



Fairview
Fire Department
Fairview, TX

Final Report On
AGENCY EVALUATION
Planning Review: Fire And EMS Operations

ESCI Emergency Services
Consulting International
Providing Expertise and Guidance that Enhances Community Safety

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March 2019

March 15, 2019

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REF: FINAL REPORT: AGENCY EVALUATION AND PLANNING REVIEW: FIRE AND EMS OPERATIONS

Dear Ms. Couch:

Emergency Services Consultants International (ESCI) is pleased to provide this report of *Agency Evaluation and Planning Review: Fire and EMS Operations* for the Fairview Fire Department. This is the final report for this project. ESCI is most appreciative of the assistance provided by you, Fire Chief Jeff Bell, and others who helped throughout this project.

We thank you for the opportunity to submit this report and are looking forward to the formal presentation on April 2 beginning at 7 PM. Please contact me if you have any questions or need additional information.

Sincerely,



Mike Montgomery
Central Region Manager
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Acknowledgements

This project was possible only with the considerable support and leadership of the Town of Fairview and the Fairview Fire Department. Emergency Services Consulting International wishes to thank and acknowledge the following people for their contributions to this project.

Town of Fairview Project Team

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Fire Marshal

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Danielle Gregory
Engineer Assistant

*...and all the men and women of
the Town of Fairview Fire Department, who
contributed to this report and who daily serve
their community with honor and distinction.*

Executive Summary

ESCI is pleased to provide the leadership of FFD with this report and recommendations, the goal of which is to prepare the FFD to successfully provide services that meet community needs and identified risks in light of current and future service requirements. Suggested recommendations have been developed with the specific intent of identifying options to deliver the desired levels of service at the most efficient cost.

Project and Methodology

Emergency Services Consulting International (ESCI) was retained by the Town of Fairview Fire Department (FFD) to complete an Agency Evaluation and Planning Review of Fire and EMS Operations. Specifically, it is the purpose of this report to address each of the following in accordance with community needs, applicable statutes, rules, regulations, standards, and recommended practices using the collaborative experience of ESCI consultants and agency personnel:

- Generally, is the Town adequately staffing existing resources (Fire and EMS personnel) and is it adequately projecting the growth needs for additional resources in equipment and staffing?
- Is the Town adequately staffed for (Fire and EMS) administrative needs and is the planning adequate for future administrative staffing needs?
- What are the best practices under National Fire Protection Association (NFPA) standards and International Standards Organization (ISO) standards for siting fire stations and does the Town meet those standards?
- What are the best practices in introducing priority dispatching and does that result in identifying certain EMS calls that only require dispatching of an ambulance and not an additional first responder unit?
- What are the advantages and disadvantages of this type of dispatching?
- What are the best practices in adding squads or Rapid Response Vehicles (RRVs) to fire fleets, how are they most frequently used?
- If they are added should they be staffed in addition to staffing of other fire apparatus and ambulances (In the fire service, a Squad is an all-purpose vehicle that is much smaller and less expensive than a fire truck with big ladders that commonly costs \$1 million or more).
- What are best practices related to trends in the fire service that Fairview should consider in its future planning?

The purpose of this evaluation was threefold:

- To understand how the department provides and coordinates system-wide service.
- To assess the FFD operations in comparison to industry standards and best practices; and
- To create benchmarks against which options for future service delivery can be measured.

This report includes best practices based on nationally-recognized guidelines and criteria, including concepts from the National Fire Protection Association (NFPA), the Insurance Services Office (ISO), the Center for Public Safety Excellence (CPSE), laws and regulations of the State of Texas, and other generally-accepted best practices for emergency services.

For this project, ESCI developed and utilized a work plan that was based on the requested scope of work as defined in the Town of Fairview's request for proposal and on proven evaluation tools developed by ESCI. To ensure accuracy and to develop an in-depth understanding of the FFD and its operations, the ESCI project team also collected information and conducted personal interviews to obtain additional perspective on operational, community, and policy issues facing the agency. ESCI then used Geographic Information Systems (GIS) technology, computer-aided dispatching (CAD) systems, and historic reporting tools to visualise the data, to ensure accurate identification of the service area, and to provide additional information for strategic planning purposes.

Use of this Report

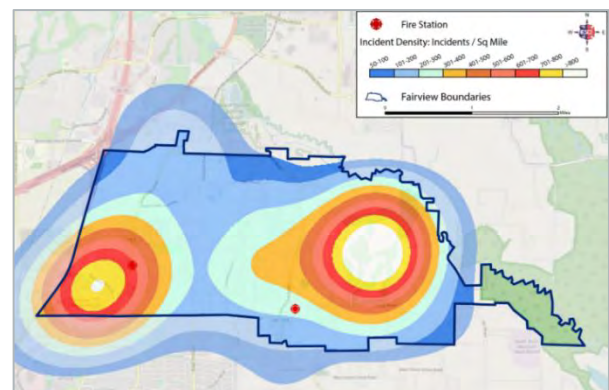
It is important to note that there are uncertainties in any assessment of this type—incomplete data, scientific uncertainty, and the inherent simplification of information within the scope of this study. ESCI recommends that the community periodically and routinely review and update the contents and implementation of recommendations to ensure that future plans contain the most accurate and up-to-date information available about community hazards, vulnerabilities, risks, and needs in order to ensure adequate funding and staffing for the desired level of services.

The material presented in this report is for informational purposes only. It is not intended to be all-inclusive, nor to be taken as legal or financial advice or opinion. The Town of Fairview is advised to seek competent legal and/or financial counsel before taking any official action, or following any specific course of action, with regard to the findings, analysis, and recommendations included in this report.

Key Findings

- **There is absolutely a need for two fire stations.** As shown here, one “mega-station”, centrally-located, would not align with the areas of historic service demand, nor would it meet the travel time or distance requirements for fire or medical calls.
- **Current stations are located in the right place.** Based on community risk, population density, service demand, and planned development (especially in the Town Center / Commercial District) area, current stations are well-located. Future needs may include additional personnel and units at one or more existing stations, or assigned to a future (third) station located in the vicinity of Hart and Beechwood.

Figure 1: Historic Service Demand, 2015-2018



- **There are “trigger points” to consider when determining when a second medic unit is needed.** It is virtually impossible to predict when those trigger points will be reached; most likely, it will be population-based. Given recent population growth, this could be 2-3 years, but it is more important to monitor service demand and compare response performance to each of the trigger points.
- **A rapid response vehicle (RRV) would not be an effective substitute for a fire apparatus on medical calls given current staffing levels.** Current staffing levels would require placing a fire apparatus out-of-service to respond a rapid response vehicle. Given current staffing levels and dependence on mutual aid from neighboring departments on any structure fire, would create an unacceptable risk in the event a fire were to occur while a fire truck was out-of-service. For an RRV concept to be successful, the department would need to add personnel (at least one paramedic per shift), contingent on the availability of funding.
- **The town is providing adequate staffing for fire and EMS response, but only with the assistance of automatic and mutual aid.** A major medical call requires 5-6 people; a working structure fire requires at least 15 people. Current staffing levels provide 8 firefighters during the day and 7 at night, not including the Fire Chief or Fire Marshal. Thus, the department is staffed to respond to a major medical call and provide initial response to a second call, but must require assistance from neighboring communities on all working structure fires and whenever there are two or more calls at the same time (about 7 percent of the time).
- **There are small, yet significant ways, for the Department to control cost.** The department should continue to recruit volunteers, pursue grant opportunities, and monitor operations for ways to operate more efficiently and save money.
- **There is a need for the department to develop and establish a strategic plan.** The strategic plan should be consistent with the Fairview Comprehensive (Economic Development) plan. Further, the plan should include both operational and administrative needs, should reflect an understanding of community risks and expectations, and should be linked to the availability of funding.

Conclusions

Based on interviews and observations, ESCI found the Fairview Fire Department to be a progressive department with good leadership and a strong customer-centered culture. Overall, the department seems well-suited for a community with the geographic size, population, and demographic characteristics of the Town of Fairview.

SWOT ANALYSIS RESULTS

For a more in-depth understanding about the department and services provided, ESCI conducted a SWOT analysis and identified the following strengths, weaknesses, opportunities, and threats

Strengths

- Core crew, dedicated to the community and future of the department
- Town-based support for public safety, fire prevention, and community risk-reduction
- Strong customer-service culture with trust in FD leadership
- Progressive transition from volunteer to career staffing
- Addition of department-based EMS and ambulance service

Weaknesses

- Limited staffing and call volume that is characteristic of smaller communities and departments
- Must rely on neighboring departments to meet effective response force (ERF) requirements
- Limited promotional opportunities
- No fulltime administrative support staff

Opportunities

- Community outreach events, *e.g.* annual pancake breakfast, parades, and National Night Out
- TIFMAS deployments to gain knowledge, experience, and reimbursement for deployment
- Recruitment and retention of equally-trained volunteers to ease staffing

Threats or Challenges

- Regional competitive pay and benefits
- Economic sustainability
- Large, community-wide disaster that overwhelms FFD capabilities

STRATEGY OPTIONS

This analysis suggests one or more of the following strategies be considered to meet emergent community needs and/or expectations.

- Use town-based support to build recruitment and retention of equally-trained volunteers
- Use scenario-based training and/or TIFMAS deployments to exercise perishable skills
- Hire for fit: Build on the concept of dedicated, core crews and strong customer-service culture to offset threat of regional pay and benefits competition
- Continue use of community outreach events to strengthen town-based support for the department

Recommendations

Item	Recommendation	Priority
<i>Note: All recommendations are contingent on the availability of funding</i>		
MINIMUM STAFFING		
1	Adopt department goals for resource deployment in accordance with NFPA 1710, adapted to meet community expectations and needs	High
2	Ensure policies and adequate staffing to comply with federal and State law regarding "two-in, two-out" requirements	High
3	Continue to ensure an adequate span of control for supervisors	Moderate
4	Establish and monitor performance metrics for the deployment of resources	Moderate
5	Conduct a critical staffing analysis based on adopted national standards and community needs	Moderate
6	Continue volunteer recruitment programs to augment staffing needs	Moderate
7	Pursue Staffing for Adequate Fire and Emergency Response (SAFER) grant funding for additional personnel	Future
8	Develop and adopt a strategic plan that includes staffing requirements based on community needs, and established trigger points	High
CURRENT AND FUTURE ADMINISTRATION STAFFING		
9	Add an administrative support staff position, based on availability of funding. This can be either a civilian or certified position based on the needs of the department	Moderate
10	Consider cross-certifying one position for each fire shift as a fire inspector to provide additional support for fire marshal operations during times of heavy inspection workload	Low
BEST PRACTICES FOR FIRE STATION LOCATION		
11	Continue to operate two stations at current locations at full staffing	High
BEST PRACTICES FOR FIRE STATION DESIGN		
12	Provide washer/extractors to allow firefighters to effectively decontaminate their gear following exposure to carcinogens	High
13	Provide laundry equipment to allow firefighters to effectively wash their uniforms, bedding, and other linen before leaving the station	High
14	Provide storage for personal protective equipment (PPE) in an environment protecting the gear from exposure to vehicle exhaust fumes and ultraviolet (UV) lighting	High
15	Provide proper exhaust capture equipment to reduce or eliminate employee exposure to diesel exhaust in the apparatus bays	High
16	Provide fire protection systems—fire-rated compartments, smoke detectors, alarms, and automatic sprinkler systems	High
17	Ensure compliance with the American Disabilities Act (ADA)	High
18	Provide drive-through apparatus bays for all emergency response vehicles if the site location and station placement allow	Moderate
19	Provide workout and exercise facilities to improve cardiac health	High
20	Consider the recommendations found in NFPA 1500, 1710, 1720, and 1851 to improve firefighter health and safety and to improve turnout times	High

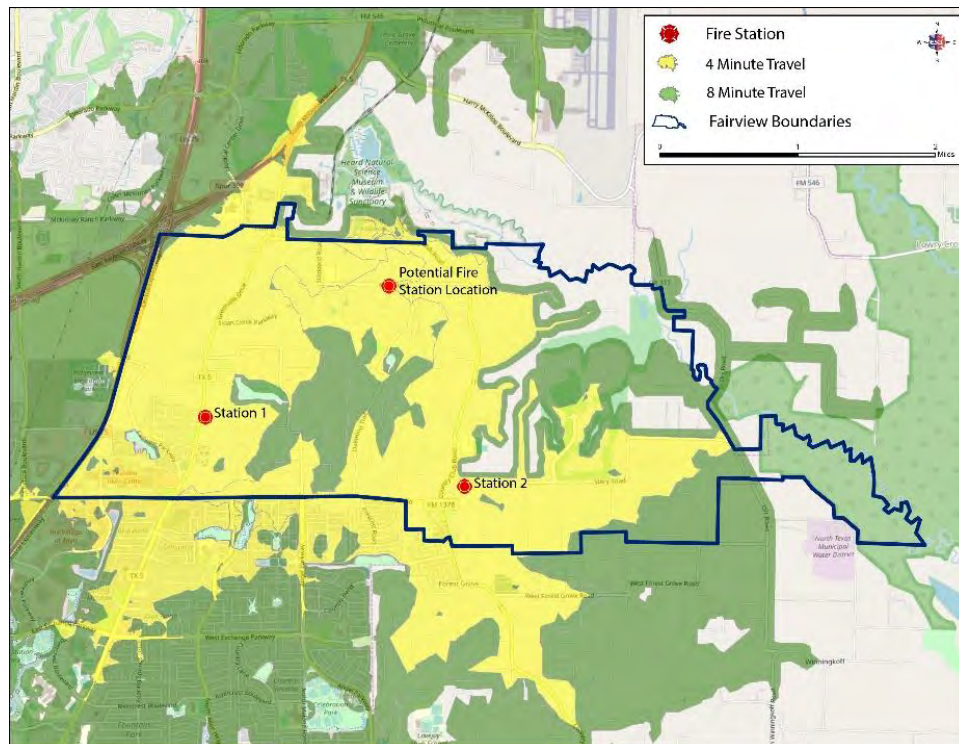
Item	Recommendation	Priority
BEST PRACTICES FOR EMERGENCY COMMUNICATIONS		
21	Continue to use WFD-CC for communications needs	High
22	Continue use of priority dispatching, ESD determinants, and protocols	High
23	Consider selected use of “pre-alerts” to eliminate any delay associated with priority dispatching and potential to “weed out” unnecessary questions	Moderate
24	Continue PAI improvement activities	High
25	Continue participation in the Collin County interoperability plan to determine options and address FFD-FPD interoperability issues	Moderate
BEST PRACTICES FOR ADDING RAPID RESPONSE VEHICLES (RRVs or SQUADS)		
26	Consider adding a peak or fulltime RRV when annual utilization rates exceed identified trigger points	Future
27	Consider cross-staffing a reserve ambulance to function as a second medic unit during days / times when system utilization rates exceed single medic unit capacity (including mutual aid)	Future
28	Consider further study and a pilot program, with existing resources and personnel, to test the validity of an RRV component to EMS service delivery and the cost/benefit of this approach.	Future
29	Consider different RRV types and determine the desired response capabilities, plus the required equipment and staffing to best meet community needs as part of the pilot program.	High
BEST PRACTICES FOR TRENDS IN FIRE/EMS SERVICE DELIVERY		
30	Continue to provide current levels of services as an example of “best practices”	High
31	Continue to explore the potential to recruit and retain formally-trained volunteers to supplement career personnel.	Moderate
32	Maintain engine company response, or rotate crew assignments, on medic calls to maximize skills, customer service, reduced burnout, and overall reliability.	Low
33	Deploy Pulse Point CPR to create a more engage citizenry and improve cardiac arrest survival rates.	Future
34	Explore opportunities to be part of the proposed ET-3 program that seeks alternative triage, treatment, and transport options for Medicare patients.	Future
35	Evaluate and identify the high utilizer group (HUG) of patients that access 911 more frequently. The identification and referral to a primary care or other healthcare provider needs to be done early to provide the greatest impact.	Future
36	Anticipate medical prevention opportunities that may reduce future demand as part of a community-risk reduction program. For example, fall-related injuries are one of the leading causes for 911 activation in an aging community.	Future
37	Develop a strategic plan to address identified critical issues—Administrative staffing, Retention of current employees, Benefits and compensation- setting benchmarks, and Uncertainty about Fire Station 1 rebuild project—and future, emergent issues	High

Future Planning

Based on the findings of this report, ESCI strongly recommends that the Fire Department prepare a Strategic Plan with regular and periodic updates to ensure the overarching department goals and initiatives will provide the desired level of coverage and service throughout the community. As part of the strategic planning process, the Department should include consideration of the following options:

- **Option 1:** Consider upgrading current mutual aid agreements with the City of McKinney to a reciprocal, automatic aid agreement to request and dispatch McKinney Engine 6/Medic 6 as a programmed first-alarm response in the Town of Fairview. Primary benefit is to reduce overall response time for a complete ERF during an emergency at no additional cost (other than fuel and maintenance) for all parties.
- **Option 2:** Consider the recruitment and retention of formally-trained volunteers to supplement existing career crews and reduce budgetary impact of adding response personnel staff. Primary benefit is to reduce dependency on mutual aid and part-time personnel.
- **Option 3:** If response times and other utilization parameters are approaching established trigger points, consider adding personnel to one of the existing stations, or adding a third station with a rapid response vehicle (RRV) and engine company, plus a total of four crew per shift) in the vicinity of Hart and Beechwood. The primary benefit of a third station is to increase successful outcomes by reducing overall response time and travel distance in the northern part of the Town while reducing dependency on mutual aid.

Figure 2. Effect on Response Time with 3rd Station



Project Understanding and Methodology

Project Background

Emergency Services Consulting International (ESCI) was retained by the Town of Fairview Fire Department (FFD) to complete an Agency Evaluation and Planning Review. This work was designed to assess current department operations and compare them to best practices, expectations, and identified trends using the collaborative experience of ESCI consultants and agency personnel. Specifically, it is the purpose of this report to address each of the following in accordance with applicable statutes, rules, regulations, standards, and recommended best practices:

- Minimum staffing and forecast demands for the addition of resources at all levels of station staffing;
- Current and future administrative staffing related to fire and EMS services;
- Forecasting the need for an additional primary ambulance;
- Evaluation of performance using best practices for fire station location and applicable NFPA and ISO standards;
- Evaluation of performance using best practices for emergency communications (dispatching) and the effect of utilizing priority dispatch protocols;
- Best practices for adding rapid response vehicles—squads—to fire department apparatus fleets;
- Best practices in reference to trends in fire service delivery, especially those that have an impact on service levels and cost reduction.

Key Concepts and National Trends

This report includes best practices based on nationally-recognized guidelines and criteria, including concepts from the National Fire Protection Association (NFPA), the Insurance Services Office (ISO), the Center for Public Safety Excellence (CPSE), laws and regulations of the State of Texas, and other generally-accepted best practices for emergency services, specifically:

- “NFPA 1710: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments, 2016 Edition,” Quincy, MD; 2015.
- 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, 2014 Edition; National Fire Protection Association, Quincy MA, 2013.
- NFPA 1221: Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems, 2016 Edition; National Fire Protection Association, Quincy MA, 2015.
- NFPA 1500: Standard on Fire Department Occupational Safety, Health, and Wellness Program, 2018 Edition; National Fire Protection Association, Quincy MA, 2017.
- “Fire and Emergency Service Self-Assessment Manual (FESSAM),” 9th Edition, Center for Public Safety Excellence, Chantilly, VA; 2015.

Methodology

For this project, ESCI developed and utilized a work plan that was based on the requested scope of work as defined in the Town of Fairview's request for proposal and on proven evaluation tools developed by ESCI. The work plan approval process helped to establish working relationships, make logistical arrangements, determine an appropriate line of communications, and finalize contractual arrangements.

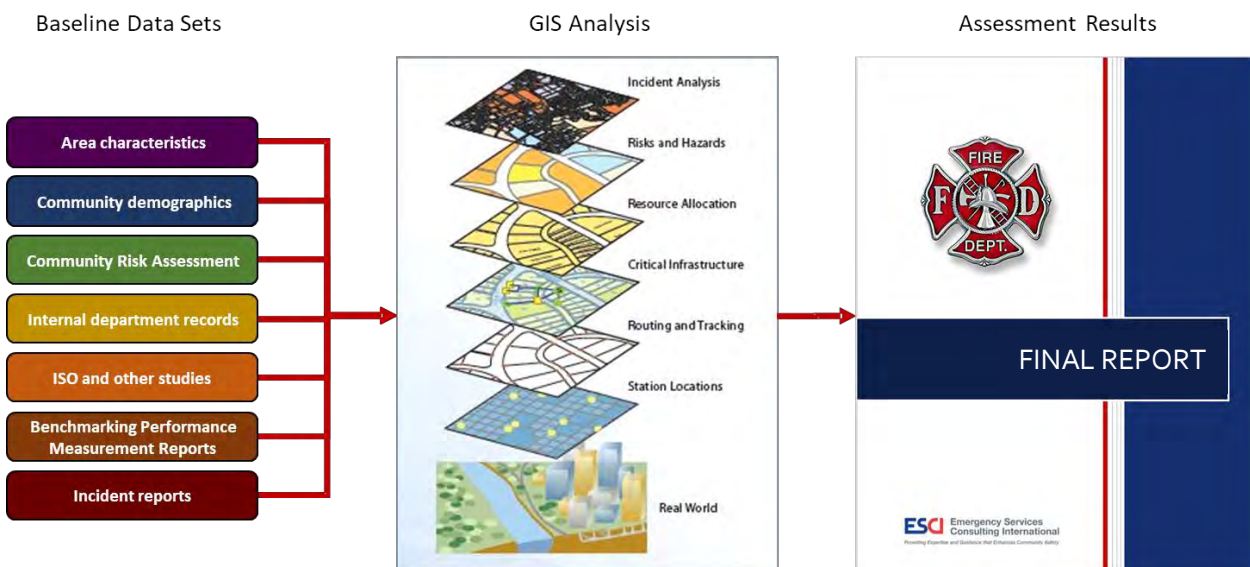
To ensure accuracy and to develop an in-depth understanding of the FFD and its operations, ESCI requested specific data and information and data from the organization. The ESCI project team also conducted interviews to obtain additional perspective on operational, economic, and policy issues facing the agency. From the information provided by the Fairview Fire Department (FFD) and others, ESCI was able to establish a baseline assessment of current conditions and service performance, centered around an organizational analysis of each specialized and technical service provided by the FFD.

The purpose of this evaluation was threefold:

- To assess the FFD operations in comparison to industry standards and best practices;
- To create a benchmark against which options for future service delivery can be measured; and
- To understand how the department provides and coordinates system-wide service.

The ESCI Planning Team also collected information, reviewed population and other community growth patterns, and then analyzed trends and expectations to provide a glimpse into future community conditions, land use, and fire protection risks in order to interpret their potential impact on emergency service planning and delivery. ESCI then used Geographic Information Systems (GIS) technology, computer-aided dispatching (CAD) systems, and historic reporting tools to visualise the data and ensure accurate identification of the service area, and to provide additional information for strategic planning purposes. The following figure illustrates the conceptual GIS methodology as applied to this assessment.

Figure 3. GIS Methodology¹



¹ Adapted from Datta, "Applying Geospatial Technology." 2014

Use of this Report

ESCI is pleased to provide to the leadership of FFD with this report and recommendations, the goal of which is to prepare the FFD to successfully provide services that meet community needs and identified risks in light of current and future service requirements. Suggested recommendations have been developed with the specific intent of identifying options to deliver the desired levels of service at the most efficient cost. The real value of this project is the “evergreen” nature of the process itself—this report is not intended to be a one-time, static document. Instead, it is intended to become part of the department’s continuous cycle of preparing, responding, monitoring, evaluating, and improving department capabilities.

It is important to note that there are uncertainties in any assessment of this type—incomplete data, scientific uncertainty, and the inherent simplification of information within the scope of this study. ESCI recommends that the community periodically and routinely review and update the contents and implementation of recommendations to ensure that future plans contain the most accurate and up-to-date information available about community hazards, vulnerabilities, risks, and needs in order to ensure adequate funding and staffing for the desired level of services.

The material presented in this report is for informational purposes only. It is not intended to be all-inclusive, nor to be taken as legal or financial advice or opinion.

The Town of Fairview is advised to seek competent legal and/or financial counsel before taking any official action, or following any specific course of action, with regard to the findings, analysis, and recommendations included in this report.

Evaluation of Current Conditions

This section of the report will begin with an overview of the community and the department, then continue with analysis for each of the specific areas requested for study and review. The purpose of this evaluation is to assess the agency's operations in comparison to industry standards and best practices, as well as to create a benchmark for which future improvements can be measured.

Overview

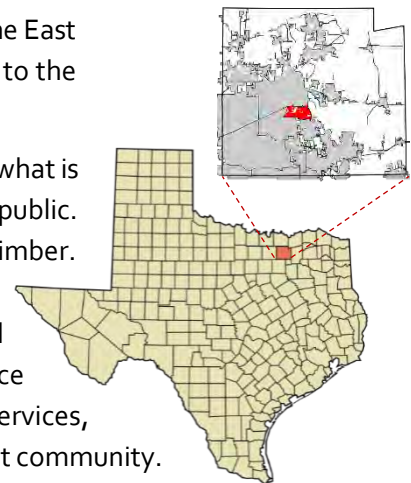
THE COMMUNITY

The Town of Fairview is located in Collin County, about 28 miles north of Dallas. The town is bordered by McKinney to the north, by Allen to the west and south, and by Lucas to the southeast. Wilson Creek, a tributary of the East Fork Trinity River, forms part of the northeastern boundary. According to the U. S. Census Bureau, the town is 8.7 square miles in size.²

Originally home to prehistoric indigenous populations, the area around what is now Fairview was first settled in the late 1840's after Texas became a republic. Early economy included farming, primarily wheat, corn, cotton, and timber. The railroad came to the area in 1872 and brought access to distant markets. Fairview was officially incorporated in 1958 with an initial population of about 175 in 1960. The town has continued to grow since that time. Today, the community is driven primarily by professional services, retail trade, healthcare, and social assistance, primarily to the retirement community.

The Fairview vision is to provide a desirable mix of urban development and transition areas to complement the more suburban and rural residential areas of the town.

Figure 4: Town of Fairview TX



SERVICE AREA

The Fairview Fire Department (FFD) provides fire and emergency medical services within the town itself and to two, small areas of unincorporated Collin County; the total service area is about 11 square miles.³ The FFD provides services from two stations strategically located to provide effective emergency response throughout the service area. There is a long-standing automatic aid agreement to provide and receive specific emergency services with the neighboring communities of Allen, Parker, and Lucas.⁴ Fairview also is able to request or provide additional assistance from McKinney or any other fire department in Collin County through the Collin County Mutual Aid Agreement.⁵ For those areas with no formal agreement, State Law, specifically Section 418, Subchapter E-1 of Texas Government Code authorizes all agencies to assist one another upon request.

² https://en.wikipedia.org/wiki/Fairview,_Texas

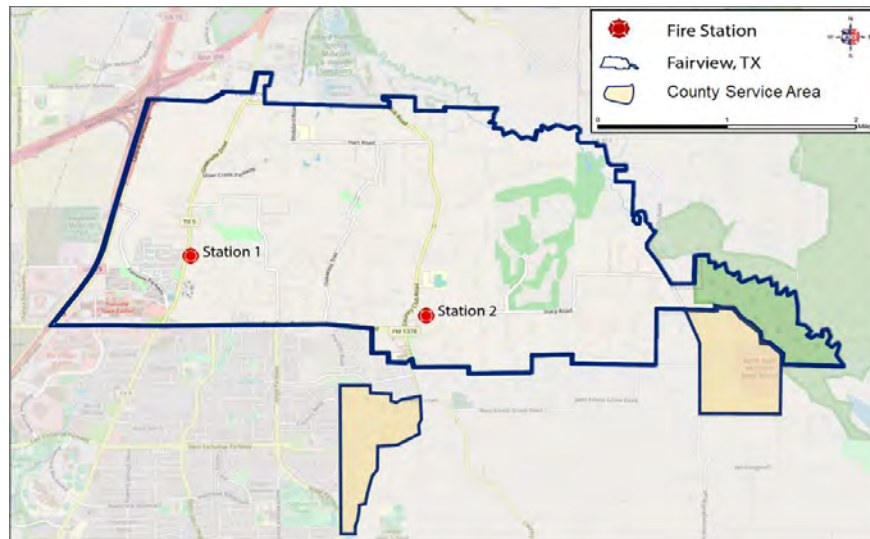
³ Service to incorporated areas of the county is authorized by Section 352.001 – 352.005 of the Tx Local Gov't Code and by the Interlocal Cooperation Act, Tex. Gov't Code, Section 791.001 – 791.006. The long-standing formal agreement, Collin County No. 2014-33, is administered by the Collin County Fire Marshal, and authorizes an annual payment of \$6,926, and was first approved by Collin County Commissioners Court in November 2013.

⁴ First approved in 2008 as authorized by the Interlocal Cooperation Act, Tex. Gov't Code, Section 791.001 – 791.006.

⁵ First established in 2008 by way of Commissioners Court Order 2008-568-08-12 in accordance with Interlocal Cooperation Act and other statutes.

The FFD service area and stations, along with surrounding response areas, is shown in the following figure.

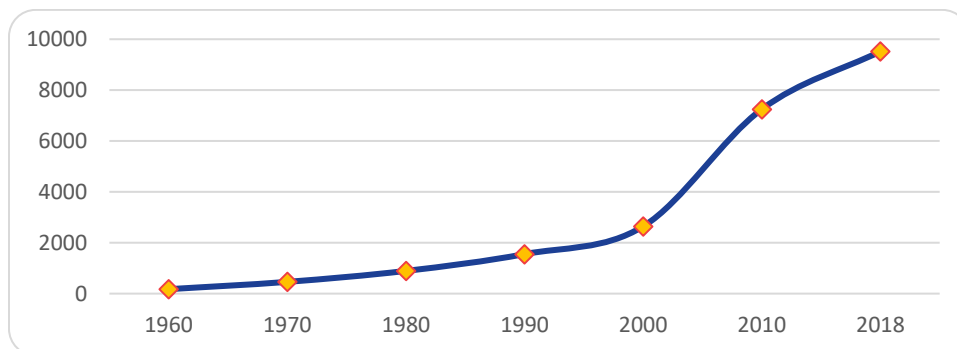
Figure 5. Service Area and the Surrounding Area



POPULATION

At the time of this study, the current service area population was estimated at 9,520.⁶ After decades of slow but steady growth, the town population began to rapidly increase. Fastest growth occurred from 2000 to 2010, with the town more than doubling in size during that 10-year span (17.4 percent annual growth rate). Growth has tapered somewhat since 2010, with an average annual growth rate of 3.9 percent between 2010 and 2018; however, growth since 2016 has grown at an estimated annual rate of 6.1 percent. The following figure illustrates resident population growth since 1960.

Figure 6: Population History, 1990 – 2018



The area has an influx of people beyond the number of residents calculated by census. Often, these numbers exceed the actual resident population and increase the demand for emergency services. As examples:

- An estimated 180,000 pass through the area along major highways every day
- An estimated 30,000 people shop in the area every day
- An estimated 250 stay in area hotels and motels every day

⁶ NCTCOG population estimates, North Central Texas Council of Governments, 2018

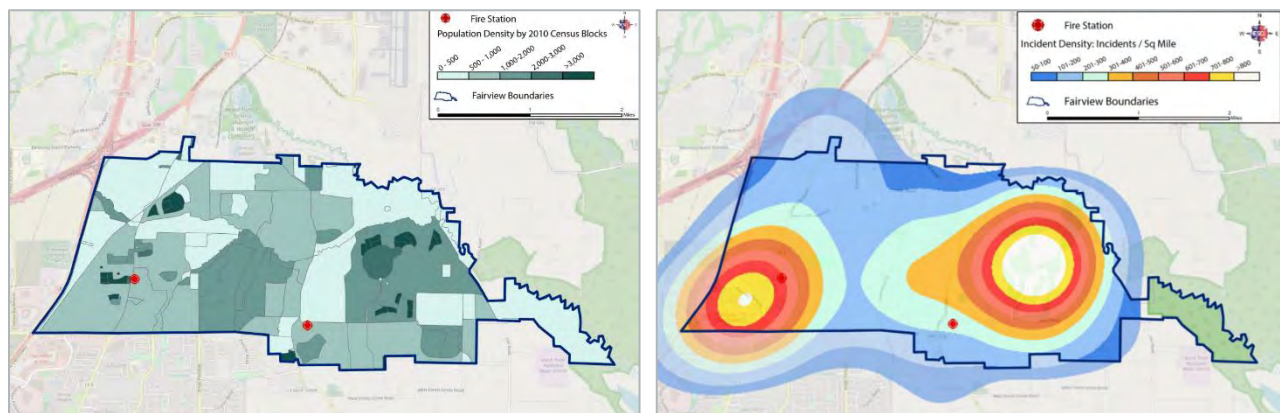
POPULATION DENSITY

The average population density in the service area is about 1,029 people per square mile, not counting the transient population. Given the nature of its development since the 2010 census and the population at risk in the wildland-urban interface, it is appropriate for planning purposes to characterize the entire area as suburban, with both urban and rural characteristics.⁷ The town has a large number of single-family neighborhoods, significant commercial development, dense neighborhoods including multi-family housing, and a mix of mid-rise retail/office and multi-family dwellings. There are also less-densely populated areas on multi-acre residential lots; both the size of the homes and the potential loss of life are large.

As shown in the figure below, the majority of high population concentrations appear in the area on either side of State Highway 5 in the mixed-use, southwest Town Center and geographically around Heritage Ranch & Golf Country Club on the east side of the town. As expected, the areas of highest population density correspond to the locations of multi-unit housing and older, close-in neighborhoods. It also appears that the areas displaying the highest population density correspond to the areas with the highest service demand as shown.

Service demand is distributed widely throughout the FFD service area but two areas account for a higher majority of incidents. The first is located geographically near FFD Station 1, the areas to the east and west of State Highway 5. Also located in this area is the Fairview Town Center. The second area of higher call density is geographically located near FFD Station 2. This area, north of Stacy Road and to the east of Country Club Road, includes the Heritage Ranch & Golf Country Club. While both fire and EMS incidents are included, a majority of the incidents displayed in the figure are EMS incidents.

Figure 7. Population Density and Service Demand



7

Urban	<ul style="list-style-type: none"> Population density over 2,500 people per square mile Significant commercial/industrial development, dense neighborhoods, and some mid-rise or high-rise buildings
Suburban	<ul style="list-style-type: none"> Population density between 1,000 and 2,500 people per square mile Single / multi-family neighborhoods, smaller commercial developments
Rural	<ul style="list-style-type: none"> Population density less than 1,000 people per square mile Low density residential, little commercial development, and significant farm or open space uses

AT RISK POPULATIONS

In addition to the distribution of the population, the demographics of the population can affect the amount of service demand and the nature of risk within a community. In urban cities, several factors have been identified that place groups of people at risk. An NFPA report⁸ has identified the groups that face a higher risk of being injured or killed in a fire as:

- Children under 5 years of age;
- Older Adults over 65 years of age;
- People with disabilities;
- People with a language barrier; and
- People in low-income communities.

Age: Senior citizens can have difficulty escaping from fire due to physical limitations. Quality of life issues and increased reliance on assisted living could affect service delivery and number of resources required due to an increase in service demand for emergency medical services. The very young also represent a vulnerable population, both regarding their ability to escape a structure fire as well as their susceptibility to serious medical ailments such as asthma, traumatic events, choking, or injury from vehicular accidents. Over 31 percent—almost one in three—residents are at risk due to age.

Disabilities: People under 65 years of age with disabilities make up 1.4 percent of the population. These people may have difficulty or be incapable of self-preservation during an emergency. Likewise, people under 65 years of age with no health insurance are more prone to chronic illness or exhibit poor physical condition simply because they do not seek treatment promptly. About 12.3 percent of the population are under 65 and have no health insurance; thus, they may require a higher level of fire-rescue response.

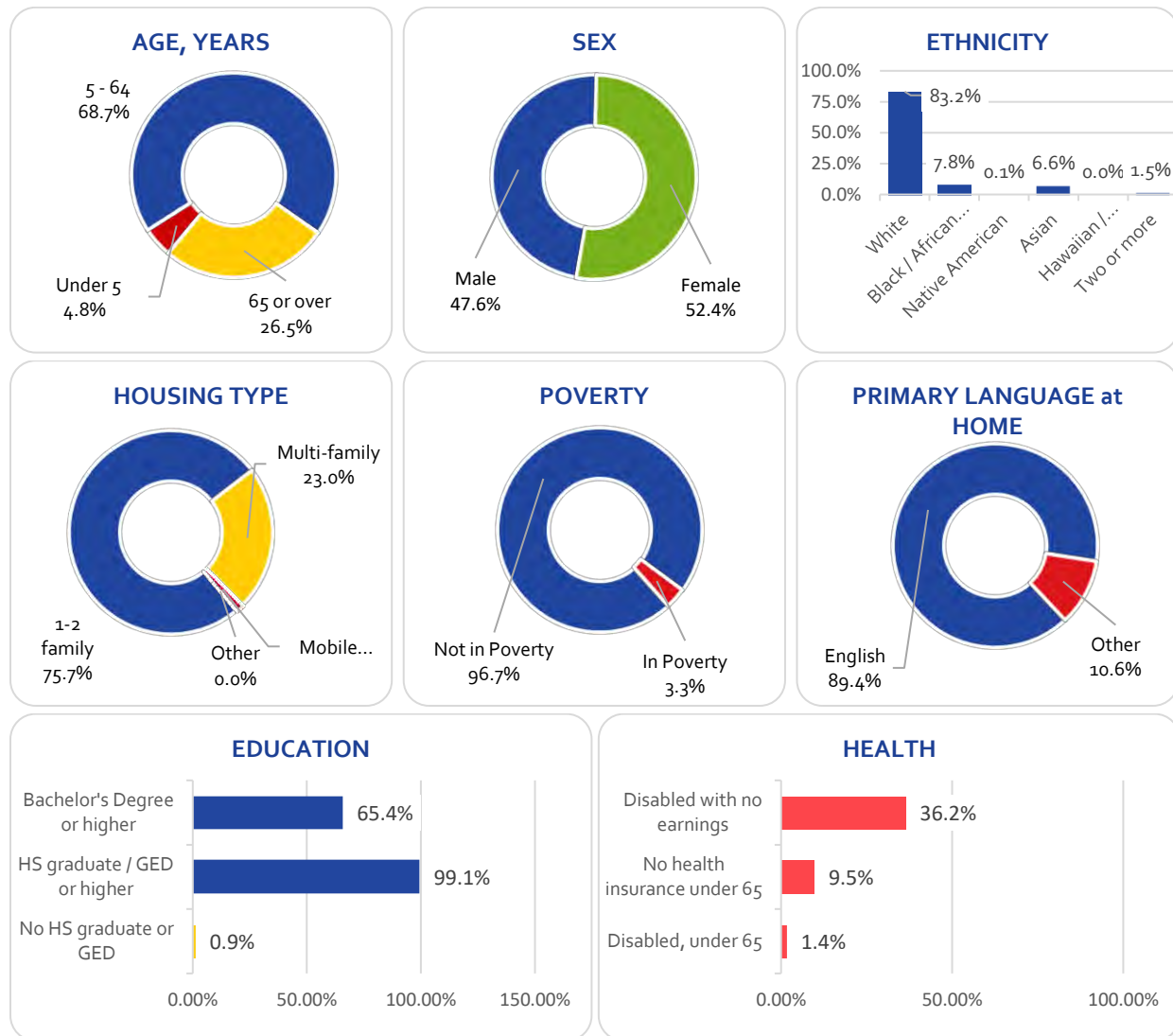
Language barrier: People may have cultural differences or language barriers that decrease the likelihood they would call for service or may affect their ability to communicate needs and concerns effectively. According to the NFPA, “Language barriers, cultural differences, and inexperience with unfamiliar home technologies are factors that mark the challenges of helping newcomers live safely from the threat of fire in the home”.⁹ About 10.6 percent of the population speak a language other than English at home.

Low-income: Likewise, low-income people are more at risk from fire or medical condition; almost 3.3 percent of the resident population live below the poverty level.¹⁰ Low income is often combined with other factors such as education or work status.

⁸ National Fire Protection Association, 2007; Urban Fire Safety Project, Emmitsburg, MD; retrieved from <http://www.nfpa.org/public-education/by-topic/people-at-risk/urban-fire-safety/reports-and-presentations>

⁹ Serving immigrant and refugee populations, National Fire Protection Association, 2017. Retrieved from: <https://www.nfpa.org/Public-Education/Campaigns/Fire-Prevention-Week/Teaching-FPW/Serving-immigrant-and-refuge-populations>

¹⁰ “The US. Census Bureau 2017 poverty threshold is defined as \$12,488 for an individual, \$25,094 for a family of four.” Retrieved from <https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html>

Figure 8. Selected Demographics¹¹

THE DEPARTMENT

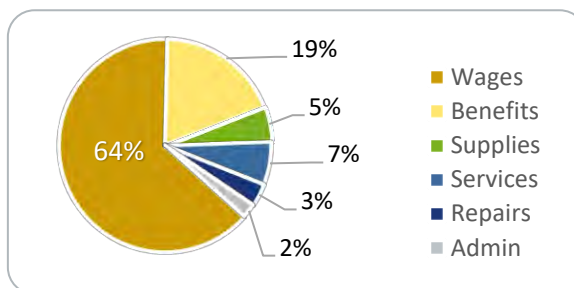
The Fairview Fire Department (FFD) was formed in 1974 as the Fairview Volunteer Fire Department. In 2006, the department began its transition from an all-volunteer department to a combination department due to a decline in the availability and number of volunteers. Today, the department is all paid, with both full-time and part-time personnel operating from two stations and providing fire suppression, emergency medical, fire prevention, public education, and fire investigation services.

¹¹ Source: U.S. Census Bureau, Quick Facts. Retrieved from: <https://www.census.gov/quickfacts/fact/table/>

FUNDING

As a town department, the FFD receives the bulk of its funding through the collection of local taxes allocated from the general fund. The FY 2019 operating budget was \$3,110,989—about 2.6 percent higher than last years' budget—and 34 percent of the town's operating budget. A summary of budget expenditures is shown here. As shown, about 83 percent of the total fire department budget is for labor costs—wages and benefits.

Figure 9. Department Budget Summary



ORGANIZATIONAL DESIGN

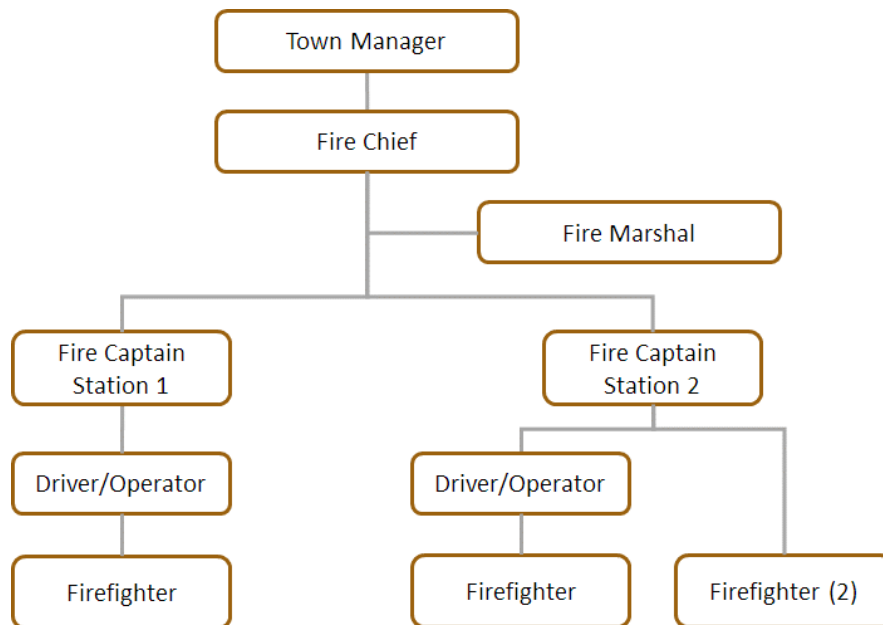
The Fire Chief is the administrative head of the department. As such, the fire chief is a senior executive of the town who (1) serves under the general supervision and direction of the Town Manager, and (2) has the general authority to supervise and direct the administrative and operational activities of the fire department.

Due to the nature of being an emergency services agency, the FFD has a structured organization that is able to operate in an effective manner, but still allow for a high degree of flexibility in a rapidly-evolving and dynamic environment. In addition to the need to function effectively and efficiently, the structural design is critical to ensuring the safety and security of the firefighters. When not operating at an emergency incident, the understanding of who reports to whom and in what situation is still very important. Studies have shown increased efficiency when employees have a single point of contact for supervision and direction. Likewise, studies have shown the effective span of control for a supervisor is four to six personnel in dangerous situations, and somewhat higher in non-emergency situations.

To operate effectively, the structure of a fire department needs to be clearly defined in a way that all members of the organization understand it. The organizational chart performs this function. The chart institutionalizes the agency's hierarchy, identifies roles and reporting authority, and helps to assure that communication flows appropriately, as well as limiting opportunities to circumvent the reporting structure. FFD has adopted an organizational chart that achieves this purpose.

Like most fire departments in the United States, FFD operates in a traditional, hierarchical management structure, with clearly-defined lines of authority and a formal reporting process. The current FFD organization chart is shown in the following figure.

Figure 10: FFD Organizational Chart



CAPITAL ASSETS AND IMPROVEMENT PROGRAMS

A detailed review of capital assets (facilities, apparatus, and equipment) and improvement programs was beyond the scope of this study and is not included in this report. ESCI did note the temporary buildings at Station 1 and is aware of the pending bond election to replace that station with new construction on an adjacent site.

CRITICAL ISSUES

Critical issues identified by the Fire Chief are:

- Administrative staffing
- Retention of current employees
- Benefits and compensation- setting benchmarks
- Uncertainty about Fire Station 1 rebuild project

Minimum Staffing

Generally, is the Town adequately staffing existing resources (Fire and EMS personnel) and is it adequately projecting the growth needs for additional resources in equipment and staffing?

BACKGROUND

An organization's greatest asset is its people. It is important that special attention 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, and opportunities 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 is dependent upon the specific needs of the organization. These needs must directly correlate to the needs of the community; thus, a structure that works for one entity may not necessarily work for another agency.

Fire department 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.

ESCI reviewed the department's staffing at all levels of station staffing, including minimum staffing, and forecast demands for the addition of resources at all levels of station staffing, and has these observations and recommendations.

FINDINGS

ESCI considered six measures of emergency staffing and compared each with current FFD policies and practices. The measures were:

- Number of firefighters per 1,000 population
- Effective Response Force (ERF) requirements for structure fires
- ERF requirements for other emergencies
- Current FFD Staffing model
- Alarm assignments
- Number of concurrent emergency responses

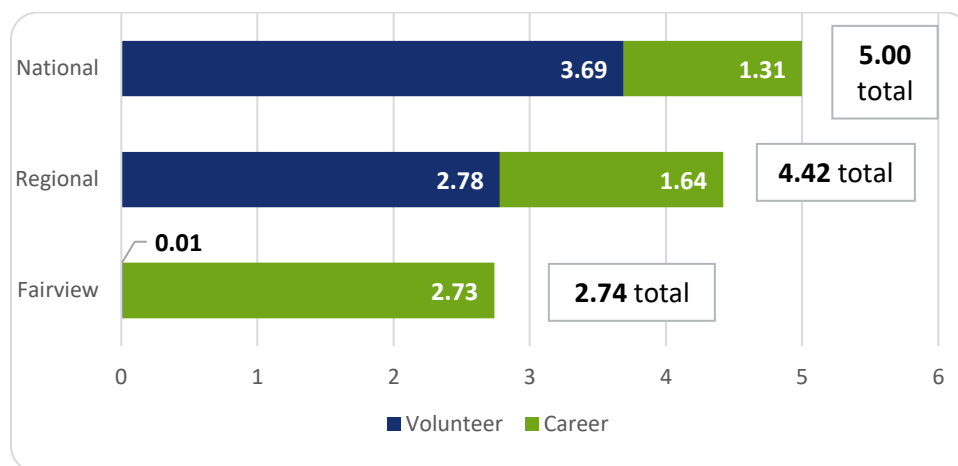
NUMBER OF FIREFIGHTERS PER 1,000 POPULATION ¹²

One measure of adequate staffing is to measure the number of firefighters—both volunteer and career—per 1,000 population of the service area. Across the country and the South Region, most communities of this size—5,000 to 9,999—are staffed with volunteers, supplemented by a small number of paid firefighters. However, in populous areas of Texas including the Metroplex, communities are most likely to rely more on paid firefighters to provide effective response in all areas and at all times. This is especially true in communities with a limited number of blue-collar, shift-working residents.

¹² U.S. Fire Department Profile, 2015. NFPA, April 2017. In this report, the "South Region", as defined by the U.S. Census Bureau, is a 16-state region that includes Texas.

As shown in the following figure, FFD is staffed with paid firefighters and a minimal number of volunteers. Although there are only limited studies about the number of volunteer firefighters in populous counties, it has been observed that the area of the Dallas-Ft. Worth Metroplex has a higher mix of career firefighters due to the limited availability of volunteers in the area. When compared to national averages for communities of similar size, FFD emergency staffing—2.74 firefighters per 1,000 population—is well below the national average of 5.00 firefighters per 1,000 and the regional average of 4.42 firefighters per 1,000 population. This comparison with regional and national averages, in and of itself, does not indicate a necessary change in staffing, but it does serve as a point of reference for analysis of current operational endeavors.

Figure 11: Firefighters per 1,000 Population, Community Size 5,000-9,999 population ¹³



EFFECTIVE RESPONSE FORCE (ERF) REQUIREMENTS FOR STRUCTURE FIRES

The goal of any fire service organization is to provide adequate resources within a period of time to reasonably mitigate an emergency event. FFD is responsible for assuring that responding companies are capable of performing all of the described tasks in a prompt, efficient, and safe manner. Insufficient staffing at an operational scene decreases the effectiveness of the response and increases the risk of injury to all individuals involved. 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.

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

¹³ US Fire Department Profile – 2016, National Fire Protection Association, Fire Analysis and Research, Quincy, MA. NFPA stops collecting career firefighter data for populations below 25,000 and stops collecting volunteer firefighter data for populations above 25,000. Career data from lowest population range for which it is available and move it into the remaining population categories below that. We then take the volunteer data from the highest population range for which it is available and move it into the remaining population categories above that. If the population is over 25,000, you are using accurate career ratios, but are using the nearest available volunteer ratios. Likewise, if the population category is under 25,000, you are using accurate volunteer ratios, but using the nearest available career ratio.

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

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

There is considerable debate at the local, regional, and national level about required firefighter staffing. Frequently, this discussion is set in the context of firefighter safety—86 firefighters lost their lives in the line of duty in 2018; six of these deaths were in Texas.¹⁴ One critical issue is the number of firefighters that are assembled at the scene of an incident. There are no mandated requirements that fit all situations, although NFPA 1710 has objectives to meet regarding the minimum number required for some typical scenarios.¹⁵

Figure 12: Initial Full Alarm Assignment for Structure Fires

Assignment	Residential Fire	Strip Center Fire	3-story Garden Apt Fire	High-Rise Fire
Incident Command Team	1	2	2	7
Safety Officer	--	--	--	1
Water Supply Operator	1	2	2	2
Fire Control	4	6	6	6
Search and Rescue / Evac	2	4	4	4 / 4
Ventilation / Ground ladders	2	4	4	4
Aerial Operator	1	1	1	2
Rapid Intervention	2	4	4	4
Support	2	3	3	5
Medical Care	--	2	2	4
Total	15	28	28	43

ERF REQUIREMENTS FOR OTHER EMERGENCIES

Fire departments respond to many incidents other than structure fires, including hazardous materials (dangerous goods) releases, motor vehicle collisions, basic and advanced life support medical emergencies, and non-structural fires. Again, critical tasks must be conducted in a timely manner by firefighters to control the situation, stop loss, and to perform necessary tasks required to ensure the life safety of both victims and emergency responders. Thus, the concept of critical tasks and minimum staff requirements is also applicable to non-structural fires, hazmat, technical rescue, and medical situations as shown in the following figure.

¹⁴ U.S. Fire Administration

¹⁵ NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments* (National Fire Protection Association 2016 ed.) Article 5.2.4 Deployment.

Figure 13: Initial Full Alarm Assignment for Other Emergencies

Assignment	Non-structure Fire	Hazmat Release	Motor Vehicle Collision with Entrapment	Medical Incident
Incident Command Team	1	1	1	--
Safety Officer	--	1	--	--
Water Supply Operator	1	1	1	--
Fire Control	2	2	2	--
Search and Rescue / Evac	--	--	--	--
Ventilation / Ground ladders	--	--	--	--
Aerial Operator	--	--	--	--
Rapid Intervention	--	--	--	--
Support	--	8	3	3
Medical Care	--	--	2	2
Total	4	13	9	5
Note: Add 1 command officer to major medical incidents for a total of 6 personnel. Major medical incidents include active shooter, hostage, cardiac, and major trauma. Support on medical calls may involve first responder medical intervention, patient packaging, and other EMS-related tasks.				

EMS OPERATIONS

It is common for fire departments, even in small communities, to provide emergency medical services (EMS) as a citizen-required service. In fact, more than 90 percent of career and combination fire departments provide some form of emergency medical care.¹⁶ A 2010 study found that first responder units (usually a fire engine) arrived prior to an ambulances about 80 percent of all calls.¹⁷ Thus, best practice suggests a response system of rapid intervention by fire crews with EMS training can increase the likelihood of a positive outcome in critical medical emergencies—chest pain, stroke, and survivable cardiac arrest.

FFD utilizes an EMS system that deploys a medically-trained engine crew with an ambulance on all medical calls. With this system, it is not unusual for the first-responding engine to arrive first, with the ambulance close behind. In critical medical emergencies, this is extremely beneficial to both the patient and the responders.

Most EMS responses are labor-intensive—patients are usually unable to provide any physical assistance—and having sufficient personnel on-scene provides the ability to perform many tasks simultaneously, thus decreasing on-scene time and reducing the overall time from the initial call for service and arrival at a hospital or other care facility. The team approach ensures continuity of patient care from initial patient contact to hospital. A team-centered methodology also provides additional protection from fire or other hostile environment, reduces the risk of injury to responders, and reduces fatigue in physically-demanding situations such as patient extrication following a motor vehicle collision or extended cardio-pulmonary resuscitation (CPR).

¹⁶ Spokane (WA) Fire Department: Geographic Information System Emergency Services Response Capabilities Analysis, Final Report. International Association of Fire Fighters, 1750 New York Avenue, N.W. Washington, DC 20006, February 2019

¹⁷ Report on Residential EMS Field Experiments, Fire Fighter Safety and Deployment Study; Moore-Merrell, L. et al.; Washington, DC, September 2010.

Given the small system size and low volume, there are two primary factors for Fairview to consider with regard to adequate staffing: service quality and economic efficiency. A recent report states, “best practices have suggested six providers would be most successful” and goes on to say that, “for an all-ALS system, two of the six should be paramedics, with a minimum of one assigned to each of the responding apparatus.”¹⁸

CURRENT FFD STAFFING MODEL

FFD has a total of 26 authorized positions as shown in the following figure. Except as noted, all positions are full-time. An additional 12 part-time positions provide backfill and work “as needed.” Where applicable, FFD makes use of Section 7(k)—the “firefighter exemption”—of the Fair Labor Standards Act to limit overtime to any hours worked in excess of 56 hours per week. The following figure depicts FFD emergency staffing.

Figure 14: FFD Emergency Response Staffing

Position Title	Number of Positions	Hours Worked per Week	Work Schedule
Paid Full-time Operational			
Chief	1	40	8-5, M-F
Fire Marshal	1	40	8-5, M-F
Captain	6	56	24/48
Driver/Operator	5	56	24/48
Firefighter	12	56	24/48
Paid Part-time Operational			
Firefighter	4	24	24/132
Firefighter	8	As needed	As needed
Volunteer			
Administrative Captain	1	18	11-5, M-W

Shift operations are accomplished using a three-platoon system working 24 hours per shift rotations that yields a 56-hour work week. Each shift is led by two captains, one at each station, that serve as the senior shift officer at their respective station; Captains report directly to the Fire Chief. Reporting to each Captain are one Driver/Operator and one Firefighter for each fire apparatus: Truck 751 and Engine 752. Medic 752 is staffed with two firefighters. All firefighters are cross-certified as emergency medical technicians (EMT) at a minimum; many are paramedics and the goal is to have one or more paramedics on each responding apparatus.

Total maximum daily staffing is limited to 8 career employees, excluding the Fire Chief and Fire Marshal. Outside normal administrative hours, maximum staffing is reduced to 8 on-shift staff personnel to cover the entire town. Also, from 7 PM to 7 AM, Engine 752 crew size is reduced from 3 to 2 for budgetary reasons.

¹⁸ Spokane report, Feb 2019.

Thus, minimum staffing is 7 employees; any number less than this will result in mandatory backfill with part-time personnel and/or overtime. The current span of control is within recommended normal limits.

ALARM ASSIGNMENTS

FFD Standard Operating Guidelines direct the following first alarm assignment for any structure fire.

Figure 15: FFD Initial 1st Alarm, Structure Fire

Unit Type	Unit Number	Crew Size
Engine	1	3
Aerial	1	3
Medic Unit	1	2
Total	3	8
Note: From 7 PM to 7 AM, Engine 2 crew size is reduced from 3 to 2 for budgetary reasons.		

Likewise, FFD Standard Operating Guidelines direct the following first alarm assignment for any medical call.

Figure 16: FFD Initial 1st Alarm, Medical Call

Unit Type	Unit Number	Crew Size
Engine or Aerial	1	3
Medic Unit	1	2
Total	2	5
Note: From 7 PM to 7 AM, Engine crew size is reduced from 3 to 2 for budgetary reasons.		

CALL CONCURRENCY

Simultaneous or concurrent incidents can affect a fire department's ability to muster sufficient resources to respond to additional emergencies. The higher amount of calls in which occur at the same time can drastically stretch available responses thus leading to extended response times from more distant resources. The following figure shows the percentage of time that FFD resources were committed to more than one incident at the same time during the study period:

Figure 17: FFD Concurrent Incidents, 2015-2018

Number of Incidents	Frequency, percent
1	93.0
2	6.7
3	0.2
4 or more	0.1
Total	100.0

As shown above, during the four-year study period, single incidents accounted for more than nine out of every ten calls. Slightly less than seven percent of the time, two incidents occurred simultaneously in FFD. Only rarely did FFD have three or more calls working at the same time—99.7 percent of the time FFD was operating at only one or two calls at the same time.

IMPACT OF STAFFING DECISIONS VS. CALL TYPE AND CALL VOLUME

Simply put, with the exception of medical calls and small, non-structural fires, FFD staffing does not provide a sufficient number of emergency personnel to complete all critical tasks without relying on assistance from neighboring fire departments. Further, there is an insufficient number of personnel to respond to more than one emergency at the same time without similar assistance. Thus, residents should expect to see responders from other departments assisting FFD on any given call.¹⁹

During interior structural firefighting, both federal and Texas state law require a minimum of two firefighters outside the hazard area while two firefighters are inside the hazard area, except when “performing emergency rescue activities before an entire team has assembled.”²⁰ It would be difficult for FFD to meet this requirement without units from both stations or from neighboring agencies arriving together.

At this time, the greatest risk of inadequate staffing is for fires in larger structures—strip shopping centers, multi-family dwellings, public schools, and multi-story, mixed use occupancies—unless there is fire protection built-in to control and/or extinguish fires in these structures before the arrival of fire crews. Thus, effective fire prevention through enforcement of fire codes and prompt correction of identified fire hazards is critical for the community.

This is the assigned role of the Fire Marshal. The department has a goal of annual inspections for all commercial and public buildings; current inspection workload suggests the current staffing level is adequate to meet this goal. As needed, additional inspections could be performed by in-service, on-shift personnel—cross-trained and certified to perform regulatory inspections—with no increase in staffing.²¹

A working interior fire would commit the entire on-duty staffing to one incident. Thus, it is not reasonable to expect simultaneous coverage during such an incident along with required services to the jurisdiction as a whole. It is critical that FFD continue the long-standing and cost-effective agreement with neighboring departments, both to assist with filling an initial alarm assignment and in response to simultaneous incidents.

Even a small EMS emergency could require response from more than one station depending on location. This should not cause concern; it is simply the nature of a small system with resources located in more than one station. Having all fire and EMS resources in one, centrally-located station would not resolve the issue of limited staffing and extended response times in remote areas. In a small system like FFD, it must be understood that one call will effectively and fully load the primary response system; there is no surge capacity.

¹⁹ The use of automatic and mutual aid is a long-standing example of “best” practices and its use is wide-spread throughout the Metroplex. The subjects of automatic and mutual aid are covered in more detail on page 10 of this report.

²⁰ OSHA CFR 29 1910.134(g)(4)(i) and Texas Gov’t Code 419.046(d).

²¹ Certification by the Texas Commission on Fire Protection as a fire inspector is required by Section 419.909 of the Tx Gov’t Code.

In another example, Station 2 has both an engine and a brush truck that are cross-staffed; that is, there is only one on-duty crew for both apparatus. The crew is assigned to the engine, but must be prepared to place the engine out of service in order to respond with the brush truck when needed. Likewise, there is a reserve ambulance at Station 1 that can respond by placing the aerial out-of-service for the duration of the ambulance call. Again, cross-staffing is a common, typical staffing model across the United States for career organizations. In small systems, there is always the risk of having to respond back to the station to switch equipment before a crew can respond to the next emergency. Further cross-staffing of EMS and fire units is not recommended for the FFD due to the potential community risks and limited staffing.

FFD utilizes a traditional three-platoon system operating on a 24-hour shift rotation per position to achieve authorized staffing of 8 personnel per shift and a minimum staffing of 7 personnel per shift as discussed earlier. It is critical for FFD to effectively manage vacancies due to vacation, sick, and other types of leave necessary minimum staffing. It is very common across the United States for firefighters to work a 24-hour period and it has proven effective for agencies with moderate to heavy workloads. Larger agencies with very heavy unit and crew workloads have implemented different staffing models, such as shorter work-shifts, peak-staffing, or additional platoons to reduce employee fatigue.

Summary: The current staffing of the emergency response division is established at 8 individuals per shift. Fully staffed, this equates to a force barely capable of meeting the response needs of the community without assistance from neighboring departments. While this is not unusual with smaller departments and communities, it is critical that FFD continue to maintain automatic aid agreements with neighboring departments to reduce the time required to get additional help on the way as quickly as possible and to reduce overall system cost. Likewise, it is important for FFD to establish and monitor response performance goals.

RECOMMENDATIONS

ESCI recommends that FFD:

- Adopt department goals for resource deployment in accordance with NFPA 1710, adapted to meet community expectations and needs, based on the availability of funding
- Ensure policies and adequate staffing to comply with federal and State law regarding “two-in, two-out” requirements
- Continue to ensure an adequate span of control for supervisors
- Establish and monitor performance metrics for the deployment of resources
- Conduct a critical staffing analysis based on adopted national standards and community needs
- Continue volunteer recruitment programs to augment staffing needs
- Pursue Staffing for Adequate Fire and Emergency Response (SAFER) grant funding for additional personnel
- Develop and adopt a strategic plan that includes staffing requirements based on community needs, established trigger points, and availability of funding

Current and Future Administration Staffing

Is the Town adequately staffed for (Fire and EMS) administrative needs and is the planning adequate for future administrative staffing needs?

BACKGROUND

The second group of fire service staff typically works behind the scenes to provide the support needed by operations personnel to deliver effective emergency response. This group is commonly known as the administrative section.

ADMINISTRATIVE AND SUPPORT STAFFING

Like any other part of a municipal fire department 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 Department in accomplishing its mission and responsibilities.

ESCI reviewed the department's staffing at all levels of station staffing, including current and future administrative staffing related to fire and EMS services, and has these observations and recommendations.

FINDINGS

FFD currently operates with very little administrative support. Each of the positions assigned to administration harnesses some level of support function for the Department, as well as transitions to operational roles when duties arise, and the system is strained. Furthermore, several operational positions are assigned administrative roles to assist with support functions.

Most administrative functions are the responsibility of the Fire Chief. The Fire Marshal is responsible for all plans review, code enforcement, public education and outreach, and fire investigation. One volunteer Administrative Captain is assigned to assist with delivering supplies and coordinating repairs.

Figure 18: FFD Administrative and Support Staffing

Position Title	Number of Positions	Hours Worked per Week	Work Schedule
Fire Chief	1	40	8-5, M-F
Fire Marshal	1	40	8-5, M-F
Volunteer Administrative Captain	1	18	11-5, M-W

The lack of a fulltime administrative support position limits the ability of the Fire Chief and Fire Marshal to focus on their primary duties of department leadership, community risk reduction, and accurate, complete documentation of training, code enforcement, and fire investigation activities. These reports can be very important for regulatory compliance, court cases, or for product liability subrogation and it is critical that they be prepared correctly.

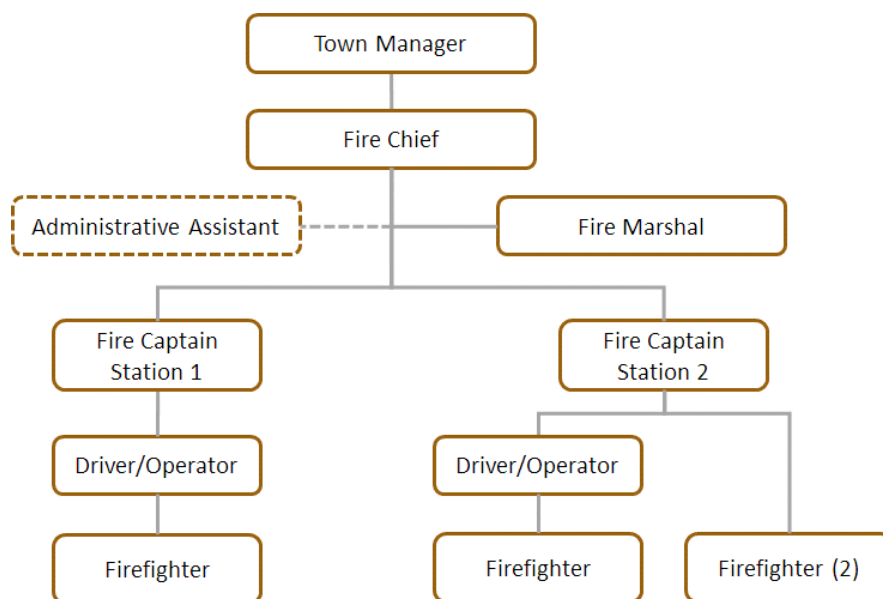
“OTHER DUTIES AS ASSIGNED”

In every fire department, there exist a number of activities that must be accomplished that are outside of the “regular” duties of responding to emergency incidents. These typically involve general maintenance of self-contained breathing apparatus (SCBA), hose testing, air monitor calibration, EMS quality assurance, and participation on various committees. FFD relies upon individuals who have a particular interest in these additional areas to accomplish the tasks. In addition to the benefit of completing these tasks, the additional responsibilities serve to further develop knowledge, skills, and abilities of participating individuals. On the one hand, these individuals learn project management, time management, and budgeting skills that prepare them for future promotional opportunities. On the other, too many “other duties” often cause employees to seek employment elsewhere.

After reviewing the functions and responsibilities assigned to all staff, ESCI concludes that the number of administrative support personnel is too low to adequately support the department. The current level of administrative and support staffing represents roughly 5 percent of total staff. ESCI experience suggests that effective administrative staffing for fire departments typically ranges from 10 to 15 percent of all positions. Adding to the issue is the fact that operational personnel are often tasked with administrative duties beyond those required for the position itself, *e.g.* supervisor duties and supportive paperwork. Inappropriately combining administrative support functions with operational functions can cause important operational activities to be delayed or impaired; likewise, administrative duties may be overlooked or otherwise compromised due to the need to conduct emergency operations.

At this point, it is premature to determine if this position should be a civilian or ranked position. That decision should be based on need at the time funds become available to authorize and staff the position. One option for the organizational structure with added admin support is shown here.

Figure 19: Optional FFD Organizational Chart



As discussed earlier, effective fire prevention through enforcement of fire codes and prompt correction of identified fire hazards. This is the assigned role of the Fire Marshal. The department has a goal of annual inspections for all commercial and public buildings; current inspection workload suggests the current staffing level is adequate to meet this goal. As needed, additional inspections could be performed by in-service, on-shift personnel—cross-trained and certified to perform regulatory inspections—with no increase in staffing.²²

RECOMMENDATIONS

ESCI recommends that FFD:

- Add an administrative support staff position, based on availability of funding.
- Consider cross-certifying one position for each fire shift as a fire inspector to provide additional support for fire marshal operations during times of heavy inspection workload

²² Certification by the Texas Commission on Fire Protection as a fire inspector is required by Section 419.909 of the Tx Gov't Code.

Forecasting the need for an additional primary ambulance

Is the Town adequately projecting the anticipated needs for a second primary ambulance? What are best practices in phasing in the addition of a second primary ambulance?

BACKGROUND

Fire department-provided EMS response and transport has become commonplace across the United States. Among the benefits attributed to fire department-based EMS:

- Fire stations are strategically positioned to deliver time-critical response and effective patient care
- Fire-based EMS provides a critical public safety service while emphasizing responder safety
- Public safety personnel are better suited to random occurrences that require an emergency response
- Cross-trained fire/EMS personnel are cost effective alternatives to fire-only and EMS-only operations

Expansion of EMS by adding a second ambulance is an expensive proposition. ESCI considered several factors to analyze current and future ambulance service:

- Demographics
- Response Times
- Unit Hour Utilization Rates
- Concurrent Calls
- Cost

Before deciding to add a second primary ambulance, it is important for interested stakeholders to understand the reasons for and significance of such action. ESCI reviewed EMS service delivery, including forecasting the need for an additional primary ambulance, and has these observations and recommendations.

FINDINGS

FFD assumed ambulance transport responsibilities in 2015. Since that time, it appears to ESCI that FFD has effectively managed the 38% increased demand for service based on this analysis of the information provided by FFD. FFD currently manages EMS operations with one (1) suppression engine, one (1) ladder truck, and one (1) ambulance. To meet EMS response time goals and on-scene staffing needs, FFD sends both a fire apparatus and the medic unit on all EMS calls for service.

Despite this increased demand, current metrics suggest that FFD does not appear to be underserved, and there does not appear to be an immediate need to add a second primary ambulance, staffed 24-hours per day, at this time based on current conditions:

- Response times below 8 minutes
- Ability to dispatch fire crews with cross-trained Fire/EMS personnel
- Even temporal distribution of responses
- Unit Hour Utilization below 5 percent
- Unit Commit Times less than 1 hour
- Low use of mutual aid medical units

Each of these parameters is discussed in more detail below.

RESPONSE TIME

For decades, a fast response time was deemed critical for all EMS responses. Recent thought suggests this should not be the case; only certain responses should receive the fastest response. NFPA 1710 provides the following benchmark of 390 seconds (6:30 minutes) for an initial EMS response and 630 seconds (10:30 minutes) for an ALS response at the 90th percentile for all EMS response times.²³

As shown in the following figure, FFD is consistently below this figure, with some variation from year to year and unit to unit. Note the lower response time for Truck 751 and Engine 752 when compared to Medic 752. This reflects the importance of having fire units integrated into the response protocols for medical emergencies. The difference in overall response time could be explained by lower travel distance and time to the western side of the town by Truck 751 and be influenced by the use of emergency medical dispatch determinants to determine an appropriate response.²⁴

Figure 20. EMS Response Times

	2015	2016	2017	2018
ENG752	0:06:12	0:05:45	0:05:54	0:06:18
MED752	0:06:44	0:06:14	0:06:57	0:06:49
TRK751	0:05:30	0:05:16	0:06:10	0:05:40
	0:06:10	0:05:47	0:06:22	0:06:20

As shown, the FFD EMS response time is well within the NFPA 1710 thresholds. Thus, from this parameter alone, there does not appear to be sufficient need for a second medic unit at this time. That said, a mutual aid medic unit is required for medical calls when Medic 752 is already committed to another call. That occurs about 7 percent of the time and will result in a longer response time for the arrival of a mutual aid medic unit; it rarely affects the response time of Engine 752 or Truck 751. A study of the impact of the response times of mutual aid medic units was beyond the scope of this study; however, future study is recommended to determine the impact of use of mutual aid units on overall response time.

TEMPORAL DEMAND

Temporal demand by day of week suggests that, since 2015, demand for EMS response has increased most significantly on Wednesday. Saturday and Sunday show the lowest increase since that time. In 2018, every day except Sunday averaged about 165 annual calls for service (3.17 calls per day); Sunday calls were significantly lower at 124 annual calls for service (2.2 calls per day). Even so, the difference is less than one medical call per day.

Likewise, temporal demand by month of year suggests that, since 2015, the daily demand for EMS response has increased most significantly in January, with June having the least change. Even so, the difference is less than two medical calls per day, with all months having less than four EMS calls per day. This is shown in the following two figures.

²³ NFPA 1710, Section 4.1.2.1 – 4.1.2.4. This time includes 90 seconds for call processing, 60 seconds for turnout time, 240 seconds for travel time of the first unit with an automatic external defibrillator (AED), and 480 seconds for arrival of the first advanced life support (ALS) unit.

²⁴ Under emergency medical dispatch determinants, the first responder unit is dispatched first, then the medic unit based on the information given by the caller. To reduce the time between the dispatch for each unit, FFD could simply have the Medic Unit begin its response as soon as the engine is dispatched. A non-emergency response by the Medic Unit could be used for a pre-alert response if desired.

Figure 21. Temporal Demand by Day of Week

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
2015	100	119	122	110	125	113	135
2016	126	149	117	128	135	139	135
2017	117	157	139	132	124	141	179
2018	124	160	173	177	172	168	163
% Inc from 2015	24.00%	34.45%	41.80%	60.91%	37.60%	48.67%	20.74%

Figure 22. Daily Average Incident Count by Month

	2015	2016	2017	2018
Jan	2.23	1.97	2.29	3.74
Feb	1.93	2.29	2.46	3.18
Mar	2.06	2.23	2.42	2.71
Apr	1.40	2.50	2.37	2.43
May	2.26	2.48	2.26	3.19
Jun	2.70	2.17	2.87	2.87
Jul	2.42	2.94	3.16	3.13
Aug	1.87	2.42	2.81	3.42
Sep	2.30	2.87	2.83	3.83
Oct	2.77	2.77	2.52	2.77
Nov	2.57	2.80	3.10	3.07
Dec	2.55	3.10	3.42	3.03
Avg	2.25	2.54	2.71	3.11

As shown, the temporal demand shows no significant periods of peak demand by either day of the week or by month of the year. Thus, from this parameter alone, there does not appear to be sufficient need for a second medic unit at this time.

UNIT HOUR UTILIZATION

Unit hour utilization, or UHU, is the actual hours, or percentage of time, a unit is actually in use for emergency response, from time of alarm until time returned to service. In emergency service delivery, UHU below 15 percent is acceptable for EMS providers.

Figure 23. Unit Hour Utilization

	2015	2016	2017	2018
ENG752	2.16%	2.37%	2.79%	3.07%
MED752	2.93%	3.87%	4.77%	4.99%
TRK751	1.69%	2.05%	2.12%	2.11%

As shown, the UHU for all units is well below that threshold. Thus, from this parameter alone, there does not appear to be sufficient need for a second medic unit at this time. Note however, the UHU for each FFD unit has risen each year of the study period, with Medic 752 showing the greatest increase.

UNIT COMMIT TIME

Unit Commit Time(UCT) is the average amount of time each unit was committed to an emergency response and unavailable for other use. When combined with unit hour utilization, UCT provides an indicator of the emergency usage. As shown in the following figure, UCT for medical response was less than 30 minutes for each medical response by fire apparatus and less than an hour for the medic unit. The difference between the two times is primarily due to transport time to the hospital or other care facility by the medic unit.

Figure 24. Unit Commit Time on Medical Incidents

	2015	2016	2017	2018
ENG752	0:26:26	0:24:18	0:25:31	0:23:56
MED752	0:48:38	0:45:38	0:51:02	0:47:46
TRK751	0:23:03	0:24:11	0:26:35	0:25:25
Avg	0:32:42	0:31:22	0:34:23	0:32:22

As shown, the UCT is typical for fire-department-provided EMS and has remained fairly consistent since 2015. From this parameter alone, there does not appear to be sufficient need for a second medic unit at this time.

MUTUAL AID RESPONSE

Mutual aid for EMS responses is necessary when Medic 752 is already committed to a call. Also, FFD staffing levels require a mutual aid response for all structure fires and when there is more than one emergency at the same time. To be truly effective, mutual aid should be reciprocal—that is, mutual aid should be given and received by both parties.²⁵ The following figures show the number of mutual aid responses and the agency providing mutual aid to the Town of Fairview. It was not reported by jurisdiction where FFD provided mutual aid to others. Note that the number of times mutual aid was received does not equal to the agency total. This is because some calls for mutual aid receive aid from more than one department.

Figure 25. Total Mutual Aid Responses, 2015-2018

Type	2015	2016	2017	2018
Total FFD responses	818	925	985	1131
Mutual aid given	54	69	77	92
Percent of all FFD responses	6.6	7.5	7.8	8.1
Mutual Aid Received	34	55	68	70
Percent of all FFD responses	4.2	5.9	6.9	6.2

As shown, the number of mutual aid received responses is relatively small when compared to the total number of responses and appears to be reciprocal. Thus, from this parameter alone, there does not appear to be sufficient need for a second medic unit at this time.

²⁵ The use of automatic and mutual aid is a long-standing example of "best" practices and its use is wide-spread throughout the Metroplex.

Figure 26. Agencies Providing Mutual Aid

Aiding Agency	2015	2016	2017	2018
Allen	18	31	30	42
Lowry Crossing	--	--	4	--
Lucas	10	24	37	30
McKinney	5	12	16	12
Parker	10	13	15	13
Plano	--	--	1	1
Wylie	--	--	1	--

TRIGGER POINTS FOR ADDING A SECOND MEDICAL UNIT

At some point in the future, FFD may need to consider adding a second, primary medical unit. Staffing could be either 24-hours per day or peak-time only, based on need. Likewise, the unit could be either a second ambulance or a rapid response vehicle (RRV), depending on need.²⁶ It is not possible to accurately predict *when* the need for a second medic unit or RRV will occur; there are simply too many variables to consider. However, there are several conditions that should be monitored to determine if one or more of the following “trigger points” have been exceeded, in which case a second medic unit or RRV should be considered:

- Unit Hour Utilization greater than 15 percent
- Response times consistently greater than 115 percent of department goals, *e.g.* Engine/Truck arrival within 6:30 from time of dispatch. Ambulance to arrive within 10:30 from time of dispatch.
- Uneven temporal distribution of responses, with repeatable and sequential peak times greater than 25 percent of response count average
- Out-of-Service commit times consistently greater than 1 hour
- Use of mutual aid medical units greater than 15 percent

RECOMMENDATIONS

ESCI recommends that FFD:

- Continue to monitor unit hour utilization, unit commit time, response time, daily incident count, temporal response distribution, and mutual aid unit use, and other factors, with periodic performance reporting at least annually
- Consider adding peak unit ambulance when Medic 752 utilization rate exceeds 15 percent
- Establish a tiered 90th percentile response time goals for agency.
- Consider adding a second ambulance when one or more performance measures exceed department trigger points

²⁶ The concept of a Rapid Response Vehicle (RRV) for EMS is discussed in more detail later in this report.

Best practices for fire station location

What are the best practices under National Fire Protection Association (NFPA) standards and International Standards Organization (ISO) standards for siting fire stations and does the Town meet those standards?

BACKGROUND

The decision to add, relocate, or close a fire station is not to be taken lightly. A fire station is a costly, capital asset designed with an anticipated service life of 30 to 50 years. The fire service has a long history of providing neighborhood-based service delivery. Simply, this means that the fire service has a history of placing stations in locations where they are needed the most, with an understanding of the need for quick response and rapid intervention. That premise has not changed; what has changed is the use of analytical tools to help determine proper station placement based on current and future need. For this analysis, ESCI considered the following factors:

- Geographic service demand and Population density
- ISO® Public Protection Classification guidelines for travel distances
- NFPA 1710 recommendations for response travel time
- Station 1 replacement

ESCI reviewed FFD fire station locations using these factors and has these observations and recommendations. GIS data was utilized to examine the areas of greatest service demand and the distribution of FFD resources. The distribution of resources was then examined by geographical location and by travel time over the existing road network.

FINDINGS

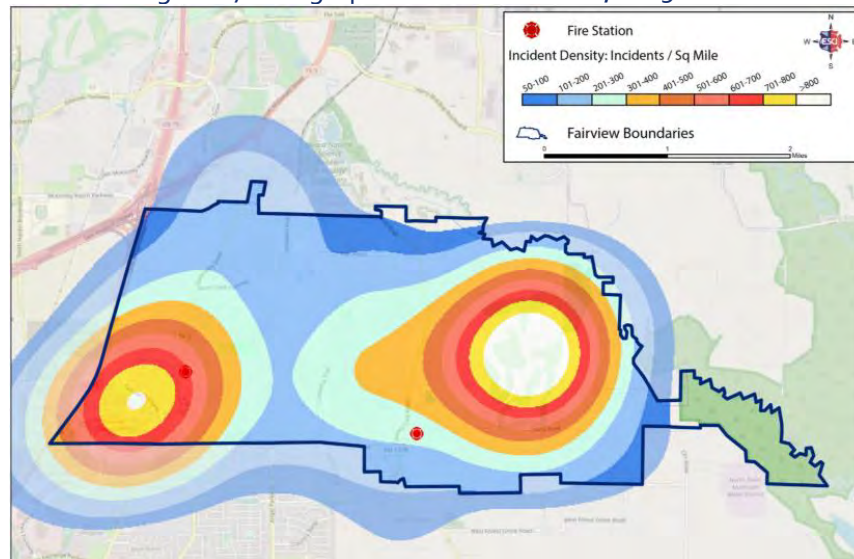
Overall, the response performance displayed by Fairview Fire Department is similar to that seen across the nation for communities of similar size that are staffed with career firefighters. Fire station location is a major factor in that performance. Generally, ESCI found that FFD stations are well-located to meet community needs, both current and future. The proximity of additional stations in neighboring communities of McKinney and Allen provide valuable assistance when available with additional coverage in the commercial and densely-populated areas along the western side of the town between U.S. Highway 75 and State Highway 5.

GEOGRAPHIC SERVICE DEMAND AND POPULATION DENSITY

Utilizing FFD data and GIS software, incident locations were plotted showing the geographical service demands for both fire and EMS incidents during the study period. This analysis does not display how many calls actually occurred in each area, but instead calculates the rate in terms of calls per square mile, based on the relative closeness of each incident to one another. Also referred to as hot-spot mapping, this technique is also used by law enforcement to locate areas of relatively high activity.

The figure that follows demonstrates the mathematical density of all incidents, summarized as incidents per square mile. As shown, service demand is distributed widely throughout the FFD service area, but two areas account for a higher majority of incidents.

Figure 27: Geographic Service Demand, 2015-2018

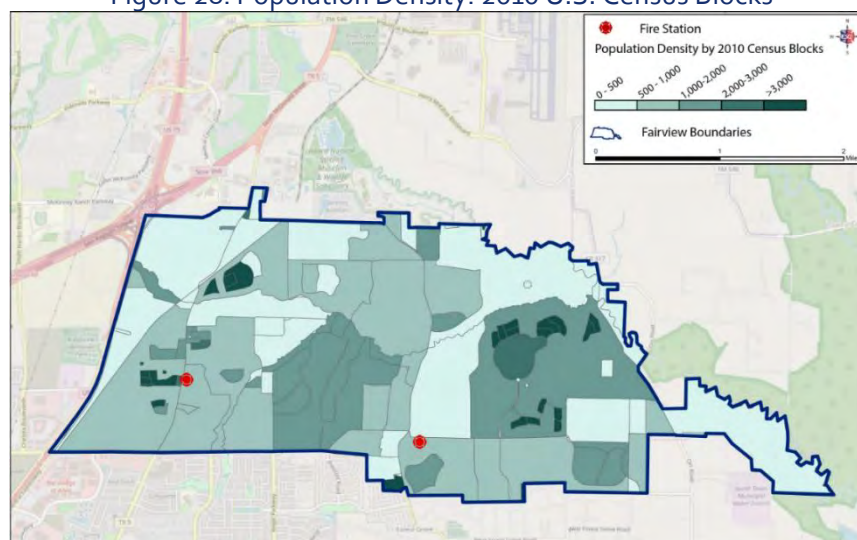


The first is located geographically near FFD Station 1, to the north of Stacy Drive and west of State Highway 5. Also located in this area is the Fairview Town Center, two mid-rise hotels, and several mid-rise, multi-story multi-family dwellings including the Overture Fairview, a 55+, 195-unit apartment and condo building.

The second area of higher call density is geographically located near FFD Station 2. This area, to the north of Stacy Road and to the east of Country Club Road, includes the Heritage Ranch & Golf Country Club and the Heritage Ranch retirement community. While both fire and EMS incidents are included, a majority of the incidents displayed in the figure are EMS incidents.

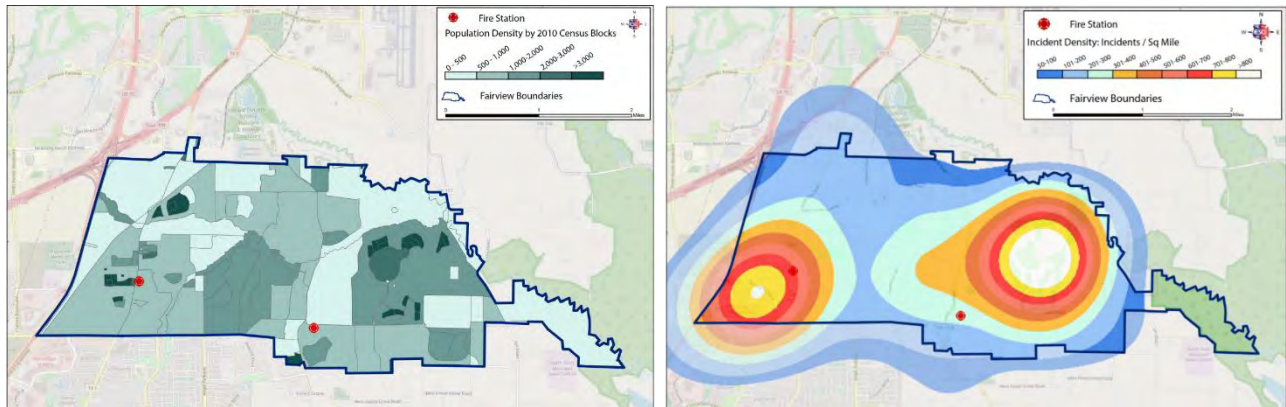
The figure illustrates the population density of the town of Fairview as reported by the 2010 Census data. While there are several areas throughout the Town of Fairview with population counts of greater than 3,000, a majority of high population concentrations appear in the area on either side of State Highway 5 in the west side of the town and geographically around Heritage Ranch & Golf Country Club on the east side of the town.

Figure 28: Population Density: 2010 U.S. Census Blocks



It should be noted that in large part, the areas with the highest population density correspond with the areas of the highest incident density as shown below.

Figure 29. Side-by-side Comparison of Population Density and Service Demand

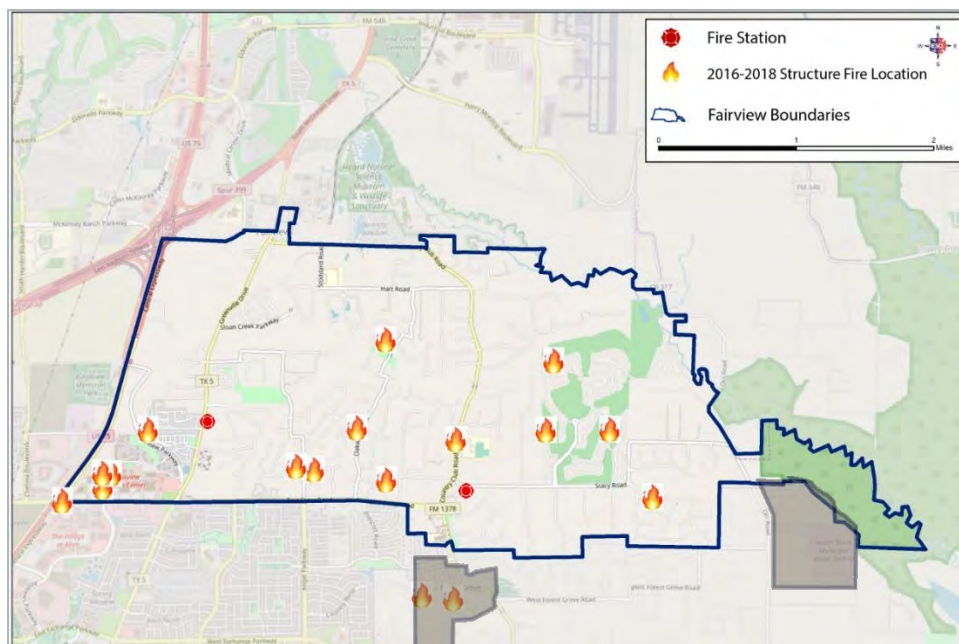


FIRE INCIDENTS

Similar to the pattern displayed with both fire and EMS incidents, structure fire incidents are widely centralized in the area of highest population density but do span out to areas of lesser population density. Because of this pattern and the potential for fires to occur in any area of the service area (including unincorporated areas), it is important to maintain an initial and effective fire response capability for the entire service area.

The next figure illustrates incidents categorized as structure fires in the NFIRS data during the study period.

Figure 30: Fire Incident Density, 2015-2018



As shown, the location of both fire stations closely matches population distribution and service demands. These figures also underscore the importance of operating and sustaining two stations.²⁷

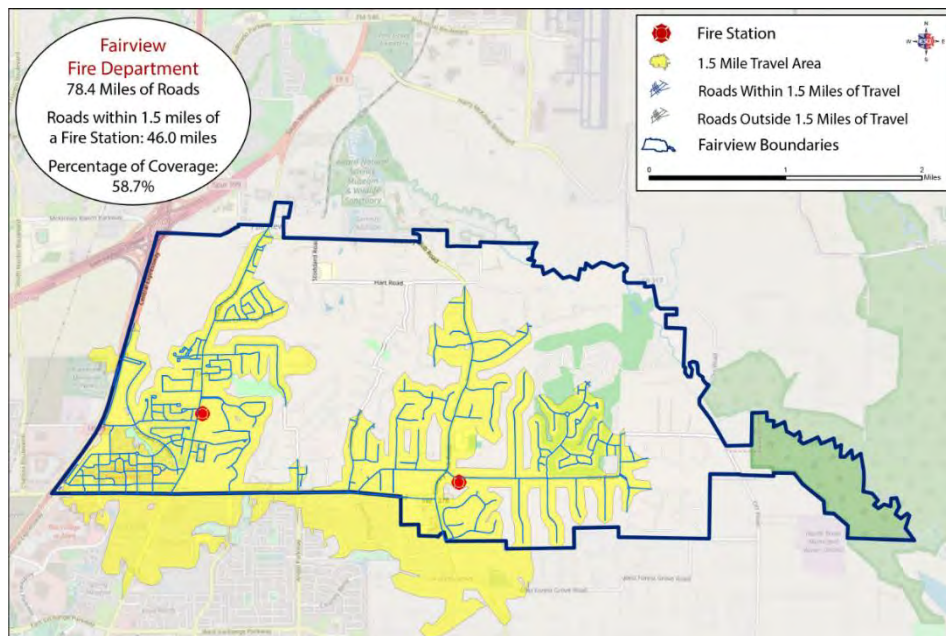
ISO® PUBLIC PROTECTION CLASSIFICATION GUIDELINES FOR TRAVEL DISTANCE

The Insurance Services Office (ISO) is a national insurance industry organization that evaluates fire protection for communities across the country. ISO assesses all areas of fire protection as broken down into four major categories including emergency communications, fire department, water supply, and community risk reduction. Following an on-site evaluation, an ISO rating, or specifically, a Public Protection Classification (PPC®) number is assigned to the community ranging from 1 (best protection) to 10 (no protection). The PPC® score is developed using the Fire Suppression Rating Schedule (FSRS), which outlines sub-categories for each of the four major categories, detailing the specific requirements for each area of evaluation. The ISO Public Protection Classification (PPC®) program only addresses fire suppression activities and is primarily concerned with the geographic coverage of property.

A community's ISO rating is an important factor when considering fire station and apparatus distribution and deployment due to its effect on the cost of fire insurance for the residents and businesses. To receive maximum credit for station and apparatus distribution, ISO evaluates the percentage of the community (contiguously built upon area) that is within specific distances of both engine/pumper companies (1.5 miles) and aerial/ladder apparatus (2.5 miles).

The following figure illustrates engine company distribution within the Town of Fairview and the roadways within the ISO required 1.5 miles of travel distance:

Figure 31: Engine Company Distribution, ISO Criteria

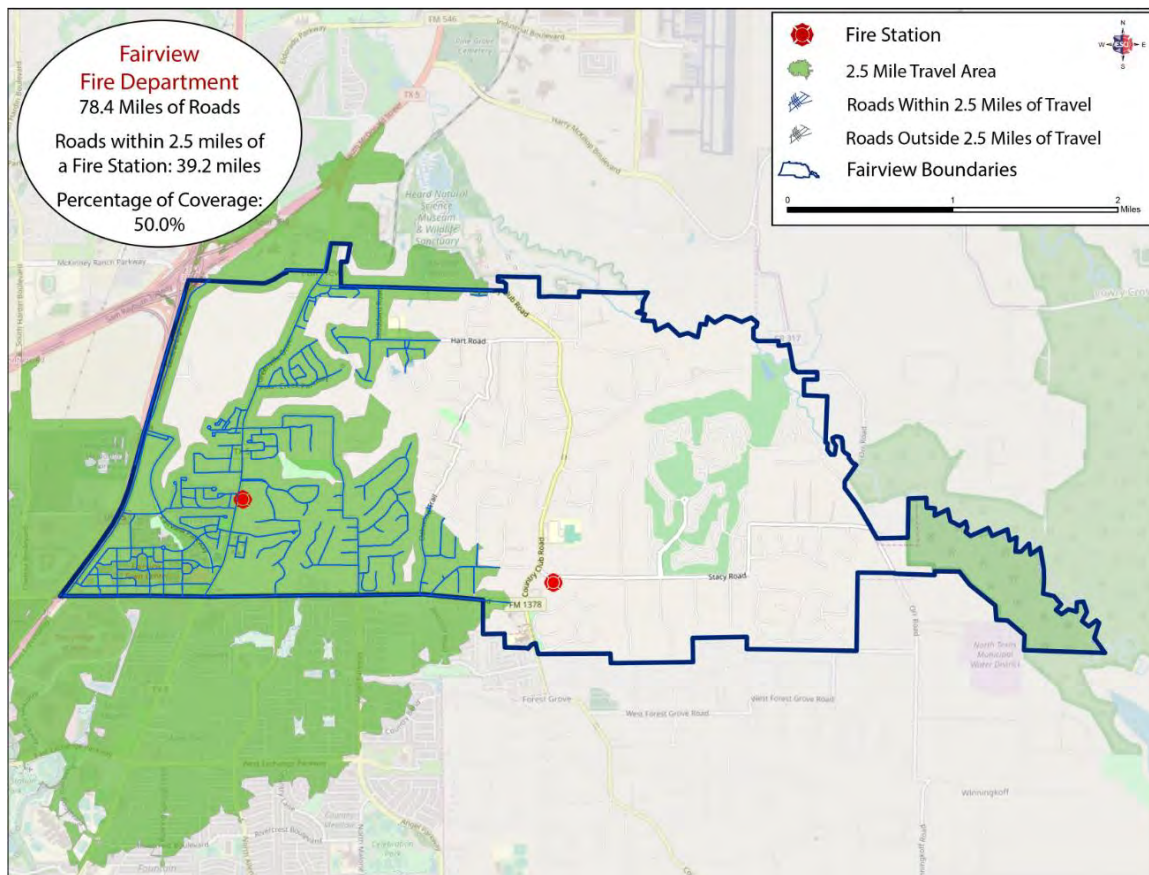


²⁷ The population density is from the 2010 census. Given the age of that information, it is highly likely that the results from the 2020 census will show significant increases in population density. Although service demand and availability of funding do not support a current need, the FFD is advised to continue to monitor conditions to determine if a need for a future station in the northern area of the town develops and, if so, when to include it in a future Strategic Plan.

As measured from the facility in which they are housed, FFD engine companies (or pump capable aerial) are deployed such that just under sixty percent (58.7%) of the road network in Fairview are within the ISO 1.5 miles of travel distance (46.0 miles). This leaves over forty percent (41.3%) of the road network outside of the ISO required 1.5 miles of travel distance (32.4 miles) as shown in the previous figure.

Similar to engine companies, aerial apparatus have a maximum required travel distance. However, due to factors such as building heights (structures over three stories) and personnel, ISO allows aerial apparatus to have an increased maximum travel distance of 2.5 miles. The following figure illustrates aerial apparatus distribution within the Town of Fairview and the roadways within the ISO required 2.5 miles of travel distance:

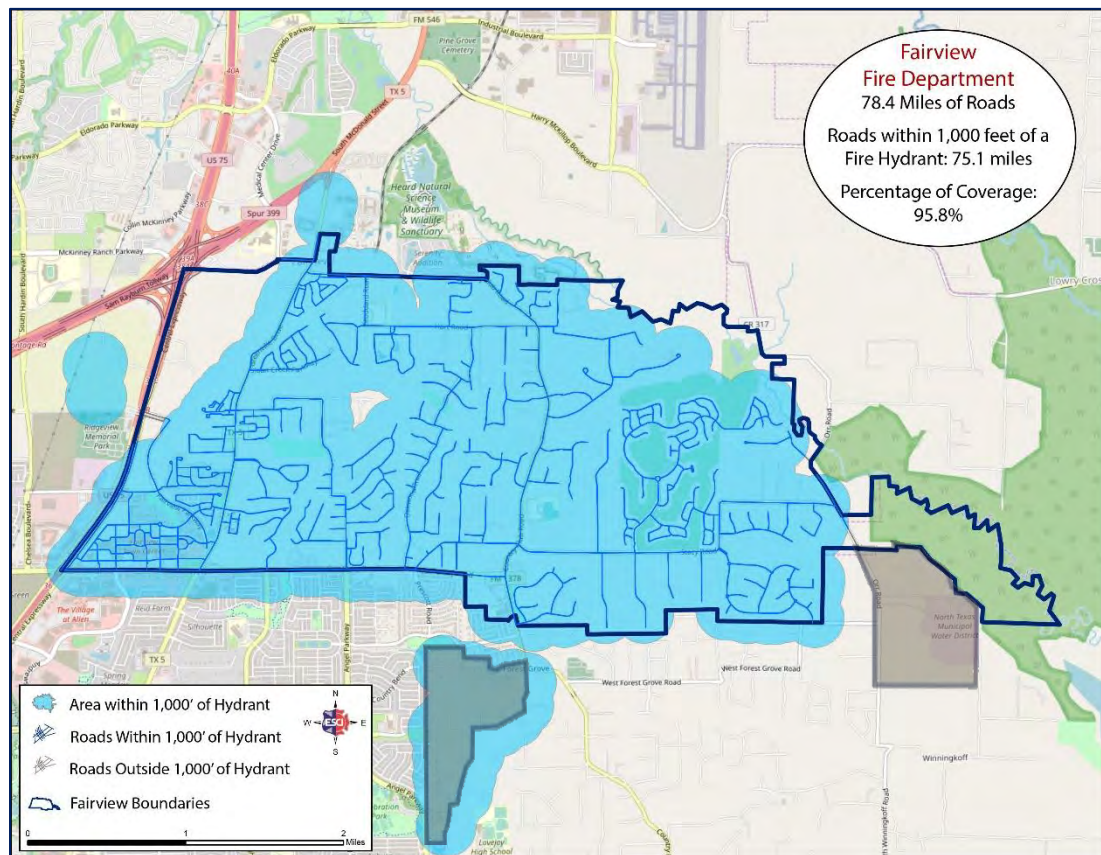
Figure 32: Aerial Apparatus Distribution, ISO Criteria



FFD operates one aerial apparatus out of Station 1. As can be expected, this limited deployment does leave gaps resulting in fifty percent (50.0%) of the road network in Fairview falling within the ISO 2.5 miles of travel distance (39.2 miles). This leaves fifty percent (50.0%) of the road network outside of the ISO required 2.5 miles of travel distance (39.2 miles). That said, adding another ladder truck would be an expensive decision that may not be practical or necessary.

Finally, water distribution is another key element for ISO community ratings. Without a sufficient and consistent water supply, suppression operations will struggle to be successful. In the following figure, the fire hydrant system in Fairview is displayed with a 1,000' buffer drawn around each fire hydrant. Similar to the previous figures, ISO calculates credit for part of the water distribution system based on this criterion. Areas outside of 1,000' of a reliable water source may be subject to a split rating by ISO, meaning that one area would receive a better rating than another.

Figure 33: Fairview Hydrant Distribution System



Based on ISO standards, Fairview has the ability to supply a fire department water to 95.8% of the road base.

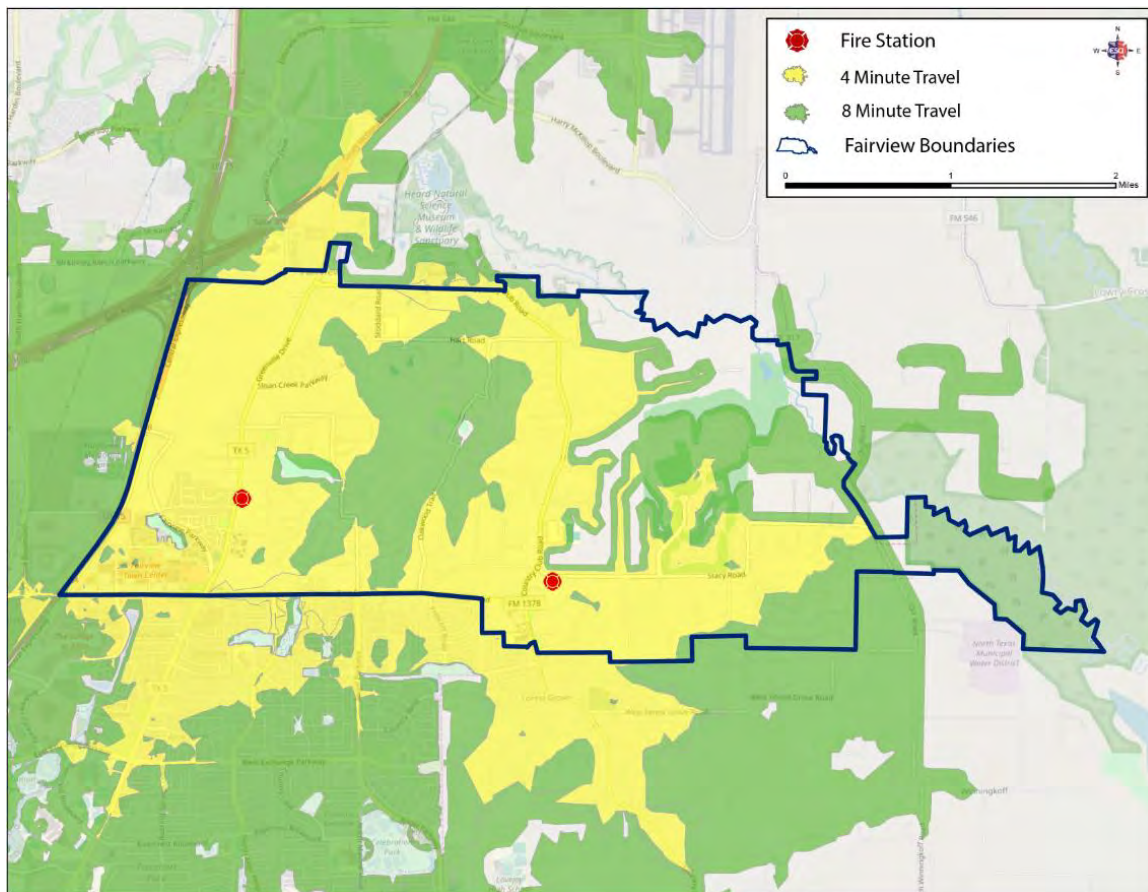
NFPA 1710 RECOMMENDATIONS FOR RESPONSE TRAVEL TIME

For jurisdictions such as FFD that respond to all types of emergencies, the travel time required to respond from a fire station to any type of emergency call for service is of equal importance to travel distance. The national consensus standard NFPA 1710²⁸ provides travel time goals for fire, EMS and special operations emergency responses.

The NFPA 1710 standard specifies that career staffed fire departments deploy resources such that 90 percent of emergency service demand can be reached in four minutes' travel time or less. Additionally, the standard recommends that the full first alarm assignment should arrive in eight minutes' travel or less at a fire suppression incident (both measured at the 90th percentile).

The following figures demonstrate travel time over the existing road network from each station, using the parameters of the NFPA 1710 standard. Travel time is calculated using the posted speed limit and adjusted for negotiating turns and intersections.

Figure 34: Travel Time Model



²⁸ NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments* (National Fire Protection Association 2010).

As discussed earlier, the areas of highest service demand and population concentration largely lie within the four-minute national response standards as outlined in NFPA 1710. However, as shown in the preceding figure, several areas, especially the area located geographically between the two fire stations, lie outside of the four-minute standard but do fall within eight minutes of travel time (shown in green).

DISCUSSION ABOUT NFPA 1710 RESPONSE TIME

A detailed discussion about NFPA 1710 standards for the individual components of total response time is beyond the scope of this discussion on station location.²⁹ The analysis of FFD's performance when compared with NFPA 1710 benchmarks revealed that FFD performance was outside the standard on most metrics. That said, few fire departments across the country possess the capabilities to meet NFPA 1710 standards, but these values are useful in determining overall performance and how the fire department meets customer expectations. Notable highlights of FFD performance when compared against the NFPA 1710 standards included:

- **Call processing time.** While out of the direct control of the fire department, CPT was 1:30. While this is above the standard for fire response by 50 percent, it is in line with top performers across the country for call processing of EMS calls when using priority dispatch determinants. However, the performance of 6:23 for fire dispatch is more than 5 times the standard and should be reviewed.³⁰
- **Turnout time.** Overall, FFD turnout time was about 50 percent higher than the industry standard. Similar to the findings in call processing, the turn out time for fire responses is much higher, but is in line with ESCI's experience nationwide for fire department turnout times. Several factors such as station design, cross-staffing units, training activities, and time of day can influence this performance. FFD should consider discussions to examine and suggest methods of improving this performance.
- **Travel performance** for Fairview was also nearly double the standard of 4 minutes for first-arriving units at 7 minutes 42 seconds. Travel time to critical medical emergencies was shorter than the national benchmark, but response to structure fires represented the worst performing metric in this category at 10 minutes 47 seconds. Travel time is often a function of proximity to the incident and can only be improved upon by placing additional units in service in strategic locations to fill any gaps in service. This may not be possible due to availability of funding and low volume.

SUMMARY

Few fire departments possess the capabilities to meet NFPA 1710 standards; however, NFPA 1710 does serve as a set of goals to strive toward. Particularly given the rural nature of much of the Fairview service area, the fire department must strike a balance between the levels of service desired by the community versus the availability of funding and what its citizens are willing to pay. Ultimately, this balance sets the performance and funding standards for all fire departments and other public service agencies.

²⁹ A detailed discussion of total response time is located in Appendix B of this report.

³⁰ At first glance, the call processing time of 6:23 for fire calls appears to be significantly excessive and cause for alarm. However, further analysis strongly suggests this is due to the need to dispatch mutual aid units on all structure fires. Not all units use the same dispatch center, and the increased amount of time required to contact the other dispatch center(s), transfer the information, and dispatch those mutual aid units. ESCI research has found that, across the country, delays up to eight minutes or more are common when requesting mutual aid units from multiple dispatch centers. This DOES NOT delay dispatch of any Fairview fire apparatus.

STATION 1 REPLACEMENT

The single most expensive infrastructure elements in a fire department are the facilities and apparatus. Because of this expense, planning must be developed to address replacement, refurbishment and maintenance. The funding of these elements is difficult to absorb for most agencies in a single year, thus a multi-year funding strategy or funding source must be identified. The replacement or refurbishment must be planned far enough ahead of actual expense to allow the agency time to acquire the funds necessary to implement the plan. ESCI is aware of the pending bond election to replace Station 1 with a new facility on property adjacent to the existing station.

Figure 35. Proposed replacement for Station 1



"Our goal must be to create the best new fire station No. 1 that we can build, and to also ensure that it is the most efficient, and at a cost that Fairview residents will support, even if we are able to fund the project without any tax increase."

*-- Mayor Darion Culbertson
Fairview Council Mtg, Nov 28, 2018*

RECOMMENDATIONS

Appropriately designed and maintained facilities are critical to a fire department's ability to provide services in a timely manner and with appropriate deployment of assets. ESCI recommends that FFD consider the following "best practices" for new Station 1:

- Provide washer/extractors to allow firefighters to effectively decontaminate their gear following exposure to carcinogens
- Provide laundry equipment to allow firefighters to effectively wash their uniforms, bedding, and other linen before leaving the station
- Provide storage for personal protective equipment (PPE) in an environment protecting the gear from exposure to vehicle exhaust fumes and ultraviolet (UV) lighting
- Provide proper exhaust capture equipment to reduce or eliminate employee exposure to diesel exhaust in the apparatus bays
- Provide fire protection systems—fire-rated compartments, smoke detectors, alarms, and automatic sprinkler systems
- Ensure compliance with the American Disabilities Act (ADA)
- Provide drive-through apparatus bays for all emergency response vehicles if the site location and station placement allow
- Provide workout and exercise facilities to improve cardiac health
- Consider the recommendations found in NFPA 1500, 1710, 1720, and 1851 to improve firefighter health and safety and to improve turnout times

Best practices for emergency communications

What are the best practices in introducing priority dispatching and does that result in identifying certain EMS calls that only require dispatching of an ambulance and not an additional first responder unit?

What are the advantages and disadvantages of this type of dispatching?

ESCI reviewed emergency communications (dispatching), including the effect of utilizing priority dispatch protocols, and has these observations and recommendations.

BACKGROUND

Most events start with a citizen's call to 9-1-1. The telecommunicators in the Communications Center are truly the "First-First Responders." Gathering and relaying the most accurate information available to responding units is the key to a quick response and being prepared to take on whatever the event is when the engine pulls up to the scene. Having a communications center that follows the industry's standards and best practices is key to consistent, thorough dispatching.

The Fairview Fire Department (FFD) utilizes the Wylie Fire Department communications center (WFD-CC) for their communications operations. The communications center dispatches for WFD, FFD, Wylie Police Department, Branch Volunteer Fire Department, and the City of Lucas Fire Department. The WFD-CC coverage area is over 60 square miles, with a population in excess of 50,000. According to the WFD-CC management staff, the fire departments are treated as one big system, with automatic aid agreements in place. It is unusual for a fire department to have control of a police department's dispatching, but it appears to work well for both disciplines.

The WFD-CC is operated by the City of Wylie and the WFD. The Alarm Coordinator (Dispatch Supervisor) reports directly to the Fire Marshal, who reports to the Fire Chief. WFD-CC has just started a dispatch users' group that includes representatives from all agencies and disciplines dispatched by WFD-CC. This will allow the users to have input on operational issues and technology changes in the communications center.

FUNDING

WFD-CC is included in the WFD budget and had a budget of \$1.3 million in 2018. The City of Wylie is a home-rule city and assesses its own 9-1-1 fee. This is a fixed fee generating approximately \$400,000 per year. These funds go into the City General Fund. WFD-CC has not received any grants.

There are Interlocal Agreements in place with the Cities of Fairview and Lucas. The agreement requires each city or town to pay the salary and benefits for one dispatcher plus an administrative fee. In FY 18-19, Fairview paid \$78,454 to WFD, down \$1,701 from the previous FY. This is the only cost to Fairview for dispatching services.

The individual agencies pay for their own fire station alerting equipment and maintenance directly to US Digital. FFD paid just over \$6,022.78 for annual fire station alerting maintenance in 2018. MDCs for the apparatus were purchased for all the department between 2012 to 2014 and FFD uses the Integrated Computer System (ICS) software for all vehicles. FFD was able to use the software with their previous dispatch agency as well, so there were no new costs to change to Wylie. FFD pays ICS a yearly maintenance fee of \$8500.

STRATEGIC PLAN

There is a Strategic Plan for communications that includes:

- A commitment to hiring additional dispatchers and/or supervisors each year
- Purchase three complete CAD (Computer-Aided Dispatch) stations for the back-up site
- Replace the existing CAD system, including monitors, towers, licensing, radio and phone systems

FACILITIES

The WFD communications center is operating out of a temporary building outside of the Public Safety building due to storm damage in 2016. The Public Safety building is scheduled to be reconstructed in the near future, with a 12-month estimated construction time. WFD states that the architects were instructed to follow NFPA 1221: *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems* in design and construction of the building.

TECHNOLOGY

WFD-CC directly monitors alarms for the City of Wylie. WFD-CC is working on becoming an Underwriters Laboratories listed certified alarm station.

WFD-CC's current CAD system is provided by Integrated Computer Systems (ICS). The system was installed in 1998. ICS is a small company, and WFD-CC has been part of developing many new features of the system. Upgrades to the software are a part of their maintenance agreement, so are performed annually. The CAD servers were replaced 2 years ago. There are issues with verifying addresses – ICS uses an AutoCAD system for street centerlines. There are efforts underway to improve coordination between cities and Collin County to improve edge-matching along borders with the cities.

WFD-CC has a Motorola (formerly AirBus/Cassidian/Plant) VESTA system. All backroom equipment is hosted by AT&T at their facilities. The VESTA system is Next Generation 9-1-1 (NG9-1-1) capable, but not implemented in this region yet. WFD-CC received a total upgrade of the 9-1-1 Customer Premise Equipment (CPE) recently. They now have the ability to map the location of the incoming 9-1-1 call. They are also using an integrated solution for Text to 9-1-1.

Collin County is using a Motorola 800 MHz Trunked P25 digital regional system. WFD-CC has MCC 7500 consoles installed in the dispatch center. Plano, Allan, Wylie, and Murphy are primary users on the system - Fairview is a contract agency. The system was installed in 2013 and in 2018 implemented considerable upgrades. The system makes upgrades to the radio system and user equipment in alternate years – one-year budget is dedicated to system upgrades, the next year it is user equipment. The system is designed for portable coverage 95% from the hip. There are reports from WPD of some coverage issues, but overall coverage is excellent. There are no issues with the digital radios in high noise environments – a frequent complaint in early implementers of the digital radio systems. WFD reports some issues with Bluetooth and their Scott air packs, but they are working through the issues.

Each dispatch console has an instant recall recorder for quick reference. Long-term recording is on a NICE Inform system. All phone lines are recorded, and radios are recorded by talkgroup. The system has redundant servers for back-up. The City of Murphy also records the radio talkgroup as an additional backup.

STAFFING

WFD-CC is currently budgeted for 11 dispatchers and 2 supervisors. The strategic plan calls for another dispatcher to be hired in 2019 and 2020. Since 2005, dispatch staff are assigned to 12-hour shifts, averaging 44 hours per week. Prior to 2005, they worked 10-hour shifts. Dispatchers work a 0700-1900 hours or 1900-0700 hours shift on a 3-on, 4-off, 4-on, 3-off schedule. The two supervisors work 1100-2300 in order to manage personnel on both day and night shifts. WFD-CC has been fully staffed for several months now, although two dispatchers are still considered trainees. The dispatch staff is happy with the shift schedule.

Minimum staffing currently is 2 dispatchers on both day and night shifts. Management at WFD-CC indicated that they are planning to move to a minimum staffing of 3 dispatchers. Under a 12-hour schedule, that requires 8 dispatchers. This leaves them 3 personnel to cover for illness and vacations without incurring overtime. If they move to minimum 3 dispatchers, they will have to have hired the additional dispatcher in 2019. The 2020 hire will allow some flexibility to cover for illness and vacation without incurring overtime. Currently WFD-CC has a budget of \$4,000.00 per month for overtime.

Work assignments on the shifts is to have one dispatcher work PD radio, and one dispatcher work FD radio and answer phones. The dispatchers rotate responsibilities midway through shift to ensure everyone has time on both fire and law radios.

TRAINING

New dispatchers have usually completed their training within 6 months. While most new hires do not have any experience in dispatching, WFD-CC can offer a pay grade incentive for experienced dispatchers, which will reduce training time. All WFD-CC-specific training is done at the console with a more experienced dispatcher. Ride-along opportunities with the WPD and WFD are offered during training. The content of the training is reported to be thorough in both fire and law areas but was not evaluated for this report.

Dispatchers are required to pass the basic dispatcher course offered by the Texas Commission on Law Enforcement (TCOLE) and specialized training for the Texas Law Enforcement Telecommunications System (TLETS). Ten of the dispatchers have continued their education with master/advanced/intermediate certificates from TCOLE. Each employee has about \$800 per year to go towards classes. When available and staffing allows, dispatchers are sent out to field training programs to see operations first hand. Dispatchers are required to complete continuing education credits for EMD and EMD-Q certifications.

SERVICE DELIVERY AND PERFORMANCE

- Almost 14,000 9-1-1 calls per year over the past 4 years
- Over 80 percent of all calls are wireless calls
- Admin calls are almost 80 percent of total call volume.
- Busiest time of day is between 1700 and 1800
- Busiest day of the week is Thursday

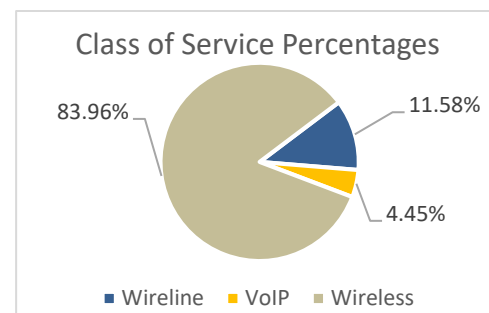
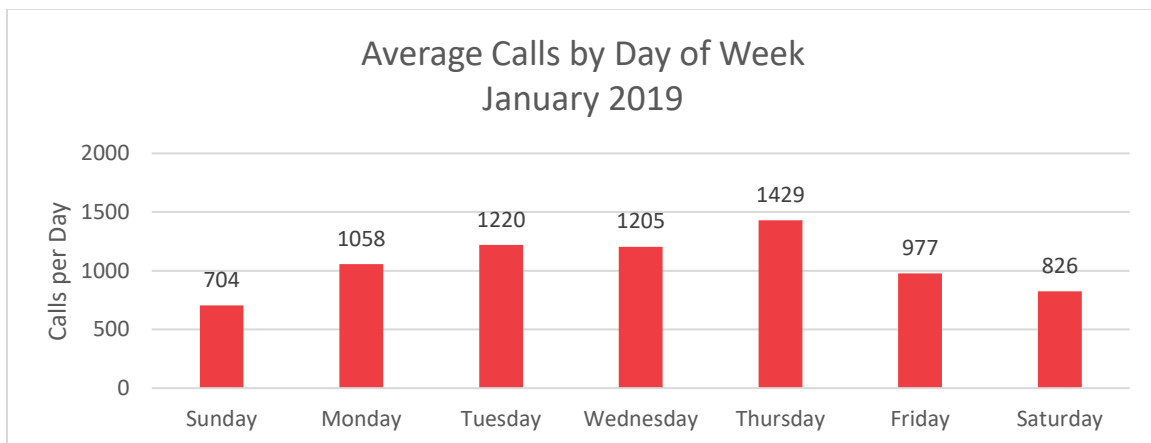
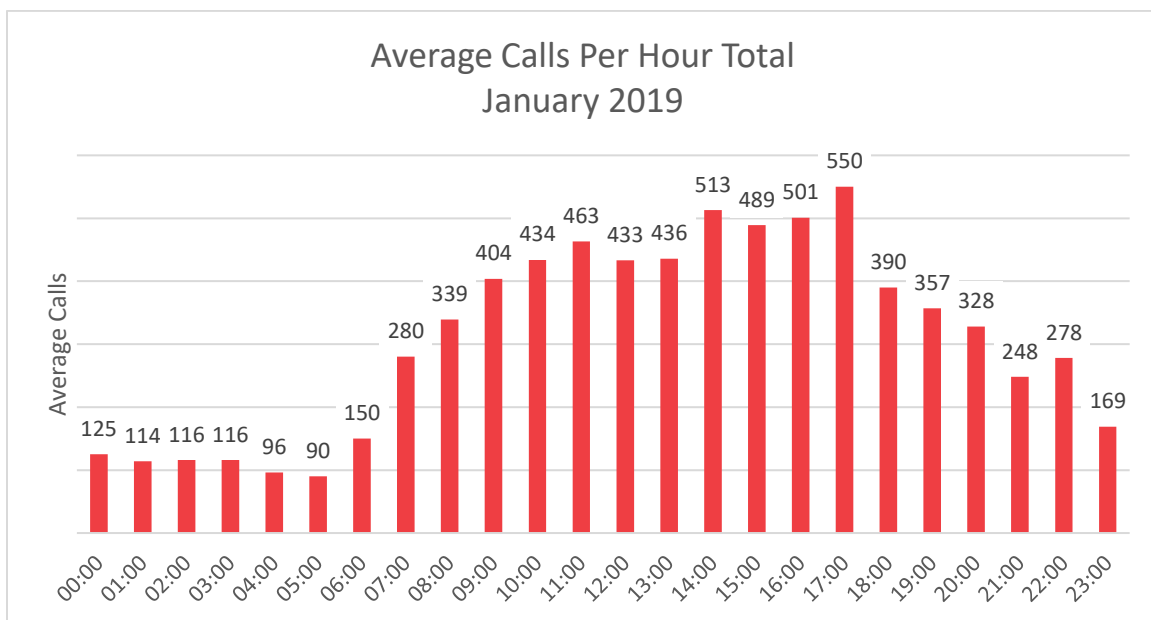
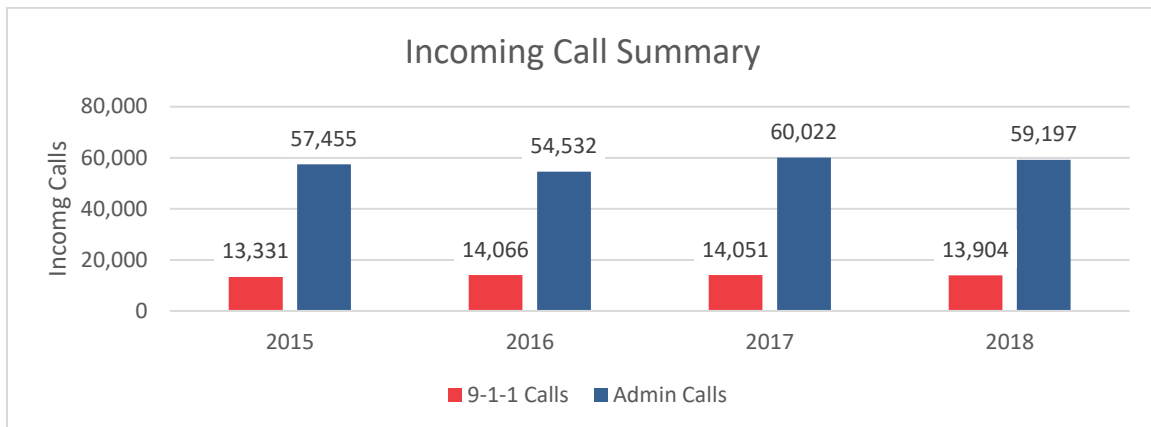


Figure 36. Communications Statistics



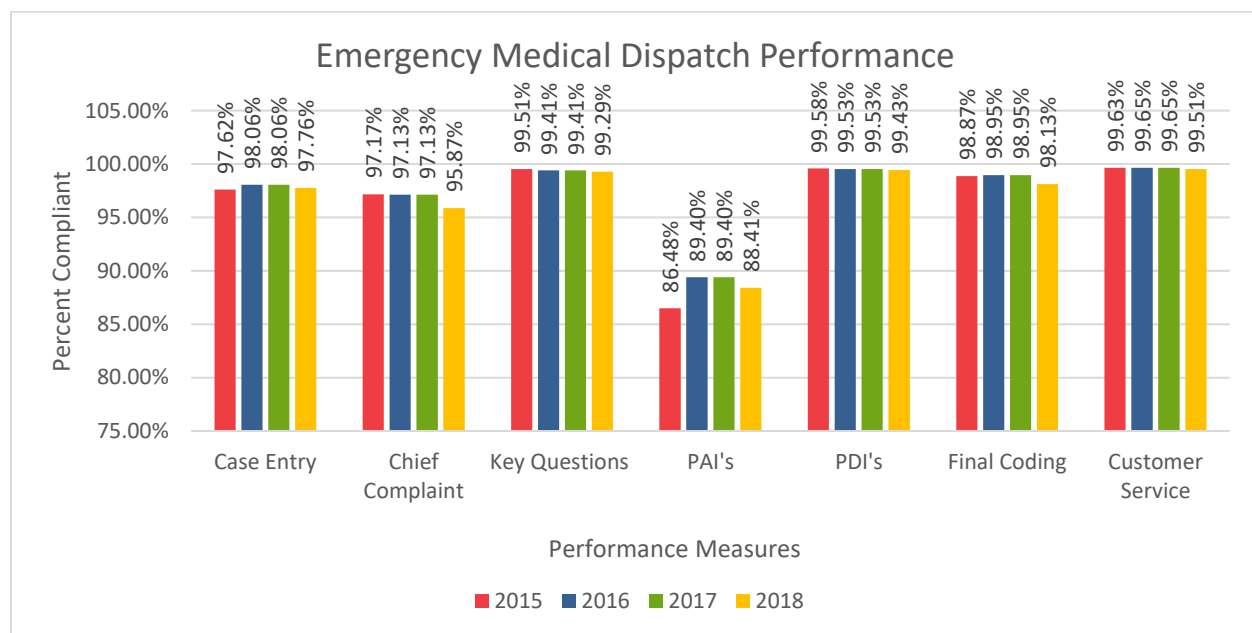
FINDINGS

The WFD-CC currently has had a policy of answering all emergency calls before the second ring (6 seconds per ring – 12 seconds). Because of the limitations of their previous 9-1-1 CPE, the ability to evaluate call answer and call processing wasn't feasible. The new VESTA 9-1-1 system and implementation of the Emergency Call Tracking System (ECaTS) Management Information System software as a data-gathering tool for dispatch centers will address that issue.

WFD-CC will establish a policy for adhering to the NFPA 1221 standard of answering emergency calls within 15 seconds 95% of the time. A report from ECaTS for the month of January 2019, showed WFD-CC answering 99.92% of emergency calls within 15 seconds, and 100% of emergency calls within 40 seconds.

All dispatchers and supervisors are certified as Emergency Medical Dispatchers (EMD) through Priority Dispatch. All medical calls are processed through the Priority Dispatch EMD protocols. This takes extra time on the phone with the callers, which can put additional work on the second dispatcher. Four dispatchers are certified as EMD-Q – quality assurance reviewers. One hundred percent (100%) of medical calls are reviewed for quality based on standards set by the International Academy of Emergency Dispatch.

Figure 37. Emergency Medical Dispatch protocol performance



NFPA 1221 also has a performance standard of processing events within 60 seconds 90% of the time. WFD-CC has a 4-year average of 1 minute, 56 seconds from call answer to responding unit notification. While this exceeds the NFPA standard for fire and EMS events, this number includes law enforcement calls for service. NFPA allows the agency having jurisdiction to determine acceptable law enforcement call processing times. WFD-CC was unable to break out fire department responses in these statistics.

Figure 38. Call Answer and Call Processing All Disciplines

Year	Calls for Service	Average Call Receipt to Call in Queue	Average Call Queue to Dispatch	Average Total Call Receipt to Dispatch
2015	20,258	00:52	01:42	02:35
2016	35,713	00:33	00:59	01:33
2017	35,465	00:36	01:15	01:51
2018	33,127	00:32	01:14	01:47
		00:38	01:18	01:56

ANALYSIS

- All medical calls are processed through the Priority Dispatch EMD protocols. EMD takes longer to process the call, but the benefits of more consistent and meaningful pre-arrival information and matching the most appropriate response to the call far outweigh the additional time required.
- In their latest ISO review, WFD-CC earned 100 percent of the credits allowed.
- Use of a fire service dispatch center has produced positive effects for FFD. Input provided by FFD mentioned courteous, professional, and knowledgeable dispatchers who are receptive to suggested changes and open to constructive criticism when mistakes are made.
- Based on the performance measures noted in this report and personal interviews, it appears that WFD-CC has sufficient staffing to handle emergency calls for FFD.
- There is room for improvement with the Pre-Arrival Instructions (PAIs) in EMD. This is being addressed through increased minimum staffing, additional training, and repetition.
- One issue for FFD is interoperability with Fairview PD. FPD has their own dispatch center; interactions between FFD and FPD require a phone call between the two dispatch centers. FPD is also on the county analog radio system, and FFD is on the regional trunked radio system; face-to-face conversations or relayed requests through the two dispatch centers are required. This is an operational issue that must be addressed.
- The use of priority dispatching takes more time, but provides needed information to determine the most appropriate and cost-effective response. More study is needed to determine the actual impact and the potential to “weed out” unnecessary questions. In the meantime, “pre-alert” mobilization of all units on medical calls will eliminate any delay.

ESCI recommends that FFD:

- Continue to use WFD-CC for communications needs
- Continue use of priority dispatching, ESD determinants, and protocols
- Consider selected use of “pre-alerts” to eliminate any delay associated with priority dispatching and potential to “weed out” unnecessary questions
- Continue PAI improvement activities
- Continue participation in the Collin County interoperability plan to determine options and address FFD-FPD interoperability issues

Best practices for adding rapid response vehicles—squads

What are the best practices in adding squads or Rapid Response Vehicles (RRVs) to fire fleets, how are they most frequently used?

If they are added should they be staffed in addition to staffing of other fire apparatus and ambulances (In the fire service, a Squad is an all-purpose vehicle that is much smaller and less expensive than a fire truck with big ladders that commonly costs \$1 million or more).

ESCI reviewed best practices for adding rapid response vehicles—squads—to fire department apparatus and has these observations and recommendations.

BACKGROUND

Rapid Response Vehicles (RRV's) are best utilized within high volume response systems that are trying to reduce the utilization of front-line suppression apparatus. High-volume systems will typically staff the vehicles as front-line apparatus that are assigned for the initial triage, treatment and transport preparation. RRV's provide the greatest value during the peak demand period of the day that typically occurs between the hours of 8 AM to 8 PM.

Agencies that maintain 4- to 5-person staffing on suppression units may also opt for cross-staffing an RRV for medical incident responses. This allows for a minimum staffing level to be maintained on the suppression unit and an opportunity to rejoin the RRV with the suppression unit to operate as a single company at fire incidents. There are four basic types of RRV: squad, transitional, fire-capable, and special event

SQUAD OR "FLY CAR"

The squad, or 'fly car', is a non-transport ALS response unit, staffed with one or two-person crew, including a paramedic or paramedic supervisor. The unit is capable of providing the same level of care as an ALS ambulance, but has no transport capability. Often used in a tiered response system to reduce wear and tear on larger fire apparatus.



TRANSITIONAL

The transitional response vehicle, or TRV, is a transport unit, similar to an ambulance, that is designed to respond to non-critical emergency medical calls, treat the patient at the scene and refer to a primary care physician, or transport to a non-traditional care facility. Often used in a tiered response system to reduce wear and tear on larger fire apparatus.



FIRE-CAPABLE

The fire-capable RRV is a small fire apparatus with BLS medical support capability. This type of RRV often has an AED, medical supplies, water tank, pump, and attack hose, along with extrication tools to respond to motor vehicle collisions. Often used in a tiered response system to reduce wear and tear on larger fire apparatus..



SPECIAL EVENT

Special event RRV's and two-person crews are often used for fast medical response in off-road, congested, crowded conditions that have a large amount of foot-traffic such as special events, carnivals, or festivals. Available with open-air, skid-unit or enclosed patient care area. Usually hand over patient care to regular EMS care at event transfer point or onsite treatment center.



FINDINGS

While use of an RRV can reduce the initial unit purchase price—an RRV would cost \$50,000-\$150,000 vs. \$500,000 for a fire apparatus, the small system staffing levels of FFD—only 8 station personnel assigned to 3 units per shift—would make it difficult to justify at this time. For FFD to integrate the use of RRV's without negatively impacting other response capabilities would require up to eight additional, full-time staff.

Likewise, given the low Unit Hour Utilization (UHU) of all FFD units, it would be hard to justify taking one of the existing fire apparatus units out of service to cross-staff an RRV. Again, the alternative is to add staff.

Thus, an RRV does not appear to be a desirable substitute for a fire apparatus at this time. However, given the potential positive impact of an RRV, the department should begin deliberation into the various types of RRV to determine the desired response capabilities, plus the required equipment and staffing, to best meet community needs as part of the pilot program and follow-on decisions.

In the future, addition of an RRV could be considered if there appears to be a need for additional, peak-time EMS response units, or if the department notices a large increase in the number of non-critical medical calls. Possible trigger points for deployment could be when:

- Annual Engine 752 or Truck 751 utilization rates exceed 10 percent; or
- Annual Medic 752 utilization rates exceed 15 percent.

Based on an analysis of historical response patterns, there is a definable peak-time demand between 0800 and 2000 as shown in the following figure. This corresponds to a 4-on, 4-off, 12-hour per day work shift, or similar variation. However, this approach would require six additional, full-time personnel to take full advantage of adding an RRV and would have to be based on the availability of funding and be weighed against other options, such as adding one additional, medically-trained firefighter to each fire apparatus and allowing the flexibility of cross-staffed, 4-person fire apparatus.

Figure 39. Highest (Peak) System Demand (12-hour Period)

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
2015	13	14	17	12	19	18	20	28	32	42	59	40	45	59	52	61	47	43	38	46	37	31	25	26
2016	15	23	14	11	11	14	15	25	36	47	50	57	53	53	77	72	46	62	42	58	38	40	43	27
2017	24	22	20	5	22	14	33	32	49	52	53	45	48	56	74	62	57	66	63	45	45	39	32	31
2018	23	29	26	18	9	24	35	36	53	55	53	49	58	75	67	65	84	63	74	55	51	60	39	36
Grand Total	75	88	77	46	61	70	103	121	170	196	215	191	204	243	270	260	234	234	217	204	171	170	139	120

However, as shown here, the overall low volume of service demand suggests this demand is not consistent from day-to-day, and this would make peak-time shift scheduling problematic. Again, the low volume and limited staffing suggest against use of an RRV at this time, especially when weighed against the cost-benefit.

Figure 40. Incident Demand – Actual and Average

Month	Year	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Grand Total	
Jan	2015			3	4	4	3	4	1	2	6	4	1			5	2	2		4	2	3	2	2	3	1	3	4				69 (2)		
	2016	1	1	2	2	3	1	1	1	2	2	5	4	1	1	2	1	4	3	1	1		1	3	3	2	4	1	1	5	1		61 (2)	
	2017	1	1	2	1	4	2	7		3	2	1	2	3	2	3	3	3	1	3	4		2	1	1	5	2	2	1	2	4		71 (1)	
	2018	5	4	7	8	5	4	1	3	3		2	4	3	4	4	6	8	4	4	2	3	3		7	3	2	3	4	1	7	2	116 (8)	
Jan Avg		2	2	4	4	4	3	3	3	2	2	3	4	4	2	3	4	4	3	3	2	3	4	2	4	2	3	3	2	2	5	3	79	
Feb	2015	1		3	4	3	2	2		2		3	1	2	5	1	1	4	2	3	2	1	1	2	1	3			4	1			54 (1)	
	2016	6	3	1	2	3	2	1	6	2		4	4	3	1		5	2	2		1	3	3	3	4	2		1				64 (3)		
	2017	2	5	2	4	2	1	1	2	2	2	2	3	7	3	1		3	2	3	2	1	2	2	2	1	4	4				69 (2)		
	2018	5	1	2	2	4	2	2	6	7	4	2	1	1	3	3	3	3	1	1	6	1	4	4	5	2	4	3	7				89 (6)	
Feb Avg		4	3	2	3	3	2	2	4	4	3	2	3	4	3	2	4	3	2	2	3	1	3	3	3	2	3	4	3				69	
Mar	2015	2	4	6	1	4	3	4	1		1	1	2		2	1	2	3	1	2	2	2	2	4	2		3	1	1	3	3	1	64 (1)	
	2016	4	3	2	3	2	1	1	2	1	2		4	5	2	1	3	2		7	5	4	2	3	2		1		1	2	3	1	69 (3)	
	2017	1	3	2	3	6	1	3	1	1	1	1	2	6	1	5	1	6	6		1	2	3	3	1	4		2	1	4		75 (5)		
	2018	2	4	1	2	3	4	3	1	3	3	1	4	6	2	3	2	5	3	4	2		3	6		2	1	6	3	1	2	2	84 (4)	
Mar Avg		2	4	3	2	4	3	3	1	2	2	1	3	5	3	3	2	4	3	4	3	3	3	4	2	3	2	3	2	3	3	2	73	
Apr	2015	3	1		1	3	1	1	3	1		3	1	2			1		5	2	4		2	1	2	1	1	1			1	1	42 (1)	
	2016	4		3	3	3	1	2	2	4	1	14	2	2	2		3	1	1	2	1	4	3	2	7	1	2	1		2	2		75 (2)	
	2017	2	2	5	3		1	2	4	2	4	5	1	1	1	1	7	1	2	1	6	1	4	1	3	3	1		2	3		71 (3)		
	2018	2	3	2	2	4	1	2	5		2	4	1	4	1	2	1	3	5	5	5	2		2		3	2	4	2	2	2		73 (4)	
Apr Avg		3	2	3	2	3	1	2	3	3	2	6	3	2	2	1	2	4	3	3	3	3	3	2	4	2	2	2	2	2	2	2	65	
May	2015	1	2	2	2		5	3	2	3	1	1	3	1	3	3	1	1	2	5	3	2	3	2	3	2	2	3	3	1			70 (2)	
	2016	3	1	1	2		5	4	3		2	1	3	3	3	1	2	4	3	4	2		3	7	1	1	5	2	5	2	4		77 (3)	
	2017	3	2	1	2	2	6	1	4	4	2	1	4	2	3	2	2	4	3	1	2	1	1	2	2	1		2	4	4	2		70 (1)	
	2018	2	2	3	6	2	6	3	2	4	2	2	2	4	7	2	5	2	1	1	3	1	3	3	3	4	5	3	11	3	2		99 (6)	
May Total		6	9	7	11	8	17	13	12	10	7	6	4	10	10	16	8	10	11	9	11	10	4	10	14	9	9	12	9	23	12	9	79	
Jun	2015	2	4	2	1	3	5	2	1	2	1	3	4	2		1	4	1	1	2	4	2	5	4	5	4	2	3	2	4	5		81 (4)	
	2016	1	1	2	7	1	1		2	2	2	5		1	1	1	4	2	4	1	4	3	3	5	1	4	1	2	1	3		65 (3)		
	2017	2	9	6	6		3	2	4	4	4	2	3	2	2	3	2	1	5	4	1	4	6	1		3	2	3	1	1		86 (5)		
	2018	2	3	3	3	2	5	2	5	5	3	2	6	3	2	3	3	2		1	2	4		2	6	3	4	2	5	3			86 (6)	
Jun Avg		2	4	3	4	2	4	2	3	3	3	2	5	2	2	2	3	2	1	3	3	3	4	4	4	3	3	2	3	2	3		80	
Jul	2015	2	5	1	2		3	3	2	1	5	2	1	1	2	3	1		2	2	4	3	2	3	1	3	4	2	1	4	7	3	75 (3)	
	2016	5		3	4	2	3	6	1	4	1		1	4	1	4	2	2	3	4	1	3	2	6	2	1	5	5	4	4	3	5	91 (6)	
	2017	3	5	4	1	6	3	14	4	1	3	5	4	3	2	2	1	2	2	5	5		3	2	6	2	2	1	4	2	1		98 (7)	
	2018	3	3	5	3	5		4	3	4	4	4	6	3	4	7	4	2	1	6	3	2	2	3	2	2	2	6		2	2		97 (6)	
Jul Avg		3	4	3	3	4	4	5	5	3	3	3	3	4	2	3	3	2	2	2	4	4	2	4	4	2	3	3	3	4	4	3	90	
Aug	2015	2	1	2	2	4	3	5	1	1	2	2	3	3		1	1	1		2	3	1	6	2	1		1	3	1	2	1	1	58 (2)	
	2016	4	1	3	4	1	3	2	6	1	1	4	7	3	1	3	2	1	3		1	1	3	1	2	1	1	2	2	3	5	3	75 (3)	
	2017	2	5	1	2	3	1	3	2	2	4	4	3	2	3	4	1	2	3	7	2	2	2		1	5	4	4	5	4	3	1	87 (4)	
	2018	4	2	2	3	1	4	2	2	6	1	2	1	2	4	7	2	7	10		2	3	2	3	5	5	6	5	6	1	2	2	106 (9)	
Aug Avg		3	2	2	3	2	3	3	3	3	2	3	4	3	3	4	2	3	5	4	2	2	4	3	2	4	3	4	2	3	3	2	82	
Sep	2015	1	1	5	2	3	1	1	2	3	3	5	3	1	1	6		2	3				3	2	2	5	4	4	5	1			69 (5)	
	2016	2	4	5	1	6	1	3	3		1	2	6	3	4	1	1	4	5	2	9	3	1	2	2	4		4	3	4			86 (5)	
	2017	3	2	2	4	2	7	3	4	5	1	3	2	5	2	2	1	2	3	3	1	2	4	4	1	2	3	3	5	4			85 (4)	
	2018	3	5	7	5	2	4	4	11	1	2	3	5	3	1	4	2	3	1	7	2	5	5	5	4	3	6	6	1	4	1		115 (11)	
Sep Avg		3	3	4	4	3	4	3	5	3	2	3	4	4	2	3	3	2	3	5	2	5	4	3	2	2	5	4	4	4	4	2		89
Oct	2015	1		5	2	3	1	1	3		4	3	2		2	3	5	2	3	2	5	4	5	5	1	3	2	5	4	2	5	3	86 (6)	
	2016	5	2	2	2	4	3	4	2	3	1	2	3	3	1	3	1	3		1	4	8	2	4	3	3	7	4	1	1	1	3	86 (3)	
	2017	1	4	1	3	3	2	6		1	1	1	1	2	4	1	2	4	3	2	2	3	3	4	4	2	2	5	4	3	2	2	78 (2)	
	2018	1	2	3	4		4	2	3	5	3	3		4	4	6	4	3	1	4	3	6		1	4	5	1	3	1	1	5		86 (5)	
Oct Avg		2	3	3	3	3	3	3	3	3	2	2	2	3	3	3	3	3	2	2	4	4	5	3	4	3	3	4	3	3	2	3	84	
Nov	2015	2	7	5	5	1	1	2	1	8	2	3	1	1	2	2	1	3		1		2	3	3	3	1	4	4	1	4			77 (4)	
	2016	2	3	2	2	2	2	3	5	1	3	3	2	3	3	2	2	1	2	11	5	2		2	6	1	1	2	4	3	4		84 (4)	
	2017	1	3	3	3	5	5	1	3	3	2	5	3	4	5	1	3	1	5	2	3	4	4	1	2	3	4	4	5	4	1		93 (6)	
	2018	2	3	2	2	2	4	7	3	2	1	4	4	7	3	2	2	2	3	3	5	3												

RECOMMENDATIONS

ESCI recommends that FFD:

- Consider adding a peak or fulltime RRV when annual utilization rates exceed identified trigger points
- Consider cross-staffing a reserve ambulance to function as a second medic unit during days / times when system utilization rates exceed single medic unit capacity (including mutual aid)
- Consider further study and a pilot program, with existing resources and personnel, to test the validity of an RRV component to EMS service delivery and the cost/benefit of this approach.
- Consider different RRV types and determine the desired response capabilities, plus the required equipment and staffing to best meet community needs as part of the pilot program.

Best practices for trends in fire/EMS service delivery

What are best practices related to future trends in the fire service that Fairview should consider in its future planning?

BACKGROUND

REVIEW OF HISTORICAL SYSTEM PERFORMANCE

Generally, emergency response is increasing across the country, even in areas of limited population growth. In areas where population is increasing, the number of fire department responses appears to be increasing at a faster rate than population growth.

Most of this growth is fueled by EMS calls. Even in areas where emergency ambulance transport service is provided by others and fire service involvement is limited to emergency first responder support, the number of EMS calls is the fastest-growing segment of fire department response.

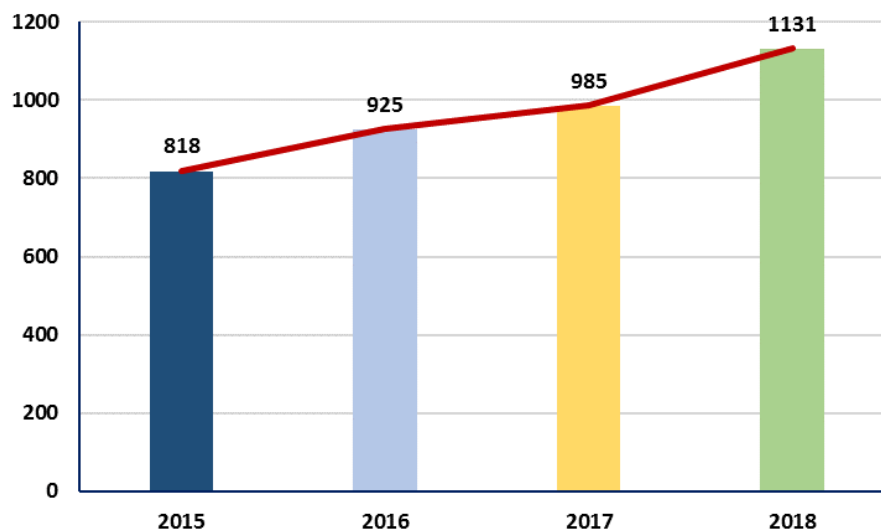
ESCI reviewed best practices for trends in fire service delivery, especially those that impact service levels and cost reduction, and has these observations and recommendations.

FINDINGS

In the service demand analysis, ESCI reviewed current and historical service demand by incident type and temporal variation. GIS software provided a geographic display of demand. National Fire Incident Reporting System (NFIRS) data provided by FFD was utilized to illustrate the specific call types and volume increases over the past four calendar years.

The following figures display historical FFD and overall service demand for the previous four calendar years and a breakdown by NFIRS incident category for incidents between January 2015 and December 2018 (study period). The incidents displayed in the following figure represent all incident types including automatic and mutual aid given to neighboring fire jurisdictions.

Figure 41: Service Demand, 2015-2018

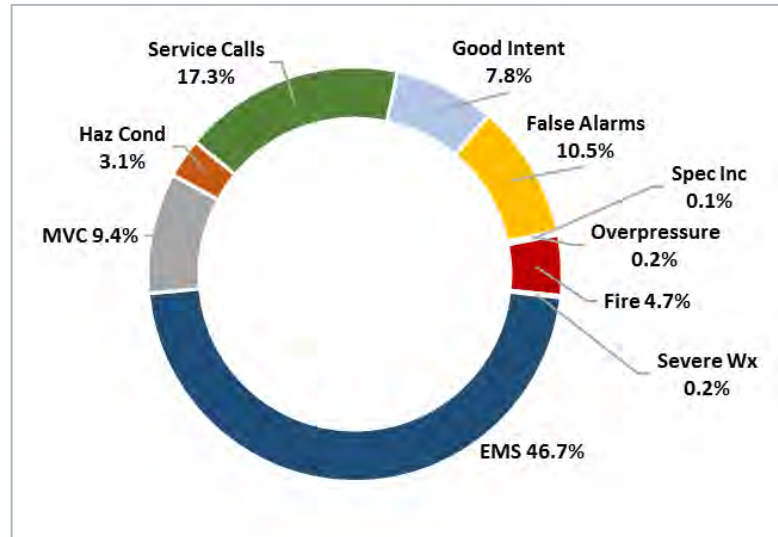


Overall for both fire and EMS related incidents, service demand increased by nearly forty percent, or 9.6 percent per year during the study period. This trend is expected to continue, or to possibly increase at a faster rate based on population growth.

As shown by the next figure, EMS calls are the most common type of call and make up almost half (46.7 percent) of all FFD responses. When motor vehicle collisions are included, these cover over half (55.1 percent) of all FFD responses. Collectively, service calls—hazardous conditions, good intent calls, weather related calls, and other service calls account for another 28.7 percent, almost one of every three calls.

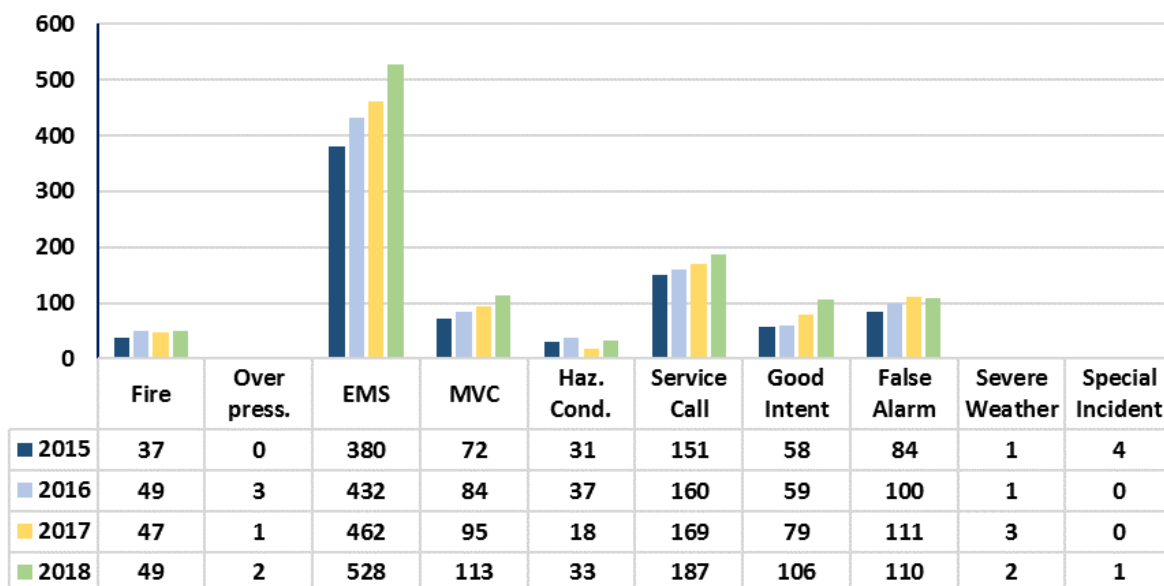
False alarms represent just over 10 percent of all calls; less than 5 percent of all calls are fire responses. Clearly the FFD is more than just a 'fire' department; it is an 'all-hazard, all-risk' response department.

Figure 42: Incident Frequency by Type



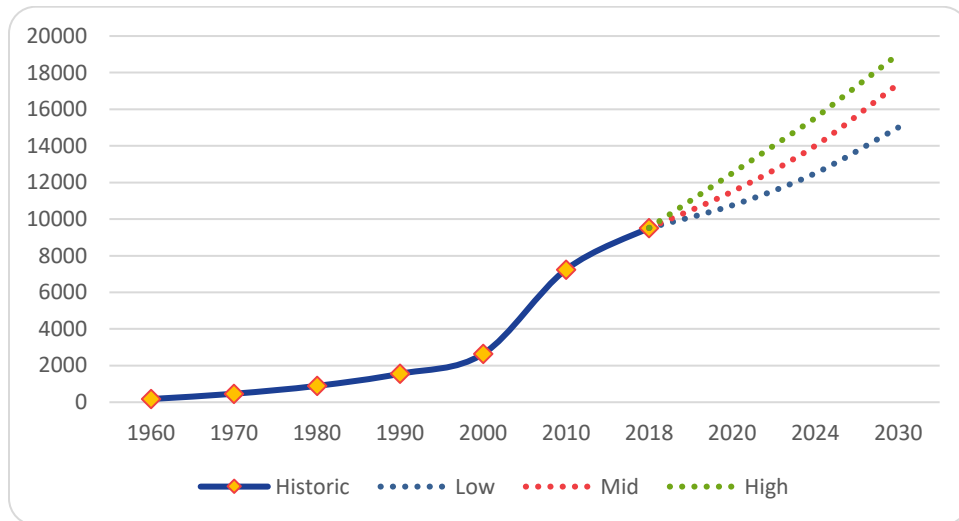
As shown below, EMS-related incidents represent not only the highest percentage of incidents, but also the fastest growing segment of all calls. Collectively, the number of motor vehicle collisions, service calls and false alarm calls are rising at about the same rate, but significantly slower than EMS calls. On the other hand, the number of fire calls has remained relatively flat. Again, this trend is expected to continue—as the population grows, so will the number of fire department responses. Ultimately this will require additional resources, both in staffing and the number of apparatus units.

Figure 43: Service Demand by NFIRS Incident Category, 2015-2018



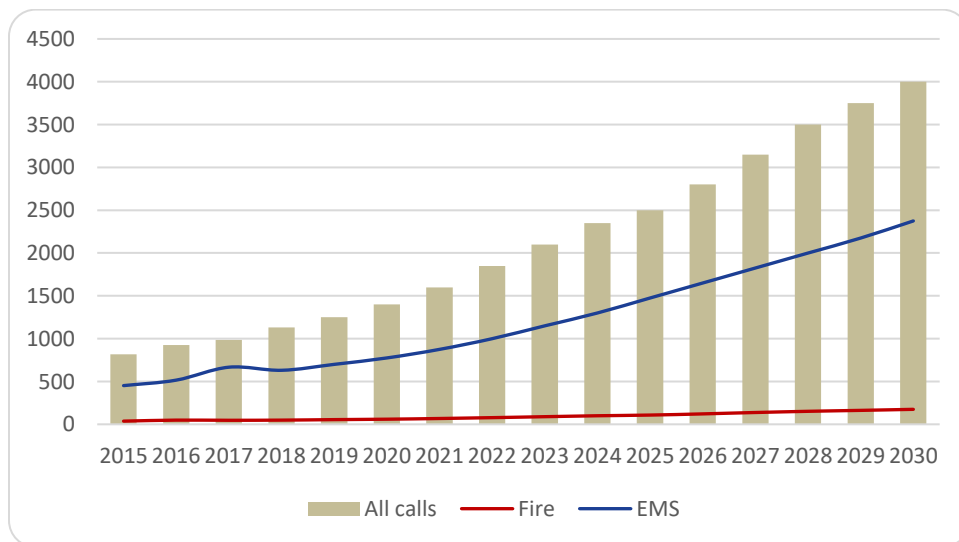
Depending on the rate of population growth and continuation of these trends, the number of responses could double in the next five years and double again over the next twenty years as shown in the next figures. Most of this growth is expected to be EMS-related calls. The most telling impact will most likely be an increase in the number of concurrent or simultaneous calls, more traffic mobility issues, and the need for an additional medic unit and staff. Potential population projections are shown in the next figure.

Figure 44: Population Projections, 2018 – 2030³¹



This rate of growth is daunting and could be problematic if plans do not include sufficient funding to sustain this pace of rapid growth. It will be very important to monitor population growth and response rates to determine if growth will return to the rates from 2000 to 2010, or remain the more temperate growth rates between 2010 and 2020.

Figure 45. Projected FFD responses³²



³¹ Adapted from NCTCOG population projections, 2019

³² Adapted from FFD historic data, 2016-2018

DISCUSSION OF BEST PRACTICES

Several trends have emerged in today's fire service regarding achieving the maximum benefit from available resources. As the fire service moves toward systems more heavily focused on EMS service delivery and are forced to shift away from a dependence on volunteer firefighters, several communities have realized the benefits of cost-sharing apparatus, equipment, and personnel. This can come in a variety of formats, but often is seen in automatic aid agreements, consolidations, peak demand units, shared stations and cross-department staffing of apparatus.

An example of how this may occur would be a jointly operated fire station near the boundary of two jurisdictions. The costs of construction, maintenance and staffing of the fire station would be shared by both jurisdictions and both would benefit from the additional fire company and its staff serving the area. Additional considerations may be a contractual agreement that guarantees one or both parties a minimum amount of time and usage of the facility for an agreed upon price, or establishing a prorated dollar amount should one party wish to leave the agreement early.

Another example using apparatus could involve one jurisdiction providing some costs of an expensive piece of apparatus, such as an aerial platform truck, in exchange for the neighboring jurisdiction providing automatic aid of the unit and its personnel. Both parties would benefit at a significantly lower upfront cost than both purchasing an aerial for their respective jurisdictions.

Finally, as the dependence on EMS service delivery becomes more prominent in all fire departments across the country, the use of peak demand units to provide care is also an emerging trend. These units are utilized at specific periods during the day or year when demand for services increases. Many organizations have utilized single, certified paramedics and RRV's to reduce program costs, while others have used cross-staffing or added personnel to meet community needs. FFD will need to continue to monitor temporal response demand to identify any trends or patterns that may present themselves and suggest the use of peak-time staffing. One option may be to expand the concept of special event staffing and apply it to peak-time staffing needs.

There are as many options and variations available as the number of fire departments in the country. The key emerging trends in the fire service are cooperation, the evaporation of jurisdictional boundaries, and the efficient use of all internal and external resources available.

FINAL OBSERVATIONS

FFD has not established formalized response standards and targets upon which is 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 FFD leadership and decision makers.

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.

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 FFD 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 FFD service area.

Note that the response goals presented in the following figure are for example only. Defining and identifying the critical tasks, the staff, and the response time necessary to meet specific fire department response goals is something that should be accomplished by the fire department in consultation with town policy-makers.

Figure 46: Example Community Expectations-Response Goals³³

Service	Community Outcome Expectations
Fire Suppression	For all fire incidents, the department shall first arrive within 5 minutes with sufficient resources to rescue at-risk victims and begin fire control operations. An effective concentration of resources shall arrive within 10 minutes to be capable of containing the fire, rescuing at-risk victims, and performing salvage operations, while providing for the safety of responders and the public.
Wildland Fire Suppression	For all wildfire incidents, the department shall arrive within 10 minutes with sufficient resources to first protect homes and other buildings, then to begin controlling the rate of fire spread.
Emergency Medical Services	For emergency medical incidents, the department shall arrive within 390 seconds (6:30 minutes) for an initial EMS response and 630 seconds (10:30 minutes) for an ALS response with a sufficient number of trained and equipped personnel (minimum number = 5) to provide medical services that will stabilize the situation, provide care and support to the victim, and reduce, reverse, or eliminate the conditions that 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 rescue of victims is required the department 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.

³³ Based on examples provided in the publication Center for Public Safety Excellence (CPSE) Community Risk Assessment: Standards of Cover, 6th Edition.

RECOMMENDATIONS

ESCI recommends that FFD:

- Consider peak-unit staffing model to manage high demand periods in the future.
- Expand EMS service delivery model to include hospital transfer and alternate care transports.
- Maintain engine company response, or rotate crew assignments, on medic calls to maximize skills, customer service, reduced burnout, and overall reliability.
- Deploy Pulse Point CPR to create a more engaged citizenry and improve cardiac arrest survival rates.
- Explore opportunities to be part of the proposed ET-3 program that seeks alternative triage, treatment, and transport options for Medicare patients.
- Evaluate and identify the high utilizer group (HUG) of patients that access 911 more frequently. The identification and referral to a primary care or other healthcare provider needs to be done early to provide the greatest impact.
- Anticipate medical prevention opportunities that may reduce future demand as part of a community-risk reduction program. For example, fall-related injuries are one of the leading causes for 911 activation in an aging community.
- Develop a strategic plan to address identified critical issues—Administrative staffing, Retention of current employees, Benefits and compensation- setting benchmarks, and Uncertainty about Fire Station 1 rebuild project—and future, emergent issues

Conclusions and Recommendations for Future Planning

Conclusions

Based on interviews and observations, ESCI found the Fairview Fire Department to be a progressive department with good leadership and a strong customer-centered culture. Overall, the department seems well-suited for a community with the geographic size, population, and demographic characteristics of the Town of Fairview.

SWOT ANALYSIS RESULTS

For a more in-depth understanding about the department and services provided, ESCI conducted a SWOT analysis and identified the following strengths, weaknesses, opportunities and threats.

Strengths

- Core crew, dedicated to the community and future of the department
- Town-based support for public safety, fire prevention, and community risk-reduction
- Strong customer-service culture with trust in FD leadership
- Progressive transition from volunteer to career staffing
- Addition of department-based EMS and ambulance service

Weaknesses

- Limited staffing and call volume that is characteristic of smaller communities and departments
- Must rely on neighboring departments to meet effective response force (ERF) requirements
- Limited promotional opportunities
- No fulltime administrative support staff

Opportunities

- Community outreach events, *e.g.* annual pancake breakfast, parades, and National Night Out
- TIFMAS deployments to gain knowledge, experience, and reimbursement for deployment
- Recruitment and retention of equally-trained volunteers to ease staffing

Threats or Challenges

- Regional competitive pay and benefits
- Economic sustainability
- Large, community-wide disaster that overwhelms FFD capabilities

STRATEGY OPTIONS

This analysis suggests one or more of the following strategies be considered to meet emergent community needs and/or expectations.

- Use town-based support to build recruitment and retention of equally-trained volunteers
- Use scenario-based training and/or TIFMAS deployments to exercise perishable skills
- Hire for fit: Build on the concept of dedicated, core crews and strong customer-service culture to offset threat of regional pay and benefits competition
- Continue use of community outreach events to strengthen town-based support for the department

Recommendations

MINIMUM STAFFING

Generally, is the Town adequately staffing existing resources (Fire and EMS personnel) and is it adequately projecting the growth needs for additional resources in equipment and staffing?

ESCI recommends that FFD:

- Adopt department goals for resource deployment in accordance with NFPA 1710, adapted to meet community expectations and needs, based on the availability of funding
- Ensure policies and adequate staffing to comply with federal and State law regarding “two-in, two-out” requirements
- Continue to ensure an adequate span of control for supervisors
- Establish and monitor performance metrics for the deployment of resources
- Conduct a critical staffing analysis based on adopted national standards and community needs
- Continue volunteer recruitment programs to augment staffing needs
- Pursue Staffing for Adequate Fire and Emergency Response (SAFER) grant funding for additional personnel
- Develop and adopt a strategic plan that includes staffing requirements based on community needed, established trigger points, and availability of funding

CURRENT AND FUTURE ADMINISTRATION STAFFING

Is the Town adequately staffed for (Fire and EMS) administrative needs and is the planning adequate for future administrative staffing needs?

ESCI recommends that FFD:

- Add an administrative support staff position, based on availability of funding. This can be either a civilian or certified position based on the needs of the department.
- Consider cross-certifying one position for each fire shift as a fire inspector to provide additional support for fire marshal operations during times of heavy inspection workload

BEST PRACTICES FOR FIRE STATION LOCATION

What are the best practices under National Fire Protection Association (NFPA) standards and International Standards Organization (ISO) standards for siting fire stations and does the Town meet those standards?

Appropriately designed and maintained facilities are critical to a fire department's ability to provide services in a timely manner and with appropriate deployment of assets. ESCI recommends that FFD consider the following "best practices" for new Station 1:

- Provide washer/extractors to allow firefighters to effectively decontaminate their gear following exposure to carcinogens
- Provide laundry equipment to allow firefighters to effectively wash their uniforms, bedding, and other linen before leaving the station
- Provide storage for personal protective equipment (PPE) in an environment protecting the gear from exposure to vehicle exhaust fumes and ultraviolet (UV) lighting
- Provide proper exhaust capture equipment to reduce or eliminate employee exposure to diesel exhaust in the apparatus bays
- Provide fire protection systems—fire-rated compartments, smoke detectors, alarms, and automatic sprinkler systems
- Ensure compliance with the American Disabilities Act (ADA)
- Provide drive-through apparatus bays for all emergency response vehicles if the site location and station placement allow
- Provide workout and exercise facilities to improve cardiac health
- Consider the recommendations found in NFPA 1500, 1710, 1720, and 1851 to improve firefighter health and safety and to improve turnout times

BEST PRACTICES FOR EMERGENCY COMMUNICATIONS

What are the best practices in introducing priority dispatching and does that result in identifying certain EMS calls that only require dispatching of an ambulance and not an additional first responder unit?

What are the advantages and disadvantages of this type of dispatching?

ESCI recommends that FFD:

- Continue to use WFD-CC for communications needs
- Continue use of priority dispatching, ESD determinants, and protocols
- Consider selected use of "pre-alerts" to eliminate any delay associated with priority dispatching and potential to "weed out" unnecessary questions
- Continue PAI improvement activities
- Continue participation in the Collin County interoperability plan to determine options and address FFD-FPD interoperability issues

BEST PRACTICES FOR ADDING RAPID RESPONSE VEHICLES—SQUADS

What are the best practices in adding squads or Rapid Response Vehicles (RRVs) to fire fleets, how are they most frequently used?

If they are added should they be staffed in addition to staffing of other fire apparatus and ambulances (In the fire service, a Squad is an all-purpose vehicle that is much smaller and less expensive than a fire truck with big ladders that commonly costs \$1 million or more).

ESCI recommends that FFD:

- Consider adding a peak or fulltime RRV when annual utilization rates exceed identified trigger points
- Consider cross-staffing a reserve ambulance to function as a second medic unit during days / times when system utilization rates exceed single medic unit capacity (including mutual aid)
- Consider further study and a pilot program, with existing resources and personnel, to test the validity of an RRV component to EMS service delivery and the cost/benefit of this approach.

BEST PRACTICES FOR TRENDS IN FIRE/EMS SERVICE DELIVERY

What are best practices related to trends in the fire service that Fairview should consider in its future planning?

ESCI recommends that FFD:

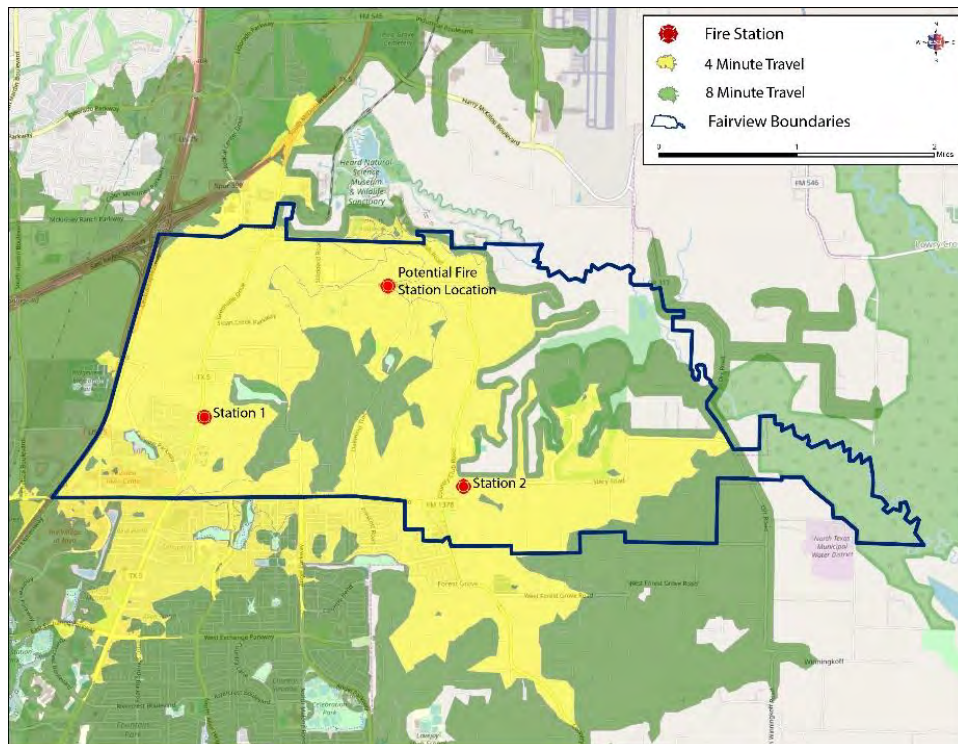
- Continue to provide current levels of services as an example of “best practices”
- Continue to explore the potential to recruit and retain formally-trained volunteers to supplement career personnel.
- Maintain engine company response, or rotate crew assignments, on medic calls to maximize skills, customer service, reduced burnout, and overall reliability.
- Deploy Pulse Point CPR to create a more engaged citizenry and improve cardiac arrest survival rates.
- Explore opportunities to be part of the proposed ET-3 program that seeks alternative triage, treatment, and transport options for Medicare patients.
- Evaluate and identify the high utilizer group (HUG) of patients that access 911 more frequently. The identification and referral to a primary care or other healthcare provider needs to be done early to provide the greatest impact.
- Anticipate medical prevention opportunities that may reduce future demand as part of a community-risk reduction program. For example, fall-related injuries are one of the leading causes for 911 activation in an aging community.
- Develop a strategic plan to address identified critical issues—Administrative staffing, Retention of current employees, Benefits and compensation- setting benchmarks, and Uncertainty about Fire Station 1 rebuild project—and future, emergent issues

Future Planning

Based on the findings of this report, ESCI strongly recommends that the Fire Department prepare a Strategic Plan with regular and periodic updates to ensure the overarching department goals and initiatives will provide the desired level of coverage and service throughout the community. As part of the strategic planning process, the Department should include consideration of the following options:

- **Option 1:** Consider upgrading current mutual aid agreements with the City of McKinney to a reciprocal, automatic aid agreement to request and dispatch McKinney Engine 6/Medic 6 as a programmed first-alarm response in the Town of Fairview. Primary benefit is to reduce overall response time for a complete ERF during an emergency at no additional cost (other than fuel and maintenance) for all parties.
- **Option 2:** Consider the recruitment and retention of formally-trained volunteers to supplement existing career crews and reduce budgetary impact of adding response personnel staff. Primary benefit is to reduce dependency on mutual aid and part-time personnel.
- **Option 3:** If response times and other utilization parameters are approaching established trigger points, consider adding personnel to one of the existing stations, or adding a third station with a rapid response vehicle (RRV) and engine company, plus a total of four crew per shift) in the vicinity of Hart and Beechwood. The primary benefit of a third station is to increase successful outcomes by reducing overall response time and travel distance in the northern part of the Town while reducing dependency on mutual aid.

Figure 47. Effect on Response Time with 3rd Station

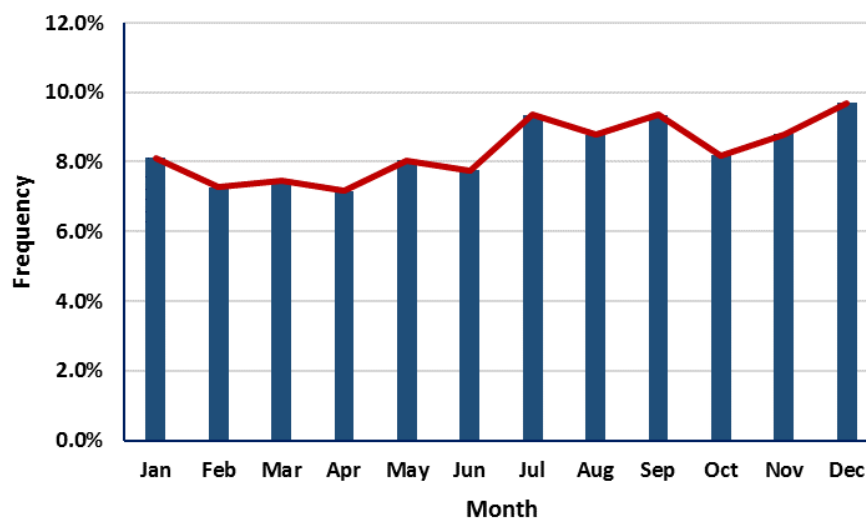


Appendix A. Temporal Response Analysis

TEMPORAL VARIATION

Another trend to monitor is temporal, or time-based, variations. Analysis of when emergency responses occur can be helpful in order to determine if there are specific times of day, week, or year where staffing can be modified from traditional full staffing to better fit the demands for service. The following figure illustrates service demand for all FFD incident types by month.

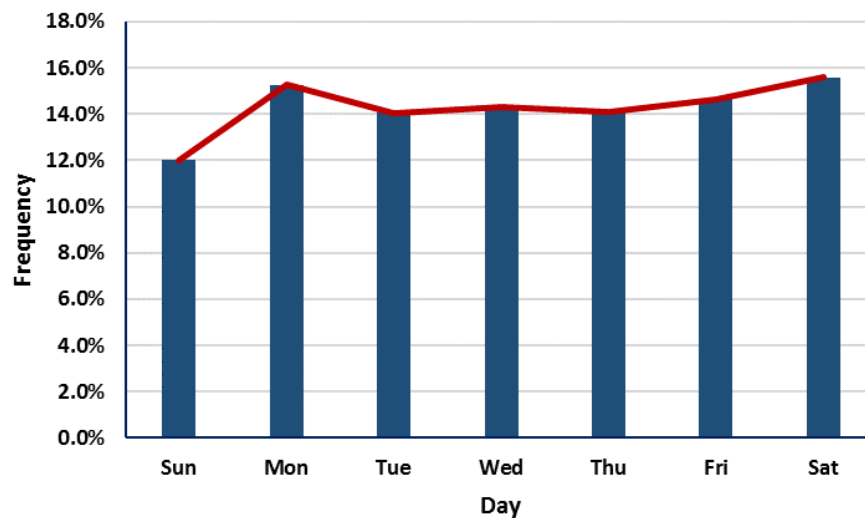
Figure 48: Service Demand by Month of the Year, 2015-2018



As seen, service demand remains relatively consistent throughout the year, with an increase that occurred during summer months and continued through years' end. Although noticeable, there is not enough difference to suggest any changes in staffing based on time of year.

The following figure continues the temporal analysis with an examination of service demand by day of the week:

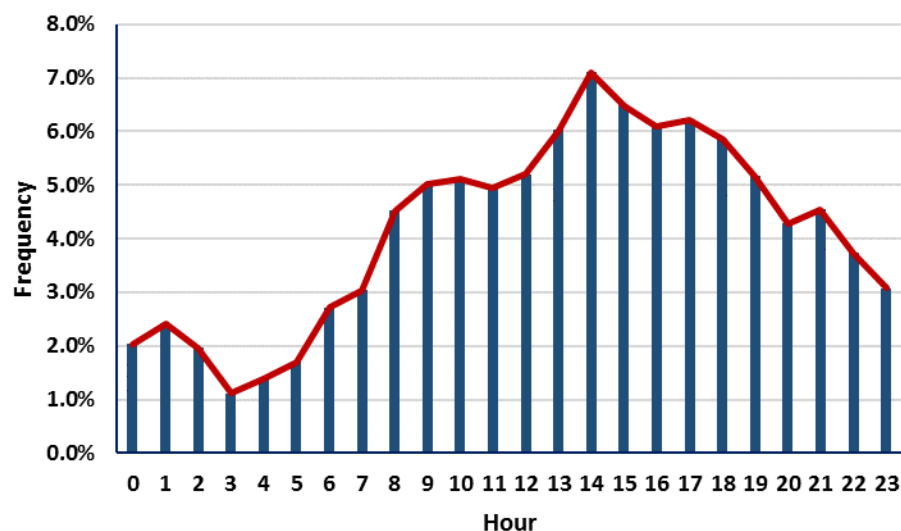
Figure 49: Service Demand by Day of the Week, 2015-2018



Similar to the service demand by month, the demand by day of the week remained relatively consistent. The most noticeable variation occurs on Sundays when service demand decreases. This is not uncommon and is expected as more activity occurs during the work week such as an increase in transient population tied to the retail/commercial labor force. In general, more activity occurs during the work week and the above data supports this. However, the increased demand on Saturdays for FFD does vary from what ESCI typically observes based on normal weekend call demand.

The final temporal analysis of service demand examines service demand by hour of day as shown below.

Figure 50: Service Demand by Hour of the Day, 2015-2018



Analysis of service demand with regard to specific times of the day revolves largely around the activities of the general population—workload increases during daytime hours and decreases during nighttime hours. Based on this history, time-of-day may be a candidate for peak-time staffing during the 8 AM to 8 PM timeframe; however, the current low volume of FFD responses does not justify additional units at this time.

In summary, historic data suggest that the trends in emergency response that are being experienced by the FFD are similar to those found in other parts of Texas and the country. Therefore, there does not appear to be any for significant changes at this time; however, there is a need to closely monitor population growth, demographics, the impact of development, especially in the Town Center area, and be ready and able to respond quickly to 'service trigger points' that indicate any negative impact on FFD response reliability or service delivery.

Appendix B. NFPA 1710 Response Analysis

A detailed discussion about NFPA 1710 standards for the individual components of total response time is beyond the scope of this discussion on station location. However, all components of response time affect the amount of time required from when a person contacts 9-1-1 and when the first unit arrives on scene.

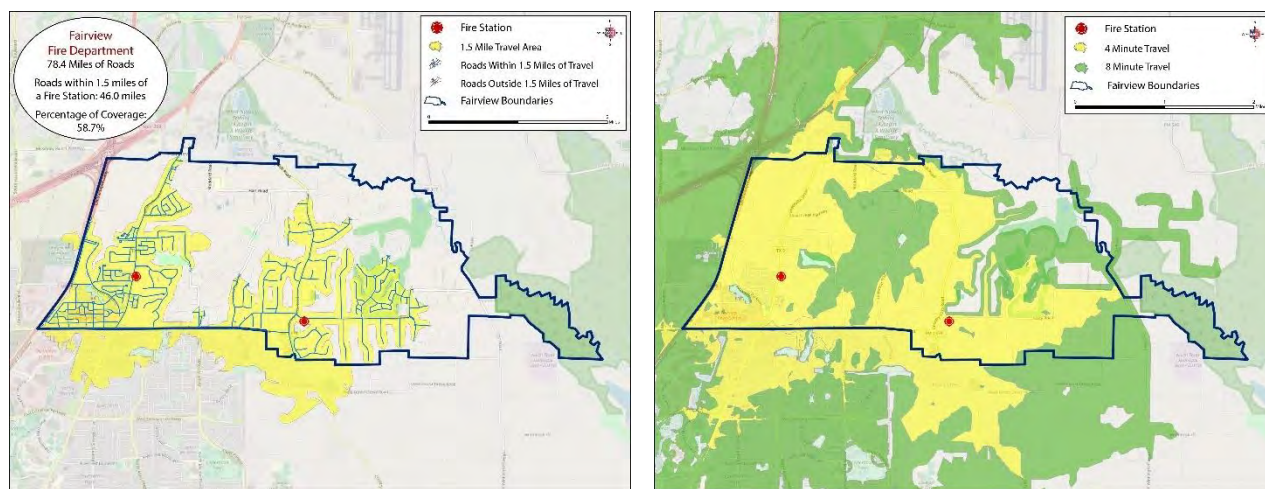
DEPLOYMENT OF RESOURCES: DISTRIBUTION VS. CONCENTRATION

Together with adequate staffing, fire station location and apparatus type are equally significant. Collectively, these factors affect response time and the probability of a successful outcome. Before discussing the staffing and deployment analysis of FFD resources, it is important to understand the concepts of distribution and concentration.

Distribution is the geographical placement of first-due resources in for initial intervention in a manner that provides rapid deployment and optimal response to all emergencies in all locations within the response jurisdiction.³⁴ Distribution can be evaluated by the percentage of the jurisdiction covered by the first-due units within adopted policy objectives. First unit arrival times are the best measure of distribution.

Typically, distribution is measured by the percentage of roads that are covered from each fire station within specific travel times, e.g. 4-minute, 8-minute, and 10-minute in accordance with NFPA 1710 benchmarks; or travel distance, e.g. 1.5 road miles, 2.5 road miles, and 5 road miles in accordance with ISO PPC® standards. Other factors to consider include population demographics, occupancy type and intended use, and access barriers such as topography, road location, and traffic patterns. Any study of distribution requires geographical analysis of the location of first due resources. The following figure shows two examples of distribution, one using 1.5 road-mile travel distance and the other showing 4- and 8-minute response time.

Figure 51. Example of GIS-based distribution analysis



Note that departments with areas where fire unit arrival times do not meet desired performance measures, it does not necessarily mean it has a distribution issue.³⁵

³⁴ *Community Risk Assessment: Standards of Cover*, 6th edition, Center for Public Safety Excellence, 2016.

³⁵ *Spokane report*, Feb 2019.

Concentration is the spacing of multiple resources so that an effective response force (ERF) can arrive on scene within expected time frames and performance objectives.³⁶ Concentration of resources is often used for placement of special operations units, such as technical rescue, hazardous materials response, wildland response, and aircraft fire rescue. In this case the specialized equipment is placed close to the identified hazard in order to provide shorter response times to specific risks.

According to a recent report, major fires have a significant impact on the resource allocation of any fire department.³⁷ In Fairview, this must be balanced with the expectation of additional EMS responses in the at-risk population due to age and the availability of funding. Thus, the challenge will continue to be how to maintain minimum required staffing and distribution for EMS response while preparing for a maximum-effort fire response.

RESPONSE PERFORMANCE

In the performance analysis, ESCI examines emergency incident response time performance within the FFD service area. The data used for this analysis is January 2015 through December 2018 emergency responses extracted from the FFD data. Non-emergency incidents, mutual or automatic aid incidents outside of FFD, data outliers, and invalid data points are removed from the data set whenever discovered.

In analyzing response performance, ESCI generates percentile measurements of response time performance of FFD. The use of percentile calculations for response performance follows industry best practices and is considered a more accurate measure of performance than “average” calculations. Commonly, the “average” measure is used as a descriptive statistic also called the mean of a data set. The reason as to why not to use averages for performance standards is due to the fact that they may not accurately reflect the performance for the entire data set and may be skewed by data outliers. One particularly good or bad value could skew the average for the entire set. Percentile measurements are a better measure of performance since they show that most of the data set has achieved a particular level of performance.

Fire service best practice documents such as the Center for Public Safety Excellence (CPSE) *Community Risk Assessment: Standards of Cover, 6th Edition*³⁸ and the NFPA 1710 *Standard for Career Fire Departments*³⁹ and the National Fire Protection Association (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* recommend measuring emergency response time performance at the 90th percentile; meaning 90 percent of emergency responses occur in the stated value or less. In basic terms, the 90th percentile means that ten percent of the values are greater than the value stated, and all other data is at or better than the stated performance. This can then be compared to the desired performance objective to determine the degree of success in achieving the goal.

³⁶ *Community Risk Assessment: Standards of Cover, 6th edition*, Center for Public Safety Excellence, 2016.

³⁷ *Spokane report*, Feb 2019.

³⁸ *Center for Public Safety Excellence (CPSE) Community Risk Assessment: Standards of Cover, 6th Edition*.

³⁹ *NFPA 1710, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments* (National Fire Protection Association 2016).

Industry best practices recommend measuring response performance from the time the emergency call is received at the dispatch center to the arrival of the first fire department apparatus. Tracking the individual components of the total response time allows for identifying deficiencies and areas for improvement. While progressing through the performance analysis, it is important to understand that, while collectively, the components of response performance are cumulative and influence total response time, each should be analyzed as an individual component. At the point at which the specific percentile is calculated, each exists as a set of data unto itself. The following are the individual components analyzed by ESCI:

- **Call Processing Time** – The amount of time between when a dispatcher answers the 911 call and resources are dispatched.
- **Turnout Time** – The time interval between when units are notified of the incident and when the apparatus are responding.
- **Travel Time** – The amount of time the responding unit actually spends on the road to the incident.
- **Response Time** – A combination of turnout time and travel time. Response time is the measure most commonly used by fire departments to discuss response performance. It is a measure of the time from the point the fire department is first notified of the call and the arrival time on scene.
- **Total Response Time** – Total Response Time adds the component of call processing time to response time. Thus, total response time is the amount of time from which a citizen or visitor first places a 911 call until resources arrive on the scene of an emergency.

It is important to note that NFPA 1710 does not actually specify a total response time performance goal. This time is calculated by adding the respective time elements as defined in NFPA 1710.⁴⁰ The current edition of NFPA 1710 includes the following benchmarks:

Figure 52. NFPA 1710 Benchmarks⁴¹

Time Component	Time in Minutes:Seconds		
	Fire	High-Rise Fire	EMS
Call processing	1:04	1:04	1:30
Turnout	1:20	1:20	1:00
Travel, 1 st unit	4:00	4:00	4:00
Travel 1 st Alarm	8:00	10:30	8:00
EMS 4-minute travel time is for unit with AED; EMS 8-minute travel time is arrival of ALS			

While ISO does not specify these specific numbers under their “Fire Department” section of FSRs PPC® review, ISO does allow the use of a “deployment analysis” based on the criteria found in NFPA 1710. Specifically, the ISO Fire Protection rating Schedule states, “they state that “the fire department meets the time constraints for initial arriving engine and initial full alarm assignment in accordance with the general criteria of in NFPA 1710.”⁴²

⁴⁰ Another NFPA standard, NFPA 1720, provides similar response time benchmarks for volunteer departments.

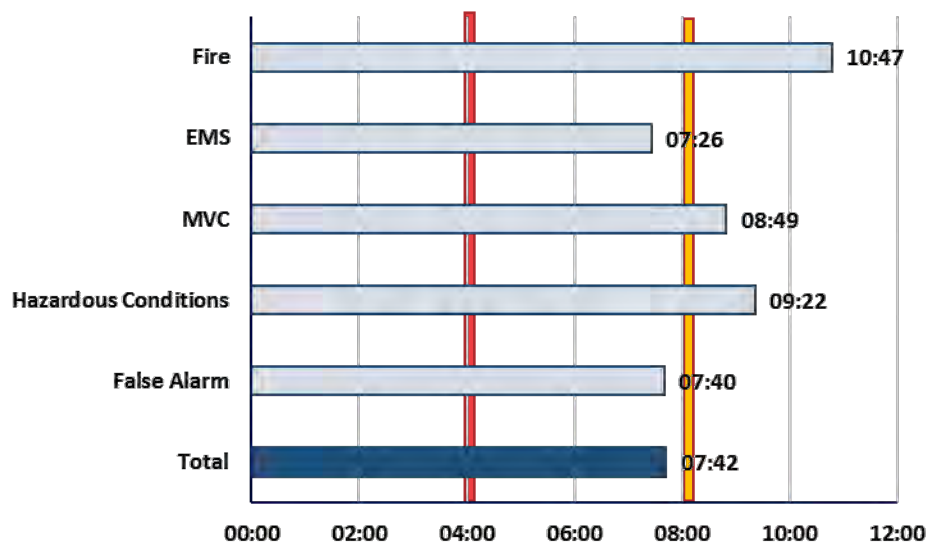
⁴¹ NFPA 1710, Section 4.1.2

⁴² ISO Fire Suppression Rating Schedule, Insurance Services Office, Inc., 2012

While FFD does not meet all of the NFPA 1710 performance goals, this does not infer that FFD is performing poorly. However, it is imperative that the fire department be aware of current performance. Tracking the individual pieces of response time performance enables the fire department to identify deficiencies and areas for improvement. As previously discussed, the NFPA standard is not a mandate; but does represent an industry best practice that is based on current research and data that is periodically reviewed and updated.

For this analysis, ESCI compared FFD performance times with nominal NFPA benchmarks. These are shown in the following figures as seen here. The red-colored bar indicates the benchmark for fire responses; the gold-colored bar indicates the benchmark for EMS responses. The blue-colored bars indicate FFD historical performance. This figure is for illustrative purposes only and does not necessarily reflect any specific comparison.

Figure 53. Example of a Time Performance Comparison to NFPA Benchmark

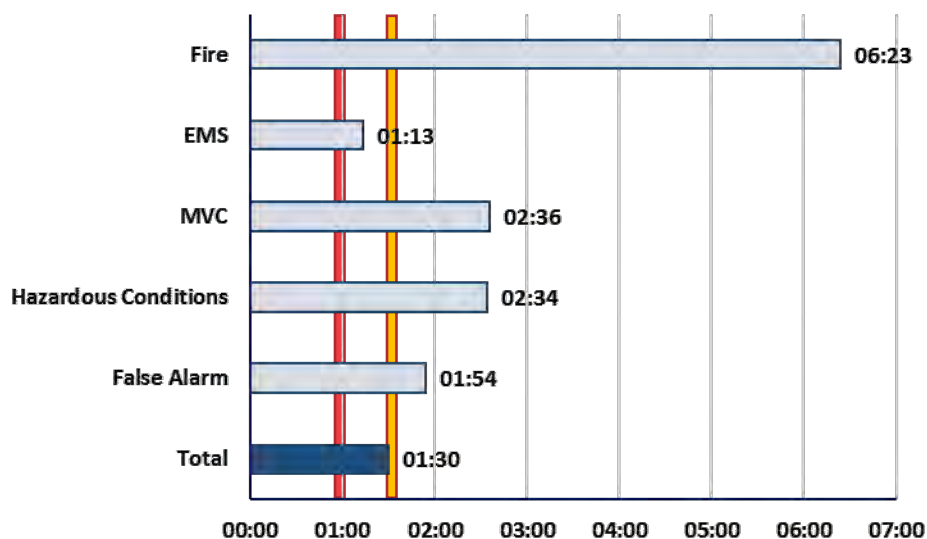


CALL PROCESSING TIME

The call processing component includes the time at which dispatch receives the call to when the resources are dispatched. FFD receives dispatch services from the Wylie Fire Department Communications Center (WFD-CC). During the last ISO survey for the City of Wylie, the WFD-CC received full credit for communications (10 points).

The following figure illustrates call processing performance for FFD's response area during the study period (January 2015 through December 2018):

Figure 54: Call Processing at 90th Percentile: 2015-2018



As displayed in the proceeding figure (and first discussed on page 41), call processing time performance does not meet the NFPA 1710 standard of 60 seconds for fire responses, but does meet the call processing time requirement of 90 seconds for EMS responses using priority dispatch protocols. As discussed on page 41, at first glance, the call processing time of 6:23 for fire calls appears to be significantly excessive.

However, further analysis strongly suggests this is due to the need to dispatch mutual aid units on all structure fires. Not all units use the same dispatch center, and the increased amount of time required to contact the other dispatch center(s), transfer the information, and dispatch those mutual aid units. ESCI research has found that, across the country, delays up to eight minutes or more are common when requesting mutual aid units from multiple dispatch centers. This DOES NOT delay dispatch of any Fairview fire apparatus.

It is suggested that FFD discuss with WFD-CC and the dispatch centers for mutual aid units to improve the call processing time, especially for fire-related incidents.⁴³

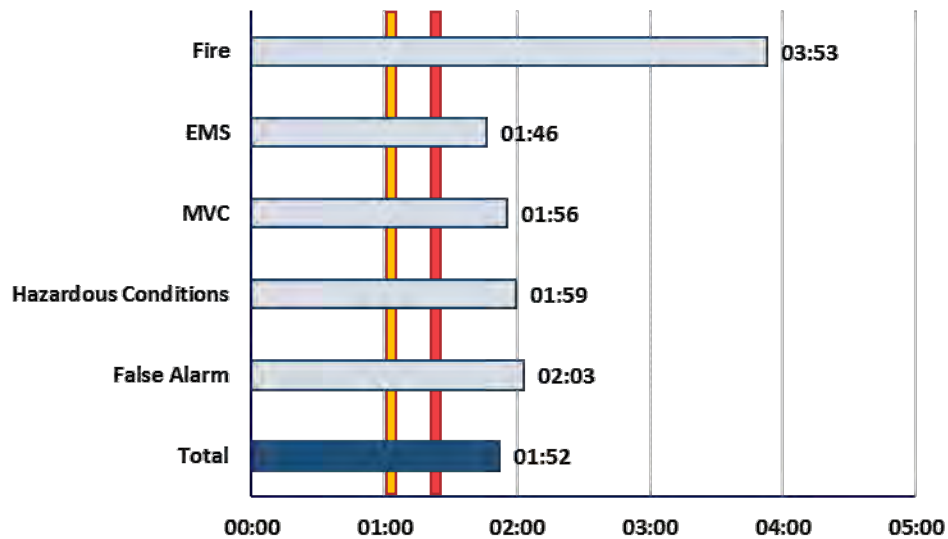
⁴³ The reason there is not a similar increase for all EMS calls is that, unlike fire calls, mutual aid medic units are required only for a small percentage of EMS calls.

TURNOUT TIME

The turnout time component begins when emergency personnel are notified via an alerting device to respond to an incident by the dispatch center and ends when the apparatus begin to respond. Turnout time is one area of the overall response time that field personnel have at least some ability to control, given proper facilities along with sufficient training that allow for rapid and efficient movement of personnel.

The following figure illustrates FFD 90th percentile turnout time performance for the first apparatus on scene at an emergency incident during the study period (January 2015 through December 2018):

Figure 55: Turnout Performance at 90th Percentile: 2015-2018

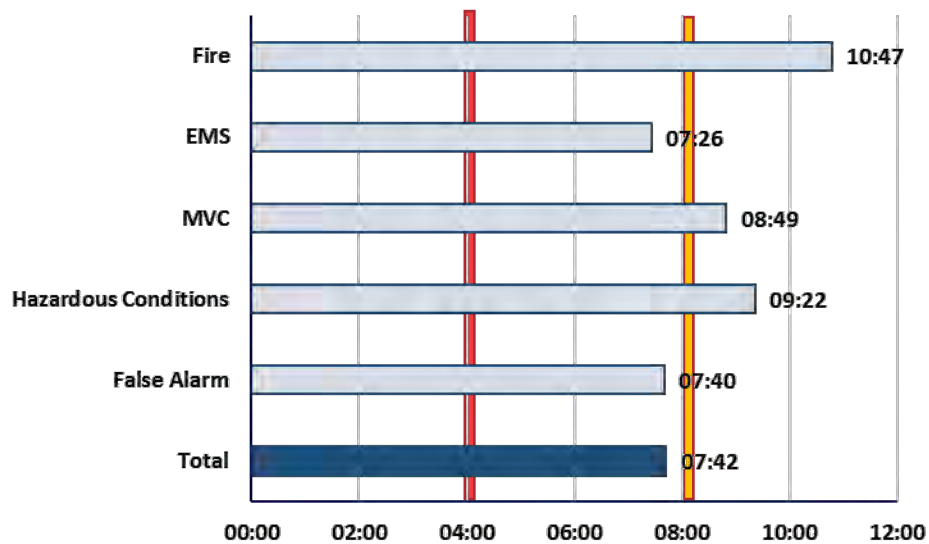


When examining turnout performance, FFD exceeds the NFA 1710 benchmark in all categories. In addition, the turnout time performance does not vary much based on the different incident types with the exception of fire-related incidents. It is suggested that FFD discuss ways to improve the turnout time, especially for fire-related incidents.

TRAVEL TIME

Travel time is the time from when an apparatus leaves the station to when an apparatus reaches the scene of an emergency. Travel time is one component of total response time that is rarely controllable by fire department personnel. The existing road network, traffic congestion, topography, intersections, construction, and unspecified incident locations all play crucial roles in travel time. Travel time can also differ considerably amongst stations. The following figure illustrates overall travel time performance for the first arriving unit throughout FFD's response area during the study period (January 2015 through December 2018):

Figure 56: Travel Performance at 90th Percentile: 2015-2018



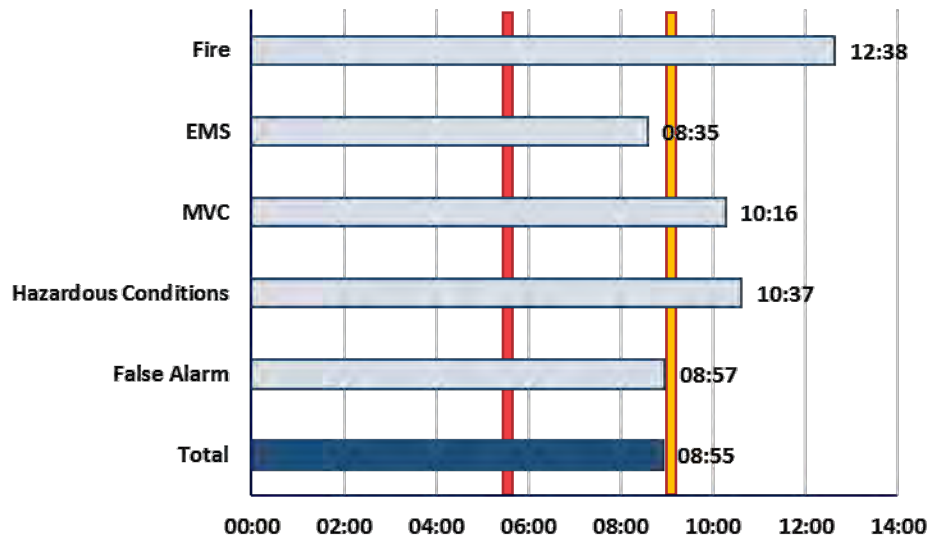
As illustrated, the travel time performance for FFD exceeds the NFPA 1710 benchmark in all categories except for response to false alarms and the arrival of an advanced life support (ALS) unit, Medic 752. It is suggested that FFD discuss ways to improve the travel time, especially for fire-related incidents.

RESPONSE PERFORMANCE

As previously discussed, the most commonly utilized measure of fire department response is a combination of turnout time and travel time, referred to as response time or response performance. This is the time from when fire personnel are notified of an incident by dispatch to when the first apparatus arrives on scene.

The following figure illustrates emergency response performance for FFD's response area during the study period (January 2015 through December 2018):

Figure 57: Response Performance at 90th Percentile: 2015-2018



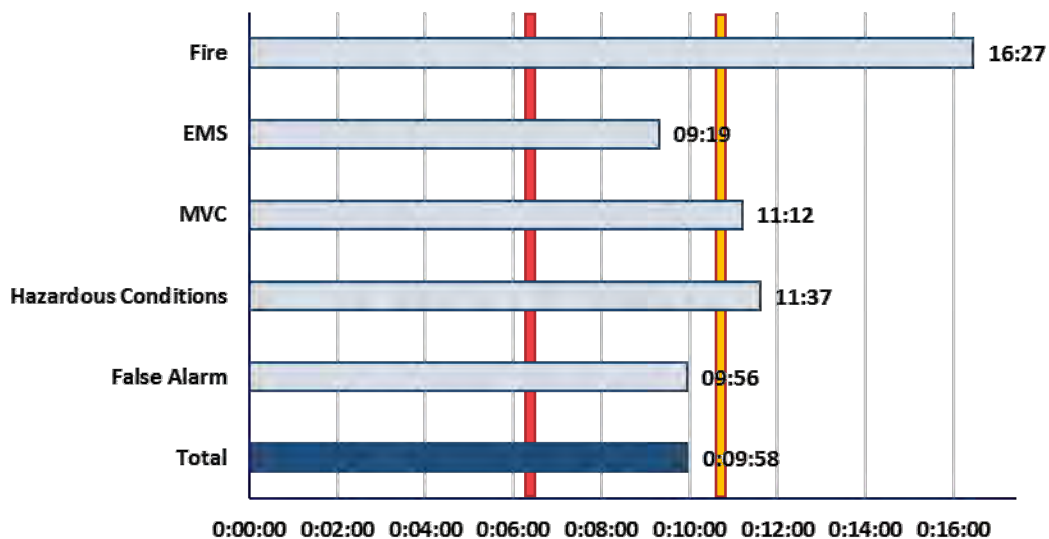
As illustrated, the response time performance for FFD exceeds the NFPA 1710 benchmark in all categories except for the arrival of an advanced life support (ALS) unit, Medic 752. It is suggested that FFD discuss ways to improve the travel time, especially for fire-related incidents.

TOTAL RESPONSE TIME PERFORMANCE

Total response time performance is the time from when the 911 call is answered by dispatch until the first apparatus arrives on scene of the incident. Utilizing the total response time continuum from NFPA 1710 including call processing, turnout time, and travel time, the recommendation for total response time at the 90th percentile is six-minutes.

The following figure illustrates FFD Total Response Time performance during the study period (January 2015 through December 2018):

Figure 58: Total Response Performance at 90th Percentile: 2015-2018



As illustrated, the total response time performance for FFD exceeds the NFPA 1710 benchmark in all categories except for the arrival of an advanced life support (ALS) unit, Medic 752. It is suggested that FFD discuss ways to improve total response time, especially for fire-related incidents.

CONCLUSIONS

During the study period, FFD exceeded the NFPA 1710 benchmarks in all categories except EMS response. Given that most of the department's response are medical calls, this performance is commendable for EMS responses, yet needs to be reviewed for non-EMS responses. This failure to meet NFPA response benchmarks is not unusual—a recent NFPA study found that, in communities with a population of 5,000 to 9,999:⁴⁴

- Over 99 percent provide structural fire protection, but only 23 percent of all firefighters have received formal training in structural firefighting to the NFPA 1001: Firefighter I level. By comparison, all FFD firefighters are certified to NFPA 1001: Firefighter II level.
- Using a maximum travel distance of 1.5 miles, only 7 percent have a sufficient number of fire stations.
- Using a maximum travel distance of 2.5 miles, only 23 percent have a sufficient number of fire stations.
- 65 percent of all departments need more stations based on coverage area, ISO guidance, and modeled response distance.
- The change identified in the most recent needs assessment survey is toward less frequent assignment of at least 4 career firefighters to an engine or pumper. This is suggestive of an initial trend toward reduced compliance with NFPA 1710.
- Except for cities protecting at least 250,000 population, most communities do not assign at least 4 career firefighters to an engine or pumper and so are probably not in compliance with NFPA 1710. For the smallest communities included in the results, population 10,000 to 24,999, only 8.5 percent have 4-person crews. The most-common crew sizes are 2-person (34.2 percent) or 3-person (29.9 percent).

FFD provides all of the following with formally trained personnel. By comparison, in communities with a population of 5,000 to 9,999. By comparison, in communities of similar size:

- Over 42 percent provide fire-department based ambulance services, but only 17 percent provide Paramedic level-EMS.
- Only 14 percent of firefighters are career; 86 percent are volunteer.
- Only 8 percent perform fire prevention services with formally-trained personnel.
- Only 20 percent perform code enforcement with formally-trained personnel.
- Only 24 percent have a program to maintain firefighter fitness and health.

RECOMMENDATIONS

ESCI recommends that the FFD:

- Continue to provide current levels of services as an example of “best practices”
- Continue to explore the potential to recruit and retain formally-trained volunteers to supplement career personnel.

⁴⁴ Fourth Needs Assessment of the U.S. Fire Service, National Fire Protection Association, Quincy MA, November 2016.

Appendix C. Resources and References

There are several resources available to assist the Town of Fairview with strategic planning for the Fairview Fire Department. Many of these references are available at no cost through the public domain and any information that has been included with the digital copy of this report is for the convenience of the reader and has been provided as a public service for NONCOMMERCIAL, INFORMATIONAL PURPOSES ONLY.

PRIMARY RESOURCES AND REFERENCES

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ADDITIONAL RESOURCES AND REFERENCES

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FEMA. National Incident Management System Guideline for Mutual Aid, Nov 2017

FEMA. National Preparedness Goal, Sep 2015

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- NFPA. Community Risk Reduction: Doing More With More, Quincy, MA; June 2016
- NFPA. Fire Protection Handbook, 20th Edition; Quincy MA, 2008.
- NFPA 472: Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents, 2013 Edition, National Fire Protection Association, Quincy MA, 2012.
- NFPA 921: Guide for Fire and Explosion Investigations, 2017 Edition, National Fire Protection Association, Quincy MA, 2016.
- NFPA 1001: Standard for Fire Fighter Professional Qualifications, 2013 Edition; National Fire Protection Association, Quincy MA, 2012.
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NFPA 1906: Standard for Wildland Fire Apparatus, 2016 Edition; National Fire Protection Association, Quincy MA, 2015.

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