City of Scottsdale Fire Department

Arizona

Standards of Coverage and Deployment Plan

2015

Emergency Services Consulting International

Introduction

The following report serves as the Scottsdale Fire Department Standards of Coverage and Deployment Plan. It follows closely the Center for Fire Public Safety Excellence (CPSE) Standards of Coverage model that develops written procedures to determine the distribution and concentration of a fire and emergency service agency's fixed and mobile resources. The purpose for completing such a document is to assist the agency in ensuring a safe and effective response force for fire suppression, emergency medical services, and specialty response situations.

Creating a Standards of Coverage and Deployment Plan document requires that a number of areas be researched, studied, and evaluated. This report will begin with an overview of both the community and the agency. Following this overview, the plan will discuss areas such as risk assessment, critical task analysis, agency service level objectives, and distribution and concentration measures. The report will provide analysis of historical performance and will conclude with policy and operational recommendations.

ESCI extends its appreciation to the elected officials and members of the City of Scottsdale, the Scottsdale Fire Department, and all others who contributed to this plan.

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Executive Summary

This document describes Scottsdale Fire Department's Standards of Coverage and Deployment Plan. Community risks, response resources, deployment strategies, and service levels have been evaluated in this study. It establishes response time objectives and standards for measuring the effectiveness of fire department services and the deployment of its resources. The document is segregated into components generally based on the format recommended by the Center for Public Safety Excellence, *Standards of Cover 5th Edition*.

The Scottsdale Fire Department (SFD) is a department of the City of Scottsdale, a city established and organized under Arizona law. It provides fire protection, emergency medical, and rescue services to its community. The department's service area encompasses all of the City of Scottsdale.

SFD has a resident population of approximately 224,800 people. It is estimated that employment increases SFD's daytime population by approximately 58,000.

SFD serves an area of approximately 184.5 square miles of which 54 square miles is dedicated reserve known as the McDowell Sonoran Preserve. The city operates 15 fire stations and 38 response apparatus. 9-1-1 calls are answered by the Scottsdale Police Department. Calls for fire department service are transferred to the Phoenix Regional Dispatch Center, a multi-agency public safety dispatch center.

The Insurance Services Office (ISO) reviews the fire protection resources within communities and provides a Community Fire Protection Rating system from which insurance rates are often based. The rating system evaluates three primary areas: the emergency communication and dispatch system, the fire department, and the community's pressurized hydrant or tanker-based water supply. The overall rating is then expressed as a number between 1 and 10, with 1 being the highest level of protection and 10 being unprotected or nearly so. As of the latest survey (September 2007) ISO gave SFD a rating of Class 3.

The analysis completed during this study revealed a number of important findings. These include:

- Total response workload has increased 19.2 percent over the past nine years.
- 71.7 percent of all responses are requests for emergency medical service.
- Response workload is greatest in the Fire Station 2 service area.
- Engine 601 and Ladder 602 both exceed 10 percent unit hour utilization.
- The current fire department services utilization rate is 127 incidents per 1,000 population. This is higher than typical and reflective of both the employment and tourism population.
- Scottsdale Police Department is unable to quantify the time required to answer and transfer a 9-1-1 call to Phoenix Regional Dispatch Center.

- The amount of time Phoenix Regional Dispatch Center takes to dispatch fire department response units exceeds national standards.
- The amount of time response units spend traveling to an incident exceeds national standards by nearly three minutes.
- Only 64.6 percent of incidents occurred within the national standard for first unit arrival of four travel minutes of a fire station.
- Roughly half of all incidents met response times recommended by national standards.
- Response times to deliver the full effective response force exceed national standards by nearly three minutes.
- Only in the southern most portion of Scottsdale can an effective response force be delivered within the time specified in the national standard.
- SFD arrived at an emergency medical incident first 63.4 percent of the time, two minutes 16 seconds before the ambulance, on average.
- Scottsdale experiences the same number of fires per 1,000 population as similarly sized cities within the western states. However, fire loss is only 20 percent of that experienced by those same cities.

In the SOC process, potential service area classifications are broken down into five categories:

- **Metropolitan**—Geography with populations of over 200,000 people in total and a population density predominately over 3,000 people per square mile. These areas are distinguished by inner city neighborhoods and numerous mid-rise and high-rise buildings often interspersed with smaller structures.
- **Urban**—Geography with a population of over 30,000 people and/or a population density predominately over 2,000 people per square mile. These areas are characterized by significant commercial and industrial development, dense neighborhoods, and some mid-rise or high-rise buildings.
- **Suburban**—Geography with a population of 10,000 to 29,999 and/or a population density predominately between 1,000 and 2,000 people per square mile. These areas are characterized by single and multifamily neighborhoods, and smaller commercial developments
- **Rural**—Geography with a total population of less than 10,000 people or with a population density of less than 1,000 people per square mile. These areas are characterized by low density residential, little commercial development, and significant farm or open space uses.
- **Wilderness/Frontier/Undeveloped**—Geography that is both rural and not readily accessible by a publicly or privately maintained road.

SFD's service area, based on population density, is of three classifications: urban, suburban, and rural. The community's risk classifications should influence how response resources are distributed now and in

the future. Since suburban areas are anticipated to develop to greater population densities, response performance objectives have been established that are uniform across the entire developable service area.

A Performance Statement as well as Objectives for the services provided by SFD has been developed. These further define the quality and quantity of service expected by the community and consistently pursued by the department.

Overall Performance Statement

The SFD has adopted the following Performance Statement consisting of its Mission, Vision, and Performance Objectives:

Performance Statement

Mission

"We Care for You."

Vision

"Scottsdale Fire Department is dedicated to providing our customers essential fire and life safety services, thereby enhancing the public safety experience in Scottsdale."

In addition to the overall Performance Statement, the following response-specific performance objectives are established by SFD.

1) **Dispatch Call Processing Time**
   - **a.** A 9-1-1 call will be answered by the primary public safety answering point to the dispatch center within X seconds 95 percent of the time (unable to determine at this time).
   - **b.** A 9-1-1 call will be transferred to the dispatch center within X seconds 95 percent of the time (unable to determine at this time).
   - **c.** Response resources shall be notified of a priority incident other than emergency medical, hazardous materials, or technical rescue, within 105 seconds from receipt of the call at the dispatch center 80 percent of the time.
   - **d.** Response resources shall be notified of a priority emergency medical, hazardous materials, or technical rescue incident within 99 seconds 90 percent of the time.
2) **Turnout Time**
   - **a.** Response personnel shall initiate response to a priority fire and special operations incident within 88 seconds from notification 90 percent of the time.
   - **b.** Response personnel shall initiate response to a priority emergency medical incident within 73 seconds from notification 90 percent of the time.
3) **Response time for arrival of the first response unit at a priority fire or special operations incident**

   The first response unit capable of initiating effective incident intervention shall arrive at a priority fire or special operations incident within eight minutes 29 seconds from notification of response personnel 90 percent of the time.

4) **Response time of the first arriving response unit at a priority emergency medical incident**
The first response unit capable of initiating effective incident intervention shall arrive at a priority emergency medical incident within seven minutes 23 seconds from notification of response personnel 90 percent of the time.

5) **Response time for arrival of the effective response force at a moderate risk structure fire**
The full effective response force shall arrive at a moderate risk structure fire within 12 minutes, 16 seconds from notification of response personnel 90 percent of the time.

The analysis conducted during the evaluation phase of this process identified a number of opportunities to improve service (improvement goals). The following improvement goals are offered for consideration. These goals and specific recommendations for each are described in more detail at the end of this report (Component H).

Recommendations

Improvement Goal A: Formally Adopt Response Performance Goals
In order to provide a solid basis for planning future service delivery, specific response performance goals should be adopted by the City of Scottsdale.

Improvement Goal B: Improve Call Processing Performance
Scottsdale Police Department, the agency that initially receives 9-1-1 calls, should develop the capability to evaluate and report the amount of time it takes to answer and then transfer a request for fire department services to the Phoenix Regional Dispatch Center (PRDC).

PRDC should implement early notification of responders (pre-alert) in order to shorten the time taken to process and dispatch an emergency.

Improvement Goal C: Improve the Delivery of Emergency Medical Service
PRDC queries the caller to determine the nature of a medical emergency using a series of questions. The purpose is to categorize a request for emergency medical service as either life-threatening or non-life threatening. This categorization is intended to determine the number and type of response resources that are sent to a medical emergency. SFD does not now use this information to vary its response. SFD should consider implementing tiered response based on the severity of the emergency medical incident.

Improvement Goal D: Reduce Incident Travel Time
There are areas of the city that have greater incident workload than can be handled by current response resources. This workload occurs during a defined period of the day. SFD should consider adding a response unit only during the defined period. The unit can be a two-person quick response unit staffed and equipped to provide emergency medical care and service to other minor non-fire incidents.

The current location of fire stations and response units do not provide sufficient coverage to achieve the recommended response performance goals. Additional fire stations and response units are needed. The number of stations and type of resources depends on the performance goals ultimately adopted by

the city. A detailed discussion of resources needed, response unit deployment, and unit types, are provided in the Recommendations section of this report. Two deployment options are offered.

Improvement Goal E: Improve Wildland Firefighting Capability

SFD has a significant wildland area in the McDowell Sonoran Preserve, but limited capability to combat wildland fires. Improvements in firefighter training are recommended. In addition, given the limited road access within the Preserve, SFD should pre-plan access to aerial firefighting resources.

Component A – Description of Community Served

ORGANIZATION OVERVIEW

Governance and Lines of Authority

SFD has existed as a fire protection agency within the State of Arizona since 2005. Prior to that time, the city was served by Rural Metro, a private fire service company. The City of Scottsdale was first incorporated in June 1951. The first city charter was adopted in November 1961. The city is provided the authority to levy taxes and raise revenue for operating an organized fire department.

Policy direction for SFD is provided by a mayor and six city council members. The mayor and council are provided the necessary power and authority to govern the provision of fire protection and emergency services. The mayor and council appoint a city manager who is responsible for implementing council policy and overseeing the operation of the fire department. The city manager appoints the fire chief.

Organizational Finance

Establishment of financial policy for the SFD is the responsibility of the elected mayor and city council with the city manager, city treasurer, and fire chief responsible for fiscal administration.

The City of Scottsdale has an assessed valuation of $4,985,995,923.

The city uses a one-year budget cycle to prepare the operating budget and the capital improvement plan based on a July through June fiscal year. The total fire department general fund budget for 2014-15 is $32,068,637.

The fire department's operating funds are generated primarily from transaction privilege (sales) taxes and, to a lesser degree, property tax, state shared revenues, fees for service, and other revenues.

Figure 1 lists the amount of non-tax revenue for SFD by division for fiscal year 2013-14.

Figure 1: Generated Revenue – FY 2013-2014

Revenue Type	2013-14 Actual
CPR classes	6,665
Special events reimbursement	136,520
After hours inspections	23,700
Fire safety permits	53,000
Re-inspection fees	2,000
Fire plans review	10,700
Ambulance contract - ALS	322,020
Ambulance contract - special events	74,332
Ambulance contract - administrative fee	64,167
Scottsdale County Island Fire District	22,218
Recovery of expenses	38,553
Indirect cost allocations	257,226
Miscellaneous	62
TOTAL	**$1,011,163**

Figure 2 shows the general operating expenditure history for the current and previous two fiscal years. During the three-year period, the department's overall budget increased 7.3 percent.

Figure 2: Budget/Expenditures by Year, FY 2013 – FY 2015

Expenditures By Department	Actual 2012/13	Approved 2013/14	Adopted 2014/15
Operations	23,697,493	24,975,855	25,185,281
Professional Services	3,940,216	4,617,122	4,436,315
Fire and Life Safety	1,449,260	1,590,414	1,571,273
Office of the Fire Chief	786,796	902,698	875,768
Total Budget	**29,873,766**	**32,086,089**	**32,068,637**

A comprehensive capital improvement and replacement program is important to the long-term financial and operational stability of any fire and emergency medical service organization. Such programs provide systematic development and renewal of the physical assets and rolling-stock of the agency. A capital program must link with the planning process to anticipate and time capital expenditures in a manner that does not adversely influence the operation of the agency or otherwise place the agency in a negative financial position. Items usually included in capital improvement and replacement programs are facilities, apparatus, land acquisition, and other major capital projects. SFD has a formally adopted and funded capital improvement plan for facilities and major equipment. The city's Fleet Management Fund provides for the purchase and replacement of vehicles and fire apparatus.

SERVICE AREA OVERVIEW

The area that is now Scottsdale has been inhabited since approximately 300 BC. Early inhabitants farmed the area and built a complex system of water canals for irrigation.

Winfield Scott purchased land in what is now downtown Scottsdale in 1888. The town, originally known as Orangedale (for the numerous citrus groves planted by the Scott brothers), grew quickly. The name was changed to Scottsdale in 1894.

Scottsdale's population grew rapidly between 1908 and 1933 due to construction of the Granite Reef and Roosevelt dams. During World War I, Scottsdale supported a thriving cotton growing industry. During World War II, what is now the Scottsdale Airport was used to train pilots.

The community grew significantly through the 1980s, primarily in a northern direction. The city is comprised of four general areas. South Scottsdale is primarily middle class residential and commercial properties. Old Town Scottsdale is the city's cultural and entertainment area. It includes hotels, condominiums and the Scottsdale Fashion Square Mall. The Shea Corridor consists of homes built primarily during the 1970s and 1980s, commercial properties and resorts. North Scottsdale is the area of most active development currently. It contains many high-end homes. It also contains the Scottsdale Airpark, an employment center of over 55,000 employees.

The City of Scottsdale is now an area of approximately 184.5 square miles, of which 54 square miles is dedicated reserve. It has a resident population of approximately 224,800 people. It is estimated that employment increases Scottsdale's daytime population by approximately 58,000[1].

[1] Source: city-data.com

Component B – Review of Services Provided

SERVICES PROVIDED

The SFD's service area includes all of the City of Scottsdale. SFD also provides automatic and mutual aid to other agencies within the Phoenix metropolitan area. The SFD provides a variety of response services, including structural and wildland fire suppression, advanced life support level emergency medical care, and entrapment extrication. SFD also provides technical rescue services including high-angle, trench, and confined space. Finally, SFD provides fully capable hazardous materials emergency response.

SFD also provides non-response services including staff training, new construction building plan review and inspection, existing occupancy fire safety inspections, public safety education, emergency preparedness, and fire investigation.

9-1-1 answering is conducted by the Scottsdale Police Department. Requests for fire department services are transferred to the Phoenix Regional Dispatch Center (PRDC), a multi-agency public safety dispatch center.

There are 267 full-time personnel involved in delivering services to the jurisdiction. Staffing coverage for emergency response is through the use of career firefighters on 24-hour shifts. For immediate response, no less than 69 personnel are on-duty at all times though only 67 are constantly staffed. Due to budget limitations the Battalion Executive Officer position is not constantly staffed. An additional four firefighters are available Monday through Thursday from 7:00 am until 5:00 pm.

The following figure provides basic information on each of the department's core services, its general resource capability for that service, and information regarding staff resources for that service.

Figure 3: Core Services Summary

Service	General Resource/Asset Capability	Basic Staffing Capability per Shift
Fire Suppression	**56 hour Operations** 12 staffed engines 4 staffed ladder trucks 2 Battalion Chiefs 1 ARFF Foam Truck **40 hour Operations** 1 staffed engine 1 staffed Shift Commander	**56 hour Operations** 67 constantly staffed positions **40 hour Operations (Mon – Thur)** 4 constantly staffed positions

Service	General Resource/Asset Capability	Basic Staffing Capability per Shift
Emergency Medical Services	**56 hour Operations** 12 staffed engines – ALS x 2, BLS x 2 4 staffed ladder trucks – ALS x 2, BLS x 2 2 Battalion Chiefs – BLS equipment 1 ARFF Foam Truck – BLS x 1 **40 hour Operations** 1 staffed engine – ALS x 2, BLS x 2 1 staffed Shift Commander – BLS equipment	**56 hour Operations** 33 constantly staffed ALS 34 constantly staffed BLS **40 hour Operations (Mon – Thur)** 2 constantly staffed ALS 2 constantly staffed BLS
Vehicle Extrication	**56 hour Operations** 4 fire stations house ladder companies (total of 4 ladders 2 of these companies are L/LT co-manned) Equipped with hand tools, air bags, stabilization cribbing, hydraulic cutter, spreader and rams, and a minimum of 1 power plant.	All ladders constantly staffed with four personnel. Firefighters assigned to Ladder companies attend regional ladder training that consists of current vehicle extrication practices and techniques. All personnel are trained to an 'operations' level and receive ongoing annual training.
High-Angle Rescue	FS610 houses E610, which is the primary Technical Rescue Team and co-staffs Support 610. Unit equipped to meet all functions of NFPA 1006.	Engine/Support 610 constantly staffed ALS x 2, BLS x2 and 100% 'Technical Rescue Team' certified. Initial training is NFPA compliant 200 hour class. TRT members receive weekly Regional training in Special Ops disciplines. 8 personnel per shift trained to the NFPA compliant 200 hour class. All personnel are trained to an 'operations' level and receive ongoing annual training.
Trench and Collapse Rescue	FS610 houses E610, which is the primary Technical Rescue Team and co-staffs Support 610. Unit equipped to meet all functions of NFPA 1006.	Engine/Support 610 constantly staffed ALS x 2, BLS x2 and 100% 'Technical Rescue Team' certified. Initial training is NFPA compliant 200 hour class. TRT members receive weekly Regional training in Special Ops disciplines. 8 personnel per shift trained to the NFPA compliant 200 hour class. All personnel are trained to an 'operations' level and receive ongoing annual training.

Service	General Resource/Asset Capability	Basic Staffing Capability per Shift
Swift-Water Rescue	FS610 houses E610, which is the primary Technical Rescue Team and co-staffs Support 610. Unit equipped to meet all functions of NFPA 1006. All engines and ladders/lts equipped with throw bags, PFD's, and helmets.	Engine/Support 610 constantly staffed ALS x 2, BLS x2 and 100% 'Technical Rescue Team' certified. Initial training is NFPA compliant 200 hour class. TRT members receive weekly Regional training in Special Ops disciplines. 8 personnel per shift trained to the NFPA compliant 200 hour class. All personnel are trained to an 'operations' level and receive ongoing annual training.
Confined Space Rescue	FS610 houses E610, which is the primary Technical Rescue Team and co-staffs Support 610. Unit equipped to meet all functions of NFPA 1006.	Engine/Support 610 constantly staffed ALS x 2, BLS x2 and 100% 'Technical Rescue Team' certified. Initial training is NFPA compliant 200 hour class. TRT members receive weekly Regional training in Special Ops disciplines. 8 personnel per shift trained to the NFPA compliant 200 hour class. All personnel are trained to an 'operations' level and receive ongoing annual training.
Hazardous Materials Response	FS608 houses E608, which is the primary Hazardous Materials Team and co-staffs HazMat 608. HazMat 608 also has full CBRNE response capabilities. Unit equipped to meet all functions of NFPA 472.	Engine/HazMat 608 is constantly staffed ALS x 2, BLS x2 and 100% 'HazMat Team' certified. Initial training is a NFPA compliant 200 hour class. HazMat members receive weekly Regional training in HazMat disciplines. 8 personnel per shift trained to the NFPA compliant 200 hour class. All personnel are trained to an 'operations' level and receive ongoing annual training.

Service	General Resource/Asset Capability	Basic Staffing Capability per Shift
Aircraft Rescue Firefighting (ARFF)	FS609 is on airport property and houses E609, which is the primary ARFF unit. Foam 609 is housed at FS609 and is dedicated to the airport only. Unit equipped to meet all functions of NFPA 403.	Engine 609 is constantly staffed ALS x 2, BLS x2 and 100% 'ARFF Team' certified. Foam 609 is constantly staffed with a BLS x 1, ARFF Engineer. Initial training is an in-house FAA139 non-credentialed certification. ARFF members receive quarterly live fire training through the Region. 9 personnel per shift trained to the NFPA 403 standards. All personnel are trained to an 'operations' level and receive ongoing annual training.
Wildland Firefighting	4- Type 6 Brush Trucks. Minimum of 300' of 1.5" line & 300' of 1" line. Deployed at four fire stations as a co-manned unit (FS607, FS611, FS613, FS616). 2- Tankers 3,000 gallon capacity. Each unit carries one buoy wall, one collapsible rigid tank, and associated hardware. Deployed at two fire stations (FS613 & FS614).	All Operations personnel trained to the FEMA S130 & S190 level. All personnel receive annual wildland refresher training: practical and LMS. Scottsdale Fire Department has members who are 'red carded' and able to deploy on out of city fires.

ASSETS AND RESOURCES

Fire Stations

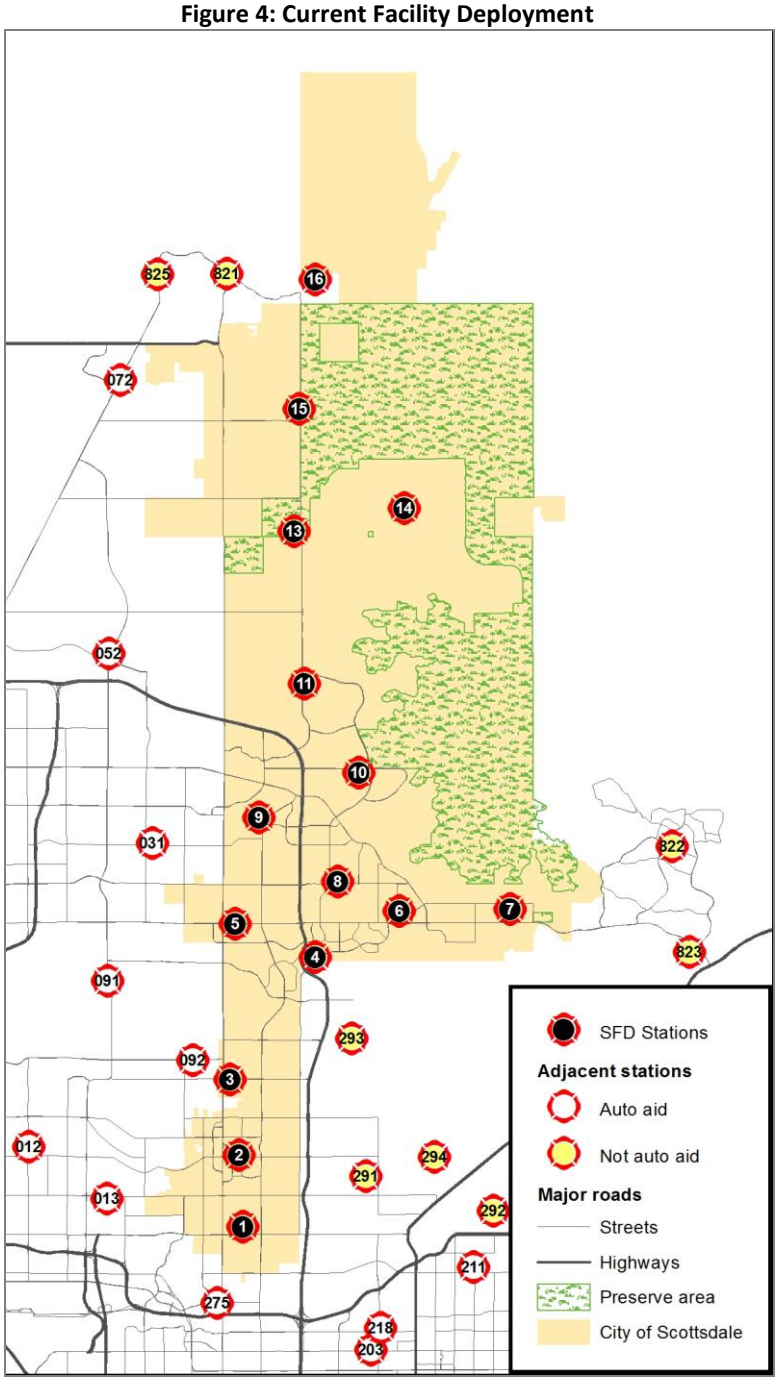
Fire stations play an integral role in the delivery of emergency services for a number of reasons. A station's location will dictate, to a large degree, response times to emergencies. Fire stations also need to be designed to adequately house equipment and apparatus, as well as the firefighters and other personnel assigned to the station.

Station Location and Deployment

The SFD delivers fire, emergency medical service (EMS), and other emergency response from 15 city-owned fire stations located throughout the city. The following map shows the city boundaries, and the locations of SFD and adjacent agency fire stations. "Auto aid" stations are those that would be dispatched simultaneously with SFD. "Not auto aid" stations are those that would not be dispatched simultaneously but could be called as needed to provide support to SFD.

A detailed assessment of the condition and serviceability of each station was completed and is found in a separate document. A summary of the findings in that assessment is contained in Appendix C.

Figure 4: Current Facility Deployment



Apparatus

Response vehicles are an important resource of the emergency response system. If emergency personnel cannot arrive quickly due to unreliable transport, or if the equipment does not function properly, then the delivery of emergency service is likely compromised. Fire apparatus are unique and expensive pieces of equipment, customized to operate efficiently for a specifically defined mission. The following figure lists apparatus assigned to each of the 15 SFD fire stations.

Figure 5: SFD Fire Stations and Apparatus

Station	Apparatus	Year Built	Condition
Station 601	Engine 601	2013	Good
	Engine 6040	2002	Fair
Station 602	Engine 602	2006	Fair
	Ladder 602	2008	Unavailable
	Ladder Tender 602	2002	Good
	BC601	2012	Good
Station 603	Engine 603	2013	Good
	MMRS Van	1996	Good
Station 604	Engine 604	2013	Good
Station 605	Engine 605	2003	Good
Station 606	Ladder 606	2004	Good
	Ladder Tender 606	2001	Fair
Station 607	Engine 607	2003	Good
	Brush 607	2008	Good
Station 608	Engine 608	2004	Fair
	HazMat 608	2010	Good
	Bike Trailer	2006	Good
Station 609	Engine 609	2003	Fair
	Foam 609	2004	Good
	Foam 6092	1985	Good
Station 610	Engine 610	2010	Good
	Support 610	2002	Good
Station 611	Ladder 611	2009	Good
	Brush 611	1997	Fair
	BC602	2012	Good
Station 613	Engine 613	2008	Good
	Tanker 613	2004	Good
Station 614	Engine 614	2005	Good
	Tanker 614	2004	Good
Station 615	Ladder 615	2006	Good
	Brush 615	2003	Good
Station 616	Engine 616	2003	Fair
	Brush 616	2003	Good
Reserve Fleet			
Engine	0802883	2001	Fair
Engine	0809935	2009	Good
Engine	0809936	2008	Good
Engine	0809937	2009	Good
Ladder	0802884	2002	Fair

Detailed information regarding the condition and serviceability of each apparatus is contained in Appendix D.

SFD uses several types of apparatus as shown in the table above. Each type is further described as follows:

- Engine – Primary response unit from each station for most types of service requests. Each is equipped with a pump and carries water.
- Ladder – A specialized apparatus equipped with long ladders, salvage, overhaul equipment, and rescue tools. Used for structure fires, rescues, and other service requests.
- Ladder tender – A unit similar to a ladder in terms of equipment carried but does not have a long fixed ladder.
- Tanker – A vehicle designed to carry large quantities of water to a fire incident. Used for fires in areas without fire hydrants.
- Brush – A smaller vehicle with pump and water tank designed to be used for brush and grass fires in wildland areas.
- Foam – A specialized unit used for aircraft crash rescue and firefighting.
- Haz Mat – A vehicle that carries specialized equipment for use on hazardous materials emergencies.
- MMRS – The acronym stands for “Metropolitan Medical Response System”. This is a response unit stocked with medical equipment and supplies. It is used for mass casualty incidents.
- Support 610 – A vehicle that carries specialized equipment for technical rescue services.

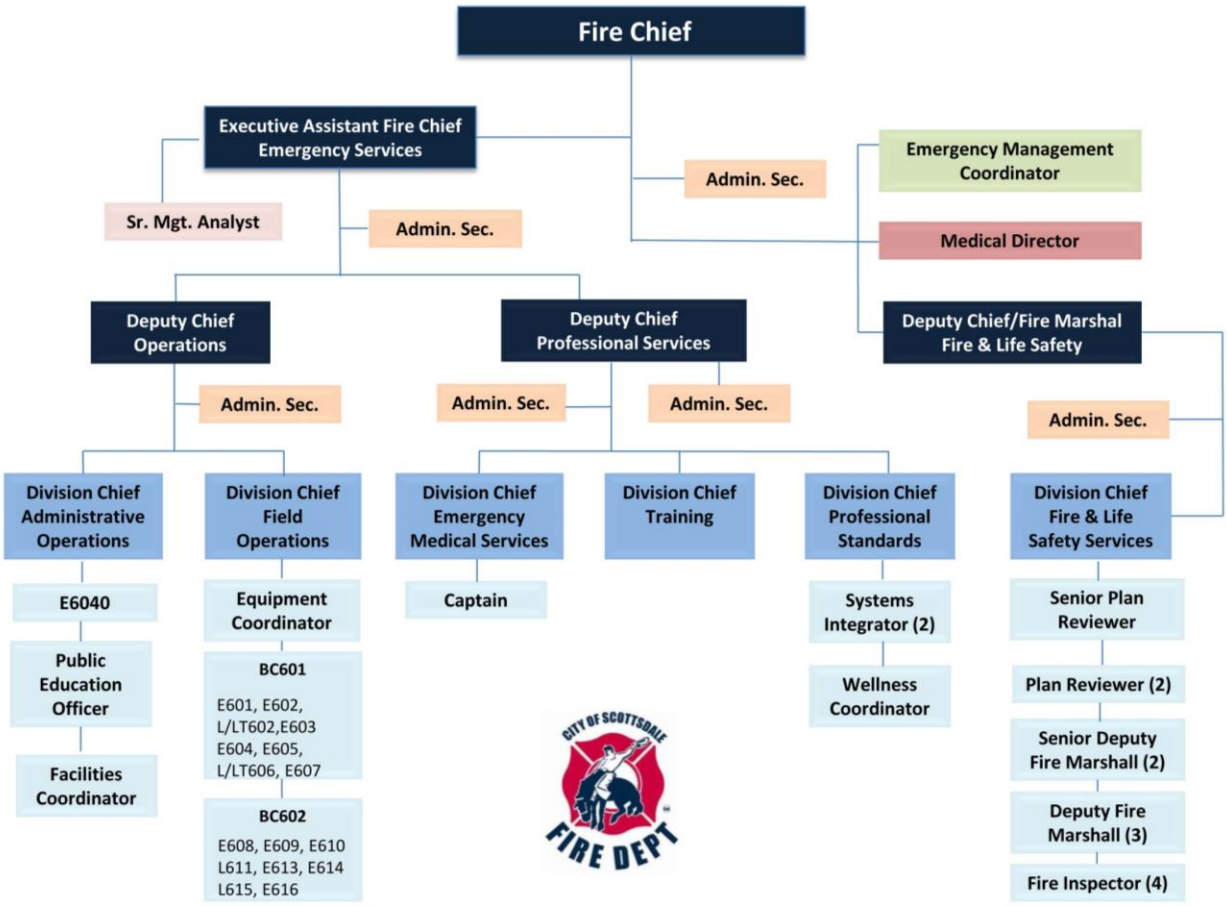
STAFFING INFORMATION

SFD provides staffing in four key areas: administration, operations, professional services, and fire and life safety services.

Organizational Structure

SFD is organized in the typical top-down hierarchy. The chain of command is identified with common roles for a fire department of this size. SFD has 15 fire stations that house emergency response resources. The department's multiple facilities and its three-shift, 24-hour-per-day, seven-day-per-week operational schedule create numerous internal communications and management challenges. The SFD organizational chart is functional and primary roles are well identified.

Figure 6: Organizational Structure



Administration and Support Staff

One of the primary responsibilities of a fire department's administration and support staff is to ensure that the operational entities of the organization have the ability to accomplish their service delivery responsibilities to the public. Without sufficient oversight, planning, documentation, training, and maintenance, the operational entities will struggle to perform their duties well. Administration and support services require appropriate resources to function properly.

There are 267 full-time personnel involved in delivering services to the jurisdiction. The fire department's primary management team includes the fire chief, executive assistant chief, and deputy chiefs for operations, professional services, and fire and life safety. Additional administrative and support personnel include division chiefs, office staff, and fire and life safety staff. SFD has 38 full-time management, administration, and support staff.

Figure 7: Management, Administration, and Support Personnel by Position

Position	Number
Fire Chief	1
Executive Assistant Fire Chief	1
Deputy Chief (one is a Fire Marshal)	3
Division Chief	6
Administrative Assistants (civilian)	6
Training Captain	1
Emergency Management Coordinator (civilian)	1
Sr. Management Analyst (civilian)	1
Facilities Coordinator (civilian)	1
Equipment Coordinator (civilian)	1
Wellness Coordinator (civilian)	1
Public Education Officer (civilian)	1
Sr. Plan Reviewer (civilian)	1
Plan Reviewer (civilian)	2
Sr. Deputy Fire Marshal	2
Deputy Fire Marshal	3
Fire Inspectors (civilian)	4
Systems Integrator	2
TOTAL	**38**

Emergency Services Staff

It takes an adequate and well-trained staff of emergency responders to put the community's emergency apparatus and equipment to its best use in mitigating incidents. Insufficient staffing at an emergency decreases the effectiveness of the response and potentially increases damage and injury.

SFD uses career personnel to carry out emergency response functions. The following figure shows the distribution of emergency personnel by rank.

Figure 8: Emergency Response Personnel by Rank

Position	Number
Battalion Chief	6
Fire Captain	56
Engineer	57
Firefighter	110
TOTAL	**229**

SFD employs 229 emergency response personnel for EMS, rescue, and fire suppression activities, no less than 67 who are on-duty at all times. The resident population of the SFD service area is 224,800. SFD provides its community with 1.02 career firefighters per 1,000 population, and 0.30 firefighters per 1,000 population on duty at all times. When daytime employment population is included the ratio is 0.81 career firefighters per 1,000 population and 0.24 firefighters per 1,000 population on duty at all times.

Methodology for Incident Staffing

This document will provide an analysis of how well SFD is doing at providing personnel and other resources for incidents within its primary service area. This data is important and can be an indicator of the effectiveness of its staffing efforts.

For larger incidents, SFD commonly acts together with one or more neighboring fire departments in providing fire and life protection through a coordinated regional response system of mutual and automatic aid agreements. This is particularly true for large structure fires, other high-risk incidents where staffing needs are great, and during periods of significant incident activity. This document will provide an overall view of aggregate staffing provided by SFD and neighboring agencies.

The prompt arrival of at least four personnel is critical for structure fires. Federal regulations (CFR 1910.120) require that personnel entering a building involved in fire must be in groups of two. Further, before personnel can enter a building to extinguish a fire, at least two personnel must be on scene and assigned to conduct search and rescue in case the fire attack crew becomes trapped. This is referred to as the two-in, two-out rule.

There are, however, some exceptions to this regulation. If it is *known* that victims are trapped inside the building, a rescue attempt can be performed without additional personnel ready to intervene outside the structure. Further, there is no requirement that all four arrive on the same response vehicle. Many fire departments rely on more than one unit arriving to initiate interior fire attack. SFD staffs fire engines with four firefighters, thus it does not need to wait for a second unit to arrive before it can initiate interior fire attack operations in a non-rescue incident.

Some incidents (such as structure fires) require more than one response unit. The ability of SFD and its automatic aid neighbors to assemble an effective response force for a multiple unit incident within the specific period of time, also known as *resource concentration*, will be analyzed in a later section of this document.

The following figure lists each station, staffed unit, and the staffing assigned to each at minimum staffing. Co-staffed means that firefighters assigned to another response unit in the station may transfer to the co-staffed unit as needed.

Figure 9: Staffing Complement

Station	Apparatus	Minimum on Duty
Station 601	Engine 601	4
Station 602	Engine 602	4
	Ladder 602	4
	Ladder Tender 602	Co-staffed
	BC601	1
Station 603	Engine 603	4
	MMRS Van	0
Station 604	Engine 604	4
Station 605	Engine 605	4
Station 606	Ladder 606	4
	Ladder Tender 606	Co- staffed
Station 607	Engine 607	4
	Brush 607	Co- staffed
Station 608	Engine 608	4
	Haz Mat 608	Co- staffed
	Bike Trailer	0
Station 609	Engine 609	4
	Foam 609	1
	Foam 6092	0
Station 610	Engine 610	4
	Support 610	Co- staffed
Station 611	Ladder 611	4
	Brush 611	Co- staffed
	BC602	1
Station 613	Engine 613	4
	Tanker 613	Co- staffed
Station 614	Engine 614	4
	Tanker 614	Co- staffed
Station 615	Ladder 615	4
	Brush 615	Co- staffed
Station 616	Engine 616	4
	Brush 616	Co- staffed
Adaptive Response Unit	Engine 6040	4
TOTAL ON-DUTY		**67 at all times 71 Monday through Thursday 7 am to 5 pm**

Engine 6040, based at Station 601, is used primarily to staff fire stations when that station's primary unit is away for training or other purposes. This practice improves response performance since it ensures a response unit is available within the station's service area.

Scottsdale and other fire agencies in the Phoenix metropolitan area have developed a very comprehensive system for sharing resources. Regional fire agencies rely on the regional mutual and automatic aid agreement for major structure fires, other higher risk incidents, and during periods of high incident activity. The automatic aid agreement provides agencies within the region access to nearly 650 response apparatus and over 2,000 emergency services personnel. It provides for common apparatus numbering, common operational procedures, and integrated incident management. Though not a substitute for locally delivered services this system provides significant depth of coverage for unusual circumstances.

INSURANCE SERVICES OFFICE PUBLIC PROTECTION CLASSIFICATION

The Insurance Services Office (ISO) reviews the fire protection resources within communities and provides a Community Fire Protection Rating system from which insurance rates are often based. The rating system evaluates three primary areas: the emergency communication and dispatch system, the fire department, and the community's pressurized hydrant or tanker-based water supply. The overall rating is then expressed as a number between 1 and 10, with 1 being the highest level of protection and 10 being unprotected or nearly so. As of the latest survey (September 2007) ISO gave SFD a rating of Class 3.

The emergency communications function includes the capabilities of the call receipt and dispatch system along with the quality and redundancy of communications systems between dispatchers and response units. ISO gave 9.65 points out of a possible 10 points to this element. Minor deficiencies were noted in the alarm circuit integrity monitoring, radio channel recording, and testing of emergency power supplies.

The fire department is evaluated on its ability to provide needed apparatus within specified distances of developed property, the pump capacity and equipment carried on those apparatus, and the number of personnel staffing each. In addition, the fire department is evaluated on its training programs and facilities. The fire department received 32.73 points out of a possible 50 points for this element. Deficiencies included insufficient numbers of engine companies (23 are needed for maximum credit), and inadequate distribution of response units (an engine should be available within 1.5 road miles of any area and a ladder company within 2.5 miles of any area with buildings three or more stories in height). The fire department received 8.17 points out of a possible 15 for the number of firefighters on duty. The training program received nine out of a possible nine points.

The water system is evaluated on the amount of storage, size of water mains, distribution and condition of fire hydrants, and the ability of the system to deliver needed quantities of water based on specific risks within the service area. The water system received 36.82 points out of a possible 40 points. Minor deficiencies were noted in the water supply system (when needed water flow from fire hydrants is compared to available water flow) and in the fire hydrant inspection program.

The City of Scottsdale requires all new buildings be equipped with fire sprinkler systems. This was an excellent initiative that has improved the level of fire safety to the community. Unfortunately, the ISO

rating criteria does not fully recognize the value of these systems in homes. Changes being considered by ISO would recognize built-in fire protection in the future.

CURRENT SERVICE DELIVERY OBJECTIVES

The SFD has adopted the following Performance Statement:

Performance Statement

Mission

"We Care for You."

Vision

"Scottsdale Fire Department is dedicated to providing our customers essential fire and life safety services, thereby, enhancing the public safety experience in Scottsdale."

The SFD has established response performance objectives. The objectives are:

1) **Dispatch Call Processing Time**
   - **a.** A 9-1-1 call will be answered by the primary public safety answering point to the dispatch center within X seconds 95 percent of the time (unable to determine at this time)
   - **b.** A 9-1-1 call will be transferred to the dispatch center within X seconds 95 percent of the time (unable to determine at this time)
   - **c.** Response resources shall be notified of a priority incident other than emergency medical, hazardous materials, or technical rescue, within 105 seconds from receipt of the call at the dispatch center 80 percent of the time.
   - **d.** Response resources shall be notified of a priority emergency medical, hazardous materials, or technical rescue incidents within 99 seconds 90 percent of the time.
2) **Turnout Time**
   - **a.** Response personnel shall initiate response to a priority fire and special operations incident within 88 seconds from notification 90 percent of the time.
   - **b.** Response personnel shall initiate response to a priority emergency medical incident within 73 seconds from notification 90 percent of the time.
3) **Response time for arrival of the first response unit at a priority fire or special operations incident**
   The first response unit capable of initiating effective incident intervention shall arrive at a priority fire or special operations incident within eight minutes 29 seconds from notification of response personnel 90 percent of the time.
4) **Response time of the first arriving response unit at a priority emergency medical incident**
   The first response unit capable of initiating effective incident intervention shall arrive at a priority emergency medical incident within seven minutes 23 seconds from notification of response personnel 90 percent of the time.
5) **Response time for arrival of the effective response force at a moderate risk structure fire**
   The full effective response force shall arrive at a moderate risk structure fire within 12 minutes, 16 seconds from notification of response personnel 90 percent of the time.

The SFD is currently achieving these objectives as will be demonstrated in a later section of this report.

Component C – Review of the Community Expectations for Type and Level of Service

The ultimate goal of any emergency service delivery system is to provide sufficient resources (personnel, apparatus, and equipment) to the scene of an emergency in time to take effective action to minimize the impacts of the emergency. This need applies to fires, medical emergencies, and any other emergency situation to which the fire department responds. Obtaining and understanding the desires and expectations of community stakeholders is an important first step. SFD is committed to incorporating the needs and expectations of residents and policy makers in the service delivery planning process.

It is important to note that the information solicited and provided during this process was provided in the form of "people inputs," some of which are perceptions as reported by stakeholders. The project team reviewed the information for consistency and frequency of comment to identify specific patterns and/or trends. The observations included in this report were confirmed by multiple sources or the information provided was significant enough to be included. Based on the information review, the team was able to identify a series of observations, recommendations, and needs which are included in this report.

Stakeholder Input

ESCI interviewed the City of Scottsdale Mayor and Council members. The City Manager, Treasurer, and other city staff were also interviewed. Finally, SFD staff, including representatives of management and labor, was interviewed. The purpose of these interviews was to gain a better understanding of issues, concerns, and opinions about the SFD emergency service delivery system. Questions posed to each sought to learn more about:

1. The community's expectations of SFD.
2. Which expectations were being met and which were not.
3. Specific concerns about the manner and method in which services are being provided by SFD.
4. Whether the services offered by SFD had value to the community.
5. Whether SFD should offer services it currently does not provide.
6. General overall level of satisfaction with the services and service levels provided by SFD.

Summary of Discussions

Those interviewed believed the community expects SFD to provide quick response to calls for emergence assistance. "Quick" was defined as between four and six minutes from the time of the 9-1-1 call until help arrives. SFD should ensure its staff is highly competent. SFD should provide a high level of positive public interaction at all times. SFD should deliver its services efficiently in an effort to deliver quality service at the least cost to taxpayers. Overall, SFD's level of service should be as good as, or better than, comparable cities.

Those interviewed believed the services provided by SFD are appropriate. There were no suggestions to either eliminate currently provided services or add new services. There were some concerns expressed about the manner SFD is providing services. These questions include:

1. What is the value in sending the SFD paramedic to the hospital with the patient on the ambulance?

2. Are there occasions when only an ambulance can be sent to a minor EMS incident?

3. Could SFD provide an appropriate response to EMS incidents using smaller vehicles?

4. Is SFD in a position to maintain or improve services as the population changes over time?

5. Is the city benefiting from the regional automatic aid agreement sufficient to justify the cost of four-person staffing of response units?

Many of those interviewed were asked to consider two deployment strategies for fire service resources. The first suggests that all residents in the city should receive generally the same level of service (i.e. fire stations are spaced uniformly around the city to equalize response time throughout the community). The other suggests resources should be deployed to serve the next most likely emergency to occur (the more populated an area the more likely an emergency will occur). One choice tries to create as much equity in the delivery of service to all residents. The other will concentrate resources in areas with higher incident activity potentially leaving other areas with slower service. Those interviewed generally agreed that SFD should deploy response resources to provide the best response to the next most likely incident to occur.

Finally, most interviewees offered these additional thoughts. SFD should focus on cost containment. Cost of service has increased at a greater rate than was suggested at the time of transition from Rural Metro to city operated fire service. SFD should aggressively explore innovative approaches to service delivery. SFD should be able to handle most of its response workload depending on automatic and mutual aid only for the unusual circumstances.

Community Outcome Goals

From these conversations general statements of outcome have been developed regarding the community's expectations of its fire department. These statements have been synthesized by ESCI using its understanding of community expectations. They should provide SFD with a better understanding of the needs and expectations of its community within each service area.

Figure 10: Community Outcome Goals

Service	Community Outcome Goal
Fire Suppression	*For all fire incidents, SFD shall arrive in a timely manner with sufficient resources to stop the escalation of the fire and keep the fire to the area of involvement. An effective concentration of resources shall arrive within time to be capable of containing the fire, rescuing at-risk victims, and performing property loss mitigation operations.*
Emergency Medical Services	*For priority emergency medical incidents, SFD shall arrive in a timely manner with sufficiently trained and equipped personnel to provide advanced medical services that will stabilize the situation, provide care and support to the victim and reduce, reverse, or eliminate the conditions that have caused the emergency.*
Vehicle Extrication	*For all vehicle accidents where rescue of victims is required, SFD shall arrive in a timely manner with sufficient resources to stabilize the situation and extricate the victim(s) from the emergency situation or location without causing further harm to the victim.*
High-Angle Rescue	*For all high-angle rescue incidents, SFD shall arrive in a timely manner with sufficient resources to stabilize the situation, rapidly access the victim, and perform the necessary rescue functions.*
Trench and Collapse Rescue	*For all trench or collapse rescue incidents, SFD shall arrive in a timely manner with sufficient resources to stabilize the situation, protect the health and safety of victims and responders, and perform the necessary rescue functions.*
Swift-Water Rescue	*For all swift water rescue incidents SFD shall arrive in a timely manner with sufficient resources to rapidly access the victim and perform the necessary rescue functions.*
Confined Space Rescue	*For all confined space rescue incidents, SFD shall arrive in a timely manner with sufficient resources to stabilize the situation, protect the health and safety of victims and responders, and perform the necessary rescue functions.*
Hazardous Materials Response	*For all hazardous materials incidents, SFD shall arrive in a timely manner with sufficient resources to stabilize the situation and perform the actions necessary to prevent or control the release, protect life and the environment and resolve the incident.*
Aircraft Rescue Firefighting	*For all at-airport aircraft emergencies SFD shall arrive in a timely manner with sufficient resources to protect aircraft occupants from fire and affect their rescue.*
Wildland Firefighting	*For all wildland fire incidents SFD shall arrive in a timely manner with sufficient resources to protect valuable property at risk, minimize the number of acres consumed by fire, and protect people at risk.*

Component D – Community Risk Assessment

This section analyzes certain categorical risks that are present within the SFD service area that potentially threaten the people and property within the community and that can create response workload for the SFD. These risks are identified to assist the SFD in identifying where to locate response resources in the types and numbers needed to effectively respond to likely emergencies.

Another very good reference describing community risks is the Maricopa County Multi-Jurisdictional Hazard Mitigation Plan (2009). This document contains a great deal of information regarding risks within the region, including Scottsdale.

OVERALL GEOSPATIAL CHARACTERISTICS

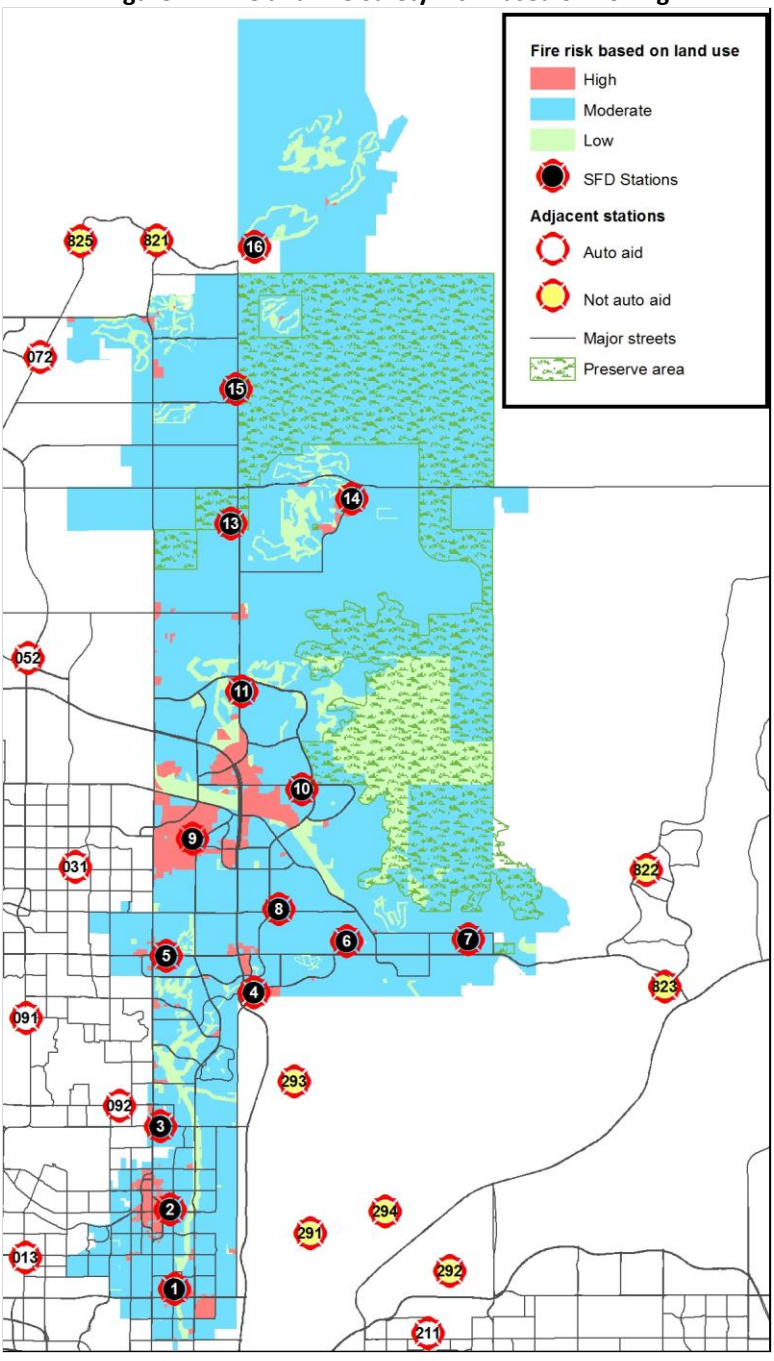
The fire service assesses the relative risk of properties based on a number of factors. Properties with high fire and life risk often require greater numbers of personnel and apparatus to effectively mitigate a fire emergency. Staffing and deployment decisions should be made with consideration to the level of risk within geographic sub-areas of a community.

The following community risk assessment has been developed based on intended land uses as described in the City of Scottsdale zoning designations. The following figure translates zoning to categories of relative fire and life risk.

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

The following figure depicts fire and life safety risk based on proposed land uses. A list of zoning designations and the risk level assigned to each can be found in Appendix B.

Figure 11: Fire and Life Safety Risk Based on Zoning



GEOGRAPHIC AND WEATHER-RELATED RISKS

Weather Risk

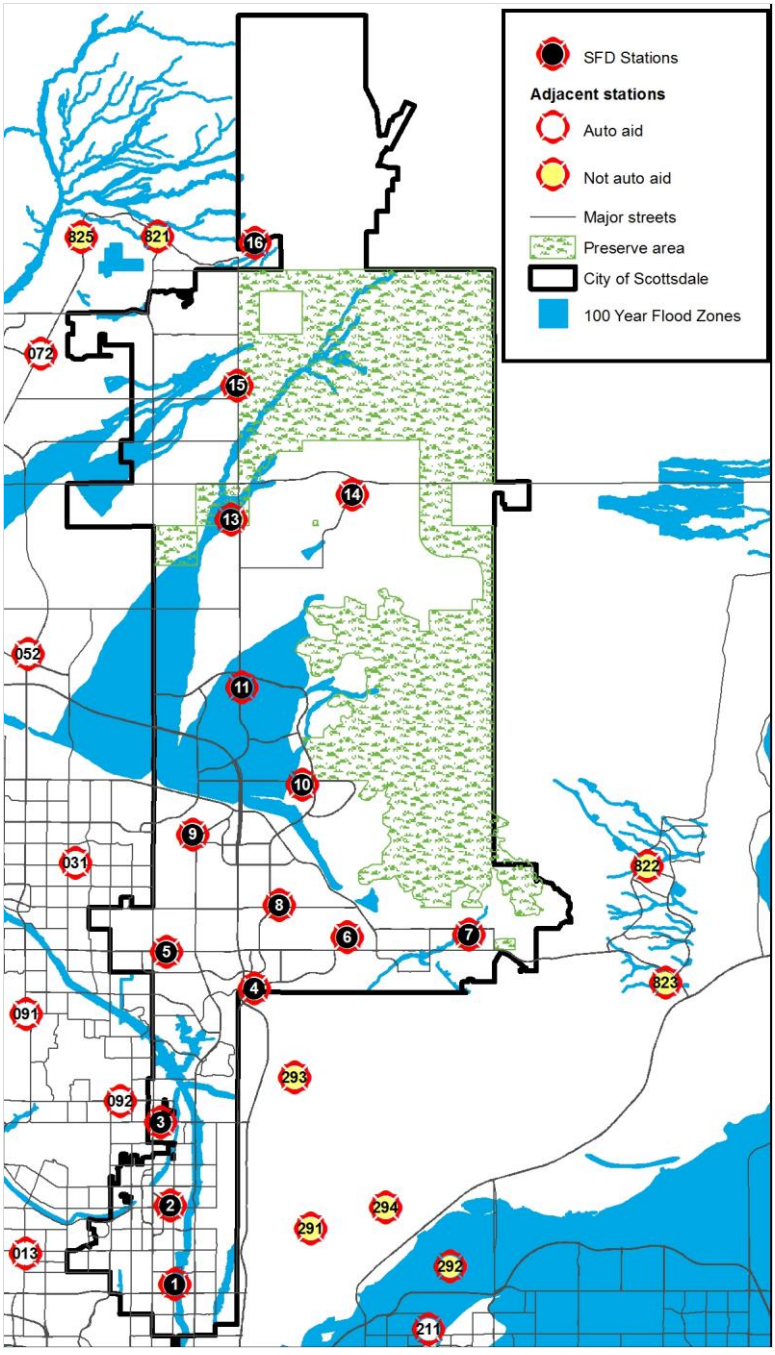
Scottsdale's climate is best described as arid. Winters are quite mild and summers quite warm. The lowest temperature recorded was 19 degrees Fahrenheit in 1955 and the highest temperature recorded was 119 degrees Fahrenheit in 1972. Scottsdale receives an average of eight inches of rainfall each year.

Extreme weather does occur. Thunderstorms and strong wind storms occur regularly, particularly between July and September, the monsoon season. There is a history of tornado activity as well, most recently in 1993.

Flood Risk

Waterway flooding is a risk within the community. During heavy rains, local streams overfill causing local area flooding. The city has taken significant steps to minimize the impact of this flooding. The adjacent figure illustrates the area designated by FEMA as 100-year flood zones. Several fire stations lie in or near the 100-year flood zone.

Figure 12: FEMA 100-Year Flood Zones

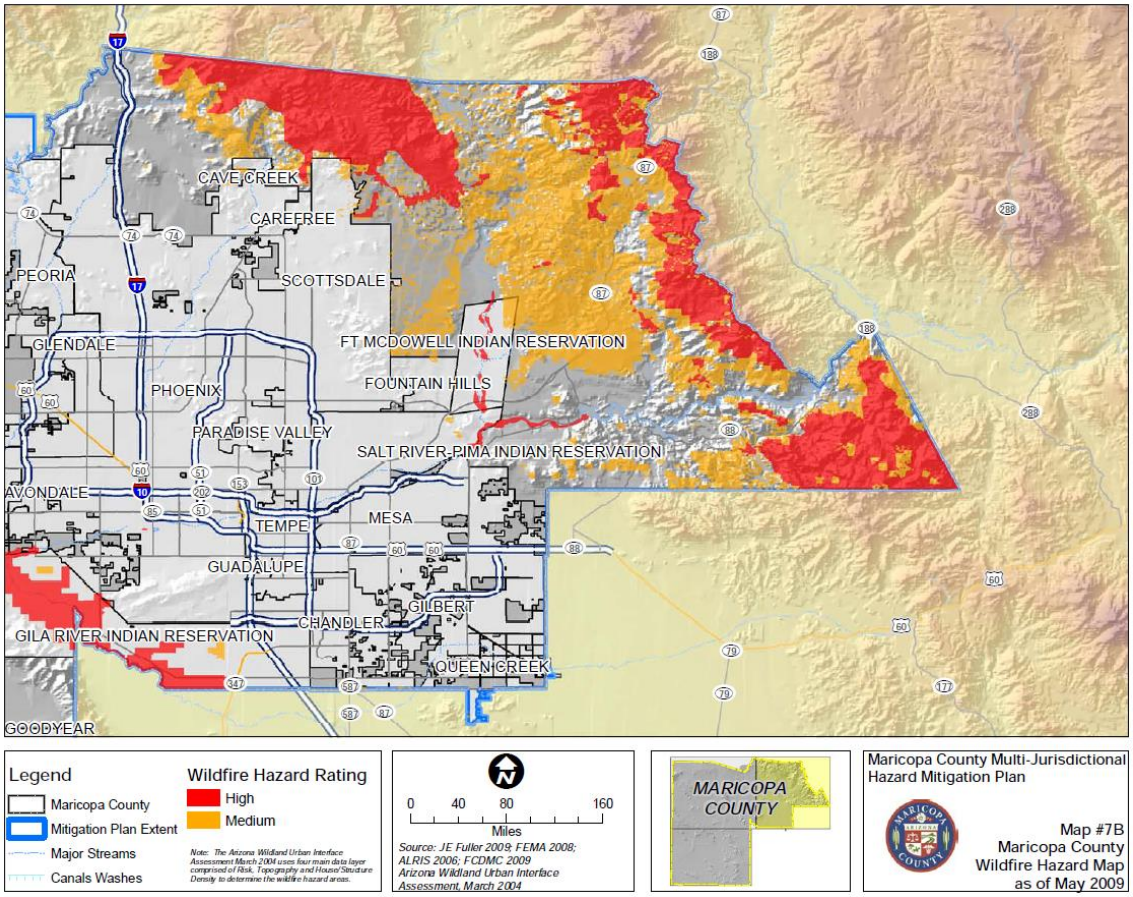


Wildfire Risk

In spite of Scottsdale's climate, the risk of wildland fires is not significant. The only area identified as of high or medium wildland fire risk in the Maricopa County Hazard Mitigation Plan is to the city's most northern area. That is not to say that wildfire is not a risk. Small field fires are possible that could threaten a small number of homes. However, the risk of a conflagration level wildfire fire is low.

The McDowell Sonoran Preserve is considered a valuable community resource. Its recreational and environmental significance is of high importance to the community. Wildfires do occur within this area. There is very limited road access within the Preserve. Effective firefighting efforts for large fires depend greatly on aerial firefighting capability.

Figure 13: High and Medium Wildfire Area Interface Hazard



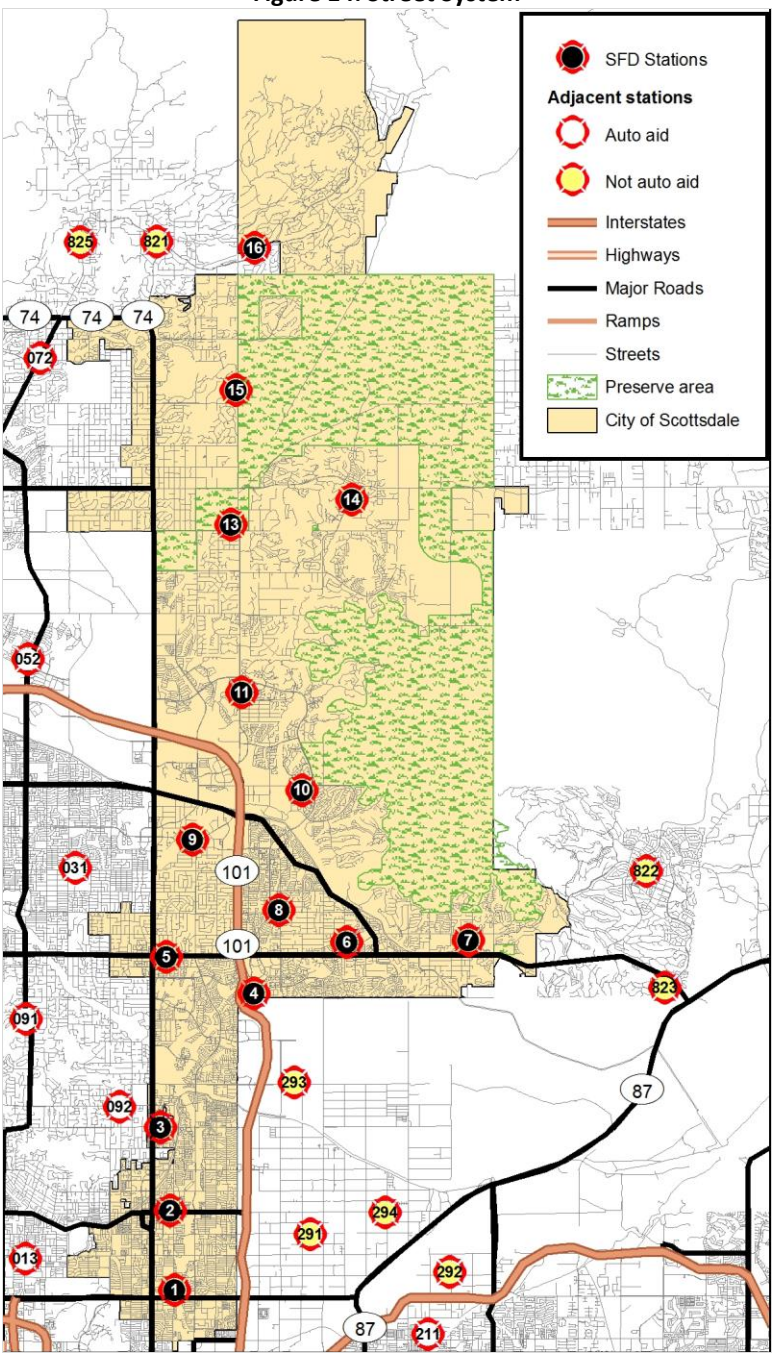
TRANSPORTATION RISKS

Transportation corridors provide necessary access and egress for the department. The configuration of transportation systems can also affect the response capability of emergency services. Limited access freeways and rail lines can interrupt street connectivity, forcing apparatus to negotiate a circuitous route to reach an emergency scene.

Roads

Surface streets dominate the SFD service area. A number of state highways and parkways provide collector and arterial level traffic circulation. The balance of the department's service has a mix of relatively well interconnected street networks and neighborhoods characterized by cul-de-sacs and other dead end street systems. Traffic signals within the service area are equipped with signal pre-emption equipment. This provides a significant response time performance advantage as well as improved safety to motorists.

Figure 14: Street System



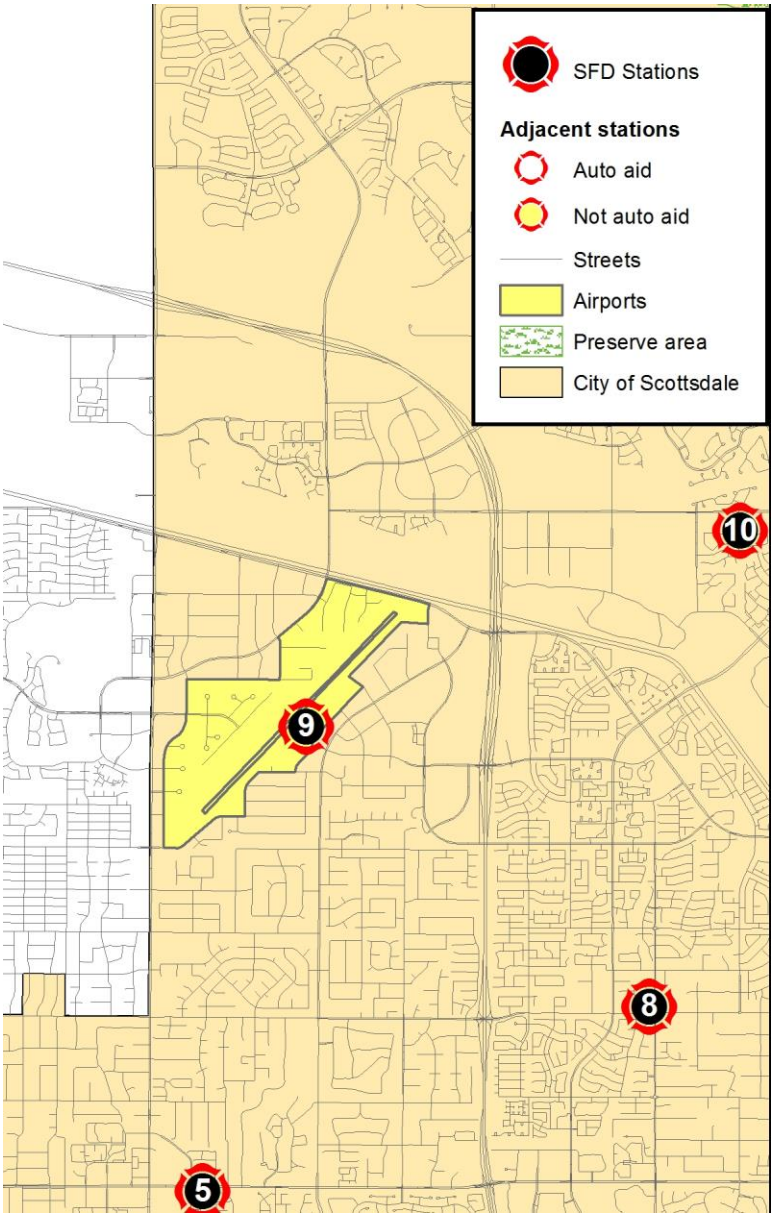
Railroads

There are no railroad lines in the City of Scottsdale. The closest line is just south of the city.

Airport

The Scottsdale Airport is operated by the City of Scottsdale. This facility is a general aviation focused airport without scheduled commercial or airline service. The airport has a single runway that is 8,249 feet long. The runway can handle aircraft up to 100,000 pounds in weight. Fire Station 9 provides on-airport aircraft crash rescue and firefighting service. Numerous businesses operate around the airport

Figure 15: Scottsdale Airport



PHYSICAL ASSETS PROTECTED

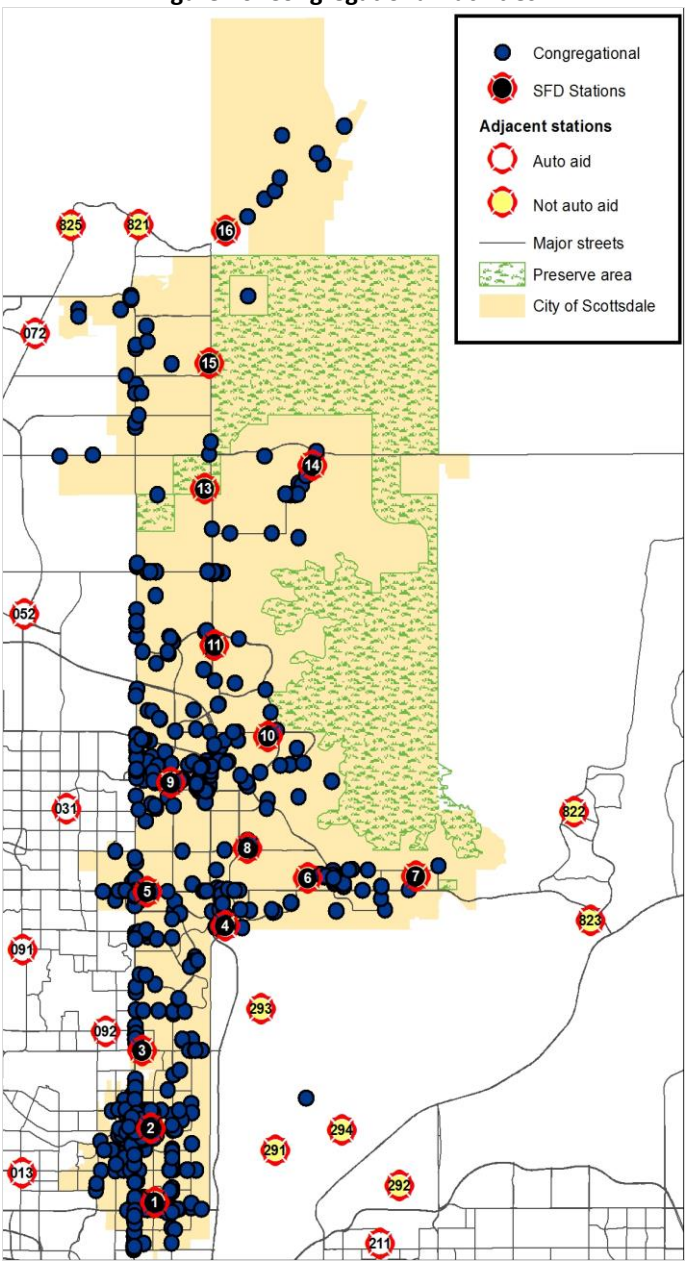
Many buildings in the city are used for purposes that create more significant risk than others. High occupancy buildings, facilities providing care to vulnerable populations, and others may require greater numbers of emergency response resources during an emergency. This section draws on information from SFD records and other sources.

Congregational

Numerous buildings lie within the city in which large numbers of people gather for entertainment, worship, and such. A variety of nightclubs, theaters, and other entertainment venues exist in the downtown area.

These facilities present additional risk, primarily for mass casualty incidents. Fire, criminal mischief, and potentially terrorism, could cause a major medical emergency requiring significant emergency service resources. The following figure shows the locations of 945 buildings identified as congregational facilities within the city.

Figure 16: Congregational Facilities

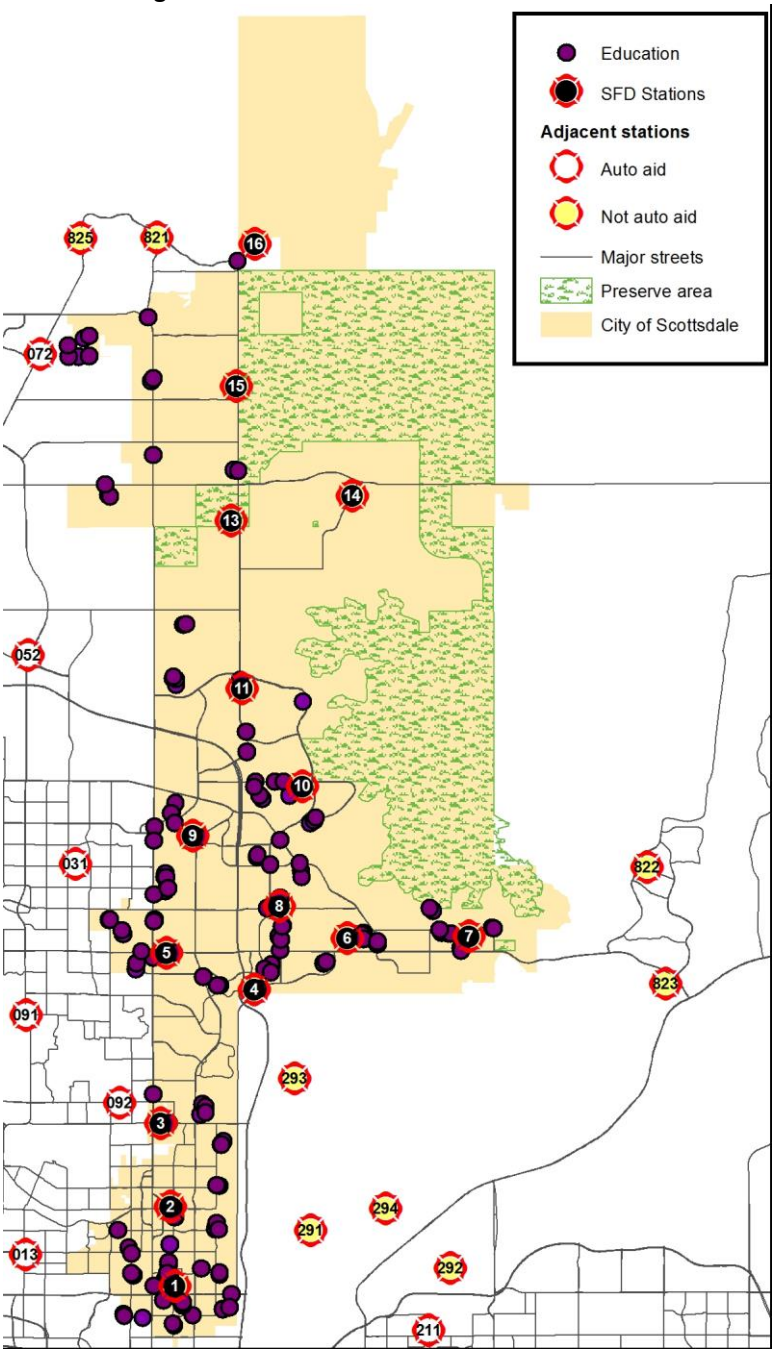


Schools/Day Care

Three school districts serve the City of Scottsdale area: Cave Creek Unified School District, Paradise Valley Unified School District, and the Scottsdale Unified School District. Together these districts and other private organizations operate 161 facilities for educational purposes.

The following figure shows the locations of most of the school facilities.

Figure 17: Public and Private School Facilities

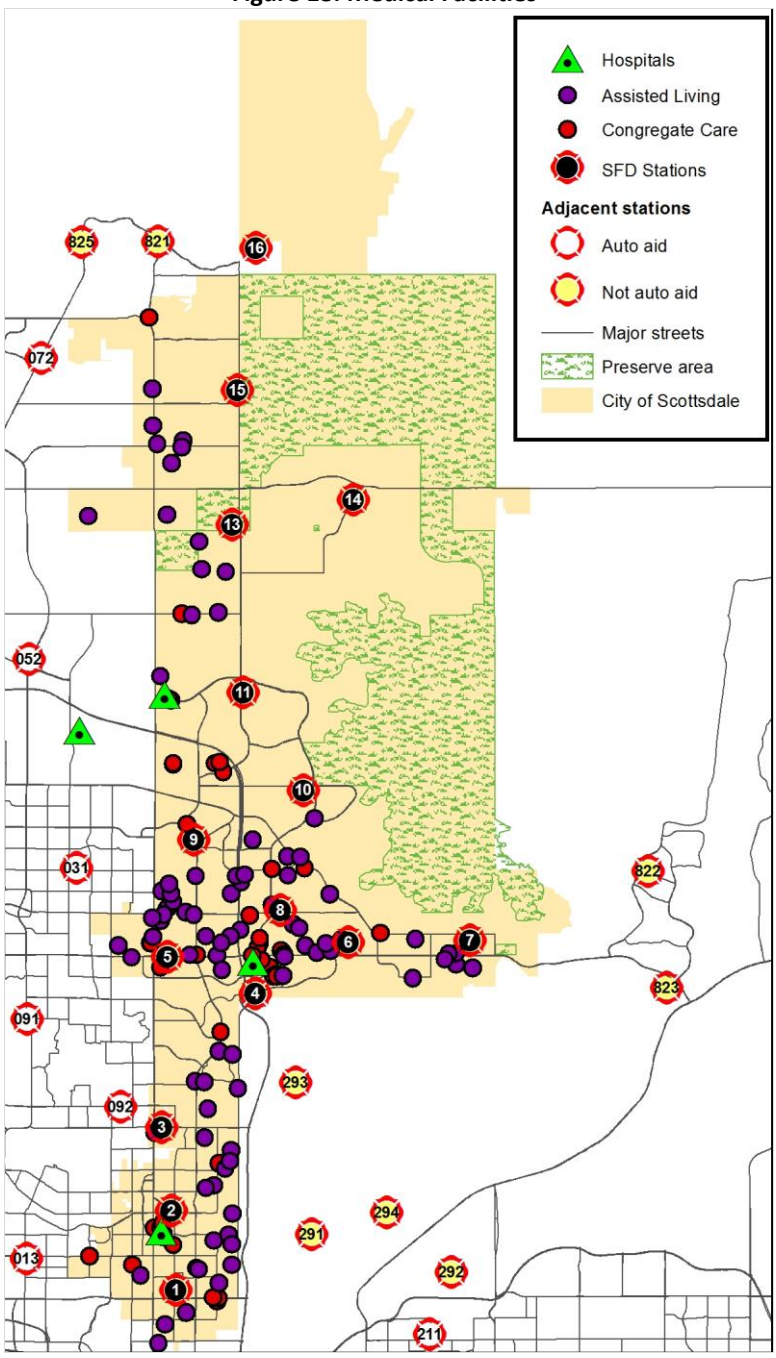


Medical and Congregate Care Facilities

Medical and congregate care facilities, particularly hospitals and nursing homes, house vulnerable populations. Although these facilities are generally built of highly fire resistive construction with built-in fire suppression, emergencies can occur that require the quick movement of patients away from the hazard.

The following figure shows the location of the four hospitals in and near Scottsdale along with the 58 congregate care and assisted living facilities.

Figure 18: Medical Facilities



Other Critical Infrastructure

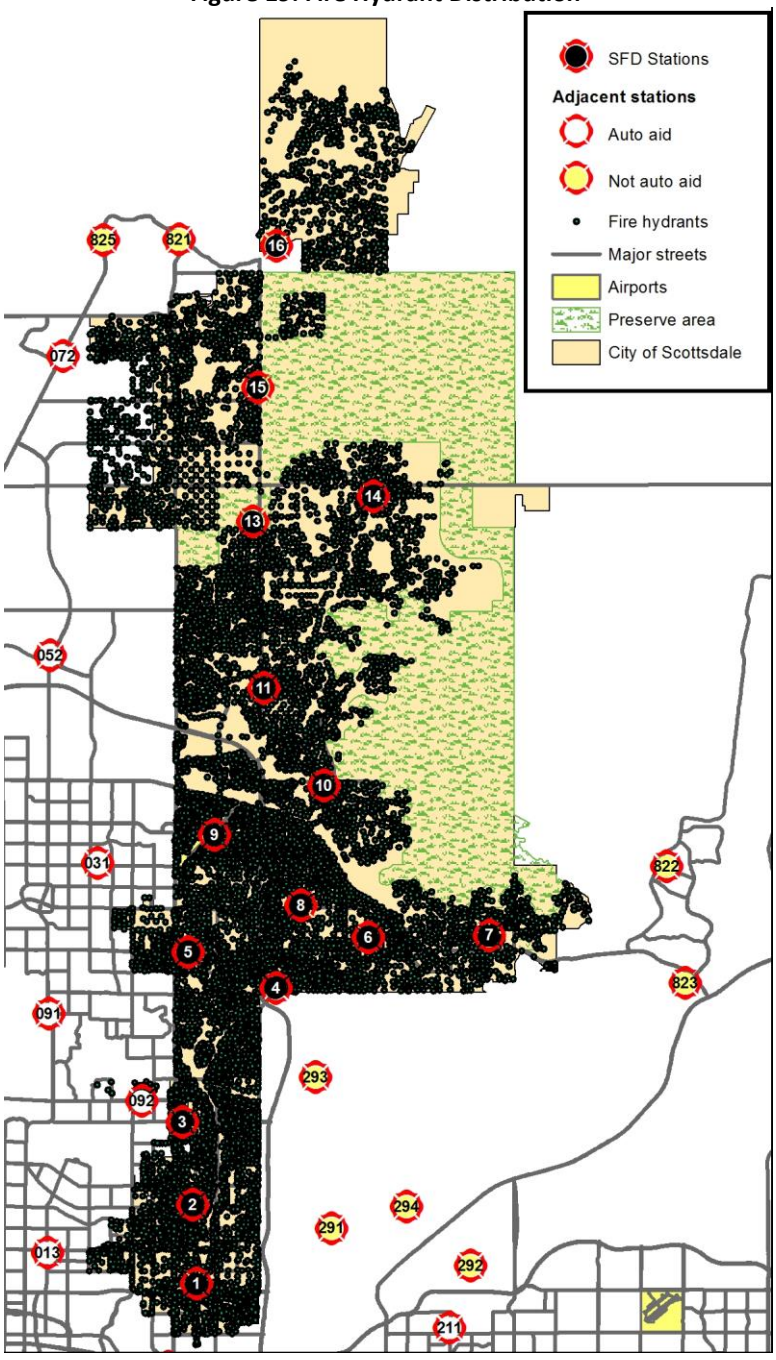
In this section, other types of infrastructure critical to a community are discussed in general terms. Though SFD does not have any unusual critical community infrastructure, it is important the fire department plan for emergencies at any of these facilities.

Water Distribution

The most obvious concern to the fire department is the water reservoir, water main, and fire hydrant system. Providing sufficient storage, distribution, and access to this valuable firefighting resource through well-distributed fire hydrants is very important. The adjacent figure shows that fire hydrants are distributed through virtually all developed areas.

The last Insurance Services Office (ISO) review of the city's water system was in 2007. At that time, ISO gave the city's water system 36.82 out of 40 points indicating that the system provides very good delivery of firefighting water supply. Water service is provided to the city by the City of Scottsdale.

Figure 19: Fire Hydrant Distribution



Communications

Emergency communication centers and the associated transmitting and receiving equipment are essential facilities for emergency response. Scottsdale Police Department provides emergency 9-1-1 call receipt. Phoenix Regional Dispatch Center provides dispatch service to a number of regional fire agencies. This center provides for the interrogation of 9-1-1 calls for help, dispatching of fire and other emergency responders, and important support to the incident management function.

There are other communication facilities and equipment that are equally important to the community and government operations. These are the telephone company central offices and the transmission lines of local telephone service providers. Internet service providers, along with wireless cellular communication providers, provide essential communication capabilities for the community as well as emergency personnel through their facilities and equipment.

Energy

Previously discussed community services, from communications to traffic signals to normal operations, require the use of energy. Whether it is electricity generation and transmission systems, fuel distribution and storage tanks, or natural gas pipelines and regulator stations, the community is dependent upon energy sources.

Structural Risks

Certain buildings, their contents, functions, and size present a greater firefighting challenge and require special equipment, operations, and training. The City of Scottsdale was a pioneer in incorporating built-in fire protection into new buildings. For many years, this highly successful initiative has afforded homeowners and others a level of fire safety not found elsewhere. This effort has (and will continue to) reduced the risk of fire within the community. Information for this section has been drawn from SFD records and the Insurance Services Office (ISO) database.

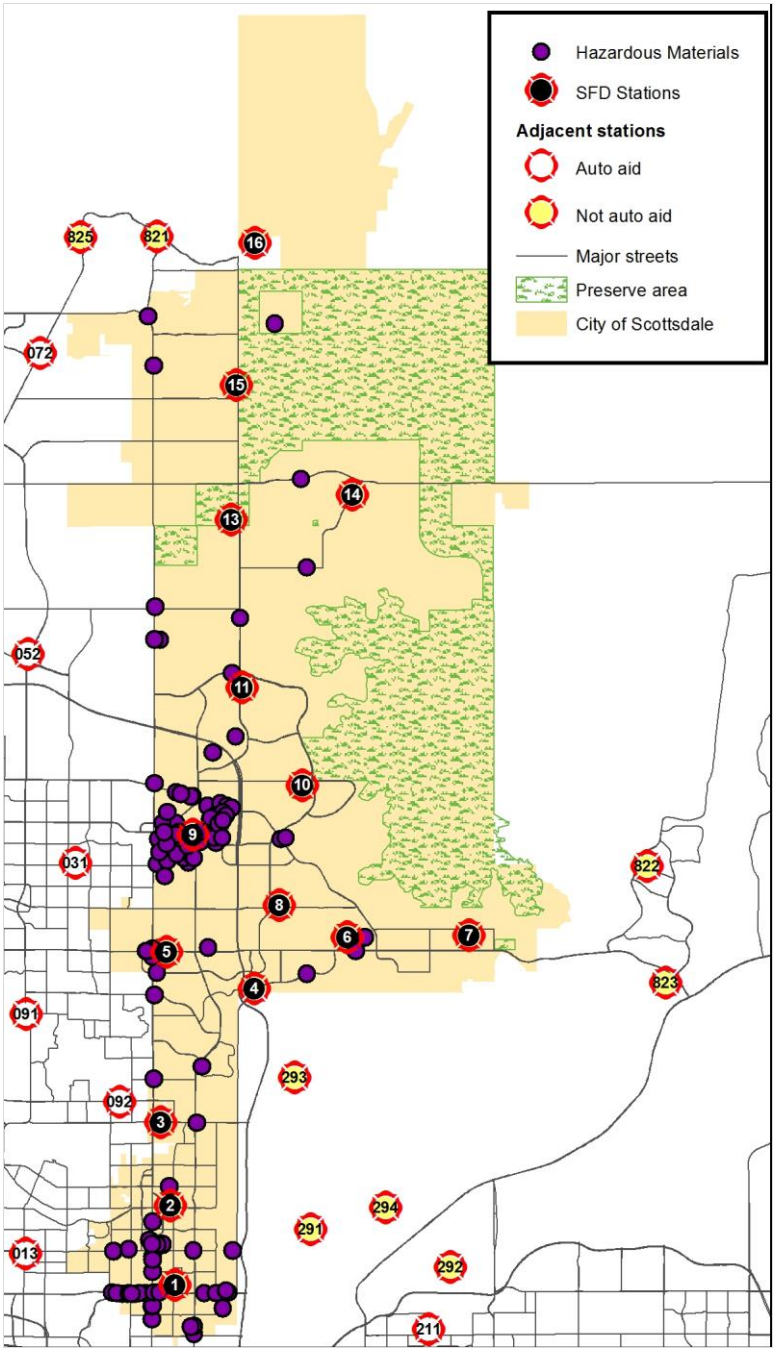
Hazardous Materials

Buildings that have been identified as containing hazardous materials can create a dangerous environment to the community as well as the firefighters during a spill or fire. Special equipment such as protective clothing and sensors, along with specialized training, is necessary to successfully mitigate a hazardous materials incident.

The SFD provides hazardous materials emergency response supported by other agencies within the region.

The following figure shows the locations of the 145 facilities classified as using more than small quantities of hazardous materials.

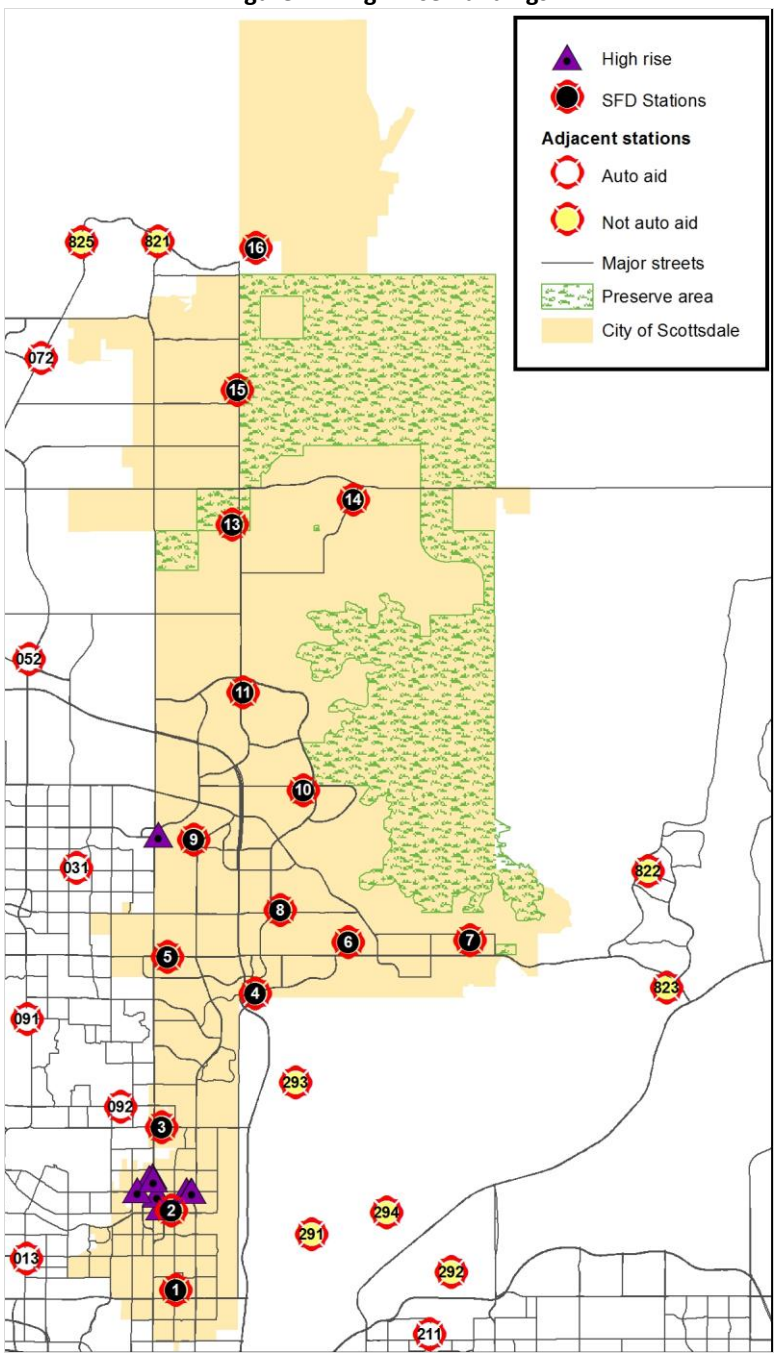
Figure 20: Hazardous Material Use Locations



High Rise Buildings

High rise buildings present a unique challenge to fire departments. Additional personnel are required to move hose and equipment to upper floors of these buildings. A high rise building, as defined by the city's building code, is any building having floors used for human occupancy located more than 75 feet above the lowest floor level having building access (approximately seven or eight stories). The following figure shows the locations of the 10 high rise buildings within the city.

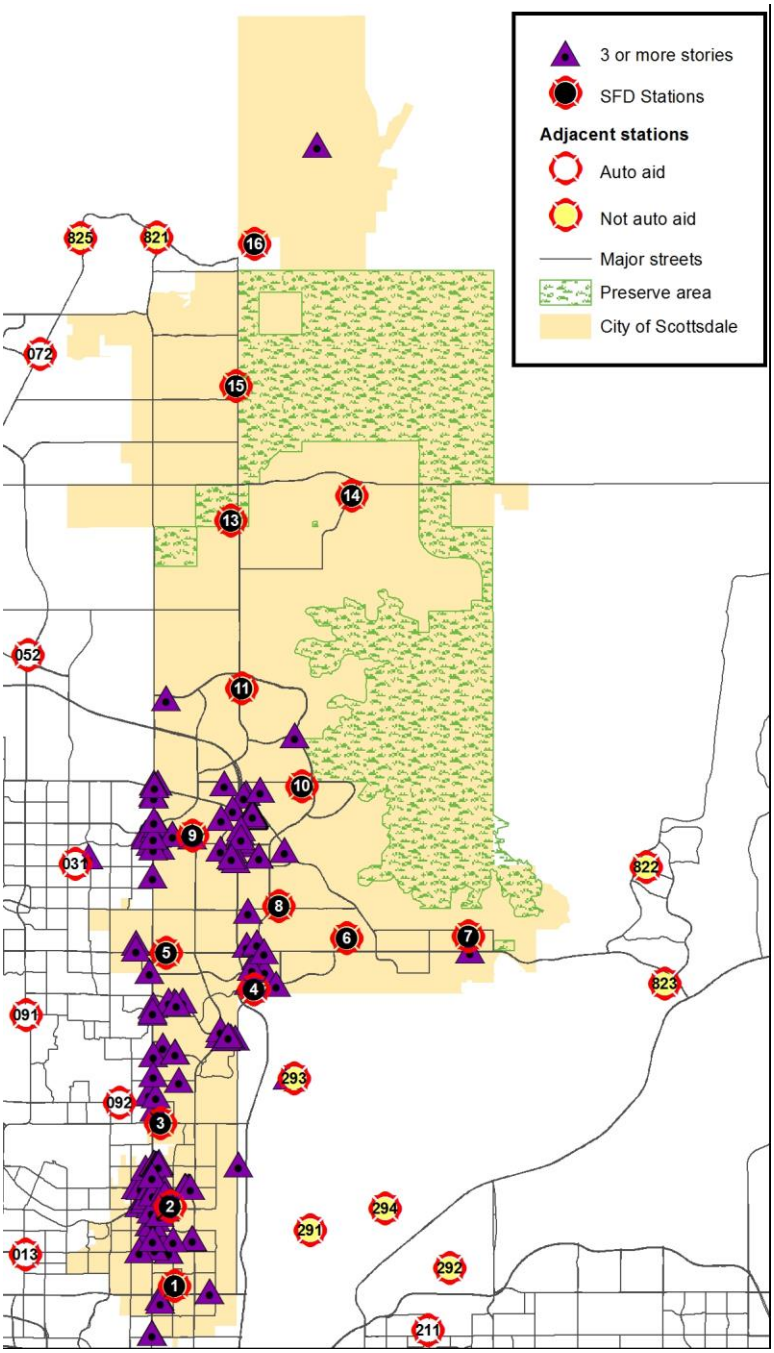
Figure 21: High Rise Buildings



Buildings Three or More Stories in Height

The Insurance Services Office calls for a ladder truck within two and one half miles of developed areas containing buildings three or more stories in height. Accessing the upper floors and roof of buildings this tall typically requires ladder truck capability as ground ladders may not provide access. The following figure shows the locations of many of the buildings in Scottsdale three or more stories in height.

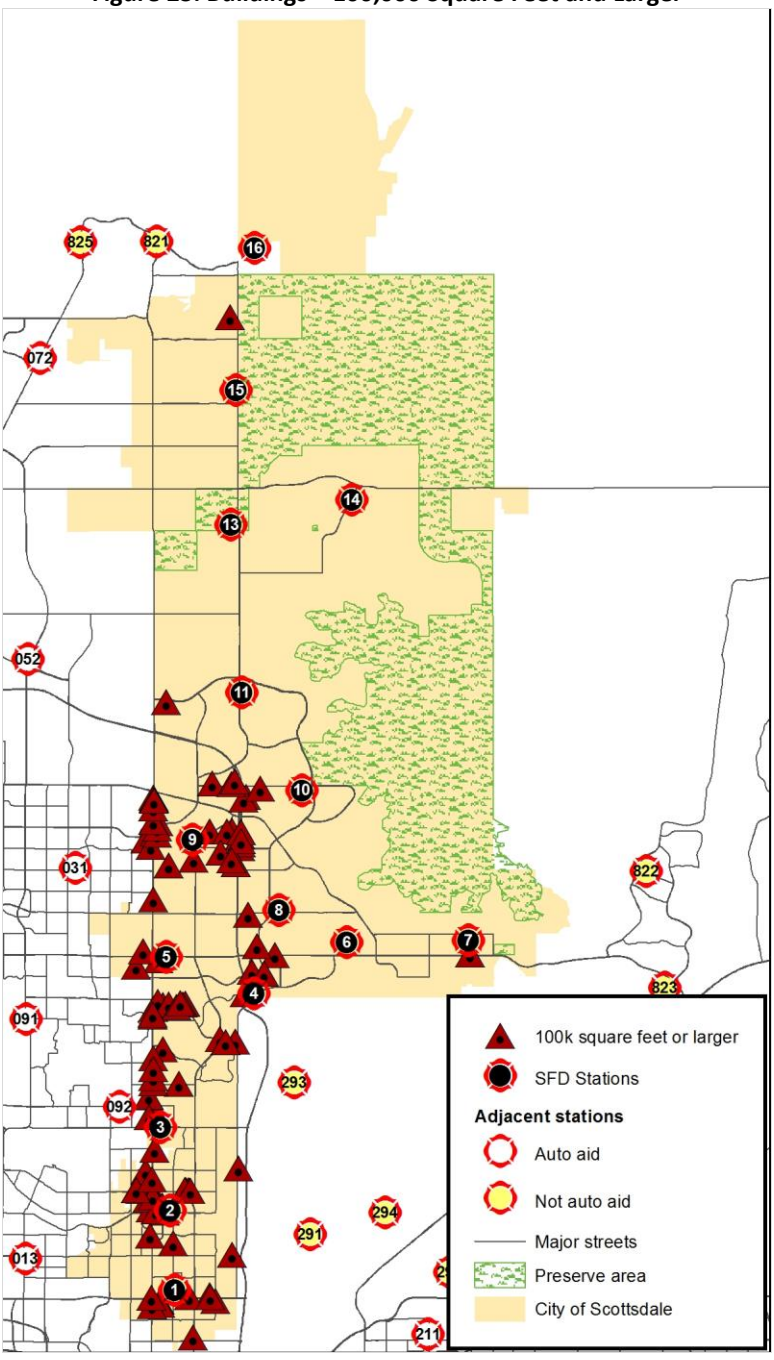
Figure 22: Buildings Three or More Stories in Height



Large Square Footage Buildings

Large buildings, such as warehouses, malls, and large "box" stores require greater volumes of water for firefighting and require more firefighters to advance hose lines long distances into the building. The following figure shows the locations for the 111 buildings 100,000 square feet and larger according to the ISO database.

Figure 23: Buildings – 100,000 Square Feet and Larger



Terrorism

Scottsdale is a potential target for terrorism. Most of the previous categorized risks in the community are targets for such activity. In addition, the city hosts numerous mass gathering events during the year. The larger of these events, all potential terrorism targets, include:

- Waste Management Phoenix Open – 560,000 attendees
- Barret/Jackson Auction – 300,000 attendees
- Arabian Horse Show – 300,000 attendees

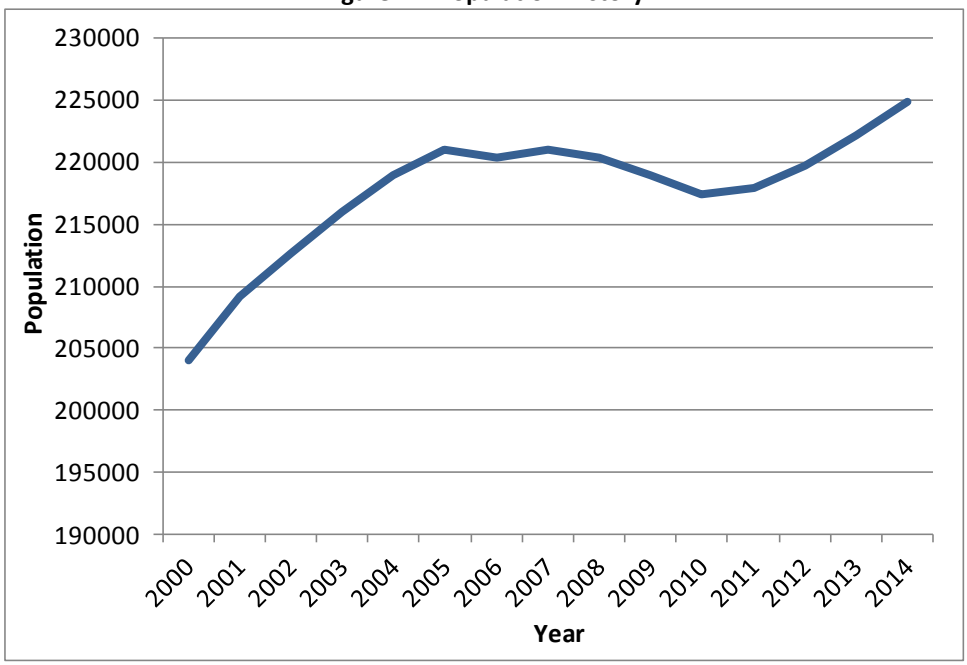
Scottsdale is in close proximity to the City of Phoenix, which also has a terrorism risk. SFD may either be impacted by the consequence of a terrorist act in Phoenix or be asked to support Phoenix in the aftermath of such an event. The fire department needs to be vigilant in its training and preparedness in the event one or more coordinated acts of terror occur in the region.

DEVELOPMENT AND POPULATION GROWTH

Current Population Information

SFD's population has grown slowly, with an average annual growth rate of 0.7 percent between 2000 and 2014. At the time of this study, the current city population is estimated at 224,800. It is estimated that employment adds approximately 58,000[2] people to the city during daytime hours. The following figure illustrates resident population growth over the past 14 years.

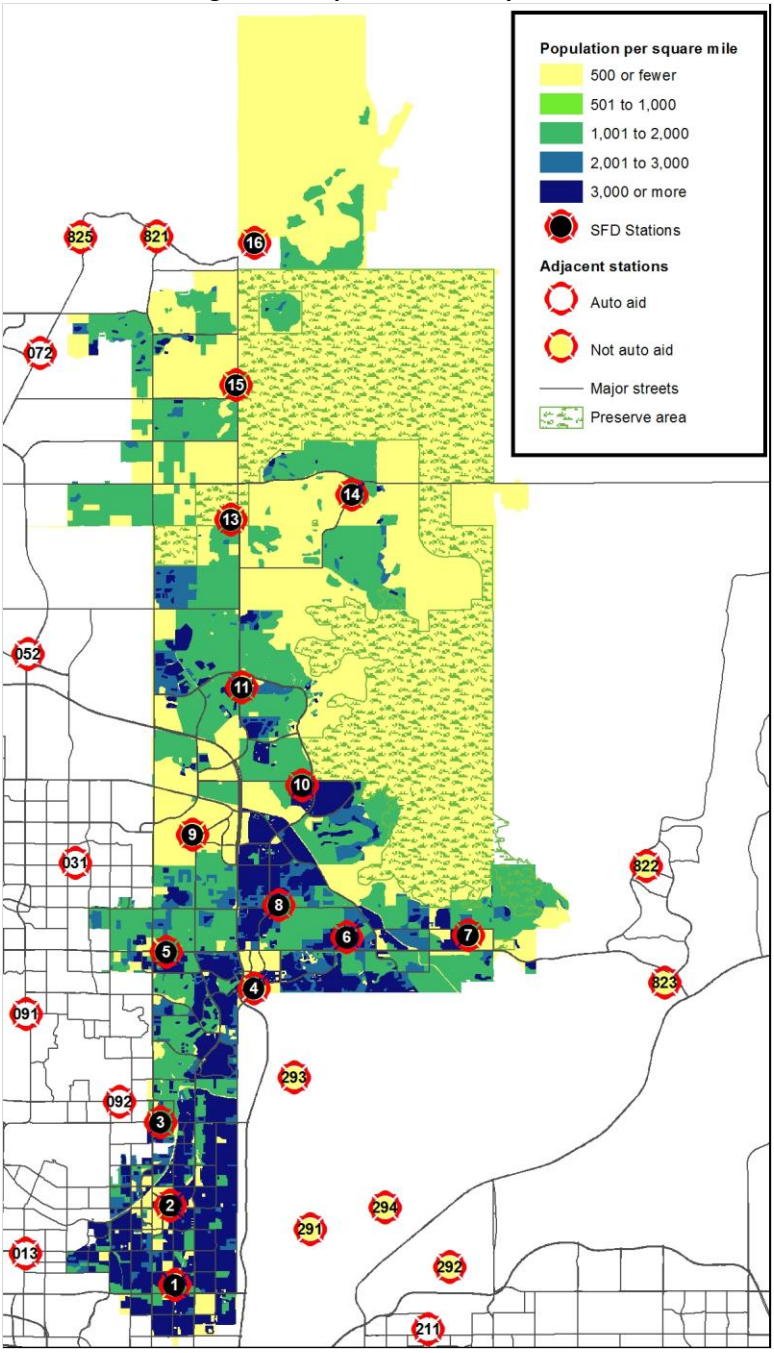
Figure 24: Population History



[2] Source: city-data.com.

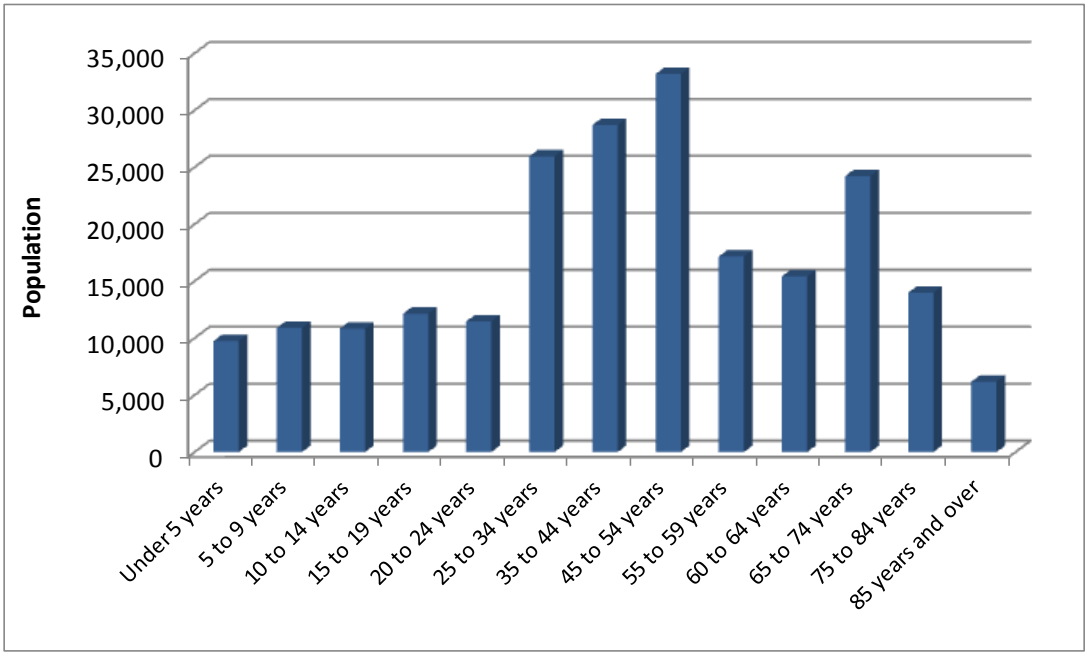
It is useful to assess the distribution of the population within the city since there is a direct correlation between population density and service demand. The following figure displays the population density of Scottsdale based on Census 2010 data. Census data only includes people who live full-time in their home. It does not include people who visit or reside temporarily in a community.

Figure 25: Population Density, 2010



One of the factors that can influence emergency service demand, particularly emergency medical services, is the population's age. The following figure examines the SFD's population segmented by age groups. This data is based on 2014 American Community Survey estimates.

Figure 26: Estimated Population by Age



Based on the preceding figure, 20.2 percent of the population is 65 years of age or older and 4.4 percent of the population is under five years of age. This places a total of 24.6 percent of the area's population within the age groups that are at highest risk in residential fire incidents and account for some of the highest use of emergency medical services. Senior citizens can have difficulty escaping from fire due to physical limitations. Seniors also tend to use emergency medical services more frequently than younger persons. As the population ages, this will create an increase in service demand for emergency medical services.

The very young also represent a vulnerable population, both in regard to 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.

RISK CLASSIFICATION

Areas of higher fire and life risk require greater numbers of personnel and apparatus to effectively mitigate emergencies. Areas with a higher incident activity require additional response units to ensure reliable response. Staffing and deployment decisions for different regions of the city should be made in consideration of the level of risk in each.

Most communities contain areas with different population densities and property risk allowing the community's policy makers to specify different response performance objectives by geographic area. The classifications are identified as:[3]

- **Metropolitan**—Geography with populations of over 200,000 people in total and a population density predominately over 3,000 people per square mile. These areas are distinguished by inner city neighborhoods, numerous mid-rise and high-rise buildings, often interspersed with smaller structures.
- **Urban**—Geography with a population of over 30,000 people and/or a population density predominately over 2,000 people per square mile. These areas are characterized by significant commercial and industrial development, dense neighborhoods, and some mid-rise or high-rise buildings.
- **Suburban**—Geography with a population of 10,000 to 29,999 and/or a population density predominately between 1,000 and 2,000 people per square mile. These areas are characterized by single and multifamily neighborhoods, and smaller commercial developments
- **Rural**—Geography with a total population of less than 10,000 people or with a population density of less than 1,000 people per square mile. These areas are characterized by low density residential, little commercial development, and significant farm or open space uses.
- **Wilderness/Frontier/Undeveloped**—Geography that is both rural and not readily accessible by a publicly or privately maintained road.

SFD's service area, based on population density, is of three classifications: urban, suburban, and rural. The community's risk classifications should influence how response resources are distributed now and in the future. Since suburban areas are anticipated to grow in population densities, response performance objectives have been established that are uniform across the entire developable service area.

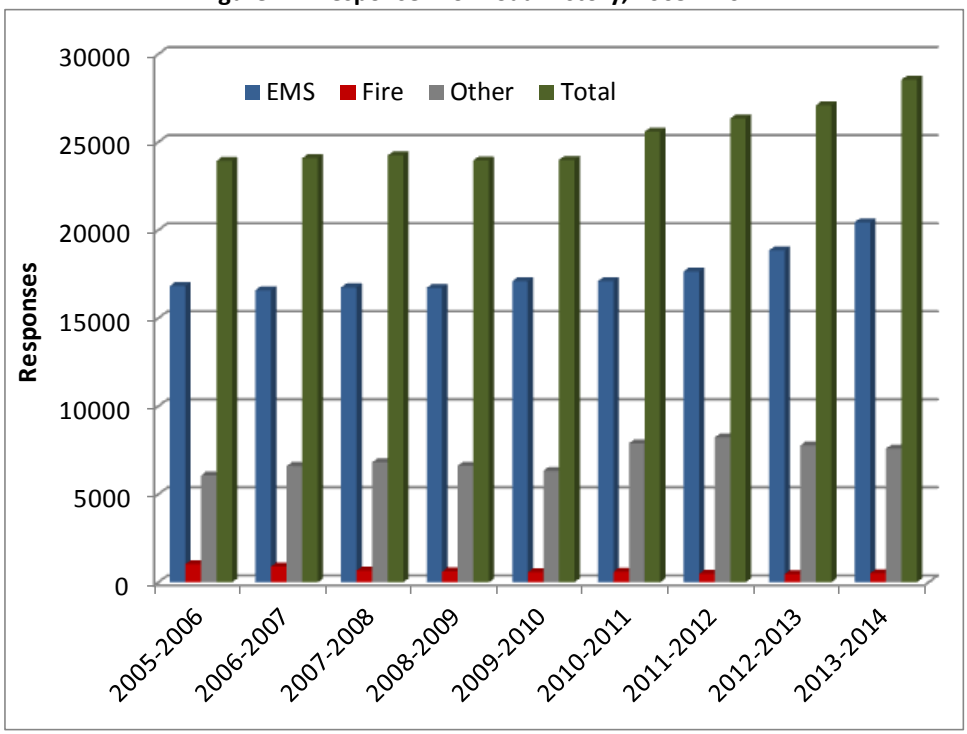
[3] CFAI *Standards of Cover, 5th edition*

HISTORIC SYSTEM RESPONSE WORKLOAD

Before a full response time analysis is conducted, it is important to first examine the level of workload (service demand) that a fire department experiences. Higher service demands can strain the resources of a department and may result in a negative effect on response time performance.

The following figure shows response workload for nine previous fiscal years[4]. Total response workload has increased 19.2 percent over the nine years, primarily driven by the increase in emergency medical responses.

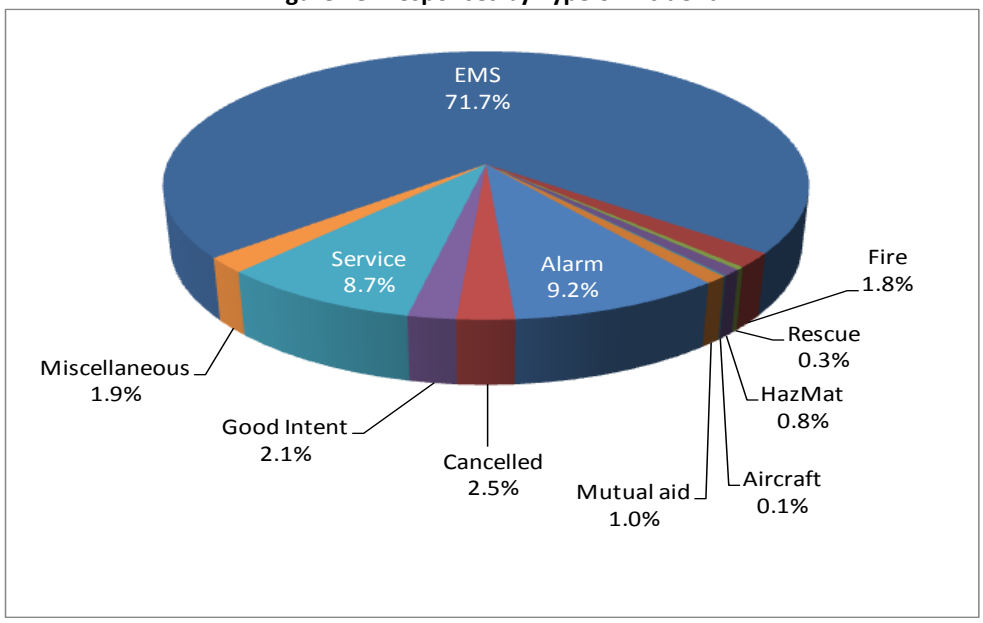
Figure 27: Response Workload History, 2005 – 2014



[4] Fiscal years run from July 1 through June 30.

Incident data used for the evaluation of current performance was all responses made between July 1, 2013 and June 30, 2014 (study period). During the study period SFD responded to 28,544 incidents. The next figure shows responses by type of incident for the study period. Emergency medical type responses (EMS and motor vehicle accidents) are the most common at 71.7 percent of total responses.

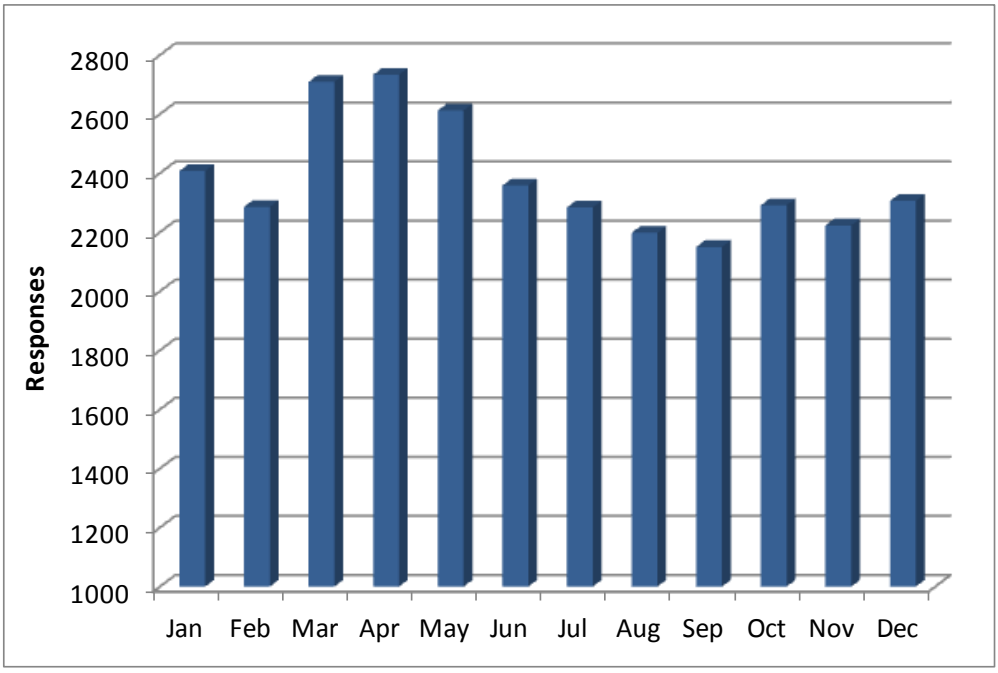
Figure 28: Responses by Type of Incident



Temporal Analysis

A review of incidents by time of occurrence also reveals when the greatest response demand is occurring. The following figures show how activity and demand changes for SFD based on various measures of time. The following figure shows response activity during the study period by month.

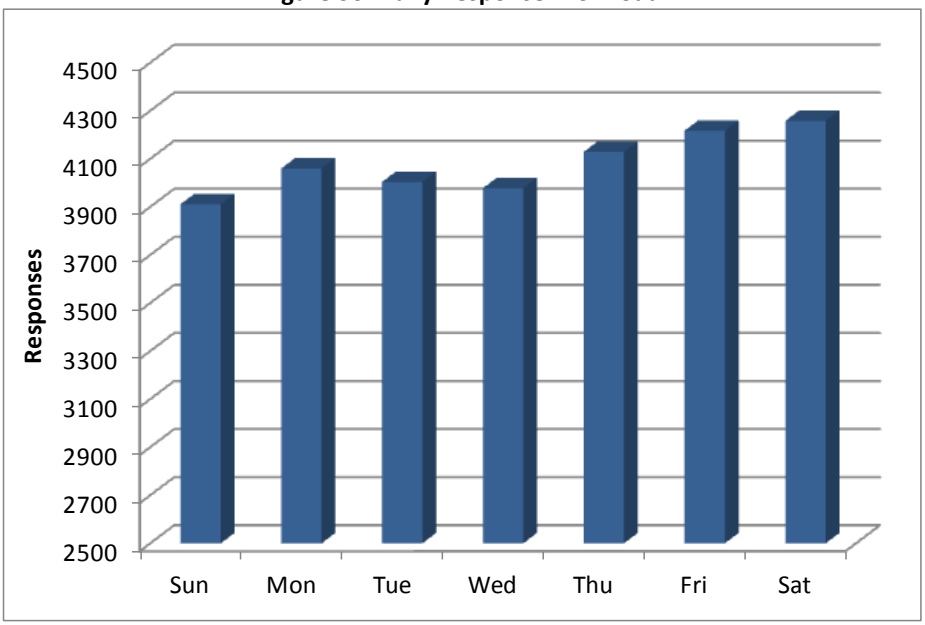
Figure 29: Monthly Response Workload



During the study period, there was 27.1 percent more response activity in the busiest month, April, versus the slowest month, September.

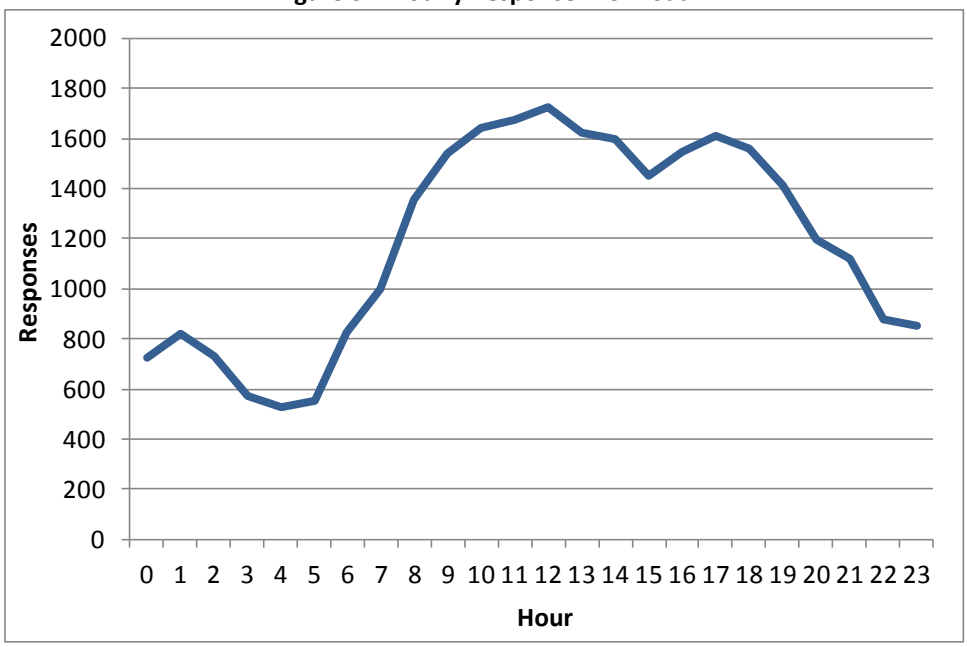
Next, response workload is compared by day of week. In this case there is 8.8 percent more incident activity on the busiest day, Saturday, versus the slowest day, Sunday.

Figure 30: Daily Response Workload



The time analysis that shows significant variation is response activity by hour of day. Response workload directly correlates with the activity of people, with workload increasing during daytime hours and decreasing during nighttime hours as shown in the following figure. Incident activity is at its highest between 8:00 AM and 8:00 PM.

Figure 31: Hourly Response Workload

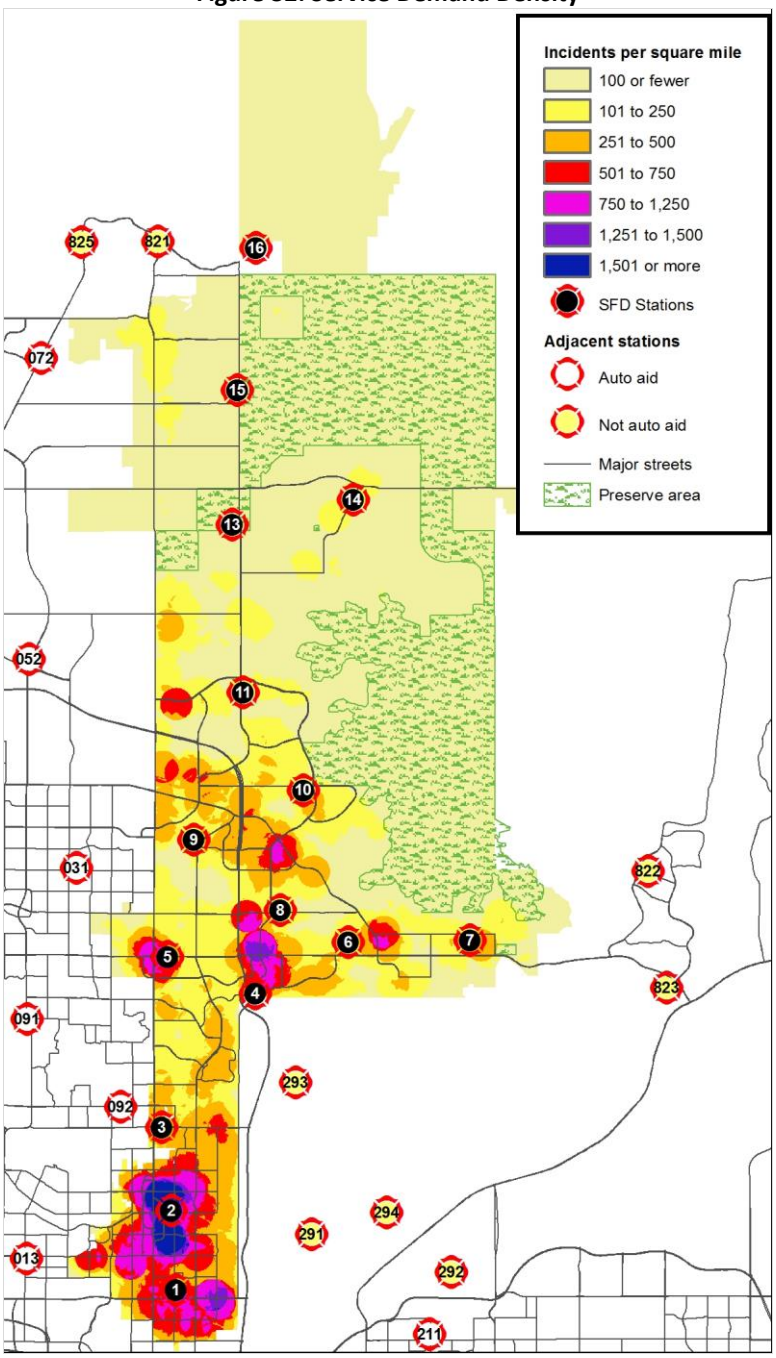


Spatial Analysis

In addition to the temporal analysis of the current service demand, it is useful to examine geographic distribution of service demand. The following figure series indicates the distribution of emergency incidents in SFD during the study period.

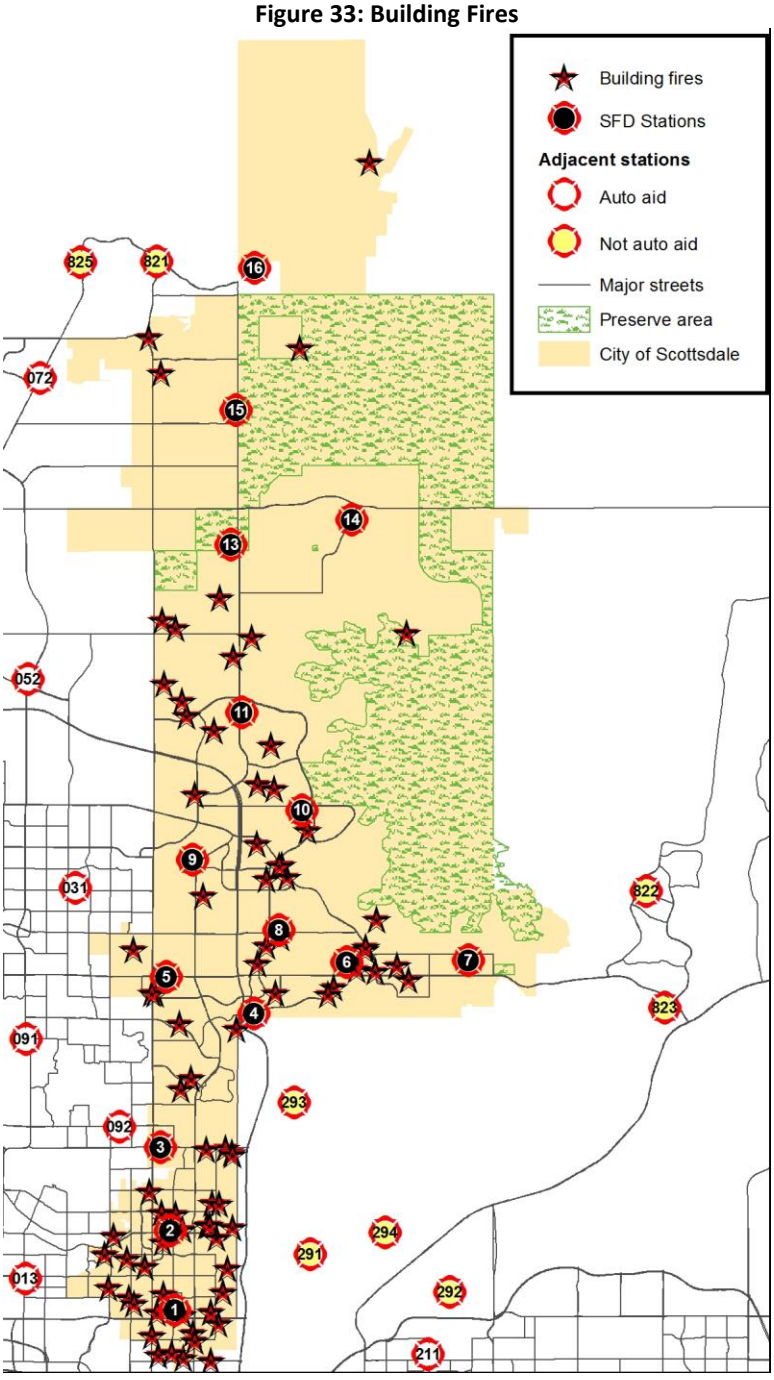
The first figure displays the number of incidents per square mile within various parts of the city. The area of greatest service demand is the city's southern half.

Figure 32: Service Demand Density



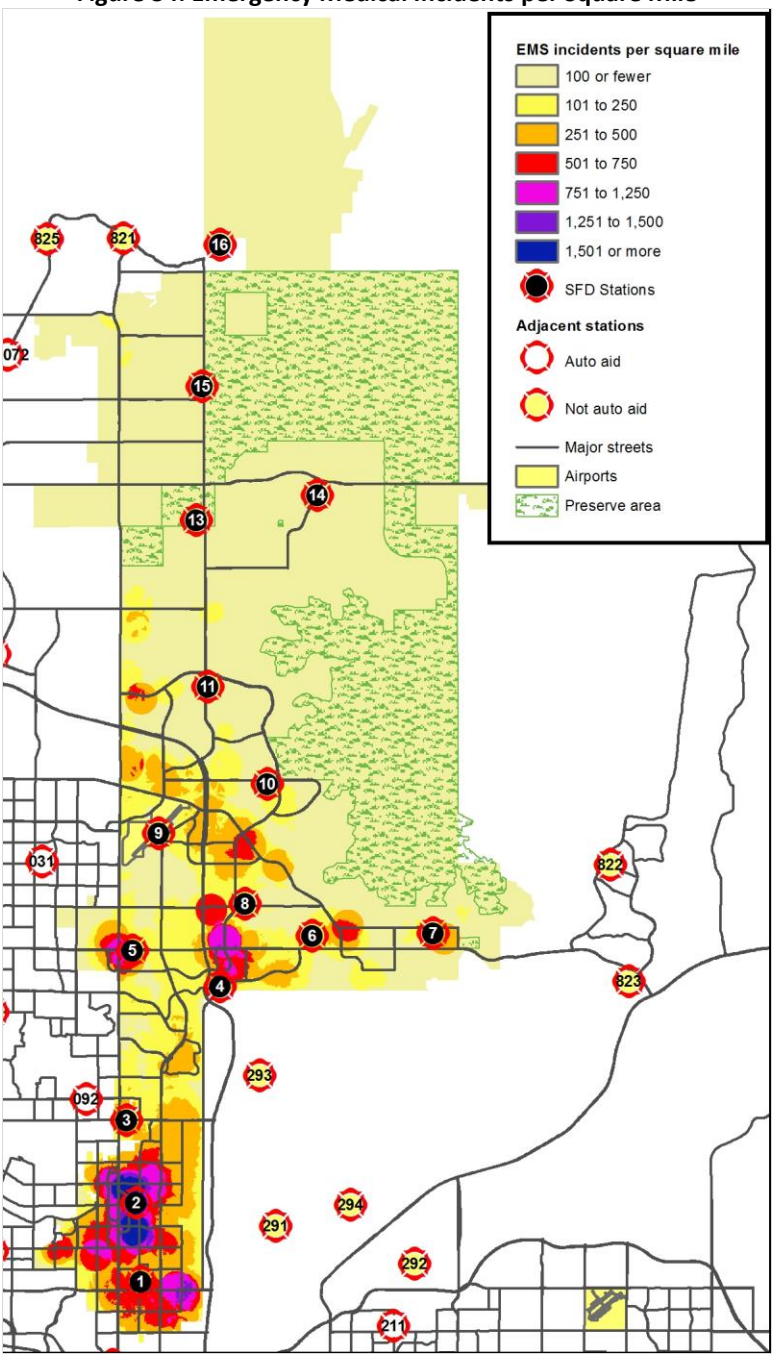
The preceding figure reflects all calls served by SFD. Service demand can vary by area based on incident type. The following figure displays the location of the 81 building fires in the city during the study period. This illustrates that structure fire incidents are distributed mostly in the city's western half.

Figure 33: Building Fires



Similarly, emergency medical incidents also occur in greater concentration in areas of higher population density. The following figure displays emergency medical incidents per square mile during the study period.

Figure 34: Emergency Medical Incidents per Square Mile



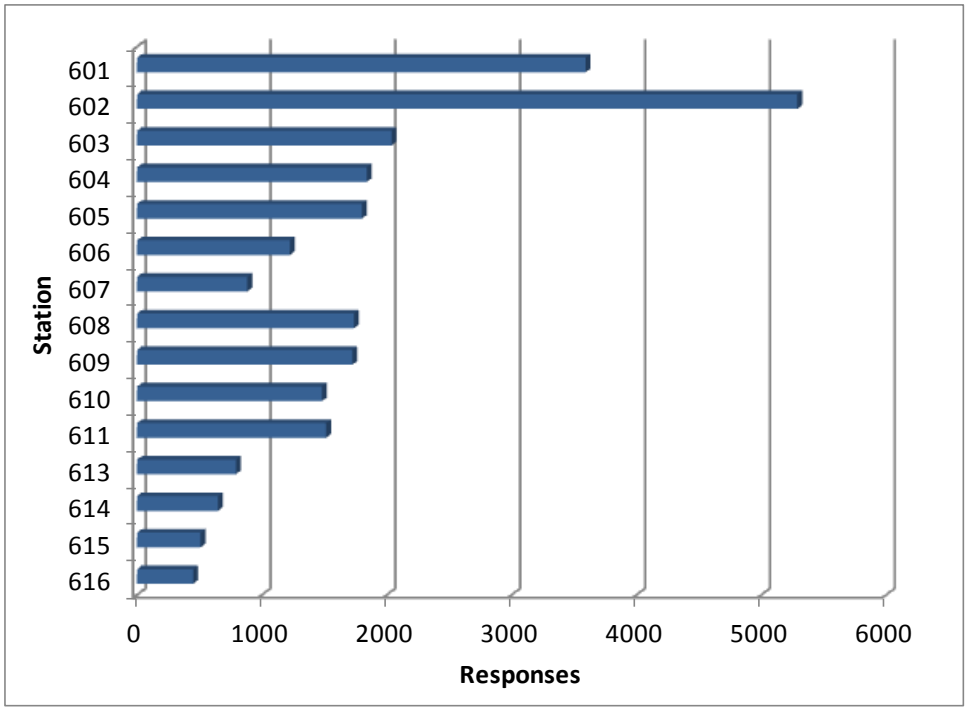
STATION AND UNIT WORKLOAD ANALYSIS

A review of workload by station and response unit can reveal much about response time performance. Although fire stations and response units may be distributed in a manner to provide quick response, that level of performance can only be obtained when the response unit is available in its primary service area. If a response unit is already on an incident and a concurrent request for service is received, a more distant response unit will need to be dispatched. This will increase response times.

Fire Station Workload

As noted earlier, response workload is not evenly distributed across the SFD's service area. Areas of higher population typically present a greater demand for fire department services. The following table lists city response activity by fire station area during the study period. Workload in the Fire Station 2 area is the highest at 5,289 calls for service.

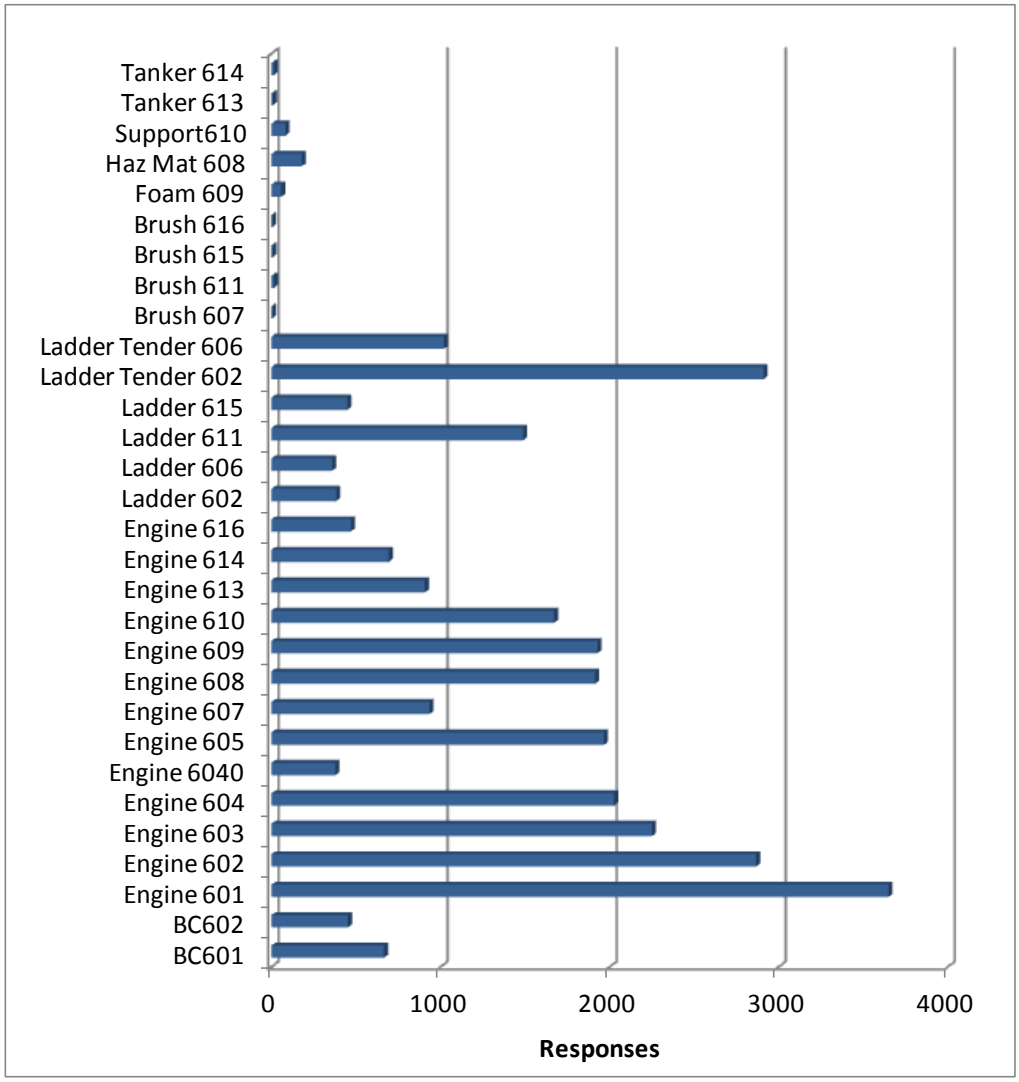
Figure 35: Responses by Fire Station Area



Response Unit Workload

The workload on individual response units during the study period is shown in the following table. Individual response unit workload can be greater than the workload in its home station area. Many incidents, such as structure fires, require more than one response unit.

Figure 36: Response Unit Workload



The amount of time a given unit is committed to an incident is also an important workload factor. The following table illustrates the average time each unit was committed to an incident, from initial dispatch until it cleared the scene.

Figure 37: Average Time Committed to an Incident by Unit

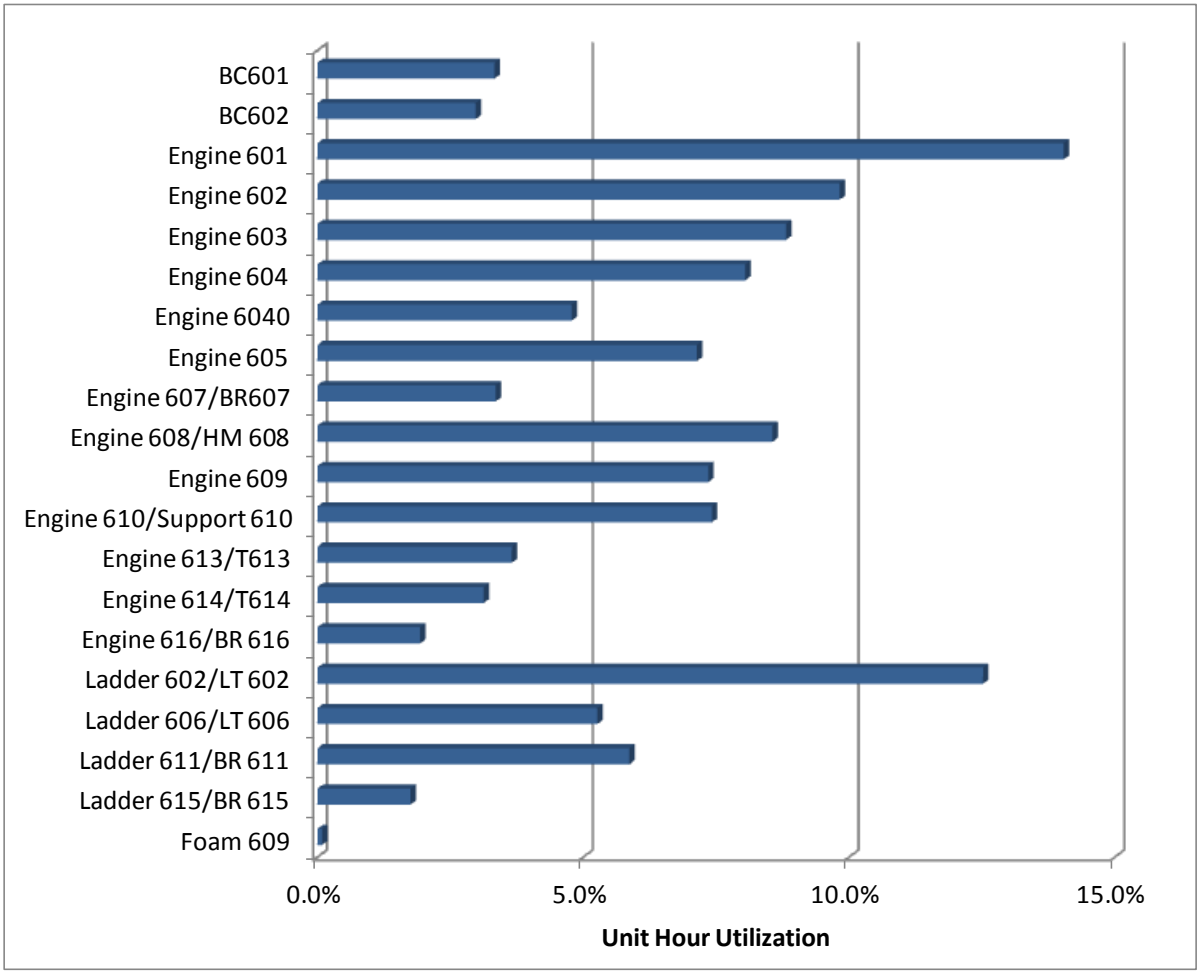
Unit	Responses	Average Minutes per Response
BC601	666	26.3
BC602	453	34.5
Engine 601	3650	20.2
Engine 602	2867	18.0
Engine 603	2251	20.6
Engine 604	2027	20.9
Engine 6040	378	15.8
Engine 605	1967	19.1
Engine 607	934	18.8
Engine 608	1915	19.2
Engine 609	1928	20.0
Engine 610	1672	21.6
Engine 613	907	21.0
Engine 614	694	23.3
Engine 616	470	21.5
Ladder 602	383	28.1
Ladder 606	359	19.9
Ladder 611	1488	20.7
Ladder 615	450	20.2
Ladder Tender 602	2911	18.9
Ladder Tender 606	1020	20.1
Brush 607	5	15.5
Brush 611	15	6.6
Brush 615	6	21.3
Brush 616	3	25.8
Foam 609	58	7.9
Haz Mat 608	180	45.2
Support610	82	35.6
Tanker 613	8	23.7
Tanker 614	14	18.5

Unit hour utilization is an important workload indicator. It is calculated by dividing the total time a unit is committed to all incidents during a year divided by the total time in a year. Expressed as a percentage, it describes the amount of time a unit is not available for response since it is already committed to an incident. The larger the percentage, the greater a unit's utilization, and the less available it is for assignment to an incident.

Unit hour utilization is an important statistic to monitor for those fire agencies using percentile-based performance standards, as does SFD. In SFD's case, where performance is measured at the 90th percentile, unit hour utilization greater than 10 percent means that the response unit will not be able to provide on-time response to its 90 percent target even if response is its only activity.

Some crews staff more than one response unit. In those cases, the workload of both units has been combined to reflect the full workload on each response crew. Engine 601 and Ladder 602/Ladder Tender 602 both exceed 10 percent utilization.

Figure 38: Unit Hour Utilization



Mutual and Automatic Aid

SFD is a participant in a very robust regional automatic aid system. This system provides for the automatic dispatch of adjacent agency response units into Scottsdale and from SFD to adjacent agencies to ensure the closest appropriate units are sent to an emergency. This system provides SFD with quick access to a significant number of response resources.

Study period incident data was evaluated to determine the benefit to and commitment of SFD to this system. The results show that SFD benefits more from the auto aid system than it returns.

SFD provided service to 1,788 adjacent agency incidents. Other agencies provided service to 2,592 incidents in the City of Scottsdale.

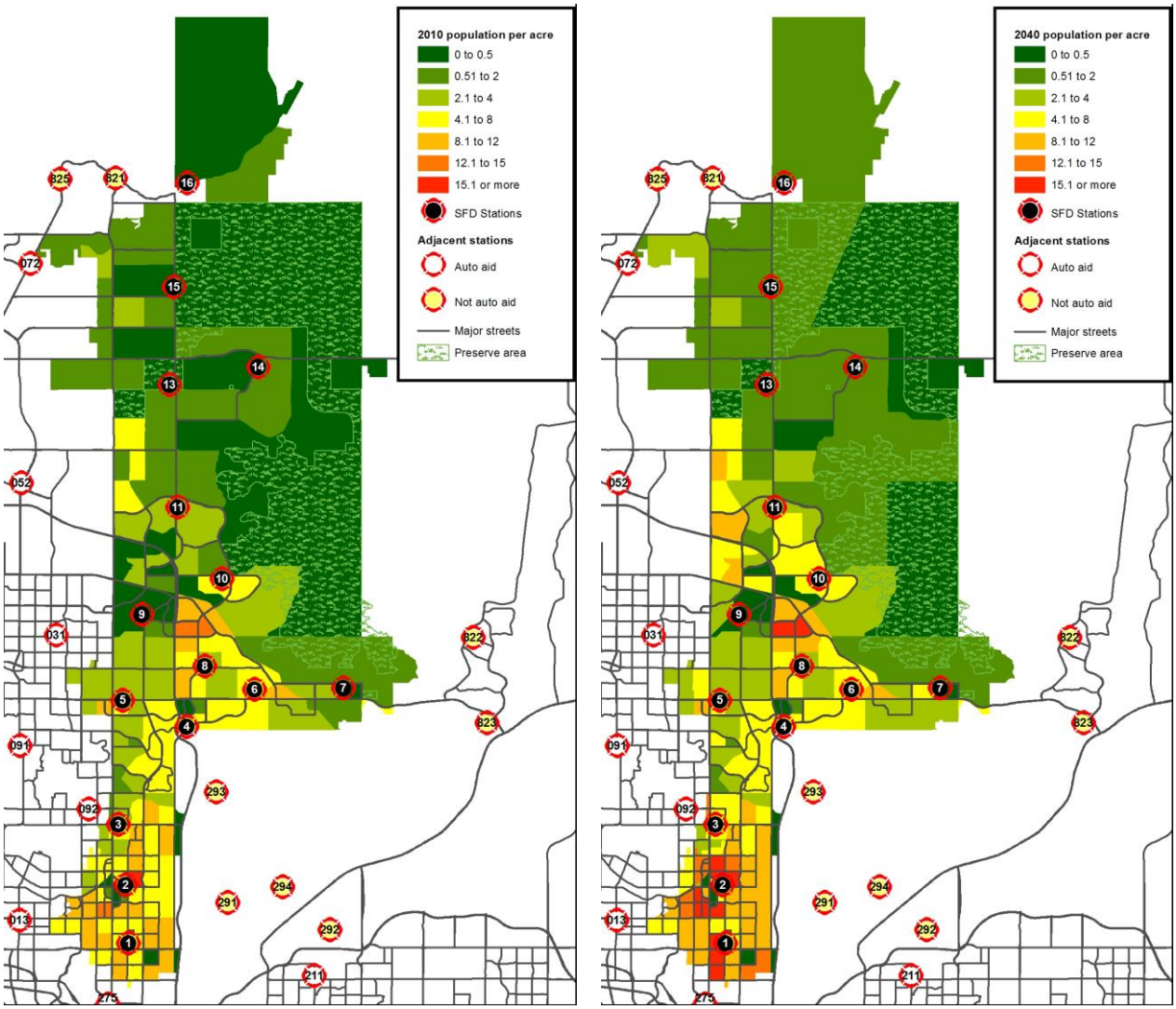
The number of unit hours of service provided to and from SFD was also calculated for the study period. This best measures the level of effort provided through the automatic aid system. SFD provided a total of 779 unit hours of service to adjacent agencies. Other agencies provided 1,537 unit hours of service to SFD. This is the equivalent of 1.75 response units, such as fire engines, of service within the city assuming a maximum unit hour utilization of 10 percent.

POPULATION FORECAST

A population forecast for the City of Scottsdale was published in the 2013 Socioeconomic Projections, Population, Housing, and Employment by Municipal Planning Area and Regional Analysis Zone, June 2013 produced by the Maricopa Association of Governments. Population growth for the City of Scottsdale is forecast to average 0.12 percent per year through 2040. Using this estimate, the city's population could reach 296,300 by 2040.

The population forecast also provided population estimates for the year 2040 by sub-areas of the city, called Traffic Analysis Zones. The following figures display current and forecast population per acre to show where future population growth is expected. Population growth will be modest in the far north and significant in Scottsdale's central and southern areas.

Figure 39: Population per Acre 2010 and 2040



Future development is expected to focus primarily in the Airpark area. Additional commercial and industrial development is expected along. High rise buildings are now allowed in the area north of the canal and in the Airpark area. Infill development is expected in the city's southern section. Additional single family development is also planned for areas in the northern half of Scottsdale.

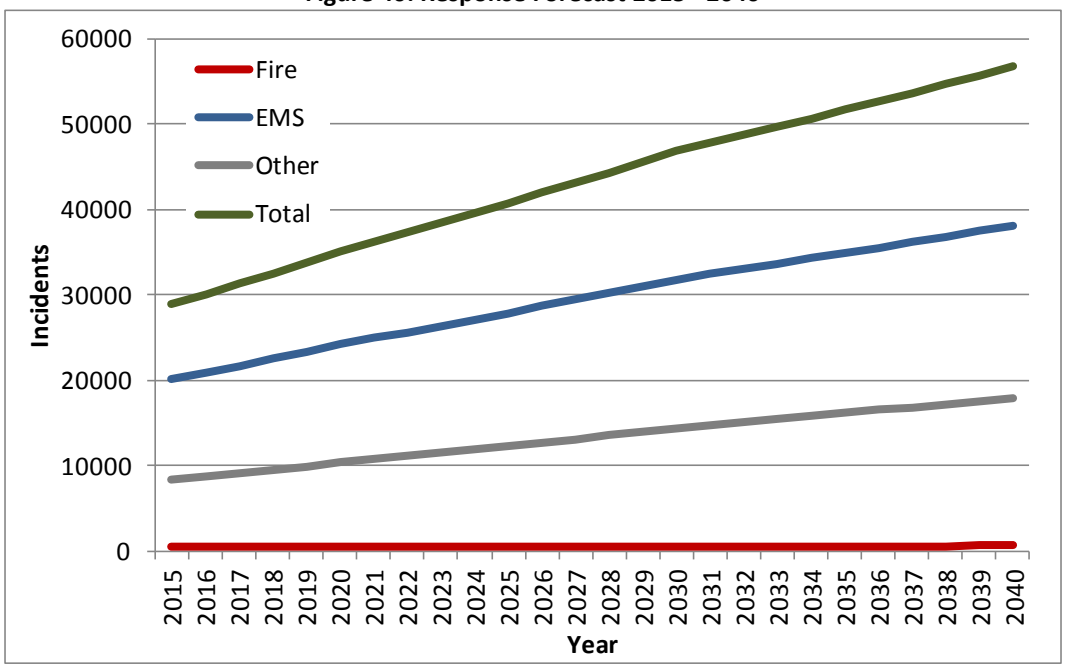
INCIDENT WORKLOAD PROJECTION

The most significant predictor of future incident workload is population; 100 percent of requests for emergency medical service are people-driven. The National Fire Protection Association reports that approximately 70 percent of all fires are the result of people either doing something they should not have (i.e., misuse of ignition source) or not doing something they should have (i.e., failure to maintain equipment). Thus it is reasonable to use future population growth to predict future fire department response workload.

The current fire department services utilization rate is 127 incidents per 1,000 population. This is higher than typical and is reflective of the significant tourism and employment influence on fire department workload.

The utilization of fire department services is expected to grow modestly over time at a rate of about two percent per year. This, plus expected population growth, will increase the SFD's workload as shown in the following figure. Response workload by the year 2040 could reach 56,797 responses per year driven primarily by requests for emergency medical care.

Figure 40: Response Forecast 2015 - 2040



Component E – Critical Tasking and Alarm Assignments

The SFD service area has a densely populated urban environment and, as such, contains an elevated number, density, and distribution of risk. Further, its suburban and rural areas present unique challenges such as wildland fires. The fire department should have the resources needed to effectively mitigate the incidents that have the highest potential to negatively impact the community. As the actual or potential risk increases, the need for higher numbers of personnel and apparatus also increases. With each type of incident and corresponding risk, specific critical tasks need to be accomplished and certain numbers and types of apparatus should be dispatched. This section considers the community's identified risks and illustrates the number of personnel that are necessary to accomplish the critical tasks at an emergency.

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 the search, rescue, and evacuation of victims. The fire flow component involves delivering sufficient water to extinguish the fire and create an environment within the building that allows entry by firefighters.

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

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

Critical task analysis also applies to non-fire type emergencies including medical, technical rescue, and hazardous materials emergencies. Numerous simultaneous tasks must be completed to effectively control an emergency. The department's ability to muster needed numbers of trained personnel quickly enough to make a difference is critical to successful incident outcomes.

The following figure illustrates the minimum emergency incident staffing recommendations of the Commission on Fire Accreditation, International.

The following definitions apply to the figure:

> **Low Risk**—Minor incidents involving small fires (fire flow less than 250 gallons per minute), single patient non-life threatening medical incidents, minor rescues, small fuel spills, and small wildland fires without unusual weather or fire behavior.
>
> **Moderate Risk**—Moderate risk incidents involving fires in single-family dwellings and equivalently sized commercial office properties (fire flow between 250 gallons per minute to 1,000 gallons per minute), life threatening medical emergencies, hazardous materials emergencies requiring specialized skills and equipment, rescues involving specialized skills and equipment, and larger wildland fires.
>
> **High Risk**—High risk incidents involving fires in larger commercial properties with sustained attack (fire flows more than 1,000 gallons per minute), multiple patient medical incidents, major releases of hazardous materials, high risk rescues, and wildland fires with extreme weather or fire behavior.

Figure 41: Staffing Recommendations Based on Risk

Incident Type	High Risk	Moderate Risk	Low Risk
Structure Fire	29	15	6
Emergency Medical Service	12	4	2
Rescue	15	8	3
Hazardous Materials	39	20	3
Wildland Fire	41 (Red Flag level)	20	7

The SFD has developed the following Critical Task analyses using the risk matrices included in the Critical Task section for various incident types. Further it has defined, based on current unit staffing levels, the number and type of apparatus needed to deliver sufficient numbers of personnel to meet the critical tasking identified. ESCI's review of the Critical Task analysis concludes that all are generally in keeping with industry standards and provide the minimum number of personnel needed for effective incident operations.

Establishing resource levels needed for various types of emergencies is a uniquely local decision. Factors influencing local decisions for incident staffing include the type of equipment operated, training levels of responders, operating procedures, geography, traffic, and the nature of building and other risks being protected.

CRITICAL TASKING

Critical tasks are those activities that must be conducted early on and in a timely manner by firefighters at emergency incidents in order to control the situation, stop loss, and to perform necessary tasks required for a medical emergency. SFD is responsible for assuring that responding companies are capable of performing all of the described tasks in a prompt, efficient, and safe manner. These are the minimum number of personnel needed by incident type. More personnel will be needed for incidents of increased complexity or size.

EMS: Medical Aids and MVAs (non-trapped) – Non-Life Threatening

Task	Number of Personnel
Patient Care	2
Total	**2**

EMS: Medical Aids and MVAs (non-trapped) – Life Threatening

Task	Number of Personnel
Patient Management	2
Patient Care	2
Documentation	1
Total	**5**

EMS: MVAs (Trapped)

Task	Number of Personnel
Command/Safety	2
Patient Management	4
Extrication	4
Total	**10**

MED 2-1 (Major Medical)

Task	Number of Personnel
Command	2
Triage	1
Treatment	10
Transportation	5
Total	**18**

MED 3-1 (Major Medical)

Task	Number of Personnel
Command	4
Triage	1
Treatment	14
Transportation	5
Total	**24**

MED 1A (Major Medical)

Task	Number of Personnel
Command	4
Triage	1
Treatment	22
Transportation	9
Total	**36**

Brush Assignment (Wildland Interface)

Task	Number of Personnel
Command	2
Fire Attack (Engine)	8
Type 6 Fire Attack	4
Water Supply	1
Total	**15**

Single Unit Response: Check Odor

Task	Number of Personnel
Command	1
Pump Operations	1
Interior Investigation	2
Total	**4**

Single Unit Response (Non-Structure Fire Low Risk)

Task	Number of Personnel
Command/Safety	1
Pump Operations	1
Attack Line	2
Total	**4**

3-1 Structure Fire Response (Non-Structure Fire High Risk)

Task	Number of Personnel
Command/Safety	4
Pump Operations	1
Attack Line	2
Back-up Line	4
Hydrant	1
Structure Protection	4
On Deck/Rescue	4
Treatment	2
Total	**22**

3-1 Structure Fire Response (Smoke in a Structure & Structure Fire Moderate Risk)

Task	Number of Personnel
Command/Safety	4
Pump Operations	1
Attack Line	2
Back-up Line	3
Search and Rescue	2
Ventilation	3
On Deck/Rescue	4
Hydrant	1
Treatment	2
Total	**22**

1st Alarm Structure Fire Response (Structure Fire High Risk)

Task	Number of Personnel
Command/Safety	4
Pump Operations	2
PIO	1
Attack Line	7
Back-up Line	4
Search and Rescue	7
Ventilation	8
On Deck/Rescue	4
Hydrant	2
Total	**39**

Working Structure Fire (Structure Fire Moderate Risk)

Task	Number of Personnel
Command/Safety	4
Pump Operations	1
Attack Line	2
Back-up Line	3
Search and Rescue	2
Ventilation	3
On Deck/Rescue	4
Hydrant	1
Treatment	2
Utility	1
Total	**23**

Working 1st Alarm Structure Fire (Structure Fire High Risk)

Task	Number of Personnel
Command/Safety	6
Pump Operations	2
PIO	1
Attack Line	7
Back-up Line	4
Search and Rescue	7
Ventilation	8
On Deck/Rescue	4
Utility	1
Hydrant	2
Rehab	1
Treatment	2
Total	**45**

HAZ1 Response (Hazardous Materials Level II)

Task	Number of Personnel
Command	2
Safety	1
Entry	8
Research/Support	4
Total	**15**

HAZ 2-1 Response (Hazardous Materials Level II)

Task	Number of Personnel
Command	4
Liaison	1
Decontamination	4
Research Support	4
Hazard	4
Evacuation	4
PIO	1
Safety	2
TOTAL	**24**

HAZ 1st Alarm Response (Hazardous Materials Level III)

Task	Number of Personnel
Command	6
Liaison	1
Decontamination	4
Research Support	4
Staging	4
Evacuation	4
PIO	1
Safety	2
Hazard	24
Total	**50**

Alert I (Aircraft Emergency)

Task	Number of Personnel
Aircraft Fire Suppression	4
Foam Operations	1
Total	**5**

Alert II (Aircraft Emergency)

Task	Number of Personnel
Command/Safety	2
Aircraft Fire Suppression	2
Pump Operations	1
Attack Line	2
Back-up Line	4
Rescue	2
Emergency Medical Care	2
Water Supply	1
Total	**16**

Alert III (Aircraft Emergency)

Task	Number of Personnel
Command/Safety	6
Aircraft Fire Suppression	9
Pump Operations	1
Attack Line	2
Back-up Line	4
Rescue	2
Emergency Medical Care	2
Water Supply	1
Utility	1
Rehab	1
Command Van	1
Crisis Response Van	2
Total	**32**

Technical Rescue – Rope (Mountain Rescue)

Task	Number of Personnel
Command	2
Rescue Team	8
Recon	4
Safety	2
Treatment	4
Total	**20**

Technical Rescue – Confined Space

Task	Number of Personnel
Command/Safety	4
Rescue Team	4
Safety	1
Backup/support team	4
Patient Care	2
Attendant	1
Rigger	1
Ground Support	8
Hazard	8
Total	**33**

Technical Rescue – Trench

Task	Number of Personnel
Command	4
Rescue Team	4
Safety	1
Backup/support team	4
Patient Care	2
Shoring	4
Total	**19**

Technical Rescue – Water

Task	Number of Personnel
Command	2
Rescue Team	4
Backup Team	4
Patient Care	2
Rope Tender	4
Upstream	4
Downstream	2
Safety	1
Total	**23**

ALARM ASSIGNMENTS

In order to ensure sufficient personnel and apparatus are dispatched to an emergency event the following first alarm response assignments have been established. "Total Staffing Needed" is the number identified in the Critical Tasking analysis above. The number of personnel and apparatus required to mitigate an active and complex working incident will require additional resources above and beyond the numbers listed below.

EMS: Medical Aids and MVAs (non-trapped) – Non-Life Threatening

Unit Type	Number of Units	Total Personnel
Engine or Ladder	1	4
Command		
Ambulance	1	2
Total Staffing Provided		**6**
Total Staffing Needed		**2**

EMS: Medical Aids and MVAs (non-trapped) – Life Threatening

Unit Type	Number of Units	Total Personnel
Engine or Ladder	1	4
Command		
Ambulance	1	2
Total Staffing Provided		**6**
Total Staffing Needed		**5**

EMS: MVAs (Trapped)

Unit Type	Number of Units	Total Personnel
Engine	1	4
Ladder	1	4
Command		
Ambulance	1	2
Total Staffing Provided		**10**
Total Staffing Needed		**10**

MED 2-1 (Major Medical)

Unit Type	Number of Units	Total Personnel
Engine	2	8
Ladder	1	4
Command	1	2
Ambulance	2	4
Total Staffing Provided		**18**
Total Staffing Needed		**18**

MED 3-1 (Major Medical)

Unit Type	Number of Units	Total Personnel
Engine	3	12
Ladder	1	4
Command	2	4
Ambulance	2	4
Total Staffing Provided		**24**
Total Staffing Needed		**24**

MED 1A (Major Medical)

Unit Type	Number of Units	Total Personnel
Engine	4	16
Ladder	2	8
Command	2	4
Ambulance	4	8
Total Staffing Provided		**36**
Total Staffing Needed		**36**

Brush Assignment (Wildland Interface)

Unit Type	Number of Units	Total Personnel
Engine	2	8
Type 6 engine	2	4
Command	2	2
Tanker	1	1
Total Staffing Provided		**15**
Total Staffing Needed		**15**

Single Unit Response: Check Odor or Smoke

Unit Type	Number of Units	Total Personnel
Engine or Ladder	1	4
Command		
Total Staffing Provided		**4**
Total Staffing Needed		**4**

Single Unit Response (Non-structure Fire Low Risk)

Unit Type	Number of Units	Total Personnel
Engine or Ladder	1	4
Command		
Total Staffing Provided		**4**
Total Staffing Needed		**4**

3-1 Structure Fire Response (Non-Structure Fire High Risk)

Unit Type	Number of Units	Total Personnel
Engine	3	12
Ladder	1	4
Command	2	4
Ambulance	1	2
Total Staffing Provided		**22**
Total Staffing Needed		**22**

3-1 Structure Fire Response (Smoke in a Structure & Structure Fire Moderate Risk)

Unit Type	Number of Units	Total Personnel
Engine	3	12
Ladder	1	4
Command	2	4
Ambulance	1	2
Total Staffing Provided		**22**
Total Staffing Needed		**22**

1st Alarm Structure Fire Response (Structure Fire High Risk)

Unit Type	Number of Units	Total Personnel
Engine	6	24
Ladder	2	8
Command	2	4
PIO	1	1
EMS Captain	1	1
Ambulance	1	2
Total Staffing Provided		**40**
Total Staffing Needed		**39**

Working Structure Fire (Structure Fire Moderate Risk)

Unit Type	Number of Units	Total Personnel
Engine	3	12
Ladder	1	4
Command	2	4
Utility	1	1
Ambulance	1	2
Total Staffing Provided		**23**
Total Staffing Needed		**23**

Working 1st Alarm Structure Fire (Structure Fire High Risk)

Unit Type	Number of Units	Total Personnel
Engine	6	24
Ladder	2	8
Command	3	6
Command Van	1	1
Utility	1	1
Rehab	1	1
PIO	1	1
EMS Captain	1	1
Ambulance	1	2
Total Staffing Provided		**45**
Total Staffing Needed		**45**

HAZ1 Response (Hazardous Materials Level II)

Unit Type	Number of Units	Total Personnel
Engine	1	4
Command	1	2
Safety	1	1
Advanced HazMat Team	2	8
Total Staffing Provided		**15**
Total Staffing Needed		**15**

HAZ 2-1 Response (Hazardous Materials Level II)

Unit Type	Number of Units	Total Personnel
Engine	2	8
Ladder	1	4
Command	1	2
Special Operations Command	1	2
Safety	1	1
Advanced HazMat Team	2	8
Total Staffing Provided		**25**
Total Staffing Needed		**24**

HAZ 1st Alarm Response (Hazardous Materials Level III)

Unit Type	Number of Units	Total Personnel
Engine	4	16
Ladder	2	8
Command	2	4
Special Operations Command	1	2
Safety	1	1
Advanced HazMat Team	4	16
Command Van	1	1
Utility	1	1
Rehab	1	1
Total Staffing Provided		**50**
Total Staffing Needed		**50**

Alert I (Aircraft Emergency)

Unit Type	Number of Units	Total Personnel
Engine	1	4
Foam	1	1
Total Staffing Provided		**5**
Total Staffing Needed		**5**

Alert II (Aircraft Emergency)

Unit Type	Number of Units	Total Personnel
Engine	2	8
Ladder	1	4
Foam	1	1
Command	1	2
Utility	1	1
Total Staffing Provided		**16**
Total Staffing Needed		**16**

Alert III (Aircraft Emergency)

Unit Type	Number of Units	Total Personnel
Engine	4	16
Ladder	2	4
Foam	1	1
Command	2	4
Special Operations Command	1	2
Command Van	1	1
Rehab	1	1
Utility	1	1
Crisis Response Van	1	2
Total Staffing Provided		**32**
Total Staffing Needed		**32**

Technical Rescue – Rope (Mountain Rescue)

Unit Type	Number of Units	Total Personnel
Technical Rescue Team	3	12
Command	1	2
Special Operations Command	3	6
Total Staffing Provided		**20**
Total Staffing Needed		**20**

Technical Rescue – Confined Space

Unit Type	Number of Units	Total Personnel
Technical Rescue Team	3	12
Command	1	2
Special Operations Command	4	8
Safety	1	1
Advanced HazMat Team	2	8
EMS Captain	1	1
Utility	1	1
Total Staffing Provided		**33**
Total Staffing Needed		**33**

Technical Rescue – Trench

Unit Type	Number of Units	Total Personnel
Technical Rescue Team	3	12
Command	2	4
Special Operations Command	1	2
Safety	1	1
Total Staffing Provided		**19**
Total Staffing Needed		**19**

Technical Rescue – Water

Unit Type	Number of Units	Total Personnel
Engine	1	4
Ladder	1	4
Command	1	2
Technical Rescue Team	2	8
Special Operations Command	2	4
EMS Captain	1	1
Total Staffing Provided		**23**
Total Staffing Needed		**23**

Component F – Review of Historical System Performance

Incident data for the period between July 1, 2013, and June 30, 2014 (study period), was evaluated in detail to determine SFD's current performance. Data was obtained from SFD incident reports and the dispatch center's computer aided dispatch system.

Only incidents occurring within the city that were dispatched as a "priority" are included in the analysis. Priority incidents involve emergencies to which the fire department initiated a "code 3" (using warning lights and sirens) response (23,721 incidents during the study period). Incidents initially dispatched as non-emergency responses were excluded. Performance is reported based on the final outcome of the incident, which may be different than how it was initially dispatched. For example a person may report smoke coming from a building that turns out to be only steam. It may have been dispatched as a structure fire but its final type would be reported as "good intent."

Each phase of the incident response sequence was evaluated to determine current performance. This allows an analysis of each individual phase to determine where opportunities might exist for improvement.

The total incident response time continuum consists of several steps, beginning with initiation of the incident and concluding with the appropriate mitigation of the incident. The time required for each of the components varies. The policies and practices of the fire department directly influence some of the steps.

SFD's response performance was compared to the national consensus standard for response performance found in the National Fire Protection Association Standard 1710 – Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments, 2010 Edition. The Scottsdale Police Department, who operates the public safety answering point, and the Phoenix Regional Dispatch Center's performance were compared to the standards found in National Fire Protection Association Standard 1221 – Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems, 2013 Edition.

The following figure summarizes the performance standards found in these National Fire Protection Association (NFPA) documents.

Figure 42: Summary of NFPA Performance Standards

Incident Interval	Performance Standard
9-1 1 call answer time (time from first ring to answer)	Within 15 seconds 95% of the time Within 40 seconds 99% of the time
Call transfer time (time from answer to acceptance at the secondary dispatch center)	Within 30 seconds 95% of the time
Call process time (time from acceptance at the dispatch center until notification of response units	Within 60 seconds 80% of the time Within 106 seconds 99% of the time When using emergency medical dispatch call triage procedures and for hazardous materials and technical rescue incidents the standard is within 90 seconds 90% of the time and within 120 seconds 99% of the time.
Turnout time (time from notification of response personnel until the initiation of movement towards the incident)	Fire and special operations incidents – Within 80 seconds 90% of the time EMS incidents – Within 60 seconds 90 % of the time
First unit travel time (time from initiation of response until arrival at the incident)	Within 4 minutes 90% of the time
Full effective response force travel time (Time from initiation of response until all units dispatched arrive at the incident. Response resources needed for a moderate risk building fire are used for the evaluation.)	Within 8 minutes 90% of the time

In keeping with NFPA Standards 1710 and 1221, all response time elements are reported at a given percentile. Percentile reporting is a methodology by which response times are sorted from least to greatest, and a "line" is drawn at a certain percentage of the calls to determine the percentile. The point at which the "line" crosses the 90th percentile, for example, is the percentile time performance. Thus, 90 percent of times were at or less than the result. Only 10 percent were longer.

Percentile differs greatly from average. Averaging calculates response times by adding all response times together and then dividing the total number of minutes by the total number of responses (mean average). Measuring and reporting average response times is not recommended. Using averages does not give a clear picture of response performance because it does not clearly identify the number and extent of events with times beyond the stated performance objective.

What follows is a detailed description and review of each phase of the response time continuum. All phases will be compared to the NFPA standards.

Detection

The detection of a fire (or medical incident) may occur immediately if someone happens to be present or if an automatic system is functioning. Otherwise, detection may be delayed, sometimes for a considerable period. The time period for this phase begins with the inception of the emergency and ends when the emergency is detected. It is largely outside the control of the fire department and not a part of the event sequence that is reliably measurable.

Call Processing

Most emergency incidents are reported by telephone to the 9-1-1 center. Call takers must quickly elicit accurate information about the nature and location of the incident from persons who are apt to be excited. A citizen well-trained in how to report emergencies can reduce the time required for this phase. The dispatcher must identify the correct units based on incident type and location, dispatch them to the emergency, and continue to update information about the emergency while the units respond. This phase typically begins when the 9-1-1 call is answered at the primary answer point (PSAP) and ends when response personnel are notified of the emergency. This phase, which has two parts, is labeled “call processing time.”

Scottsdale Police Department (SPD) dispatch center is the PSAP for the City of Scottsdale. All 9-1-1 calls are answered at SPD. Those callers requesting fire department services are transferred to Phoenix Regional Dispatch Center (PRDC), the regional public safety dispatch center providing dispatch services to SFD. This first part of call processing time is known as “transfer time.”

National Fire Protection Association Standard 1221 recommends transfer time be within 30 seconds 95 percent of the time and within 40 seconds 99 percent of the time. SPD is unable to quantify its current performance at this time.

The second part of call processing time, dispatch time, begins when the call is received at the dispatch center (PRDC) and ends when response units are notified of the incident. NFPA 1221 prescribes that this phase should occur within 60 seconds 80 percent of the time. For EMS incidents when emergency medical dispatch call triage procedures (EMD) are used, hazardous materials incidents and technical rescue incidents the call should be dispatched within 90 seconds 90 percent of the time. PRDC uses EMD for emergency medical incidents. The following figures lists the call processing time for all priority incidents during the study period within the city, as well as specific incident types. This data does not include the time from initial call answer at SPD until the call is answered at PRDC (transfer time).

Overall, the time from first notification to PRDC until notification of response personnel is within 82 seconds 80 percent of the time. PRDC met the 60 second standard for all except emergency medical, hazardous materials, and rescue incidents 44 percent of the time. PRDC met the 90 second standard for emergency medical, hazardous materials, and rescue incidents 86.4 percent of the time.

Figure 43: Call Processing Performance at the 80th Percentile

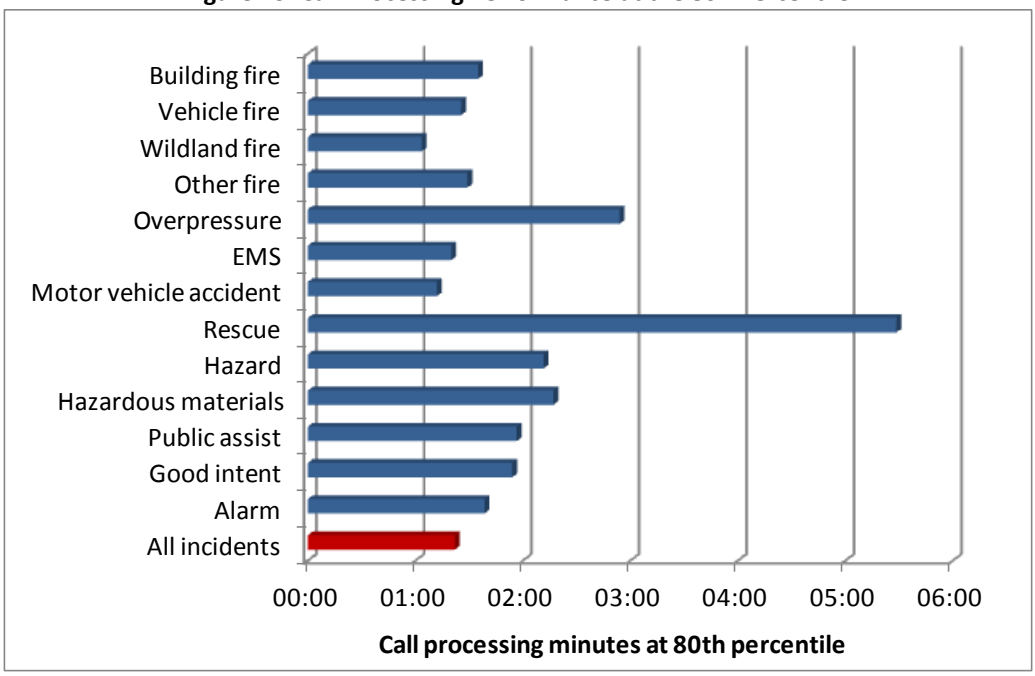
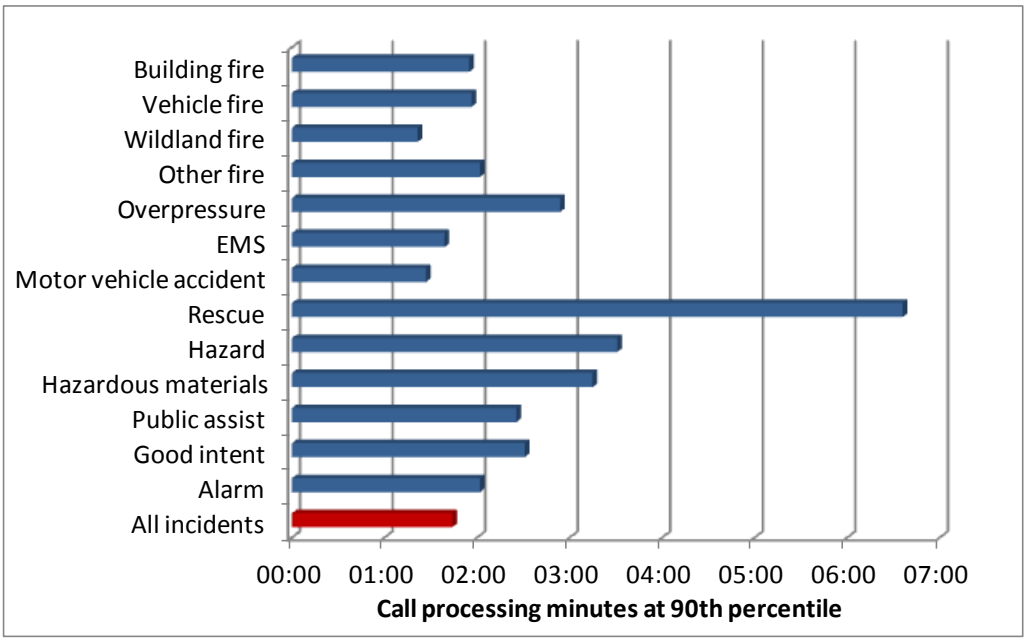
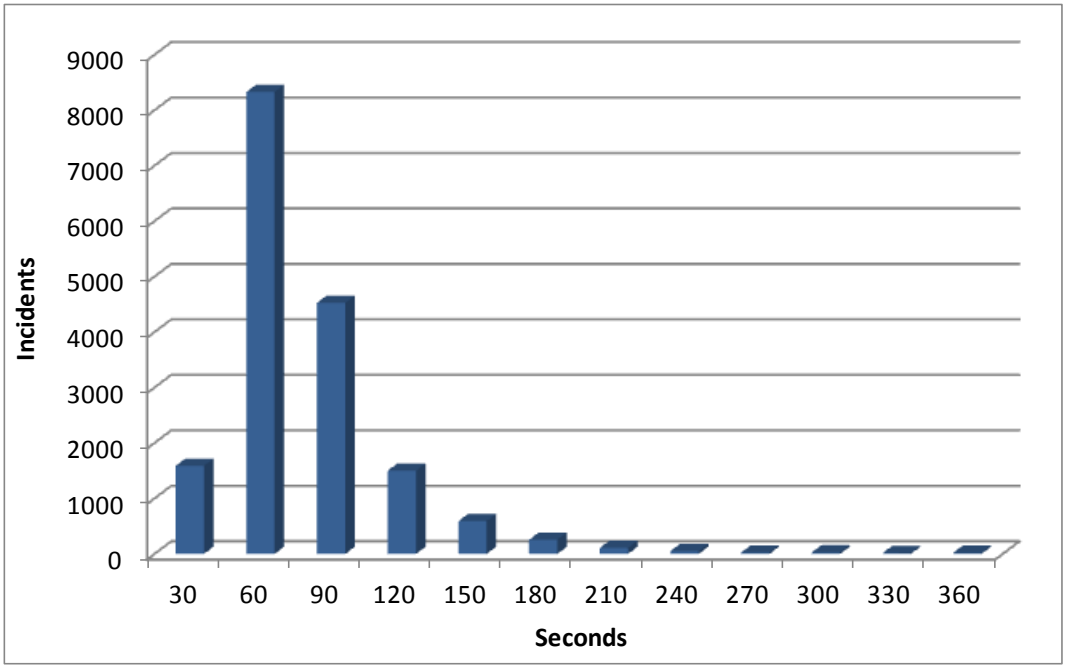


Figure 44: Call Processing Performance at the 90th Percentile



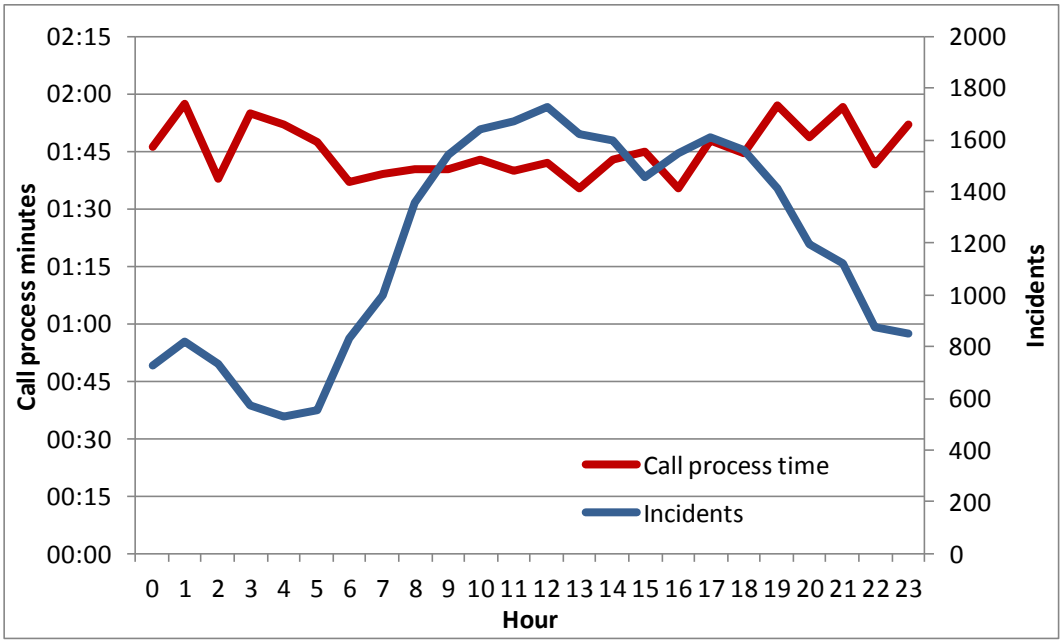
The following figure illustrates the frequency distribution of call processing times during the study period. It shows the number of incidents for which call processing occurred at various minutes of time. 58.1 percent of incidents had call processing times of 60 seconds or less.

Figure 45: Frequency Distribution of Call Processing Times



Activity levels at the dispatch center can affect the time it takes to receive, process, and dispatch a request for service. The following figure shows call processing time at the 90th percentile and number of incidents during the study period by hour of day. Call processing times are only moderately variable throughout the day. The variation does not relate to incident activity.

Figure 46: Call Processing Time by Hour of Day



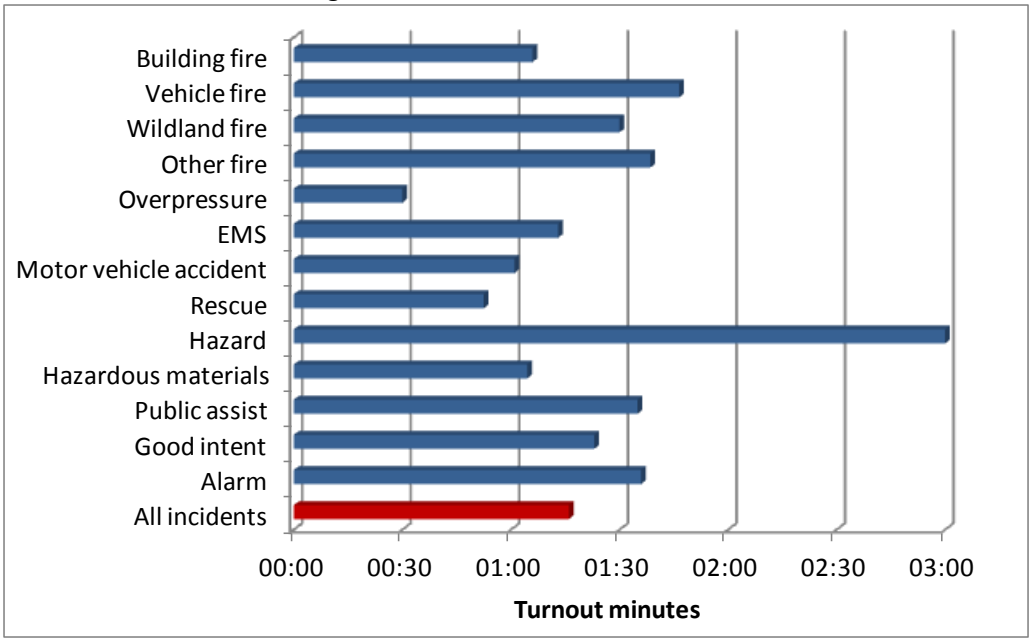
Turnout Time

Turnout time is a response phase controllable by the fire department. This phase begins at notification of an emergency in progress by the dispatch center and ends when personnel and apparatus begin movement towards the incident location. Personnel must don appropriate equipment, assemble on the response vehicle, and begin travel to the incident. Good training and proper fire station design can minimize the time required for this step.

The NFPA 1710 performance standard for turnout time is within 80 seconds 90 percent of the time for fire and special operations incidents and within 60 seconds 90 percent of the time for EMS incidents.

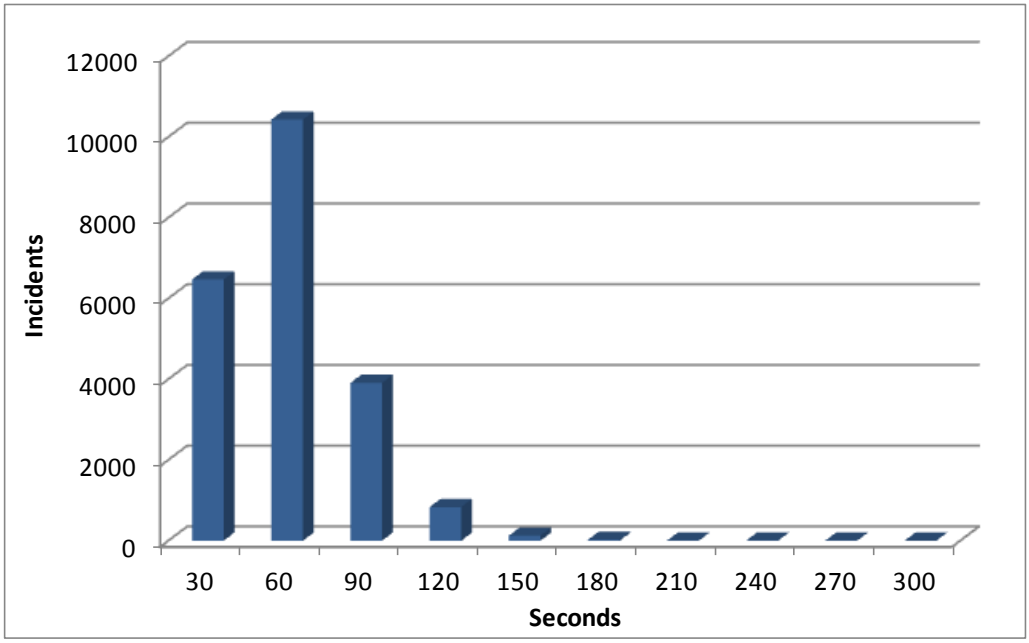
The following figure lists turnout time for all incidents as well as specific incident types. Turnout time for all incidents is within 76 seconds 90 percent of the time. Turnout time for fire and special operations incidents was within 88 seconds 90 percent of the time. For EMS incidents it was within 73 seconds 90 percent of the time. SFD met its target for fire and special operations incidents 87.1 percent of the time. It met its target for EMS incidents 80 percent of the time.

Figure 47: Turnout Time Performance



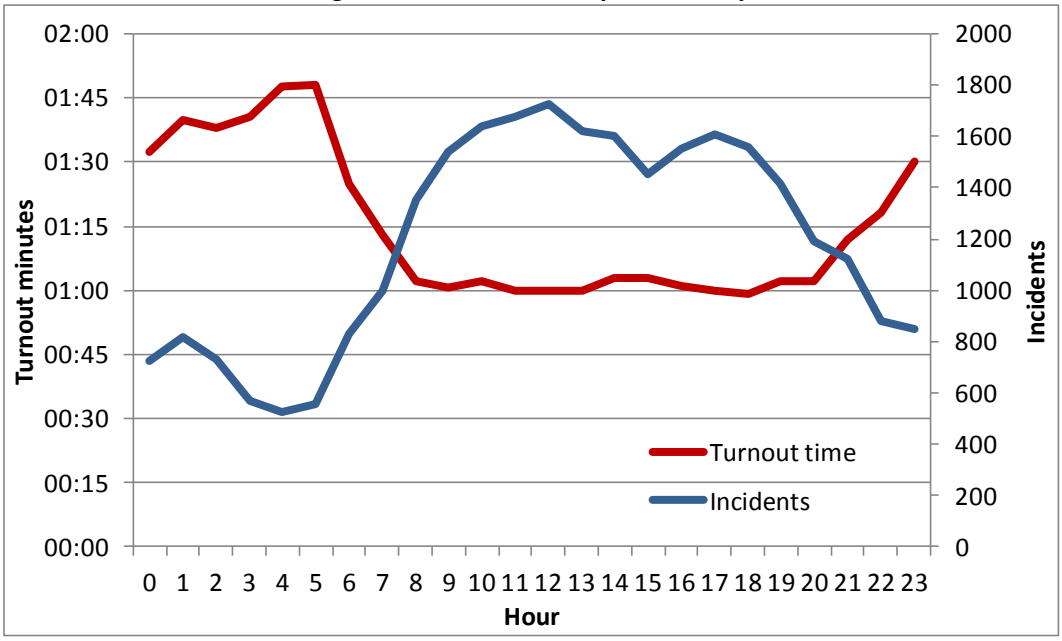
The following figure illustrates the frequency distribution of turnout times during the study period. It shows the number of incidents for which crews initiated response at various minutes of time. 77.4 percent of incidents had turnout times of 60 seconds or less.

Figure 48: Frequency Distribution of Turnout Times



Turnout time can vary by hour of day. In this case turnout time varies by 49 seconds between the early morning hours and daytime hours.

Figure 49: Turnout Time by Hour of Day



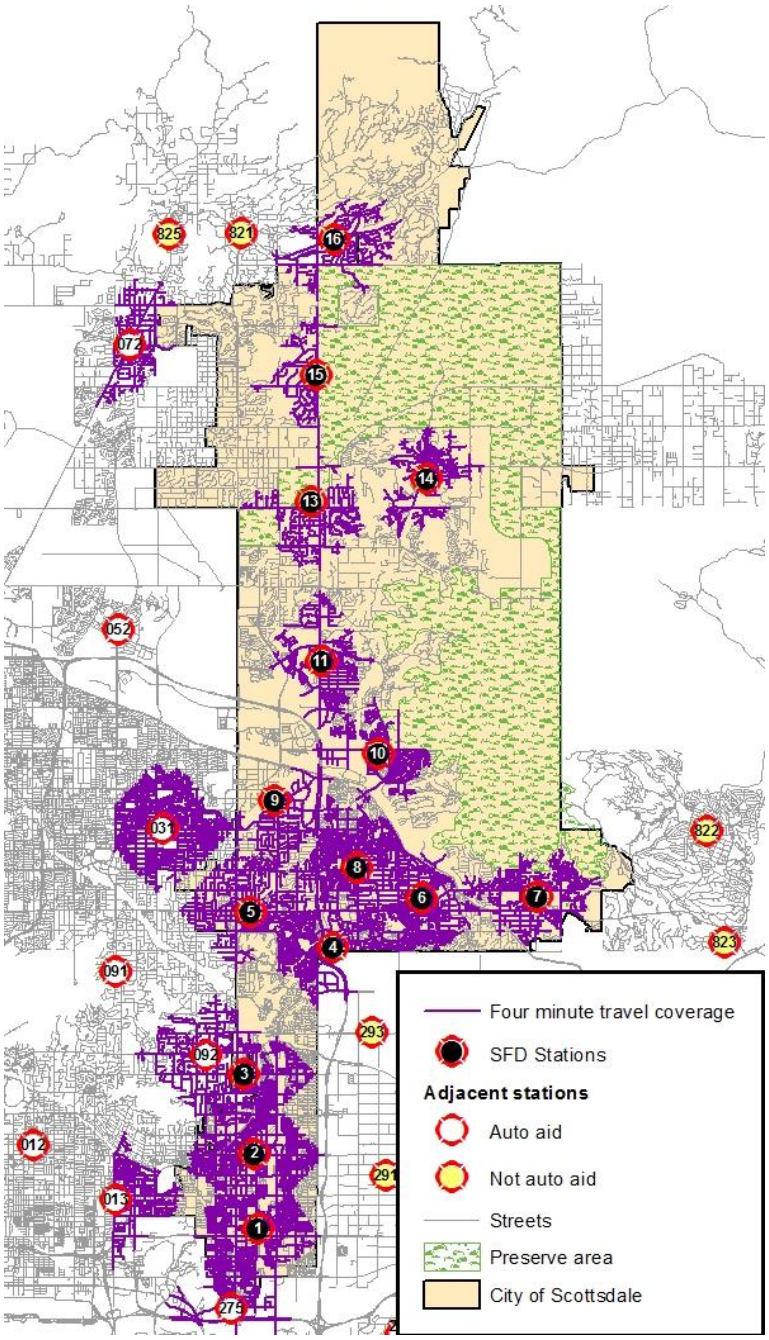
Distribution and Initial Arriving Unit Travel Time

Travel time is potentially the longest of the response phases. The distance between the fire station and the location of the emergency influences response time the most. The quality and connectivity of streets, traffic, driver training, geography, and environmental conditions are also factors. This phase begins with initial apparatus movement towards the incident location and ends when response personnel and apparatus arrive at the emergency's location. Within the NFPA standards, four minutes is allowed for the first response unit to arrive at an incident.

The following figure illustrates the street sections that can be reached from all SFD fire stations and adjacent agency stations providing automatic aid in four minutes of travel time. It is based on an assumed 25 MPH average travel speed to account for turning, stops, and acceleration.

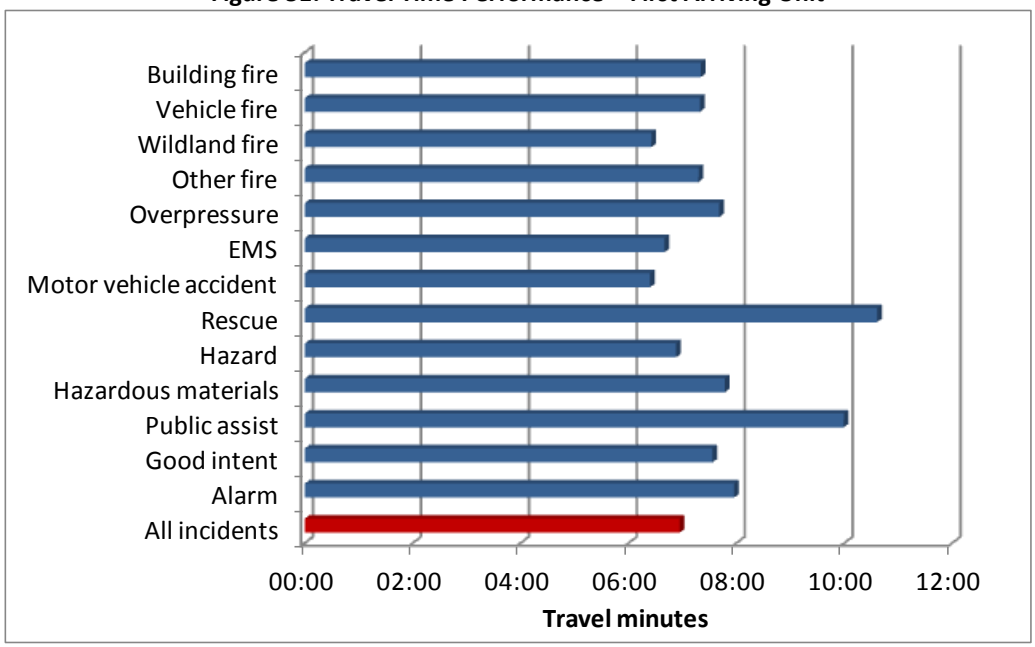
Significant portions of Scottsdale are beyond four travel minutes of a fire station. Automatic aid agencies provide limited four minute travel coverage within the city.

Figure 50: Initial Unit Travel Time Capability – SFD and Automatic Aid Resources



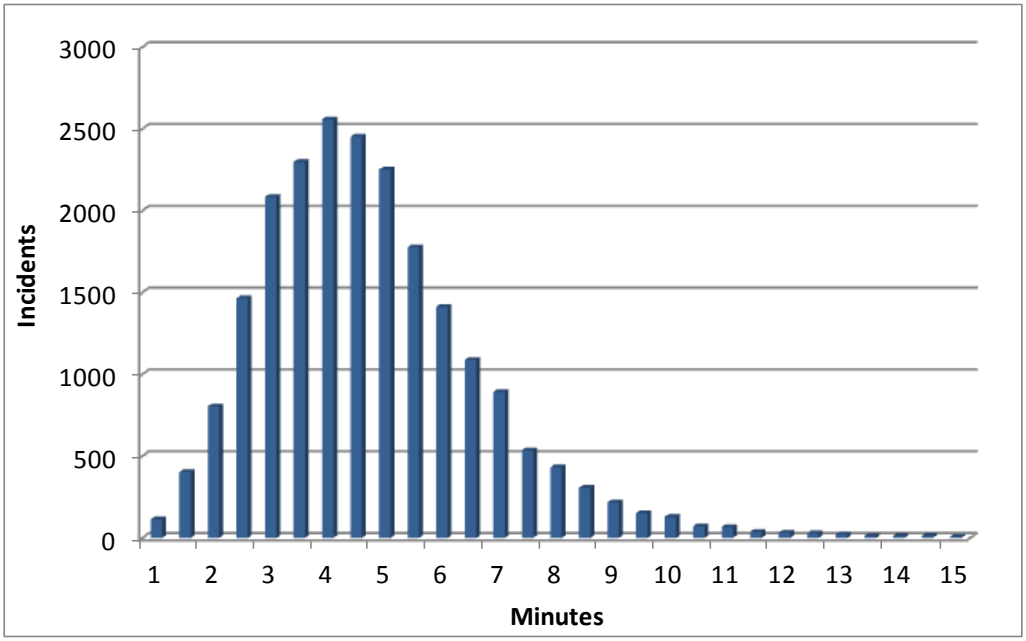
The following figure lists travel time for all priority incidents as well as specific incident types. Overall, travel time for all incidents within the city is within six minutes 57 seconds 90 percent of the time. SFD met the four minute NFPA standard 45 percent of the time.

Figure 51: Travel Time Performance – First Arriving Unit



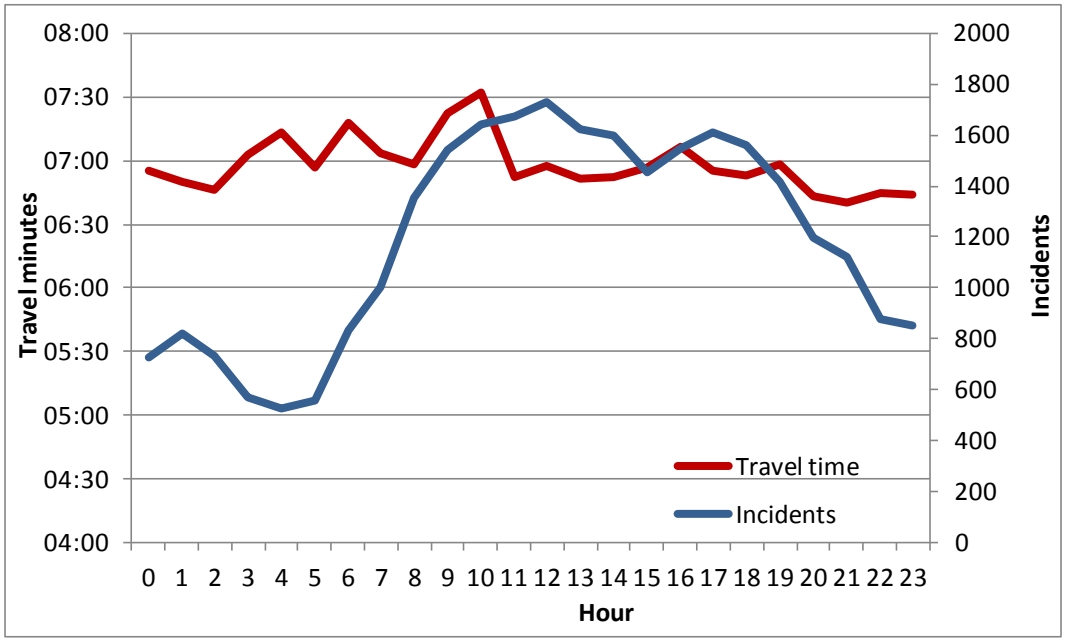
The following figure illustrates the frequency distribution of travel times during the study period. It shows the number of incidents with travel times at various minutes of time. 68 percent of incidents had travel times of three to six minutes.

Figure 52: Frequency Distribution of Travel Times



Travel time can, in some situations, vary considerably by time of day. Heavy traffic at morning and evening rush hour can slow fire department response. Concurrent incidents can also increase travel time since units from more distant stations would need to respond. Travel time varied by 53 seconds during the course of the day.

Figure 53: Overall Travel Time and Incidents by Hour of Day – First Arriving Unit



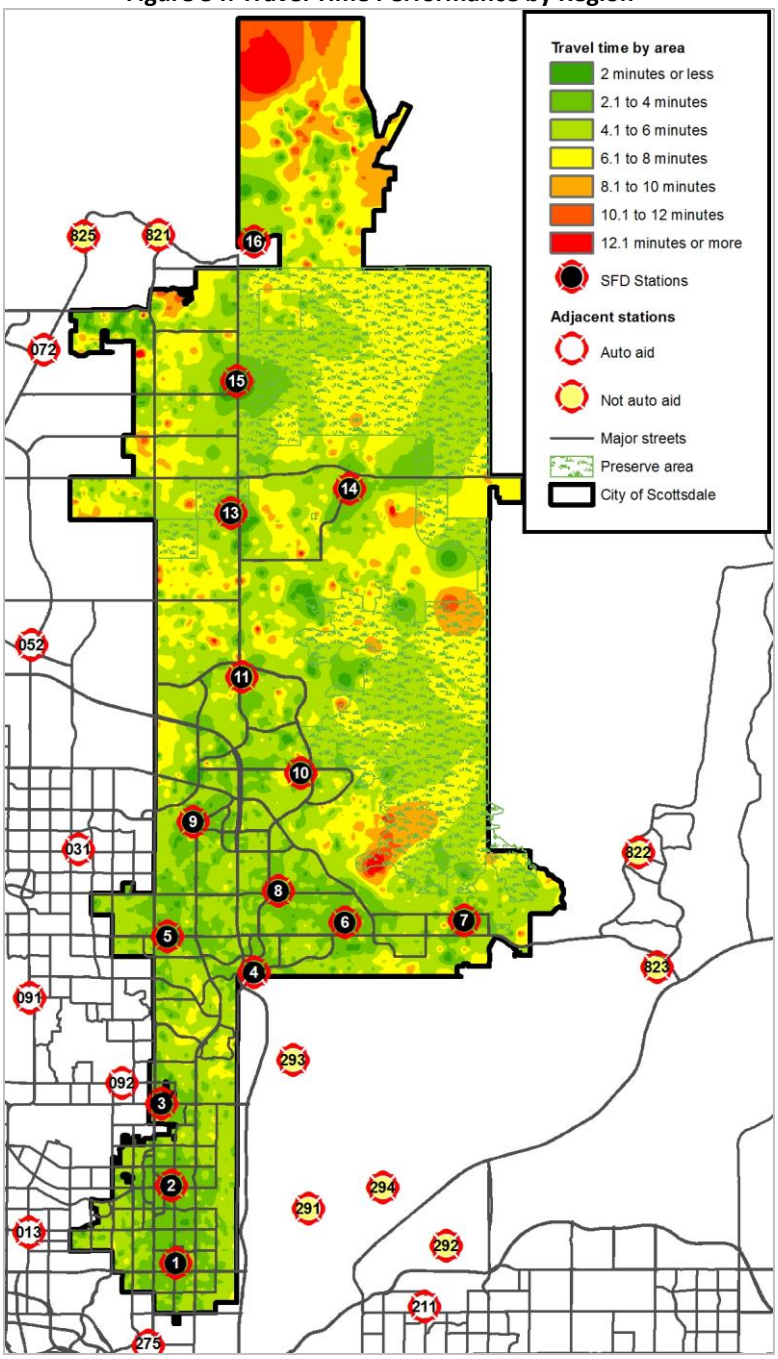
In order to provide on-time response, a response unit must be within four travel minutes of the incident. Incidents were reviewed to identify how many were within four travel minutes of a fire station. During the study period 16,832 of the 23,721 priority incidents (70.9 percent) occurred within four travel minutes of a fire station.

Travel Time Performance by Region

Travel time performance by region is variable and influenced by a number of factors including individual station area workload, and the number of times a station must cover another station's area. Additional factors include the size of the station area and the street system serving it. More highly connected, grid patterned, street systems contribute to faster response times than do areas with meandering streets with numerous dead-ends.

The adjacent figure evaluates travel time performance by sub-area using inverse distance weighting analysis (IDW). This process uses travel time for known points (actual incidents) to predict travel time for the area surrounding the actual incident. Better performance is generally noted near fire stations with progressively longer response times for those incidents more distant from the stations.

Figure 54: Travel Time Performance by Region

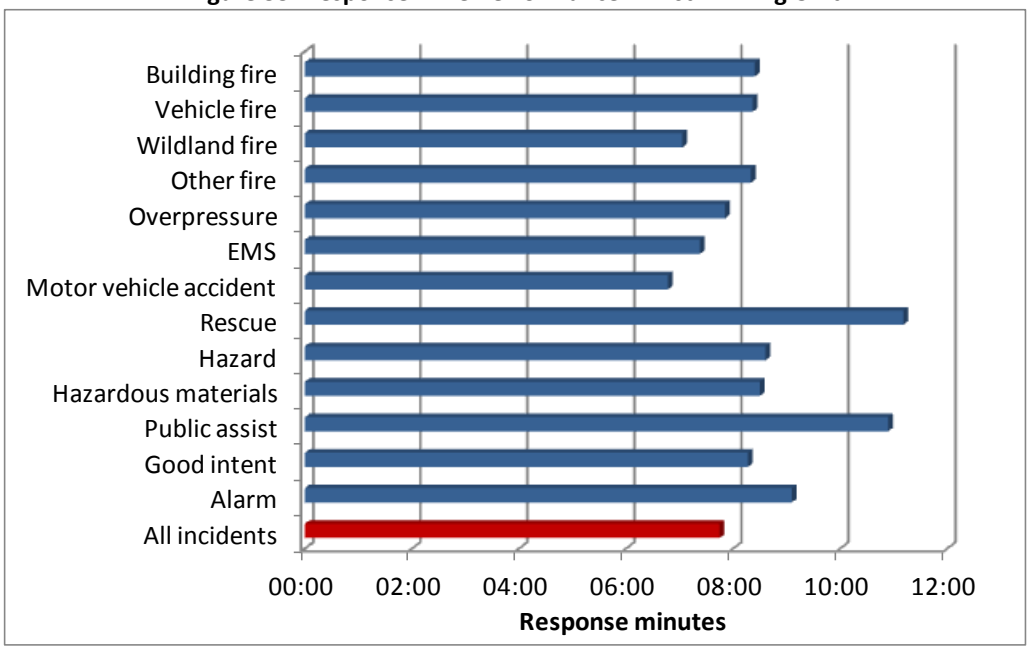


First Arriving Unit Response Time

Response time is defined as that period between notification of response personnel by the dispatch center that an emergency is in progress until arrival of the first fire department response unit at the emergency. When turnout time and travel time are combined, the NFPA 1710 performance standard for response time is five minutes 90 percent of the time for all priority emergency medical incidents and five minutes 20 seconds 90 percent of the time for priority fire and special operations incidents.

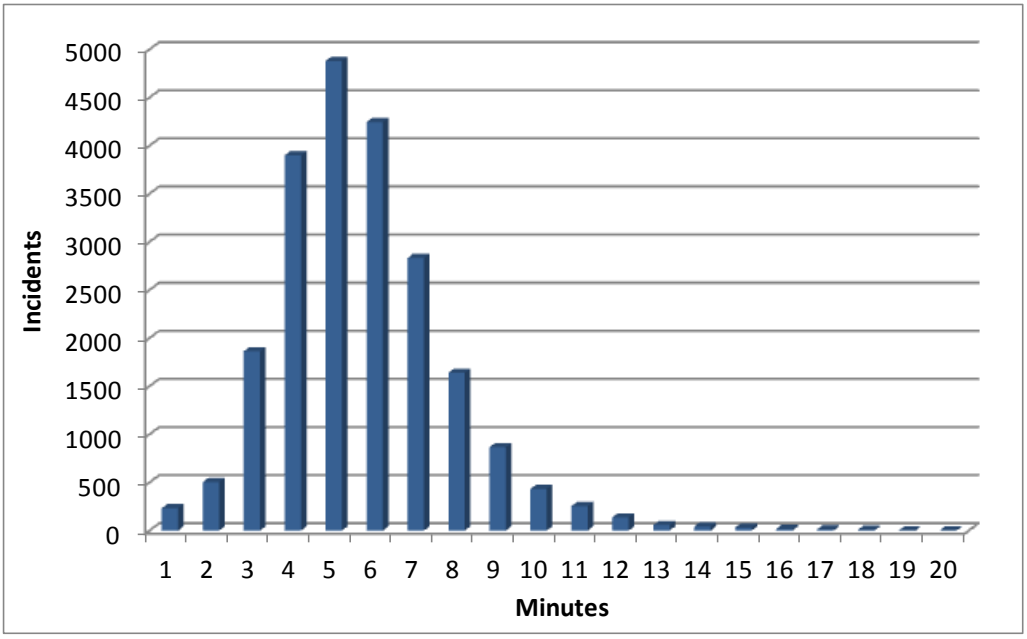
The following figure illustrates response time for all city priority incidents as well as specific incident types during the study period. Overall, response time for all priority incidents was within seven minutes 45 seconds 90 percent of the time. Response time for emergency medical incidents was within seven minutes 23 seconds 90 percent of the time. For fire and special operations incidents it was eight minutes 29 seconds 90 percent of the time. SFD met the NFPA standard for emergency medical incidents 53.8 percent of the time. It met the NFPA standard for fire and special operations incidents 47.7 percent of the time.

Figure 55: Response Time Performance – First Arriving Unit



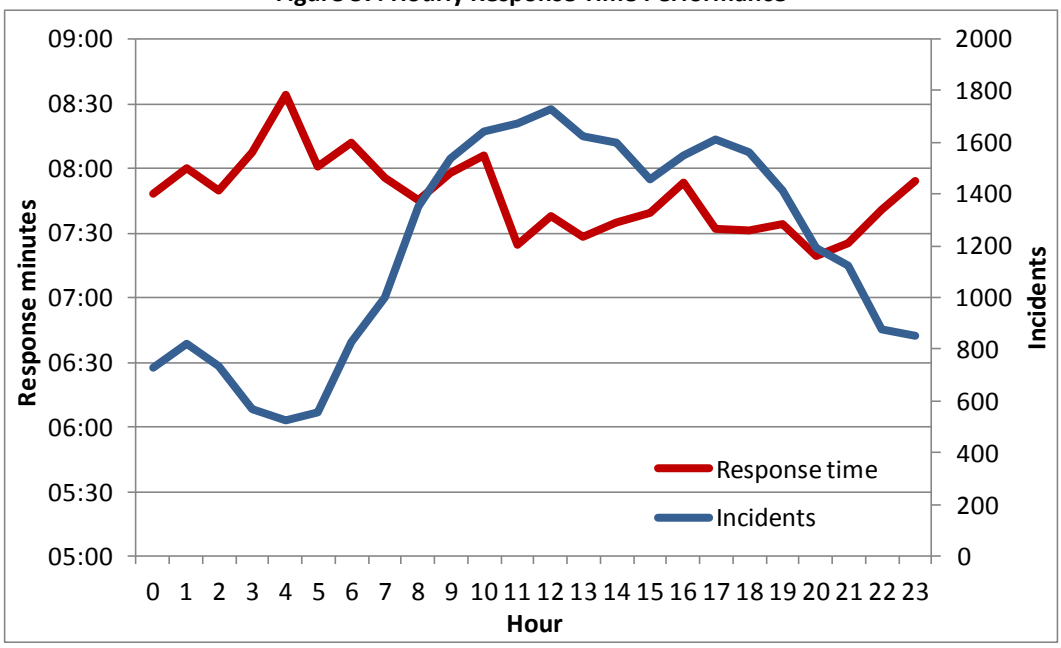
The following figure illustrates the frequency distribution of response times during the study period. It shows the number of incidents for which dispatch to arrival occurred at various minutes of time. 79.6 percent of incidents had first unit arrival between four and eight minutes.

Figure 56: Frequency Distribution of First Arrival Response Times



The next figure shows response time and number of incidents by hour of day for all incidents. Response time is slowest during the night-time hours and fastest during the day. Generally, SFD's best response times occur during the period of the day when response activity is at its highest.

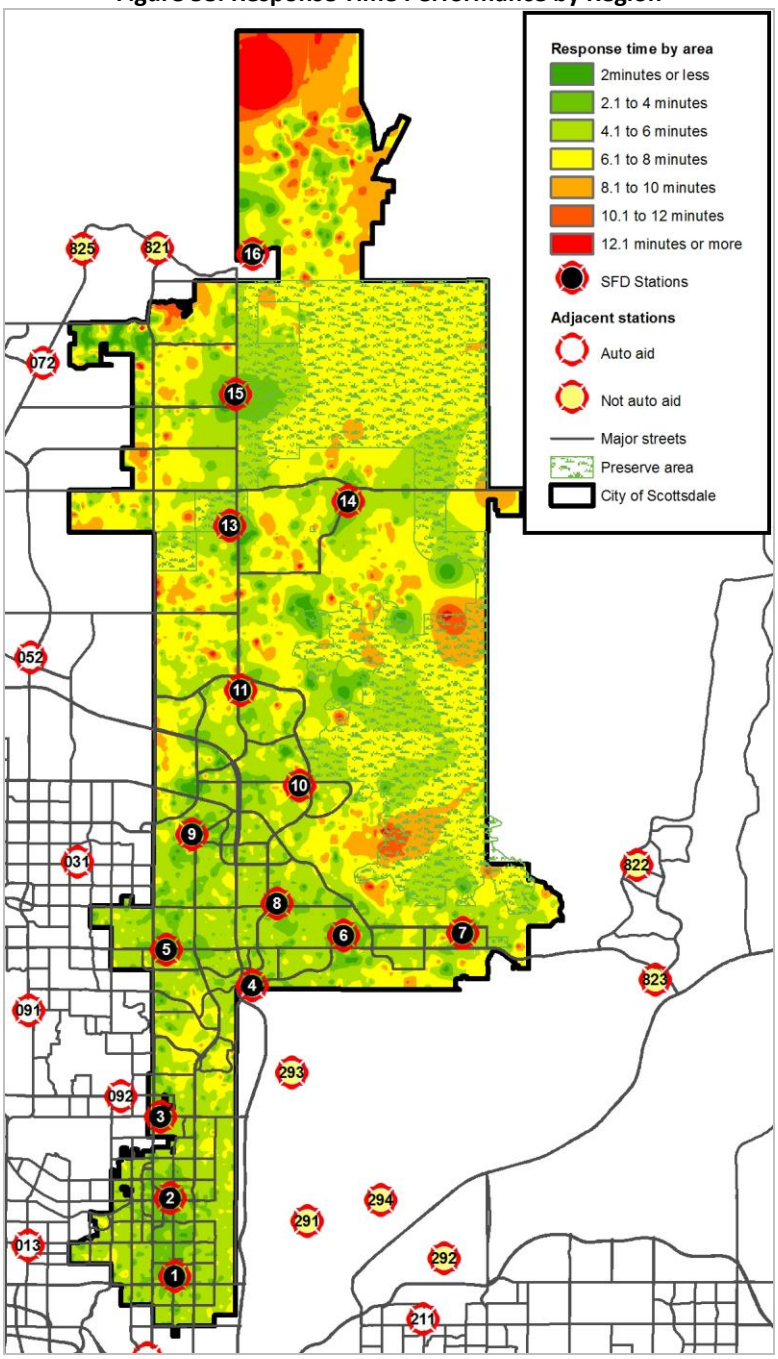
Figure 57: Hourly Response Time Performance



Response Time Performance by Region

Response time performance by region is also highly variable. The next figure evaluates the response time performance by sub-area using IDW analysis. Better performance is generally noted near fire stations with progressively longer response times for those incidents more distant from the stations.

Figure 58: Response Time Performance by Region

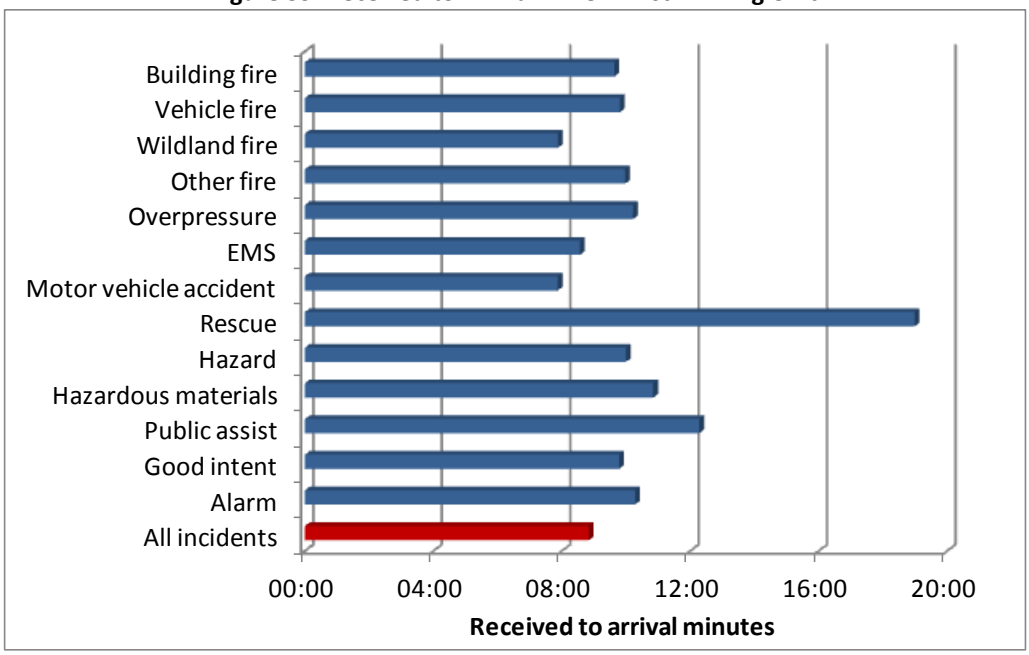


First Arriving Unit Received to Arrival Time

From the customer's standpoint, response time begins when the emergency occurs. Their first contact with emergency services is when they call for help, usually by dialing 9-1-1. Received to arrival time combines transfer, call processing, turnout, and travel time. Reliable data for call answer and transfer time is not available so that phase will be excluded from the following analysis. For the balance, the NFPA standards for received to arrival time is within six minutes 30 seconds 90 percent of the time for emergency medical incidents and within six minutes 20 seconds 90 percent of the time for fire and special operations incidents.

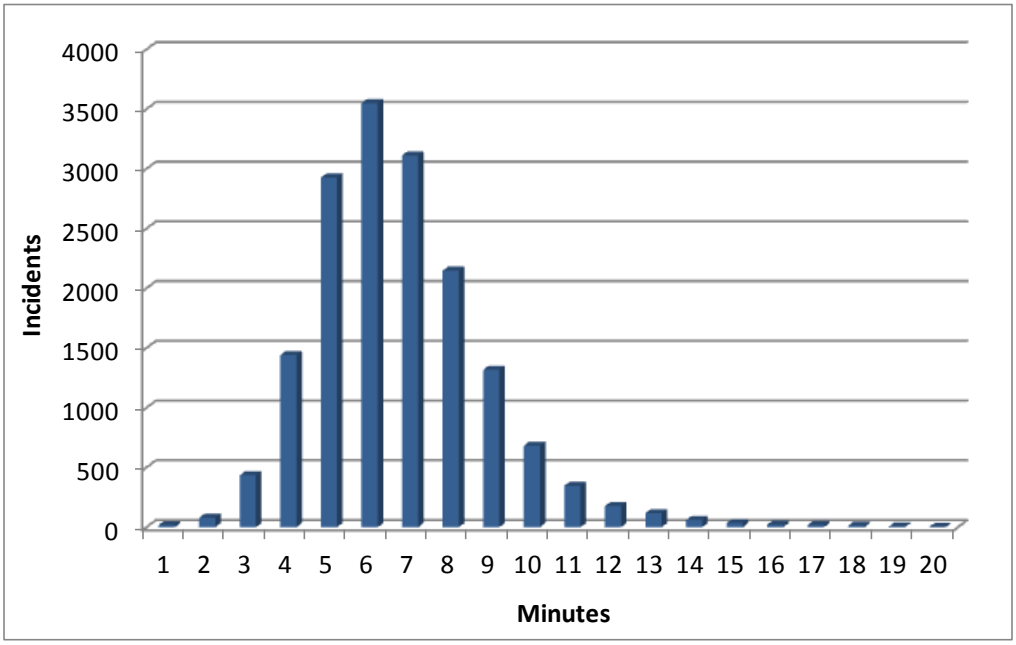
The next figure shows received to arrival performance during the study period at the 90th percentile for priority incidents within the city from the time the call is received at the PRDC until the first unit arrives at the incident location. Overall, received to arrival time is within eight minutes 50 seconds 90 percent of the time. Received to arrival time for emergency medical incidents was eight minutes 34 seconds 90 percent of the time. For fire and special operations incidents it was 10 minutes 39 seconds 90 percent of the time. SFD met the NFPA standard for emergency medical incidents 63.3 percent of the time. It met the NFPA standard for fire and special operations incidents 39 percent of the time.

Figure 59: Received to Arrival Time – First Arriving Unit



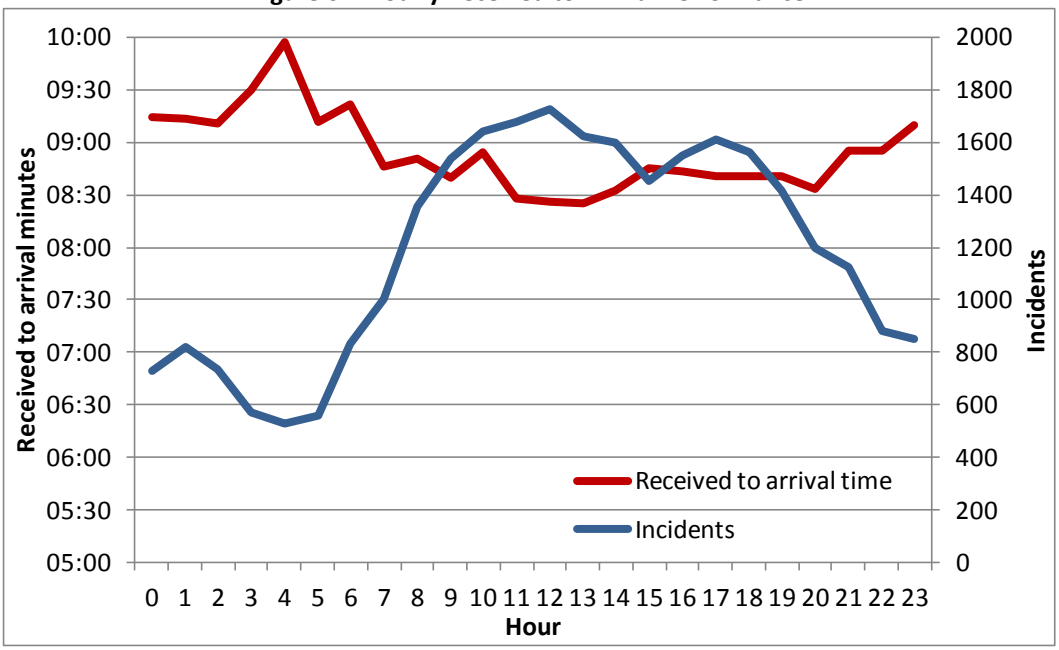
The following figure illustrates the frequency distribution of received to arrival times during the study period. It shows the number of incidents for which received to arrival occurred at various minutes of time. 79.8 percent of incidents had received to arrival times of between four and eight minutes.

Figure 60: Frequency Distribution of Received to Arrival Times



The next figure shows received to arrival performance by time of day also compared to incident activity by time of day. Total response time, from the customer's standpoint, is quickest during the day and slowest during the early morning hours.

Figure 61: Hourly Received to Arrival Performance



Concentration and Effective Response Force Capability Analysis

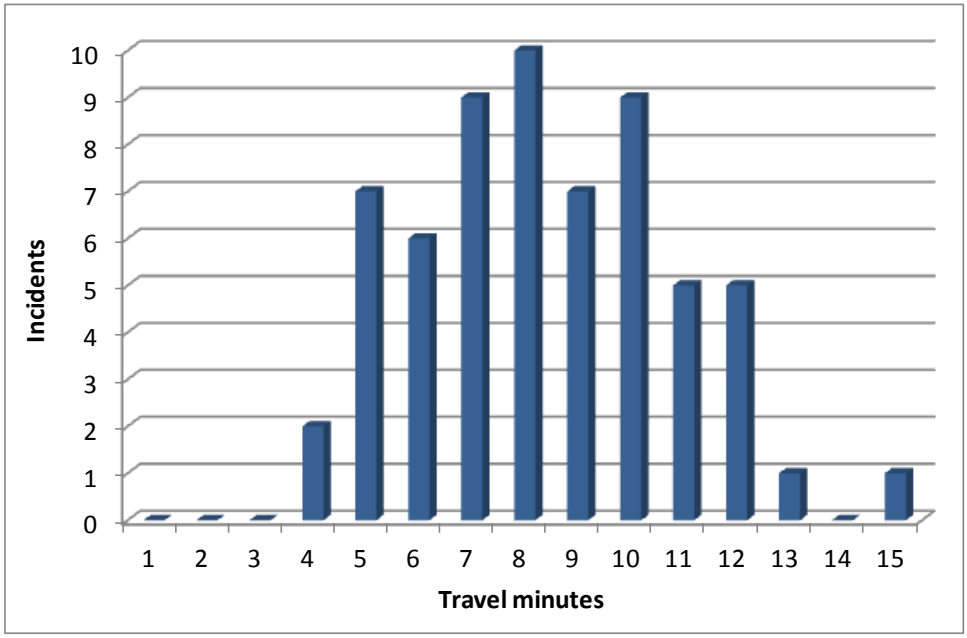
Effective Response Force (ERF) is the number of personnel and apparatus required to be present on the scene of an emergency incident to perform the critical tasks in such a manner to effectively mitigate the incident without unnecessary loss of life and/or property. The ERF is specific to each individual type of incident, and is based on the critical tasks that must be performed. In accordance with NFPA 1710, a moderate risk building fire is modeled for this analysis.

The NFPA 1710 travel time performance standard for the delivery of the full ERF to a moderate risk building fire is within eight minutes 90 percent of the time. Adding the 80 second turnout time allowed in NFPA 1710, response time performance should be within nine minutes 20 seconds, 90 percent of the time.

SFD has defined the minimum full effective response force for moderate risk building fires as two fire engines, one ladder truck, and one battalion chief with a total of 14 firefighters. Dispatch protocols call for three engines, a ladder truck, and two battalion chiefs to be dispatched to moderate risk building fires. That SFD sends more than the minimum response follows common practice in fire service. Should the incident be more significant than originally reported, needed resources are already enroute. If the additional resources are not needed they can be returned to service quickly.

The minimum full effective response force arrived at 62 building fires during the study period. SFD delivered the full ERF to these building fires within 11 minutes four seconds **travel time** 90 percent of the time. SFD delivered the full ERF within 12 minutes 16 seconds **response time** 90 percent of the time. The following figure illustrates the frequency distribution of the travel times experienced during the study period.

Figure 62: Frequency Distribution of Travel Time for Full ERF Arrival

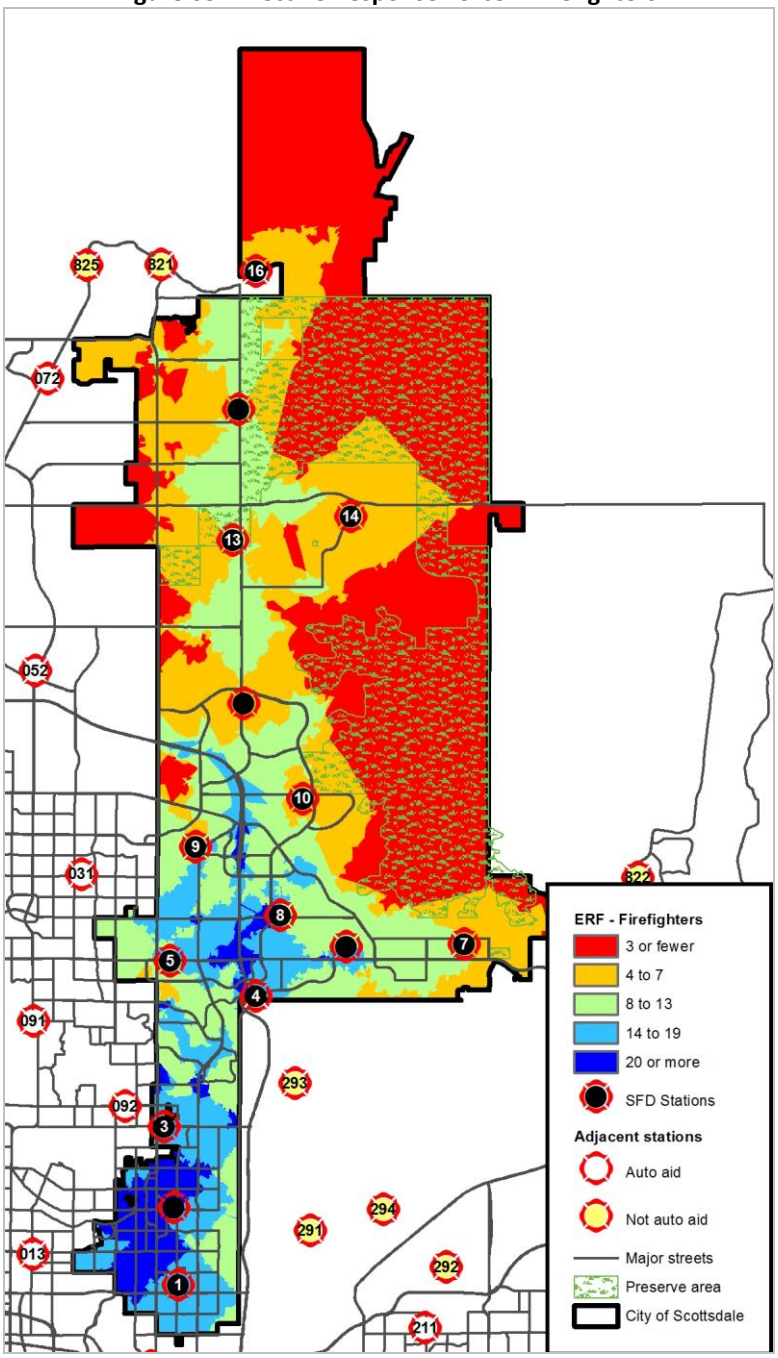


Concentration analysis reviews the physical capability of SFD's resources to achieve its target ERF travel time to the city. The following figures depict the physical capability of SFD to assemble apparatus and firefighters by area within eight minutes travel time. The modeled analysis shown assumes that all response units are available.

The first figure shows the area that can be reached by the number of firefighters that make up the target ERF based on the NFPA 1710 standard. Eight minutes of travel time is allowed to assemble the defined full effective response force on scene. This figure includes the resources of adjacent automatic aid agencies.

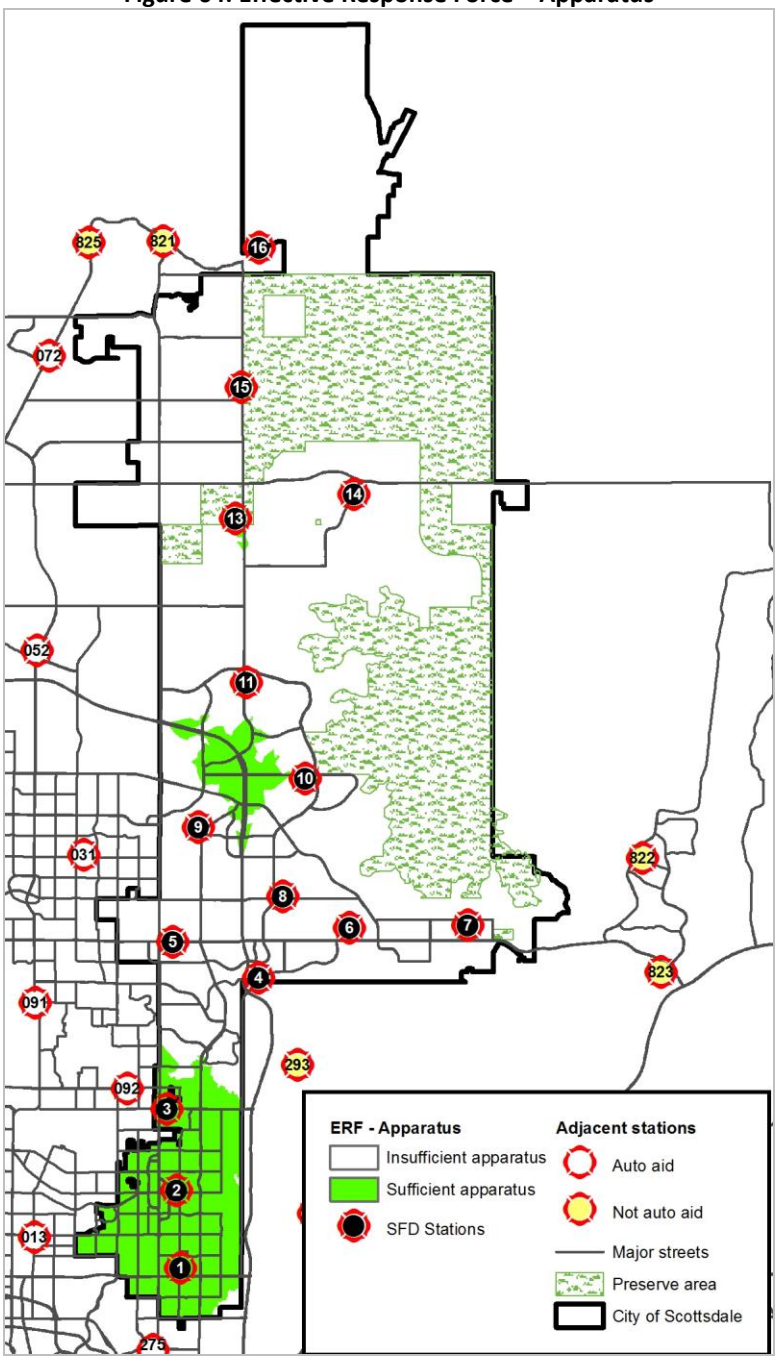
Only portions of the southern and central areas of the city can be served with the minimum 14 firefighters needed for a moderate risk building fire within the target response time.

Figure 63: Effective Response Force – Firefighters



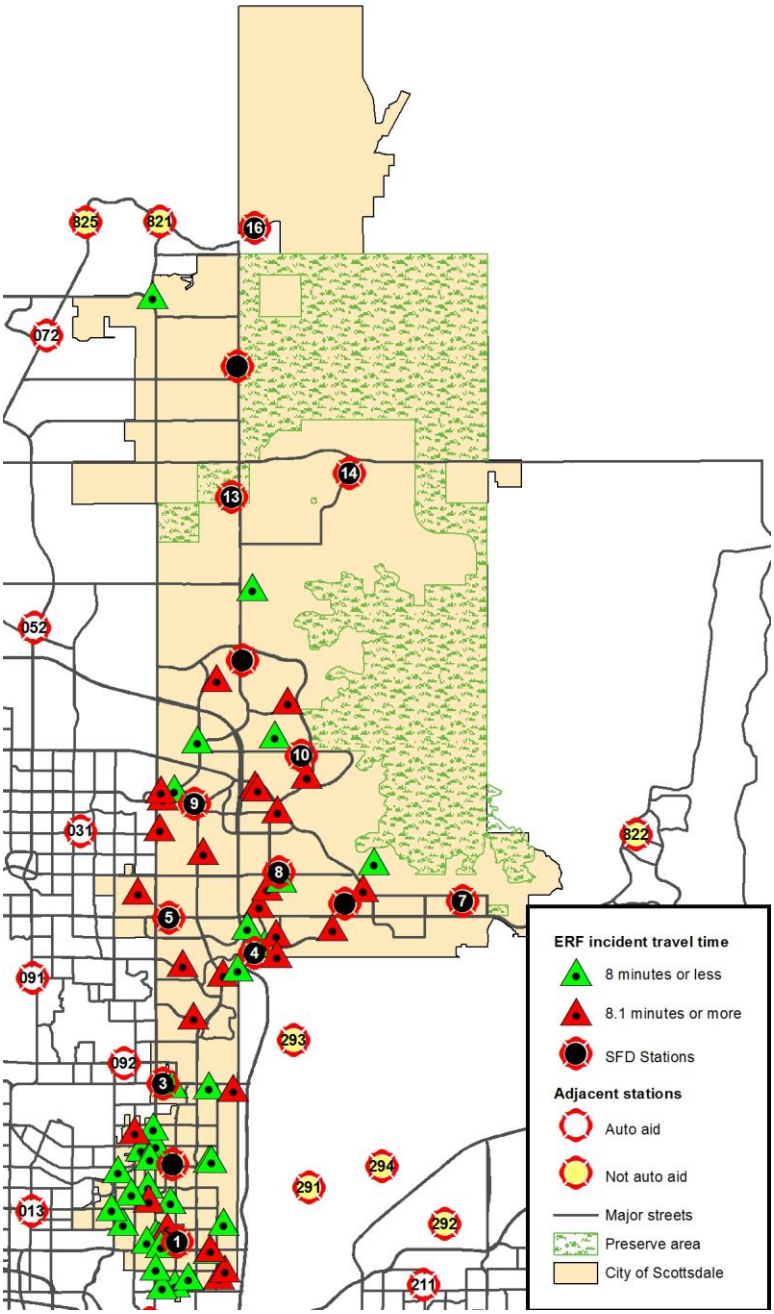
The next figure shows the area to which two fire engines, one ladder truck, and one battalion chief can reach within the eight minutes travel time allowed by the NFPA 1710 standard. These are the minimum resources needed for a moderate risk building fire. The model indicates these resources can be delivered within eight minutes travel only to the city's southern area and a small portion of the central area. The greatest limitation to better coverage is the battalion chief. Only two are available within Scottsdale at any time.

Figure 64: Effective Response Force – Apparatus



The following figure illustrates the location of those building fires to which ERF was provided within eight travel minutes and those for which travel time was longer than eight minutes. During the study period only 16 of the 62 building fires that received the full ERF had travel times of eight minutes or less. Most building fires that met the NFPA standard occurred in the southern portion of Scottsdale, an area with a greater concentration of response resources.

Figure 65: Building Fires Meeting and Not Meeting NFPA Travel Time Standards



Second Unit Arrival Time

All SFD fire engines and ladder trucks are staffed with four personnel. Safety regulations require that at least four firefighters be on scene before firefighters can enter a burning building. The only exception is if it is known that a person is inside the building and needs rescue. Current staffing levels on engines do not require the arrival of a second response unit before non-rescue interior firefighting activities can be initiated.

Incident data for building fires during the study period was reviewed to determine the time the second response unit arrived on the scene. According to the data the second unit arrived on scene of a structure fire within one minute 57 seconds 90 percent of the time after the arrival of the first unit.

Emergency Medical Services

SFD provides first response emergency medical service at the advanced life support level. Private ambulance companies provide patient transportation and enroute care to a medical facility. All SFD engines and ladders are advanced life support capable.

SFD units deliver advanced life support service to a priority emergency medical incident within eight minutes 90 percent of the time from time of dispatch. The private ambulance arrives within nine minutes 29 seconds 90 percent of the time from the time of dispatch.

A review of EMS incidents was conducted to determine the number of times each entity arrived first at an EMS incident. Arrival of both an SFD engine or ladder and an ambulance occurred at a total of 15,572 EMS incidents. Both units arrived simultaneously on 68 incidents. SFD arrived first at 9,830 incidents (63.4 percent) and the ambulance arrived first at 5,674 incidents (36.6 percent).

When SFD arrived first, it arrived ahead of the ambulance by four minutes 53 seconds 90 percent of the time, or an average of two minutes 16 seconds. When the ambulance arrived first, it arrived ahead of SFD by three minutes 17 second 90 percent of the time, or an average of one minute 31 seconds.

Call Concurrency and Reliability

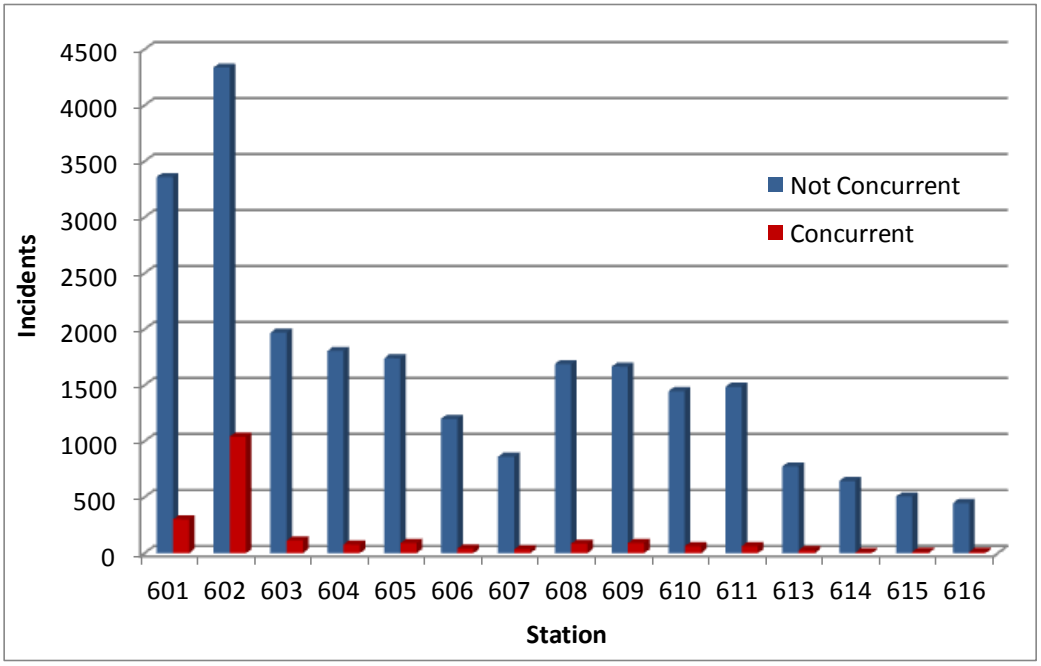
When evaluating the effectiveness of any resource deployment plan, it is necessary to evaluate the workload of the individual response units to determine to what extent their availability for dispatch is affecting the response time performance. In simplest terms, a response unit cannot make it to an incident across the street from its own station in four minutes if it is unavailable to be dispatched to that incident because it is committed to another call.

Concurrency

One way to look at resource workload is to examine the number of times multiple incidents happen within the same time frame in each station area. Incidents during the study period were examined to determine the frequency of concurrent incidents within each station's response area. This is important because concurrent incidents can stretch available resources and extend response times.

The following figure shows the number of concurrent and non-current calls for each SFD station during the study period. Concurrent calls were highest in the Station 602 area at 19.4 percent of total and lowest in the Station 614 area at 1.4 percent of total.

Figure 66: Call Concurrency by Station



Reliability

The ability of a fire station's first-due unit(s) to respond to an incident within its assigned response area is known as unit *reliability*. The reliability analysis is normally done by measuring the number of times response units assigned to a given fire station were available to respond to a request for service within that fire station's primary service area.

SFD does not dispatch response units based on a particular geographic service area. Instead, the computer aided dispatch system assigns the closest unit to an incident based on calculated travel time. This is a far superior way to select response units for an incident.

To determine reliability under this system, data should be collected to determine the number of times any response unit was available for an incident within the target travel time, in this case four minutes. Data is not currently available to make that calculation.

Component G – Performance Objectives and Performance Measures

DYNAMICS OF FIRE IN BUILDINGS

Most fires within buildings develop in a predictable fashion, unless influenced by highly flammable material. Ignition, or the beginning of a fire, starts the sequence of events. It may take several minutes or even hours from the time of ignition until a flame is visible. This smoldering stage is very dangerous, especially during times when people are sleeping, since large amounts of highly toxic smoke may be generated during this phase.

Once flames do appear, the sequence continues rapidly. Combustible material adjacent to the flame heat and ignite, which in turn heats and ignites other adjacent materials if sufficient oxygen is present. As the objects burn, heated gases accumulate at the ceiling of the room. Some of the gases are flammable and highly toxic.

The spread of the fire from this point continues quickly. Soon the flammable gases at the ceiling as well as other combustible material in the room of origin reach ignition temperature. At that point, an event termed “flashover” occurs; the gases and other material ignite, which in turn ignites everything in the room. Once flashover occurs, damage caused by the fire is significant and the environment within the room can no longer support human life.

Flashover usually occurs about five to eight minutes from the appearance of flame in typically furnished and ventilated buildings. Since flashover has such a dramatic influence on the outcome of a fire event, the goal of any fire agency is to apply water to a fire before flashover occurs.

Although modern codes tend to make fires in newer structures more infrequent, today’s energy-efficient construction (designed to hold heat during the winter) also tends to confine the heat of a hostile fire. In addition, research has shown that modern furnishings generally ignite more quickly and burn hotter (due to synthetics).

In the 1970s, scientists at the National Institute of Standards and Technology found that after a fire broke out, building occupants had about 17 minutes to escape before being overcome by heat and smoke. Today, that estimate is as short as three minutes.[5] The necessity of effective early warning (smoke alarms), early suppression (fire sprinklers), and firefighters arriving on the scene of a fire in the shortest span of time is more critical now than ever.

Perhaps as important as preventing flashover is the need to control a fire before it does damage to the structural framing of a building. Materials used to construct buildings today are often less fire resistive than the heavy structural skeletons of older frame buildings. Roof trusses and floor joists are commonly made with lighter materials that are more easily weakened by the effects of fire. “Light weight” roof

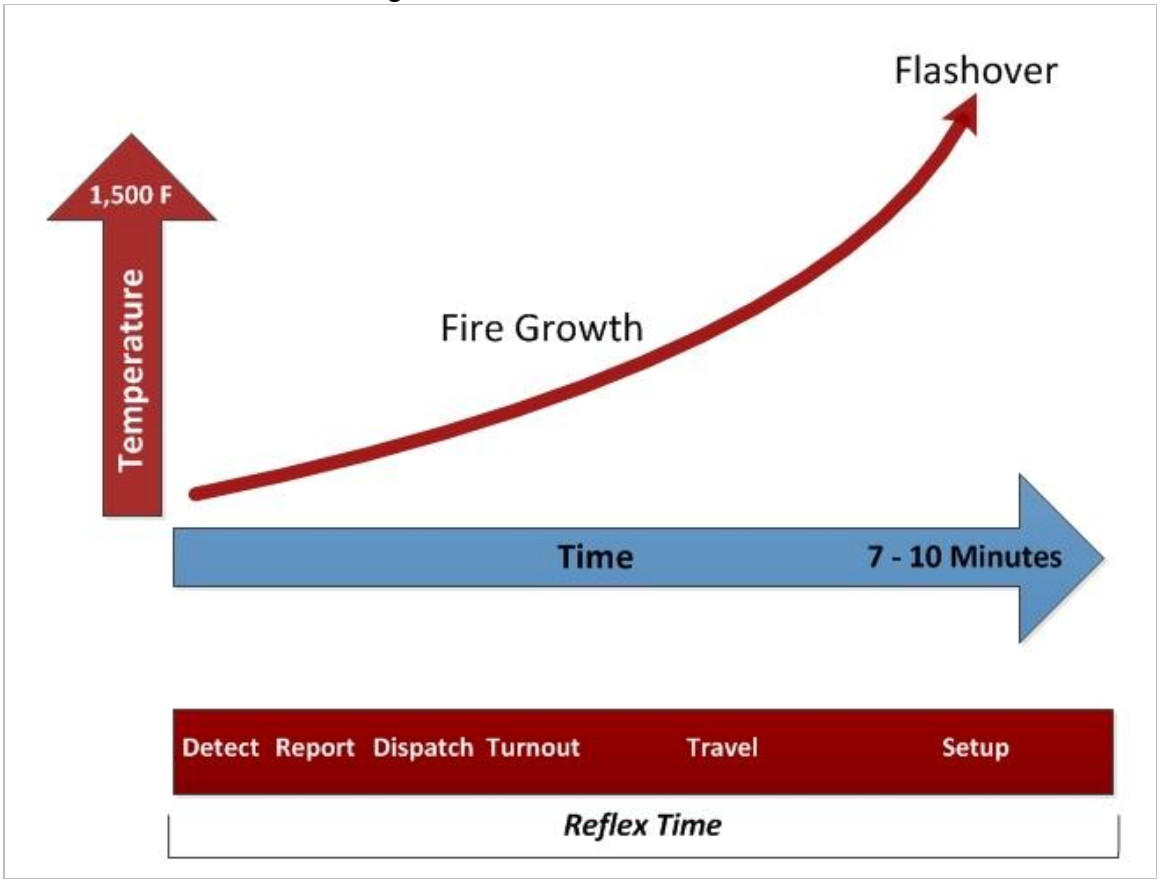
[5] National Institute of Standards and Technology, *Performance of Home Smoke Alarms, Analysis of the Response of Several Available Technologies in Residential Fire Settings,* Bukowski, Richard, et al.

trusses fail after five to seven minutes of direct flame impingement. Plywood I-beam joists can fail after as little as three minutes of flame contact. This creates a dangerous environment for firefighters.

In addition, the contents of buildings today have a much greater potential for heat production than in the past. The widespread use of plastics in furnishings and other building contents rapidly accelerate fire spread and increase the amount of water needed to effectively control a fire. All of these factors make the need for early application of water essential to a successful fire outcome.

A number of events must take place quickly to make it possible to achieve fire suppression prior to flashover. Figure 67 illustrates the sequence of events.

Figure 67: Fire Growth vs. Reflex Time



As is apparent by this description of the sequence of events, application of water in time to prevent flashover is a serious challenge for any fire department. It is critical, though, as studies of historical fire losses can demonstrate.

The National Fire Protection Association found that fires contained to the room of origin (typically extinguished prior to or immediately following flashover) had significantly lower rates of death, injury, and property loss when compared to fires that had an opportunity to spread beyond the room of origin (typically extinguished post-flashover). As evidenced in the following figure, fire losses, casualties, and deaths rise significantly as the extent of fire damage increases.

Figure 68: Fire Extension in Residential Structures – United States

Consequence of Fire Extension In Residential Structures 2003 - 2007			
Extension	Rates per 1,000 Fires		
	Civilian Deaths	Civilian Injuries	Average Dollar Loss Per Fire
Confined to room of origin or smaller	2.44	25.67	$5,317
Confined to floor of origin	16.18	72.79	$34,852
Confined to building of origin or larger	27.54	54.26	$60,064

Source: National Fire Protection Association "Home Structure Fires," March 2010

EMERGENCY MEDICAL EVENT SEQUENCE

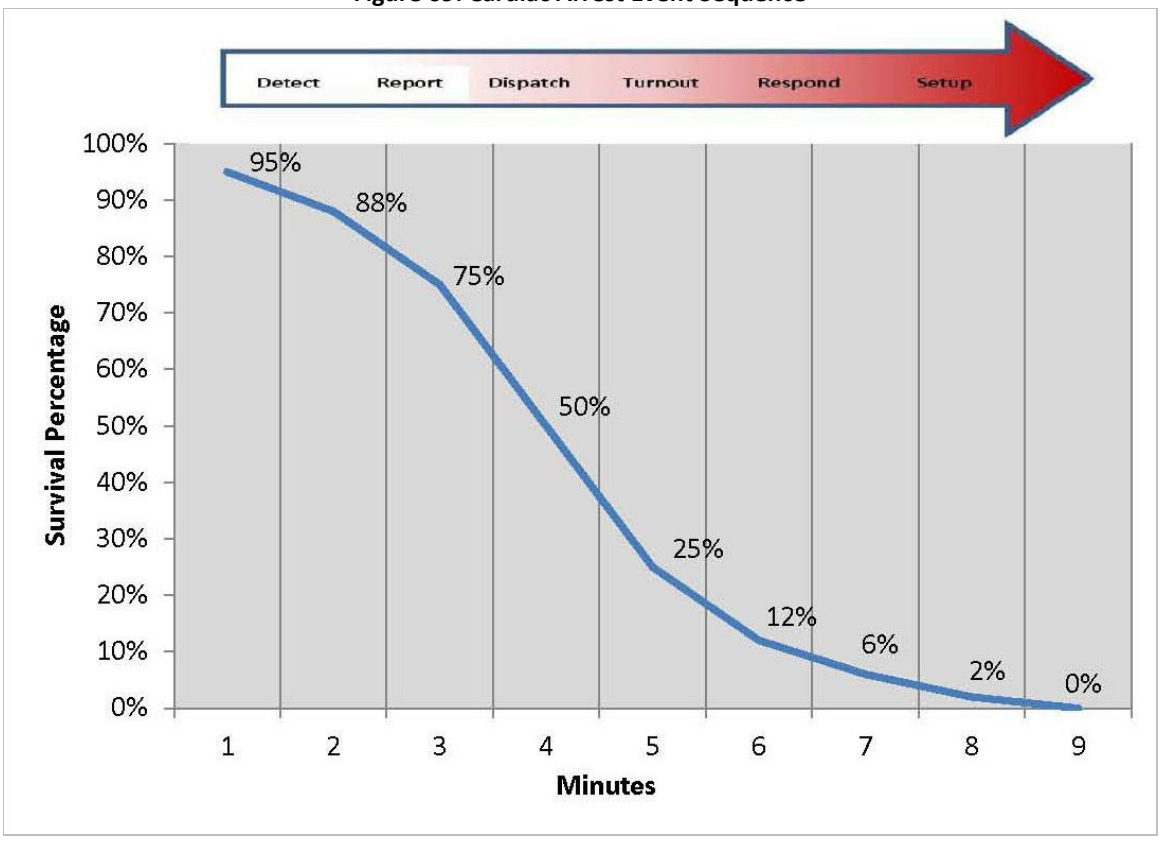
Cardiac arrest is the most significant life-threatening medical event in emergency medicine today. A victim of cardiac arrest has mere minutes in which to receive lifesaving care if there is to be any hope for resuscitation.

The American Heart Association (AHA) issued a set of cardiopulmonary resuscitation guidelines designed to streamline emergency procedures for heart attack victims, and to increase the likelihood of survival. The AHA guidelines include goals for the application of cardiac defibrillation to cardiac arrest victims.

Cardiac arrest survival chances fall by seven to 10 percent for every minute between collapse and defibrillation. Consequently, the AHA recommends cardiac defibrillation within five minutes of cardiac arrest.

As with fires, the sequence of events that lead to emergency cardiac care can be graphically illustrated, as in the following figure.

Figure 69: Cardiac Arrest Event Sequence



The percentage of opportunity for recovery from cardiac arrest drops quickly as time progresses. The stages of medical response are very similar to the components described for a fire response. Recent research stresses the importance of rapid cardiac defibrillation and administration of certain medications as a means of improving the opportunity for successful resuscitation and survival.

PEOPLE, TOOLS, AND TIME

Time matters a great deal in the achievement of an effective outcome to an emergency event. Time, however, is not the only factor. Delivering sufficient numbers of properly trained, appropriately equipped personnel within the critical time period completes the equation.

For medical emergencies this can vary based on the nature of the emergency. Many medical emergencies are not time critical. However, for serious trauma, cardiac arrest, or conditions that may lead to cardiac arrest, a rapid response is essential.

Equally critical is delivering enough personnel to the scene to perform all of the concurrent tasks required to deliver quality emergency care. For a cardiac arrest, this can be up to six personnel; two to perform CPR, two to set up and operate advanced medical equipment, one to record the actions taken by emergency care workers, and one to direct patient care.

Thus, for a medical emergency, the real test of performance is the time it takes to provide the personnel and equipment needed to deal effectively with the patient's condition, not necessarily the time it takes for the first person to arrive.

Fire emergencies are even more resource critical. Again, the true test of performance is the time it takes to deliver sufficient personnel to initiate application of water to a fire. This is the only practical method to reverse the continuing internal temperature increases and ultimately prevent flashover. The arrival of one person with a portable radio does not provide fire intervention capability and should not be counted as "arrival" by the fire department.

Component H – Overall Evaluation, Conclusions, and Recommendations

OVERALL EVALUATION

This Standards of Coverage and Deployment Plan, based on the *CFAI Standards of Cover 5th Edition,* required the completion of an intensive analysis on all aspects of the SFD deployment policies. The analysis used various tools to review historical performance, evaluate risk, validate response coverage, and define critical tasking and alarm assignments. The analysis relied on the experience of staff officers and their historical perspective combined with historical incident data captured by both the dispatch center and SFD's in-house records management system.

The Description of Community Served section provided a general overview of the organization, including governance, lines of authority, finance, and capital and human resources, as well as an overview of the service area including population and geography served. The Review of Services Provided section detailed the core services the organization provides based on general resource/asset capability and basic staffing complements. During the Review of Community Expectations and Performance Goals, it was determined that the community had high expectations of the fire department and felt generally positive about its services.

An overview of community risk was provided to identify the risks and challenges faced by the fire department. Geospatial characteristics, topographic and weather risks, transportation network risks, physical assets, and critical infrastructure were reviewed and which then identified medical incidents, structure fires, and rescues as the primary risks within the community. As a factor of risk, community populations and demographics are evaluated against historic and projected service demand. Population and service demand has increased over the past decade and will continue to increase in the future.

Evaluating risk using advanced geographic information systems (GIS) provided an increased understanding of community risk factors and led to an improved deployment policy.

During the analysis of service level objectives, critical tasking assignments were completed for incident types ranging from a basic medical emergency to a high rise structure fire. Critical tasking required a review of on-scene staffing requirements to mitigate the effects of an emergency. These tasks ultimately determine the resource allocation necessary to achieve a successful operation. The results of the analysis indicate that a moderate risk structure fire required a minimum of 14 personnel.

The review of historical system performance evaluated each component of the emergency incident sequence. These included call processing, turnout, and travel time. Beyond the response time of the initial arriving units, the additional components of concentration and effective response force, reliability, and call concurrency were evaluated.

Based on the analysis and considering community expectations, recommendations are offered to improve the delivery of fire and emergency services to the community service by SFD. It is not expected that all will be implemented in the short-term. Some may wait until economic conditions allow their implementation. However, all the recommendations offered chart a course to improved capability and service.

RECOMMENDATIONS

During the course of this study a number of issues, concerns, and opportunities were identified. The following recommendations are intended to accomplish three primary objectives:

1. Define clearly the expected level of performance provided by Scottsdale Fire Department.
2. Improve service delivery with no, or minimal, expenditure of funds.
3. Identify service level improvement opportunities that can be implemented as funding becomes available.

The recommendations are described as improvement goals and should be implemented as funding allows. Each will improve SFD's ability to provide effective service to the community.

Improvement Goal A: Formally Adopt Response Performance Goals

A community's desired level of service is a uniquely individual decision. No two communities are exactly alike. Performance goals must be tailored to match community expectations, community conditions, and the ability to pay for the resources necessary to attain the desired level of service.

Levels of service and resource allocation decisions are the responsibility of the community's elected officials, in this case the Scottsdale City Council. The policy making body must carefully balance the needs and expectations of its citizenry when deciding how much money to allocate to all of the services it provides.

With this in mind the following are recommended as SFD's fire and life safety response performance goals. These are not levels of service that must be achieved immediately but, instead, are targets for achievement when resources are available to do so.

Call-Processing Performance Goal

There are two parts to this phase of total response time. SPD is the primary public safety answering point (PSAP) for all 9-1-1 calls. For fire and emergency medical type calls SPD transfers the call to PRDC. This part is referred to as "answer and transfer time."

The second part occurs once the call is received at PRDC. Dispatchers must determine the nature and location of the emergency, determine which unit or units to dispatch, and relay the information to responders. This phase is referred to as "dispatch time."

The two parts of call processing time are the first phase of overall response time. Though much information must be gathered to properly identify the resources needed to respond to the emergency, keeping this time as short as possible has a direct impact on response time. National Fire Protection Association Standard 1221 recommends a call be answered at the PSAP within 15 seconds 95 percent of the time and transferred to the dispatch center within 30 seconds 95 percent of the time. This standard also recommends a call be processed by the dispatch center and responders notified within 60 seconds 80 percent of the time (within 90 seconds 90 percent of the time for EMS, hazardous materials, and technical rescue incidents) from the time it receives the call.

Recommended Call Processing Goals:
A 9-1-1 call will be answered within 15 seconds from receipt of the call at the PSAP 95 percent of the time.

- Current performance – Due to data limitations current performance is not known.

A 9-1-1 call will be transferred to the dispatch center within 30 seconds from receipt of the call at the PSAP 95 percent of the time.

- Current performance – Due to data limitations current performance is not known.

Response resources shall be notified of a priority incident other than emergency medical, hazardous materials, or technical rescue within 60 seconds from receipt of the call at the dispatch center 80 percent of the time.

- Current performance – Within 105 seconds, 80 percent of the time.

Response resources shall be notified of a priority emergency medical, hazardous materials, or technical rescue incident within 90 seconds from receipt of the call at the dispatch center 90 percent of the time.

- Current performance – Within 99 seconds, 90 percent of the time.

Turnout Time Performance Goal
Turnout time is one area over which the fire department has total control and is not affected by outside influences. Turnout time, or the time between when the call is received by the response units (dispatched) and when the unit is actually en route to the scene (responding), affects overall response times. Reducing this response time component reduces total response time.

National Fire Protection Association Standard 1710 recommends turnout time performance objectives of 80 seconds or less for fire and special operations response and 60 seconds or less for all other priority responses. SFD is close to meeting the turnout time recommended in the national standard for both categories of incidents.

Recommended Turnout Goal:
Response personnel shall initiate response to a priority fire and special operations incident within 80 seconds from notification 90 percent of the time.

- Current performance – Within 88 second 90 percent of the time

Response personnel shall initiate response to a priority emergency medical incident within 60 seconds from notification 90 percent of the time.

- Current performance – Within 73 seconds 90 percent of the time

Response Time for the First-due Unit

The time required to deliver the first response unit capable of intervening in the emergency includes both turnout time and travel time but not call processing time. Travel time is normally the longest phase of this response interval.

Recommended First-Due Response Time Goal:

The first response unit capable of initiating effective incident intervention shall arrive at a priority fire or special operations incident within five minutes 20 seconds (5:20) from notification of response personnel 90 percent of the time.

- Current performance – Within eight minutes 29 seconds 90 percent of the time

The first response unit capable of initiating effective incident intervention shall arrive at a priority emergency medical incident within five minutes 0 seconds (5:00) from notification of response personnel 90 percent of the time.

- Current performance – Within seven minutes 23 seconds 90 percent of the time.

Effective Response Force Performance Goal

A fire department's *concentration* is the spacing of multiple resources close enough together so that an initial "Effective Response Force" (ERF) for a given risk can be assembled on the scene of an emergency within the specific time frame identified in the community's performance goals for that risk type. An initial effective response force is defined as that which will be most likely to stop the escalation of the emergency. There are two types of effective response force identified in these performance goals; effective firefighting force (EFF) and effective medical force (EMF).

The minimum ERF for moderate risk structure fires in Scottsdale is identified as the arrival of at least two fire engines (8 firefighters), one ladder truck (4 firefighters), and one battalion command vehicle (2 firefighters) (14 firefighters total). This initial ERF does not necessarily represent the entire alarm assignment, as additional units may be assigned based on long-term incident needs and risks. Additional engines, ladders, or other specialty companies are assigned to higher risk responses in order to accomplish additional critical tasks that are necessary beyond the initial attack and containment.

Recommended Effective Response Force Goal:

The minimum effective response force shall arrive at a moderate risk structure fire within nine minutes 20 seconds (9:20) from notification of response personnel 90 percent of the time.

- Current performance – Within 12 minutes 16 seconds 90 percent of the time.

Improvement Goal B: Improve Call Processing Performance

SPD answers all 9-1-1 calls and transfers those that are a request for fire department services to PRDC. At present it does not have the ability to quantify the amount of time this sequence adds to overall call processing time. SPD should develop this capability in order to fully evaluate the amount of time it takes from the receipt of the 9-1-1 call until response resources are notified.

PRDC call processing performance exceeds national standards. There are opportunities to reduce the time required to notify response personnel of an incident that should be explored.

In the dispatch process used by PRDC, the caller is questioned to determine the nature and location of the emergency. Once gathered, that information is transferred to a dispatcher who notifies response personnel. Many high performance dispatch centers are not waiting for complete information to be gathered but instead are dispatching the closest response unit once the location and general nature (medical, fire, other) is known. This early dispatch, or pre-alert, can shave valuable seconds off overall response time. PRDC began utilizing computer technology that alerts response personnel via simultaneous pager, radio, station alerting system, and computer-generated voice incident information in November 2014. This technology supports the pre-alert process.

Cost to Implement: Implementation costs will depend on computer hardware and software modifications required to be able to capture needed data.

Improvement Goal C: Improve the Delivery of Emergency Medical Service

Responses to requests for emergency medical service represent the greatest percentage of SFD's response activity at 70.7 percent of total responses. As the service most requested by SFD's customers it is imperative that it be provided in the most effective and efficient manner possible.

SFD provides advanced life support first response service. The City of Scottsdale has an exclusive service agreement with PMT Ambulance to provide advanced life support transportation services. SFD administers this agreement. The Arizona Department of Health Services (ADHS) also regulates services provided by ambulance transportation providers.

Implement Tiered Response to EMS Incidents

When a request for emergency medical service is received at PRDC, call takers ask a series of questions to determine the nature and severity of the medical emergency. These questions are designed to quickly determine if the incident is potentially life-threatening or not. The primary purpose of this questioning process is to identify the most appropriate response. Life-threatening incidents require more resources (personnel and equipment) than non-life threatening incidents.

Although PRDC is using this process for emergency medical incidents within Scottsdale, it does not result in the dispatch of differing amounts or types of resources. All incidents receive at least one fire engine or ladder truck staffed with a paramedic and a paramedic staffed ambulance for patient transport.

In other recommendations, smaller response units with fewer personnel are proposed for specific areas of the city and times of day. These smaller units could be used for response to non-life threatening

emergency medical incidents rather than fire engines or ladder trucks. Should the use of smaller units be implemented, implementation of tiered EMS response should follow.

Implementation of tiered EMS response can also be used to determine if ambulance resources are dispatched to an incident. Some EMS incidents may only require a fire department response to provide patient evaluation. Use of tiered EMS response can reduce the number of units sent to EMS incidents.

If the caller questioning process used at PRDC does not result in a differentiation of response then it should not result in a delay in dispatch. PRDC should only question the caller sufficiently to determine location and basic nature before it dispatches the incident to SFD. The caller questioning process adds to overall response time. If it does not change the response then the time taken is not warranted.

Cost to Implement: None

Improvement Goal D: Reduce Incident Travel Time

As mentioned earlier in this report travel time is typically the longest phase of the incident response sequence. Current priority incident travel time performance is well beyond that allowed in the recommended response time goal. There are numerous opportunities for SFD to reduce travel time.

Implement Peak Activity Response Units

Response workload is highly variable throughout the day. There are more incidents during the day than at night. SFD's practice of providing the same number of personnel and response units 24 hours per day can result in a shortage of response resources during busy daytime periods.

Fire stations should be located, staffed, and equipped to provide response resources using two primary considerations:

1. Provide sufficient resources to effectively intervene in predictable requests for emergency service.
2. Provide sufficient resources to ensure a reliable response to any predictable emergency service request.

The first consideration suggests that there should be sufficient resources available 24 hours per day to effectively respond to an incident based on risk. For example, resources should be deployed so that the full effective response force can be provided to a building fire in any area at any time of the day. In most of Scottsdale that means a minimum of two fire engines, one ladder truck, and a battalion chief (14 firefighters total) should be available to respond and arrive within a set amount of time. In areas with much larger buildings, high-rise buildings, or other unusual risks, additional resources may be needed 24 hours per day.

The second consideration suggests that during periods of higher incident activity, additional resources should be available to respond. The additional resources should be of the type necessary for predictable requests for service; in SFD's case, emergency medical incidents.

Dynamic deployment practices can be, and to a degree are now, used during unusual events such as predicted significant storms, special events with large gatherings of people, and the like. Since the likelihood of a response is greater during these events additional resources are assigned and positioned to where incidents are likely to occur.

This dynamic approach to deployment provides two benefits. First, additional response resources can be made available during times each are predictably needed. Second, since these resources are not needed or assigned during slower workload periods the organization is maximizing its ability to match resources with system demand.

SFD currently staffs a daytime engine Monday through Thursday, Engine 6040. This unit's purpose is primarily to refill a station vacated by that station's primary unit when it is away for training or other non-incident activities. This is valuable to system reliability and should continue. However, peak workload periods occur every day of the week and during hours not covered by Engine 6040. The following figure illustrates workload by station and by time of day during the study period.

Figure 70: Incidents by Station and by Period of Day – Study Period

Station	Incidents 8:00 am to 7:59 pm	Incidents 8:00 pm to 7:59 am	Total	Incidents per hour 8:00 am to 8:00 pm	Incidents per hour 8:00 pm to 8:00 am
601	2184	1479	3663	0.50	0.34
602	3077	2302	5379	0.70	0.53
603	1266	817	2083	0.29	0.19
604	1290	594	1884	0.29	0.14
605	1259	573	1832	0.29	0.13
606	834	408	1242	0.19	0.09
607	640	256	896	0.15	0.06
608	1157	618	1775	0.26	0.14
609	1295	462	1757	0.30	0.11
610	1048	462	1510	0.24	0.11
611	1056	492	1548	0.24	0.11
613	602	200	802	0.14	0.05
614	456	197	653	0.10	0.04
615	387	131	518	0.09	0.03
616	331	128	459	0.08	0.03

A process called "queuing analysis" has been used to determine the number of units needed in each station area by time of day. This utilizes probability analysis to determine the number of units needed in each station area to reduce the likelihood that a response unit would not be available to serve an incident to ten percent or less. It uses the variables incidents per hour, number of available response units, and average time committed per incident.

Though very useful to this effort, queuing analysis has some limitations. It assumes that customers (incidents) arrive at a constant rate. This is not always true in emergency services. It also assumes that each customer requires an equal amount of time from servers (response units). While the average time

committed to an incident was used for service time some incidents require less, or substantially more than the average.

The following figure illustrates the current deployment and proposed deployment plan for both daytime (8:00 am to 7:59 pm) and night-time (8:00 pm to 7:59 am) based on current station locations. The figure includes individual station workload and the current and proposed probability of wait analysis based on the current number of stations.

Figure 71: Current and Proposed Response Units

Station	Current Units Day	Current Units Night	Current Probability of wait - day	Current probability of wait - night	Proposed Units Day	Proposed Units Night	Proposed probability of wait - day	Proposed probability of wait - night
601	1	1	16.7%	11.3%	2	1	1.3%	11.3%
602	2	2	2.5%	1.4%	2	2	2.5%	1.4%
603	1	1	9.7%	6.2%	1	1	9.7%	6.2%
604	1	1	9.8%	4.5%	1	1	9.8%	4.5%
605	1	1	9.6%	4.4%	1	1	9.6%	4.4%
606	1	1	6.4%	3.1%	1	1	6.4%	3.1%
607	1	1	4.9%	2.0%	1	1	4.9%	2.0%
608	1	1	8.8%	4.7%	1	1	8.8%	4.7%
609	1	1	9.9%	3.5%	1	1	9.9%	3.5%
610	1	1	8.0%	3.5%	1	1	8.0%	3.5%
611	1	1	8.1%	3.8%	1	1	8.1%	3.8%
613	1	1	4.6%	1.5%	1	1	4.6%	1.5%
614	1	1	3.5%	1.5%	1	1	3.5%	1.5%
615	1	1	3.0%	1.0%	1	1	3.0%	1.0%
616	1	1	2.5%	1.0%	1	1	2.5%	1.0%

One additional response unit is proposed for Station 601 during the daytime. Recommended is a two-person Quick Response Unit, (QRU) staffed and equipped to respond to emergency medical incidents and other non-emergency non-fire incidents. This unit would use a vehicle such as a larger sport utility vehicle (SUV) or a Type 6 engine. It could respond alone to non-life threatening EMS incidents if tiered medical dispatch is implemented as recommended earlier.

As system workload increases over time due to development and population growth, this analysis will likely identify other station areas that would benefit from a peak activity period response unit.

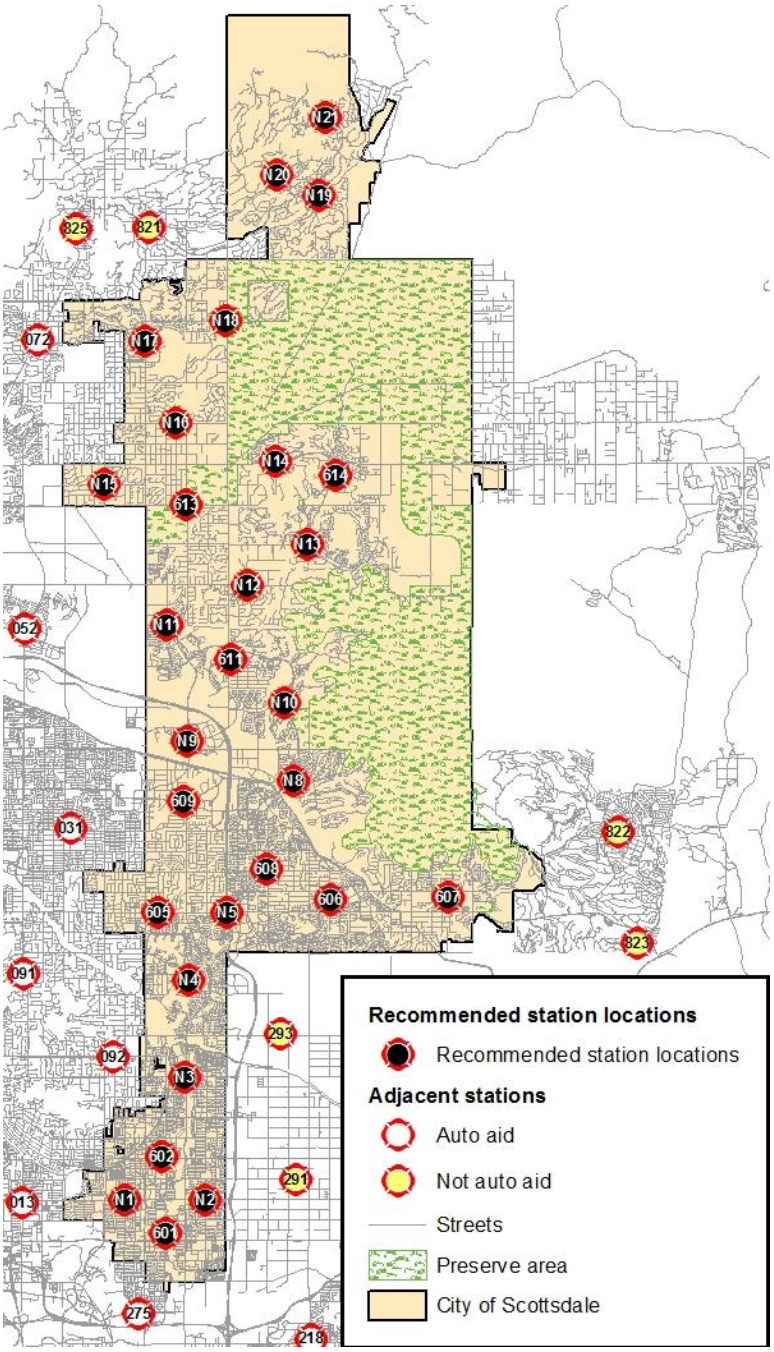
Current fire station locations do not provide sufficient coverage of the city to meet response performance in accordance with the recommended response time goal at the 90th percentile. As noted earlier only 70.9 percent of priority incidents during the study period occurred within four travel minutes of a fire station.

Additional fire stations and response units are needed to deliver service within four travel minutes, 90 percent of the time. Because of the city's transportation network, each station location has limited reach within four travel minutes. Meandering streets, lack of connectivity, and single access neighborhoods are challenges to emergency response.

The adjacent figure shows the locations recommended for additional fire stations and the relocation of existing stations.

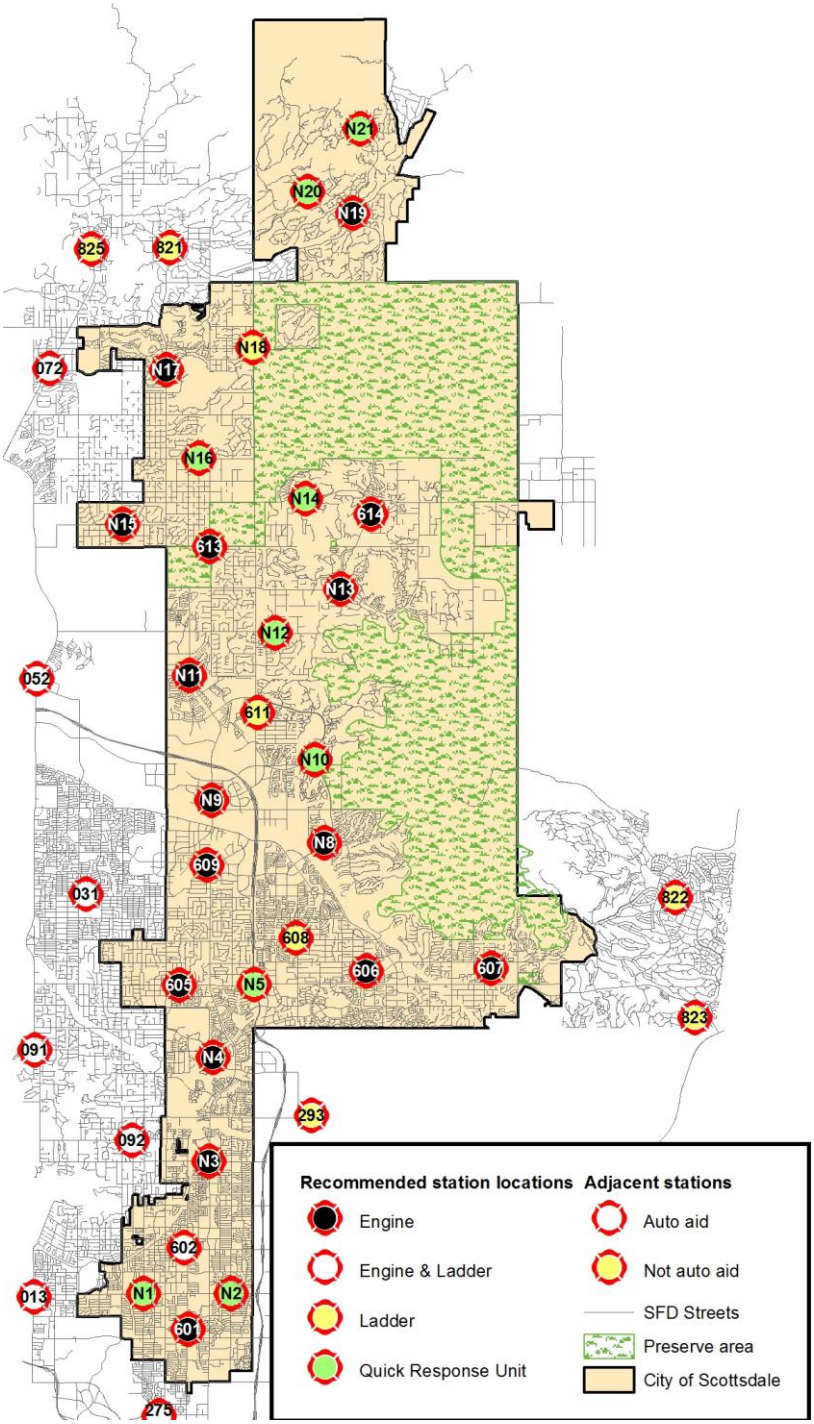
This station deployment recommendation would have placed 21,717 of 23,721 priority incidents (90.8 percent) within four travel minutes of a fire station. This deployment plan also significantly improves effective response force coverage.

Figure 72: Recommended Fire Station Locations



Not all fire stations need to be staffed and equipped with the same type of apparatus. The figure below shows the recommended staffing and apparatus deployment. It incorporates the two-person quick response unit (QRU) recommended earlier in several stations. The ladder truck currently located at Station 606 is moved to Station 608 to improve ladder truck coverage.

Figure 73: Recommended Fire Station Locations with Unit Type



The following figure lists each station, its location, and staffing.

Figure 74: Recommended Fire Stations – Locations and Units – 90th Percentile Coverage

Station	Location	Apparatus
601	1901 N Miller Rd	Engine
602	7522 E Indian School Rd	Engine & Ladder
605	7455 E Shea Blvd	Engine
606	10850 E Via Linda	Engine
607	11160 N 130TH St	Engine
608	9598 E Cactus Rd	Ladder
609	14970 N 78TH Way	Engine
611	20355 N Pima Rd	Ladder
613	N Hayden Rd and E Jomax Rd	Engine
614	27777 N Alma School PY	Engine
N1	E Thomas Rd and N 68th St	Quick Response Unit
N2	E Thomas Rd and N Granite Reef Rd	Quick Response Unit
N3	N Hayden Rd and E McDonald Dr	Engine
N4	E Doubletree Ranch Rd and E Via Linda	Engine
N5	E Shea Blvd and 101 Loop	Quick Response Unit
N8	E McDowell Mt Ranch Rd and N Thompson Peak PY	Engine
N9	N Hayden Rd and E Princess Dr	Engine
N10	N Thompson Peak PY and E Legacy Blvd	Quick Response Unit
N11	N Miller Rd and E Deer Valley Rd	Engine
N12	E Pinnacle Peak Rd and N 92nd	Quick Response Unit
N13	E Happy Valley Rd and N Alma School Rd	Engine
N14	E Dynamite Blvd and N 97th Pl	Quick Response Unit
N15	N 64th St and E Pinnacle Vista Dr	Engine
N16	E Dixileta Dr and N 78th St	Quick Response Unit
N17	N Scottsdale Rd and E Dove Valley Rd	Engine
N18	N Pima Rd and E Westland Dr	Ladder
N19	N Cave Creek Rd and E Desert Hills Dr	Engine
N20	N Charles Blair MacDonald Rd and E Desert Hills Dr	Quick Response Unit
N21	N Desert Mountain PY and N 197th Pl	Quick Response Unit

Those stations only housing QRUs can be much smaller facilities than would be required for full size fire engines or ladder trucks.

It is neither expected nor possible for SFD to implement these fire station and response company additions over the short-term. These improvements will be implemented over time. When to implement is most likely a funding decision. Where to implement may be based on a couple of factors. These can include:

1. Add resources to areas of greatest service demand first in order to provide the best service to the most people.
2. Add resources to areas currently experiencing the longest response times.

The following figure illustrates current performance and workload by SFD planning zone. The adjacent map shows the boundaries of each zone along with current SFD stations.

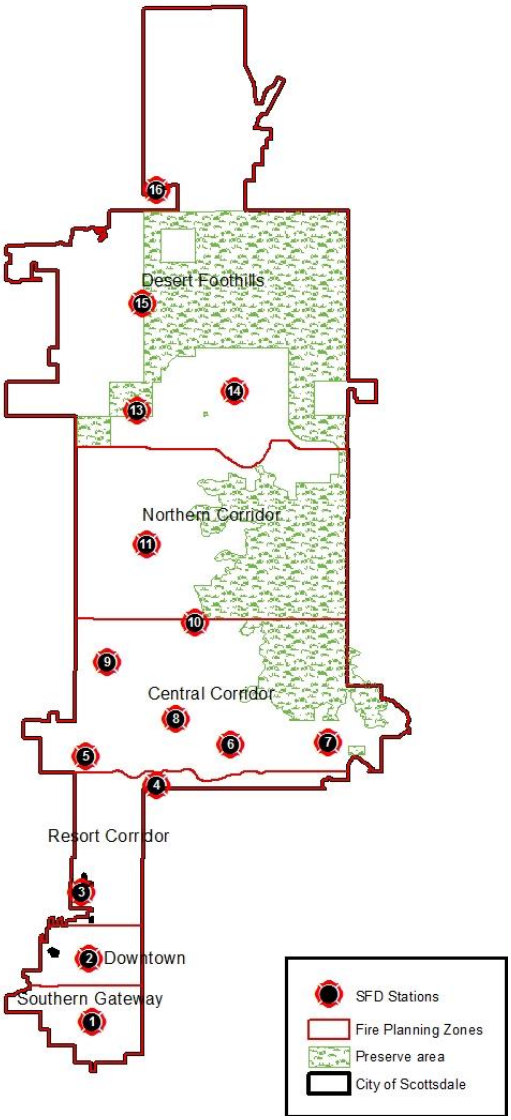
Figure 765: Response Time and Workload by Planning Zone

Zone	Response time at 90th percentile	Incidents per square mile
Southern Gateway	06:37	706
Downtown	06:10	901
Resort Corridor	07:46	303
Central Corridor	07:16	202
Northern Corridor	09:02	70
Desert Foothills	10:23	25
Citywide	**07:37**	**141**

Based on demand, the Downtown zone would be the first to receive new response resources. Based on current response time performance the Desert Foothills zone would be the first.

Resources can also be added incrementally by time of day. It is known that the greatest demand for service is between the hours of 8:00 am and 8:00 pm. The stations identified as being staffed by QRUs, in particular, could be staffed initially only during the 12 hour period of greatest service demand.

Figure 75: SFD Planning Zones

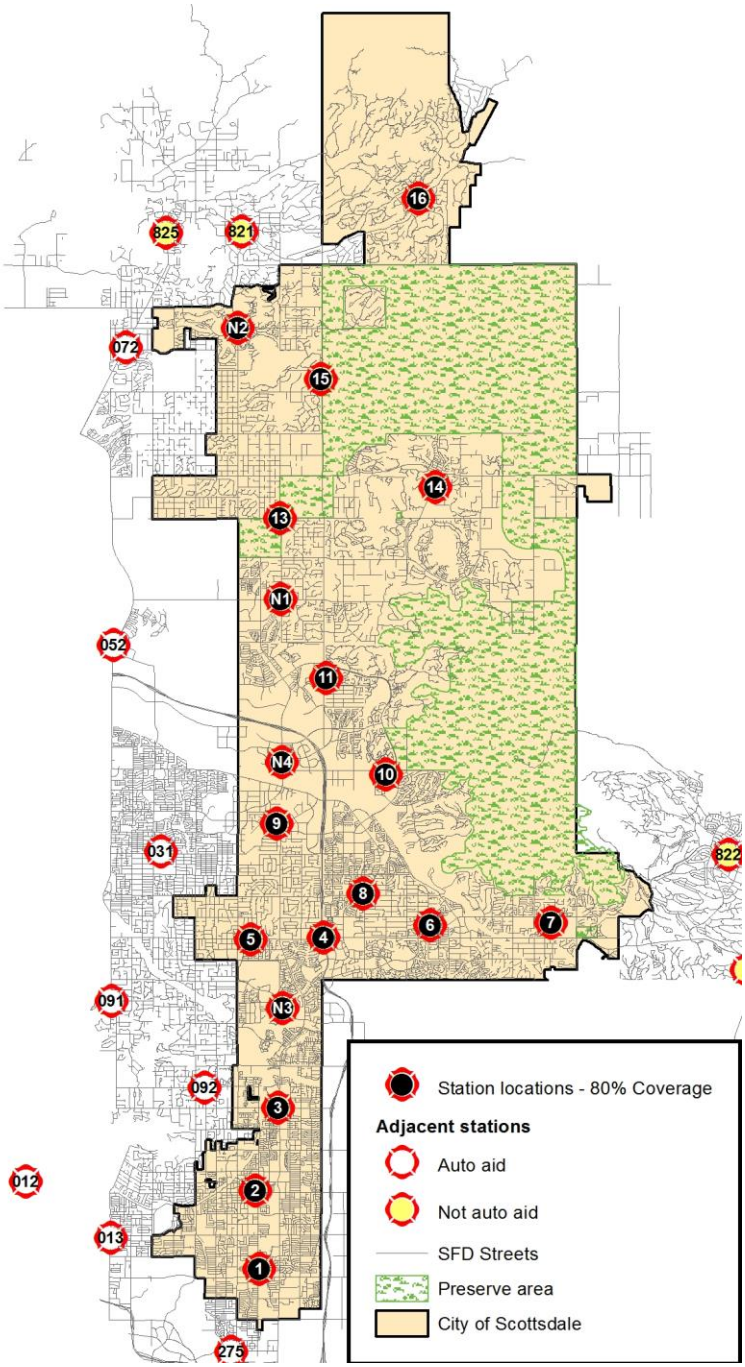


Relocate Existing Fire Stations and Add Additional Fire Stations and Response Units – Alternative

A significant number of new response resources are needed to achieve response time performance at the 90th percentile as recommended by national standards. As an alternative, Scottsdale could adopt the same response time goal but at the 80th percentile. This would mean that instead of only 10% of emergencies experiencing response times longer than the goal of five minutes 20 seconds for fire and special operations incidents and five minutes for emergency medical incidents, 20 percent would experience longer response times. However, attainment of an 80th percentile response performance goal is significantly less expensive.

The following map shows the locations of current and proposed stations needed to achieve 80th percentile response time performance. Only four additional stations are needed.

Figure 77: Fire Station Locations – 80th Percentile Coverage



The figure below lists the proposed locations for existing, relocated, and new fire stations.

This option does not propose use of QRUs as suggested in the previous option. In order to improve effective response force coverage each station would need either an engine or ladder truck.

Figure 78: Recommended Fire Stations – Location and Units – 80th Percentile Coverage

Station	Location	Apparatus
601	1901 N Miller RD	Engine
602	7522 E Indian School RD	Engine & Ladder
603	N Hayden RD AND E McDonald	Engine
604	LOOP 101 AND E Shea BL	Engine
605	7455 E Shea BL	Engine
606	10850 E Via Linda	Engine
607	11160 N 130TH ST	Engine
608	9598 E Cactus RD	Ladder
609	14970 N 78TH WY	Engine
610	16701 N 100TH ST	Engine
611	20355 N Pima RD	Ladder
613	N Hayden AND Jomax	Engine
614	27777 N Alma School PY	Engine
615	31802 N Pima RD	Ladder
616	N Cave Creek RD E Dessert Hills	Engine
N1	N Hayden AND Pinnacle Peak	Engine
N2	N Scottsdale RD AND E Westland DR	Engine
N3	N Via Linda AND E Via De Ventura	Engine
N4	N Hayden AND Princess	Engine

As in the previous deployment option, new resources can be added incrementally based on current performance and workload. The following figure illustrates current service demand and response time performance at the 80th percentile by SFD planning zone.

Figure 79: Response Time and Workload by Planning Zone – 80th Percentile

Zone	Response time at 80th percentile	Incidents per square mile
Southern Gateway	05:51	706
Downtown	05:19	901
Resort Corridor	06:51	303
Central Corridor	06:18	202
Northern Corridor	08:01	70
Desert Foothills	08:43	25
Citywide	**07:37**	**141**

Improvement Goal E: Improve Wildland Firefighting Capability

As noted earlier in this report, Scottsdale has a sizeable wildland fire risk. The risk is not so much to developed property as it is to the McDowell Sonoran Preserve. SFD has an active fuels modification public education program in place that can reduce the risk to developed property. However, the Preserve is a significant community recreational and environmental resource.

SFD currently has limited capability to respond to significant wildland fires within the Preserve. Limited response resources coupled with very limited road access to areas within the Preserve lead to the likelihood of a large wildland fire occurring and, in fact, such fires have occurred in the past.

SFD has four vehicles suitable for wildland fire response. Its personnel are trained to only basic wildland firefighting levels.

SFD should provide additional training to its response personnel. This training should include that recommended by the National Wildfire Coordinating Group (NWCG) Wildland Fire Qualification System Guide for activities likely to be conducted by SFD personnel. This includes wildland/urban interface, wildland incident management, air attack operations, firing and burnout operations, and more.

Because of the lack of road access within the Preserve, use of air attack firefighting resources will be necessary to minimize fire spread. Air attack resources are available from state and federal wildland fire agencies (helicopters and air tankers) and from the City of Phoenix (helicopter). There are formal agreements between SFD and these agencies for access to these resources. However, the regional automatic aid agreement does not automatically deploy state and federal wildland agencies. This support is provided through the Arizona Mutual Aid Compact. This agreement provides SFD access to air resources but the request process is slow to implement.

Air attack resources are only available from state and federal agencies during fire season, and then only if they are not being used in other areas. Thus there is limited year around availability and no assurance that air attack resources will be available when needed.

SFD should identify all sources of air attack capability including private sector resources. SFD should work with these sources, particularly private sector resources, to develop agreements so that air attack

resources can be available more immediately and at pre-determined costs. Joint planning and training should be continue so that incident operations and communications are pre-determined and practiced.

Cost to Implement: Training costs to increase SFD firefighter wildland capability - $75,000

Appendix

APPENDIX A – SCOTTSDALE FIRE DEPARTMENT COMPARED TO OTHERS

The following figures provide a comparison of SFD to other fire service agencies serving similar populations. Comparable information is derived from several sources including the National Fire Protection Association and the U. S. Census Bureau. Western data includes fire agencies from the states of Alaska, Arizona, Washington, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming of similar population. Regional data includes Chandler, Gilbert, Glendale, Mesa, Peoria, Tempe, and Phoenix (except where noted).

Figure 80: Firefighters per 1,000 Population

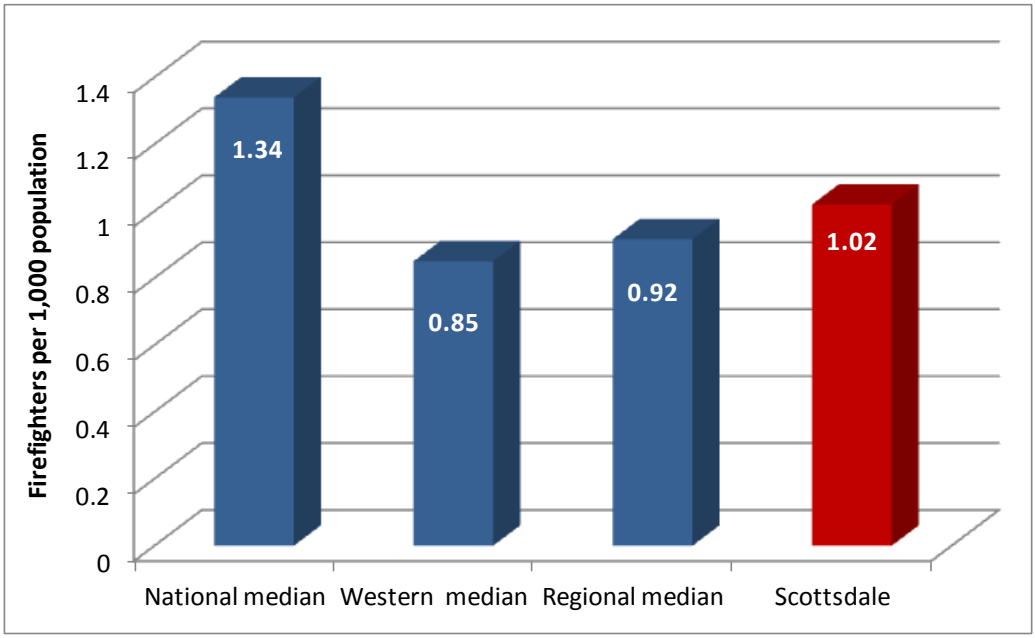
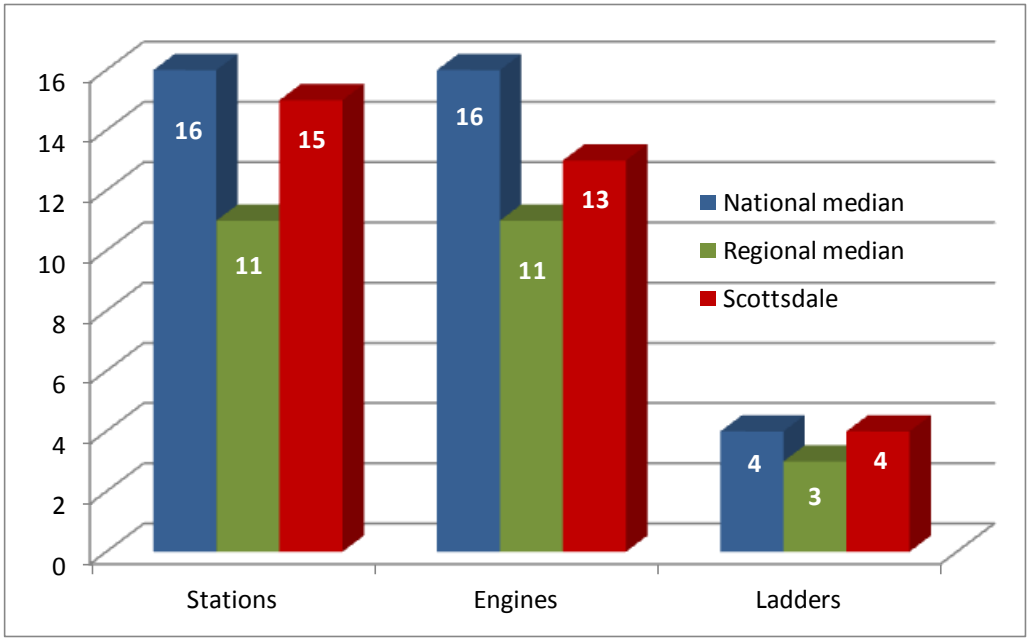


Figure 81: Comparison of Physical Resources



Note: Regional median does not include Phoenix

Figure 82: Total Incidents per 1,000 Population

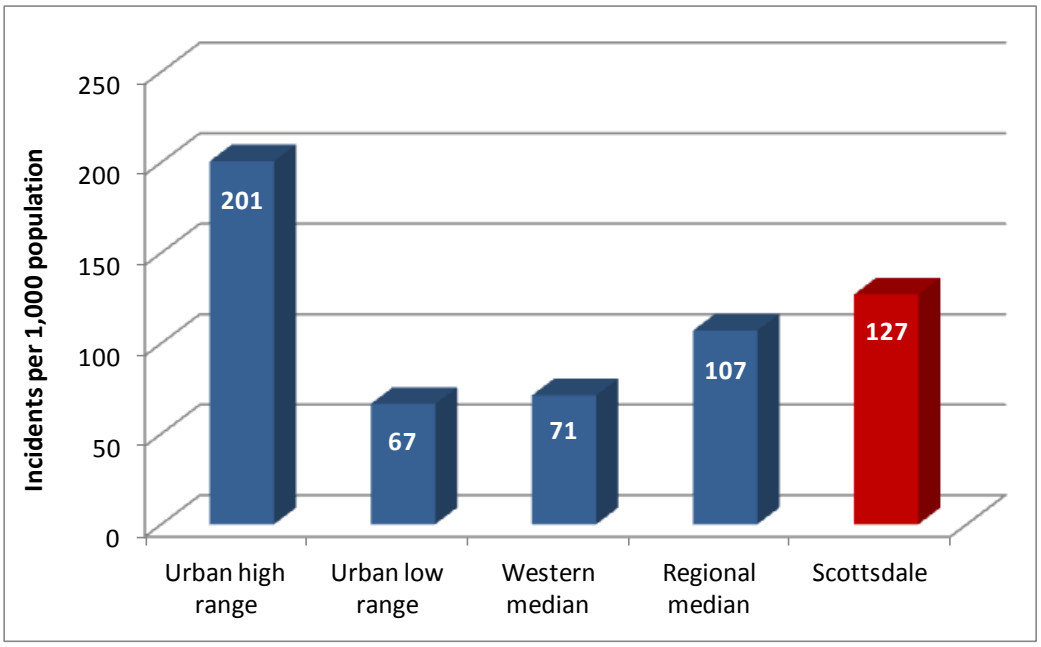


Figure 83: Fires per 1,000 Population

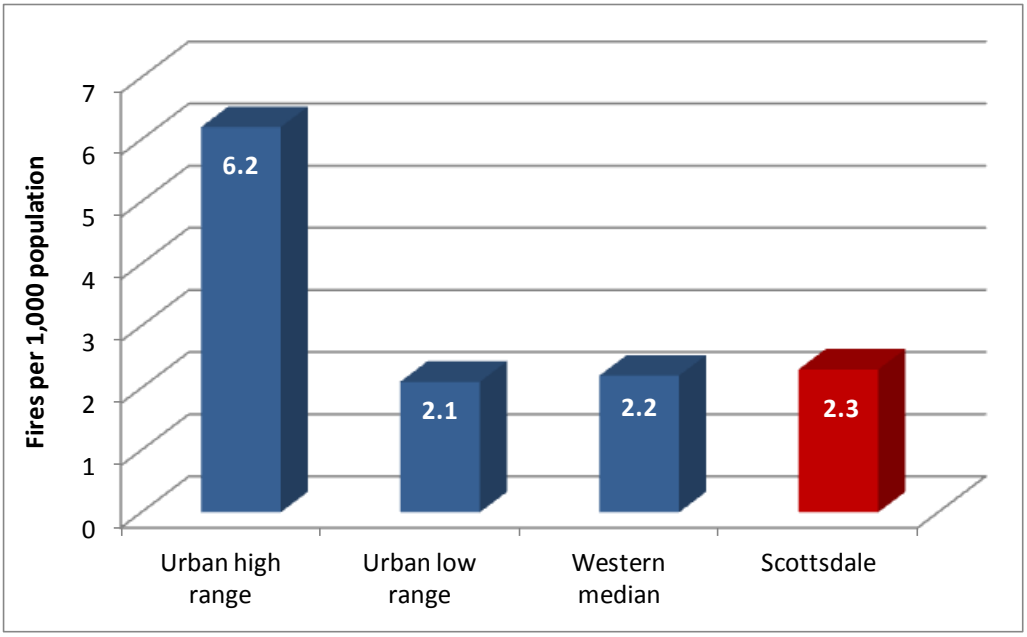
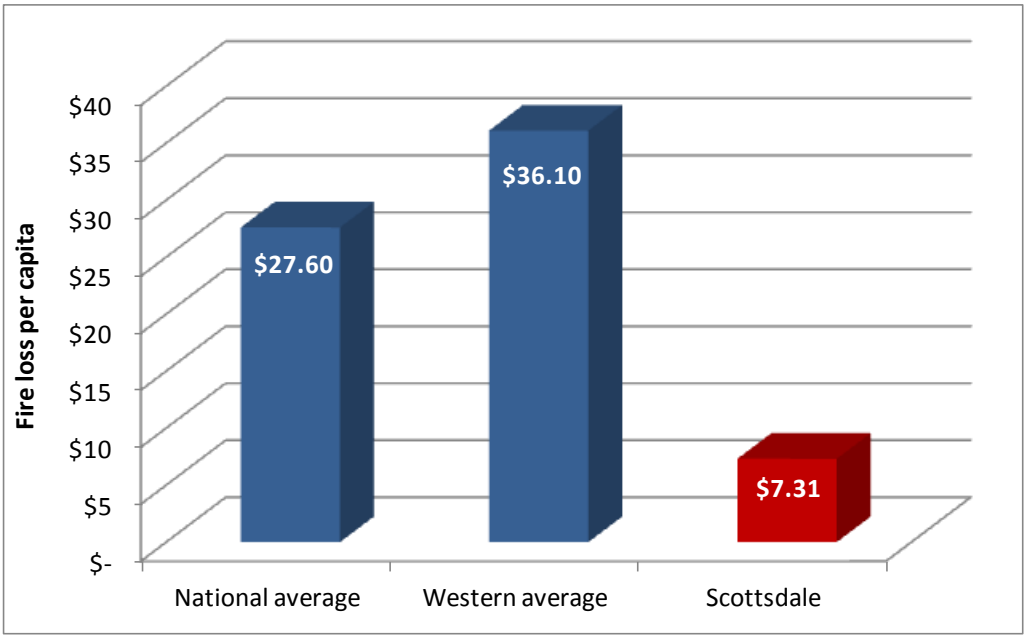


Figure 84: Fire Loss per Capita



APPENDIX B – FIRE AND LIFE SAFETY RISK BY ZONING DESIGNATION

The following table lists zoning designations used by the City of Scottsdale. A fire and life safety risk level has been assigned to each based on allowable uses within each zone.

Zone Designation	Description	Risk
C-1	Neighborhood Commercial	Moderate
C-2	Central Business	High
C-3	Highway Commercial	Moderate
C-4	General Commercial	Moderate
C-O	Commercial Office	Moderate
C.O.S.	Conservation Open Space	Low
C-S	Regional Shopping Center	High
D	Downtown	High
DO	Downtown Overlay	High
ESL	Environmentally Sensitive Lands	Low
F-O	Foothills Overlay	Moderate
H-P	Historic Property	Moderate
I-1	Industrial Park	High
I-G	Light Employment	Moderate
M-H	Manufactured Home	Moderate
OS	Open Space	Low
P.Co.C.	Planned Convenience Center	Moderate
P-1	Parking P-1; Passenger Vehicle Parking, Limited	Moderate
P-2	Parking P-2; Passenger Vehicle Parking	Moderate
P-3	Parking P-3	Moderate
P-4	Parking P-4	Moderate
PBD	Planned Block Development Overlay	Moderate
P-C	Planned Community	Moderate
PCC	Planned Community Center	Moderate
PCP	Planned Commerce Park	Moderate
PNC	Planned Neighborhood Center	Moderate
PRC	Planned Regional Center	High
PUD	Planned Unit Development	Moderate
R1-10	Single-family Residential—10,000 square feet per lot	Moderate
R1-130	Single-family Residential—130,000 square feet per lot	Moderate
R1-18	Single-family Residential—18,000 square feet per lot	Moderate
R1-190	Single-family Residential—190,000 square feet per lot	Moderate
R1-35	Single-family Residential—35,000 square feet per lot	Moderate
R1-43	Single-family Residential—43,000 square feet per lot	Moderate
R1-5	Single-family Residential—4,700 square feet per lot	Moderate
R1-7	Single-family Residential—7,000 square feet per lot	Moderate
R1-70	Single-family Residential—70,000 square feet per lot	Moderate
R-2	Two-family Residential	Moderate
R-3	Medium Density Residential	Moderate
R-4	Townhouse Residential	Moderate
R-4R	Resort/Townhouse Residential	Moderate
R-5	Multiple-family Residential	Moderate
SC	Special Campus	Moderate

Zone Designation	Description	Risk
S-R	Service-Residential	Moderate
SS	Support Services	Moderate
W-P	Western Theme Park	High

APPENDIX C – FACILITIES ASSESSMENT

The following is the Executive Summary from the "City of Scottsdale Fire Department Fire Station Assessments – January 5, 2015" report. Additional details regarding each station can be found in the full report.

CITY OF SCOTTSDALE
FIRE STATIONS ASSESSMENT
EXECUTIVE SUMMARY

In October 2014, LEA Architects was commissioned by ESCI to perform Existing Fire Station Assessments for the City of Scottsdale Fire Department. The information included in the assessments in conjunction with ESCI findings will be utilized in subsequent evaluations and decisions by the City of Scottsdale Fire Department.

The City of Scottsdale is presently served by fifteen (15) fire stations of which thirteen (13) are permanent facilities and two (2) are temporary (Fire Station No. 13 and No. 16). The City of Scottsdale Fire Department presently serves the City of Scottsdale with a population of 225,000 and an area of 184.5 square miles, stretching 31 miles from north to south. In addition, the City of Scottsdale is part of the mutual aid system with neighboring municipalities.

LEA Architects LLC obtained any available plans and reports from the City of Scottsdale and visited each of the Fire Stations in order to perform assessments of each. The following fire stations were evaluated and a subsequent assessment was prepared for each fire station:

- Scottsdale Eldorado Park Fire Station No. 1
- Scottsdale Downtown Fire Station No. 2
- Scottsdale Fire Station No. 3
- Scottsdale Fire Station No. 4
- Scottsdale Fire Station No. 5
- Scottsdale Fire Station No. 6
- Scottsdale Rio Montana Fire Station No. 7
- Scottsdale Cactus Acres Fire Station No. 8
- Scottsdale Airport Fire Station No. 9
- Scottsdale McDowell Fire Station No. 10
- Scottsdale DC Ranch Fire Station No. 11
- Scottsdale Desert Foothills Fire Station No. 13 (Temporary Facility)
- Scottsdale Troon North Park Fire Station No. 14
- Scottsdale Lone Mountain Fire Station No. 15
- Scottsdale Desert Mountain Fire Station No. 16 (Temporary Facility)

The following is a brief summary of each of the fire stations based on the complete assessment report generated for each station. Issues identified are based on observations made during the field assessments, review of available plans provided by the City of Scottsdale, and LEA Architect's experience in the design of fire stations and public safety facilities.

Scottsdale Eldorado Park Fire Station No. 1:
1901 N. Miller Rd.
Constructed in 2010, Scottsdale Fire Station No. 1 along with Fire Station No. 8 are the newest fire stations built in the City of Scottsdale. Fire Station No. 1 achieved a USGBC LEED Platinum rating. The design/layout of the fire station is functional with 3 apparatus bays, single person dormitories and restrooms along with offices and community/training room. The primary issues that were highlighted in the assessment dealt with the mechanical systems and functional controls, excess humidity in the Physical Fitness Room, evaporative cooler control issues including sporadic non functional interlock with the exhaust fans, and difficulty with accessibility to clean/service the cooler pads. The facilities staff also noted that the solar hot water system and gray water system were no longer functioning. Interior Finishes are in good condition, although there is some peeling paint on the apparatus walls and a concern with the gyp. bd material in the Turn-out Room due to the abuse that this room takes. City of Scottsdale facilities staff commented that they had to coat the restroom/shower floors with a slip resistant finish as the ground concrete floor was too slick when wet.

The overall assessment of the facility is positive and should serve the City of Scottsdale and Fire Department for the next 30+ years.

Scottsdale Downtown Fire Station No. 2:
7522 E. Indian School
Constructed in 2008, Scottsdale Fire Station No. 2 serves the Downtown Scottsdale area and is the third newest fire station built in the City of Scottsdale. Scottsdale Fire Station No. 2 achieved a USGBC LEED Platinum rating. The design/layout of the two story fire station is functional on a compressed downtown site with 3 apparatus bays, single person dormitories and restrooms along with offices and a community/training room that is presently utilized as a computer training lab for the City of Scottsdale. Issues that were highlighted in the assessment primarily dealt with the original mechanical units which have been replaced with conventional split systems which have been reported to have rectified most issues. It was reported by City of Scottsdale facilities staff however that the new units have some control issues and that the City of Scottsdale EMS (energy management system) is not currently integrated with the new mechanical units. It was also noted by City of Scottsdale facilities staff that the solar hot water system is no longer functioning. Interior and exterior finishes are in good condition, however it was observed that a portion of the tile base near the showers at the (2) ADA compliant restrooms was needing to be replaced do to water damage from the shower. It was observed that the north side I-beam gutter was missing a required closure plate and that a few of the stone veneer tiles at the tower element abutting the gutter were in need of replacement. LEA Architects provided COS facilities staff with original construction details showing the proper installation required for the gutter closure plate and stone veneer interface.

The overall assessment of the facility is positive and will serve the City of Scottsdale and Fire Department for the next 30+ years

Scottsdale Fire Station No. 3:
7339 E. McDonald Dr.

Scottsdale Fire Station No. 3 was constructed in 1971 and is the oldest fire station still in operation within the city. The facility has undergone numerous renovations including a dormitory addition, lengthening of the apparatus bays, addition of a fire sprinkler system and various interior finish revisions. The facility is not very functional and does not meet the current standards established by the City of Scottsdale Fire Dept. as is evident in their current fire station designs. The facility does not meet current ADA standards, is not on emergency power and has severe site drainage issues and structurally failing drives and apparatus bay concrete. Interior finishes are all very dated and the facility still contains hazardous materials that have not been remediated.

The overall assessment of the facility is very poor and would indicate that the facility has reached the limits of its functional life. Its replacement/relocation should be considered in the near future.

Scottsdale Fire Station No. 4:
9045 E. Via Linda

Scottsdale Fire Station No. 4 was constructed in 1988 as part of the Scottsdale Police Facility so vehicular access to the facility is through the police vehicular gate. The facility has undergone renovations including a dormitory remodel to create single person dorms and the addition of an ADA/women's restroom which removed the primary entrance for the public, however, there is no public parking for the fire station so visitors are required to park in an adjacent parking lot not owned by the City of Scottsdale and utilize and intercom system at the exterior gate which requires fire personnel to go outside. The facility is not very functional and does not meet the current standards established by the City of Scottsdale Fire Dept. as is evident in their current fire station designs. The facility does not meet current ADA standards and does not have evaporative cooling in the single apparatus bay. Emergency power is available and is fed from the emergency generator at the police facility. Interior rooms are not of adequate size and finishes are all dated. The storage mezzanine located above the living areas is accessed by a spiral staircase so ability to access with storage materials is limited.

Due to the limited size of the facility (2,770 sf) and single apparatus bay, the overall assessment of the facility is poor and replacement/relocation should be considered in the near future.

Scottsdale Fire Station No. 5:
7455 E. Shea Blvd

Scottsdale Fire Station No. 5 was constructed in the 1990's although the exact construction date could not be verified. The fire station floor plan is similar to several other fire stations constructed in Scottsdale between 1990 and 2002. Due to the heavy vehicle volume on Shea Blvd. ingress/egress can be difficult at certain times of the day although emergency apparatus egress was not mentioned as a concern. The facility has undergone minor renovation to include enclosing a Captain Dorm and the addition of a fairly large emergency generator that was relocated from another facility. The facility is functional but does not meet the current standards established by the City of Scottsdale Fire Dept. as is evident in their current fire station designs. Portions of facility meet previous ADA standards but the entire facility is not ADA accessible. Issues of the facility include the lack of private dormitories which

compromises the ability for male/female fire personnel; however male/female restrooms are available. Locating the physical fitness equipment, turn-out, laundry and ice storage bin in the apparatus bays does not meet current NFPA 1500 recommendations. Interior finishes are somewhat dated in appearance but in generally good condition. Mechanical systems, (2) 5-ton split systems were functional requiring general maintenance, but the evaporator cooler relief system was not adequate allowing humidified air to enter the living side of the facility through the man-doors.

The overall assessment of the facility is fair and replacement/relocation due to facility condition is not presently warranted provided the facility is maintained.

Scottsdale Fire Station No. 6:
10850 E. Via Linda

Scottsdale Fire Station No. 6 was constructed in the 1985 and is one of the older fire stations constructed in Scottsdale. The facility has undergone several interior renovations including a kitchen/dining remodel, the removal of entry/offices for a Physical Fitness area and the addition of an exterior building which is utilized for Scottsdale Fire Dept. storage. The facility is 8,800 sf. and has three (3) apparatus bays. Although square footage is adequate, the split-level design with no elevator does not allow ADA access. The dormitory areas are all open and located in the basement level with very limited access to natural daylight. Also, the open dormitory environment poses potential issues for male/female collocation. Restrooms that are at grade level are partially ADA accessible, but the kitchen, dining and dayroom are all located on an upper level and are not ADA accessible. The facility is functional but does not meet the current standards established by the City of Scottsdale Fire Dept. as is evident in their current fire station designs. The facility does have a very small emergency generator that is very old and in need of replacement. Mechanical systems appear to be functional but there was evidence of a leak in the dormitory ceiling. There are (4) roof mounted evap. coolers but there was no relief louvers so an apparatus door would need to be left partially open to function properly with greater potential for diesel fumes / humidified air being forced into the living areas of the fire station. Turn-out gear was located in the apparatus bays which do not meet current NFPA 1500 recommendations.

The overall assessment of the facility is fair, and may not warrant replacement / relocation, although ADA accessibility and functionality of spaces within the split level design is a concern.

Scottsdale Rio Montana Fire Station No. 7:
11160 N. 132nd St.

Scottsdale Fire Station No. 7 was constructed in the 1995. The fire station floor plan is similar to several other fire stations constructed in Scottsdale between 1990 and 2004. The facility is collocated with a Scottsdale Park and shares a public parking area. The parking area is separated by a fence/gate, but this does not allow for ADA parking to be in close proximity to the fire station entry. The facility has not undergone any significant renovations but the Physical fitness equipment was relocated to the center of the apparatus bays to make room for a small engineer repair workspace, which is located at this facility. The facility is functional but does not meet the current standards established by the City of Scottsdale Fire Department as is evident in their current fire station designs. Portions of facility meet previous ADA

standards but the entire facility is not ADA accessible. Issues of the facility include the lack of private dormitories which compromises the ability for male/female fire personnel; however male/female restrooms are available. Locating the physical fitness equipment, turn-out, laundry and ice storage bin in the apparatus bays does not meet current NFPA 1500 recommendations. Interior finishes are somewhat dated in appearance but in generally good condition. Mechanical systems, (2) 5-ton split systems were functional requiring general maintenance, but the evaporative cooler relief system was not adequate allowing humidified air to enter the fire station living areas through the man-doors.

The overall assessment of the facility is fair and replacement/relocation due to facility condition is not presently warranted.

Scottsdale Cactus Acres Fire Station No. 8:
9598 E. Cactus Rd.

Constructed in 2010, Scottsdale Fire Station No. 8 along with Fire Station No. 1 are the newest fire stations built in the City of Scottsdale. Fire Station No. 8 achieved a USGBC LEED Platinum rating. The design/layout of the fire station is functional with 3 apparatus bays, single person dormitories and restrooms along with offices and community/training room. The issues that were highlighted in the assessment dealt with the mechanical systems and functional control, evaporative cooler control issues, interlock with the exhaust fans and ability to clean/service the cooler pads. The other systems that they are having issues with are the solar hot water system and gray water system, which are no longer functioning. Interior Finishes are in good condition, although there is some peeling paint on the apparatus walls and a concern with the gyp. bd material in the Turn-out Room due to the abuse that this room takes. This facility also serves as the Hazardous Material response facility and has turn-out washing/drying capability. City of Scottsdale staff commented that there was a roof leak in one of the offices, which may be caused by the roof gutter at the base of the sloped concrete roof tile.

The overall assessment of the facility is positive and should serve the City of Scottsdale and Fire Department for the next 30+ years

Scottsdale Airport Fire Station No. 9:
14970 N. 78th Way

Scottsdale Fire Station No. 9 was constructed in the 2003 and is located at Scottsdale Airport adjacent to the aviation control tower. The fire station is a three (3) bay 5,000 sf. facility that serves both the community as well as the airport with ARFF vehicles. The facility has not undergone any significant renovations but the City of Scottsdale staff stated that they had added roof gutters and have replaced waterproofing and flashing on the NE side of the facility to deal with water intrusion issues. A 1,000 gallon above ground fuel system was also added and located on the airport side of the facility. The facility is functional but does not meet the current standards established by the City of Scottsdale Fire Dept. as is evident in their current fire station designs. Portions of facility meet previous ADA standards but the entire facility is not ADA accessible. Dormitory walls extend to approx. 1' below the ceiling allowing for male/female fire personnel. The location of the, turn-out, laundry and ice storage bin in the apparatus bays does not meet current NFPA 1500 recommendations. Interior finishes are somewhat dated in appearance but in generally good condition. Mechanical systems, (2) 5-ton split systems were

functional requiring general maintenance, but the evaporator cooler relief system was not adequate allowing humidified air to enter the facility through the man-doors. Exhaust fans provided for diesel extraction.

The overall assessment of the facility is fair and replacement/relocation due to facility condition is not presently warranted provided the facility is maintained.

Scottsdale McDowell Mountain Fire Station No. 10:
16701 N. 100th St.

Scottsdale Fire Station No. 10 was constructed in the 2002. The fire station floor plan is similar to several other fire stations constructed in Scottsdale between 1990 and 2004. The facility is located on a very small site adjacent to a retail center, with no apparent storm retention located on-site. The mechanical condensing units are located adjacent to the front entry behind a screen wall. The facility has not undergone any significant renovations but there was a Scottsdale Police communications tower building and emergency generator added to the project. The fire station shares this emergency generator with its own transfer switch and separate emergency electrical panel located in the apparatus bays. The facility is functional but does not meet the current standards established by the City of Scottsdale Fire Dept. as is evident in their current fire station designs. There are two (2) safety concerns that include: The man-door from the Dormitory area opens to the exterior and not into the apparatus bays potentially increasing response time. The steps from the living area man-door into the fire station also pose a potential tripping hazard. Portions of the facility meet previous ADA standards but the entire facility is not ADA accessible. The facility has private dormitories which allows for both male/female fire personnel, with male/female restrooms being available. Locating the physical fitness equipment, turn-out, laundry and ice storage bin in the apparatus bays does not meet current NFPA 1500 recommendations. Interior finishes are somewhat dated in appearance but in generally good condition. Mechanical systems, (2) 5-ton split systems were functional but Scottsdale staff stated that they had issues with the air handler coils freezing.

The overall assessment of the facility is fair and replacement/relocation due to facility condition is not presently warranted provided the facility is maintained.

Scottsdale DC Ranch Fire Station No. 11:
20355 N. Pima Rd.

Scottsdale Fire Station No. 11 was constructed in 1998 as part of the Scottsdale Police Facility. Staff and apparatus vehicular access to the facility is through the police vehicular gate at the rear of the facility. The fire station floor plan is similar to several other fire stations constructed in Scottsdale between 1990 and 2002. The facility has not undergone any significant renovations but dormitory walls were raised to create private dormitories, SCBA compressor was added and the exterior rear trellis was removed due to water damage. The fire station shares a large 250KW emergency generator with the police facility so the entire fire station is on emergency power. Both facilities also share an air cooled chiller system with two (2) air handlers located in the fire station living areas and a separate ground mounted evap. cooler that supplies the apparatus bays. The facility is functional but does not meet the current standards established by the City of Scottsdale Fire Dept. as is evident in their current fire station designs. Portions

of facility meet previous ADA standards but the entire facility is not ADA accessible and the approx. 6" steps from the living area man-doors into the fire station causing a potential tripping hazard. The facility has private dormitories which allows for both male/female fire personnel, with male/female restrooms being available. Locating the physical fitness equipment, turn-out, laundry and ice storage bin in the apparatus bays does not meet current NFPA 1500 recommendations. Interior finishes are somewhat dated in appearance but in generally good condition.

The overall assessment of the facility is fair and replacement/relocation due to facility condition is not presently warranted provided the facility is maintained.

Scottsdale Desert Foothills Fire Station No. 13 (Temporary):
26602 N. Pima Rd.

Scottsdale Fire Station No. 13 is a temporary facility co-located with a Scottsdale Well site so public access/visibility is limited. The fire station is a modular trailer housing fire station living areas, a covered canopy for the fire apparatus and (2) con-ex boxes for storage and turn-out gear. The facility is not very functional and does not meet the current standards established by the City of Scottsdale Fire Dept. The facility does not meet current ADA standards. The electrical power to the facility is fed from the well site and the facility does have emergency power. The facility has a single package A/C unit and sewage ejector/force main pumps to the well site sewer system. Interior finishes are all very dated and due to age the facility may contain hazardous materials that have not been remediated.

The overall assessment of the facility is very poor and has reached the limits of its functional life. It is our understanding that the replacement/relocation of the facility has been authorized by City of Scottsdale City Council.

Scottsdale Troon North Park Fire Station No. 14:
27777 N. Alma School Rd.

Scottsdale Fire Station No. 14 was constructed in 2002. The fire station floor plan is similar to several other fire stations constructed in Scottsdale between 1990 and 2004; however the constructed fire station does not match the original construction documents in that one dormitory was converted to storage and janitor room was located off of the apparatus bays. The facility has not undergone any significant renovations but there was a Scottsdale IT Communications Tower, building and emergency generator added to the project. The fire station does not share this emergency generator so there is no emergency power at this fire station. The facility is functional but does not meet the current standards established by the City of Scottsdale Fire Dept. as is evident in their current fire station designs. The facility has private dormitories which allows for both male/female fire personnel, with male/female restrooms being available. Locating the physical fitness equipment, turn-out, laundry and ice storage bin in the apparatus bays does not meet current NFPA 1500 recommendations. Interior finishes are somewhat dated in appearance but in generally good condition. Mechanical systems, (2) 5-ton split systems were functional requiring general maintenance, but the evaporator cooler relief system was not adequate allowing humidified air to enter the living areas in the facility through the man-doors.

The overall assessment of the facility is fair and replacement/relocation due to facility condition is not presently warranted provided the facility is maintained.

Scottsdale Lone Mountain Fire Station No. 15:
31802 N. Pima Rd.

Scottsdale Fire Station No. 14 was constructed in 2004 and the last fire station utilizing the similar floor plan similar to several other fire stations constructed in Scottsdale between 1990 and 2004, however the exterior was revised significantly to have a southwest adobe style character, with added foam/framing to provide thick appearing walls. This type of construction has caused significant water intrusion along the parapet tops which Scottsdale staff has continued to repair. The facility has not undergone any significant renovations but dormitory walls were raised to create private dormitories. The facility is functional but does not meet the current standards established by the City of Scottsdale Fire Dept. as is evident in their current fire station designs. The facility has private dormitories which allows for both male/female fire personnel, with male/female restrooms being available. Locating the physical fitness equipment, turn-out, laundry and ice storage bin in the apparatus bays does not meet current NFPA 1500 recommendations. Interior finishes are in generally good condition. Mechanical systems, 2 5-ton split systems were functional requiring general maintenance, but the evaporator cooler relief system was not adequate allowing humidified air to enter the living areas in the facility through the man-doors. The facility does not have emergency power.

The overall assessment of the facility is fair and replacement/relocation due to facility condition is not presently warranted provided the facility is maintained.

Scottsdale Desert Mountain Fire Station No. 16 (Temporary):
9320 E. Cave Creek Rd.

Scottsdale Fire Station No. 16 is a temporary facility co-located with a Scottsdale Well site so public access/visibility is limited. The ingress/egress drive is an approx. ¼" gravel road that passes through wash(es) which could be compromised during sudden weather. There is a manual vehicle gate that would delay response time, but is our understanding that it remains open when fire personnel are in the facility. The fire station is a double wide modular trailer housing fire station living areas, a covered canopy for the fire apparatus and approx. 500 sf. structure, which was the previous fire station, but is now being utilized for physical fitness, restroom and laundry. The modular facility is relatively new and restrooms are ADA accessible and two (2) of the dorms private and the other two are shared. The electrical power to the facility is fed from the well site/existing 500 sf structure with no emergency power. The modular facility has two split system A/C units with no reported issues. Scottsdale staff stated that there was a roof leak above one of the offices and was due to improper seam in the single-ply roof but could not verify if it had been repaired. Additional asphalt was added around the modular fire station to direct storm water to the west into the surrounding desert. Interior finishes are functional and in good condition based on the age of the facility.

Although considered a temporary facility the new modular fire station is in very good condition so replacement/relocation is not critical, although it was stated that the land has been purchased for a new facility in the future.

APPENDIX D – APPARATUS ASSESSMENT

A survey of the Scottsdale Arizona Fire Department apparatus fleet was conducted October 20 through 23, 2014. The survey included an interview with the city Fleet Director, discussions with a fleet mechanic, and with the fire department battalion chief who oversees the fire fleet. Also interviewed were a number of fire department personnel, including engineers and captains. An inspection was done on all but two apparatus. The two were unavailable for inspection. The apparatus inspected included engines, ladders, tankers, ARFF, technical rescue, hazmat, mass casualty, and brush units. Staff vehicles were not included in the survey.

Scottsdale apparatus receive preventative maintenance based on calendar days with each apparatus scheduled four times per year. The fire department conducts daily inspections and notes any apparatus issues. These are submitted via computer to the battalion chief. Anything that requires immediate repair is referred to Fleet at that time. Minor issues are compiled and are repaired during the next scheduled preventative maintenance.

The fleet repair facility operates with two shifts, and is open approximately 16 hours per day, five days a week. There are currently two certified EVT (Emergency Vehicle Technicians) and an additional two mechanics that have completed a portion of the certification process. The certified technicians spend virtually all of their time on fire apparatus however they are also utilized as necessary with repairs to other City of Scottsdale equipment. Non-certified mechanics also work on the fire fleet, generally working on repairs that are not specific to fire apparatus or fire apparatus certification.

The city fleet repair facility appears to be well equipped and is able to handle the majority of fire apparatus repairs. There are a number of local commercial truck repair facilities available to handle warranty issues. Specialized fire apparatus repair centers are also available for repairs that are unable to be completed by the city technicians.

Annual fire pump testing is conducted by the city's certified EVT mechanics at the Scottsdale fleet maintenance facility. A sampling of the pump test records was reviewed. Testing appears to be conducted to NFPA pump test criteria. Apparatus failing pump testing are repaired prior to returning to service. Aerial ladder testing is conducted by a certified contract agent. A sampling of ladder test records was reviewed. Testing and the associated documentation follow NFPA 1911 Standard for Aerial Device Testing. Repairs are completed as necessary before returning the apparatus to service.

Replacement of the fire fleet is based on a point system established by Fleet and utilized for the replacement of all Scottsdale equipment. The point system has different values established based on the type of vehicle. Fire fleet replacement is based primarily on age and mileage. The current age established for replacement of fire engines is 12 years and 130,000 miles. Replacement of ladder trucks is set for 8 years and 110,000 miles. Fleet indicates that during the difficult economic times the replacement of fire apparatus did not occur per schedule. The city is in the third year of a five year "catch-up" plan. Two new engines are on order for delivery in 2014. It is anticipated that two additional engines will be ordered with expected delivery in 2015.

City fleet indicates funding for replacement apparatus in 2015 has been approved as requested.

The relationship between the fire department and City Fleet has improved vastly over the last couple of years. Both Fleet and Fire indicate that communication between the departments has increased through the assignment of a fire battalion chief, joint specification committee, and computerized maintenance records.

Based on the review of Scottsdale Fleet Services and the Scottsdale fire apparatus the following recommendations are offered.

1. Scottsdale Fleet now has two certified Emergency Vehicle Technicians. There are two additional mechanics that have completed a portion of the EVT process. Due to the size and complexity of the Scottsdale fire fleet the mechanics with the partial certification should be encouraged to complete the process. This would allow for there to be a minimum of one EVT certified mechanic to be available during regular fleet maintenance hours.

2. The Scottsdale Fire fleet is currently serviced on a quarterly basis regardless of the number of hours or miles of operation. Consideration should be given to a preventative maintenance schedule based on hours of operation. A preventative maintenance schedule at intervals of 300 hours is generally considered the industry standard. This would likely mean that some apparatus are in for preventative maintenance more than the current four times per year while others may require less frequent service.

3. More than 50 percent of the existing engine and ladder fleet is beyond the currently established replacement criteria. New apparatus scheduled for delivery in 2014 and the anticipated order of apparatus in 2015 will be beneficial. Replacement of a significant number of apparatus over the next three years will be necessary to meet the existing replacement criteria and schedule.

4. It is recommended that the age and mileage criteria currently established be re-evaluated. Some current apparatus meeting the twelve year service life have in excess of 157,000 miles. Much of the fleet has over 9,000 engine hours, which is very high for fire apparatus. While it is possible to operate with a high mileage, high hour fleet it generally comes with extensive repair costs and significant out of service time. Fire companies indicated that mechanical issues, while frequent, did not always cause the unit to be taken immediately out of service.

5. There are two new engines that have been in service for less than nine months. Engine 601 has over 19,000 miles and Engine 603 has over 17,000 miles. Assuming 20,000 miles per year, replacement based on mileage would be necessary in less than seven years, five years less than the current standard. A replacement schedule that considers age, mileage and condition is generally the most effective way to replace apparatus in a programmed manner. This schedule should be evaluated annually and criteria modified as needed to assure apparatus are replaced in a cost effective manner and remain reliable for emergency response. The schedule must be completed more than a year in advance of the anticipated replacement due to the length of time necessary to write specifications, order and take delivery of a new fire apparatus. In

general, this is how Scottsdale is currently replacing their apparatus. However the existing values should be revisited likely resulting in a shorter replacement cycle.

6. American LaFrance Fire Apparatus has recently gone out of business. Industry experts agree that the company is not likely to reopen. Replacement parts and technical assistance are becoming increasingly difficult to obtain. While many of the parts utilized on American LaFrance apparatus are universal to the trucking industry, many of the body components are not. The Scottsdale fleet is more than 50 percent American LaFrance (both engines and ladders). The problem in obtaining parts is becoming evident at this time. An example is a current front line engine with a broken driver's side windshield (out of service criteria). Fleet has been attempting to locate replacement glass for over four (4) months. Replacement of the American LaFrance apparatus may need to be accelerated. It may be a consideration to retain one or more of the older units when replaced to be used as parts units until the remainder of the American LaFrance apparatus has been replaced.

Other Observations

Given Scottsdale's existing fleet, replacing two engines per year would result in replacement of front line engines every eight years. Replacement of a ladder truck or ladder tender each year would equate to an approximate seven (7) year life cycle.

Crews suggest that the repair frequency and the length of out of service time for repairs, specifically on ladder trucks, are excessive. In one case the ladder had been out of service for nearly a year.

Tankers, brush, mass casualty, technical rescue, and hazmat units appear to be in excellent condition with several years of useful life remaining.

Foam 609 (ARFF) is in front line service at the airport station 609. This unit appears to be in good condition and meets the requirements of the Federal Aviation Administration (FAA) for airport service. This unit is however ten years old. The reserve Foam 6092 is nearing thirty years of age with some parts becoming difficult to obtain. A plan should be developed for replacing Foam 6092 with the existing Foam 609 and the purchase of a new front line ARFF unit in the near future.

In general the fire fleet appears to have been well maintained and cared for by both Fleet and the fire department. Scottsdale apparatus has a high usage rate that requires an aggressive replacement schedule be maintained.

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# 0808800

License# G961FP

Brush 607	Ford	F550	2008
Apparatus Type	Make	Model	Year
Unknown	5096	6.0 Diesel	Automatic
Hours	Miles	Motor	Transmission
Darley	250 GPM	Single	300 gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
No	No		10 gallon
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	Emergency lighting meets the current NFPA standard.
NFPA Striping	Reflective striping meets the current NFPA standard.
Ground Ladders	N/A
Loose Equipment	The loose equipment appears to be in good condition.
Mechanical	No mechanical issues were noted during the survey.
Interior Condition	The interior appears to be in good condition.
Exterior Condition	The exterior appears to be in good condition.

Comments:

Brush 607 is a type 3 brush unit. The apparatus appears to be in good condition.

Fire Fleet Survey
Scottsdale Arizona

Date 10-22-14

Shop# Unknown

License# G917CS

Brush 615	Ford	F550	2003
Apparatus Type	Make	Model	Year
Unknown	27649	Diesel	Automatic
Hours	Miles	Motor	Transmission
Waterous	250 GPM	Single	250-300 gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
No	No		10 gallon
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	Emergency lighting does not meet the current NFPA standard.
NFPA Striping	Reflective striping does not meet the current NFPA standard.
Ground Ladders	N/A
Loose Equipment	The loose equipment appears to be in good condition and is properly secured.
Mechanical	The apparatus appears to be in good mechanical condition.
Interior Condition	The interior is in good condition.
Exterior Condition	The exterior is in good condition.

Comments:

Brush 615 is a type 3 apparatus. The unit is in very good condition and with low miles.

Fire Fleet Survey
Scottsdale Arizona

Date 10-22-14

Shop# 0803890

License# G916CS

Brush 616	Ford	F550	2003
Apparatus Type	Make	Model	Year
Unknown	24463	Diesel	Automatic
Hours	Miles	Motor	Transmission
Waterous	250 GPM	Single	300 gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
No	No		12 gallon
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	Emergency lighting does not meet the current NFPA standard.
NFPA Striping	Reflective striping does not meet the current NFPA standard.
Ground Ladders	N/A
Loose Equipment	The loose equipment appears to be in good condition and is properly secured.
Mechanical	The apparatus appears to be in good mechanical condition.
Interior Condition	The interior is in good condition.
Exterior Condition	The exterior is in good condition.

Comments:

Brush 616 is a type 3. The apparatus appears to be in good condition.

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# 13192

License# G790GM

Engine 601	Pierce	Impel	2013
Apparatus Type	Make	Model	Year
2041	19436	Detroit	Allison Automatic
Hours	Miles	Motor	Transmission
Waterous	1500	Single	720 Gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	Yes		40 Gallon
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	Emergency lighting meets the current NFPA standards.
NFPA Striping	Reflective striping meets the current NFPA standards.
Ground Ladders	24’ extension ladder, 12’ roof ladder and 10’ attic ladder.
Loose Equipment	All loose equipment is in good condition, well maintained and properly secured in body compartments.
Mechanical	No mechanical defects were noted.
Interior Condition	Excellent
Exterior Condition	Excellent

Comments:

Engine 601 is one of the newer Scottsdale apparatus with a compressed air foam system. This unit while having been in service for less than 12 months (crew indicates approximately 9 months) has a significant amount of miles at nearly 20,000.

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# 0806896

License# G782DS

Engine 602	American LaFrance	Eagle	2006
Apparatus Type	Make	Model	Year
9494	90604	Detroit	Allison Automatic
Hours	Miles	Motor	Transmission
Hale	1500 GPM	Single	750 Gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	No		30 Gallon
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	The emergency lighting meets the current NFPA standards.
NFPA Striping	The reflective striping does not meet the current NFPA standard. The apparatus did meet the standard in place at the time of construction.
Ground Ladders	24’ extension ladder, 12’ roof ladder and 10’ attic ladder.
Loose Equipment	The loose equipment appears to be in good working condition and mounted properly in apparatus compartments.
Mechanical	There were no mechanical issues noted during the inspection.
Interior Condition	The interior appears to be in fair condition.
Exterior Condition	The exterior appears to be in fair to poor condition with several paint and minor body issues.

Comments:

The fire department rates this apparatus in fair condition. Crews indicated that it was considered a “work truck” by them.

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# 13194

License# G791GM

Engine 603	Pierce	Impel	2013
Apparatus Type	Make	Model	Year
1582	17200	Cummins	Allison Automatic
Hours	Miles	Motor	Transmission
Waterous	1500 GPM	Single	720
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	Yes		40
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	The emergency lighting meets the current NFPA standards.
NFPA Striping	The reflective striping meets the current NFPA standards.
Ground Ladders	24’ extension ladder, 12’ roof ladder and 10’ attic ladder.
Loose Equipment	All loose equipment appears to be in excellent condition and properly mounted in the apparatus compartments.
Mechanical	There were no mechanical defects noted during the inspection.
Interior Condition	The interior appears to be in excellent condition.
Exterior Condition	The exterior appears to be in excellent condition.

Comments:

This apparatus has a compressed air foam system. The unit has been in-service for less than 12 months and currently has over 17,000 miles.

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# 13194

License# G792GM

Engine 604	Pierce	Impel	2013
Apparatus Type	Make	Model	Year
1414	13030	Cummins	Allison Automatic
Hours	Miles	Motor	Transmission
Waterous	1500 GPM	Single	750 gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	Yes		30 gallon
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	Emergency lighting meets the current NFPA standard.
NFPA Striping	Reflective striping meets the current NFPA standard.
Ground Ladders	24’ extension ladder, 12’ roof ladder, 10’ attic ladder.
Loose Equipment	The loose equipment appears to be in good condition and is properly secured.
Mechanical	There were no mechanical issues noted at the time of the survey.
Interior Condition	The interior appears to be in good condition.
Exterior Condition	The exterior appears to be in good condition.

Comments:

Crews report that with the minor exception of a motor oil leak the apparatus has been very serviceable. The apparatus has been in-service for less than a year and is showing 13,000 miles at this time.

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# 0804888

License# G482CB

Engine 605	American LaFrance	Eagle	2003
Apparatus Type	Make	Model	Year
12089	128989	Detroit	Allison Automatic
Hours	Miles	Motor	Transmission
Hale	1500 GPM	Single	750
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes-telescoping	No		30
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	The emergency lighting does not meet the current NFPA standard however did meet the standard at the time of construction.
NFPA Striping	The reflective striping does not meet the NPFA standard.
Ground Ladders	24'extension ladder, 12' roof ladder and 10' attic ladder are carried on this apparatus.
Loose Equipment	All loose equipment appears to be in good condition and is properly secured.
Mechanical	The apparatus appears to be in fair mechanical condition.
Interior Condition	The interior appears to be in fair condition with some tearing of the upholstery etc.
Exterior Condition	The exterior is in fair condition with some minor paint and body issues.

Comments:

The unit has a significant amount of engine hours (12,000+) and approximately 130,000 miles. This unit meets the current replacement criteria in one or more areas.

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# 0804894

License# G926CS

Engine 607	American LaFrance	Eagle	2003
Apparatus Type	Make	Model	Year
10604	133870	Detroit	Allison Automatic
Hours	Miles	Motor	Transmission
Hale	1500 GPM	Single	720
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes-telescoping	No		30
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	The emergency lighting met the NFPA standard at the time of construction.
NFPA Striping	The reflective striping does not meet the current NFPA standard.
Ground Ladders	24’ extension, 12’ roof and 10’ attic ladder.
Loose Equipment	The loose equipment appears to be in good condition and properly secured.
Mechanical	There were no significant mechanical issues noted during the inspection.
Interior Condition	The interior appears to be in fair condition.
Exterior Condition	The exterior appears to be in fair to poor condition with numerous paint and minor body issues.

Comments:

This engine meets all of the currently established replacement criteria.

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# 0804893

License# G924CS

Engine 608	American LaFrance	Eagle	2004
Apparatus Type	Make	Model	Year
11467	137635	Detroit	Allison Automatic
Hours	Miles	Motor	Transmission
Hale	1500 GPM	Single	750 gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	No		30 gallon
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	Emergency lighting met the NFPA requirements at the time of construction.
NFPA Striping	The reflective striping does not meet the current NFPA standard.
Ground Ladders	24’ extension ladder, 12’ roof ladder and 10’ attic ladder.
Loose Equipment	The loose equipment appears to be in good condition and is properly mounted.
Mechanical	There were no major mechanical issues noted during the inspection.
Interior Condition	The interior appears to be in fair condition.
Exterior Condition	The exterior appears to be in fair condition with some paint and minor body issues noted.

Comments:

The apparatus has over 11,000 engine hours and is beyond the existing replacement criteria based on mileage.

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# 0804886

License# G403DL

Engine 609	American LaFrance	Eagle	2003
Apparatus Type	Make	Model	Year
12152	152187	Detroit	Allison Automatic
Hours	Miles	Motor	Transmission
Hale	1500 GPM	Single	720 gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	No		30 gallon
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	The emergency lighting met the NFPA requirements at the time of construction.
NFPA Striping	The apparatus does not meet the current NFPA standard for reflective striping.
Ground Ladders	24’ extension ladder, 12’ roof ladder and 10’ attic ladder.
Loose Equipment	The loose equipment appears to be in good condition and is properly secured.
Mechanical	There were no significant mechanical issues noted during the inspection.
Interior Condition	The interior appears to be in fair condition.
Exterior Condition	The exterior appears to be in fair condition with some paint and minor body issues.

Comments:

The engine is beyond the existing replacement criteria in both age and mileage. The apparatus indicates high engine hours with over 12,000.

Fire Fleet Survey
Scottsdale Arizona

Date 10-22-14

Shop# 0810948

License# G953FP

Engine 610	Pierce	Velocity	2010
Apparatus Type	Make	Model	Year
4309	60189	Detroit	Allison Automatic
Hours	Miles	Motor	Transmission
Waterous	1500 GPM	Single	750 gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	Yes		30 gallon
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	The emergency lighting meets the current NFPA standard.
NFPA Striping	The reflective striping meets the current NFPA standard.
Ground Ladders	24’ extension ladder, 12’ roof ladder and 10’ attic ladder.
Loose Equipment	The loose equipment appears to be in excellent condition and is properly secured.
Mechanical	Both front axle hubs appear to be leaking oil. The unit has suffered from transmission/engine issues. Crew reports that at times they have not been able to engage the pump.
Interior Condition	The interior appears to be in good condition.
Exterior Condition	The exterior appears to be in excellent condition.

Comments:

This apparatus is approximately 4 years old with 60,000 miles. There are some mechanical issues with the engine/transmission and pump. Crews are concerned with the reliability of this part of the apparatus. The issues have been documented and reported for some time.

Fire Fleet Survey
Scottsdale Arizona

Date 10-22-14

Shop# 0808934

License# G363FB

Engine 613	Pierce	Velocity	2008
Apparatus Type	Make	Model	Year
7873	73012	Detroit	Allison Automatic
Hours	Miles	Motor	Transmission
Waterous	1500 GPM	Single	500 gallons
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	Yes		30 gallons
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	This apparatus meets the NFPA standard for emergency lighting.
NFPA Striping	Reflective striping meets the current NFPA standard.
Ground Ladders	24’ extension ladder, 12’ roof ladder and 10’ attic ladder.
Loose Equipment	The loose equipment appears to be in good condition and is properly secured.
Mechanical	There were no mechanical issues noted during the inspection.
Interior Condition	The interior appears to be in good condition.
Exterior Condition	The exterior appears to be in good condition with only minor paint issues noted.

Comments:

The apparatus is approximately 6 years old with 73,000 miles.

Fire Fleet Survey
Scottsdale Arizona

Date 10-22-14

Shop# 0806897

License# G783DS

Engine 614	American LaFrance	Eagle	2005
Apparatus Type	Make	Model	Year
9477	110747	Detroit	Allison Automatic
Hours	Miles	Motor	Transmission
Hale	1500 GPM	Single	750 gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	No		30 gallon
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	Emergency lighting does not meet the current NFPA standard however it was in compliance at the time of construction.
NFPA Striping	Reflective striping does not meet the current NFPA standard.
Ground Ladders	24’ extension ladder, 12’ roof ladder and 10’ attic ladder are carried on this apparatus.
Loose Equipment	The loose equipment appears to be in good condition and is properly secured.
Mechanical	There were no mechanical issues noted during the apparatus inspection.
Interior Condition	The interior appears to be in good condition.
Exterior Condition	The exterior appears to be in good condition.

Comments:

Crews indicate that Engine 614 is the best of Scottsdale’s American LaFrance engines. The unit has over 9,000 engine hours at 9 years of age, showing 110,000 miles.

Fire Fleet Survey
Scottsdale Arizona

Date 10-22-14

Shop# 0804887

License# G462CM

Engine 616	American LaFrance	Eagle	2003
Apparatus Type	Make	Model	Year
10022	118153	Detroit	Allison Automatic
Hours	Miles	Motor	Transmission
Hale	1500 GPM	Single	750 gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	No		30 gallon
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	The emergency lighting does not meet current NFPA standards but did meet the requirements at the time of construction.
NFPA Striping	Reflective striping does not meet the current NFPA standard.
Ground Ladders	24’ extension ladder, 12’ roof ladder and 10’ attic ladder.
Loose Equipment	The loose equipment appears to be in good condition and is properly secured.
Mechanical	There were no major mechanical issues at the time of inspection.
Interior Condition	The interior of the apparatus is in fair condition.
Exterior Condition	The exterior is in fair condition with numerous paint and minor body issues.

Comments:

The crews indicate that this apparatus has a high rate of mechanical failure. The unit was out of service for 3 weeks at a scheduled preventative maintenance. The engine has a high number of hours (over 10,000).

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# 0802883

License# G182CK

Engine (reserve)	American LaFrance	Eagle	2001
Apparatus Type	Make	Model	Year
8471	156650	Detroit	Allison Automatic
Hours	Miles	Motor	Transmission
Hale	1500 GPM	Single	720 gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	No		30 gallon
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	The emergency lighting does not meet the current NPFA standard however did at the time of construction.
NFPA Striping	Reflective striping does not meet the current NFPA standard.
Ground Ladders	24’ extension ladder, 12’ roof ladder and 10’ attic ladder.
Loose Equipment	The loose equipment appeared to be in good condition and was properly secured.
Mechanical	There were no major mechanical issues noted during the survey.
Interior Condition	The interior appeared to be in poor condition with numerous tears in the upholstery.
Exterior Condition	The exterior is in fair condition with several paint and minor body issues.

Comments:

The apparatus is beyond the current replacement criteria in both age and miles. This apparatus has the highest mileage noted in the fleet.

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# 0809935

License# G371FB

Engine (reserve)	Kenworth/Pierce	Contender	2009
Apparatus Type	Make	Model	Year
4283	58896	Cummins	Allison Automatic
Hours	Miles	Motor	Transmission
Waterous	1500 GPM	Single	750 gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	No		30 gallon
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	Emergency lighting meets the current NFPA standard.
NFPA Striping	Reflective striping meets the current NFPA standard.
Ground Ladders	24’ extension ladder, 12’ roof ladder, 10’ attic ladder.
Loose Equipment	Loose equipment appears to be in good condition and is properly secured. Compartment space is crowded.
Mechanical	There were no mechanical issues noted at the time of the survey.
Interior Condition	The interior appeared to be crowded with equipment but in good condition.
Exterior Condition	The exterior appeared to be in good condition.

Comments:

As with the other Contender apparatus the firefighters had concern with the unit being unpowered, having a poor turning radius, and difficulties in safely exiting the cab. The upgrade to the air conditioning was a major improvement.

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# 089936

License# G372FB

Engine (reserve)	Kenworth/Pierce	Contender	2008
Apparatus Type	Make	Model	Year
3813	51519	Cummins	Allison Automatic
Hours	Miles	Motor	Transmission
Waterous	1500 GPM	Single	750 gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	No		30 gallon
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	Emergency lighting meets the current NFPA standard.
NFPA Striping	The reflective striping meets the current NFPA standard.
Ground Ladders	24’ extension ladder, 12 roof ladder, 10’ attic ladder.
Loose Equipment	The loose equipment appears to be in good condition and is secured properly.
Mechanical	The apparatus appears to be in good mechanical condition.
Interior Condition	The interior appears to be in good condition.
Exterior Condition	The exterior of the apparatus is in fair condition with some body issues particularly with the roll-up doors.

Comments:

This apparatus is in reserve status however it is placed in front-line service often due to preventative maintenance and repair of front line apparatus. Firefighters indicate that the Contender apparatus have a cramped cab area and are difficult to dismount. Numerous injuries have occurred when firefighters exit the apparatus due to poor step area and inconsistent step spacing. Firefighters felt the apparatus was difficult to maneuver due to a poor turning radius. Recent modification to the air conditioning systems have been a welcomed improvement. Firefighters indicate that the apparatus feels underpowered however there were no issues with pumping capability.

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# unknown

License# G180CK

Engine 6040	American LaFrance	Eagle	2002
Apparatus Type	Make	Model	Year
900.8 (not accurate)	141,000	Detroit	Allison Automatic
Hours	Miles	Motor	Transmission
Hale	1500 GPM	Single	750 gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	No		30 gallon
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	The emergency lighting does not meet the current NFPA standard however did at the time of construction.
NFPA Striping	The reflective striping does not meet the current NFPA standard.
Ground Ladders	24’ extension ladder, 12’ roof ladder and 10’ attic ladder.
Loose Equipment	Loose equipment appears to be in serviceable condition and is properly mounted.
Mechanical	Apparatus appears to be in fair mechanical condition with no major issues noted during the survey.
Interior Condition	The interior is in fair condition.
Exterior Condition	The exterior is in poor condition with numerous paint and minor body issues.

Comments:

This apparatus is beyond the currently established replacement criteria in both age and mileage. The engine hour meter appears to have been replaced. Accurate engine hours can be established through maintenance records.

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# 0804895

License# N/A

Foam 609 (ARFF)	Oshkosh	Striker 1500	2004
Apparatus Type	Make	Model	Year
1923	7860	Caterpillar	Allison Automatic
Hours	Miles	Motor	Transmission
Waterous	1500 GPM	Single	1500 gallons
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	Hydraulic		210 gallons
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	The apparatus meets all FAA emergency lighting requirements.
NFPA Striping	The apparatus meets all FAA reflective striping requirements.
Ground Ladders	24’ extension ladder.
Loose Equipment	The loose equipment appears to be in good condition and is properly mounted.
Mechanical	The apparatus appears to be in good mechanical condition.
Interior Condition	The interior is in good condition.
Exterior Condition	The exterior is in good condition.

Comments:

This apparatus meets all of the current FAA requirements for an airport of this size.

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# 0885870

License# N/A

Foam 6092 (ARFF)	Emergency One	Titan	1985
Apparatus Type	Make	Model	Year
Unavailable	758 on rebuilt odometer	Catepillar	Allison Automatic
Hours	Miles	Motor	Transmission
Hale	1500 GPM	Single	1500 gallons
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	No		210 gallon
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	The apparatus meets the FAA requirements.
NFPA Striping	Reflective striping meets the FAA requirements.
Ground Ladders	24’ extension.
Loose Equipment	Loose equipment appears to be in good condition and properly mounted.
Mechanical	The apparatus appears to be in good mechanical condition.
Interior Condition	The interior is in fair condition.
Exterior Condition	The exterior is in good condition.

Comments:

This apparatus meets the FAA crash rescue vehicle requirements for an airport of this size. This unit, while in reserve status, is nearing 30 years of age.

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# G960FP

License# 0810947

Hazmat 608	Pierce	Impel	2010
Apparatus Type	Make	Model	Year
923	15548	Cummins	Allison Automatic
Hours	Miles	Motor	Transmission
N/A	N/A	N/A	N/A
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	Hydraulic		N/A
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	The emergency lighting meets the current NFPA requirements.
NFPA Striping	The reflective striping meets the current NFPA standards.
Ground Ladders	N/A
Loose Equipment	All loose equipment appears to be in excellent condition and is properly secured.
Mechanical	The apparatus appears to be in excellent mechanical condition.
Interior Condition	The interior is in good condition.
Exterior Condition	The exterior is in good condition.

Comments:

Hazmat 608 was purchased with funding from Homeland Security. The apparatus is in good condition and is well equipped.

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# 0808998

License# G364FB

Ladder 602	Pierce	Velocity	2008
Apparatus Type	Make	Model	Year
Unable to obtain	Unable to obtain	Unable to determine	Allison Automatic
Hours	Miles	Motor	Transmission
Unable to obtain	Unable to obtain	Single	Unable to confirm
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	Yes		Unable to determine
Scene Lighting	Generator		Foam Tank Size
Click here to enter text.	Click here to enter text.	Click here to enter text.	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	See comments
NFPA Striping	See comments
Ground Ladders	See comments
Loose Equipment	See comments
Mechanical	See comments
Interior Condition	See comments
Exterior Condition	See comments

Comments:

This apparatus was out of service at the time of the survey and located at an outsider vendor repair facility. Crews reported that the apparatus had been out of service for several weeks and were unsure of the repair status or the estimated return date of the apparatus. Hughes Fire Equipment indicated the apparatus was in their shop for issues not related to Pierce apparatus. There was no estimate provided regarding the return date of the apparatus.

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# 0804862

License# G360DP

Ladder 606	American LaFrance	Eagle	2004
Apparatus Type	Make	Model	Year
7070	67775	Detroit	Allison Automatic
Hours	Miles	Motor	Transmission
Hale	2000 GPM	Single	300 gallons
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	Yes		30 gallon
Scene Lighting	Generator		Foam Tank Size
Rear mount bucket	LTI	105	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	Emergency lighting does not meet the current NFPA standard but did at the time of apparatus construction.
NFPA Striping	The reflective striping does not meet the current NFPA standard.
Ground Ladders	The apparatus carries a full complement of ground ladders meeting NFPA requirements.
Loose Equipment	The loose equipment appears to be in good condition and is properly mounted.
Mechanical	The apparatus appears to have a slight sag issue to the rear of the apparatus.
Interior Condition	The interior appears to be in fair condition.
Exterior Condition	The exterior appears to be in good condition with only minor paint and body issues noted.

Comments:

The crew indicates that this apparatus has had continual maintenance issues causing long and frequent out of service periods. Suspension air bags are a frequent issue.

Fire Fleet Survey
Scottsdale Arizona

Date 10-22-14

Shop# 0806927

License# G775DS

Ladder 615	American LaFrance	Eagle	2006
Apparatus Type	Make	Model	Year
4997	95525	Detroit	Allison Automatic
Hours	Miles	Motor	Transmission
Hale	1500 GPM	Single	300 gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	Yes		30 gallon
Scene Lighting	Generator		Foam Tank Size
Rearmount	LTI	75' (914 ladder hours)	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	Emergency lighting does not meet the current NFPA standard however did at the time of construction.
NFPA Striping	Reflective striping does not meet the current NFPA standard.
Ground Ladders	Apparatus carries the NFPA specified ground ladders.
Loose Equipment	The loose equipment appears to be in good condition and is properly secured. Compartment space is minimal.
Mechanical	See comments.
Interior Condition	The interior of the apparatus is in fair condition.
Exterior Condition	The exterior of the apparatus is in good condition with only minor paint issues noted.

Comments:

A new engine was installed in this apparatus at the expense of an outside service facility that ran the motor without engine oil. After return of the apparatus the crew reports excessive engine heat in the cab (dog house area). The temperature is significant and will cause skin burns if touched. Communications between the ladder tip and the console is not working. The engineer reports that at times the dash gauges do not function. The apparatus has a broken driver's side windshield. Fleet has been unable to obtain a replacement glass in over 4 months.

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# 0809937

License# G373FB

Ladder Tender 602	Kenworth/Pierce	Contender	2008
Apparatus Type	Make	Model	Year
4299	56551	Cummins	Allison Automatic
Hours	Miles	Motor	Transmission
Waterous	1500 GPM	Single	750 gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	Yes		30 gallon
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	Emergency lighting meets the current NFPA standard.
NFPA Striping	Reflective striping meets the current NFPA standard.
Ground Ladders	24’ extension ladder, 12 roof ladder, 10’ attic ladder.
Loose Equipment	The loose equipment appears to be in good condition and is properly mounted. The compartment space is very limited for use as a ladder tender.
Mechanical	There were no mechanical issues noted at the time of the survey.
Interior Condition	The interior appears to be in good condition. The cab is cramped due to the apparatus configuration.
Exterior Condition	The exterior of the apparatus appears to be in good condition.

Comments:

As with the other Contender apparatus firefighters indicate the cab is extremely cramped, exiting the apparatus is a safety concern. The apparatus is underpowered and has a poor turning radius. There were no issues raised regarding pumping operations.

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# 0802880

License# G179CK

Ladder Tender 606	American LaFrance	Eagle	2001
Apparatus Type	Make	Model	Year
11076	149685	Detroit	Allison Automatic
Hours	Miles	Motor	Transmission
Hale	1500 GPM	Single	750 gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	No		30 gallon
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	The emergency lighting does not meet the current NFPA standard but did at the time of construction.
NFPA Striping	Reflective striping does not meet the current NFPA standard.
Ground Ladders	24’ extension ladder, 12’ roof ladder and 10’ attic ladder.
Loose Equipment	The loose equipment appears to be in good condition and is secured properly.
Mechanical	The mechanical condition is fair. The apparatus leans to the drivers side likely due to spring collapse.
Interior Condition	The interior is in fair condition.
Exterior Condition	The exterior is in fair condition with minor paint and body issues.

Comments:

This apparatus is beyond the currently established replacement criteria in both age and miles. The engine hours are significant with over 11,000 hour showing.

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# 080882

License# G181CK

Ladder Tender	American LaFrance	Eagle	2002
Apparatus Type	Make	Model	Year
Unable to obtain	Unable to obtain	Detroit	Allison Automatic
Hours	Miles	Motor	Transmission
Hale	1500 GPM	Single	750 gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	No		30 gallon
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	Emergency lighting does not meet the current NFPA standard but did at the time of construction.
NFPA Striping	Reflective striping does not meet the current NFPA standard.
Ground Ladders	24’ extension ladder, 12’ roof ladder, 10’ attic ladder.
Loose Equipment	Unable to observe.
Mechanical	Mechanic indicates the unit is in fair condition.
Interior Condition	Unable to observe.
Exterior Condition	Exterior appears to be in fair condition with minor paint and body issues.

Comments:

The apparatus was in the fleet facility and up on the lift for preventative maintenance and repairs. Radiator “stop leak” was observed being added to the radiator. Mechanic indicated that the unit exceeds the current apparatus replacement criteria.

Fire Fleet Survey
Scottsdale Arizona

Date 10-22-14

Shop# 0802884

License# unknown

Ladder (reserve)	American LaFrance	Eagle	2002
Apparatus Type	Make	Model	Year
10232	143043	Detroit	Allison Automatic
Hours	Miles	Motor	Transmission
Hale	1500 GPM	Single	500 gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	Yes		30 gallon
Scene Lighting	Generator		Foam Tank Size
Rear mount	LTI	75’ (785 aerial hours)	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	Emergency lighting does not meet the current NFPA standard however did meet the standard in place at the time of construction.
NFPA Striping	Reflective striping does not meet the current NFPA standard.
Ground Ladders	24’ extension ladder, 12’ roof ladder and 10’ attic ladder.
Loose Equipment	The loose equipment appears to be in good condition and is properly mounted.
Mechanical	There were numerous mechanical issues noted by the crew at the time of the survey.
Interior Condition	The interior is in poor condition.
Exterior Condition	The exterior is in poor condition with numerous paint and minor body issues.

Comments:

The crew reported that the ladder nozzle control from the tip of the ladder is not working from the tip however is controllable at the turntable. Communication between the ladder tip and the pedestal is not working. The captain indicated that he would not put a crew member on the ladder for operations at this time. Some of the lights were not working properly at the time of the survey. The apparatus is beyond the currently established replacement criteria and is showing significant engine hours at over 10,000. Ladder issues likely meet out of service criteria. Due to a front-line ladder being out of service for repair this unit remains in service with limited capability.

Fire Fleet Survey
Scottsdale Arizona

Date 10-21-14

Shop# 0896878

License# G571BT

MMRS 603	Utilimaster	Van	1996
Apparatus Type	Make	Model	Year
2791	25649	Diesel	Automatic
Hours	Miles	Motor	Transmission
N/A	N/A	N/A	N/A
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	Yes		N/A
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	Emergency lighting does not meet the current NFPA standards.
NFPA Striping	Reflective striping does not meet the current NFPA standards.
Ground Ladders	N/A
Loose Equipment	The loose equipment appears to be in good condition.
Mechanical	The apparatus appeared to be in good condition at the time of the survey.
Interior Condition	The interior is in good condition.
Exterior Condition	The exterior is in good condition.

Comments:

This unit is designated for mass casualty situations and is equipped for that event. The unit was originally utilized as a hazmat unit. When replaced by the new hazmat it was converted for mass casualty use.

Fire Fleet Survey
Scottsdale Arizona

Date 10-22-14

Shop# 0802885

License# G773DD

Support 610 (TRT)	Freightliner/Pierce	FL80	2002
Apparatus Type	Make	Model	Year
Unable to obtain	33778	Cummins	Allison Automatic
Hours	Miles	Motor	Transmission
N/A	N/A	N/A	N/A
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	Yes		N/A
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	The emergency lighting does not meet the existing NFPA standard but did at the time of construction.
NFPA Striping	The reflective striping does not meet the current JFPA standard.
Ground Ladders	24’ extension ladder, 12’ roof ladder, 10’ attic ladder.
Loose Equipment	The equipment appears to be in good condition and is properly secured.
Mechanical	The apparatus appears to be in good mechanical condition.
Interior Condition	The interior is in good condition.
Exterior Condition	The exterior is in good condition.

Comments:

This apparatus is utilized for technical rescue situations. The crews indicate that the apparatus works well for its intended purpose with the major drawback being the poor turning radius created with the conventional cab.

Fire Fleet Survey
Scottsdale Arizona

Date 10-22-14

Shop# 0804891

License# G922CS

Tanker 613	Freightliner/ALF	FL80	2004
Apparatus Type	Make	Model	Year
873	11389	Cummins	Allison Automatic
Hours	Miles	Motor	Transmission
Hale	1250 GPM	Single	3000 gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	No		N/A
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	Emergency lighting does not meet the current NFPA standard but did when the apparatus was constructed.
NFPA Striping	Reflective striping does not meet the current NFPA standard.
Ground Ladders	24’ extension ladder, 12’ roof ladder.
Loose Equipment	The loose equipment appears in good condition and is properly secured.
Mechanical	There were no mechanical issues noted at the time of the survey.
Interior Condition	The interior is in good condition.
Exterior Condition	The exterior is in good condition.

Comments:

The apparatus is in good condition with low miles and hours.

Fire Fleet Survey
Scottsdale Arizona

Date 10-22-14

Shop# 0804892

License# G923CS

Tanker 614	Freightliner/ALF	FL80	2004
Apparatus Type	Make	Model	Year
832	11088	Cummins	Allison Automatic
Hours	Miles	Motor	Transmission
Hale	1250 GPM	Single	3000 gallon
Pump Brand	Pump Size	# Stages	Water Tank Size
Yes	No		N/A
Scene Lighting	Generator		Foam Tank Size
N/A	N/A	N/A	
Aerial Type	Aerial Brand	Aerial Size	

NFPA Lighting	The emergency lighting does not meet the current NFPA standards but did at the time of construction.
NFPA Striping	Reflective striping does not meet the existing NFPA standard.
Ground Ladders	24’ extension ladder, 12’ roof ladder.
Loose Equipment	The loose equipment appears to be in good condition and is properly secured.
Mechanical	The apparatus appears to be in good mechanical condition.
Interior Condition	The interior is in good condition.
Exterior Condition	The exterior is in good condition.

Comments:

At the time of the survey a leak was visible at the driver’s side pump intake. While this apparatus was constructed by American LaFrance, the majority of the apparatus components are not subject to parts availability issues.