Pitkin County Fleet Maintenance provides apparatus maintenance and management for AFPD.

AFPD Apparatus Inventory

The next figure shows the fleet inventory of the major apparatus and rescue units maintained and operated by AFPD.

Figure 65: AFPD Fleet Inventory

Apparatus Type	Frontline Quantity	Reserve Quantity	TOTALS
Engines/Pumpers	5	0	**5**
Aerials/Quints	1	0	**1**
Medic Units (ambulances)	0	0	**0**
Tender/Tankers	1	0	**1**
Brush/Wildland	3	0	**3**
Rescues	2	0	**2**
Other Units	3	0	**3**
Command/Staff Vehicles	4	0	**4**

Collectively, AFPD has an adequate fleet of apparatus and other vehicles. If AFPD were to include additional programs and call loads, if adequately staffed and assigned and deployed strategically, they should be able to appropriately respond to most of the typical emergency incidents occurring throughout the studied area.

Apparatus & Facilities Replacement Planning

Managing capital assets is an important responsibility in managing a fire department. Citizens expect prudent and careful spending of their tax dollars, especially as it pertains to funding station facilities and apparatus, which could result in long-term tax increases in a community. Careful and long-range capital planning is essential in ensuring funding, and funding support will be available when the time comes to add, improve, or replace capital assets.

Future Apparatus Serviceability

An important consideration when evaluating capital assets is the costs associated with the future replacement of major equipment. Apparatus service-lives can be readily predicted based on factors including vehicle type, call volume, age, and maintenance considerations.

The *National Fire Protection Association* (NFPA) *1911, 2017 Edition, Standard for Automotive Fire Apparatus* recommends per Annex D that fire apparatus 15 years of age or older be placed into reserve status, and apparatus 25 years or older should be replaced.[8] This is a general guideline, and the standard recommends using the following objective criteria in evaluating fire apparatus lifespan:

- Vehicle road mileage
- Engine operating hours
- The quality of the preventative maintenance program
- The quality of the driver-training program

- Whether the fire apparatus was used within its design parameters
- Whether the fire apparatus was manufactured on a custom or commercial chassis
- The quality of workmanship by the original manufacturer
- The quality of the components used in the manufacturing process
- The availability of replacement parts

A vehicle basically has three "lives." It has a service life, technological life, and an economic life. Service life is the amount of time the vehicle is capable of rendering service. A technological life represents the relative productivity decline of the vehicle when compared to the newer apparatus. The economic life is the total cost associated with the apparatus over time. A department must pay attention to the economic life of the apparatus. The apparatus must eventually be replaced to reduce the total cost of operation, safety, and user-friendliness. Figure 66 lists the quantity and average age of AFPD's apparatus fleet.

Figure 66: AFPD Average Age of Apparatus (2019)

Apparatus Type	Number of Units	Average Age
Engine/Aerial	6	14.8
Rescues	2	5
Wildland	3	8.25
Tenders	1	20
Support	4	9
Staff	3	3.75
Total	**19**	**9.42**

It is important to note that age is not the only factor for evaluating serviceability and replacement. Vehicle mileage and hours on engines must also be considered. One engine hour equals approximately 30 miles. A two-year-old engine with 30,000 miles and 6,000 engine hours (30,000 + 180,000 engine hour miles = 210,000 miles total) may need replaced sooner than a 10-year-old one with 25,000 miles and 2,500 engine hours (25,000 + 75,000 engine hour miles = 100,000 miles total).

Apparatus Maintenance & Replacement Planning

No piece of mechanical equipment or vehicle can be expected to last indefinitely. As an apparatus ages, repairs tend to become more frequent and more complex. Parts may become more difficult to obtain, and downtime for repair and maintenance increases. Given that fire protection, EMS, and other emergencies prove so critical to a community, downtime is one of the most frequently identified reasons for apparatus replacement. ESCI notes a less than prudent fire apparatus replacement schedule for AFPD.

Because of the expense of fire apparatus, most communities develop replacement plans. To enable such planning, fire departments often turn to the accepted practice of establishing a life-cycle cost analysis for apparatus that results in an anticipated replacement date for each vehicle. The reality is that it may be best to establish a life-cycle costing for planning purposes, such as the development of replacement funding for various types of apparatus, yet apply a different method (such as maintenance and downtime) for determining the actual replacement date, thereby achieving greater cost-effectiveness when possible.

Those within AFPD responsible for managing and maintaining the fleet should be concerned about aging apparatus and vehicles and ensure that a funded replacement schedule is in place. As frontline units age, fleet costs will naturally increase with more downtime and will be associated with necessary repairs and routine maintenance. The availability of parts is also an important issue.

Figure 67: Example Criteria & Method for Determining Apparatus Replacement

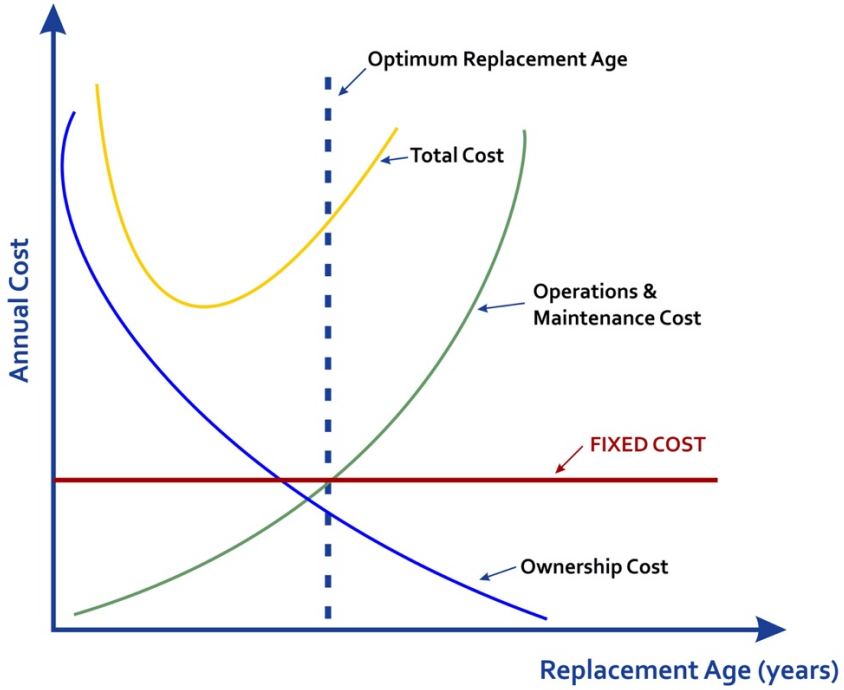
Evaluation Components	Points Assignment Criteria	
Age:	One point for every year of chronological age, based on in-service date.	
Miles/Hours:	One point for each 10,000 miles or 1,000 hours	
Service:	1, 3, or 5 points are assigned based on service-type received (e.g., a pumper would be given a 5 since it is classified as severe duty service).	
Condition:	This category takes into consideration body condition, rust interior condition, accident history, anticipated repairs, etc. The better the condition, the lower the assignment of points.	
Reliability:	Points are assigned as 1, 3, or 5, depending on the frequency a vehicle is in for repair (e.g., a 5 would be assigned to a vehicle in the shop two or more times per month on average; while a 1 would be assigned to a vehicle in the shop an average of once every three months or less.	
Point Ranges	**Condition Rating**	**Condition Description**
Under 18 points	Condition I	Excellent
18–22 points	Condition II	Good
23–27 points	Condition III	Consider Replacement
28 points or higher	Condition IV	Immediate Replacement

ESCI recommends that AFPD update this plan annually. Both the apparatus and support equipment capital equipment replacement plans began in 2020 and are budgeted through 2039. ESCI recommends a comprehensive replacement funding plan that projects five years out for fire apparatus and related equipment. A capital equipment replacement plan is updated annually and based on the life, cost, and condition for each unit.

Economic Theory of Apparatus Replacement

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

Figure 68: Economic Theory of Vehicle Replacement



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

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

Regardless of its net effect on current apparatus costs, the deferral of replacement purchases unquestionably increases future replacement spending needs and may impact overall operational capabilities impacting the safe and efficient use of the apparatus.

Current Replacement Cost of Frontline Apparatus

In the following figure, ESCI calculated the replacement cost of all frontline apparatus. This schedule calculates the cost of each unit for replacement with annual inflation of 4% as well as the cash that should be in a fund to replace the vehicles. This schedule also calculates the amount that should be added to the replacement fund each year. This may not be the process the organization will wish to use to determine the actual replacement date but will generally provide funding since there will be some apparatus that may exceed the life expectancy and others that will be replaced earlier than the scheduled date. The assumptions shown in Figure 69 and Figure 70 are based on industry standards.

Figure 69: Estimated Apparatus Replacement Cost

Type	Vehicle	Life Expectancy	Replacement Cost
1	Squad/Utility	15	$75,000
2	Med Rescue Truck	15	$210,000
3	Heavy Rescue Truck	20	$525,000
4	Commercial Pumper	20	$560,000
5	Custom Pumper	20	$630,000
6	Tanker/Tender	20	$375,000
7	Ladder	25	$1,200,000
8	Brush	20	$160,000
9	Type 3 Engine	10	$315,000
10	Type I or III Ambulance	7	$225,000
11	Type II	7	$150,000

Figure 70: AFPD Apparatus Replacement Schedule

Type	Unit	Year	Replacement Cost	Replacement Cost w/ Inflation	Annual Cash Requirements	Life Expectancy	Replacement Year
5	E61	2000	$630,000	$655,200	$32,760	20	2020
5	E62	2000	$630,000	$655,200	$32,760	20	2020
5	E63	2005	$630,000	$797,151	$39,858	20	2025
5	E64	2005	$630,000	$797,151	$39,858	20	2025
7	L61	2011	$1,200,000	$2,337,481	$93,499	25	2036
9	E65	2019	$315,000	$466,277	$46,628	10	2029
9	B61	2008	$315,000	$315,000	N/A	10	**OVERDUE**
9	B63	2008	$315,000	$315,000	N/A	10	**OVERDUE**
9	B69	1999	$315,000	$315,000	N/A	10	**OVERDUE**
2	R61	2016	$210,000	$336,217	$22,414	15	2031
2	R62	2012	$210,000	$287,400	$19,160	15	2027
6	T62	1999	$375,000	$375,000	N/A	20	2019
		Totals:	**$5,775,000**	**$7,652,076**	**$326,936**		

Apparatus Preventative Maintenance, Inspection, & Testing

ESCI reviewed all the documents provided regarding regular apparatus maintenance, repairs, annual DOT inspections, and annual testing, and noted potential areas of serious liability. Documentation indicated several areas requiring immediate attention.

The first is related to AFPD's maintenance of apparatus tires. As noted in Appendix C, apparatus is in service with 20-year-old tires that exceed national safety standards. AFPD should implement a tire management program. Tire technology has advanced over the years, including newer tire compounds, computer software for tracking, inflation gauges, and other tools that can help manage the tire program. When implementing a tire management program, make sure to include the most current edition of NFPA 1911: *Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Fire Apparatus*, which is the 2017 Edition. When it comes to tires, follow the information in Chapter 8, which includes:

- 8.3.3* Tires shall be inspected for damage and shall be inflated to the tire manufacturer's recommended pressure.
- 8.3.4* The tire load rating shall be checked to verify that it meets or exceeds the GAWR.
- 8.3.5 The tire speed rating shall be checked to verify that it meets or exceeds the maximum top speed of the apparatus.
- 8.3.6* Tires shall be replaced at least every 7 years or more frequently when the tread wear exceeds state or federal standards as determined by measuring with a tread depth gauge.

Some sections include asterisks, which signal that additional explanatory information is in an annex to the standard.

The second area relates to documented issues that are identified during annual inspections but do not correspond to required repairs. Appendix C shows an example of critical repairs requiring immediate attention that appear to remain unresolved. ESCI recommends the development of a maintenance program that ensures all necessary repairs are made in a timely manner. The program should be consistent with standards defined in NFPA 1911.

The third opportunity for improvement is related to inspection and repair of fire ground ladders. While ESCI was inspecting the apparatus and equipment, it was discovered the 28-foot, two-section extension ground ladder was still in-service with two damaged rungs. Appendix D shows photos of the damaged rungs and documentation of the Annual Ground Ladder testing results tested by UL Industries. This ladder has been damaged for more than four years, documented by UL each inspection, and is still in-service, putting firefighters at risk with any ground ladder operation or training using this ladder. Per NFPA 1931, 2020 Edition, because the lives of firefighters and fire victims often rely on the performance, without failure, of these valuable pieces of fire department equipment, these standards of performance are critical. This 28-foot ladder should be out-of-service until professionally repaired and retested.

The fourth opportunity for improvement relates to apparatus truck checks. AFPD has an internal standard operating procedure (SOP) 10.2 requiring apparatus readiness checks every two weeks. A sample of 2018 apparatus readiness checked showed that only 16 of the required 26 inspections were performed on Ladder 61. Apparatus readiness is a critical component of response capability, and ESCI recommends strict requirements for the application of the established SOP.

SERVICE DELIVERY & PERFORMANCE

The most visible and quantifiable aspect of any emergency service agency is the ability to provide services when requested. There are several different components that all have an impact on this ability to provide service. This section of the report evaluates the current and historical elements of:

- Service demand
- Resource distribution
- Resource concentration
- Workload and reliability
- Response performance

Service Demand Analysis

Incident Type Analysis

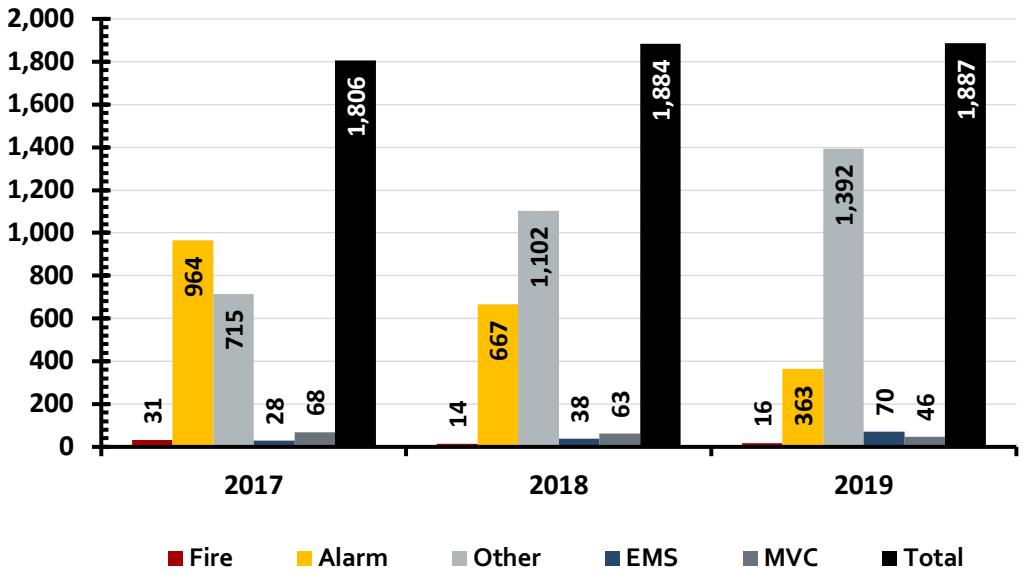
A very general view of service demand would be to analyze the number of incidents over a given period. This provides a narrow snapshot that is much better displayed when evaluated by the type of incidents as well as quantity. A fuller picture of the demand through this method provides leadership the ability to meet existing needs better and plan for future demand. The National Fire Incident Reporting System (NFIRS) has developed a classification system to categorize various types of incidents. These codes identify the various types of incidents to which the fire department responds and allows the fire department to document the full range of incidents it handles. This information can be used to analyze the frequency of different types of incidents, provide insight on fire and other incident problems, and identify training needs. The codes are three digits and are grouped into series by the first digit, as illustrated in Figure 71.

Figure 71: National Fire Incident Reporting System

Incident Series	Incident Heading
100-Series	Fires
200-Series	Overpressure Rupture, Explosion, Overheat (No Fire)
300-Series	Rescue and Emergency Medical Service (EMS) Incidents
400-Series	Hazardous Condition (No Fire)
500-Series	Service Call
600-Series	Canceled, Good Intent
700-Series	False Alarm, False Call
800-Series	Severe Weather, Natural Disaster
900-Series	Special Incident Type

The following figure provides a historical overview of incidents based upon the classification system established by NFIRS. For this analysis, ESCI combined NFIRS 200-series, 400-series, 500-series, 600-series, 800-series, and 900-series incidents into the "Other" category.

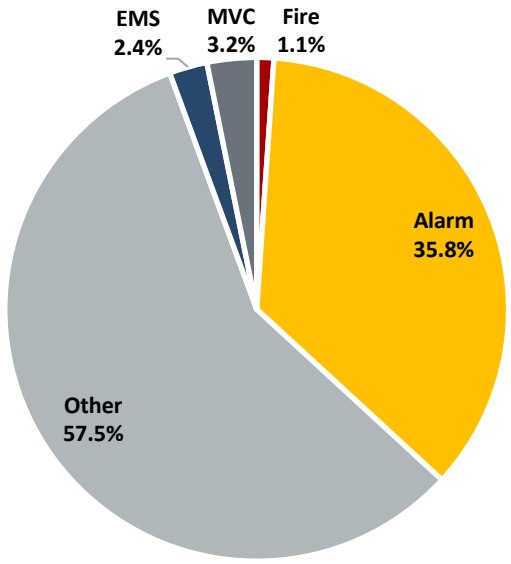
Figure 72: AFPD Service Demand by Incident Type (2017–2019)



As illustrated in Figure 72, the overall demand for service increased by 4.5% from 2017 to 2019. The greatest increase occurred in the first year at 4.3%, followed by a 0.2% increase the following year. Overall, increases occurred in emergency medical incidents and other incidents—150.0% and 94.7%, respectively. Fire incidents decreased by 48.4%, alarm incidents by 62.3%, and motor vehicle collision incidents by 32.4%.

While Figure 72 provides a detailed count of incidents, it is also valuable to view the data as a percentage of the whole, as presented in Figure 73.

Figure 73: AFPD Service Demand by Type (2017–2019)

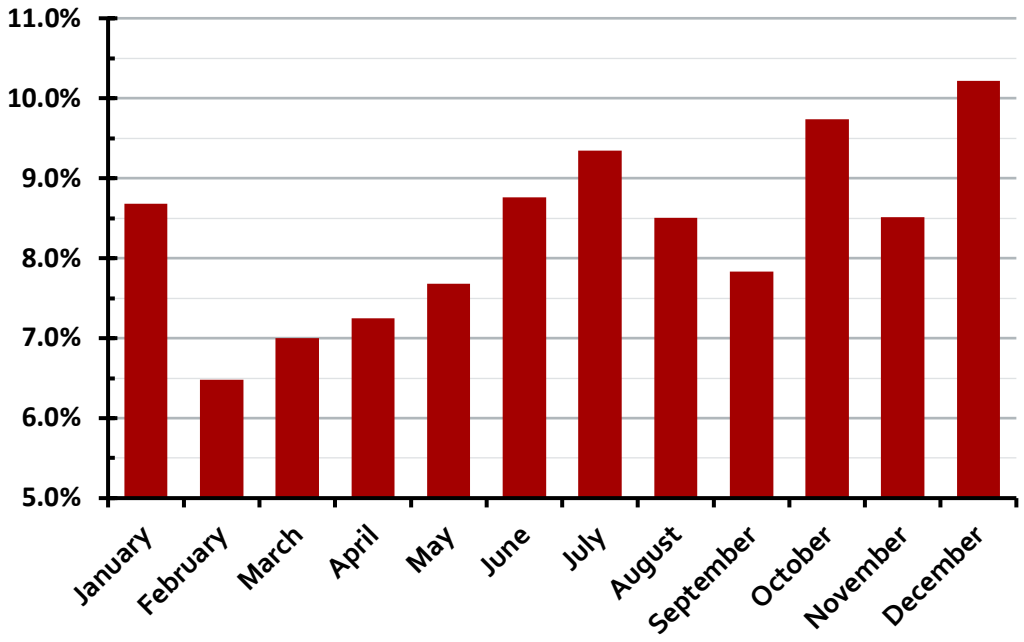


Temporal Analysis

The next component to analyze in order to have a broad picture of service demand is the temporal analysis of historical data. A temporal analysis gives AFPD's leadership additional factors for determining the needed department resources to meet the demands for services./ These factors may include providing a base response capability, providing for changes in service demand in the future, scheduling of non-response activities such as training and apparatus maintenance, and any other factors that may impact the community. Each temporal component is presented as the percentage relative to the total service demand that occurred during the study period.

Figure 74 illustrates the temporal variation by month. With this knowledge, the District's leadership can better determine the most appropriate months for performing non-incident time-intensive projects such as pre-planning target hazards, testing fire hydrants, testing fire hose, etc. Often, it may be better suited to perform these activities during the months with lower service demand.

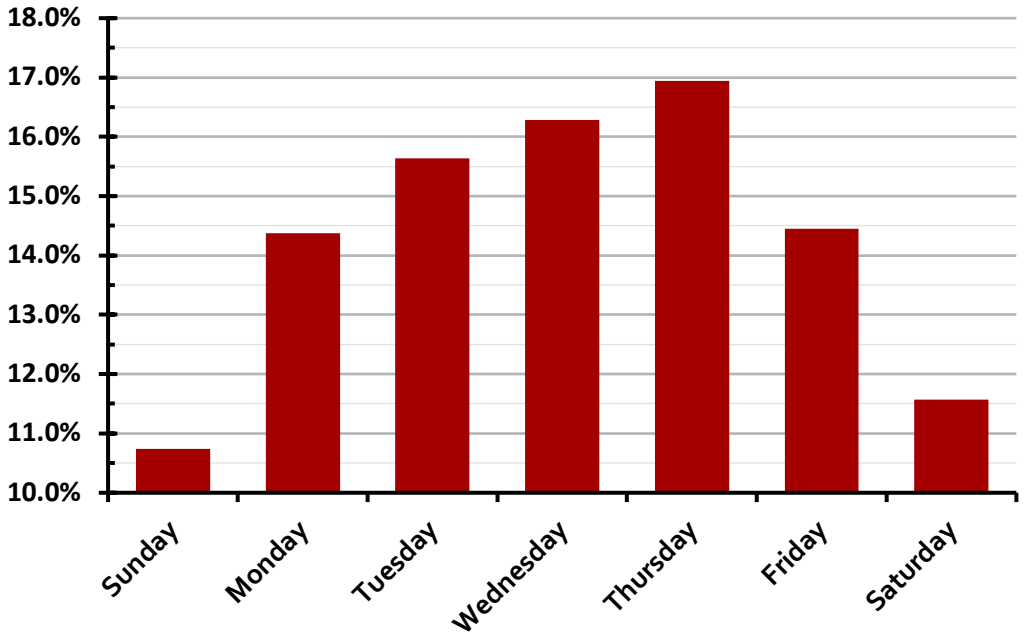
Figure 74: AFPD Service Demand by Month (2017–2019)



As shown, the highest demand for service falls in December, followed by October and July. The two lowest months for service demand are February and March, and the remaining months stay fairly consistent within a percentage point.

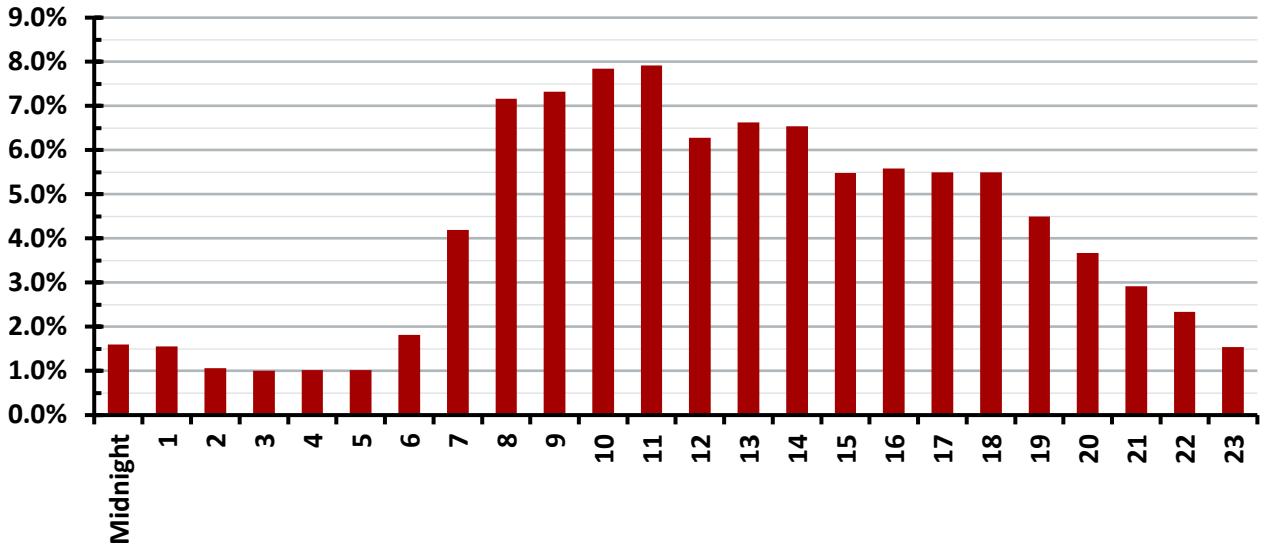
Figure 75 illustrates the temporal variation by day of the week. As shown, the lowest demand for service occurs on Saturdays and Sundays. Service demand begins increasing dramatically on Mondays, followed by a steady increase until it reaches a peak on Thursdays. There is then a significant drop on Fridays, followed by another drop for the remainder of the weekend.

Figure 75: AFPD Service Demand by Day of Week (2017–2019)



The final component of the temporal analysis is to view the data by time of day. Figure 76 illustrates the time of day temporal variation. With a community that is primarily centered around outdoor activities that generally occur during the day, the pattern seems to follow that activity. Around 7 a.m., as people begin their outdoor activities, service demand increases until it peaks just before noon. It then fluctuates with an overall decrease until around 10 p.m., where it then steadily decreases to the lowest hours from midnight until 6 a.m.

Figure 76: AFPD Service Demand by Time of Day (2017–2019)

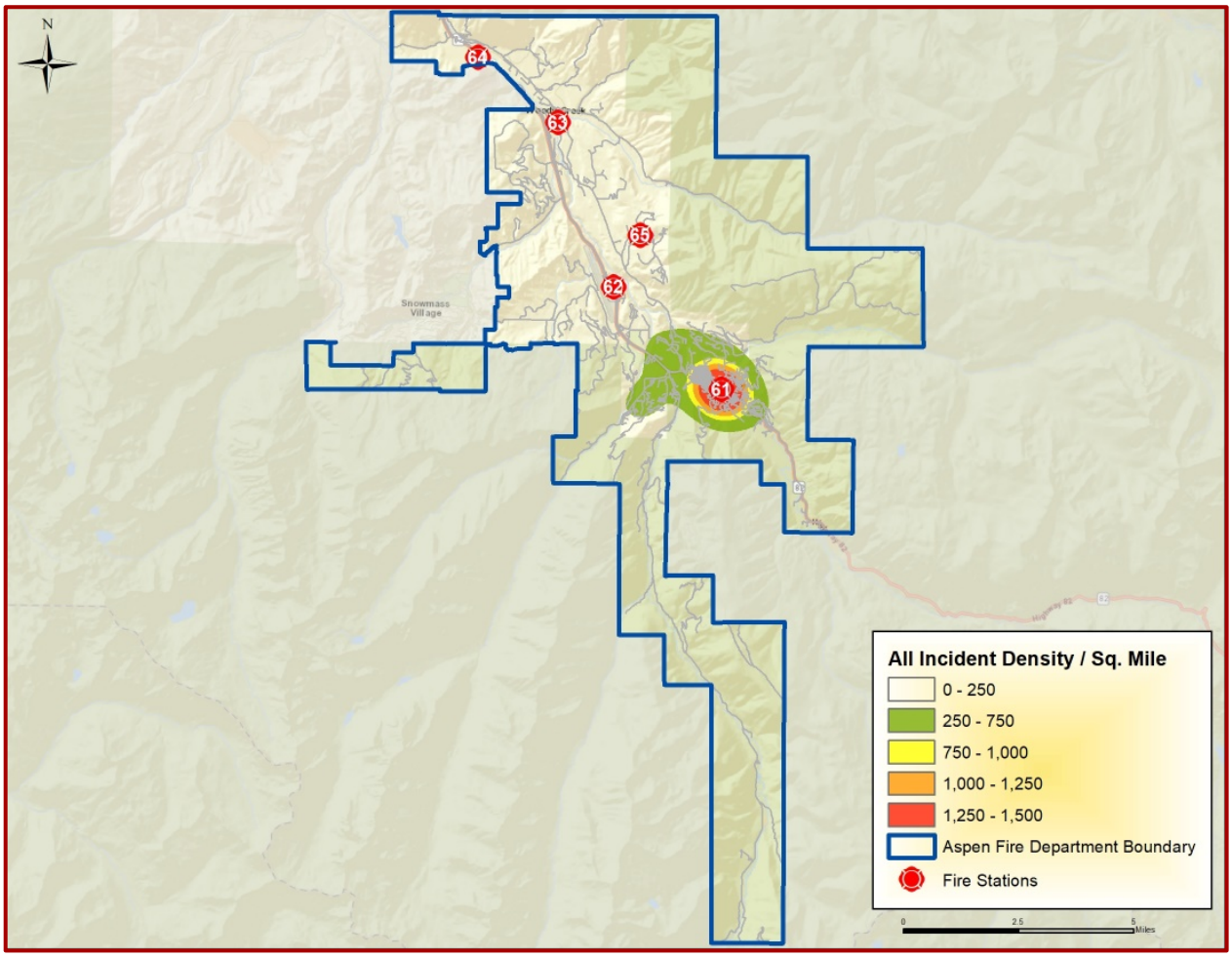


While service demand is lowest during the early morning hours, it should be noted that most fatal residential fires occur most frequently late at night or early in the morning. Based on findings from a national study, from 2014 to 2016, fatal residential fires were highest between 1:00 a.m. to 2:00 a.m. The 8-hour peak (11:00 p.m. to 7:00 a.m.) accounted for 48% of fatal residential fires.[9]

Resource Distribution Analysis

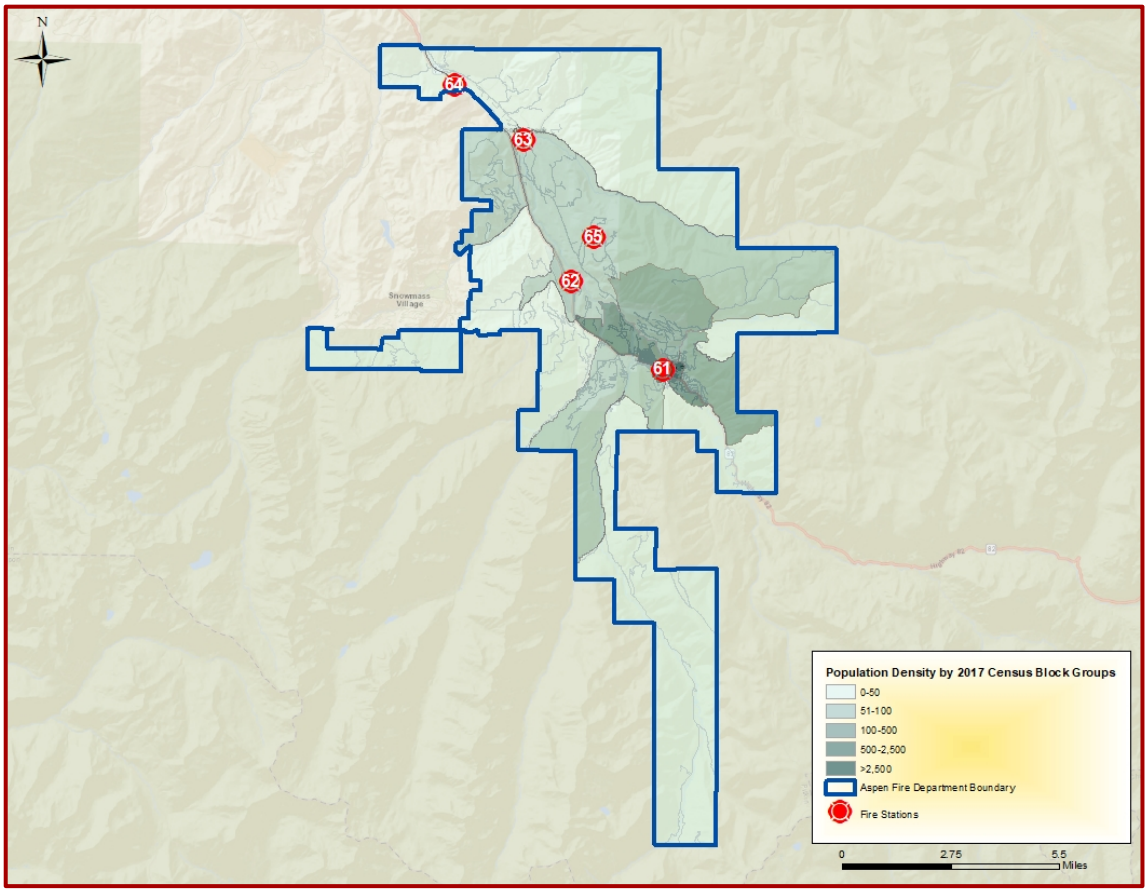
The prior section provided an in-depth analysis of service demand based on the demand type and temporal views. It is also useful to examine the distribution of service demand as it relates to the various geographic components of the community. ESCI used geographic information systems software (GIS) to plot the location of incidents within the AFPD study area (Figure 77) from January 2017 through June 2019 and calculated the mathematical density of incidents (incidents per square mile).

Figure 77: AFPD Geographic Service Demand (2017–2019)



As shown, the vast majority of incidents occur in the area immediately surrounding Station 61. This understandably correlates with the following figure, which illustrates the population density for the AFPD service area. As would be expected, the higher density of service demand occurs in the areas with a higher population density.

Figure 78: AFPD Population Density



ISO Distribution

The Insurance Services Office, Inc. (ISO©), a subsidiary of Verisk Analytics, is a national data analytics provider that evaluates fire protection for communities across the country. ISO assesses fire protection through the use of a proprietary Fire Suppression Rating Schedule (FSRS) that details specific requirements for each of four major categories—emergency communications, fire department, water supply, and community risk reduction.

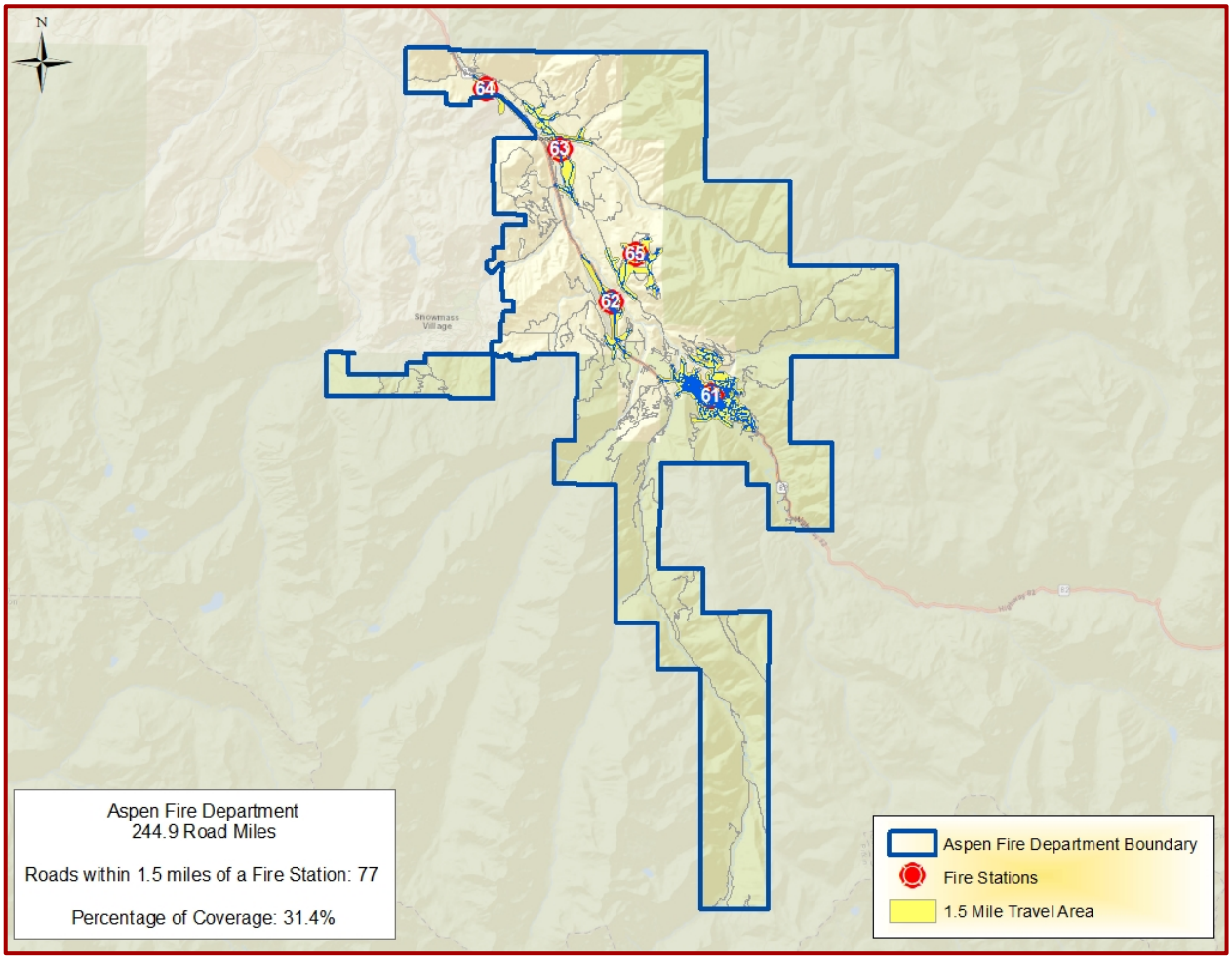
Following an on-site evaluation, ISO assigns a Public Protection Classification (PPC®) rating using a scale of 1 to 10, with Class 1 representing the highest degree of fire protection and Class 10 designating a fire protection program that does not meet ISO's minimum criteria. According to a recent report, the ISO's Public Protection Classification program, or PPC, "is a proven and reliable predictor of future fire losses." All other factors equal, commercial property insurance rates are expected to be lower in areas with lower (better) ISO PPC Class rating.

A community's ISO rating is an important factor when considering fire station and apparatus concentration, distribution, and deployment due to its effect on the cost of fire insurance for the residents and businesses. To receive maximum credit for the station and apparatus distribution, ISO evaluates the percentage of the community (contiguously built upon area) that is within specific distances of fire stations, central water supply access (fire hydrants), engine/pumper companies, and aerial/ladder apparatus.

Travel Distance from a Fire Station

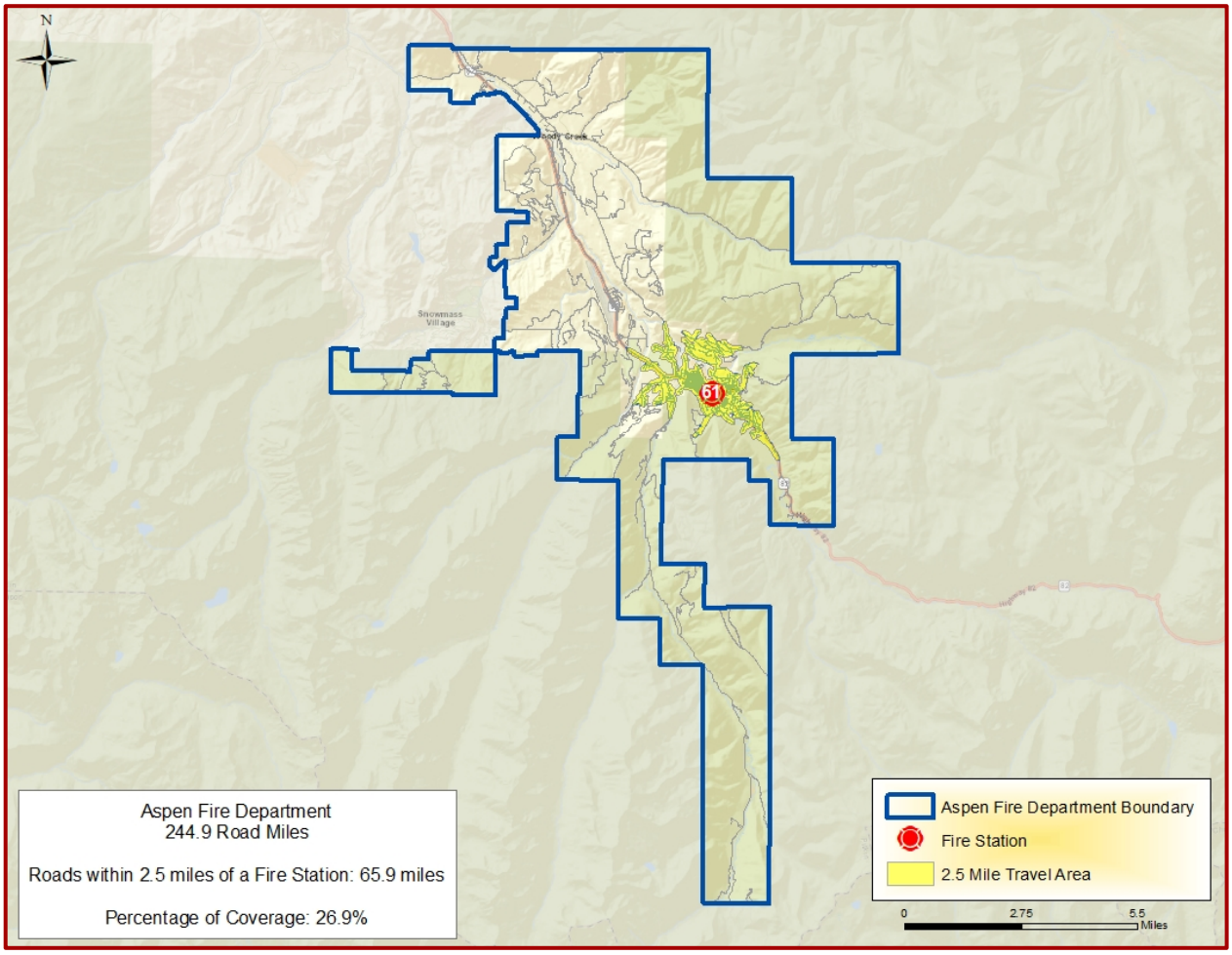
The first component evaluated by ISO is the percentage of the service area that falls within 1.5 miles travel distance of a fire station. As illustrated in Figure 79, only 31.4% of the service area meets this travel distance.

Figure 79: AFPD 1.5-Mile Engine Distribution per ISO Criteria



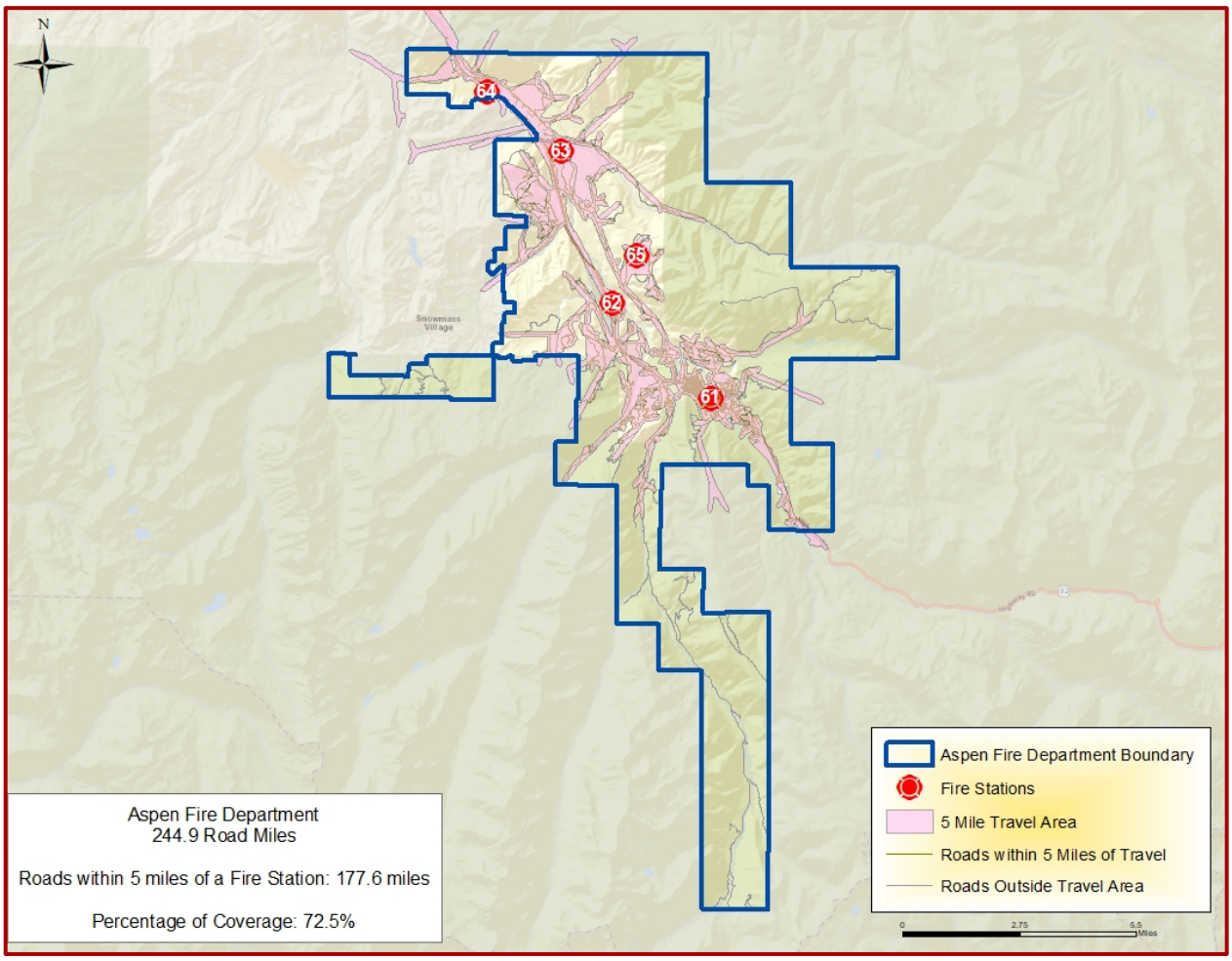
The second travel component evaluated by ISO is the percentage of service area within 2.5 miles of an aerial apparatus. As illustrated in Figure 80, only 26.9% of the service area is within the 2.5-mile travel distance.

Figure 80: AFPD 2.5-Mile Truck Distribution per ISO Criteria



The final travel component evaluated by ISO is the percentage of the service area that lays within 5 miles of a fire station. The figure below illustrates this evaluation and shows that 72.5% of the AFPD service area is within the 5-mile distance.

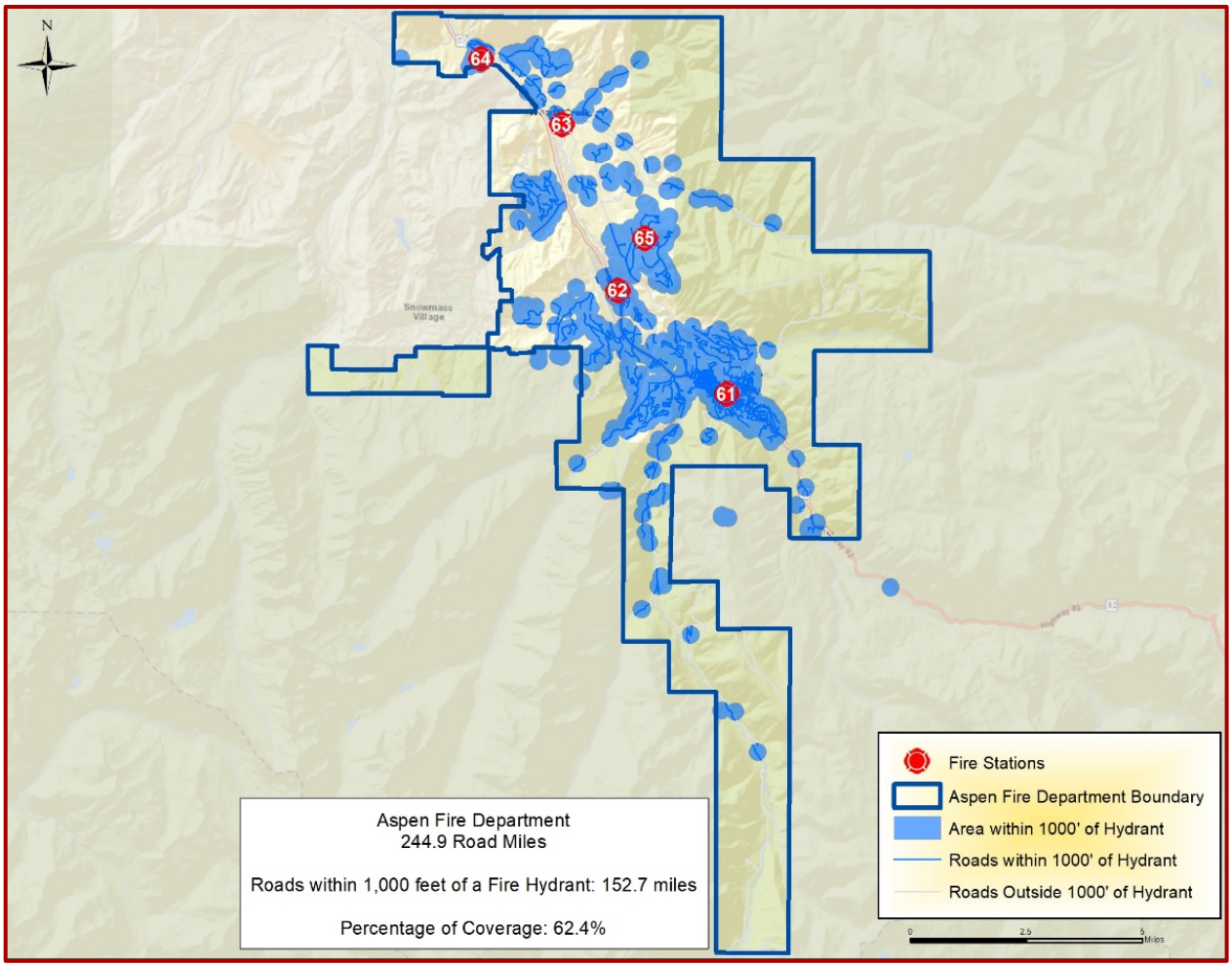
Figure 81: AFPD 5-Mile Coverage per ISO Criteria



Water Supply Distribution

ISO evaluates a community's availability of a sufficient water supply, which is critical for the extinguishment of fires. Included in this evaluation are the geographic location and distribution of fire hydrants. Structures outside a 1,000-foot radius of a fire hydrant are subject to a lower Public Protection Classification® rating than areas with adequate hydrant coverage, thus signifying limited fire protection. Exceptions are made when a fire department can show that either a dry hydrant or a suitable water tanker operation is possible to provide the needed volume of water for fire suppression activities for a specific period. As illustrated by Figure 82, 62.4% of the service area is within 1,000 feet of a fire hydrant. The majority of fire hydrant coverage coincides with greater population density and greater service demand density.

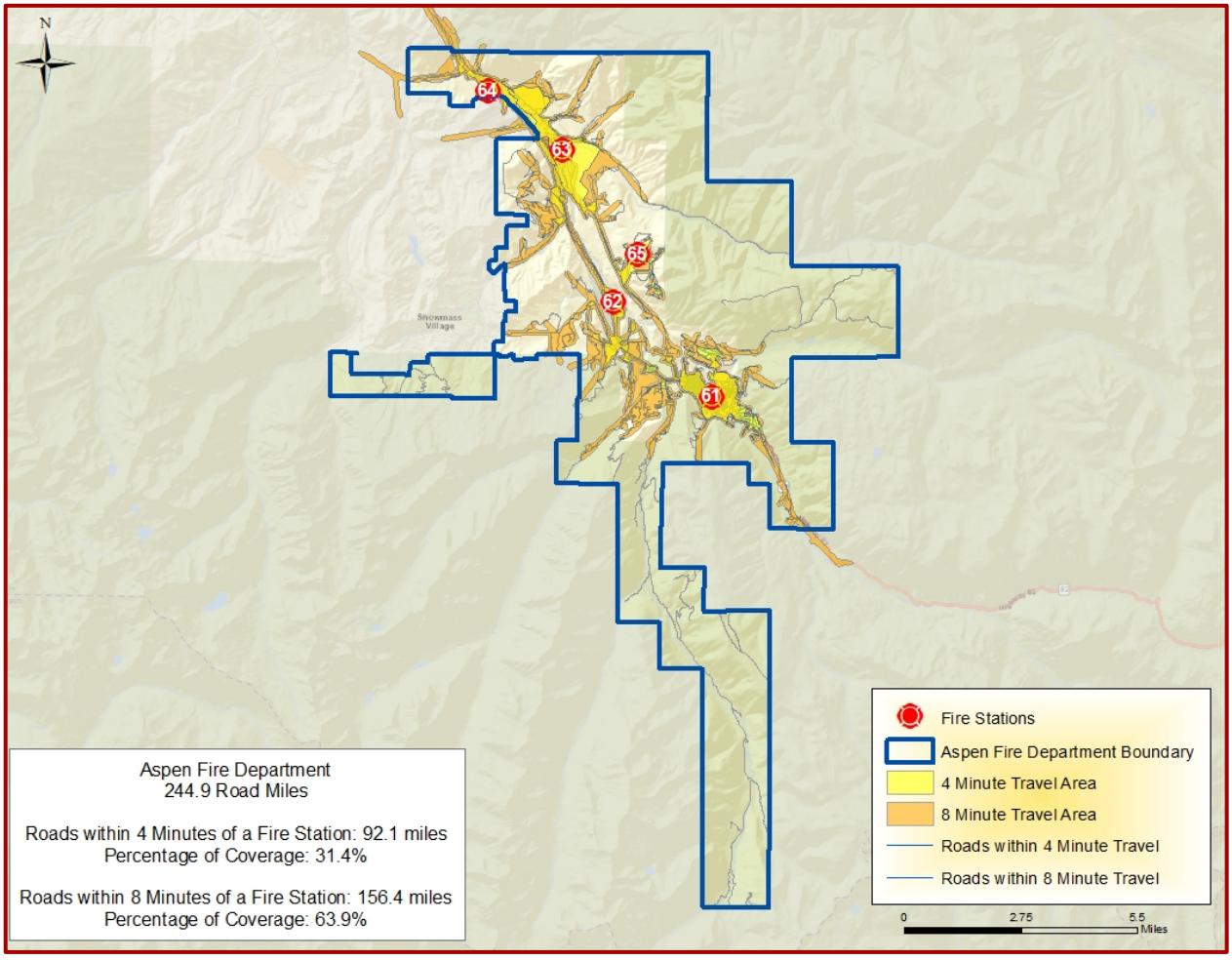
Figure 82: AFPD Hydrant Coverage



NFPA Distribution

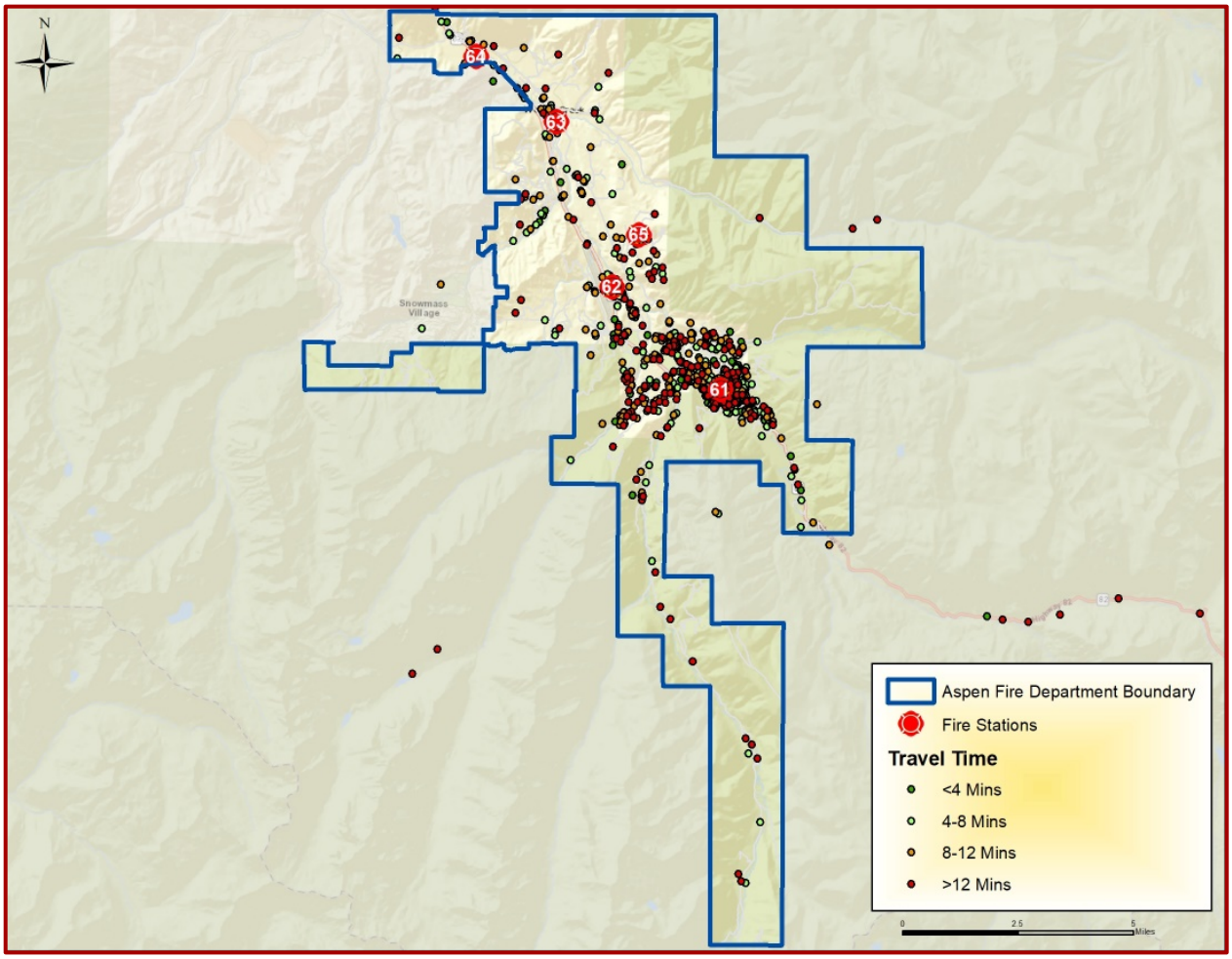
National Fire Protection Association (NFPA) standards and the Center for Public Safety Excellence (CPSE) accreditation of fire departments both evaluate response time criteria for purposes of analyzing resource distribution. For low/medium hazard incidents, the first unit should arrive within 4 minutes, and the full assignment should arrive within 8 minutes. Travel time is calculated using the posted speed limit and adjusted for negotiating turns, intersections, and one-way streets. The figure below illustrates the 4-minute/8-minute travel time for AFPD. As shown, 31.4% of the service area is within 4 minutes of a fire station, and 63.9% is within 8 minutes of a fire station.

Figure 83: AFPD 4-Minute/8-Minute Travel Time



While Figure 83 provides theoretical travel time, it is of value to compare this to actual travel time experienced by AFPD when responding to incidents. Figure 84 illustrates the actual travel time for all incidents 2017 through 2019. The data provided did not identify emergency versus non-emergency responses, so actual travel time to emergency incidents may be better than illustrated.

Figure 84: AFPD Actual Travel Time (January 2017–June 2019)



Resource Concentration Analysis

Accepted firefighting procedures call for the arrival of the entire initial assignment (sufficient apparatus and personnel to effectively deal with an emergency based on its level of risk) within a reasonable amount of time.[10] This is to ensure that enough people and equipment arrive soon enough to safely control a fire or mitigate any emergency before there is substantial damage or injury. AFPD should consider its ability to meet these minimum staffing recommendations through its own resources as well as automatic aid and mutual aid resources.

Figure 85: Initial Full Alarm Assignment Structure Fire

Initial Full Alarm Assignment 2,000 SF Residential Structure Fire	
Command	1
Apparatus Operator	1
Handlines (2 members each)	4
Support Members	2
Victim Search and Rescue Team	2
Ground Ladders/Ventilation	2
Aerial Device Operator (if ladder used)	(1)
Initial Rapid Intervention Team	4
Total	**16 (17)**

Initial Full Alarm Assignment Open Air Strip Shopping Center (13,000 SF to 196,000 SF)	
Command	2
Apparatus Operator	2
Handlines (2 members each)	6
Support Members	3
Victim Search and Rescue team	4
Ground Ladders/Ventilation	4
Aerial Device Operator (if ladder used)	(1)
Initial Rapid Intervention Team	4
Initial Medical Care Component	2
Total	**27 (28)**

Initial Full Alarm Assignment 1,200 SF Apartment (3-story garden apartment)	
Command	2
Apparatus Operator	2
Handlines (2 members each)	6
Support Members	3
Victim Search and Rescue team	4
Ground Ladders/Ventilation	4
Aerial Device Operator (if ladder used)	(1)
Initial Rapid Intervention Team	4
Initial Medical Care Component	2
Total	**27 (28)**

Workload and Response Reliability

Workload and call concurrency impact the ability of a department to provide reliable service to the community. Workload refers to the amount of work a particular unit incurs and may be measured in the number of calls or the time spent on calls. Call concurrency refers to the number of incidents occurring at the same time within a jurisdiction.

Workload

There was not unit-level data provided to enable a detailed analysis of workload on each of the units for AFPD. ESCI recommends that AFPD work with its dispatch provider and its internal incident reporting system to ensure proper documentation of all data to enable this analysis in the future.

Call Concurrency

The effectiveness of an organization to handle all incidents may be hampered by an inordinate percentage of incidents occurring at the same time. If this occurs too often, the department may not be able to provide immediate response without relying on automatic and mutual aid agreements. Also, as the number of concurrent incidents increases, the ability to meet response time standards may decrease. As illustrated in Figure 86, call concurrency is very low for AFPD, with 94.2% of incidents occurring as either single incidents. ESCI developed this figure using only the incident level timestamp data as individual unit data was not provided. There were also 1,883 calls excluded because no apparatus cleared time was recorded. In the event that AFPD elects to increase service delivery, there will most likely be an increase in concurrent events. ESCI recommends better data capture so that the department will be able to continue to monitor call concurrency to determine future needs.

Figure 86: AFPD Call Concurrency (2017–2019)

Concurrent Incidents in Progress	Number of Incidents	Percent of Total Incidents
Single Incident	3,483	94.29%
Two Incidents	204	5.52%
Three Incidents	7	0.19%

Response Performance

Policymakers and the public often look to departments to provide service quickly and efficiently. To that end, they often request response time performance data to demonstrate the department's ability to respond to their emergency promptly.

As identified previously in this report, unit-level detailed response data was not available for effective analysis. ESCI developed the following figures based on incident level data that was provided, and while it presents a level of understanding of response time performance, it does not lend to the accuracy that would be provided with a more complete data set.

In analyzing response performance, ESCI generates percentile measurements of response time performance. The use of percentile measurement using the components of response time follows the recommendations of industry best practices. The best practices are derived by the Center for Public Safety Excellence (CPSE), Standard of Cover document and the National Fire Protection Association (NFPA) 1720: *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments*.

The "average" measure is a commonly used descriptive statistic, also called the mean of a data set. The most important reason for not using the average for performance standards is that it may not accurately reflect the performance for the entire data set and may be skewed by outliers, especially in small data sets. One extremely good or bad value can skew the average for the entire data set.

The "median" measure is another acceptable method of analyzing performance. This method identifies the value in the middle of a data set and thus tends not to be as strongly influenced by data outliers.

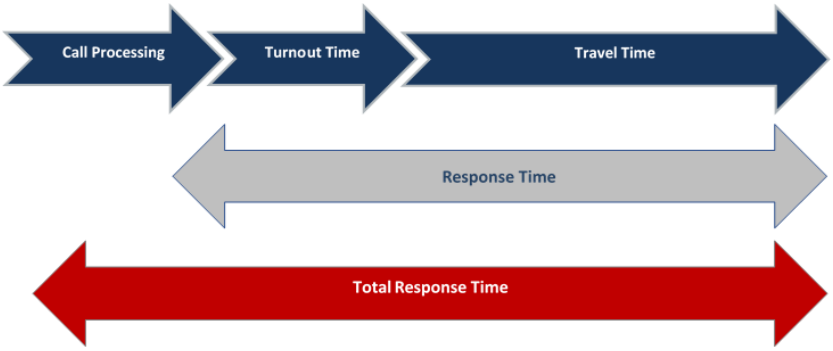
Percentile measurements are a better measure of performance because they show that most of the data set has achieved a particular level of performance. The 90th percentile means that 10% of the values are greater than the value stated, and all other data are at or below this level. This can be compared to the desired performance objective to determine the degree of success in achieving the goal.

As this report progresses through the performance analysis, it is important to keep in mind that each component of response performance is not cumulative. Each is analyzed as an individual component, and the point at which the fractile percentile is calculated exists in a set of data unto itself.

The *response time continuum*—the time between when the caller dials 911 and when assistance arrives—is comprised of several components:

- *Call Processing Time*—The time between a dispatcher getting the call and the resources being dispatched.
- *Turnout Time*—The time between unit notification of the incident and when it is responding.
- *Travel Time*—The time the responding unit spends on the road to the incident
- *Response Time*—A combination of turnout time and travel time, the most commonly used measure of fire department response performance.
- *Total Response Time*—The time from when the 911 call is answered until the dispatched unit arrives on the scene.

Figure 87: Response Time Continuum



Total response time is the amount of time a resident or business waits for resources to arrive at the scene of an emergency beginning when they first placed a 911 call. This process begins for the fire department once the communications center dispatches the appropriate unit. The NFPA standard for alarm handling and call processing is derived from NFPA 1221: *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems* and provides for communication centers to have alarm handling time of not more than 15 seconds, 90% of the time and not more than 20 seconds, 95% of the time. Additionally, NFPA 1221 requires the processing of the call to occur within 64 seconds, 90% of the time for high-priority incidents. Similarly, NFPA 1720 requires the call processing time to be 60 seconds or less, 90% of the time, as does ISO.

Figure 88: NFPA 1720 Standards for Fire/EMS Responses

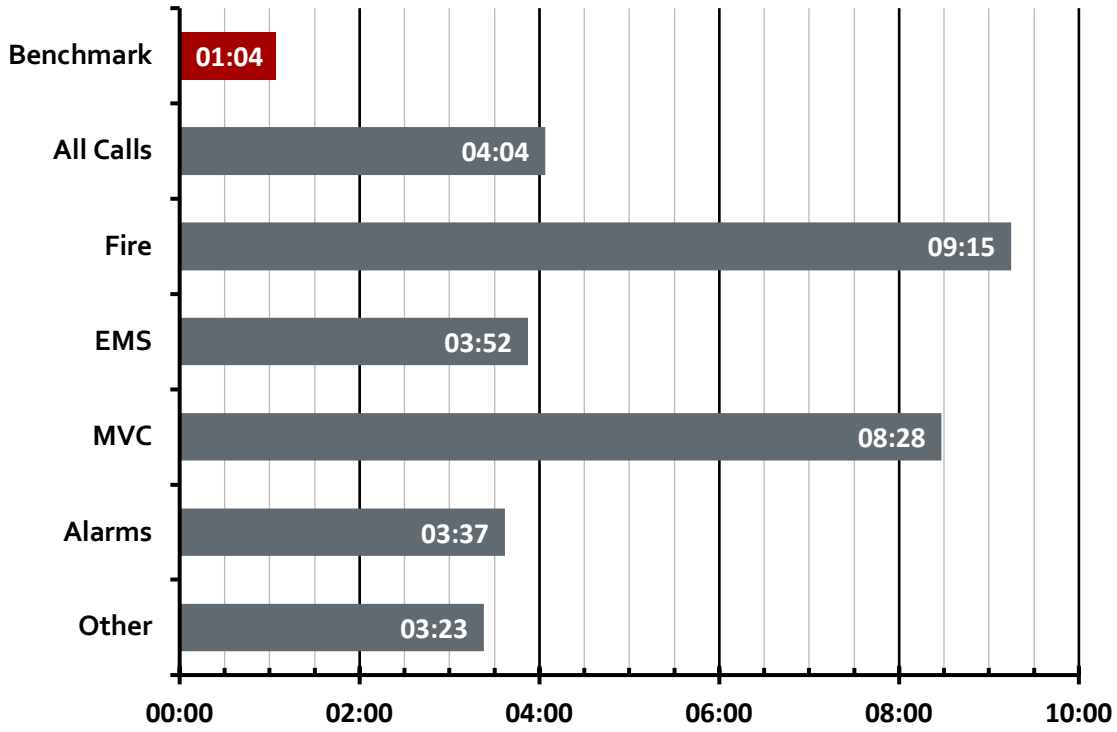
Response Interval	NFPA/CFAI Recommendations
Call Processing	60 seconds or less at 90%
Turnout Time	60 seconds or less at 90%
Travel Time	240 seconds

Tracking the individual components of response time enables jurisdictions to identify deficiencies and areas for improvement. In addition, knowledge of current performance for the components listed above; is an essential element of developing response goals and standards that are relevant and achievable. Fire service best practice documents recommend that fire jurisdictions monitor and report the components of total response time.

Call Processing

Tracking and effective change of call processing are generally handled by the dispatch center and often are not under the direct control of the fire department. However, the fire department should work closely with the dispatch center and encourage them to monitor performance and make improvements.

Figure 89: AFPD Call Processing Time Performance (2017–2019)

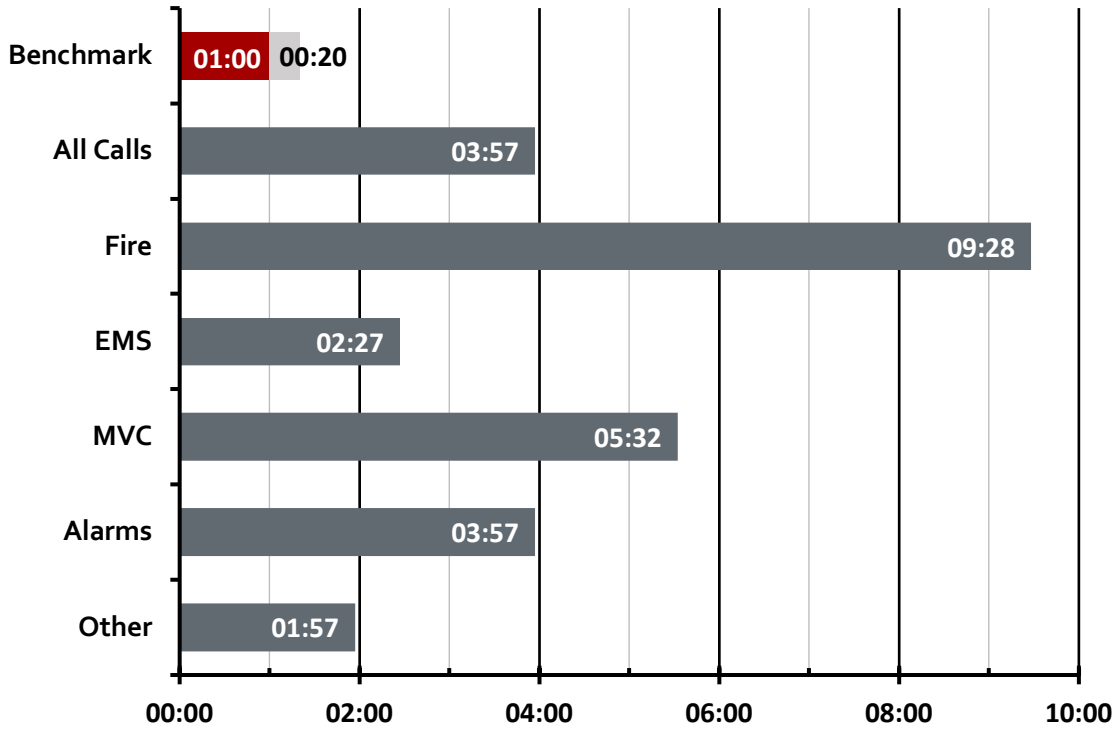


As illustrated in Figure 89, the call processing time performance is well outside of the recommended 1 minute, 4 seconds (01:04). Performance ranged from 3 minutes, 23 seconds (03:23) for other incidents to 9 minutes, 15 seconds (09:15) for fire incidents—with an overall performance of 4 minutes, 4 seconds (04:04).

Turnout Time Performance

The ability to quickly react to the notice of an alarm and begin responding to an incident is the first component that is under the direct control of the fire department personnel. Turnout is the time it takes personnel to receive the dispatch information, move to the appropriate apparatus, and proceed to the incident. NFPA 1720 specifies that turnout time performance for staffed stations should be less than 60 seconds (01:00), measured at the 90th percentile for incidents other than fire and special operations. For those incidents, turnout time performance should be 1 minute, 20 seconds (1:20). There is no specific performance specified for non-staffed stations.

Figure 90: AFPD Turnout Time Performance (2017–2019)

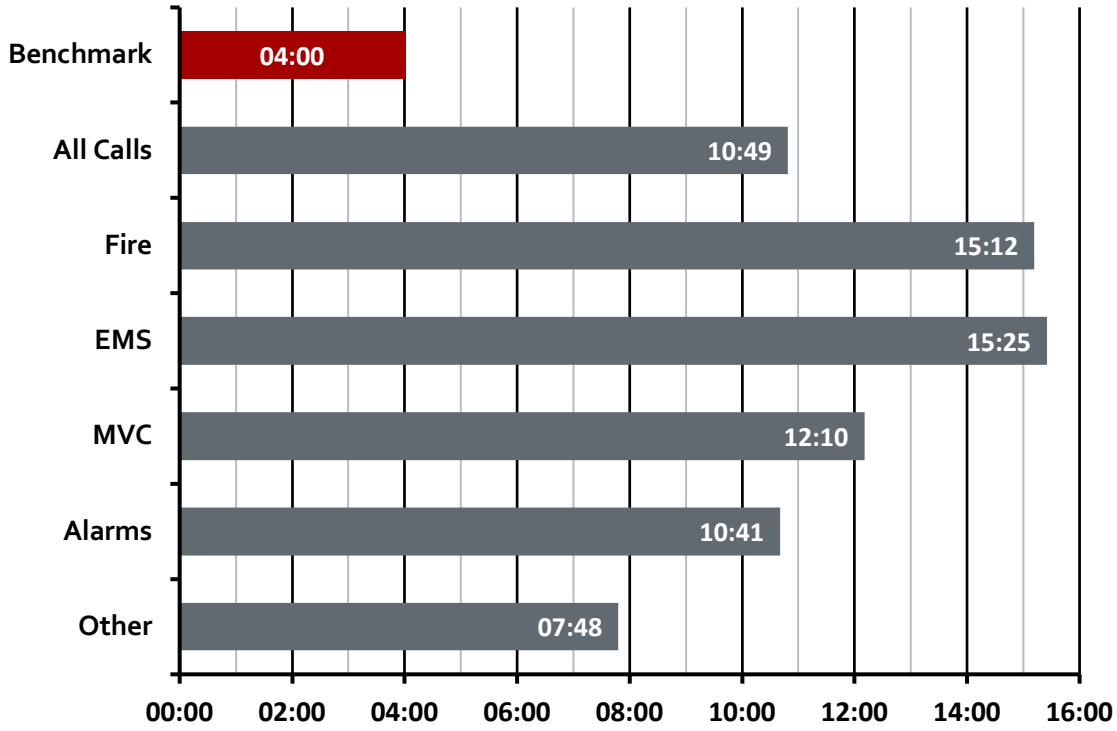


As illustrated in Figure 90, the turnout time for AFPD for overall incidents is 3 minutes, 57 seconds (03:57). While this is well above the staffed station performance standard, it may be reasonable based on locations of volunteer staff responding to the station to pick up apparatus. Based on incident type, turnout time performance ranged from 1 minute, 57 seconds (01:57) for other incidents to 9 minutes, 28 seconds (09:28) for fire incidents. AFPD has a unique challenge effecting the results of this analysis. Firefighters responding in their private vehicles receive a time stamp through the CAD system. This practice limits the reliability of all of the performance data collected. Department leadership may consider that staffing stations may decrease turnout time and thus reduce the overall total response time. Leadership should also consider any other factors that may impact turnout time, such as notification processes, station layout, etc.

Travel Time Performance

Often, travel time is the longest segment of the total response time. This may be impacted significantly by geographic location, traffic, time of day, weather, and other factors.

Figure 91: AFPD Travel Time Performance (2017–2019)

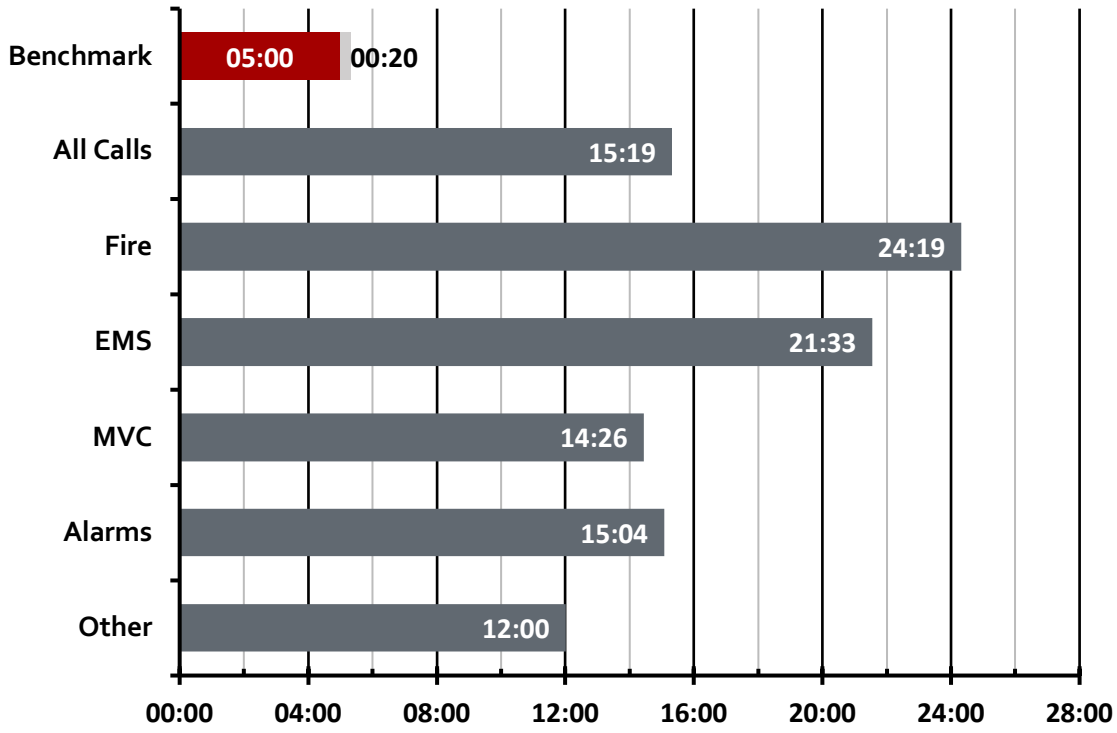


As illustrated in Figure 91, the travel time performance for AFPD for overall incidents was 10 minutes, 49 seconds (10:49). When analyzed by incident type, it ranged from 7 minutes, 48 seconds (07:48) for other incidents to 15 minutes, 25 seconds (10:25) for emergency medical incidents.

Response Time Performance

When turnout time and travel time are combined, this is expressed as response time with an expected performance of 5 minutes (05:00) or less in a staffed station. The expected performance for non-staffed stations is 9 minutes (09:00) for urban areas, 10 minutes (10:00) for suburban areas, and 14 minutes (14:00) for rural areas. This is perhaps one of the most often tracked and reported response time performance measures, as it is comprised of components under the direct control of the department.

Figure 92: AFPD Response Time Performance (2017–2019)

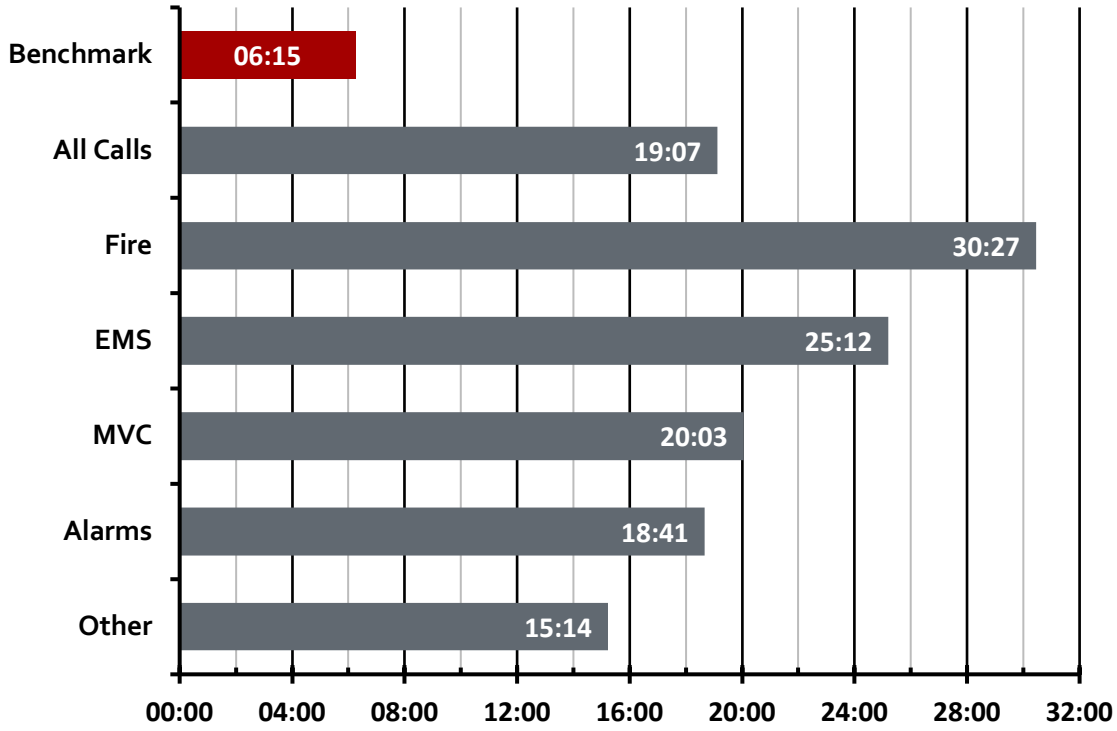


As illustrated in Figure 92, the overall response time performance for AFPD is 15 minutes, 19 seconds (15:19). Performance ranged from 12 minutes, 0 seconds (12:00) for other incidents to 24 minutes, 19 seconds (24:19) for fire incidents. District leadership should consider developing a formal response time standard based on population density and then monitor for performance to that standard.

Total Response Time Performance

The time from when the 911 call is answered until the dispatched unit arrives on the scene is referred to as total response time.

Figure 93: AFPD Total Response Time Performance (2017–2019)



As illustrated in Figure 93, the overall total response time performance for AFPD is 19 minutes, 7 seconds (19:07). Performance ranged from 15 minutes, 14 seconds (15:14) for other incidents to 30 minutes, 27 seconds (30:27) for fire incidents.

FUTURE PROJECTIONS

Population Growth Projections

The District's service area is comprised primarily of the City of Aspen, Colorado. The following figure illustrates the historical population growth for Aspen, Colorado. Aspen experienced an overall 10.79% increase in population from 2010 to 2018. While an increase was estimated the majority of those years, the final two years were estimated with a decrease.

Figure 94: Aspen, CO, Historical Population Data (2010–2018)[11]

Year	Population
2010	6,648
2011	6,638
2012	6,680
2013	6,742
2014	6,871
2015	7,178
2016	7,405
2017	7,366
2018	7,365

Using the average annual increase of 1.3%, Figure 95 illustrates the expected population estimates.

Figure 95: Aspen, CO, Population Estimates (2019–2040)

Year	Population
2019	7,461
2020	7,558
2025	8,063
2030	8,602
2035	9,176
2040	9,789

While the overall population is a component of how changes in service demand may occur, it is also important to analyze the composition of that population. As illustrated in Figure 96, the population of those under the age of 55 changed from 74% to 70% from 2010 to 2017. Leadership should continue to monitor this shift in age demographics as it relates to response to emergency medical incidents. Those residents aged 55 or older are more likely to have a higher utilization of District services than the other age categories.

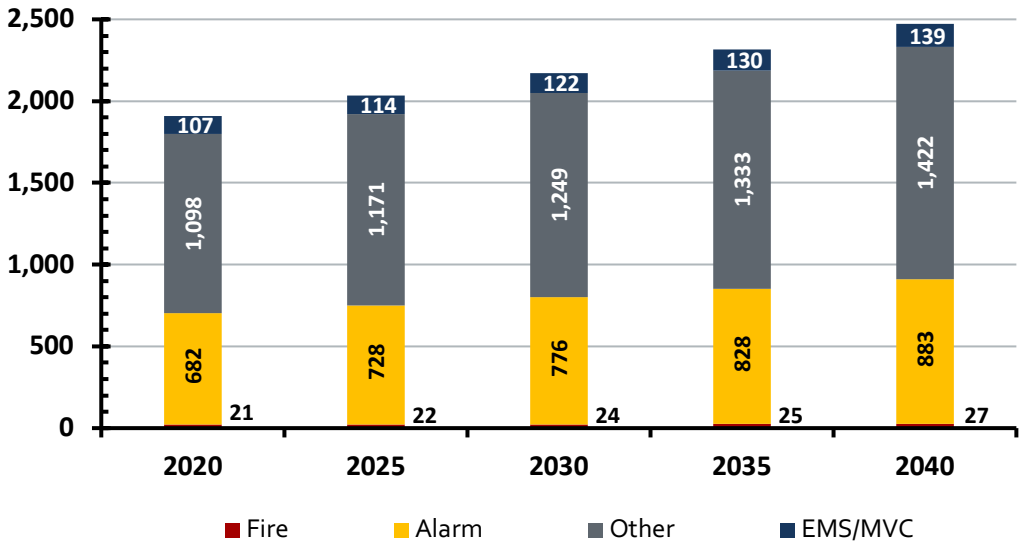
Figure 96: Aspen, CO, Census Demographics

Age	2010	2017
Under 5 years:	254	208
5 to 9 years:	300	249
10 to 14 years:	313	411
15 to 19 years:	252	274
20 to 24 years:	335	338
25 to 34 years:	1,192	1,219
35 to 44 years:	1,173	1,053
45 to 54 years:	1,111	1,200
55 to 59 years:	480	366
60 to 64 years:	484	467
65 to 74 years:	505	792
75 to 84 years:	206	425
89 years and over:	53	95

Service Demand Projections

The current service demand per 1,000 population is determined by taking the annual number of responses and dividing by the population number in thousands. Looking at the estimated 2018 population of 7,365, the rate of total service demand is about 25 calls for service per 1,000 population. ESCI derived this by looking at 2017 through 2019 data and taking the average of service calls compared to the estimated 2018 population of the District. Using the projected population estimates for five-year points from 2020 to 2040, Figure 97 illustrates the projected service demand. The primary growth in service demand will be in the other incidents and alarm incidents versus fire and emergency medical/motor vehicle collision incidents.

Figure 97: AFPD Service Demand Projections (2020–2040)



TRAINING

Training is the foundation of all aspects of emergency services. An individual's ability to effectively utilize resources and equipment is dependent on the level of training an organization has provided. The following section provides an overview of the equipment, facilities, execution, and efficacy of the current training program.

General Training Competencies

Figure 98 summarizes the general training topics and certification levels provided in the District.

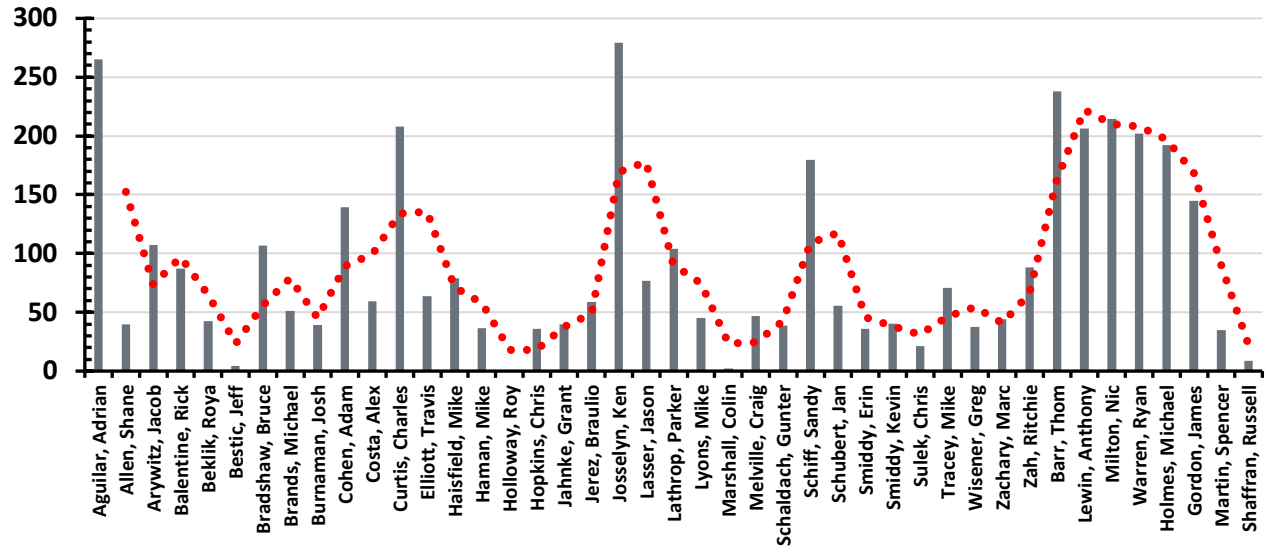
Figure 98: AFPD General Training Competencies

Training Competencies	AFPD
Incident command system–cert levels defined?	All personnel NIMS ICS 200 minimum
Personnel accountability training in place?	No
Formal SOGs on training in place?	No
Emergency & training safety procedures in place?	No
Recruit Academy (internal or external)?	Yes, usually external, occasionally combined with neighboring fire districts (RFFR and Carbondale Fire)
Special rescue (high-angle, TRT, etc.)?	Outside sourced
Hazardous materials certification level?	CO State HazMat Operations
Wildland firefighter (certification level)?	No minimum, in-house trained
Vehicle extrication?	Majority of personnel CO State FFII extrication module & in-house training
Defensive driving? (program used; frequency?)	No
Use, safety, & care of small tools?	No policy, covered in State FFI Training
Use, safety, & care of power equipment?	No policy, covered in State FFI Training
Radio communications & dispatch protocols?	Yes

AFPD provides a wide variety of general training competencies and opportunities to attend outside training programs. The focus of this evaluation will be on the training provided to all the firefighters, and individual training opportunities such as the National Fire Academy are generally omitted. There are several opportunities for potential improvement. The first is the development of training standard operating guidelines (SOG). With the consideration of expanding service delivery, specifically in the area of pre-hospital care, guidelines can help ensure consistent application of the training program. Training SOGs should include modalities, successful completion metrics, and required documentation. Emphasis should be placed on safety requirements for all training cycles in compliance with NFPA 1001. An example relates to Mayday Training by the department in 2018. Based on the provided documentation, there were only two hours of Mayday Training in 2018, and only one individual attended the training. This is most likely a documentation issue and may be addressed with the District's transition to Emergency Reporting in 2020.

Another topic that will require focused evaluation is the training requirements for individual firefighters. ESCI analyzed the 2018 roster of firefighters and displayed the total number of training hours for all personnel in Figure 99. AFPD demonstrated limited consistency in training hours that individuals had received in 2018. The data supports the need to develop a program with specific training topics and hours required by an individual firefighter. Additionally, it is understood that roles such as Engineer require specific training, but there appears to be the need to establish minimal annual training requirements for all line personnel.

Figure 99: AFPD Consistency in Training by Individual Firefighter (2018)



Training Topics

Figure 100 summarizes the general training topics and the emphasis for each category in 2018. As previously mentioned, the focus is on training provided to all firefighters, which omits some of the outside training that individuals received.

Figure 100: AFPD Training Provided by Category

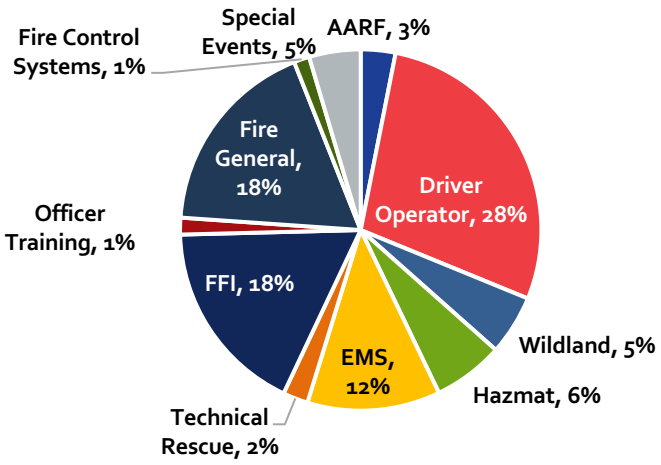
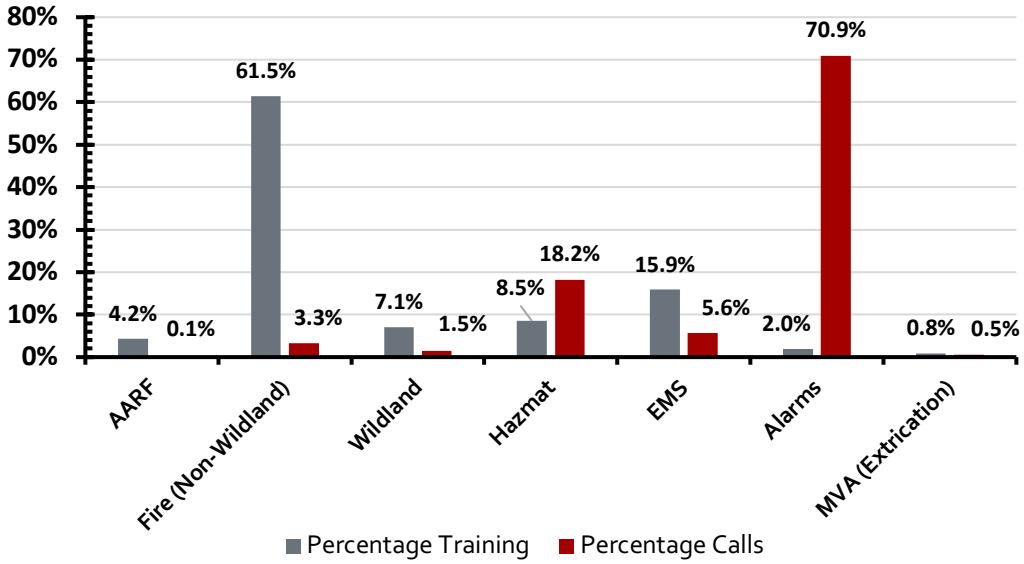


Figure 100 is consistent with most fire service organizations. Gordan Graham, a research consultant, described the necessity to focus on "high risk/low frequency" events.[12] This concept is evident in the amount of training for fire and related categories compared to actual service demand. The following figure provides an overview of the amount of training provided by AFPD in relation to the actual call volume.

Figure 101: AFPD Training Hours Compared to Actual Calls (2018)



Analysis indicates the need for a more balanced training program with an increased emphasis on EMS, officer training, and fire control systems. One recommendation discussed in detail in the *EMS* section is for AFPD to increase its capacity to provide a higher level of first response. Currently, AFPD responds to approximately 2% of the EMS service demand in the Aspen Community. Working closely with AAD, the District should consider increasing the number of EMS training hours commensurate to a higher demand for service.

AFPD currently selects officers based on a general election process. A fire officer has significant responsibilities relating to firefighter safety, fire ground operations, and overall service delivery. ESCI recommends modifying the current system to include minimum standards for potential officers prior to being eligible to participate in the election process. In addition, ESCI recommends increasing the number of training hours provided and/or required for all line officers.

A third opportunity for improvement relates to AFPD's response to automated fire alarms in commercial and residential occupancies. The automated fire protection systems in most commercial occupancies are specifically engineered for the structure and often challenging to manage. As previously discussed in the *Service Delivery* section, AFPD responded to 29% of automated fire alarms in 2018. There are significant life safety issues specific to a hazardous environment due to poisonous gasses even when a structure has fire sprinkler protection. ESCI recommends that AFPD re-evaluate its response plan and develop a comprehensive response for these types of events. In line with the above recommendation, AFPD should consider increasing the number of training hours specific to commercial fire protection systems.

Training Methodologies & Delivery

AFPD has an extensive training program providing an estimated 3,202 cumulative training hours in 2018. ESCI recommends the development of a balanced EMS/Fire training program. The program would be a balance of standard re-certification training and focused training. One portion of the program should reflect retrospective statistical data from actual incidents. The District should look for areas of improvement based on a comprehensive quality assurance (QA) program, or opportunities for additional levels of patient care or service. This training will fall under the category of focused training. A second portion should include fulfilling the continuing education requirements for various certifications. AFPD should establish a training calendar that assigns specific monthly training to a specific purpose. Training opportunities can be placed on a 12-month calendar. Individuals can then plan on attending specific training necessary for recertification. Following is an abbreviated example of a balanced EMS/Fire training program. Part of a balanced training program is the determination of annual required training that must be attended by each firefighter each year. Training involving Mayday Drills, SCBA training, and MCI drills are often mandatory required attendance.

Figure 102: Balanced EMS/Fire Training Schedule Example

January	February	March	April	May	June
Re-cert (OB/Peds)/ IC Training	Re-cert (Cardiac)/ RIT Training	Re-cert (Trauma)/ Wildland	Focused Training	Re-cert (Medical)/ Ladder	Multi-agency MCI/ Fire Ground (Night Drills)
July	**August**	**September**	**October**	**November**	**December**
Re-cert (Environmental)/ Water Supply	Focused Training	Re-cert (BLS, ACLS, PALS as needed) / Tech Rescue	Re-cert (Respiratory)/ Hazmat	Re-cert (Behavioral)/ Extrication	Focused Training

Training Program Administration

A training program must be closely monitored, supported, and funded to function effectively. Administrative program support is important, along with program guidance in the form of the development of training plans and establishing goals and specific training objectives.

AFPD has an established administrative process specific to its training programs. Currently, there is an assigned Training Officer who will become a permanent position. The District has adequately funded the program with a budgeted $44,500 for 2020. The training program is currently in development and is progressing well. Based on the data collected, there appears to be an opportunity for improvement relating to training documentation. Limited documentation exists relating to lesson plans, training action plans (TAP), or actual hours of attendance. An example noted was the numerous training sessions where the attendance time documented as "variable." The use of Emergency Reporting software should be sufficient to maintain tracking and certification requirements at all levels.

Training Facilities & Resources

In today's fire service, multiple resources are necessary to arm the trainer with the tools needed to provide realistic, effective, and verifiable training. An organization must have adequate training facilities to prepare for all levels of service delivery demand. Figure 103 displays a summary of the current training resources and facilities available for the District.

Figure 103: AFPD Training Facilities and Resources

Training Resources	AFPD
Adequate training ground space/equipment?	Yes
Describe training facilities (tower, props, pits)	Only routine response apparatus and equipment
Live fire props?	No
Fire and driving grounds?	No
Other fire-related training resources:	Neighboring agency training tower and facilities
Maintenance of training facilities adequate?	Yes
Classroom facilities adequate?	Yes
Video, computer simulations available?	No
Instructional materials available?	Yes
EMS-related training props & manikins (describe)	CPR/BLS Manikins (12); adult & infant
EMS equipment assigned specifically for training?	AED Trainers (4)

AFPD stated in survey documents that the department had adequate training ground space and equipment. Based on this training analysis, it appears that AFPD has limited resources and facilities to meet the demand for adequate training currently and with the potential of increased service demand. The high cost of training facilities, exacerbated by the limited amount of available property, creates a challenge in developing adequate training resources. ESCI recommends the development of a regional training facility that could serve AFPD as well as Roaring Fork Fire Protection District (RFFPD). A collaborative system could also support the potential for future consolidations.

EMERGENCY MEDICAL SERVICES

The *Emergency Medical Services* section provides a summary of the District's services relating to pre-hospital medical care. ESCI used focused interviews with internal and external stakeholders combined with information from the District to develop a comprehensive perspective of current and future EMS needs throughout the AFPD. The purpose of this section is to evaluate the current level of pre-hospital care and future needs based on projected call volume and available resources. ESCI will identify challenges relating to the EMS program and make recommendations with projected outcomes.

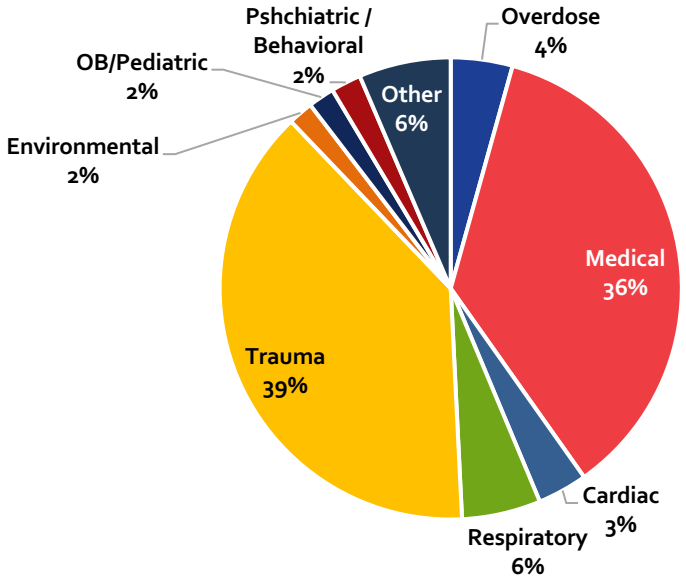
The fire service has been providing EMS for over 40 years. In fact, 90% of the 31,000 departments in the United States provide some form of pre-hospital medical care.[13] Since 1980, residential and commercial structure fires nationwide have dropped 52%. In contrast, EMS responses have continued to climb nationally.[14] Based on data from the *Service Delivery* section of this report, AFPD has seen a slight decrease in fire calls, and EMS accounts for 2% of the total call volume. Structure fire response accounts for less than 1% of the total call volume.

Current State

EMS Service Demand

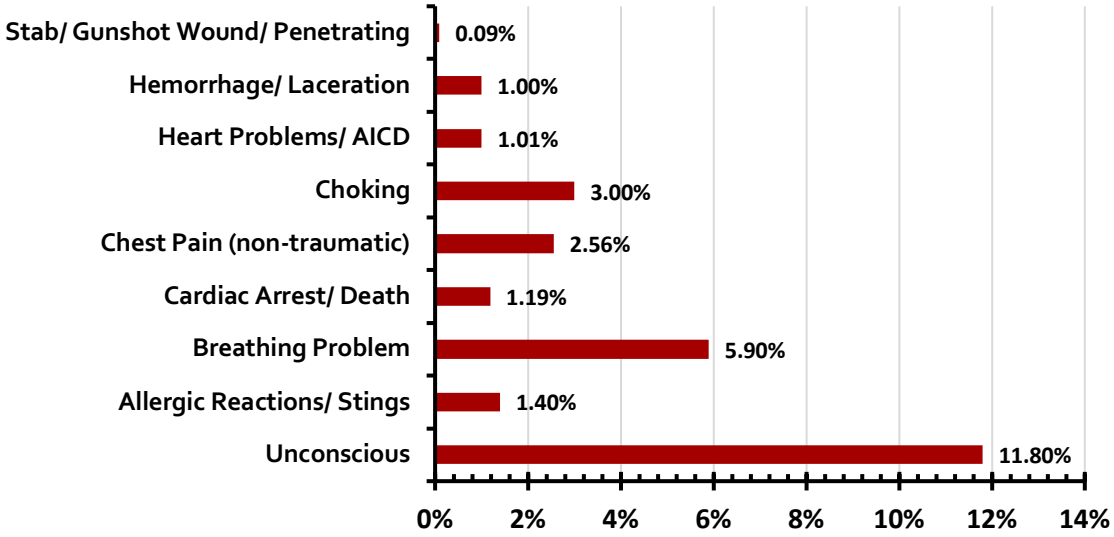
Aspen Ambulance District (AAD) had a service demand of approximately 1,327 calls in 2019. AFPD provides limited basic life support (BLS) first response to approximately 2% of the EMS calls within the District. On rare occasions, staff within Station 61 or the two-person on-call crew will provide first responder care before the arrival of the ambulance. AFPD responded to 38 EMS incidents in 2018, which did not include motor vehicle accidents. AAD provides advanced life support (ALS) and ambulance transport in the District. Figure 104 shows a breakdown of the medical emergency incidents based on the 2019 data.

Figure 104: AAD EMS Service Demand (2019)



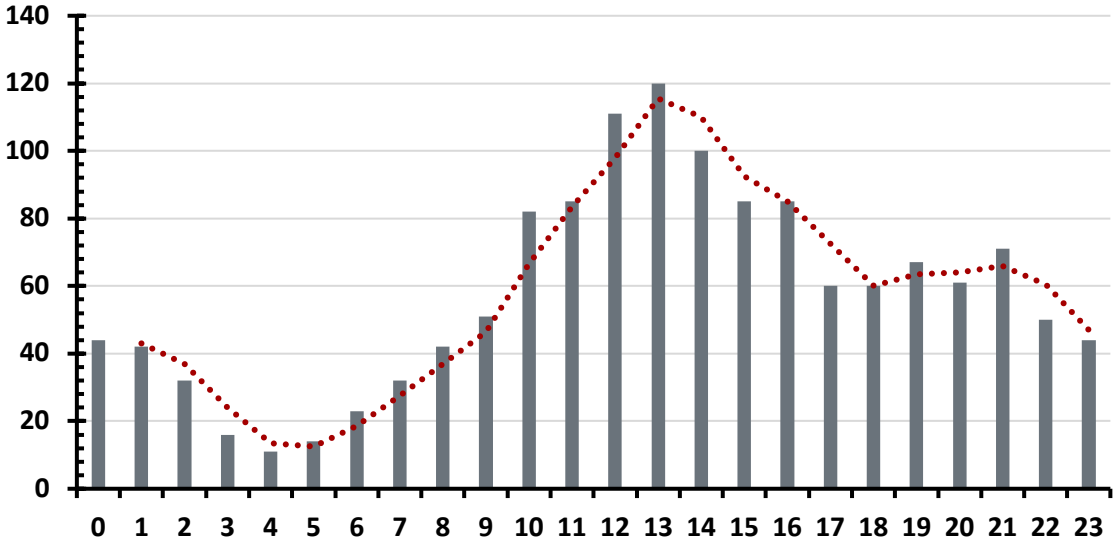
Focusing on identifying the percentage of calls that were considered acute in nature and requiring E-level or immediate response accounted for approximately 27.9%. Figure 105 lists the nine categories often related to an airway, breathing, or circulation (ABCs) type of medical emergency. All medical events can become life-threatening, but this discussion will focus on the following categories of available data.

Figure 105: Focused Life-Threatening Medical Emergencies (2019)



AAD runs most of the EMS service demand between 10 a.m. and 4 p.m. This is consistent with the tourism activities throughout the year. Figure 106 shows the number of calls during a 24-hour period (2017–2018).

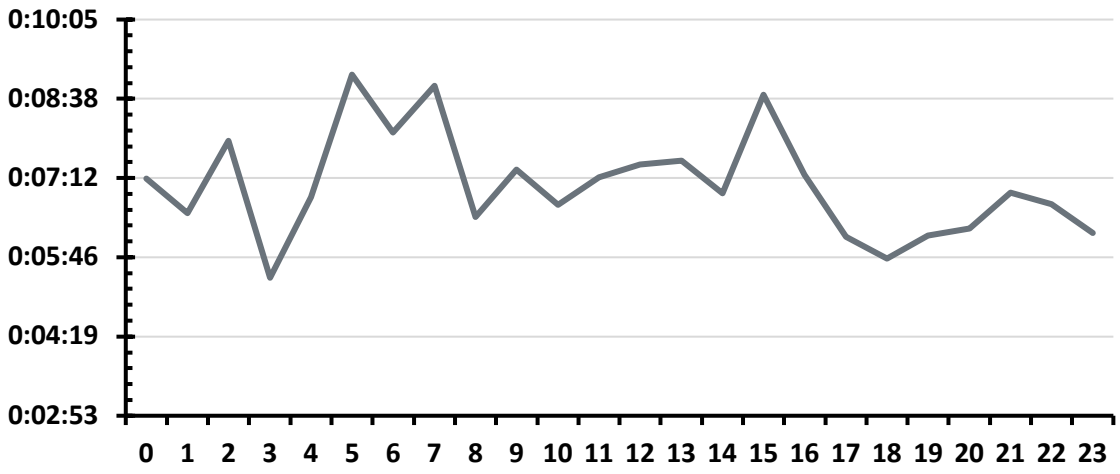
Figure 106: Aspen Ambulance District Service Demand by Hour (2017–2018)



EMS Performance

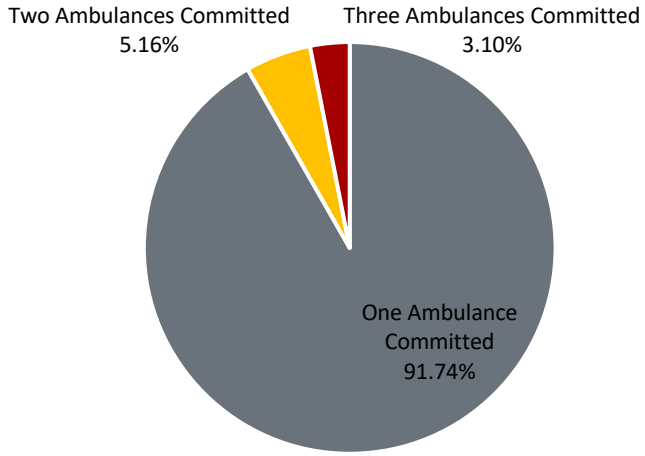
In evaluating the statistical relationship between AFPD and AAD, ESCI excluded the incidents involving the ski area and medical facilities, since they do not require assistance from outside agencies. Data is limited, but it appears that AAD has an average total response time of 7 minutes, 4 seconds (07:04). Additionally, the data shows an average total committed time of 32 minutes, 54 seconds (32:54). Figure 107 shows the response time averages based on the hour of the day.

Figure 107: Average Response Times by Hour of the Day (2017–2018)



The data in Figure 107 indicates that there is a delayed response early in the morning and mid-afternoon, corresponding to heavy traffic. Another consideration relates to the number of concurrent events that AAD documented in 2017 and 2018. Figure 108 shows that AAD had two or more ambulances committed to incidents approximately 8.26% of the time. This statistic demonstrates efficient use of current resources but also shows the current EMS system is reaching capacity.

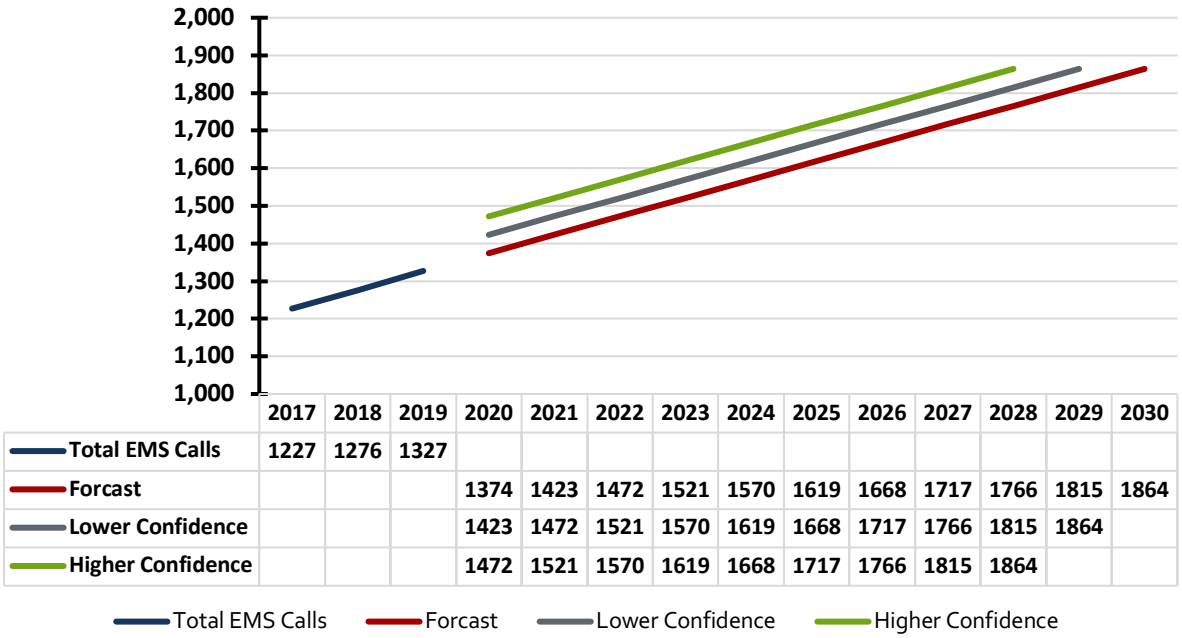
Figure 108: Aspen Ambulance District Concurrent Calls (2017–2018)



Future Projection

Available data showed an approximate increase of 22% in EMS service demand over the past three years. Based on this information, Figure 109 shows the potential of EMS service demand over the next 10 years.

Figure 109: EMS Service Demand Forecast



	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total EMS Calls	1227	1276	1327											
Forcast				1374	1423	1472	1521	1570	1619	1668	1717	1766	1815	1864
Lower Confidence				1423	1472	1521	1570	1619	1668	1717	1766	1815	1864	
Higher Confidence				1472	1521	1570	1619	1668	1717	1766	1815	1864		

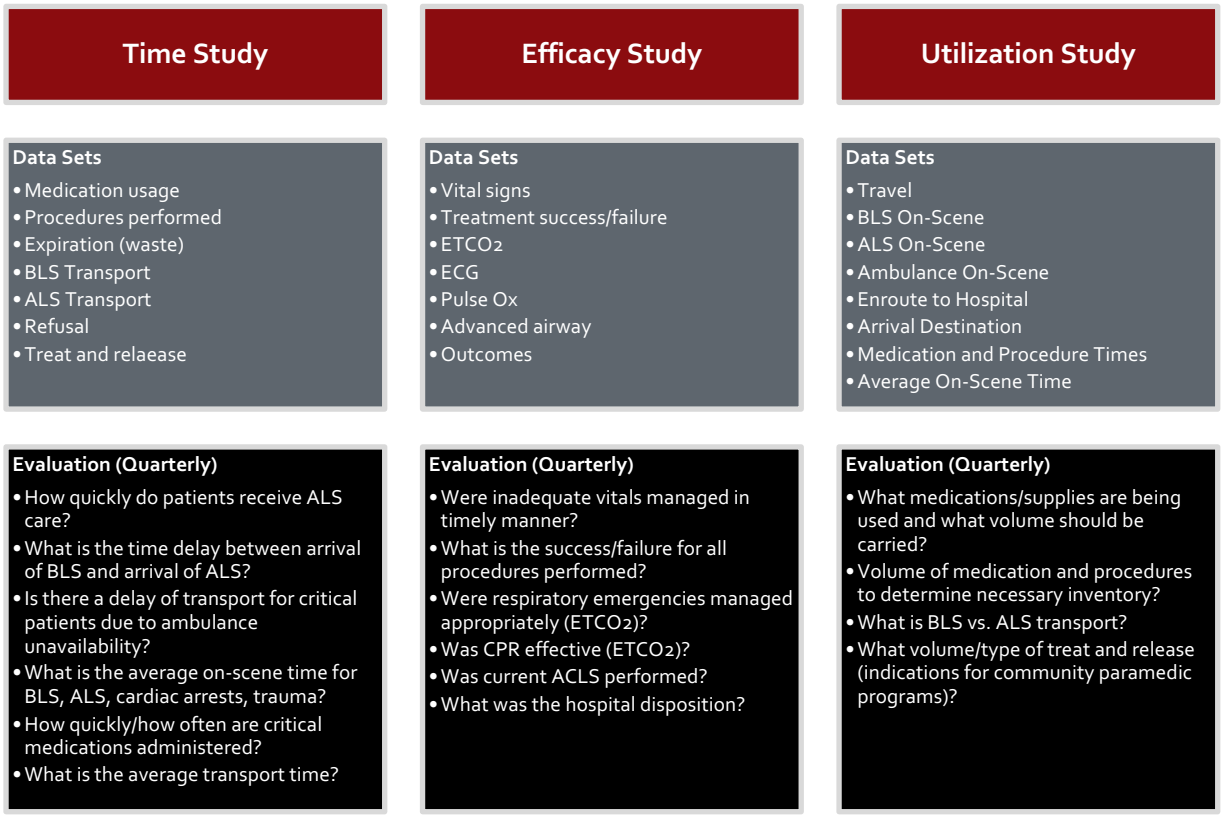
Conservative estimates show that EMS service demand will reach 1,700 calls over the next 10 years and planning should occur to support the increased call volume.

Quality Management

AFPD currently responds to a small number of medical incidents. Based on the potential for AFPD to increase services relating to EMS, emphasis should be placed on gathering appropriate patient care documentation. A challenge currently facing many EMS agencies is the lack of objective data to support the high-quality care provided. Evidence-based data can provide objective information regarding the level of care provided.

Additionally, the data can support program expansion and budgetary increases. The ESCI evaluation process indicated an opportunity exists for improvement regarding data collection and analysis. AFPD currently does not have a system to capture patient care reports. ESCI recommends that the District document all EMS calls internally, utilizing a patient care reporting (PCR) system. This system would provide complete and accurate data collection and support the Quality Improvement (QI) program. Most PCR systems will export data to an Excel format, and the data can be easily interrogated to provide various evaluations. Figure 110 shows a minimal data set and potential evaluation criteria that would be beneficial in making objective decisions.

Figure 110: Data Set and Quality Assurance Criteria



EMS Training

At the time of this evaluation, there was limited documentation regarding EMS Continuing Education (CE). An essential component of a quality First Responder Program is accurate training documentation supporting the specific needs of the community and for the purpose of certification.

Medical Control and Oversight

Dr. Chris Martinez provides medical direction. Interaction with the physician advisor is limited but, based on AFPD's BLS status, the contact is sufficient for the level of care. An opportunity may exist to expand the level of care provided by AFPD. ESCI recommends communicating with its current physician advisor and exploring options for an expanded scope of practice.

Based on the information described above, there appears to be an opportunity for AFPD to improve service delivery as it relates to emergency medical incidents. There were approximately 1,327 EMS related calls in 2019. Of that volume, AFPD responded to less than 2% of the calls. Interviews during the ESCI site visit in December 2019 found a much higher emphasis exists on the utilization of the Aspen Police Department for First Responder medical care. While it is important for law enforcement to have capabilities to render medical care prior to the arrival of EMS, its primary responsibility should focus on scene safety and law enforcement activities. ESCI believes that AFPD has the capacity to provide better service as the primary First Responder entity.

There appears to be a need for improved First Responder response within the Aspen community. A high acuity level of medical emergencies exists at approximately 28%. The average response time by AAD is a little over 7 minutes, and AAD has the concurrency of calls beyond one ambulance at 8.2%. All these factors support the necessity for improved First Responder care that may be accomplished by the AFPD.

The majority of EMS service demand occurs between 10 a.m. and 4 p.m. There is the potential for AFPD paid staffing to respond to most medical calls in the area during daytime hours. More on this subject can be found in the *Staffing* section.

Effective medical direction and training is the key to providing a level of service Aspen citizens deserve. During consideration of expanding EMS response by AFPD, the department should work closely with the Medical Director in conjunction with AAD to establish response protocols that define responsibilities for EMS incidents. From this, a combined level of service agreement should be developed and implemented that clearly outlines the roles of each agency. Fire personnel should be trained at a minimum to the First Responder level. Funding levels should be in place for initial training and to maintain certifications.

Dispatch procedures should also be included in the agreement to prevent duplication of services and ensure appropriate resources are deployed based on call type. Again, this will require close coordination between all agencies involved in the initial response.

Moving forward, EMS supply partnerships will need to be in place (utilizing hospitals or outside vendors) to ensure adequate equipment and supply levels are maintained. Procedures for daily inventory and reordering will need to be developed internally and reviewed periodically in time intervals determined by the department. A very important component to be a successful EMS service provider will be the establishment of a QA/QI program. Reviewing past incidents is critical to ensuring that protocols are followed, appropriate treatments are provided, and patient outcomes are assessed. Through this process, agencies can assess their effectiveness, determine training needs, and when required, assist with disciplinary processes.

Section III:
OPTIONS FOR FUTURE DELIVERY SERVICES

ORGANIZATIONAL IMPROVEMENT STRATEGIES

Short- and Mid-Term Strategies

The recommendations made in the report are listed here for convenience. Most of these recommendations can be implemented relatively quickly, although some may require some work that may span two to three years. ESCI recommends that those dealing with safety concerns be made a higher priority. Creating a strategic plan to accomplish these items effectively is the best approach, although some of these can be implemented by the officers responsible.

Other recommendations are completely new strategies or may require some time and effort to implement and are reflected in the *Long-Term Strategies* section with additional explanation.

Management Components

- The District should conduct a comprehensive strategic planning process to develop, adopt, and support a contemporary mission statement, vision, values, and goals for the next three to five years. To be successful, this effort should include the participation and input of various key community stakeholders and outside agencies.
- There appeared to be limited documentation for the various meetings. ESCI recommends an additional focus on documentation and distribution of meeting minutes.
- The environment between AFPD and surrounding agencies appeared to be strained and has resulted in limited interagency cooperation. A lack of cooperation can compromise mutual aid responses, fire ground operations, and overall service delivery. ESCI recommends the development and implementation of a process to improve interagency cooperation throughout Pitkin County.

Staffing and Personnel

- As AFPD moves forward with the considerations of hiring full-time career staff, it should strive to develop and establish clear funding priorities that support those initiatives. The lack of funding and budgeting priorities make it difficult to plan for the future if funding revenues should shift or are reduced.
- Based on limitations described in the *Staffing* section, for responses to automated fire alarms, medical incidents, and an effective response force for structure fires, ESCI recommends AFPD conduct its own critical staffing analysis based on adopted national standards.
- AFPD should conduct field validation exercises with its crews to verify the critical task analyses provided. After field validation is complete, the Department may find that the critical tasking can be adjusted appropriately upward or downward.
- This analysis demonstrates that a volunteer-staffed fire station, with only two firefighters assigned on call from home per 24-hour period, does not provide the level of effectiveness ESCI recommends consideration for increasing the number of career dedicated staff.
- To prepare for ARFF incidents, AFPD should ensure personnel receive training outlined in NFPA 1003: *Standard for Airport Fire Fighter Professional Qualifications* and NFPA 402: *Guide for Aircraft Rescue and Fire-Fighting Operations*.
- A review of current job descriptions reveals that some of the descriptions are dated and in need of review and possible revision if the duties described are different from actual practices.

Performance Standards

- ESCI compared AFPD performance standards to national standards and determined several areas for improvement.

Figure 111: AFPD Performance Standards Comparison

Performance Standard	Benchmark	AFPD
Call Processing	1 minute, 4 seconds	4 minutes, 23 seconds
Turnout Time	1 minute, 20 seconds	3 minutes, 5 seconds
Travel Time	4 minutes, 0 seconds	10 minutes, 22 seconds
Total Response Time	6 minutes, 24 seconds	18 minutes, 20 seconds

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

Financial Considerations

- ESCI recommends the use of common object codes for the same type of expense, regardless of the functional area of the expenditure. This will make it much easier to match audit with budget results and show the full impact of District operations on taxpayers, improving transparency.
- ESCI recommends AFPD develop public presentation documents tying annual tax increase revenue directly to various expenditure items. For example, develop a table showing the percentage increase earmarked, by year, for various items such as COPS Housing Project debt service, replacement equipment, additional career staff, etc. This transparency will provide the District with greater credibility.
- ESCI recommends that if and when the District considers hiring career staff, the housing project could be used as an incentive (a recruiting tool) to hire career firefighters and could be included in the total benefits package rather than viewing it as a benefit for volunteers.
- ESCI recommends further evaluation of the cost/benefit of this added housing cost obligation concerning the return in the direct level of fire rescue service to the community. The District should benchmark cost/benefit and use of career versus volunteer personnel with other similar resort communities.
- ESCI recommends the development of a budget review committee comprised of members of the public, at least one elected city official, and one District board member to work with fire department administration on a more open, transparent budget process and presentation.

- ESCI recommends the development of a more detailed line-item budget that identifies each volunteer benefit, both individual and group (such as annual award banquets, etc.). Consider a compliance and documentation program tying individual volunteer benefits to annual performance rather than just longevity. For example, in order to obtain any benefits, a volunteer must obtain a certain initial number of hours/certifications, must complete a certain number of hours of annual training, must perform a certain number of annual service hours to the department and must respond to a certain percentage of service calls each year. Further, there should be documented annual performance appraisals for each volunteer, similar to a career staff member.

Capital Facilities and Apparatus

- Apparatus and support equipment capital equipment replacement plans began in "Current Year" through 2039. ESCI recommends a comprehensive replacement funding plan that projects out five years for fire apparatus and related equipment. A capital equipment replacement plan is updated annually and based on the life, cost, and condition for each unit.
- As noted in Appendix C, apparatus are in service with 20-year-old tires, which exceeds national safety standards. AFPD should implement some type of tire management program.
- ESCI recommends addressing issues relating to documented issues that are identified during annual inspections but do not correspond to required repairs. Appendix C shows an example of critical repairs requiring immediate attention that appear to remain unresolved. ESCI recommends the development of a maintenance program that ensures all necessary repairs are made promptly. The program should be consistent with standards defined in NFPA 1911 for Apparatus Maintenance and Testing.
- ESCI recommends an immediate evaluation of 28-foot two-section extension ground ladders that are still in-service with two damaged rungs. Appendix D shows photos of the damaged rungs and documentation of the Annual Ground Ladder testing results tested by UL Industries. This ladder has been damaged for over four years, documented by UL each inspection, and is still in-service, putting firefighters at risk with any ground ladder operation or training using this ladder.
- ESCI recommends strict requirements for the application of established SOPs relating to apparatus readiness. A sample of 2018 apparatus readiness checks showed that only 16 of the required 26 inspections were performed on Ladder 61.

Training

- ESCI recommends the development of training standard operating guidelines (SOGs). With the consideration of expanding service delivery, specifically in the area of pre-hospital care, guidelines can help ensure consistent application of the training program.
- The data supports the need for a to develop a program with specific training topics and hours required by an individual firefighter. It is understood that roles such as Engineer require specific training, but there appears to be the need to establish minimal annual training requirements for all line personnel.
- Analysis indicated the need for a more balanced training program with an increased emphasis on EMS, officer training, and fire control systems. One recommendation discussed in detail in the *EMS* section is for AFPD to increase its capacity to provide a higher level of First Responder response.

- ESCI recommends modifying the current system to include minimum standards for potential officers prior to being eligible to participate in the election process. In addition, ESCI recommends increasing the number of training hours provided/required for all line officers.
- ESCI recommends that AFPD re-evaluate its response plan to monitored fire alarms and develop a comprehensive response for these types of events. In line with the above recommendation, AFPD should consider increasing the number of training hours specific to commercial fire protection systems.
- ESCI recommends the development of a regional training facility that could serve AFPD as well as the Roaring Fork Fire Protection District. A collaborative system could also support the potential for future consolidations.

Emergency Medical Services

- AFPD responded to less than 2% of the calls of EMS related calls within the response area. Based on a 28% high acuity in medical emergencies, peak EMS demand between 10:00 a.m. and 4:00 p.m., and overall response time limitations by AAD, ESCI recommends the development of an enhanced first responder program.
- ESCI recommends that AFPD document all EMS calls internally, utilizing a patient care reporting (PCR) system. This system would provide complete/accurate data collection and support the Quality Improvement (QI) program.

Long-Term Strategies

The environment between AFPD and surrounding agencies is limited. AFPD should place current emphasis on improving interagency cooperation and the development of the core responsibilities.

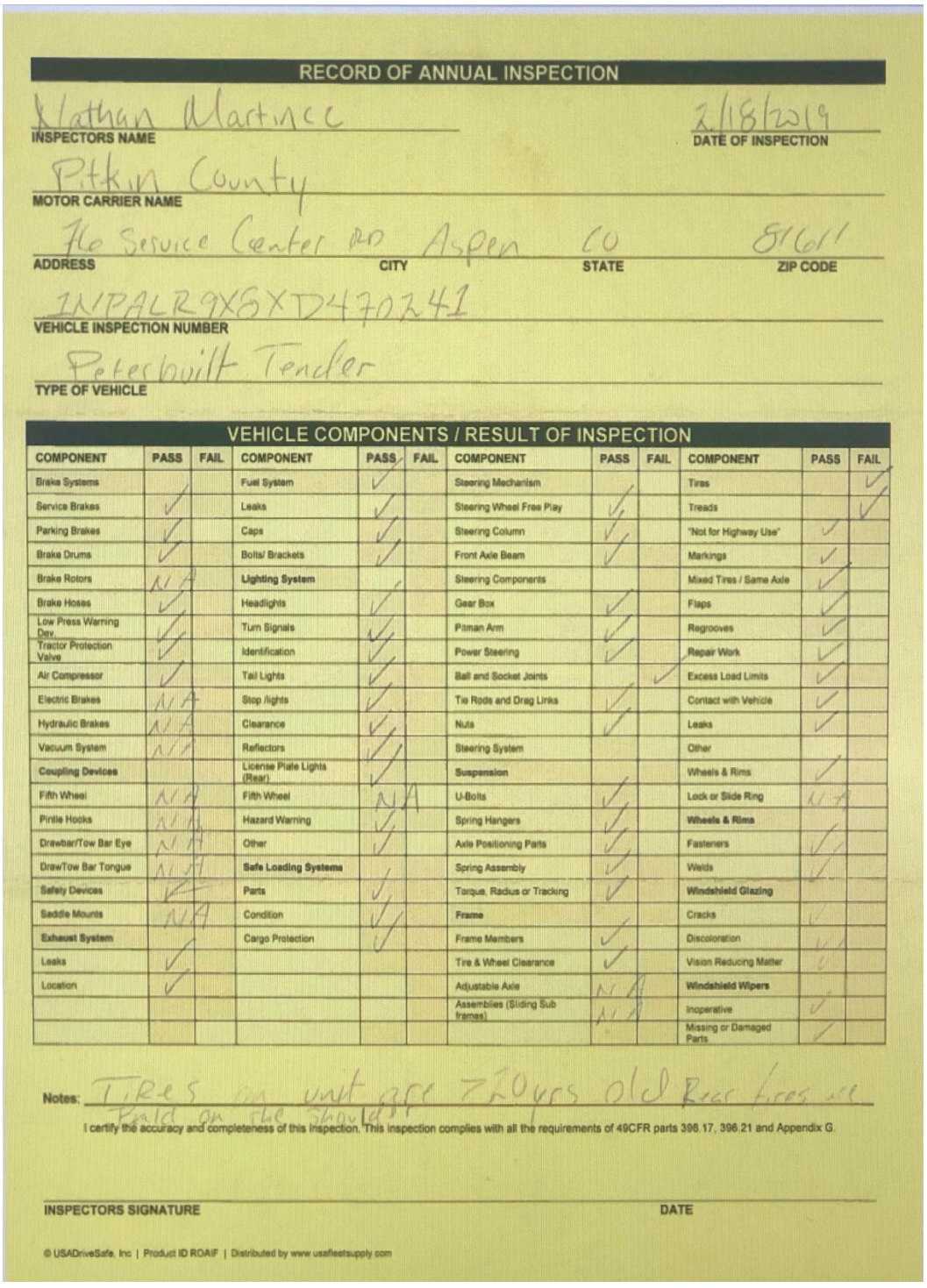
Following the development of short and mid-term strategies, ESCI recommends exploring the development of formal cooperative services either in the form of functional consolidations or operational consolidation between neighboring fire protection districts and EMS agencies. Improvement in response capabilities, efficiency, and fiscal capacity can often be achieved through mergers or consolidation. ESCI recommends long-term consideration for a consolidation feasibility study to determine potential opportunities for improved service delivery.

Section IV:
APPENDICES

APPENDIX A: ANNUAL APPARATUS SAFETY INSPECTIONS

Tender 62 2019 Annual Safety Inspection performed by Pitkin County Fleet Maintenance.

Note: 20 plus year-old tires are unacceptable on fire apparatus per NFPA 1911.



RECORD OF ANNUAL INSPECTION

Nathan Martinez — INSPECTORS NAME
2/18/2019 — DATE OF INSPECTION
Pitkin County — MOTOR CARRIER NAME
76 Service Center Rd — ADDRESS
Aspen — CITY
CO — STATE
81611 — ZIP CODE
1NPALR9X8XD470241 — VEHICLE INSPECTION NUMBER
Peterbuilt Tender — TYPE OF VEHICLE

VEHICLE COMPONENTS / RESULT OF INSPECTION

COMPONENT	PASS	FAIL	COMPONENT	PASS	FAIL	COMPONENT	PASS	FAIL	COMPONENT	PASS	FAIL
Brake Systems			Fuel System	✓		Steering Mechanism			Tires		✓
Service Brakes	✓		Leaks	✓		Steering Wheel Free Play	✓		Treads		✓
Parking Brakes	✓		Caps	✓		Steering Column	✓		"Not for Highway Use"	✓	
Brake Drums	✓		Bolts/ Brackets	✓		Front Axle Beam	✓		Markings	✓	
Brake Rotors	N/A		**Lighting System**			Steering Components			Mixed Tires / Same Axle	✓	
Brake Hoses	✓		Headlights	✓		Gear Box	✓		Flaps	✓	
Low Press Warning Dev.	✓		Turn Signals	✓		Pitman Arm	✓		Regrooves	✓	
Tractor Protection Valve	✓		Identification	✓		Power Steering	✓		Repair Work	✓	
Air Compressor	✓		Tail Lights	✓		Ball and Socket Joints		✓	Excess Load Limits	✓	
Electric Brakes	N/A		Stop /lights	✓		Tie Rods and Drag Links	✓		Contact with Vehicle	✓	
Hydraulic Brakes	N/A		Clearance	✓		Nuts	✓		Leaks	✓	
Vacuum System	N/A		Reflectors	✓		Steering System			Other		
Coupling Devices			License Plate Lights (Rear)	✓		**Suspension**			Wheels & Rims	✓	
Fifth Wheel	N/A		Fifth Wheel	N/A		U-Bolts	✓		Lock or Slide Ring	N/A	
Pintle Hooks	N/A		Hazard Warning	✓		Spring Hangers	✓		**Wheels & Rims**		
Drawbar/Tow Bar Eye	N/A		Other	✓		Axle Positioning Parts	✓		Fasteners	✓	
DrawTow Bar Tongue	N/A		**Safe Loading Systems**			Spring Assembly	✓		Welds	✓	
Safety Devices	✓		Parts	✓		Torque, Radius or Tracking	✓		**Windshield Glazing**		
Saddle Mounts	N/A		Condition	✓		**Frame**			Cracks	✓	
Exhaust System			Cargo Protection	✓		Frame Members	✓		Discoloration		
Leaks	✓					Tire & Wheel Clearance	✓		Vision Reducing Matter		
Location	✓					Adjustable Axle	N/A		**Windshield Wipers**		
						Assemblies (Sliding Sub frames)	N/A		Inoperative	✓	
									Missing or Damaged Parts	✓	

Notes: Tires on unit are 7-10yrs old Rear tires are Paid on the Shoulder

I certify the accuracy and completeness of this inspection. This inspection complies with all the requirements of 49CFR parts 396.17, 396.21 and Appendix G.

INSPECTORS SIGNATURE — DATE

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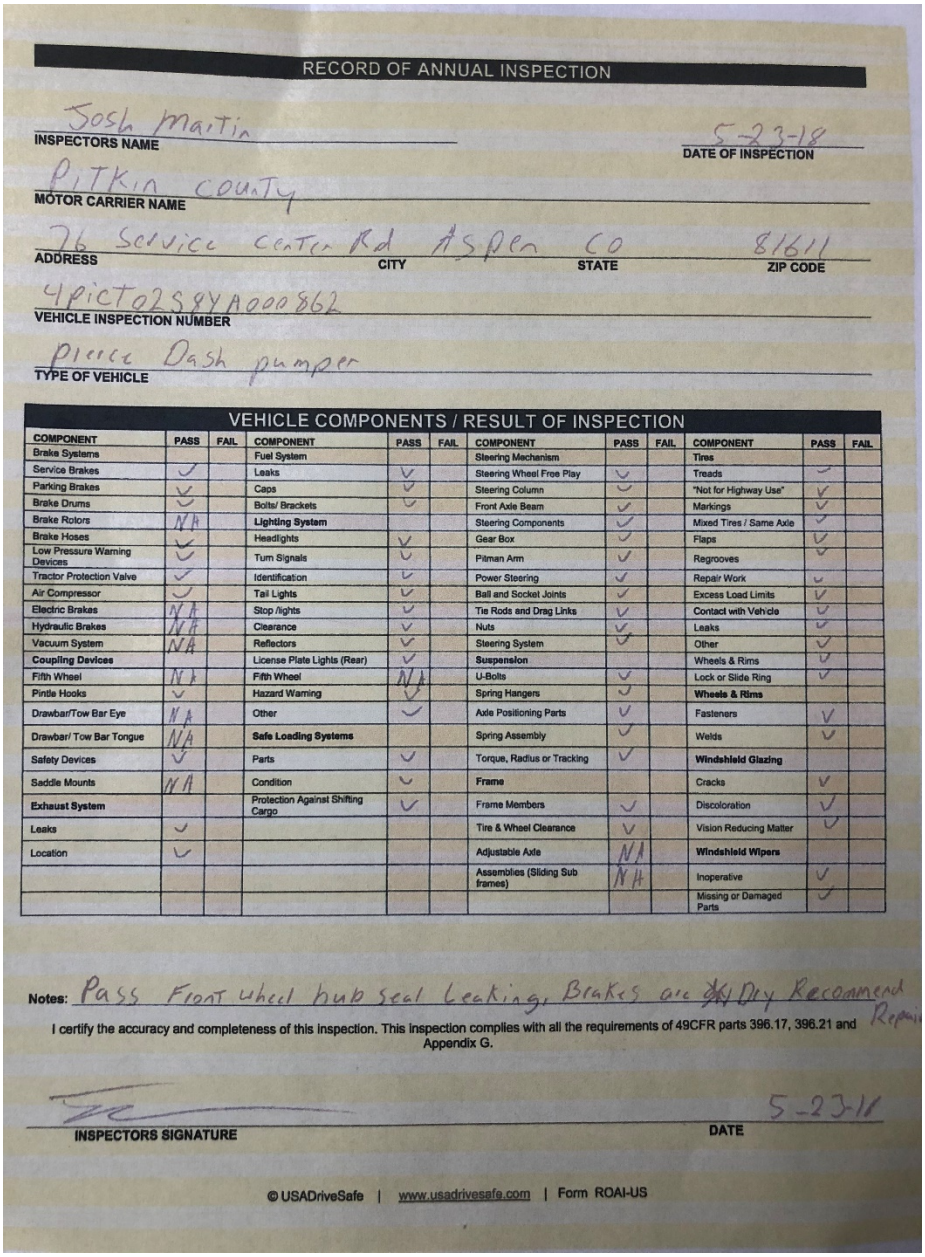
Engine 66 2018 Annual Safety Inspection performed by Pitkin County Fleet Maintenance.

Note: May 2018, Technician noted the Front Seal Leak and Dry Brakes, Recommended Repair.



RECORD OF ANNUAL INSPECTION

INSPECTORS NAME: Josh Martin

DATE OF INSPECTION: 5-23-18

MOTOR CARRIER NAME: Pitkin County

ADDRESS: 76 Service Center Rd CITY: Aspen STATE: CO ZIP CODE: 81611

VEHICLE INSPECTION NUMBER: 4pict02S9YA000862

TYPE OF VEHICLE: Pierce Dash pumper

VEHICLE COMPONENTS / RESULT OF INSPECTION

COMPONENT	PASS	FAIL	COMPONENT	PASS	FAIL	COMPONENT	PASS	FAIL	COMPONENT	PASS	FAIL
Brake Systems			Fuel System			Steering Mechanism			Tires		
Service Brakes	✓		Leaks	✓		Steering Wheel Free Play	✓		Treads	✓	
Parking Brakes	✓		Caps	✓		Steering Column	✓		"Not for Highway Use"	✓	
Brake Drums	✓		Bolts/ Brackets	✓		Front Axle Beam	✓		Markings	✓	
Brake Rotors	NA		Lighting System			Steering Components	✓		Mixed Tires / Same Axle	✓	
Brake Hoses	✓		Headlights	✓		Gear Box	✓		Flaps	✓	
Low Pressure Warning Devices	✓		Turn Signals	✓		Pitman Arm	✓		Regrooves	✓	
Tractor Protection Valve	✓		Identification	✓		Power Steering	✓		Repair Work	✓	
Air Compressor	✓		Tail Lights	✓		Ball and Socket Joints	✓		Excess Load Limits	✓	
Electric Brakes	NA		Stop /lights	✓		Tie Rods and Drag Links	✓		Contact with Vehicle	✓	
Hydraulic Brakes	NA		Clearance	✓		Nuts	✓		Leaks	✓	
Vacuum System	NA		Reflectors	✓		Steering System	✓		Other	✓	
Coupling Devices			License Plate Lights (Rear)	✓		Suspension			Wheels & Rims	✓	
Fifth Wheel	NA		Fifth Wheel	NA		U-Bolts	✓		Lock or Slide Ring	✓	
Pintle Hooks	✓		Hazard Warning	✓		Spring Hangers	✓		Wheels & Rims		
Drawbar/Tow Bar Eye	NA		Other	✓		Axle Positioning Parts	✓		Fasteners	✓	
Drawbar/ Tow Bar Tongue	NA		Safe Loading Systems			Spring Assembly	✓		Welds	✓	
Safety Devices	✓		Parts	✓		Torque, Radius or Tracking	✓		Windshield Glazing		
Saddle Mounts	NA		Condition	✓		Frame			Cracks	✓	
Exhaust System			Protection Against Shifting Cargo	✓		Frame Members	✓		Discoloration	✓	
Leaks	✓					Tire & Wheel Clearance	✓		Vision Reducing Matter	✓	
Location	✓					Adjustable Axle	NA		Windshield Wipers		
						Assemblies (Sliding Sub frames)	NA		Inoperative	✓	
									Missing or Damaged Parts	✓	

Notes: Pass Front wheel hub seal Leaking, Brakes are ~~NA~~ Dry Recommend Repair

I certify the accuracy and completeness of this inspection. This inspection complies with all the requirements of 49CFR parts 396.17, 396.21 and Appendix G.

INSPECTORS SIGNATURE

DATE: 5-23-18

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Engine 66/62 2019 Annual Safety Inspection performed by Pitkin County Fleet Maintenance.

Note: April 2019, a different technician noted again the RF Hub Seal Leak and Dry Brakes. Have the repairs ever been performed?

RECORD OF ANNUAL INSPECTION

INSPECTORS NAME: Nathan Martinez — DATE OF INSPECTION: 4/23/2019

MOTOR CARRIER NAME: Pitkin County

ADDRESS: Fleet Service Center RD — CITY: Aspen — STATE: CO — ZIP CODE: 81611

VEHICLE INSPECTION NUMBER: 4PICT02S6YA000562

TYPE OF VEHICLE: Pierce Dash Pumper

VEHICLE COMPONENTS / RESULT OF INSPECTION

COMPONENT	PASS	FAIL	COMPONENT	PASS	FAIL	COMPONENT	PASS	FAIL	COMPONENT	PASS	FAIL
Brake Systems			Fuel System			Steering Mechanism			Tires		
Service Brakes	✓		Leaks	✓		Steering Wheel Free Play	✓		Treads	✓	
Parking Brakes	✓		Caps	✓		Steering Column	✓		"Not for Highway Use"	✓	
Brake Drums	✓		Bolts/ Brackets	✓		Front Axle Beam	✓		Markings	✓	
Brake Rotors	✓		**Lighting System**			Steering Components	✓		Mixed Tires / Same Axle	✓	
Brake Hoses	✓		Headlights	✓		Gear Box	✓		Flaps	✓	
Low Press Warning Dev	✓		Turn Signals	✓		Pitman Arm	✓		Regrooves	✓	
Tractor Protection Valve	✓		Identification	✓		Power Steering	✓		Repair Work	✓	
Air Compressor	✓		Tail Lights	✓		Ball and Socket Joints	✓		Excess Load Limits	✓	
Electric Brakes	N/A		Stop /lights	✓		Tie Rods and Drag Links	✓		Contact with Vehicle	✓	
Hydraulic Brakes	N/A		Clearance	✓		Nuts	✓		Leaks	✓	
Vacuum System	N/A		Reflectors	✓		Steering System	✓		Other	✓	
Coupling Devices			License Plate Lights (Rear)	✓		**Suspension**			Wheels & Rims	✓	
Fifth Wheel	N/A		Fifth Wheel	N/A		U-Bolts	✓		Lock or Side Ring	✓	
Pintle Hooks	✓		Hazard Warning	✓		Spring Hangers	✓		**Wheels & Rims**		
Drawbar/Tow Bar Eye	N/A		Other	✓		Axle Positioning Parts	✓		Fasteners	✓	
DrawTow Bar Tongue	N/A		**Safe Loading Systems**			Spring Assembly	✓		Welds	✓	
Safety Devices	✓		Parts	✓		Torque, Radius or Tracking	✓		**Windshield Glazing**		
Saddle Mounts	N/A		Condition	✓		**Frame**			Cracks	✓	
Exhaust System			Cargo Protection	✓		Frame Members	✓		Discoloration	✓	
Leaks	✓					Tire & Wheel Clearance	✓		Vision Reducing Matter	✓	
Location	✓					Adjustable Axle	N/A		**Windshield Wipers**		
						Assemblies (Sliding Sub frames)	N/A		Inoperative	✓	
									Missing or Damaged Parts	✓	

Notes: RF Hub Seal Leaking, Trailer are low

I certify the accuracy and completeness of this inspection. This inspection complies with all the requirements of 49CFR parts 396.17, 396.21 and Appendix G.

INSPECTORS SIGNATURE — DATE: 4/23/2019

Pitkin County Fleet Maintenance Work Order Notes:

Work Order

Work Order 01-2018-0560

WO Meter 2,164

PM DJob Type

AFPD

Closed-Posted WO Status

Year 2000 PIERCE DASHMake/Model 4PICT02S8YA000862Serial # 60006 101BFCEquip #/License

0 PM Repair Reason

Open Date 5/8/2018

Close Date 9/11/2018 Finish Date 8/20/2018

10:30 AM

9:31 AM 3:11 PM

Date Note Notes Task PULL AND CHARGE OUT PARTS5/8/2018 D Annual PM & DOT Inspection Check cross lay valves for wear, replace as needed Check 2.5" rear discharge valves for wear, replace as needed.- Contact: Aspen Fire, email: fleet@aspenfire.com ----------

Have parts to rebuild all three cross lay valves. Rear discharge valves are going to have to be scheduled later. Need to take complete pump panel off to access valve on driver side. Or take dismount stuff mounted on top of that section of the truck and go in from the top. Going in from the top might not gain access either. Taking pump panel off is best option to get the job done efficiently. 5/22/2018

009-061 System Generated Service Notification---------- Started Seasonal PMD service. Found oil pan gasket seeping not bad. Output seal on trans is wet but not bad. Passenger side wheel seal is badly leaking oil. Found a bad coolant hose on passenger side of unit going from radiator to water pump. 5/22/2018 D System Generated Service Notification---------- PMH completed.

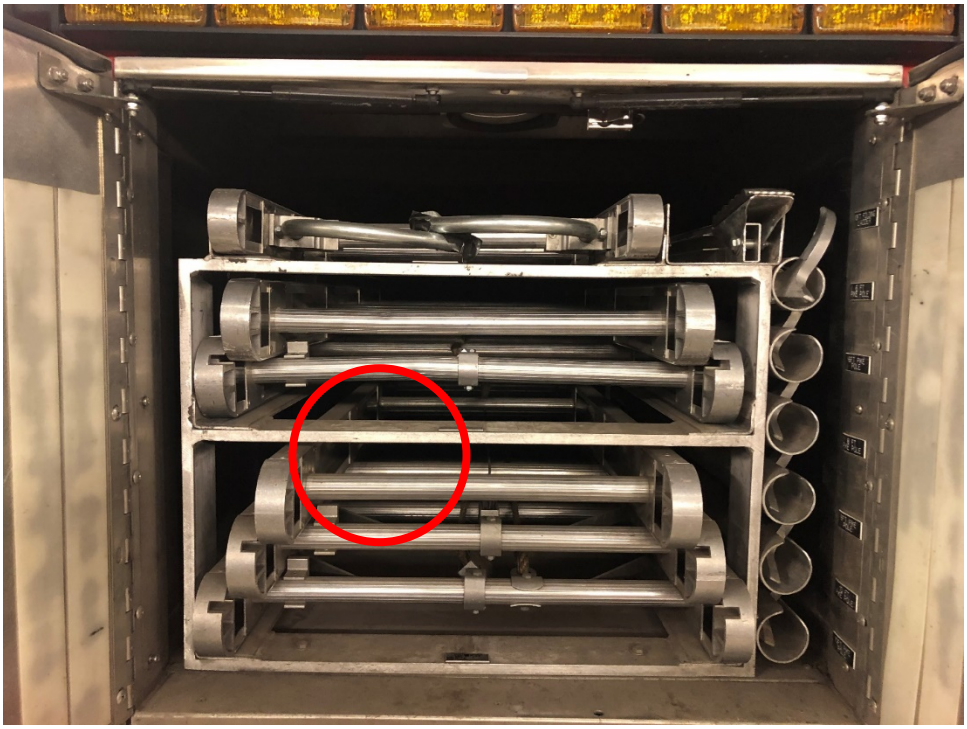
5/23/2018 H Passenger side front wheel hub seal is leaking. Took wheel off unit and brake drum off. Brake shoes are dry. Cleaned the hub area out with brake clean and removed all oil from complete assembly. Put brake drum and wheel back on unit and took for test drive so I could confirm exactly point of leak. Brought unit back in the shop and took wheel and brake drum back off and found a little oil coming out of wheel hub seal. Have James getting parts and Justin is scheduling repair at a later date. Put a note on DOT paperwork about oil leak.

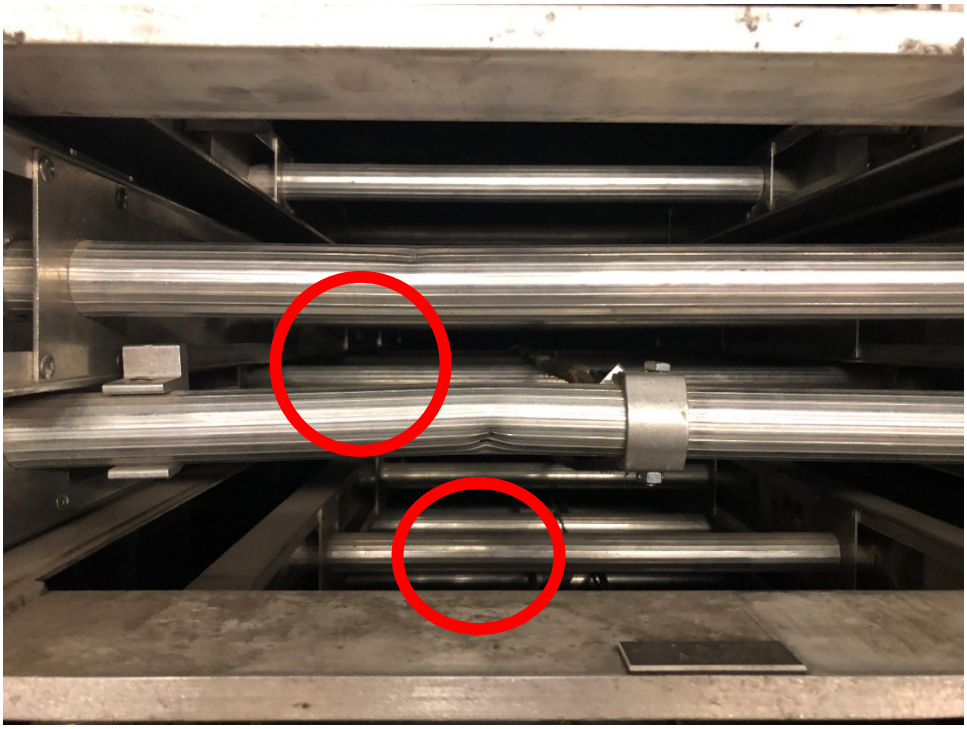
5/23/2018 005-022 System Generated Service Notification---------- DOT completed. Passenger side front wheel hub seal is leaking. Took wheel off unit and brake drum off. Brake shoes are dry. Cleaned the hub area out with brake clean and removed all oil from complete assembly. Put brake drum and wheel back on unit and took for test drive so I could confirm exactly point of leak. Brought unit back in the shop and took wheel and brake drum back off and found a little oil coming out of wheel hub seal. Have James getting parts and Justin is scheduling repair later.

5/23/2018 DOT Power steering leak, front passenger side.- Contact: Aspen Fire, email: fleet@aspenfire.com ---------- No power steering leak found. Did find coolant hose from reservoir to water pump leaking and that fluid is red like power steering fluid. Hose was bad. Replaced hose with new one and topped off reservoir. 5/23/2018 007-042 Removed and rebuilt all three cross lay valves. Reinstalled valves back on unit.5/23/2018 009-061 Updated hours in flagship due to being off.5/23/2018 008-050 helped Josh with service on implements. Oil is changed in fan and pump need to replace gas and test units.

ESCI reviewed all work orders provided for 2018 and 2019 with no repairs documented for the front hub seal leaking on this unit.

APPENDIX B: ANNUAL GROUND LADDER TESTING





Annual Ground Ladder Testing Results for Ladder 64

File: FS111951 T9-1 Issued: June 25, 2019
Project No.: 19FES33687
Ladder Manufacturer: Duo Safety
UL ID No.: 62164
Assigned to Unit: Ladder 64
Ladder Length: 28 ft.
Ladder Type: Extension, 2 Sec

VISUAL INSPECTION (See Appendix A):

R E S U L T S

The following defects were detected. These results are noncompliant.

Rung number 14 was damaged on the base section.

File: FS111951 T2-1 Issued: May 3, 2017
Project No.: 17FES22569
T E S T R E C O R D N O. 2

Ladder Manufacturer: Duo Safety
UL ID No.: 62164
Assigned to Unit: Ladder 4 Ladder
Length: 28 ft. Ladder
Type: Extension, 2 Sec

VISUAL INSPECTION (See Appendix A):

R E S U L T S

The following defects were detected. These results are noncompliant.

Rung number 14 was loose or damaged on the base section.

File: FS111951 T6-1 Issued: May 22, 2015
Project No.: 15FES10752

T E S T R E C O R D N O. 6

Ladder Manufacturer: Duo Safety
UL ID No.: 62164
Assigned to Unit: Ladder 4
Ladder Length: 28 ft. Ladder
Type: Extension, 2 Sec

VISUAL INSPECTION (See Appendix A):

R E S U L T S

The following defects were detected. These results are noncompliant.

Rung number 14 was damaged on the base section.

Additional results were discovered in the ground ladder testing reports on 6/25/2019 that include:

- E65 – 14 ft Roof Ladder with a cracked weld was discovered on the right beam at rung number 10, a cracked weld was discovered on the left beam at rung number 8, and a cut was discovered on the left beam at or near rung number 9.
- E65 – 35 ft Extension, 3 section with Rung number 3 was damaged on the fly section and a cracked weld was discovered on the right beam of the base section at rung number 11.
- E62 – 24 ft Extension, 2 section with a cracked weld was discovered on the right beam of the fly section at rung number 4.
- E66 – 14 ft Roof Ladder with Rung number 9 was damaged.
- E66 – 35 ft Extension, 3 section with the following defects Rung number 12 and 13 was damaged on the base section and Rung number 3 was damaged on the fly section.
- E68 – 24 ft Extension, 2 section with a cracked weld was discovered on the right beam of the fly section at rung number 10 and 11.

APPENDIX C: TABLE OF FIGURES

APPENDIX D: REFERENCES

[1] Based on examples provided in the publication Center for Public Safety Excellence (CPSE) Community Risk Assessment: Standards of Cover, 6th Edition.

[2] Based on examples provided in the publication "Creating and Evaluating Standards of Response Coverage for Fire Departments," 4th Edition; Commission on Fire Accreditation International, Inc. (now Center for Public Safety Excellence).

[3] Additional personnel required for rural water supply operations using water tenders for water supply.

[4] See: NFPA 1720: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments (National Fire Protection Association 2014).

[5] Center for Public Safety Excellence (CPSE) Community Risk Assessment: Standards of Cover, 6th Edition, 2016.

[6] http://www.gfoa.org/fund-balance-guidelines-general-fund.

[7] Pitkin County Proposed 2020 Budget and Five-Year Plan: Presentation to BOCC, 10/15/19.

[8] NFPA 1911: Standard for Automotive Fire Apparatus; Section D.3.

[9] Fatal Fires in Residential Buildings (2014-2016), Topical Fire Report Series Volume 19, Issue 1 /June 18, U.S. Department of Homeland Security, U.S. Fire Administration, National Fire Data Center.

[10] See: 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; and the Commission on Fire Accreditation (CFAI) Standards of Cover, 6th Edition.

[11] https://factfinder.census.gov.

[12] Gordon Grahm. www.gorddongraham.com.

[13] Compton, D. (2006). Fire Department-Based EMS: A Proud Tradition.

[14] Haynes, H. J. (September 2017). National Fire Protection Agency. Retrieved from NFPA.org.