Shaker Heights
University Heights

Ohio

Cooperative Services Feasibility Study

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Executive Summary

Emergency Services Consulting International (ESCI) was engaged by the cities of Shaker Heights and University Heights, Ohio, to conduct a Cooperative Services Feasibility Study of the two municipalities' fire departments. The study was largely funded by a grant from The Cleveland Foundation. This study begins with an evaluation of each individual organization including an organizational overview of such components as governance and lines of authority, foundational policy documents and funding and continues the evaluation by analyzing the departmental components of management, capital assets and capital improvement programs, staffing and personnel management, service delivery, training, fire prevention and life-safety education programs, emergency medical services, and hazardous materials and technical rescue services.

The Shaker Heights and University Heights communities are located to the east of Cleveland, Ohio, and are considered to be a part of the greater Cleveland metropolitan statistical area, within Cuyahoga County. Both departments provide fire protection, rescue, hazardous materials response, and transport emergency medical services to their respective communities. Shaker Heights Fire Department (SHFD) provides services to a population of 28,448 in a service area of 6.3 square miles while University Heights Fire Department (UHFD) provides services to a population of 13,539 in a service area of 1.8 square miles.

Each study agency is a standing department in its respective governmental structure and, as such, each fire chief reports to the lead city executive. Each fire chief's position is appointed and serves as an at-will employee without a personal services contract, although the UHFD fire chief is currently in an interim status. Neither department is segregated into clear operating divisions, primarily due to size, and most ancillary duties are assigned as additional responsibilities.

SHFD provides services from two fixed facilities and eight primary response apparatus while UHFD operates from a single facility using four primary response apparatus. An evaluation of each facility and apparatus is included in the body of the report. Of the total combined capital assets, two facilities (SHFD Station 2 and UHFD) were considered small, dated, and somewhat limited in their expansion and/or upgrade capacity. The apparatus were scored based on overall condition with three being ranked as 'excellent', seven as 'good', one as 'fair' and one as 'poor'.

Both SHFD and UHFD employ career staff to accomplish their respective missions and deliver services to the citizens of each community. The staffing and compensation systems of both departments are

specifically detailed in each respective labor unit's collective bargaining agreement and were used as a comparison of future collaboration. Additional staffing components included application, recruitment and retention, testing, measurement and promotions, and health and wellness programs. An analysis of each agency's administrative and support staff as well as operational personnel was also completed.

The most publicly visible component of any emergency services organization is that of service delivery and performance. The delivery of fire suppression and rescue services requires efficient notification of an emergency, rapid response from well-located facilities in appropriate apparatus, and sufficient staffing following a well-practiced plan of action. A comprehensive analysis of service delivery is included in the document, including service demand, distribution of resources, the ability of each department to concentrate resources (individually and as an aggregate with surrounding agencies), reliability, and response performance. Response performance is summarized in the table below.

	2011 Average	**2011 90th %**
Shaker Heights	03:33	05:24
University Heights	04:10	05:51

The National Fire Protection Association recommends that career fire departments reach 90 percent of their service demand within five minutes of total response time. The recommendation, however, is considered aggressive and each study agency should be commended on their excellent overall response performance of less than six minutes when measured at the 90th percentile.

Once the evaluation of each individual department was completed, ESCI began the process of evaluating the feasibility of cooperative effort strategies. The second section of the report identifies the potential feasibility of increasing shared services between the study departments and provides information relative to budget, personnel, policy actions, governance options, and critical issues and provides some guidance for implementation.

Three basic strategies are generally available when considering consolidation of services, beginning with a do-nothing approach and ending with complete unification of the organizations into what is, essentially, a new emergency service provider. The final section of the report begins with a summary discussion of each of the methodologies available; functional, operational and legal unification.

The actual evaluation of consolidation feasibility begins with an analysis of the baseline budget of each agency since feasibility is often based on the ability to save money through a combination of services. Total costs for personnel services with benefits (including pension contributions) totaled $11,218,339 and accounted for 91.6 percent of total expenditures. Materials and services and capital outlay are approximately 8.4 percent of the total current baseline budget. Operational and administrative positions were evaluated to determine the current utilization of personnel as summarized below.

Position	SHFD	UHFD	Total
Fire Chief	1.00	1.00	2.00
Assistant Chief	1.00		1.00
Fire Inspector	1.00		1.00
Accounting Clerk	1.00		1.00
Supt. Of Equipment	0.50		0.50
Total	**4.50**	**1.00**	**5.50**

Position	SHFD	UHFD	Total
Battalion Chief	4.00		4.00
Captain		4.00	4.00
Lieutenant	12.00	2.00	14.00
Firefighter/Paramedic	28.00	19.00	47.00
Firefighter	7.00	1.00	8.00
Total	**51.00**	**26.00**	**77.00**

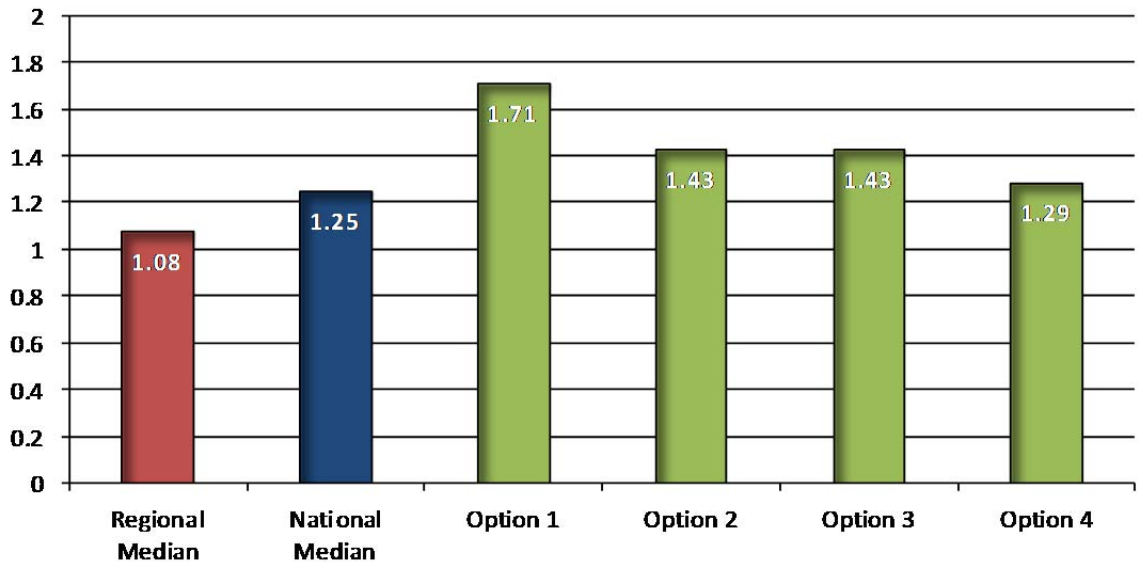
A total of 5.5 positions are involved in the administrative and support functions of the study fire departments while a total of 77 positions are assigned to fire suppression, EMS, and service delivery. The final baseline analysis was that of compensation and benefits and is provided in the body of the document.

Once the baseline was established, ESCI evaluated a number of operational strategies that offer the cities options as they move forward with any cooperative efforts. The study fire departments already benefit from some collaborative efforts, particularly in regard to emergency response and suppression activities; and it is natural that continuing the long-term strategy of cooperation should eventually lead to a single fire agency. A cost analysis of this strategy at full deployment shows an annual cost avoidance of between $930,000 and $3.2 million based on 2011 fiscal year dollars, depending on the staffing model adopted and implemented.

A concept for staffing of administration and support services of a combined fire and EMS department lists position/title and the number of positions. A total of 5.5 positions are assigned to the administration and support functions under this strategy.

While there is no net change in the number of administrative and support personnel, the concept assigns personnel to functions that did not previously have dedicated personnel, such as a Training Officer to provide educational oversight to the combined agency.

In regard to operational staffing, ESCI has developed four potential models for policymaker consideration. The figure below illustrates how the new number of personnel based on each model compares to the regional and national medians.



Although the resulting benchmark comparison is higher than both the regional and national medians, it should be understood that the benchmark data does not delineate between those departments that do or do not provide transport EMS. This service tends to increase the overall number of personnel within a system due to the high service demand. Because both departments provide transport EMS, the staffing per 1,000 population would be expected to be higher than the medians.

The following modeled budgets were developed by ESCI using financial information provided by each city. Any existing debts or liabilities were excluded from this analysis. If the fire departments do pursue a consolidation, the liabilities could be transferred to the new organization. For this example, the

assumption is that the debt remains where it was incurred. Personal services estimates are based on highest current salaries in similar classifications. Operational costs are based on the modeled expenditures developed by ESCI and do not necessarily account for each and every indirect cost not specifically identified within the current departmental budgets. The capital expenditures are based on a fully funded capital replacement plan that assumes the reduction in apparatus.

Operating Budget	Baseline	Option 1	Option 2	Option 3	Option 4
Personal Services	$10,279,755	$9,449,339	$8,032,907	$8,032,907	$7,324,691
Materials & Services	$891,547	$891,547	$891,547	$691,008	$691,008
Capital Outlay	$342,014	$241,836	$241,836	$241,836	$241,836
Total Requirements	**$11,513,316**	**$10,582,722**	**$9,166,290**	**$8,965,751**	**$8,257,535**
Change		**$930,594**	**$2,347,026**	**$2,547,565**	**$3,255,781**

The major savings associated with the Materials and Services budget under Options 3 and 4 are related to the operating expenses of the station that would be eliminated. Additional cost avoidance can be realized by a reduction in the number of frontline and reserve fire apparatus requirements. A portion of the savings should be used to establish a capital reserve fund for the replacement of capital apparatus and equipment with annual contributions equal to the amount shown in the table above for each option.

At this point, the cities should work closely with one another to form a joint vision for consolidated service and determine the most effective model of governance; several of which are discussed in the report including a joint fire district, intergovernmental agreement, and the creation of a council of governments. To end the report, a list of critical issues is discussed along with guidance for policymakers to utilize as they move forward as well as a partial listing of potential benefits of a cooperative effort between the two cities.

The success of adopting and implementing change, improvement, or cooperative opportunities depends on many things. In ESCI's experience with dozens of functional, operational, and legal unifications, leadership is the single factor that most frequently determines success. Nearly always, a key staff, councillor, or governing body member champions the concept garnering the support of the various affected groups (political, labor, member, and community). In addition, good leadership fosters an organizational culture receptive to planning, calculated risk taking, and flexibility. The manner in which

leaders promote a trusting relationship between all groups and aid two-way communication between them is essential.

The ESCI project team began collecting information concerning the fire services for Shaker Heights and University Heights in March 2012. The team members recognize that the report contains a large quantity of information and ESCI would like to thank the elected officials of each organization involved as well as the officers and employees of each department. ESCI would also like to thank the various individuals and external organizations for their input, opinions, and candid conversations throughout this process. It is ESCI's sincere hope that the information contained in this report is utilized to its fullest extent and that the emergency services provided to the citizens of the Shaker Heights and University Heights area are improved by its implementation.

Baseline Agency Evaluations

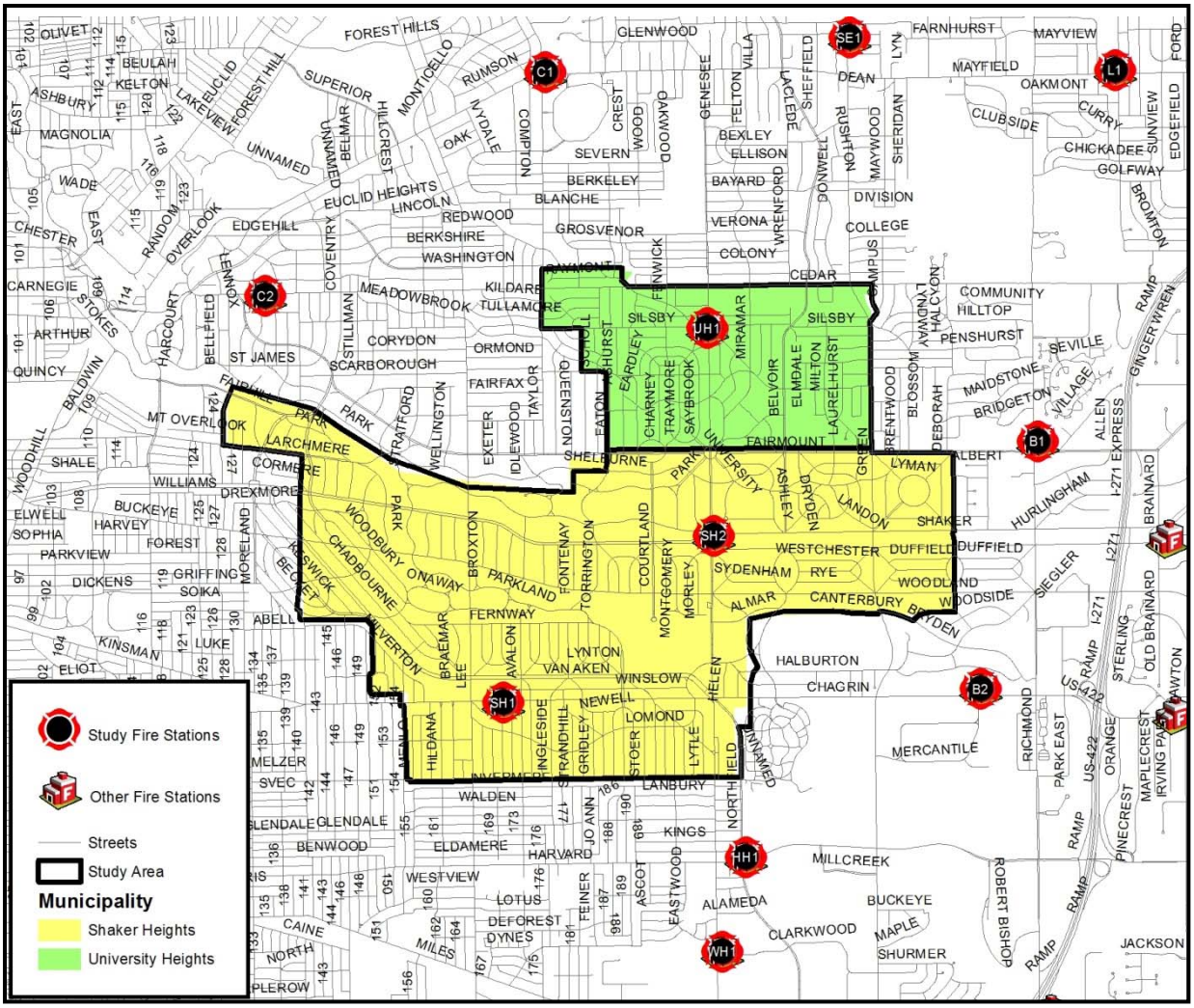
Emergency Services Consulting International (ESCI) was engaged by the cities of Shaker Heights and University Heights, Ohio, to conduct a Cooperative Services Feasibility Study of the two municipalities' fire departments. The study was largely funded by a grant from The Cleveland Foundation. This study begins with an evaluation of each individual organization.

Organization Overview

The report begins with an overview and description of the study communities as well as the service delivery infrastructure currently utilized by the Shaker Heights and University Heights fire departments.

The Shaker Heights and University Heights communities are located to the east of Cleveland, Ohio, and are considered to be a part of the greater Cleveland metropolitan statistical area, within Cuyahoga County. Both departments provide fire protection, rescue, hazardous materials response, and transport emergency medical services to their respective communities. The following figure illustrates the primary service area of the study departments.

Figure 1: General Service Area



In the figure above, the shaded areas represent Shaker Heights (yellow) and University Heights (green). The fire stations immediately surrounding the study areas were used during concentration analysis, presented later in this report. Shaker Heights Fire Department (SHFD) provides services to a population of 28,448 in a service area of 6.3 square miles.[1] University Heights Fire Department (UHFD) provides services to a population of 13,539 in a service area of 1.8 square miles.[2] The figures below compare the populations and service areas of the study departments graphically.

[1] 2010 U.S. Census Data.
[2] Ibid.

Figure 2: Population Comparison[3]

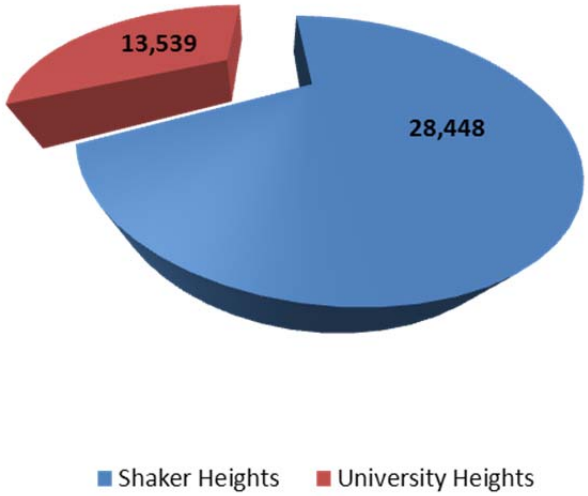
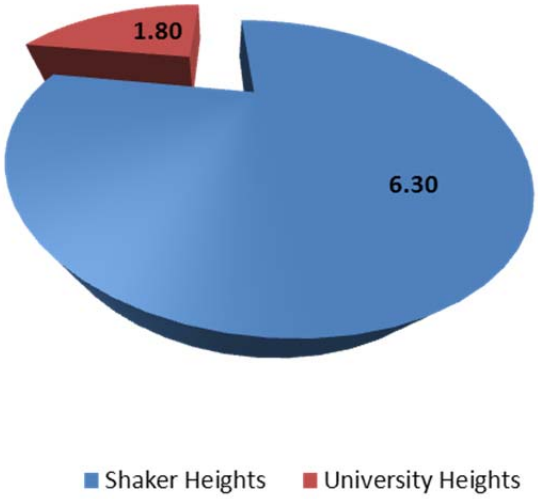


Figure 3: Service Area Comparison (Square Miles)[4]



History, Formation, and General Description

SHFD is a standing department within the general government of the City of Shaker Heights. The primary mission of the department has been and will continue to be, fire protection for the citizens and properties located within the city; but, as the field has evolved, so have the ancillary missions of SHFD. SHFD provides fire, rescue, hazardous materials and transport EMS services from two permanent

[3] 2010 U.S. Census Bureau.
[4] Ibid.

stations utilizing a fully career staff. The department uses a total of eight primary response apparatus (including reserves).

UHFD is a standing department within the general government of the City of University Heights; and provides fire, rescue, hazardous materials, rescue, and transport EMS services from a single permanent station utilizing a fully career staff. The department uses a total of four primary response apparatus (including reserves).

Figure 4: Summary of Organizational Overview Elements

	Shaker Heights Fire Department	University Heights Fire Department
Department Preferred Acronym	SHFD	UHFD
Governance Authority	Is a direct operating department of	Is a direct operating department of
Municipality Name	City of Shaker Heights	City of University Heights
Name of County	Cuyahoga County	Cuyahoga County
State or Province	Ohio	Ohio
Jurisdictional Limits	Duplicates the governmental boundaries of the community	Duplicates the governmental boundaries of the community
Primary Risk Types	Urban residential and commercial Suburban residential and commercial	Urban residential and commercial
Community Growth Level	Very limited	Very limited
Year Agency Formed	1917	1941
List All Services	Fire suppression ALS ambulance transport Vehicle extrication Hazmat operations-level Public education Code enforcement and inspections	Fire suppression ALS ambulance transport Vehicle extrication Hazmat operations-level Public education Code enforcement and inspections
Technician-Level Hazmat Services Provided By	Reciprocal agreement to Chagrin Southeast Hazmat Team with Shaker and University Heights providing tech rescue through Heights Area Special Rescue Team	Reciprocal agreement to Chagrin Southeast Hazmat Team with Shaker and University Heights providing tech rescue through Heights Area Special Rescue Team
Name Of Dispatch Agency	EASTCOM Communications Center	EASTCOM Communications Center
Primary Management Team	Chief Assistant Chief Battalion Chiefs Fire Inspector and Union President	Interim Chief Captains Lieutenants
Support Positions	Accounting Clerk and Superintendent of Equipment	None
Staffing Methodology	Career firefighters on duty 24 hours a day	Career firefighters on duty 24 hours a day
Minimum On-Duty Strength or Typical On-Call Availability	Daytime 13 Nighttime 12	6
Latest ISO Rating	3	4
Is This A Split Rating?	No	No
Last ISO Survey Conducted In	2010	2008

Governance and Lines of Authority

It is important to understand the governance structure in which a fire department operates. This includes the documents that authorize its functioning and the ability for it to receive adequate and sustainable funding. The lines of authority differentiate the basic organizational structure under which each department functions.

A well-designed organizational structure should reflect the efficient assignment of responsibility and authority, allowing the organization to accomplish effectiveness by maximizing distribution of workload. The lines on an organizational chart simply clarify accountability, coordination, and supervision. Thorough job descriptions should provide the details of each position and ensure that each individual's specific role is clear and centered on the overall mission of the organization.

The organizational structure of the department should demonstrate a clear unity of command, in which each individual member reports to only one supervisor (within the context of any given position), and is aware to whom he or she is responsible for supervision and accountability. This method of organization encourages structured and consistent lines of communication; and prevents positions, tasks, and assignments from being overlooked. The overall goals and objectives of the organization can be more effectively passed down through the rank and file members in a consistent fashion.

The organizational structure should be charted with clear, designated operating divisions that permit the core functions of the organization to be the primary focus of specific supervisors and assigned members. While some task-level activities may carry over from division to division, the primary focus of leadership, management, and budgeting within the division should be clarified by the division's key function within the mission statement. Those individuals supervising or operating within a specific division must be positively clear as to the role of the division and its goals and objectives.

The department should have sufficiently analyzed its mission and functions such that a resulting set of specific agency programs have been established. Organized, structured programs permit better assignment of resources, division of workload, development of future planning, and analysis of service delivery. Those departments that have clarified their programs with titles, assigned leadership, resources, budget appropriations, performance objectives, and accountability are among the most successful.

As mentioned previously, each study agency is a standing department in their respective governmental structures and, as such, each fire chief reports to the lead city executive. Each fire chief's position is appointed, and serves as an at-will employee without a personal services contract, although the UHFD fire chief is currently in an interim status. Neither department is segregated into clear operating divisions, primarily due to size, and most ancillary duties are assigned as additional responsibilities. The following figure summarizes the governance and lines of authority issues within each agency.

Figure 5: Summary of Governance and Lines of Authority Elements

	Shaker Heights Fire Department	University Heights Fire Department
Municipality or Organization Type:	Charter city	Charter city
Name Of Governing Entity, Body or Person	City Council	City Council
Taxing Authority	Provided the authority to levy taxes for operating a fire protection system	Provided the authority to levy taxes for operating a fire protection system
Form of Government	Strong Mayor-Council	Strong Mayor-Council
Title of Governing Authority or Body	City Council	City Council
Governing Authority Number of Members	7	7
How Are Governing Authority Members Appointed	Elected by the voters	Elected by the voters
Length of Term for Governing Authority Members	Four years	Four years
Title of Governing Authority Executive	Mayor	Mayor
Agency Authorization Document	City charter and ordinances	City charter and ordinances
Policy Limiting Governing Body from Operational Authority	Yes	Yes
Fire Chief Status	At-will employee with no personal contract	Interim appointment of a Captain
Does the Chief Receive a Performance Evaluation	Annually	Not regularly

Foundational Policy Documents

Organizations that operate efficiently are typically governed by clear policies that lay the foundation for effective organizational culture. These policies set the boundaries for both expected and acceptable behavior, while not discouraging creativity and self-motivation.

A comprehensive set of departmental operating rules and guidelines should contain at least two primary sections. The following format is suggested.

1. Administrative Rules: This section would contain all of the rules that personnel in the organization are required to comply with at all times. Administrative Rules, by definition, **require** certain actions or behaviors in all situations. The governing body should adopt or approve the Administrative Rules, since the Chief is also subject to them. However, the governing body should then delegate authority to the Chief for their enforcement on department personnel. The Administrative Rules should govern **all** members of the department: paid, volunteer, and civilian. Where rules and policies, by their nature, require different application or provisions for different classifications of members, these differences should be clearly indicated and explained in writing. Specifically, the Administrative Rules should contain sections which address:
   - Public records access and retention
   - Contracting and purchasing authority
   - Safety and loss prevention
   - Respiratory protection program
   - Hazard communication program
   - Harassment and discrimination
   - Personnel appointment and promotion
   - Disciplinary and grievance procedures
   - Uniforms and personal appearance
   - Other personnel management issues

2. Standard Operating Guidelines/Procedures (SOG/Ps): This section should contain "street-level" operational standards of practice for personnel of the department. SOGs are different from Administrative Rules in that variances are allowed in unique or unusual circumstances where strict application of the SOG would be less effective. The document should provide for a program of regular, systematic updating to assure it remains current, practical, and relevant. SOGs should be developed, approved, and enforced under the direction of the Fire Chief.

The following table provides information related to each of the departments' foundational policy documents.

Figure 6: Description of Foundational Policy Documents

	Shaker Heights Fire Department	University Heights Fire Department
Titles of Policy Documents	Standard Operating Procedures Rules and Regulations Collective Bargaining Agreement City Employee Handbook General Orders	Standard Operating Procedures Rules and Regulations Collective Bargaining Agreement City Employee Handbook General Orders
Total Number of Policy/ Governing Documents	5	5
Quality of Administrative Policy Documents	Good	Good
Important Civil Liability and Risk Management Policies Present	Yes	Yes
Quality of Standard Operating Policies	Good	Good
Adequate Operational Scene Guidance	Yes	Yes

Organizational Design

A well-designed organizational structure should reflect the efficient assignment of responsibility and authority, allowing the organization to accomplish effectiveness by maximizing distribution of workload. The lines on an organizational chart simply clarify accountability, coordination, and supervision. Thorough job descriptions should provide the details of each position and ensure that each individual's specific role is clear and centered on the overall mission of the organization.

The organizational structure of the department should demonstrate a clear unity of command, in which each individual member reports to only one supervisor (within the context of any given position) and is aware to whom he or she is responsible for supervision and accountability. This method of organization encourages structured and consistent lines of communication; and prevents positions, tasks, and assignments from being overlooked. The overall goals and objectives of the organization can be more effectively passed down through the rank and file members in a consistent fashion.

The organizational structure should be charted with clear, designated operating divisions that permit the core functions of the organization to be the primary focus of specific supervisors and assigned members. While some task-level activities may carry over from division to division, the primary focus of leadership, management, and budgeting within the division should be clarified by the division's key function within the mission statement. Those individuals supervising or operating within a specific division must be positively clear as to the role of the division and its goals and objectives.

The departments should have sufficiently analyzed its mission and functions such that a resulting set of specific agency programs have been established. Organized, structured programs permit better assignment of resources, division of workload, development of future planning, and analysis of service delivery. Those departments that have clarified their programs with titles, assigned leadership, resources, budget appropriations, performance objectives, and accountability are among the most successful. The following table provides information related to these departments' basic organizational design.

Figure 7: Departments' Organizational Design

	Shaker Heights Fire Department	University Heights Fire Department
Does This Department Have Clear Unity of Command	Yes	Yes
Is This Department Organized With Clear Operating Divisions	Yes, but limited due to the small size of the organization, with members often filling multiple roles	Yes, but limited due to the small size of the organization, with members often filling multiple roles
Are There Specific Programs With Managers Designated	Yes	Yes
List The Individuals That Report Directly To The Chief	Assistant Chief Fire Inspector Accounting Clerk Building Commissioner	Three Shift Captains
Chief's Span of Control	4	3
What is the Chief's Disciplinary Authority	Suspension from duty and recommendation for termination	Suspension from duty and recommendation for termination
Does This Agency Have Collective Bargaining	Yes	Yes
Positions Covered	All positions below Assistant Chief	All positions below Chief
Is There a Formal History Retention Effort	Yes, in addition Shaker Heights Historical Society assists with retention efforts	Informal collection of photos and news articles without appointed historian
Does the Agency Produce an Annual Report	Annual report provided to elected officials and appointed review committee	Annual report produced, but limited to elected officials

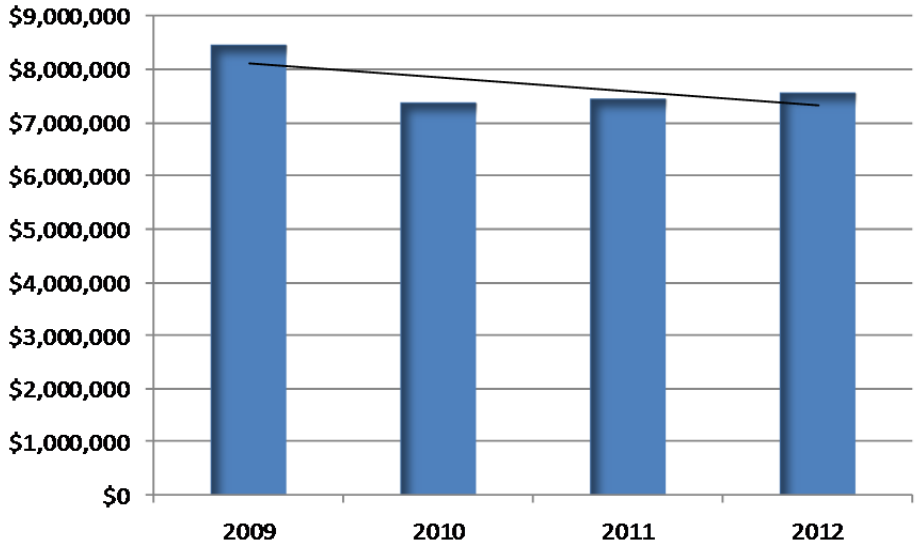
Funding, Fees and Taxation

Without adequate funding, no emergency services organization can survive or provide the level of service the community expects and deserves. Adequate funding can come from a variety of sources; including property taxes, special purpose levies, fundraising, donations, or fees for service. Regardless of the source of revenue, it is imperative that departments have sufficient funding to carry out their primary mission. This section provides an overview of each agency's financial and budgeting components.

As noted previously, each study agency is a standing department within their respective governmental structures and, as such, funding is received through the individual municipal general funds.

The SHFD budget operates on a one-year cycle from January 1 to December 31. Over the past five years, the department has seen a decline in overall budget, as illustrated in the following figure.

Figure 8: SHFD Budget History[5]

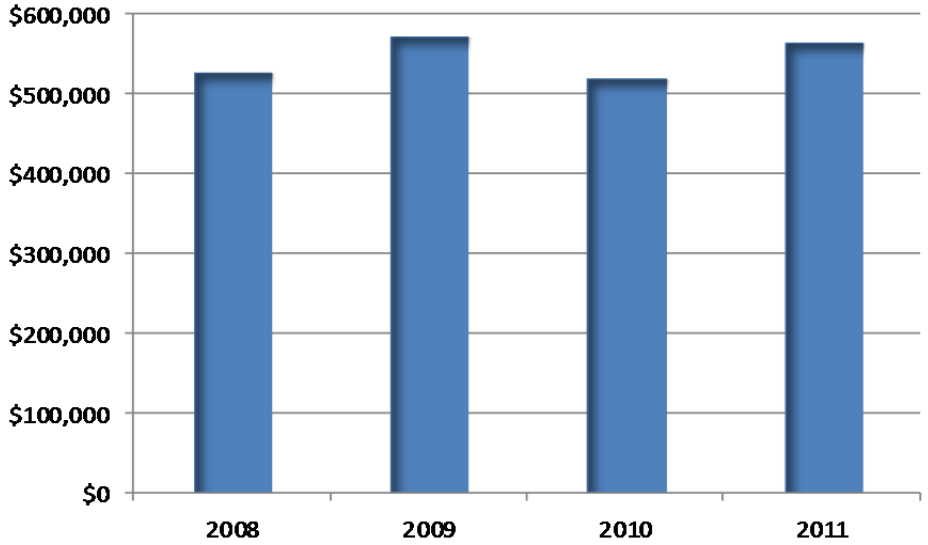


As is the case with most fire departments that utilize career personnel, a vast majority of the department's budget is dedicated to personnel costs. In the 2011 budget year, a total of $6,892,360 (92.3%) was dedicated to personnel costs. This is common in career fire departments, particularly those that provide transport EMS.

The benefit, however, to providing transport EMS is that a substantial amount of revenue can be generated from these services. Over the last five years, SHFD has been able to steadily increase collection of EMS bills, reaching a collection of $566,528 during 2011. The following figure illustrates the department's collection success over the past five years.

[5] City of Shaker Heights budget documents.

Figure 9: SHFD EMS Collection History[6]

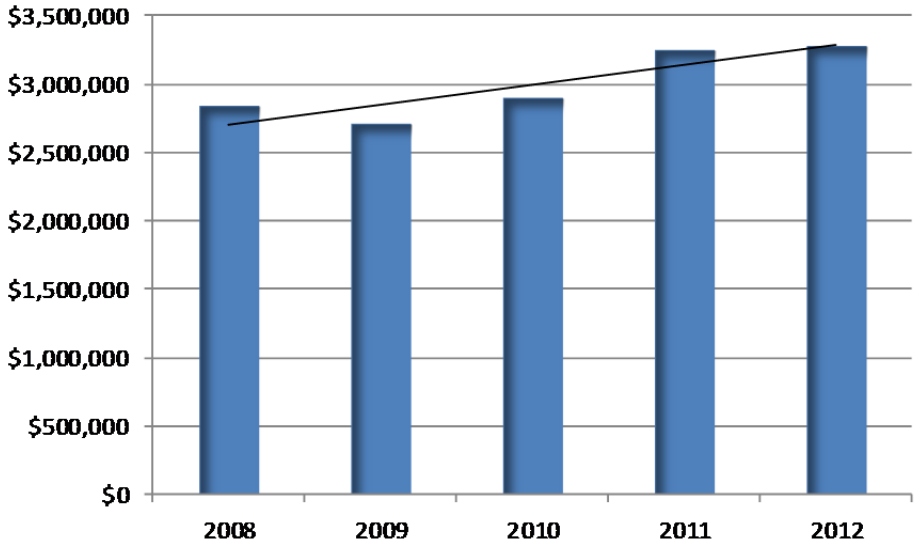


EMS is not the only source of revenue for SHFD. The department also receives revenue from other service fees, fines, grants, and other interfund transfers.

[6] Ibid.

The UHFD budget operates on a one-year cycle from January 1 to December 31. The 2011 fiscal year department budget is reported to be $3,249,155, and is not segregated into operating divisions. Over the past five years (including the current fiscal year), the department has seen a slight increase in overall budget, as illustrated in the following figure.

Figure 10: UHFD Budget History[7]

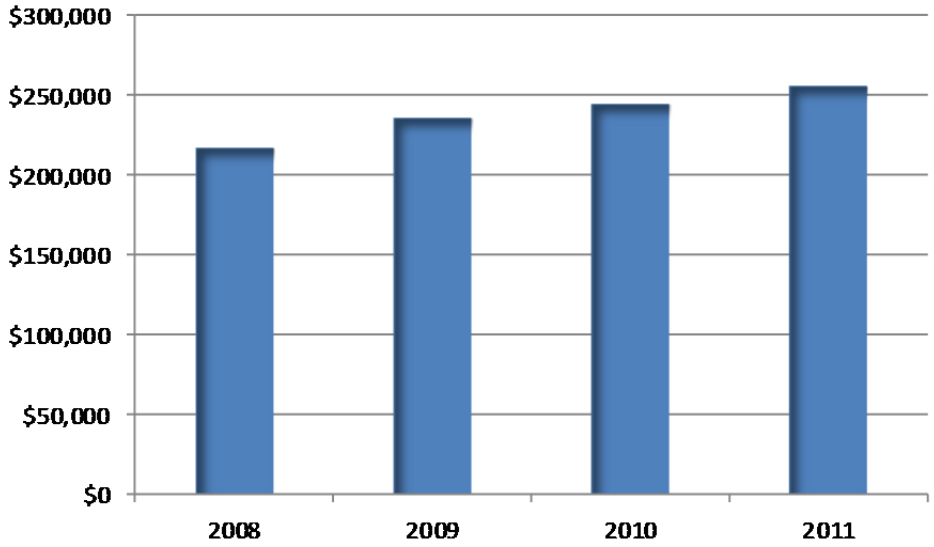


As is the case with most fire departments that utilize career personnel, a vast majority of the department's budget is dedicated to personnel costs. In the 2011 budget year, a total of $2,985,865 (90.8%) was dedicated to personnel costs. This is common in career fire departments, particularly those that provide transport EMS.

[7] City of University Heights budget documents.

The benefit, however, to providing transport EMS is that a substantial amount of revenue can be generated from these services. Over the last five years, UHFD has been able to steadily increase collection of EMS bills, reaching a collection of $255,921 during 2011. The following figure illustrates the department's collection success over the past four years.

Figure 11: UHFD EMS Collection History[8]



The amounts collected through billing for EMS transport decrease the overall tax burden on the community.

[8] Ibid.

Management Components

Being service providers to diverse communities, the study departments face challenges to organizational growth and management. In addition to the operational challenges of emergency response, the management of the business of a fire department always presents unique issues involving the administration of financial resources, the setting of goals and objectives, internal and external communications, information management, and security. This section of the report examines the department's efforts in this area and preparation for the future health of the organization.

Organizational Planning, Goals, and Objectives

Emergency services exist in a rapidly changing environment. Along with improvements in tools and methods used to provide service come increased regulation of activities, new risks to protect, and other challenges that can quickly catch the unwary off guard. Only through continuous internal and external environmental awareness and periodic course corrections can an organization stay on the leading edge.

The process of planning in advance for occurrences that will take place in the future requires both discipline and organization. In order to be truly effective, an emergency services agency considers planning on three distinct levels: tactical planning, operational planning, and master/strategic planning. Tactical planning is practical preparation of incident strategies for potential emergency incidents. Operational planning is preparation for the day-to-day activities of the agency and its integration into other regional or national response networks. Master planning (long-range planning) and strategic planning are preparation for the future success and effectiveness of the agency in a changing environment.

With the exception of this study, neither department has undertaken formal planning processes regarding goals and objectives. Both departments have, of course, conducted tactical planning elements; and both have established mission statements. Each department, regardless of the outcome of this cooperative efforts feasibility study, should initiate formal long-range planning processes.

Internal and External Communications Processes

Quality communications is an achievable goal for any organization, but one that always seems to be the most elusive. Regularly scheduled meetings permit management personnel to openly exchange ideas on a regular basis, share issues and concerns, apply creative teambuilding and problem-solving, and

improve the overall flow of communications. Distributed minutes or summaries of regular staff meetings encourages internal communications and permits members to share ideas on issues involving departmental issues, enhancing a feeling of empowerment among personnel. Written, formal memorandums ensure that all members receive critical data in an organized and consistent fashion. This process also provides a critical written record of internal communications that are important to organizational efficiency. Employee and community newsletters can foster improved relations with internal and external stakeholders.

The following figure summarizes the internal and external communications processes in place within each study agency.

Figure 12: Summary of Internal and External Communications Process Elements

	Shaker Heights Fire Department	University Heights Fire Department
Administrative Policies Available to All Members	Yes, hard copies available in each workplace	Yes, individual copies
Standard Operating Guidelines Available to All Members	Yes, hard copies available in each workplace	Yes, hard copies available in each workplace
Regularly Schedule Staff Meetings Conducted	Yes, quarterly	Only as needed
Minutes of Staff Meetings Taken/Distributed	Minutes taken but not posted	Yes
Written Memos (print or electronic) Used for the Regular Dissemination of Agency Information	Yes	Yes
Standard Process for Memo Distribution	Yes	Yes
Receipt Verification Required for Critical Information Distribution	Yes, signature required	Yes, signature required
Member Forums/Meetings for Exchange with Administration	Yes, labor/management committee serves this purpose	Yes, labor/management committee serves this purpose
Employee/Member Newsletter Published	Yes, community employee newsletter	No
Formal Responsibility for Bulletin Board Management/Organization	Yes	Yes
Email Distribution of Information Used Regularly	Yes, agency email addresses issued	Yes, agency email addresses issued
All Members Have In-Box for Hard Copy Documents	Yes, individual member mailboxes	Yes, individual member mailboxes

	Shaker Heights Fire Department	University Heights Fire Department
Voicemail for Key Officers	Yes, key officers have voicemail	Yes, key officers have voicemail
Public Newsletter Published by Community or Agency	Yes, community publications issued by mail/email Agency has contributed material	Yes, issued in utility invoice Agency has contributed material
Active Website In Use	Yes, includes basic agency information only	Yes, includes basic agency information only
Formal Public Input Survey Conducted	Yes, municipality conducted for all services	No
Formal Written Complaint-Handling Policy In Place	Not in writing	Not in writing
Citizen's Advisory Group Assists with Public Safety Planning	Yes, public safety committee or board	No
Clear Written Policy and Procedure for Access of Public Records (FOIA)	Yes	Yes

Document Control and Security

Records management is a critical function within any organization. A variety of uses are made of written records and, therefore, their integrity must be protected. Certain laws require public access to certain fire and EMS department documents and data. The following figure summarizes each department's record keeping, document control, and security measures.

Figure 13: Summary of Document Control and Security Elements

	Shaker Heights Fire Department	University Heights Fire Department
Hard Copy Files Secured	Yes, passage locks and container locks	Yes, passage locks and container locks
Buildings Consistently Secured When Unoccupied	Yes, firm policy rigidly followed	Yes, firm policy rigidly followed
Public Access Limited When Buildings Occupied	Public access secured to limited areas	Public access secured to limited areas
Locks or Codes Changed Occasionally	Locks changed occasionally or when security threat identified	Locks changed in last three to five years
Any Buildings with Premises Security Alarms	No security systems	No security systems
Any Buildings with Monitored Fire Alarm Systems	Yes, newer buildings only	Yes, all buildings
Cash Accepted on Premises	Yes, deposited daily	No cash accepted
Petty Cash Use	Yes, access strictly controlled	No petty cash used
General Use Credit Cards	No general use cards	No general use cards

Information Technology Systems

In a modern emergency services agency, information technology is a critical component, as the development, storage, and flow of information has become necessary for departments to operate efficiently. Departments should work closely with professional information technology staff and/or vendors to ensure that computer equipment is up-to-date, of sufficient size, properly configured and secure; including properly backed-up at an off-site location to prevent loss. This section provides an overview of information technology systems.

Figure 14: Summary of Information Technology Elements

	Shaker Heights Fire Department	University Heights Fire Department
Type of Computer Network or System	PCs networked to community/municipal server	PCs networked to community/municipal server
Redundant Servers	Yes	Yes
Computer Files Backed Up	Yes, backed up off-site	Yes, backed up on-site only
Computers Programmed with Password Protection	Yes, timeout with inactivity	Yes, timeout with inactivity
Updated Firewall and Virus Protection	Yes	Yes
Records Fully Computerized	Incident records Inspections and occupancies Training Hydrants EMS patient records Personnel records Maintenance Preplans Finance	Incidents records Inspections and occupancies Training Hydrants EMS patient records Personnel records Prevention

Capital Assets and Capital Improvement Programs

In order for any emergency services system to be effective, physical resources must be sufficient to handle the current and expected workload, and be adequately distributed throughout the primary response area so as to affect the quickest response possible to the greatest number of incidents. Additionally, the apparatus or vehicles used in service delivery must be reliable and sufficient in number to accommodate the anticipated workload. This section of the report will evaluate the facilities and apparatus currently in use by the departments. Distribution of those resources throughout the response area will be analyzed in the next section of this report.

Facilities

Inadequate facilities for housing personnel and apparatus detract from an organization's mission. Limited space can significantly impact the available options for resource assignment, hinder the ability to maintain a well-trained workforce, and may affect member and employee morale. The primary functions that take place within the station should provide adequate and efficient space for all functions. Some examples include:

- Housing and cleaning of apparatus and equipment
- Administrative office duties where necessary
- Personnel training
- Residential living that is gender compatible for on-duty members when necessary
- Operations that include enough room for community groups and parking

While this list may seem elementary, the lack of dedicated space compromises the ability of the facility to support these functions, and can detract from its primary purpose. ESCI did not conduct an in-depth engineering or architectural review of the stations in the study area but did note locations, access to the community, general size, condition, and usability. The following is a summary of each facility.

Shaker Heights
Station 1

Address of Facility	1700 Chagrin Blvd
Year Facility Initially Constructed	2005
Number of Major Additions or Renovations	0
Building Square Feet	20,408
Apparatus Bays:	
Back-in, single unit	*1*
Back-in, used with stacked parking	*2*
Drive-through use, single unit	*1*
Drive-through capable, used with stacked parking	*0*

Building Height	Two-story
Construction Type	TYPE II-B: Unprotected Non-Combustible
Outside Finish	Masonry block
Unusual Construction Features	None
Overall Construction Condition	New condition
Does Structure Appear to be ADA Compliant	Yes
Building Code Issues Evident	None
Roof Type	Flat: membrane
Roof Age	One to 10 years
Roof Condition	No known problems
Type of Heating System (all that apply)	Forced air, natural gas
Heating System Age	One to 10 years
Air Conditioning (all that apply)	Central air: office and living areas only
Any Known Maintenance or Disrepair Issues	None
Overall Size of Facility Adequate for Current Use	Yes
Apparatus Exit	Traffic sightlines compromised, but accommodated by signalization triggered at apparatus exit
Building and Property Blend Well with Neighborhood	Yes
Building and Property Adaptable if Future Expansion Needed	No
Adequate Staff and Visitor Parking	Parking is adequate
Any Additional Design Comments	None
Automatic Door Stops on Overhead Doors Operating Properly	Yes
Adequate Fire Extinguishers (not on apparatus)	Yes
Cooking Equipment Central Shutdown	Yes
Automatic Fire Sprinklers Present	Entire building
Fire Sprinkler System Type	Partial wet, partial dry
Alarm Systems Present	Sprinkler water flow Monitored smoke/heat alarms
Is Commercial Cooking Equipment Present	Yes
Proper Hood Duct and Grease Filters in Place	Yes
Fixed Fire Extinguishing System in Hood Properly	Yes

Inspected	
Flammable and Combustible Liquids Stored in Approved Cabinet	Yes
All Pressure Cylinders Stored Properly	Yes
SCBA Compressor System Present	Yes
Air Sample Certification Present and Visible	Yes
Back-Up Generator Present	Yes, with auto transfer switch
Generator Fuel Type and Source	Natural gas, piped in
Apparatus Exhaust Removal	Forced air through structure, automatic activation
Underground Storage Tanks Present	No
Apparatus Floor Drain Oil Separators in Place	No oil separator in use
Adequate Space for Working On or Around Apparatus	Space around apparatus is adequate
Apparatus Room Accommodates Working on Small Equipment	Adequate space
Personnel Can Move Quickly and Easily to Apparatus for Response	Yes
Adequate Space for Cooking and Eating	Yes
Adequate Space for Local Company Training and Drills	Yes
Are Compromises Necessary for Two-Gender Staffing	No
Adequate Space for Personal Hygiene	Yes
Adequate Space for Sleeping	Yes
Adequate Space for Storage	Yes
Identify any Additional Operational Compromises Made by Staff or Crew to Compensate for Facility Inadequacies	None

Shaker Heights
Station 2

Address of Facility	2801 Warrenville Center Road
Year Facility Initially Constructed	1952
Number of Major Additions or Renovations	0
Building Square Feet	10,000
Apparatus Bays:	
Back-in, single unit	*0*
Back-in, used with stacked parking	*4*
Drive-through use, single unit	*0*
Drive-through capable, used with stacked parking	*0*

Building Height	Two-story
Construction Type	TYPE II-B: Unprotected Non-Combustible
Outside Finish	Masonry block
Unusual Construction Features	None
Overall Construction Condition	Worn paint or finishes
Does Structure Appear to be ADA Compliant	No
Building Code Issues Evident	None
Roof Type	Peaked: shingle Flat: roll roofing
Roof Age	Age unknown
Roof Condition	No known problems
Type of Heating System (all that apply)	Steam/boiler, natural gas
Heating System Age	Over 10 years
Air Conditioning (all that apply)	Window AC unit: living areas only
Any Known Maintenance or Disrepair Issues	None
Overall Size of Facility Adequate for Current Use	Yes
Apparatus Exit	Exit to traffic flow safe and unimpeded
Building and Property Blend Well with Neighborhood	Yes
Building and Property Adaptable if Future Expansion Needed	No
Adequate Staff and Visitor Parking	Parking is adequate
Any Additional Design Comments	None
Automatic Door Stops on Overhead Doors Operating Properly	Yes
Adequate Fire Extinguishers (not on apparatus)	Yes
Cooking Equipment Central Shutdown	No
Automatic Fire Sprinklers Present	None
Alarm Systems Present	Local smoke detection only No alarm systems present
Is Commercial Cooking Equipment Present	Yes
Proper Hood Duct and Grease Filters in Place	Yes

Fixed Fire Extinguishing System in Hood Properly Inspected	No
Flammable and Combustible Liquids Stored in Approved Cabinet	Yes
All Pressure Cylinders Stored Properly	Yes
SCBA Compressor System Present	Yes
Air Sample Certification Present and Visible	Yes
Back-Up Generator Present	Yes, with auto transfer switch
Generator Fuel Type and Source	Natural gas, piped in
Apparatus Exhaust Removal	Direct connect vacuum system, connected
Underground Storage Tanks Present	Yes
Type of Underground Storage Tank	Diesel fuel
Age of Underground Storage Tank	Over 10 years
Type of Leak Detection in Place	Level alarm and monthly pressure test
Apparatus Floor Drain Oil Separators in Place	No oil separator in use
Adequate Space for Working On or Around Apparatus	Space around apparatus cramped and movement is limited
Apparatus Room Accommodates Working on Small Equipment	Adequate space
Personnel Can Move Quickly and Easily to Apparatus for Response	Yes
Adequate Space for Cooking and Eating	Yes
Adequate Space for Local Company Training and Drills	Yes
Are Compromises Necessary for Two-Gender Staffing	No
Adequate Space for Personal Hygiene	Yes
Adequate Space for Sleeping	Yes
Adequate Space for Storage	Yes

University Heights
Station 1

Address of Facility	3980 Silsby Rd
Year Facility Initially Constructed	1941
Number of Major Additions or Renovations	1
Year of Major Addition/Renovation	1969
Building Square Feet	5,760
Apparatus Bays:	
Back-in, single unit	*2*
Back-in, used with stacked parking	*1*
Drive-through use, single unit	*0*
Drive-through capable, used with stacked parking	*0*

Building Height	Two-story
Construction Type	TYPE II-B: Unprotected Non-Combustible
Outside Finish	Masonry block
Unusual Construction Features	None
Overall Construction Condition	Worn paint or finishes
Does Structure Appear to be ADA Compliant	No
Building Code Issues Evident	None
Roof Type	Flat: membrane
Roof Age	Over 10 years
Roof Condition	No known problems
Type of Heating System (all that apply)	Forced air, natural gas
Heating System Age	Over 10 years
Air Conditioning (all that apply)	Central air: entire building
Any Known Maintenance or Disrepair Issues	Yes: miscellaneous pipe leaks, asbestos wrap on piping in bay
Overall Size of Facility Adequate for Current Use	No
Apparatus Exit	Single turn direction on divided roadway
Building and Property Blend Well with Neighborhood	Yes
Building and Property Adaptable if Future Expansion Needed	Yes
Adequate Staff and Visitor Parking	Staff parking is inadequate
Any Additional Design Comments	None
Automatic Door Stops on Overhead Doors Operating Properly	Yes
Adequate Fire Extinguishers (not on apparatus)	Yes
Cooking Equipment Central Shutdown	Yes
Automatic Fire Sprinklers Present	None
Alarm Systems Present	Local smoke detection only
Is Commercial Cooking Equipment Present	Yes
Proper Hood Duct and Grease Filters in Place	Yes

Fixed Fire Extinguishing System in Hood Properly Inspected	Yes
Flammable and Combustible Liquids Stored in Approved Cabinet	No
Location of Improperly Stored Flammables/Combustibles	Small wood cabinet in apparatus bay
All Pressure Cylinders Stored Properly	Yes
SCBA Compressor System Present	Yes
Air Sample Certification Present and Visible	Certification status current, but not present
Back-Up Generator Present	Yes, with auto transfer switch
Generator Fuel Type and Source	Natural gas, piped in
Apparatus Exhaust Removal	No exhaust removal effort in place
Underground Storage Tanks Present	No
Apparatus Floor Drain Oil Separators in Place	No oil separator in use
Adequate Space for Working On or Around Apparatus	Space around apparatus cramped and movement is limited
Apparatus Room Accommodates Working on Small Equipment	Adequate space
Personnel Can Move Quickly and Easily to Apparatus for Response	Yes
Adequate Space for Cooking and Eating	Yes
Adequate Space for Local Company Training and Drills	No
Are Compromises Necessary for Two-Gender Staffing	Yes
Adequate Space for Personal Hygiene	Yes
Adequate Space for Sleeping	Yes
Adequate Space for Storage	Limited

Apparatus

In totality, SHFD maintains a fleet of three engines, one aerial truck, and three ambulances. Most of the current emergency vehicles fall within what is considered to be an acceptable lifespan, with an average age calculated at 11.1 years. UHFD maintains a fleet of one engine, one truck, and two ambulances. Most of the current emergency vehicles fall within what is considered to be an acceptable lifespan, with an average age calculated at 10.0 years. The following figures summarize currently existing fire and emergency response apparatus.

Shaker Heights Station 1

Engine 215	
Unit Status	Active Service
Manufacturer	Pierce Mfg.
Year of Manufacture	2001
Mileage	44,704
Hours	6,358
Pumping Capacity	2,000 gpm
Tank Capacity	750 gallons
Seating Capacity	6
Number of SCBA	6

Equipment	Large diameter hose, Generator, Power rescue tool, BLS medical gear, Automatic external defibrillator, Thermal imaging camera, Class A foam/eductor, Class B foam/educator, 35 gallon foam tank
Surface Rust Present	Light
Structural Rust and Corrosion	None
Apparent Fluid Leaks	None
Overall Appearance and Condition Rating	Excellent

Truck 225

Unit Status	Active Service
Manufacturer	Other Simon Duplex
Year of Manufacture	1995
Mileage	41,124
Hours	6,547
Pumping Capacity	2,000 gpm
Type of Elevating Aerial Device	Straight Ladder
Elevating Device Style	Rear Mount
Height Of Device At Full Elevation	110
Does this unit also respond as a standard engine (quint use)	Responds as aerial/truck company only
Tank Capacity	200 gallons
Seating Capacity	6
Number of SCBA	6

Equipment	Large diameter hose, Generator, Power rescue tool, BLS medical gear, Automatic external defibrillator, Thermal imaging camera
Surface Rust	Light
Structural Rust and Corrosion	Light
Apparent Fluid Leaks	None
Overall Appearance and Condition Rating	Fair

Rescue 245

Unit Status	Active Service
Manufacturer	Horton Emergency Vehicles
Year of Manufacture	2009
Mileage	N/A
Equipped for	ALS
Crew Seating Capacity	2
Number of SCBA	3

Equipment	ALS medical gear
Surface Rust	None
Structural Rust and Corrosion	None
Apparent Fluid Leaks	None
Overall Appearance and Condition Rating	Excellent

Hazard 1

Unit Status	**Active Service- Housed at Shaker Heights but owned by regional special services team**
General Rescue Class	Heavy Rescue non walk-in
Manufacturer	Summit Fire Apparatus
Year of Manufacture	2001
Mileage	6,600
Seating Capacity	4
Number of SCBA	0

Equipment	Generator, Articulating flood light, Rope rescue gear, Confined space rescue gear
Surface Rust	None
Structural Rust and Corrosion	None
Apparent Fluid Leaks	None
Overall Appearance and Condition Rating	Good

Shaker Heights Station Two

Engine 216

Unit Status	Active Service
Manufacturer	Pierce Mfg.
Year of Manufacture	2003
Mileage	0
Hours	0
Pumping Capacity	2,000 gpm
Tank Capacity	750 gallons
Seating Capacity	6
Number of SCBA	6

Equipment	Large diameter hose, Generator, Power rescue tool, BLS medical gear, Automatic external defibrillator, Thermal imaging camera, Class A foam/eductor, Class B foam/eductor
Surface Rust Present	Light
Structural Rust and Corrosion	Light
Apparent Fluid Leaks	None
Overall Appearance and Condition Rating	Good

Engine 217

Unit Status	Reserve status, response-ready
Manufacturer	Other Simon Duplex
Year of Manufacture	1991
Mileage	55,142
Hours	675
Pumping Capacity	1,500 gpm
Type of Elevating Aerial Device	Straight Ladder
Elevating Device Style	Rear Mount
Height Of Device At Full Elevation	75
Does this unit also respond as a standard engine (quint use)	Reserve ladder or engine
Tank Capacity	400
Seating Capacity	5
Number of SCBA	5

Equipment	Large diameter hose, Generator, BLS medical gear, Automatic external defibrillator, Thermal imaging camera
Surface Rust	Heavy
Structural Rust and Corrosion	Moderate
Apparent Fluid Leaks	None
Overall Appearance and Condition Rating	Poor

Rescue 246

Unit Status	**Active Service**
Manufacturer	Horton Emergency Vehicles
Year of Manufacture	2005
Mileage	68,619
Equipped for	ALS
Crew Seating Capacity	2
Number of SCBA	3

Equipment	ALS medical gear
Surface Rust	None
Structural Rust and Corrosion	None
Apparent Fluid Leaks	None
Overall Appearance and Condition Rating	Good

Rescue 247

Unit Status	**Reserve status, response-ready**
Manufacturer	Horton Emergency Vehicles
Year of Manufacture	2002
Mileage	93,416
Equipped for	ALS
Crew Seating Capacity	2
Number of SCBA	3

Equipment	ALS medical gear
Surface Rust	None
Structural Rust and Corrosion	None
Apparent Fluid Leaks	None
Overall Appearance and Condition Rating	Good

University Heights Station One

Engine 1112

Unit Status	Active Service
Manufacturer	Rosenbauer International
Year of Manufacture	2010
Mileage	3,201
Pumping Capacity	1,500 gpm
Tank Capacity	750 gallons
Seating Capacity	4
Number of SCBA	5

Equipment	Large diameter hose, Generator, BLS medical gear, Automatic external defibrillator, Thermal imaging camera, Class A foam/eductor, Class B foam/eductor
Surface Rust Present	None
Structural Rust and Corrosion	None
Apparent Fluid Leaks	None
Overall Appearance and Condition Rating	Excellent

Ladder 1121

Unit Status	Active Service
Manufacturer	Pierce Mfg.
Year of Manufacture	1992
Mileage	21,831
Hours	4,433
Pumping Capacity	1,250 gpm
Type of Elevating Aerial Device	Straight Ladder
Elevating Device Style	Rear Mount
Height Of Device At Full Elevation	75
Does this unit also respond as a standard engine (quint use)	Responds as aerial/truck company only
Tank Capacity	350
Seating Capacity	6
Number of SCBA	4

Equipment	Large diameter hose, Generator, Power rescue tool, BLS medical gear, Thermal imaging camera
Surface Rust	Moderate
Structural Rust and Corrosion	Light
Apparent Fluid Leaks	None
Overall Appearance and Condition Rating	Good

Squad 1141

Unit Status	**Active Service**
Manufacturer	Braun Industries, Inc.
Year of Manufacture	2005
Mileage	50,963
Equipped for	ALS
Crew Seating Capacity	3
Number of SCBA	2

Equipment	ALS medical gear
Surface Rust	None
Structural Rust and Corrosion	None
Apparent Fluid Leaks	None
Overall Appearance and Condition Rating	Good

Squad 1142

Unit Status	**Reserve status, response-ready**
Manufacturer	Braun Industries, Inc.
Year of Manufacture	2000
Mileage	43,515
Equipped for	ALS
Crew Seating Capacity	3
Number of SCBA	2

Equipment	ALS medical gear
Surface Rust	Light
Structural Rust and Corrosion	None
Apparent Fluid Leaks	None
Overall Appearance and Condition Rating	Good

Staffing and Personnel Management

Both SHFD and UHFD employ career staff to accomplish their respective missions and deliver services to the citizens of each community. This section describes the staffing and personnel management activities and provides an analysis of the organizations' current staffing levels. The review of personnel management programs focused on:

- Policies, rules, regulations, manuals, and handbooks
- Reports and records
- Labor-management relationship and issues
- Certifications and licensing
- Disciplinary process
- Counseling services
- The application and recruitment process
- Testing, measuring, and promotion processes
- Health and wellness programs

In simplest terms, staffing is defined as "to supply with a staff or with workers."[9] In broader terms, it involves the decisions and activities connected with selecting and training individuals for specific job functions and charging them with job responsibilities. These individuals provide the staff for an organization.

Before delving into a discussion of staffing and personnel management, a clarification is offered. The terms "human resource management" and "human resources" (HR) have largely replaced the term "personnel management" as a description of the processes involved in managing people in organizations.[10] However, the terms are frequently used interchangeably when describing the recruitment and retention of a workforce.

Human resource management (HRM) is based on the assumption that workers and members of organizations are individuals with varying goals, desires, needs, and wants. As such, the workforce should never be thought of as an inanimate business resource. Because people represent the very foundation of any successful organization, HRM should take a positive view of workers, assuming that all

[9] Merriam-Webster Online Dictionary, 2010.
[10] Armstrong, Michael (2006). *A Handbook of Human Resource Management Practice* (10th edition), London: Kogan.

wish to contribute productively; and that the main obstacles to any endeavour result from a lack of knowledge, insufficient training, or process failure.

Careful attention must be paid to managing the workforce to achieve maximum productivity for the organization, and maximum satisfaction for the individual. A safe working environment, fair treatment, and recognition for a job well done are key components to job satisfaction.

It is important that the organization's members know to whom they should go when they have a problem, question, or issue related to their relationship to the city. In large companies, a human resource department typically handles this function. Staff within such a department addresses questions, issues, and tasks related to appointment, benefits, performance, discipline, promotion, or termination of employees.

Compensation Systems, Disciplinary, and Appeals Processes

As noted previously, personnel compensation is typically the highest percentage of a career department's overall budget. This is the case with both SHFD and UHFD. The compensation systems of both departments are specifically detailed in each respective labor unit's collective bargaining agreement. The basic compensation of each covered position is illustrated below for comparative purposes.

Figure 15: Comparison of Department Compensation Systems – 2011[11]

	2011 Base Salary	
Position	**SHFD**	**UHFD**
Battalion Chief	$86,374	
Captain		$86,404
Lieutenant	$77,118	$77,841
Fire Inspector	$70,922	N/A
Primary Driver	$69,895	N/A
Back-Up Driver	$69,375	N/A
Firefighter 5th Year	$68,855	$77,316
Firefighter 4th Year	$62,699	$73,634
Firefighter 3rd Year	$56,539	$70,128
Firefighter 2nd Year	$51,525	$66,735
Firefighter 1st Year	$46,513	$63,343

[11] Obtained from each department's collective bargaining agreement, 2011 salary figures.

Other components of the overall salary and compensation packages are detailed within the collective bargaining agreements; and include items such as paramedic pay, holiday and vacation pay, overtime, seniority, and benefits.

This comparison will become more important as the study moves forward to evaluate the potential feasibility of bringing these departments together in a cooperative effort.

All disciplinary and appeals processes are detailed within each department's respective collective bargaining agreement and are similar in scope and nature.

Emergency services bring otherwise ordinary people into life-and-death situations that sometimes end tragically. Even though department personnel are trained responders, they do not have an impregnable shield that prevents them from being affected by traumatic events. Critical incident stress is a very real condition that affects all emergency service workers to some degree or another. Every emergency worker handles stress in a different way and, at times, may be unable to adjust or compensate. The trigger for significant psychological trauma may be a single event or a series of compounding events.

Fire and EMS departments recognize the need to provide a support system for emergency workers who are exposed to traumatic incidents. Critical incident stress interventions by this group are short-term processes only. Although this intervention is normally enough to help emergency personnel cope with the event, on occasion longer-term support is needed. Failure to provide that support can ultimately lead to the loss of a very valuable member of an organization.

An Employee Assistance Program (EAP) is offered by organizations to personnel as a long-term stress intervention tool. Typical plans allow the member a fixed number of counseling visits per year with no out-of-pocket cost. The counseling provides additional support for other life problems that may affect a member's motivation and work quality; such as substance abuse, marital difficulties, and financial problems.

Figure 16: Summary of Employee Benefits Elements

	SHFD	UHFD
Retirement Plan	State plan used, ICMA, Ohio 457	State plan used
Medical Insurance (not duty-related)	Employer-employee shared	Employer-employee shared
Dental Insurance (not duty-related)	Employer paid	Employer-employee shared
Vision Insurance (not duty-related)	No medical insurance	Employer-employee shared
Critical Incident Stress Debriefing (CISD) Program	County or regional team	County or regional team
Employee Assistance Program (not duty-related)	Yes, all personnel	No EAP

Application, Recruitment, and Retention Efforts

Personnel recruitment is a key function of all emergency service agencies. The community places a tremendous amount of faith in fire and EMS personnel, trusting them to provide the highest level of service when the public is most vulnerable. As such, the process used to select personnel should be very comprehensive.

Experience within the fire service industry has shown that relaxing the requirements for entry-level positions is not the answer for recruiting any employee. Instead, most departments have had greatest success in activities that encourage qualified applicants to apply. This process often involves targeted advertising and promotional campaigns aimed at demonstrating the salary and benefits, as well as the personal satisfaction, of a career in the fire service. Existing employees can be encouraged to participate in any such campaign, and professional assistance from a human resource department is advisable.

In the state of Ohio, civil service plays a significant role in how local governments recruit and hire personnel. Both Shaker Heights and University Heights are participants in the civil service system and adhere to those rules and regulations. Thus, recruitment is limited to the utilization of eligibility lists generated through the civil service system; and hiring must be accomplished from that list. The following figure summarizes the recruitment and retention elements for the study departments.

Figure 17: Summary of Recruitment and Retention Elements

	SHFD	UHFD
Minimum Physical Standards Established	Yes, Cuyahoga Comm. College	Yes, Cuyahoga Comm. College
Aptitude of Knowledge Testing	Yes	Yes
Pre-Appointment Medical Exam Required	Yes	Yes
Pre-Appointment Medical Exam Paid	Paid by agency	Paid by agency
Nature of Pre-Appointment Medical Exam	Ohio Police and Fire Standards	Ohio Police and Fire Standards
Who is the Hiring Authority	Mayor	Public Safety Director
Applicant Process Includes	Complete application packet with job description and requirements, Application review, Applicant interview panel, Criminal history check, Education and certification check, Employment reference checks, Personal reference checks, Written test, Physical agility test, Psychological test, Polygraph test, Medical examination, Probationary period, Advertise in papers, advertise at fire academy and paramedic schools, interviews with chief and union, One year probation, minority recruitment components in place	Complete application packet with job description and requirements, Application review, Applicant interview panel, Criminal history check, Employment reference checks, Written test, Physical agility test, Psychological test, Polygraph test, Medical examination, Probationary period

Testing, Measurement, and Promotional Processes

Once on staff, personnel should be evaluated periodically to ensure their continued ability to perform job duties safely and efficiently. Technical and manipulative skills should be assessed on a regular basis. This provides documentation about a person's ability to perform responsibilities and provides valuable input into the training and education development process.

It is important to maintain such programs whenever possible; it has long been known that members sincerely wish to be a contributing part of any organization. This basic desire to succeed is best encouraged through feedback that allows each member to know what he/she is doing well and what skills may need improvement. Honest and effective feedback encourages members to reinforce mastered skills and abilities, and to work harder to improve the areas where performance may fall short. Regular evaluation and feedback for personnel is critical to behavior modification and improvement.

Technical and manipulative skills should be evaluated regularly. This provides documentation about a person's ability to perform their responsibilities, and provides valuable input into the training and education development process. *NFPA 1021 Standard for Fire Officer Professional Qualifications, 2009 Edition* identifies the recommended progressive levels of performance required at the various levels of fire officer responsibility, including Fire I, II, III, and IV. These processes should be evaluated for integration into each department's promotional systems and, if necessary, included in the collective bargaining agreement. The following figure summarizes each study department's testing, measurement, and promotional elements.

Figure 18: Summary of Testing, Measurement, and Promotional Elements

	SHFD	UHFD
Periodic Capability Testing to Measure Minimum Standards Compliance	Yes, formal periodic testing	Yes, formal periodic testing
Periodic Performance Evaluations	Yes, annually	No
Formal Promotional Testing	Yes	Yes
Types of Promotional Testing	Written test plus assessment center	Written test, Skills test, Interview panel

Health and Wellness Programs

Keeping members safe and healthy, once thought of as an expensive and unneeded extra, is today an important component of a fire department's method of operation. It has been clearly documented that it is by far cheaper to prevent injury than to pay for rehabilitation and work replacement.[12] Modern, progressive departments are incorporating numerous methodologies into the daily routine of firefighters to help in this regard.

There is a need for fire departments to have access to a group of professionals with expertise in the occupational medicine field. Occupational medicine is dedicated to promoting and protecting the health of workers through preventive services, clinical care, research, and educational programs. One aspect of a program is keeping up to date with health and safety regulations, standards, and current practices. Occupational medicine specialists review current practices to see if they meet the regulations, make modifications if needed, and assist the department in adopting any changes. Another aspect of a holistic occupational medicine system is fitness programs. Fitness programs are used to monitor and

[12] *American Journal of Industrial Medicine*, Volume 43, Issue 4; "The Economic Consequences of Firefighter Injuries and Their Prevention," National Institute of Standards and Technology, March 2005, pgs 454-458.

develop required physical training to keep personnel ready for the tasks to be performed and reduce the possibility of injury while on the job.

The importance of employee health and welfare, and the potential liability associated with the lack of such programs, necessitates that fire departments establish close professional relationships with occupational medicine specialists to assure that emergency workers are protected by the most up-to-date occupational health and safety programs possible.

Occupational safety and health programs (sometimes referred to as Industrial Medicine) vary in depth, form, and delivery. A fire department may employ a physician full time, contract with a provider organization, or conduct a program partially in-house while contracting for the remaining services.

A stress test is used to determine the amount of stress that a heart can manage before developing either an abnormal rhythm or evidence of ischemia (inadequate blood flow to the heart muscle). The test provides information about how the heart responds to exertion. It usually involves walking on a treadmill or pedaling a stationary bike at increasing levels of difficulty, while an electrocardiogram, heart rate, and blood pressure are monitored. The test helps to determine if there is adequate blood flow to the heart during increasing levels of activity, and the likelihood of having a coronary event; or the need for further evaluation.

Annual medical physical examinations should be considered for fire department personnel at all ranks and job assignments. Examinations should follow *NFPA 1582*. Baseline values for all firefighters should be established at time of hire that include: titer level, vision, spirometry, audiometry, hepatitis B and C, and tetanus.

Medical physical assessments should involve periodic stress tests of incumbent employees every two to five years, based on age and risk factors. We recommend that a stress test be performed at the time of hire to determine if a candidate has an underlying heart defect or disease that would put them at risk while performing the duties of a firefighter. The leading cause of death for firefighters is heart attack (44 percent). [13]

[13] The United States Fire Administration (USFA), *The USFA Firefighter Fatality Retrospective Study: 1990-2000*, October 2002.

In a joint effort, the International Association of Fire Fighters and the International Association of Fire Chiefs have developed a health and wellness model for use by both volunteer and career fire departments. The program, known as "The Fire Service Joint Labor Management Wellness/Fitness Initiative," is designed for current personnel and requires a commitment by both labor and management to provide a positive and individualized wellness/fitness program. The program addresses medical evaluation, fitness evaluation, injury/medical rehabilitation, behavioral health, cost justification, data collection, and implementation. Los Angeles County (CA) Fire Department implemented a wellness and fitness program following the IAFF/IAFC model, and, as of their 2006 program report, workers' compensation claims were reduced 23 percent since the introduction of the program, resulting in significant cost savings.

Neither of the study departments has formalized health and wellness initiatives, although SHFD has one officer that has instituted a voluntary program for physical fitness and wellness that follows the IAFC/IAFF programs. The figure below summarizes the health and wellness elements of each study department.

Figure 19: Summary of Health and Wellness Elements

	SHFD	UHFD
Post-appointment Periodic Medical Examinations	Yes	No
Nature of Periodic Medical Exam	NFPA 1582 compliant	N/A

Administrative and Support Personnel

One of the primary responsibilities of a fire department's administrative and support staff is to ensure that the operational entities have the ability and means to accomplish their duties on the emergency incident. Efficient and effective administration and support are critical to the department's success. Without sufficient oversight, planning, documentation, training, and maintenance; the operational entities of a fire department will fail any operational test. Additionally, like any other part of a fire department, administration and support require appropriate resources to function properly.

Analyzing the administrative and support positions of a fire department facilitates an understanding of the relative number of resources committed to this important function. The appropriate balance of the administrative and support components to the operational component is critical to the success of a department's mission and responsibilities.

The following figure outlines the corporate, administrative, and/or support organizational structure and complement of the study departments.

Figure 20: Summary of Administrative and Support Positions[14]

Position	SHFD	UHFD	Total
Fire Chief	1	1	**2**
Assistant Chief	1	0	**1**
Accounting Clerk	1	0	**1**
Fire Inspector	1	0	**1**
Supt. Of Equipment	0.5	0	**0.5**
Total	**4.5**	**1**	**5.5**

Although there is no set guide to determine the appropriate ratio of administrative and support staff to total personnel, through ESCI's experience with emergency services agencies it is common to find ratios in the range of 10 to 15 percent. SHFD's ratio of administrative and support staff to total personnel equals 7.7 percent, while UHFD's ratio of administrative and support staff to total personnel equals 3.4 percent. From a combined perspective, the ratio equates to 6.3 percent, below what ESCI has routinely experienced.

Operational Staffing Levels

It takes an adequate and well-trained staff of emergency responders to put the appropriate emergency apparatus and equipment to its best use in mitigating incidents. Insufficient staffing at an operational scene decreases the effectiveness of the response and increases the risk of injury to all individuals involved. The following figure summarizes the personnel assigned to street-level service delivery, as provided by the department.

[14] Supplied by each department on ESCI worksheets.

Figure 21: Summary of Budgeted Operational Staff Positions[15, 16]

Position	SHFD	UHFD	Total
Battalion Chief	4	0	**4**
Captain	0	4	**4**
Lieutenant	12	2	**14**
Firefighter/Paramedic	31	19	**50**
Firefighter	7	1	**8**
Total	**54**	**26**	**80**

Combined, the departments have 80 career emergency response personnel, plus administrative staff.

Staff Allocation

In communities across North America, the number of fire calls has declined over the past decade. Yet as the frequency of fires diminishes, in part due to stricter fire codes and safety education, the workload of fire departments has risen sharply; medical calls, hazardous materials calls, and every sort of household emergency is now addressed by fire departments. Therefore, even though the frequency of fires diminishes, the need for a ready group of personnel has increased.

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 burn hotter (due to synthetics), and roofs collapse sooner because prefabricated roof trusses separate easily after a very short exposure to flame. The necessity of firefighters arriving on the scene of a fire in the shortest span of time is more critical now than ever.

Along with a quick response, a robust, well-trained, and appropriately equipped complement of emergency workers is needed to successfully mitigate structural fires. Too few firefighters at an emergency scene decreases effectiveness and increases the risk of injury to firefighters and civilians alike.

While many requests for emergency assistance are comparatively low-risk, requiring few personnel; the emergency workers needed to mitigate a structure fire are greater. A house fire involving just one room and its contents is considered as a moderate-risk incident in the industry.

[15] Ibid.
[16] UHFD does not differentiate between firefighter/paramedic and firefighter positions in job classification but rather pays a premium to those certified as paramedic.

As noted previously, the study departments staff three stations with career personnel based on a minimum staffing methodology, as outlined below.

Figure 22: Minimum Apparatus Staffing[17, 18]

Apparatus	Minimum Staffing
Shaker Heights Station 1	
Engine 215	3
Truck 225	Cross-staffed
Command 263	1
Rescue 245	3
Shaker Heights Station 2	
Engine 216	3
Rescue 246	3
Rescue 247	Cross-staffed
University Heights Station 1	
Engine 1112	3
Truck 1121	Cross-staffed
Squad 1141	3
Squad 1142	Cross-staffed

Cross-staffing is an apparatus staffing methodology whereby personnel staff individual apparatus based on the type of incident dispatched and the available staffing. For instance, if SHFD is dispatched to a working structure fire and all personnel are available in the station, then both Engine 215 and Truck 225 would be staffed, leaving Rescue 245 unstaffed. Likewise, if two medical incidents are dispatched in the UHFD area, both Squad 1141 and Squad 1142 would be staffed, leaving Engine 1112 unstaffed. SHFD also allows minimum staffing to be reduced to 12 during overnight hours (2200 – 0800).

SHFD operations personnel work under a collective bargaining agreement (CBA) between the city of Shaker Heights and International Association of Firefighters (IAFF) Local 516, which dictates most of the working conditions and labor/management requirements. Issues not covered within the CBA fall within the city employee policies and procedures. SHFD personnel work a 24-hour shift on a three-platoon rotation for an average of 51 hours per week on a 21-day cycle, and receive one day off (Special Day) each cycle.

UHFD operations personnel work under a CBA between the city of University Heights and IAFF Local 974, which dictates most of the working conditions and labor/management requirements. Issues not covered

[17] Supplied by each department on ESCI worksheets.
[18] The term rescue and squad are used interchangeably by the departments and both represent a transport ambulance.

within the CBA fall within the city employee policies and procedures. UHFD personnel work a 24-hour shift on a three-platoon rotation, for an average of 49.92 hours per week on a 27-day cycle.

Although a majority of both departments' incidents are medical in nature (as will be discussed later in this report), it is necessary for both departments to produce a sufficient number of personnel for fire suppression activities, particularly structure fires. The Center for Public Safety Excellence (CPSE), the organization that accredits fire departments internationally, recommends that departments conduct a tabletop critical tasking analysis to determine personnel needs for various types of incidents. The following figure illustrates an example of critical tasking based on four major risk categories.

Figure 23: Minimum Firefighting Personnel Needed Based on Level of Risk (Critical Tasking)[19]

Critical Task	Maximum Risk	High Risk	Moderate Risk	Low Risk
Attack line	4 (16-18*)	4	2	2
Search and rescue	4	2	2	
Ventilation	4	2	2	
Back-up line	2	3	3	
Pump operator	1	1	1	1
Water supply	1	1	1	
Utilities	1	1	1	
Command/safety	2	2	1	1#
Forcible entry	*			
Accountability	1			
Salvage	*			
Overhaul	*			
Communication	1*			
Chief's aide	1	1		
Operations officer	1			
Administration	*			
Logistics	1			
Planning		1*		
Staging		1*		
Rehabilitation	1			
Sector officers	1 (4*)			
High-rise evacuation	10-30*			
Stairwell support	10*			
Relief	*			
Investigation	*			
Totals	**25-65***	**17**	**13**	**3-4**

 # Can often be handled by the first due officer

** At maximum and high-risk fires, additional personnel may be needed*

[19] Based on recommendations of the Centers for Public Safety Excellence.

Based on the figure above, a typical single-family detached dwelling structure fire would require at least 13 personnel (Moderate Risk). Based on the minimum staffing of each department (13 for SHFD and 6 for UHFD) it is obvious that the departments should work together to produce sufficient personnel for suppression incidents. ESCI conducted an analysis of each department's National Fire Incident Reporting System (NFIRS) data to determine how well each department was actually producing their own personnel for structure fires. The results are presented below.

Figure 24: Actual Structure Fire Staffing Performance: 2010 to 2011[20]

Department	Average Structure Fire Staffing
SHFD	11.7
UHFD	5.6

As can be seen from the figure above, neither department has been able to produce the recommended minimum number of suppression personnel for structure fire incidents, on average, over the last two years. This provides more evidence that both departments should be working together to assemble the necessary minimum personnel as well using the personnel resources from other surrounding agencies.

The study departments currently have mutual aid agreements in place whereby resources from both departments can be summoned to emergency scenes when additional resources are needed. This program is enhanced to an automatic aid agreement whereby resources from both departments are automatically dispatched for second alarm incidents. Additional information regarding the concentration capabilities of the departments will be provided later in this report.

Labor Agreements

As mentioned previously, both study departments are served by fully career staff and each city has entered into a collective bargaining agreement with each department's respective union. While each of the collective bargaining agreements are with locals of the International Association of Firefighters (IAFF) each unit is independent. IAFF Local 516 represents the SHFD firefighters while IAFF Local 974 represents the UHFD firefighters.

[20] Determined through analysis of each departments records management system data.

The CBA between the City of Shaker Heights and IAFF Local 516 expires 31 December 2012 and the CBA between the City of University Heights and IAFF Local 974 expires 30 June 2014. These primary differences are summarized below.

Figure 25: Labor Agreements

	SHFD	UHFD
Hours of Work	51 hours per week	49.92 hour per week
Schedule Cycle	21 days	27 days
Normal Work Year	2,652 Hours	2,595.84 Hours
Salaries	As Discussed	As Discussed
Longevity	Begins at 7 Years	Begins at 4 Years[21]
Education Incentive	1 to 7.5 % of Base Pay	½ of 1 to 2 % of Base Pay
Holidays	6-24 Hour Special Days	13-24 Hour Special Days

[21] Changes to 6 years for personnel hired after 1 July 2011.

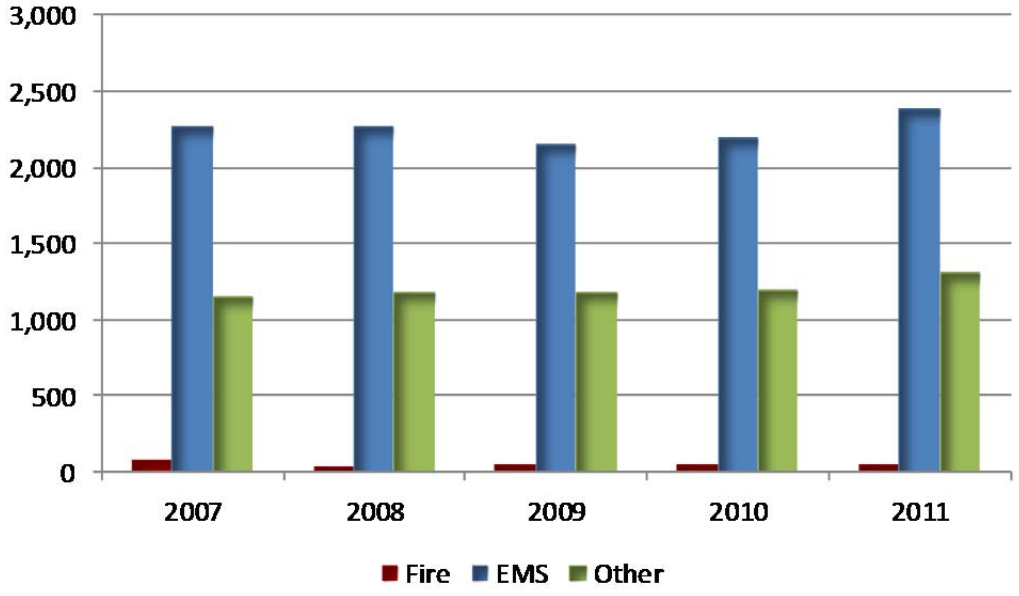
Service Delivery and Performance

The delivery of fire suppression and rescue services requires efficient notification of an emergency, rapid response from well-located facilities in appropriate apparatus, and sufficient staffing following a well-practiced plan of action. This section evaluates these various components and provides observations of the elements that make up the delivery of the most critical core services provided by the study departments.

Service Demand

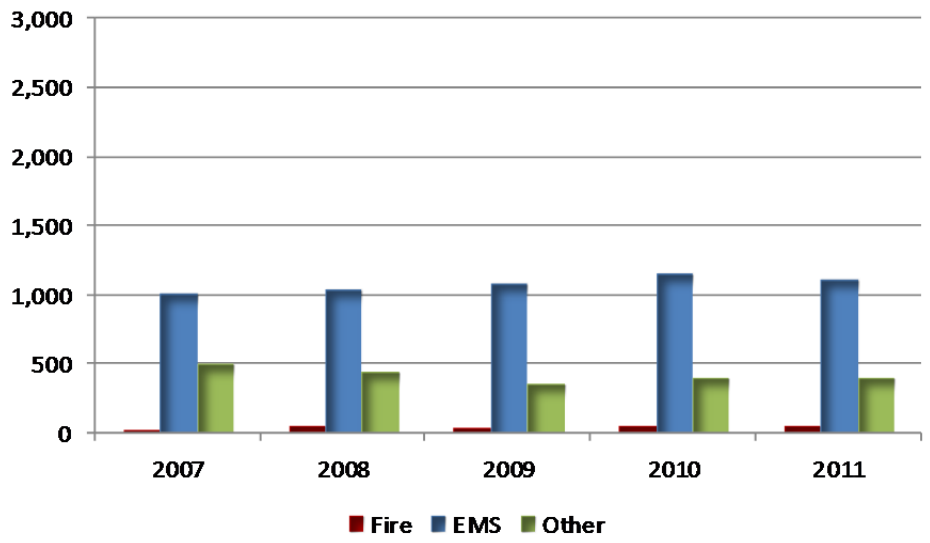
Demand is defined as the workload experienced by an emergency services organization. This workload, or demand, can be emergency and/or non-emergency, depending on the mission of the organization. For SHFD and UHFD, most of the workload is related to EMS responses, as identified in the figures below.

Figure 26: Service Demand by Major Category: SHFD[22]



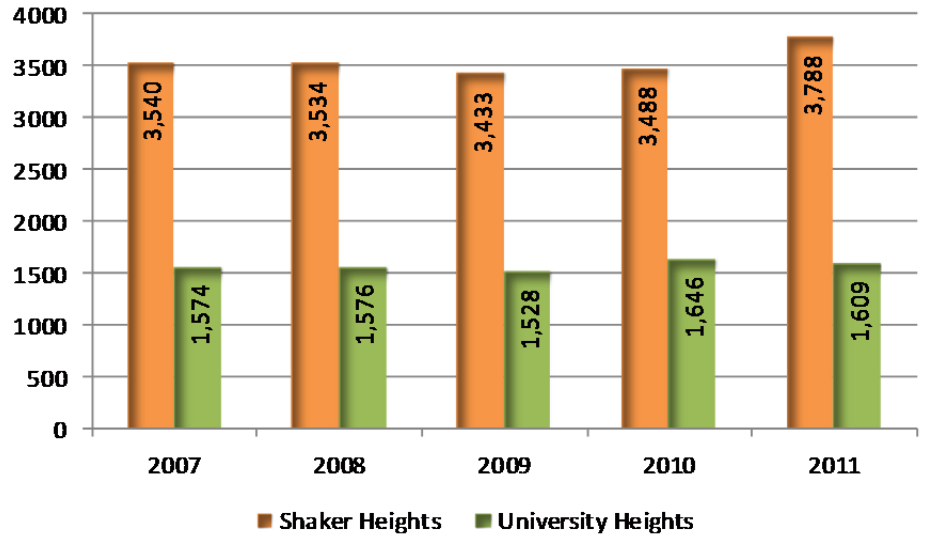
[22] Determined through analysis of SHFD records management system data.

Figure 27: Service Demand by Major Category: UHFD[23]



In both departments, medical incidents comprise a majority of the overall workload. Over the last five years, EMS workload has increased approximately 5.2 percent for SHFD and 9.8 percent for UHFD. Fire incidents in Shaker Heights have decreased significantly (26.9 percent) while 'other' incidents types have decreased in University Heights (19.2 percent). As expected due to the differences in land area and population served, SHFD has a total service demand roughly double that of UHFD as illustrated below.

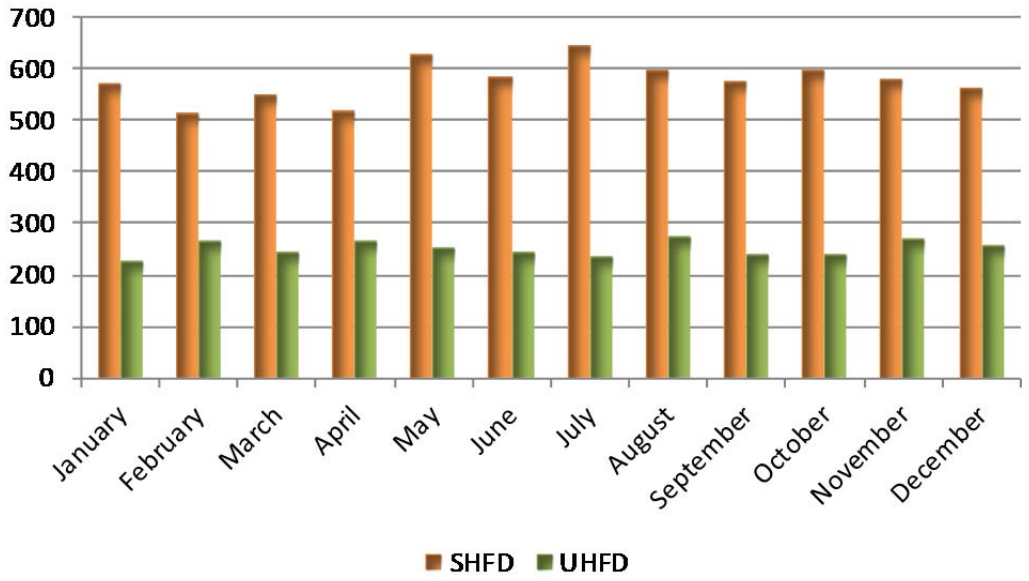
Figure 28: Total Workload Comparison[24]



[23] Determined through analysis of UHFD records management system data.
[24] Determined through analysis of each department's records management system data.

For the remainder of the temporal analysis, ESCI combined the NFIRS data for calendar years 2010 and 2011 to determine if any trends exist that may impact each department's ability to provide service. This analysis begins with an evaluation of service demand by month.

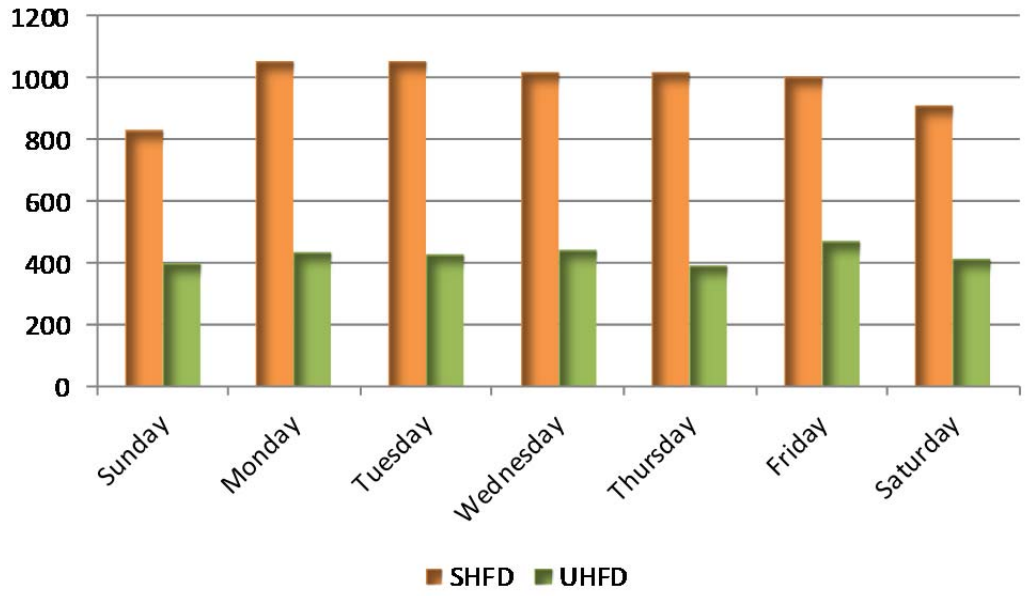
Figure 29: Service Demand by Month (2010-2011)[25]



Although peaks do exist during the summer months, service demand for both departments is relatively stable across all months of the year. Temporal analysis continues with an evaluation of service demand by day of week.

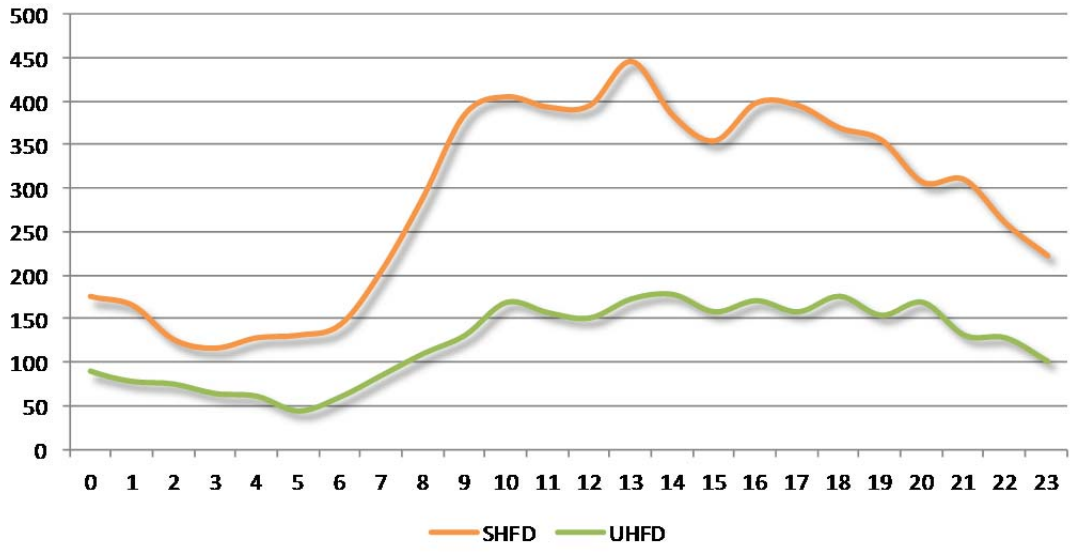
[25] Ibid.

Figure 30: Service Demand by Day of Week[26]



As with service demand by month, an analysis of daily service demand does not reveal any unusual trends that could impact service delivery. The final temporal analysis evaluated service demand by hour of day.

Figure 31: Service Demand by Hour of Day[27]

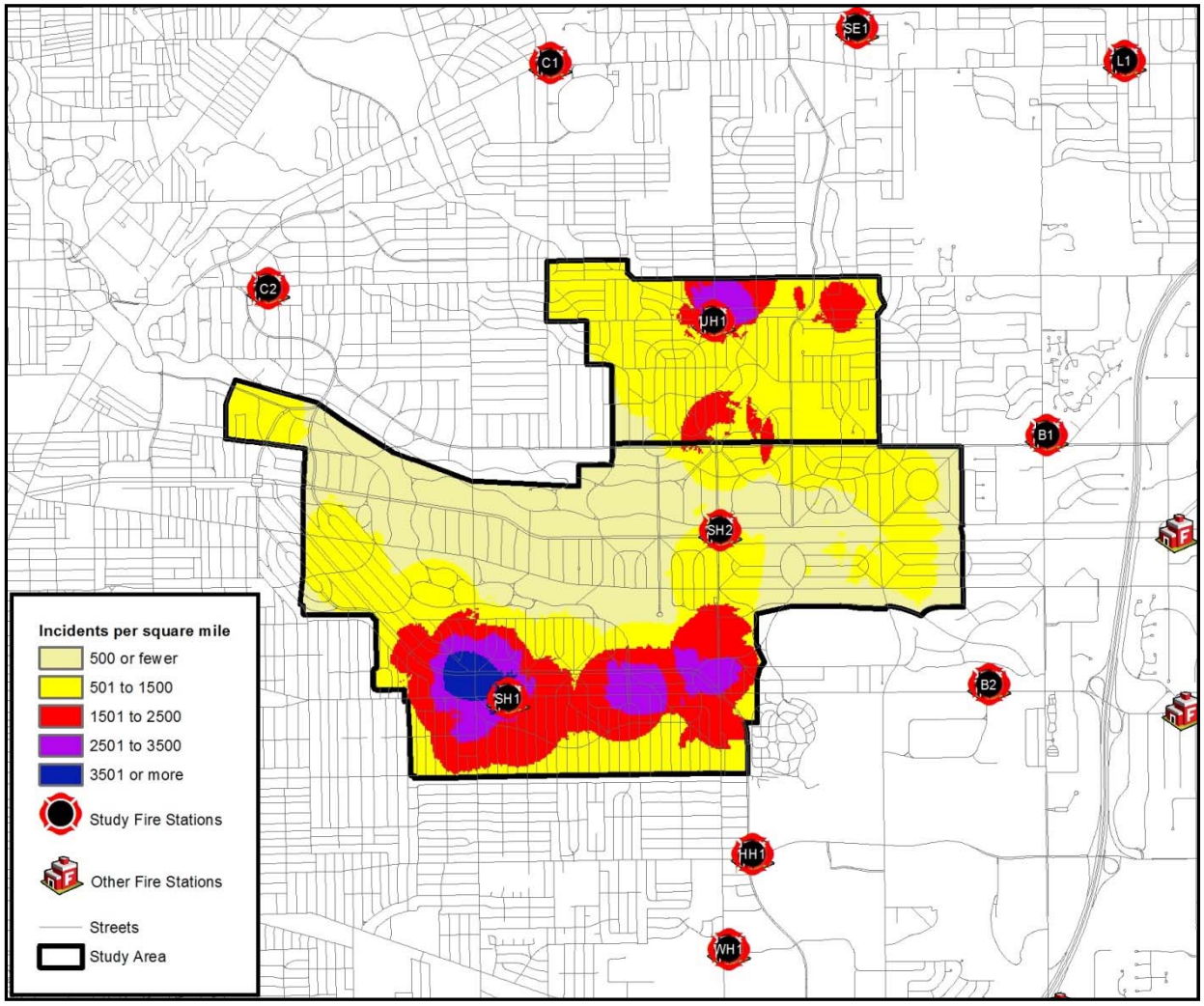


[26] Ibid.
[27] Ibid.

Unlike the service demand analysis by month and by day, a significant trend can be seen in the service demand by hour of day analysis. The bell curve visible in the figure above is typical for modern emergency services agencies, particularly those providing EMS. As can be seen, service demand begins to increase around 0700 hours and begins to decline around 1700 hours; a pattern that closely follows normal human activity. SHFD has used this trend in planning for deployment of resources, and increases minimum staffing to 13 during high volume service demand periods of 0800 to 2200.

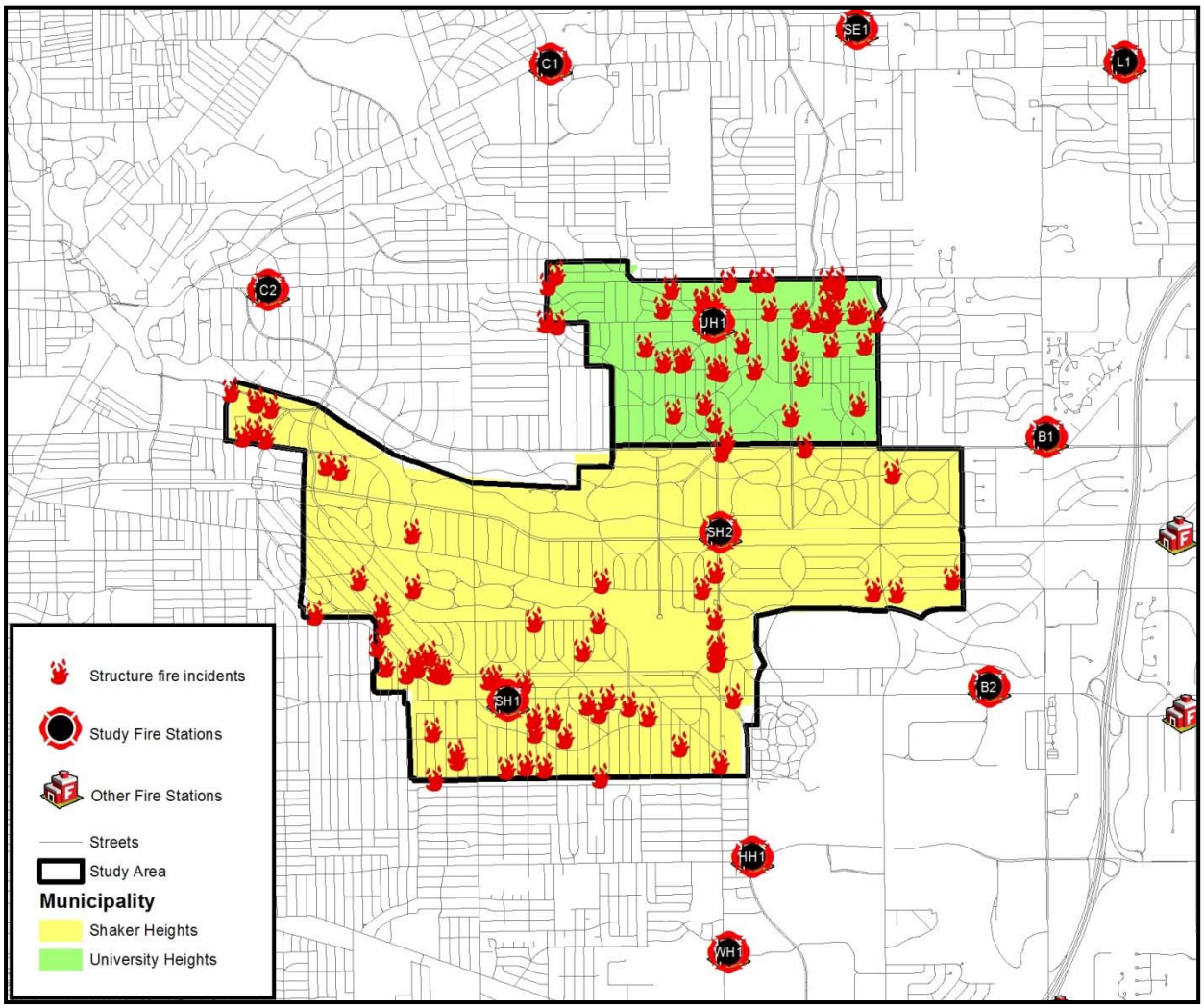
The next analysis consists of geographical service demand. The figure below illustrates how service demand is distributed across the service area of each department.

Figure 32: Geographic Service Demand: All Incidents (2010-2011)



As illustrated in the figure above, a majority of service demand is occurring in close proximity to SHFD Station 1 and UHFD. Although it is useful to display total service demand, geographic densities can be influenced by the prevalence of medical incidents. The following figure illustrates the geographic distribution of structure fires.

Figure 33: Geographic Distribution of Structure Fires

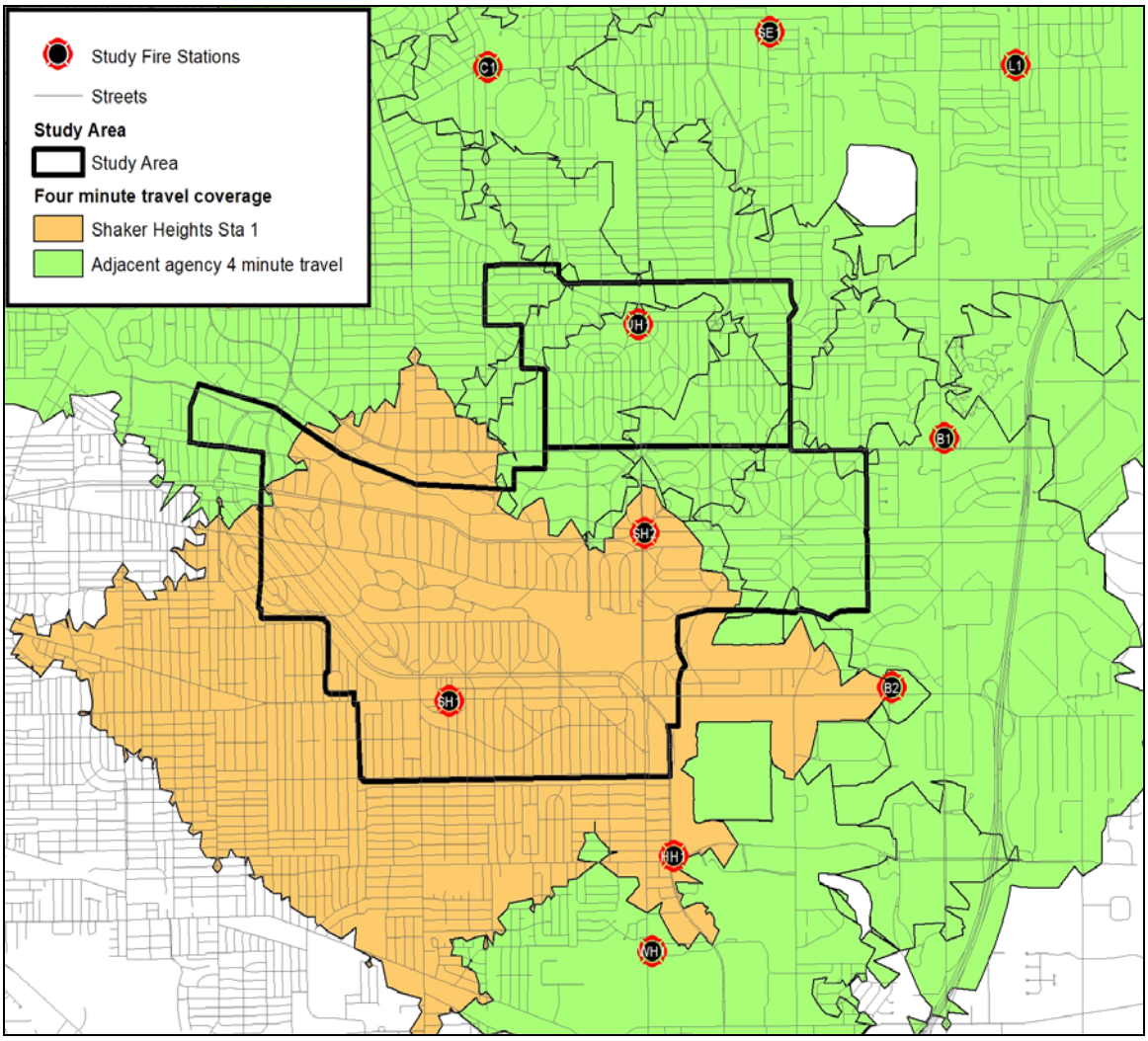


Unlike the previous figure, structure fires are more widely distributed throughout the service area, particularly those occurring within University Heights. This will be discussed in the next section of this report, which covers distribution of resources.

Distribution

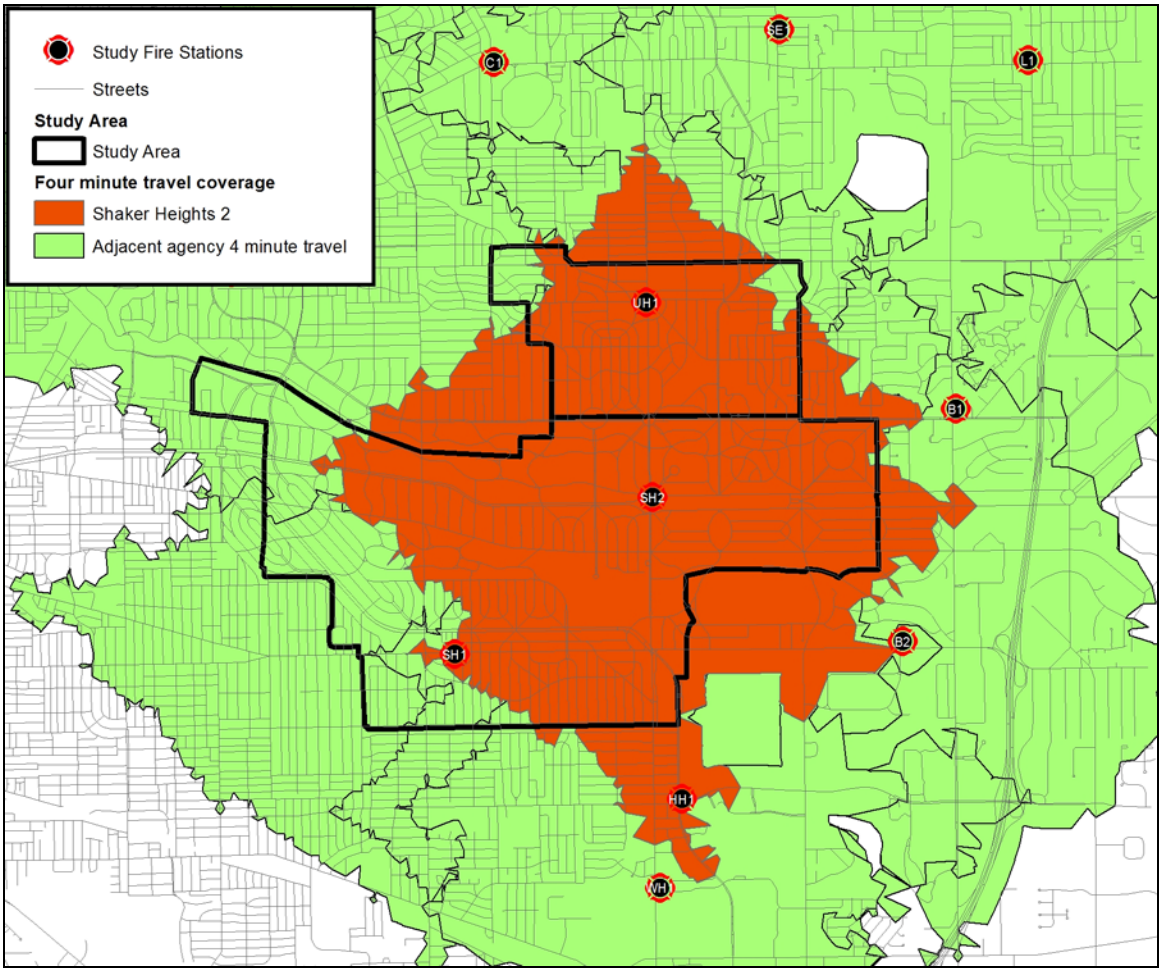
As stated previously, SHFD and UHFD operate from three facilities distributed across the study area. There exists a certain extent of each primary response area that can be reached within a certain travel time from the stations, regardless of staffing patterns. That is, once a unit is en route to an incident from the current station locations, there is a certain geographic area that can be covered within specific time periods. This is known as travel time. The intent of distribution analysis is to determine not only how much *area* can be covered from the existing stations within a certain amount of time, but also how much of the historic service demand can be covered within that time. The following maps illustrate the four-minute travel model from each existing station location beginning with SHFD Station 1.

Figure 34: Four-Minute Travel Model - SHFD Station 1



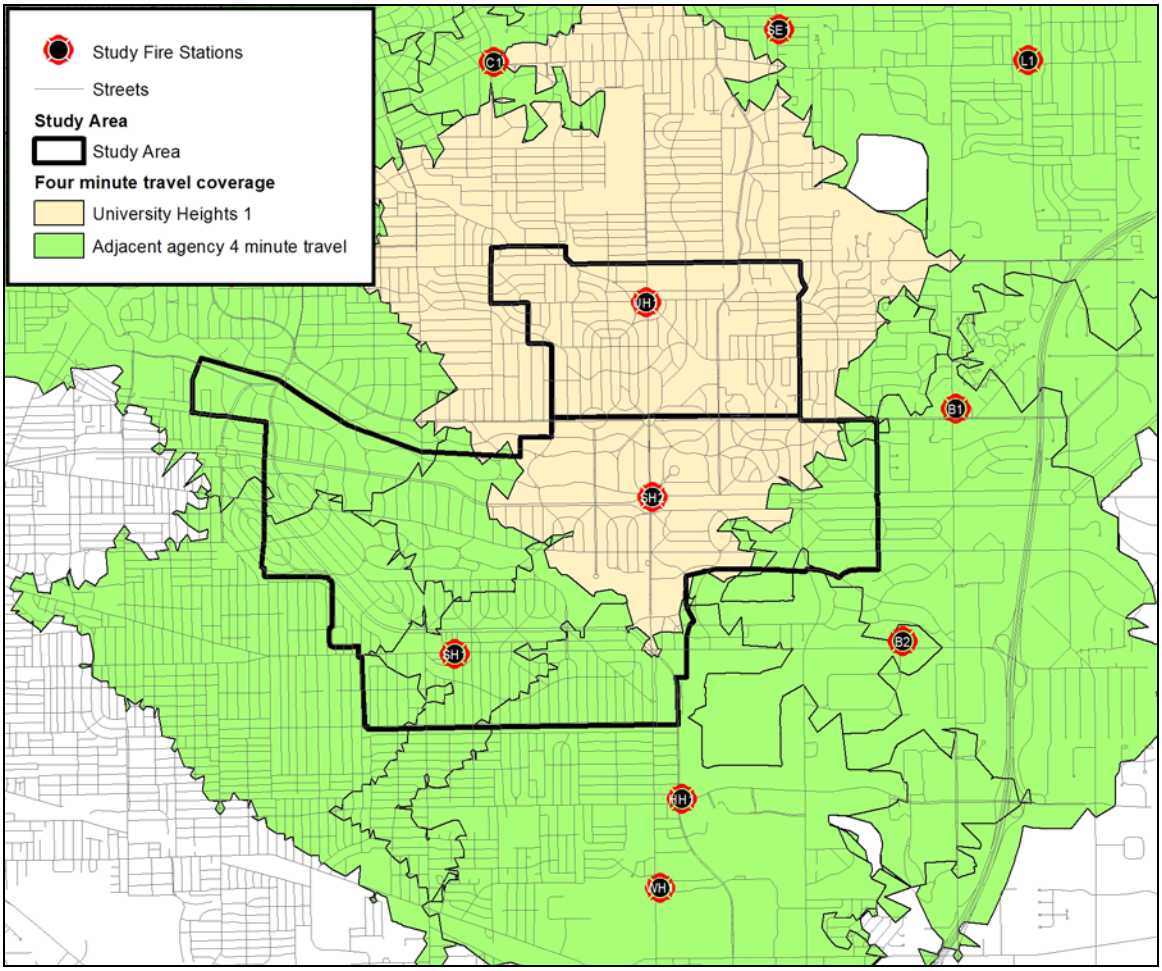
SHFD Station 1 is able to reach a majority of the City of Shaker Heights and, based on its current location, has substantial coverage outside the city to the west and southwest. The figure below illustrates SHFD Station 2's coverage area.

Figure 35: Four-Minute Travel Model - SHFD Station 2



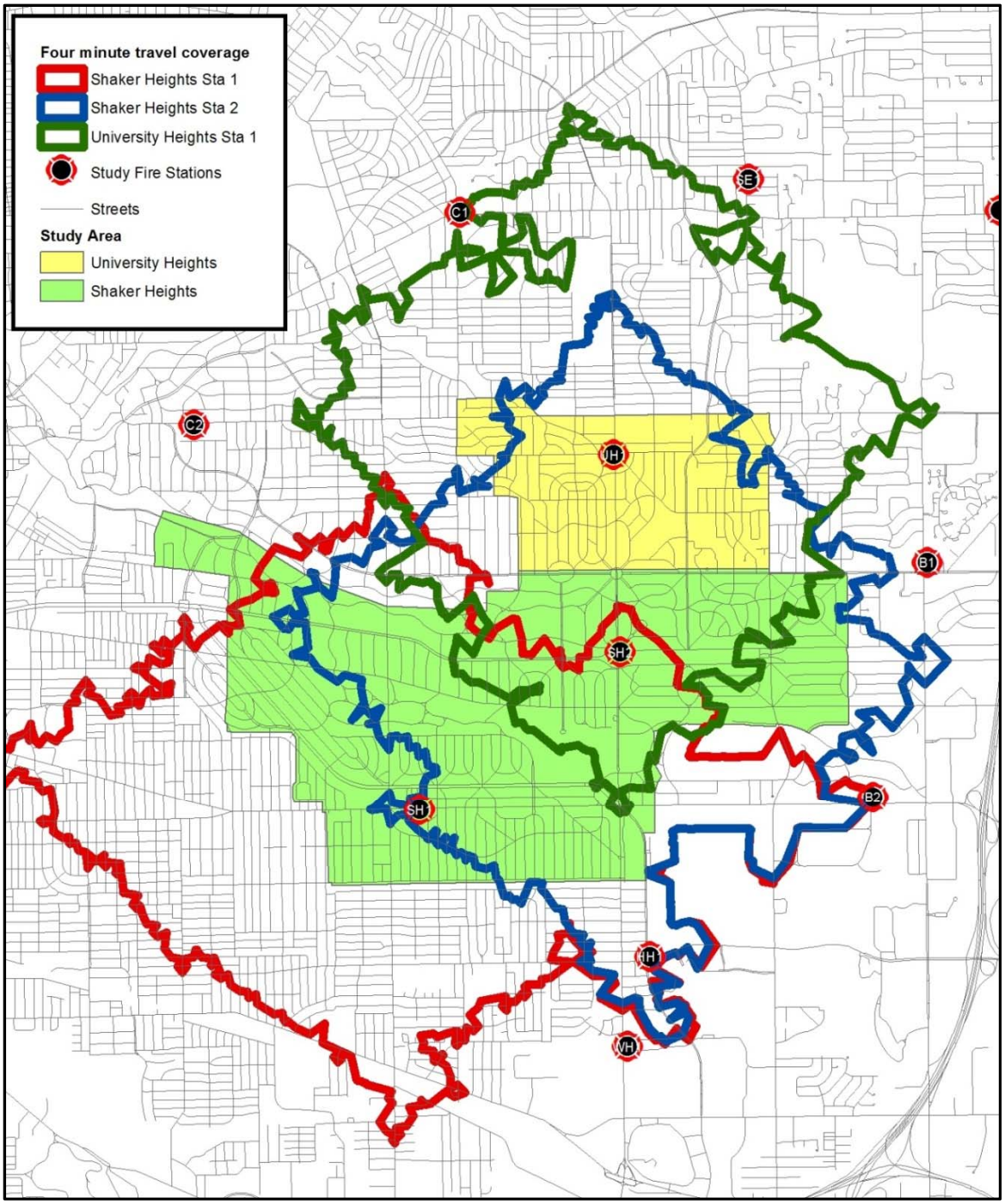
While overlap from SHFD Station 2 into the SHFD Station 1 area is evident, it is also possible for SHFD Station 2 to cover a majority of the City of University Heights within four minutes of travel. The following figure illustrates UHFD's travel model.

Figure 36: Four-Minute Travel Model - UHFD



Due to UHFD's current location on the north side of the city, the station has a response capability well to the north as well as 100 percent coverage of University Heights. When the preceding models are overlaid with one another, the substantial overlap between the three stations is evident, as illustrated below.

Figure 37: Four-Minute Travel Model from Existing Stations



The travel model, which does not include turnout time, indicates that 100 percent of all incidents occurring with the study area are within a four-minute travel of a fire station. In addition, there is a significant area of overlap within the central portion of the overall study area. UHFD overlaps 21.9 percent of SHFD Station 1's service area and 31.3 percent of SHFD Station 2's service area. Additionally,

SHFD Station 1 overlaps 48.5 percent of SHFD Station 2's service area. SHFD Station 2 overlaps 68.4 percent of SHFD Station 1's service area and 42.4 of UHFD's service area within the City of University Heights.

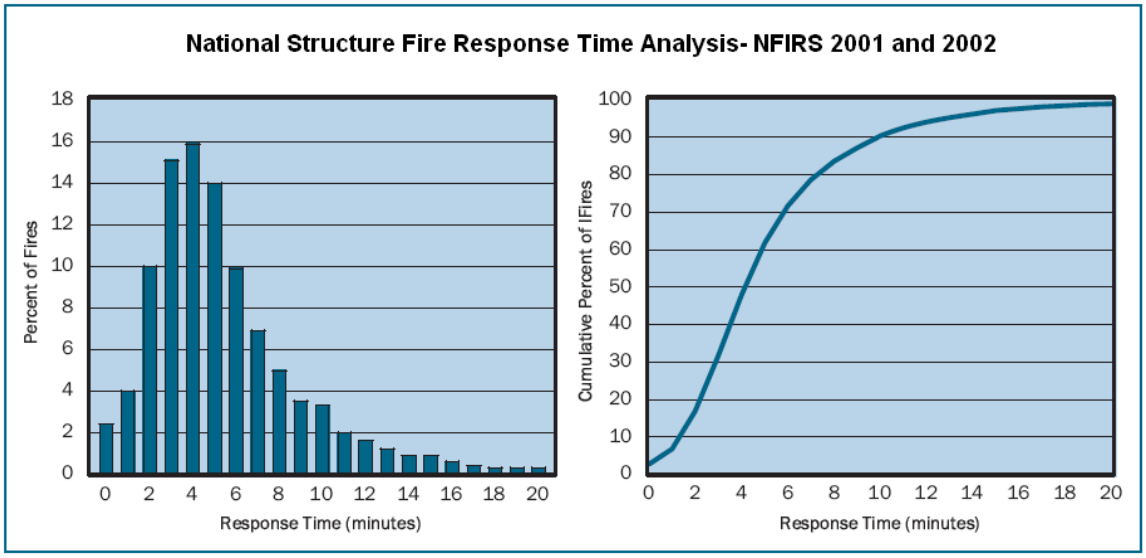
Published peer standards, *NFPA 1710, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*[28] and *NFPA 1720, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer or Combination Fire Departments* includes a performance objective of 240 seconds or less travel time for the arrival of the first arriving engine company in urban areas serviced by career fire departments.[29] NFPA 1720 also recommends a response performance objective of nine minutes or less when measured at the 90th percentile in urban areas, 10 minutes or less in suburban areas, and 14 minutes or less in rural areas served by volunteer or combination fire departments. NFPA 1710 does not differentiate between the various population densities, and assumes that all areas served by career or mostly career fire departments, such as the study departments, will adhere to a single performance objective.

It should be understood, however, that the response performance objective set by NFPA is extremely difficult for most departments to achieve, particularly those agencies serving a variety of population densities. The figures below were taken from a 2006 U.S. Fire Administration document that polled departments for actual response performance and then produced the results.

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

[29] *NFPA 1720, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer and Combination Fire Departments.* (National Fire Protection Association 2010.)

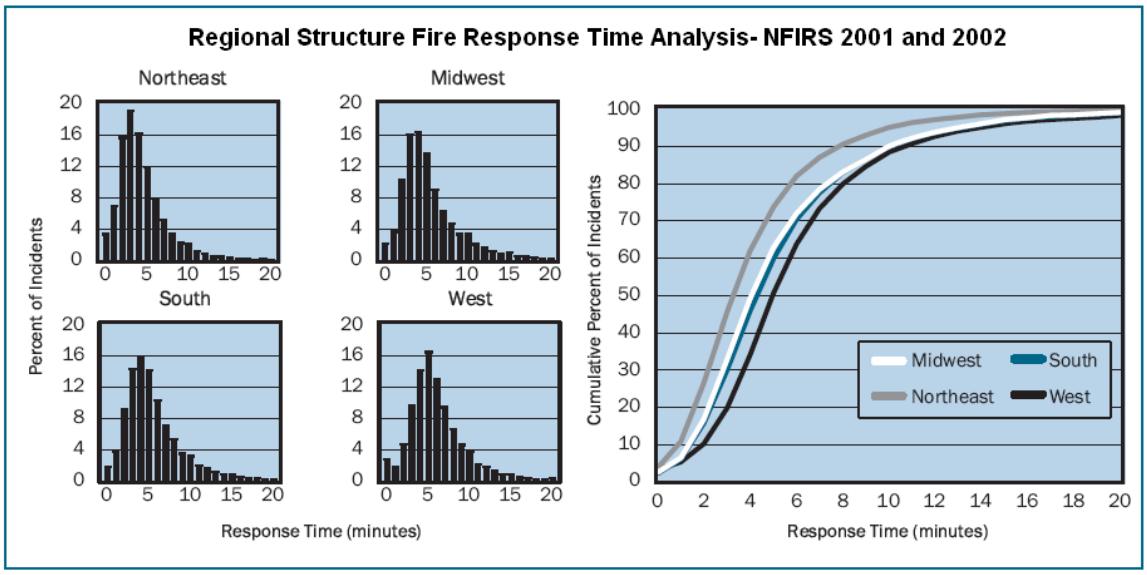
Figure 38: National Structure Fire Response Time Analysis



"Structure Fire Response Times"- U.S. Fire Administration/ National Data Center, January 2006

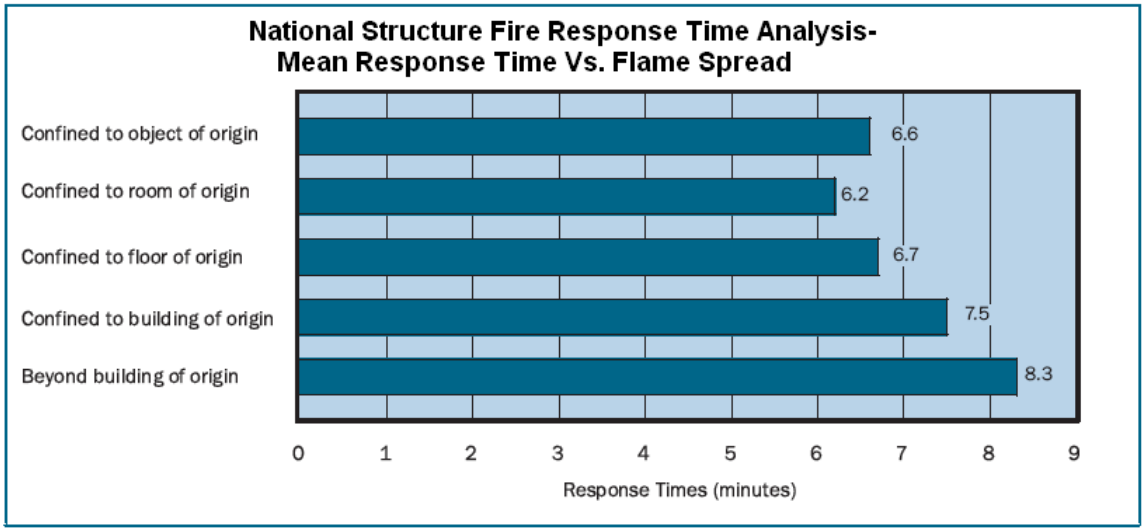
Nationally, the highest percentage (16 percent) of structure fires had a response time in the 4-minute range. The percent of structure fires with response times of three and five minutes were not far behind at 15 percent and 14 percent, respectively. Overall, 61 percent of structure fires in 2001 and 2002 had a response time of less than six minutes.

Figure 39: Regional Structure Fire Response Time Analysis



"Structure Fire Response Times"- U.S. Fire Administration/ National Data Center, January 2006

Figure 40: Mean Response Time vs. Flame Spread



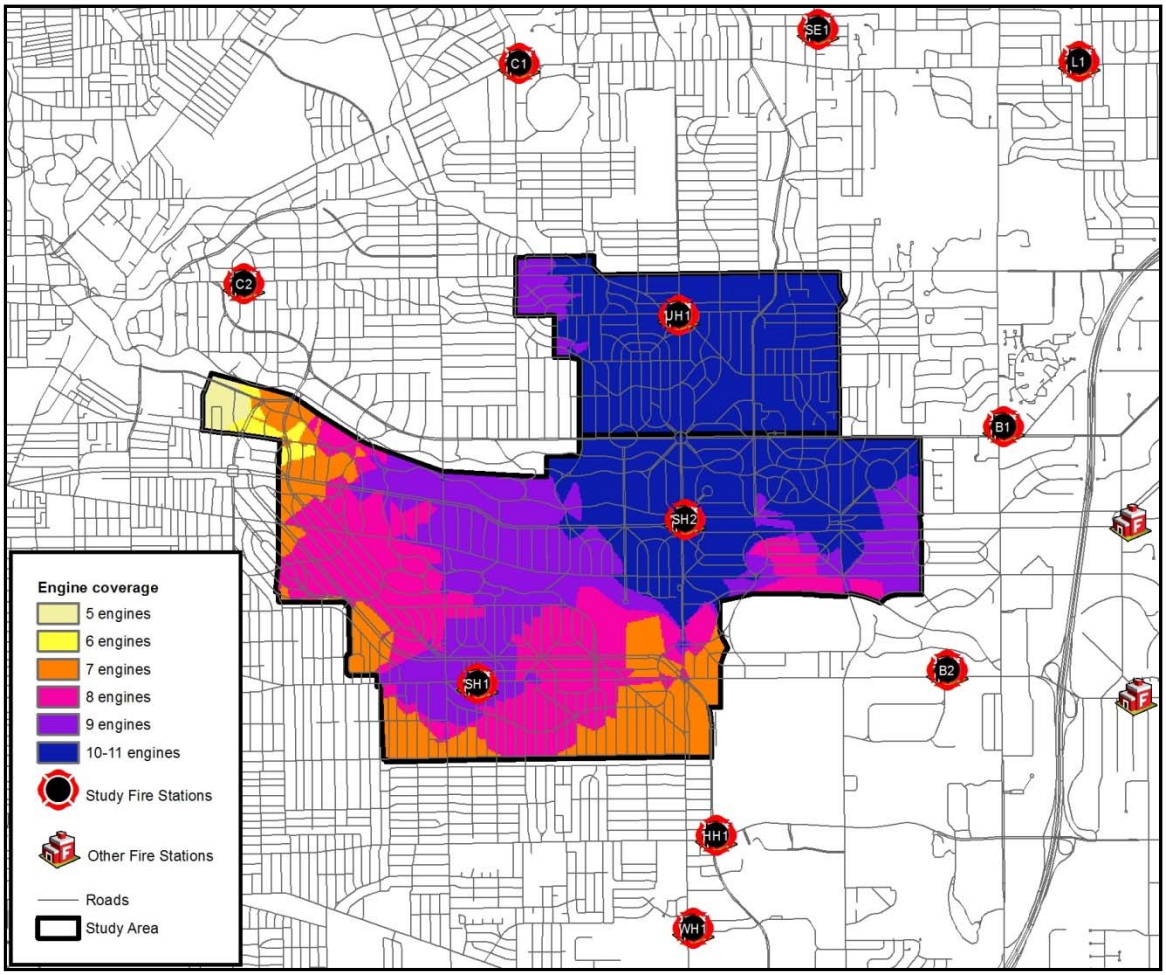
"Structure Fire Response Times"- U.S. Fire Administration/ National Fire Data Center, January 2006; NFIRS Data 2001 and 2002

Although this study is somewhat dated, it is the most recent data available. The figure shows that the mean response time was lowest for fires confined to the room of origin (less than seven minutes), while fires that spread beyond the building of origin have the highest mean response time (less than nine minutes). Establishing response performance objectives for both departments, regardless of the outcome of this study, will be addressed in the future service delivery strategies section of this report.

Concentration

Concentration is an analysis of the departments' ability to assemble an adequate amount of resources, either personnel and/or apparatus, within a sufficient amount of time to effectively mitigate specific incidents, particularly structure fires. Concentration analysis does not consider staffing patterns and only evaluates travel time as the primary factor. The analysis also assumes that all resources are available at the time of the incident. It should be understood that other agencies' service demand will impact that actual availability of physical and personnel resources. The figure below illustrates the modeled concentration of primary engines based on eight minutes of travel from existing stations.

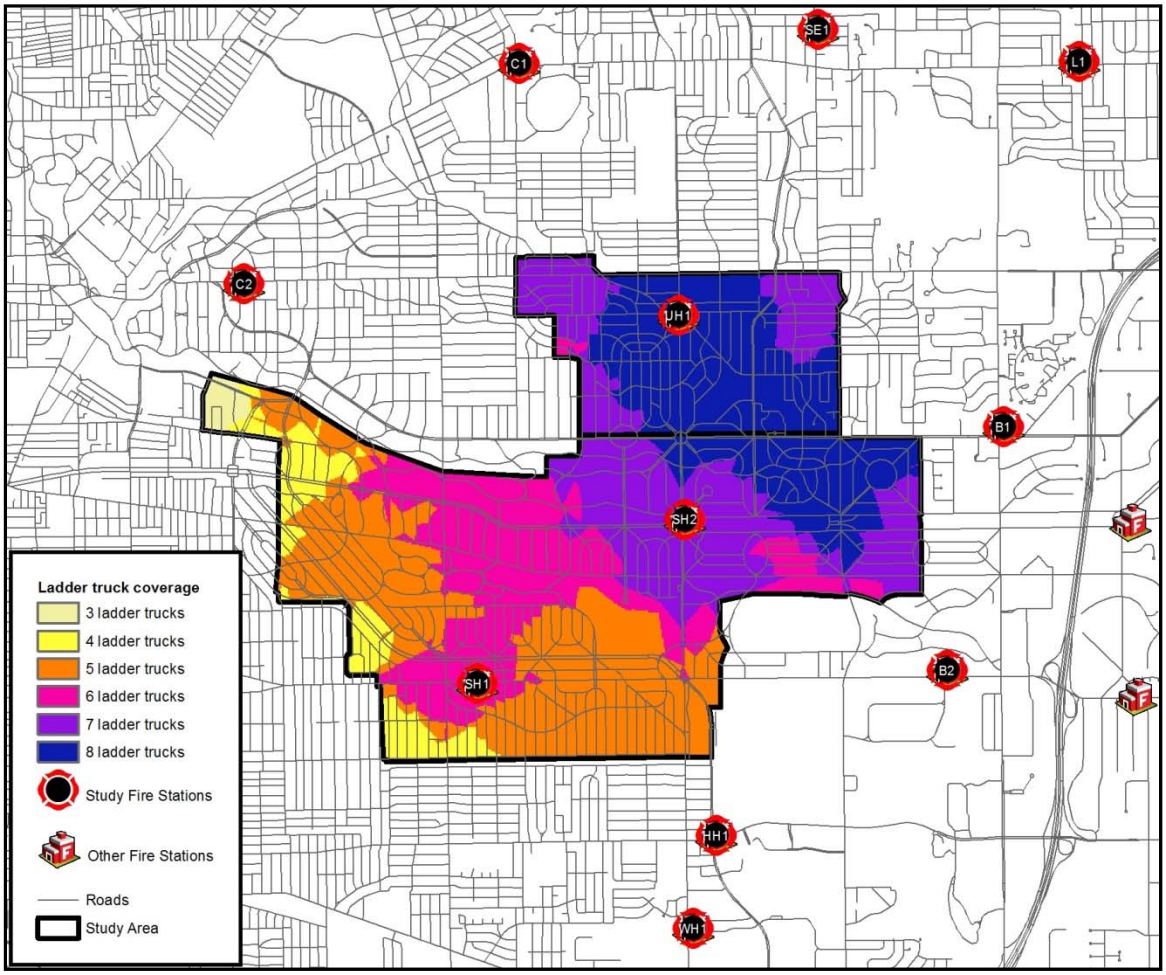
Figure 41: Concentration of Engines: Eight Minutes of Travel



As is evident in the figure above, both departments can concentrate a large number of apparatus when using resources from other departments if those resources are not already busy with other incidents. Nearly all of the UHFD response area is reachable by as many as 11 engines within eight minutes of travel. Likewise, a majority of the SHFD can be covered by as many as eight engines within eight minutes of travel.

The figure below models the concentration of aerial truck apparatus.

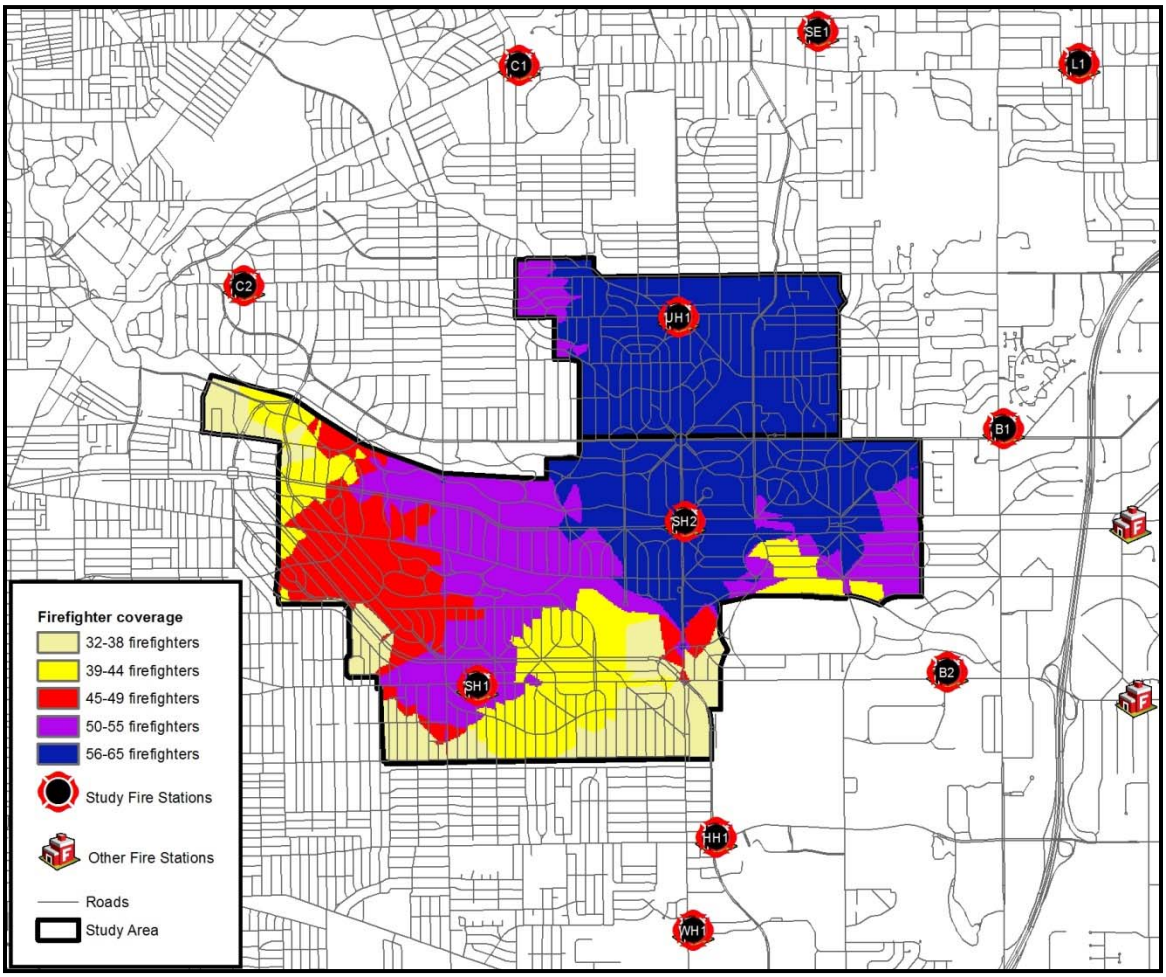
Figure 42: Concentration of Aerial Apparatus: Eight Minutes of Travel



Although not as well covered as with engines, the number of aerial apparatus available to the entirety of the overall study area reaches as high as eight in the core of the UHFD area; and most of the SHFD area is reachable by as many as five aerial apparatus within eight minutes of travel.

Although modeling the concentration of apparatus is important, it should be understood that apparatus alone cannot combat a fire incident. Personnel are necessary for an effective mitigation effort. The following figure models the concentration of personnel based on eight minutes of travel.

Figure 43: Concentration of Firefighters: Eight Minutes of Travel



Utilization of mutual aid resources gives the study area an enormous amount of personnel to work with. For UHFD, as many as 65 firefighters can be assembled within eight minutes of travel. The same is true for a large portion of the SHFD response area, while the western half of the district can assemble up to 55 firefighters. With mutual aid resources, the minimum number of firefighters that can be assembled within eight minutes of travel is 38.

Call Concurrency and Reliability

The workload on emergency response units can also be a factor in response time performance. The busier a given unit, the less available it is for the next emergency. One aspect of how reliable individual units are for emergency responses is known as concurrency. Concurrency is the amount of time that simultaneous incidents are occurring. Multiple simultaneous incidents drain resources by requiring multiple responses by the same agency, or requiring units from an adjacent jurisdiction to respond. The following figure illustrates what percentage of time the two fire departments are experiencing concurrent incidents as an aggregate.

Figure 44: Incident Concurrency[30]

Concurrent Calls	Percentage
1	65.8%
2	26.3%
3	6.5%
4	1.3%
5	0.1%
6	0.0%

The concurrency analysis indicates that the two departments combined respond to most incidents singularly, or one incident at a time. However, it should be noted that 26.3 percent of the time, two incidents are occurring simultaneously, indicating the need for more than one crew. Although 6.5 percent of time three incidents are occurring simultaneously, this is below the threshold that ESCI would consider significant.

Response Performance

Total response time is the amount of time a resident or business waits for an apparatus to arrive at the scene of an emergency beginning when they first call 9-1-1. This process begins for the fire department once the appropriate unit is dispatched by the communications center. The period of time between dispatch and when a unit is en route to the incident is known as turnout or reflex time. Computer Aided Dispatch (CAD) and NFIRS data for calendar years 2010 and 2011 were used to calculate each department's response performance.

[30] Determined through analysis of combined records management system data from each department.

Throughout this document, certain descriptive statistical measures are utilized which may not be familiar to all readers. In an effort to reduce confusion or the drawing of inaccurate conclusions, this section seeks to provide a brief explanation of these measures. The measures most often used which require clarification are the use of "average" and "percentile."

The "average" measure is a commonly used descriptive statistic, also called the mean of a data set. It is a measure that is a way to describe the central tendency, or the center of a data set. The average is the sum of all the points of data in a set divided by the total number of data points. In this measurement, each data point is counted, and the value of each data point has an impact on the overall performance. Averages should be viewed with a certain amount of caution, because the average measure can be skewed if an unusual data point, known as an outlier, is present within the data set. Depending on the sample size of the data set, this skewing can be either very large or very small.

As an example, assume that a particular fire station with a response time objective of six minutes or less had five calls on a particular day. If four of the calls had a response time of eight minutes, while the other call was across the street and only a few seconds away; the average would indicate the station was achieving its performance goal. However, four of the five calls, or 80 percent, were beyond the stated response time performance objective.

The opposite can also be true where one call with an unusually long response time can make otherwise satisfactory performance appear unacceptable. These calls with unusually short or long response time have a direct impact on the total performance measurements, and the farther they are from the desired performance, the greater the impact.

The reason we do compute the average is because of its common use and ease of understanding that is associated with it. The most important reason for not using an average for performance standards is that it does not accurately reflect the performance for the entire data set. As discussed above, one extremely good or bad call skewed the entire average. While it does reflect all values, it does not really speak to the level of accomplishment in a strong manner.

With the average measure, it is recognized that some data points are below the average and some are above the average. The same is true for a median measure, which simply arranges the data set in order, and finds the value in which 50 percent of the data points are below the median and the other half are above the median value. This is also called the 50th percentile.

When you deal with percentiles or percentages, the actual value of the individual data does not have the same impact as it did in the average. The reason for this is that the percentile is nothing more than the ranking of the data set. The 90th percentile means that 10 percent of the data is greater than the value stated, and all other data is at or below this level.

Higher percentile measurements are normally used for performance objectives and performance measurement because they show that the large majority of the data set has achieved a particular level of performance. This can then be compared to the desired performance objective to determine the degree of success in achieving the goal. Each department's average performance is presented below as well as each department's 90th percentile response performance over the last two years.

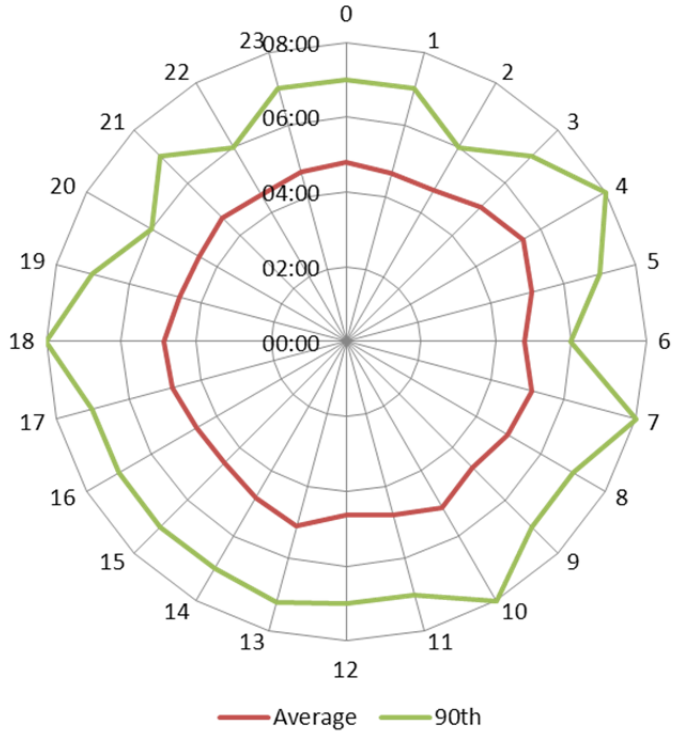
Figure 45: Historical Response Performance[31]

	2010 Average	2010 90th	2011 Average	2011 90th
Shaker Heights	03:45	05:29	03:33	05:24
University Heights	04:24	06:08	04:10	05:51

It is also useful to evaluate response time by hour of day to determine if any conditions may exist that are impeding response during certain time periods. The figures below illustrate each department's average and 90th percentile response performance to emergency incidents by hour of day.

[31] Ibid.

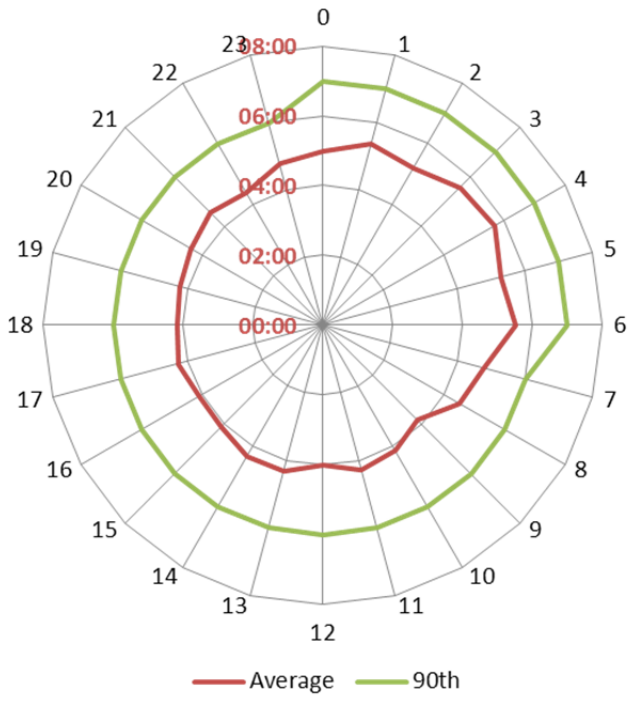
Figure 46: Response Performance by Hour of Day: SHFD[32]



As is evident from the figure above, the 90th percentile response performance has several times during which extended responses are realized. Although no actual event was found within the data set that could be the cause of these extended response, it is probable that higher than normal workload had at least some impact on the system's ability to respond effectively. This type of data should be monitored closely in the future to determine the actual cause of extended response times during certain periods.

[32] Determined through analysis of SHFD records management system data.

Figure 47: Response Performance by Hour of Day: UHFD[33]



While response performance for SHFD is varied widely by hour of day; responses for UHFD are more stable, with an expected slight increase during the overnight hours. This may indicate that SHFD is experiencing periods of high service demand, which is affecting their response performance during the day as well as experiencing the typical longer responses during the overnight hours. One method to evaluate this type of trend is to analyze turnout time; that time between when the incident is dispatched and apparatus are en route. This information is only available through the analysis of CAD data since typical NFIRS records do not require the input of an en route time. The figure below illustrates each department's turnout time performance over the last two years.

Figure 48: Historic Turnout Time Performance[34]

	2010 Average	2010 90th	2011 Average	2011 90th
Shaker Heights	01:16	01:51	00:59	01:41
University Heights	02:00	03:01	01:45	02:50

[33] Determined through analysis of UHFD records management system data.
[34] Determined through analysis of combined records management system data from each department.

NFPA 1710 recommends that career fire departments be en route to medical incidents within one minute and be en route to fire incidents within one minute 20 seconds when measured at the 90th percentile. Although the data was not analyzed for this distinction, the overall turnout time for each department's is beyond NFPA recommendations. Each department should evaluate turnout time performance on a regular basis to determine if causes of excessive turnout times can be identified.

Incident Control and Management

Fire departments must have systems in place to manage incidents and resources. Preparation begins with the establishment of pre-incident plans on higher risk structures, such as commercial or industrial occupancies, along with development of resource management systems in the event of large-scale or concurrent incidents. Location mapping, standardized response protocols, and water supply planning also help prepare a department for efficient and effective emergency response.

Once a call is dispatched, management of the incident itself begins. Fire departments should utilize incident command structures compliant with local, state, or federal regulations. Personnel accountability systems should be established in department procedures, and should be implemented on all multi-apparatus working incidents. The following figure summarizes the incident control and management elements.

Figure 49: Summary of Incident Control and Management Elements

	Shaker Heights Fire Department	University Heights Fire Department
Levels of Tactical Pre-Incident Planning	Pre-incident plans for all commercial/industrial/assembly/ institutional Plans updated at least annually Standardized forms and drawings used Printed versions shared on all appropriate vehicles Pre-plans made available to mutual aid resources	Pre-incident plans for only high-hazard occupancies Plans updated at least annually Printed versions shared on all appropriate vehicles
Levels of Operational Planning	Resources managed by standard apparatus assignment based on call type Formal regional mutual aid call-up system (MABAS) Multi-level hazmat response plan Multi-level technical rescue response plan Local or regional disaster plans	Resources managed by standard apparatus assignment based on call type Formal regional mutual aid call-up system (MABAS) Multi-level hazmat response plan Multi-level technical rescue response plan Local or regional disaster plans

	Shaker Heights Fire Department	University Heights Fire Department
Hydrant Locations Mapped	Yes, with main sizes and flow rates	Yes, w/no main sizes or flow rates shown
Alternate Static Water Points Mapped	No	No
Maps Available in All Vehicles	Yes, department vehicles only	Yes, department vehicles only
Standard Response Recommendation Based on Type of Call	Yes	Yes
Minimum Number of Responders per Apparatus Standardized	Yes	Yes
Turnout Time Standards Established	Yes; 1:30 for EMS, 2:00 for fire	Yes; 1:30 for EMS, 2:00 for fire
Total Response Time Standards Established	Yes	No
Simultaneous Incident Cover Plans	Automatic station move-up by CAD Call-back system for career personnel Mutual aid initiated on simultaneous call receipt	Automatic station move-up by CAD Call-back system for career personnel Mutual aid initiated on simultaneous call receipt
Is a Duty Officer Assigned 24 Hours Per Day	Yes, assigned shift officer	Yes, assigned shift officer
Is Incident Command System Used	Always, NIMS compliant	Always, NIMS compliant
Incident Arrival Size-Up Announcement Required	All multi-company incidents	All multi-company incidents
Initial Strategy Declaration Required on Arrival	All multi-company incidents	All multi-company incidents
Is an Accountability System Used on All Major Incidents	Always	Always
Do Command Officers Have Formal Strategy and Tactics Training	Yes, local classes only	Yes, local classes only
Do Command Officers Have Formal Building Construction Training	Yes, local classes only	Yes, local classes only
Minimum Level of Hazmat Certification for Responding Personnel	Hazmat-Operations	Hazmat-Operations
Formal Safety Officer Assignment	Auto-dispatch and assignment based on call type	Up to the incident commander at each incident

Mutual and Automatic Aid Systems

There are numerous mutual aid agreements, both formal and informal, in place between fire, police, and emergency medical agencies in the surrounding areas. Mutual aid is typically employed on an "as needed" basis, where units are called for and specified one by one through an Incident Commander. A complete mutual aid resource list has been developed by the Cuyahoga County Fire Chiefs Association.

According to interviews, multi-agency training is sporadic. For the most effective mutual and automatic aid programs, as well as maximum credit in the ISO Fire Protection Rating system, multi-agency drills should be scheduled regularly. Ideally, these should occur at least once per quarter and be recorded as multi-agency training in all agency records. In addition to the ISO credit, these trainings will naturally lead to enhanced working relationships, more regional thinking; and perhaps cooperative planning, policy, and procedural development.

Training and Education Programs

Firefighters operate in a complex, dangerous, and dynamic environment; as demonstrated nationally by over 100 fatalities and 3,000 serious injuries annually. Firefighter training is the single most important factor that prepares them to meet the challenges of the situations and environments in which they work. The delivery of safe and effective fire and emergency medical services is, therefore, clearly dependent on a well-trained response force.

The International Fire Service Training Association (IFSTA) states:

> *. . . regardless of the particular system used, an effective training program will include: (1) the continuous training of all levels of personnel in the organization; (2) a master outline or plan; (3) a system for evaluating the scope, depth, and effectiveness of the program; and (4) revising the program, as required, to include changing state and federal mandates, advances in equipment, products, and operational techniques.*

Without a comprehensive training program, emergency outcomes are compromised, response personnel are at risk, and the city may be exposed to liability for the actions of its employees. Training and education of personnel are critical functions for both of the study departments.

The function of a training program is not merely imparting personal knowledge and technical skills to an individual; it is developing the self-confidence to perform correctly under stressful, if not hostile conditions. Firefighting is inherently dangerous; it is important that firefighters practice working within the confines of calculated risk. With fire department training, individuals are exposed to emergency situations, where they will be required to interact with a number of realistic variables. Training gives firefighters situational awareness, a necessary tool in their arsenal. A training program must be systematic and must provide positive feedback to the trainee, firefighter, or officer. The goals of training should always focus on performance, never merely on acquiring a certain number of training hours.

The following figure summarizes the training and education program elements for the study agencies.

Figure 50: Summary of Training and Education Programs

	Shaker Heights Fire Department	University Heights Fire Department
Initial Training of Personnel Conducted By	Must have Paramedic and Firefighter 1 & 2 at hiring, then go to shift training/orientation to local operation	Must have Paramedic and Firefighter 1 & 2 at hiring, then go to shift training/orientation to local operation
Firefighter Training Required Prior to Scene Response	Mandatory Firefighter I and II course Hazmat-operations level	Mandatory Firefighter I and II course Hazmat-operations level
Firefighter Training Required to Leave Probation/Trainee Status	Internal orientation and monitored job performance approved by Training BC, two years	18 months observation of competency
Established Minimum Training Hours Annually	All training offered during duty shift as well as external training opportunities	Complies with State certification CEUs for both fire and EMS
Minimum Training Hours Annually by Duty		
Firefighter	*120*	*18*
EMT	*0*	*0*
Paramedic	*72*	*29*
First responder	*0*	*0*
Hazmat technician	*0*	*0*
Apparatus driver/operator	*15*	*8*
Fire officer	*0*	*0*
Fire inspector	*12*	*0*
Other	*0*	*0*
All Position Minimum Requirements Follow NFPA Standards	Yes	No
Consistent Officer Training Provided	Yes	No
Consistent Driver/Operator Training Provided	Yes	Yes
Individual Responsible for Training Program	Battalion Chief	Shift Captain
Number of Certified Fire Instructors in Agency		
Fire	*18*	*6*
EMS	*1*	*3*
Other	*0*	*0*
Are All Company Officers Trained in Instructional Technique	Yes, certified	No
Is an Annual Training Plan Prepared and Followed	Yes	No
Does the Training Program Have Software and Data Support	Yes, specific RMS system	Yes, specific RMS system
Does the Training Program Have an Identified Program Budget	Yes, but typically not sufficient for all desired program activities	No

	Shaker Heights Fire Department	University Heights Fire Department
Training Resources Available	Formal classroom(s) Appropriate AV equipment Training library Formal drill ground area Drill tower, owned EMS training supplies EMS training manikins simulators	Appropriate AV equipment Use borrowed structures or SHFD Station 2 EMS training supplies EMS training manikins simulators
Standard Training Curriculum Manuals Used	IFSTA Blend various materials as needed	IFSTA
Lesson Plans Utilized	For most training sessions	For most training sessions
Night Drills Conducted	Annually	Rarely
Multi-Company Drills Conducted	Regularly	Occasionally
Regional Disaster Drills Conducted	Annually, by Emergency Management agency	Annually, by Emergency Management agency
Is There a Periodic Physical Performance Evaluation to Ensure Personnel Maintain Physical Capacity to Perform Duties	No formal program, observed through annual trainings	No effort to track physical ability
Is There a Periodic Skills Competency Test to Ensure Personnel Maintain Competency in Job-Required Skills	No formal program, observed through annual trainings	No formal program, observed through annual trainings
Post-Incident Analysis	Conducted for all major incidents	Conducted for all major incidents
Safety Officer for Drills	Senior officer assigned as safety officer for most drills	Instructor also fills safety role
Training Records	Individual attendance records computerized, searchable	Individual attendance records computerized, searchable
Recertification Requirements	Recorded and monitored by agency training officer	Recorded and monitored by agency training officer

Fire Prevention and Life Safety Education Programs

An aggressive risk management program, through active fire prevention, is a fire department's best opportunity to minimize the losses and human trauma associated with fire. Robert Klinoff, author of *Introduction to Fire Prevention*, 2007, outlines the perspective as follows:

> *One of the true measures of a fire department's effectiveness is the amount of loss experienced in the community or jurisdiction. If hazards and unsafe acts can be reduced, there will be a resultant reduction in the area's fire experience. In order to reduce the losses due to fires, effective, focused fire prevention effort must take place.*

A community's fire problem should be addressed in a continuous manner whereby each resource and function supports the reduction of the incidence of fires. This cycle includes the following:

- Public education: Awareness of hazards, prevention, and what to do if they occur.
- Engineering and code enforcement: To ensure that community structures are appropriately constructed and maintained.
- Fire suppression: Fires are mitigated when there is a failure of education and code enforcement.
- Fire investigation: To determine fire cause and create a method or process for mitigating future incidents.

The most effective way to combat fires is to prevent them. A strong fire prevention program reduces loss of property, life, and the personal disruption that accompanies a catastrophic fire. The impacts of fire are significant; it is reported that nearly 50 percent of all small businesses that are forced to close due to fire, never re-open. The economic consequence of a fire is estimated to be 2.5 times the actual damage that the fire causes to a structure and its contents.

Most North American fire services that advocate Fire Prevention initiatives direct their public education activities toward assisting the general public by trying to reduce common hazardous conditions and to prevent these dangerous acts from occurring in the first place. In doing so, the general public can reduce the probability of needing to muster an emergency response to such incidents. Prevention initiatives do this through public presentations, issuing fire safety information and utilizing local media formats and public service advertisements and announcements (PSAs) throughout the community. This is usually coordinated by specific fire prevention resources that are dedicated and fully trained in this discipline from within the department. The old adage, "an ounce of prevention is worth a pound of cure", is the foundation of all activities generated in properly established and resourced fire prevention divisions.

This cannot occur without a concerted and focused effort directed towards Fire Code Inspections and Life Safety Education. These are two distinct areas of importance both requiring specific areas of expertise. While not practical, it should be the goal of all fire services to never have a fire death or significant uncontrolled fire. While prevention efforts will never totally eliminate all uncontrolled fires from occurring, it is proven that these same efforts can and do minimize the injuries, deaths and severity of property damage caused by fire within in its community, simply by preventing a fire from occurring in the first place. The following figure summarizes the fire prevention and life safety education programs of the study fire departments.

Figure 51: Summary of Fire Prevention and Life Safety Education Programs

	Shaker Heights FD	University Heights FD
Applicable Fire Code	International Fire Code model	International Fire Code model
Local Sprinkler Requirements Exceeding Model Code	Meets code	Yes Installed sprinkler requires pull-station by at least one exit door
Agency Involvement in New Commercial Construction	Agency requires plan submittal Site review conducted Inspection prior to occupancy sign-off required Observed flow test required for sprinkler system Observed test required for fire alarm system in public assembly	Agency requires plan submittal Inspection prior to occupancy sign-off required Observed flow test required for sprinkler system Observed test required for fire alarm system in public assembly
Key-Vault Entry Box Program	Yes- voluntary only	Yes- required for sprinklered or alarmed occupancies
Inspections Conducted by This Agency	All commercial occupancies All assembly occupancies All institutional occupancies Licensed liquor establishments High-risk occupancies Single-family residential courtesy inspections Multi-unit residential occupancies	All commercial occupancies All industrial occupancies All assembly occupancies All institutional occupancies Licensed liquor establishments High-risk occupancies Storage tank installation/modification/removal Multi-unit residential occupancies Single-family residential courtesy inspections
Number of Occupancies on Scheduled Inspection List	550	300
Self-Inspection Incentive Program	No	No
Inspection Frequency for High-Risk Occupancies	Semi-Annually	Annually
Inspection Frequency for Moderate-Risk Occupancies	Annually	Annually
Inspection Frequency for Low-Risk Occupancies	Annually	Annually
Formal Citation Process	Formal process	Formal process

	Shaker Heights FD	University Heights FD
Number of Full-Time (FTE) Staff Assigned Solely to Inspection Function	1	0
Company Personnel Conduct Inspections	Yes	Yes
Formal Training for Inspectors	Formal inspection certification	Formal inspection certification
Public Education Officer/Program Manager Assigned	Yes ancillary duty assignment	Yes ancillary duty assignment
Topics Included in Public Education Programs	Residential exit plans/drills Smoke alarm use General fire safety Fire extinguisher use Injury prevention Babysitting safety CPR courses Blood pressure checks CERT Learn not to Burn	Residential exit plans/drills Smoke alarm use General fire safety Fire extinguisher use Injury prevention Elderly care and safety Babysitting safety Blood pressure checks
Publications Stocked and Distributed	Yes	Yes
Formal Public Education Training Provided to All Personnel	No	No
Number of Formal Public Education Contacts Prior Year	3,800	1,000
Level of Fire Investigation Provided by Agency Itself	Arson investigation	Arson investigation
Additional Fire Investigation Resources Available	State Fire Marshal's Office fire investigators	State Fire Marshal's Office fire investigators
Individual Responsible for Fire Investigations	Inspector leads team approach	Shift Captain
Formal Training for All Personnel	Scene control and evidence quarantine	Scene control and evidence quarantine
Formal Training for Specified Fire Investigators	Scene control and evidence quarantine Initial fire cause and origin Arson detection and investigation Formal fire investigation certification National Fire Academy course	Scene control and evidence quarantine Initial fire cause and origin Arson detection and investigation
Investigation Program Guided by NFPA 921	Yes fully compliant	Yes fully compliant
Juvenile Firesetter Program	Local agency program with trained personnel	No formal program

Communications and Dispatch

The methods by which emergency services units are dispatched are critical components in the overall delivery of service to the community. Without a formal process by which emergency incidents can be reported, appropriate resources will be delayed in their response. Likewise, without a system that intuitively assists dispatchers and telecommunicators through automatic number and location identification (ANI/ALI), resources could be delayed based on a lack of appropriate location information.

Modern dispatch centers utilize a number of systems to assist dispatchers and telecommunicators in the notification of emergency resources. Progressive communities have implemented region-wide 9-1-1 call systems to centralize the reporting of emergency incidents, have appointed individuals with specific knowledge of emergency communications systems to oversee and direct these operations, have appropriately staffed these operations with sufficient personnel to handle the community's call volume, have implemented specific protocols for the answering of emergency calls and dispatching of emergency resources, and provide adequate training to all personnel involved in the system. Both study departments are dispatched by EASTCOMM, joint communications center covering Cleveland Heights, Shaker Heights and University Heights. The following figure summarizes the communications and dispatch elements.

Figure 52: Summary of Communications and Dispatch Elements

Dispatch Center Name	EASTCOMM Communications Center
Dispatch Agency Type	Regional dispatch center
Incoming Emergency Calls	Secondary 9-1-1 PSAP
How are Calls Received from Primary PSAP	Direct line transfer w/ ANI-ALI
Dispatch Center Governance	Cooperative joint powers authority
Center Management	Appointed/hired center manager reports to regional governing body
Center Staffing	
Maximum total staff at peak demand	*2*
Minimum total staff at off-peak demand	*1*
Is a Supervisor On Duty At All Times	No
Dedicated Consoles for Fire and/or EMS	Yes
Call Answering Methodology	Combination call-taker/telecommunicator handles call start to finish
Responsibility for Training	Supervisor(s)
Dispatcher Initial Training	Agency conducts initial training in-house
In-house Initial Training in Weeks	
Classroom technical training	*1*
Emergency medical dispatch training/certification	*1*
Practical experience with console training officer	*6*
Law enforcement criminal data training	*0*

Fire service/EMS ride-along	*1*
Law enforcement ride-along	*0*
Telecommunicator basic certification course	*6*
First responder certification course	*0*
CPR certification course	*1*
Annual Recurrent Training in Days	
Classroom technical training	*1*
Ancillary Functions Performed by Telecommunicators	Administrative telephone call answering
Incoming Call Volume per Year	
9-1-1 incoming	*54000*
Formal Performance Standards	Yes
Performance Standards in Seconds	
Call pick up	*:10*
Call processing- emergency calls	*:60*
Formal Quality Assurance Program	Yes, with random review
Computer-Aided Dispatch Available	Yes
Computer-Aided Dispatch Hardware Platform	Windows-based
CAD Software	New World
Type of CAD System	Geo-Based
Who Maintains CAD Resource Information	Center supervisors/staff
Who Maintains Geographic Data	Center supervisors/staff
Information Available Through CAD	Location call history, location hazards
Fire/EMS Back-Up Response Recommendation Layers Programmed	3
Dispatch Method	Specific apparatus response assignment
Methods of Station Notification	Direct line station announce, station printer
Methods of Field Personnel Notification	Two-way radio
Is Emergency Medical Dispatch Used	Yes- call type identification and pre-arrival instructions
Emergency Communication System	Digital trunked system
Number of Trunking Channels in System	8
Number of Talk Groups for this Agency	16
System Queuing Experience	Occasionally
Center Redundancy Preparation	Back-up power, Back-up transmitters, Redundant dispatch site
Center Security	Off ground floor, Hardened or no windows, Electronic passage lock system, Positive visual identify prior to entry

Emergency Medical Services Support and Oversight

Emergency Medical Services (EMS) is the component of an emergency services organization that responds to requests for medical assistance. EMS can take many forms, including first responders; those that respond ahead of a transport provider, and ambulances; those resources that actually transport the patient to the hospital. Regardless of the vehicle type used, all pre-hospital medical resources are considered part of the greater EMS system.

SHFD began providing ambulance transportation services in 1936 and first trained paramedics through Brentwood Hospital in 1977. All employees hired after 1995 must be certified as an Emergency Medical Technician – Paramedic (EMT-P). SHFD currently has 36 personnel certified at the paramedic level.

UHFD began providing paramedic level services in 1991 based on the establishment of an EMS levy that paid for all equipment and initial training. The department currently has 22 paramedics and all new personnel must be certified at the paramedic level to sit for the civil service examination.

Logistical Support Services

Logistical support services for EMS include equipment and supply exchange and replacement, equipment maintenance, and training. These support services are critical to an efficient EMS operation in that each incident uses different equipment and different types of supplies. University Hospitals has developed a minimum equipment list for all ambulances and allows for the exchange of disposable equipment on a one-for-one basis. Durable equipment is left at the receiving facility after a form is filled out and signed by a hospital representative.

Medical Control and Oversight

As in most states, the Ohio Department of Public Safety Division of Emergency Medical Services credentials EMS personnel rather than licensing. This requires that EMS personnel operate under the permission and authority of a medical control and direction physician or board. University Hospital provides medical direction for both agencies through Jeff Luk, MD, a board certified emergency physician. Dr. Luk attends training sessions in both departments and requires that a review and check-off of basic skills be conducted annually for all personnel in addition to participating in incident review.

Quality Assurance/Improvement Mechanisms

Quality Assurance and Quality Improvement (QA/QI) programs are those processes and/or procedures whereby clinical data is used to evaluate the effectiveness of field-level care. In EMS, this is typically manifested by a review of patient care reports (PCR) for accuracy, adherence to established protocols and changes in patient outcomes, recording of data, and a provision of feedback to the field provider. QA/QI should also be used to identify trends in skill and procedure degradation that should be highlighted during future training sessions.

SHFD uses EMS Charts, an electronic PCR, to capture patient and incident data but is using a paper report in the field. Data is entered upon return to the station. This allows the next duty lieutenant to review the incident and flag any deviations from protocol or need for further review. UHFD uses a hand-written PCR, which is copied and left at the receiving hospital for inclusion in the patient's medical record. The patient and incident data is then entered into Firehouse software at the station by the on-duty officer. As mentioned previously, the medical director reviews incident reports for quality assurance compliance.

Hazardous Materials Services and Support

Hazardous materials response is a specialized component of any fire department, with a number of levels by which response can be defined. The lowest and least technical level is that of Awareness, followed by Operations, Technician, and Specialist. *OSHA 1910.120 Hazardous Materials* provides definitions for each level, as well as required training and duties and responsibilities.

Awareness: First responders at the awareness level are individuals who are likely to witness or discover a hazardous substance release, and who have been trained to initiate an emergency response sequence by notifying the proper authorities of the release. They would take no further action beyond notifying the authorities of the release. First responders at the awareness level shall have sufficient training or have had sufficient experience to objectively demonstrate competency in the following areas:

- An understanding of what hazardous substances are, and the risks associated with them in an incident.
- An understanding of the potential outcomes associated with an emergency created when hazardous substances are present.
- The ability to recognize the presence of hazardous substances in an emergency.
- The ability to identify the hazardous substances, if possible.
- An understanding of the role of the first responder awareness individual in the employer's emergency response plan, including site security and control and the U.S. Department of Transportation's Emergency Response Guidebook.
- The ability to realize the need for additional resources, and to make appropriate notifications to the communication center.

Operations: First responders at the operations level are individuals who respond to releases, or potential releases, of hazardous substances as part of the initial response to the site; for the purpose of protecting nearby persons, property, or the environment from the effects of the release. They are trained to respond in a defensive fashion without actually trying to stop the release. Their function is to contain the release from a safe distance, keep it from spreading, and prevent exposures. First responders at the operational level shall have received at least eight hours of training or have had sufficient experience to objectively demonstrate competency in the following areas, in addition to those listed for the awareness level, and the employer shall so certify:

- Knowledge of the basic hazard and risk assessment techniques.
- Know how to select and use proper personal protective equipment provided to the first responder operational level.

- An understanding of basic hazardous materials terms.
- Know how to perform basic control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available with their unit.
- Know how to implement basic decontamination procedures.
- An understanding of the relevant standard operating procedures and termination procedures.

Technician: Hazardous materials technicians are individuals who respond to releases or potential releases for the purpose of stopping the release. They assume a more aggressive role than a first responder at the operations level in that they will approach the point of release in order to plug, patch, or otherwise stop the release of a hazardous substance. Hazardous materials technicians shall have received at least 24 hours of training equal to the first responder operations level; and in addition have competency in the following areas, and the employer shall so certify:

- Know how to implement the employer's emergency response plan.
- Know the classification, identification, and verification of known and unknown materials by using field survey instruments and equipment.
- Be able to function within an assigned role in the Incident Command System.
- Know how to select and use proper specialized chemical personal protective equipment provided to the hazardous materials technician.
- Understand hazard and risk assessment techniques.
- Be able to perform advance control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available with the unit.
- Understand and implement decontamination procedures.
- Understand termination procedures.
- Understand basic chemical and toxicological terminology and behavior.

Specialist: Hazardous materials specialists are individuals who respond with and provide support to hazardous materials technicians. Their duties parallel those of the hazardous materials technician; however, those duties require a more directed or specific knowledge of the various substances they may be called upon to contain. The hazardous materials specialist would also act as the site liaison with Federal, state, local, and other government authorities in regard to site activities. Hazardous materials specialists shall have received at least 24 hours of training equal to the technician level; and in addition have competency in the following areas, and the employer shall so certify:

- Know how to implement the local emergency response plan.
- Understand classification, identification, and verification of known and unknown materials by using advanced survey instruments and equipment.

- Know the state emergency response plan.
- Be able to select and use proper specialized chemical personal protective equipment provided to the hazardous materials specialist.
- Understand in-depth hazard and risk techniques.
- Be able to perform specialized control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available.
- Be able to determine and implement decontamination procedures.
- Have the ability to develop a site safety and control plan.
- Understand chemical, radiological, and toxicological terminology and behavior.[35]

Level of Hazardous Materials Response

Each agency in the study area independently delivers hazardous materials response at the operations level. For incidents above the operations level, including weapons of mass destruction (WMD), and chemical, biological, radiological, and nuclear (CBRN) events; the region relies on the Chagrin/Southeast Regional Hazardous Materials Response Team.

The regional hazmat team offers four levels of response, as needed based on the scope and magnitude of the incident. The on-scene incident commander can activate the various levels of response through the dispatch center, which contacts the on-call hazmat team leader to confirm the needs of the incident. The various levels are described below.

1. Equipment and/or supplies. Only items specifically needed to mitigate the incident are delivered to the scene.
2. Technical consultation. The Hazmat Control Officer (HCO) responds to the scene to provide support to the local IC with technical support and decision-making.
3. A limited response of four to six hazmat team members respond to the scene to assist with mitigation.
4. A full regional response deploys to mitigate the incident.

Regional Team Management

Policy and budget decisions are made by elected officials who meet annually or as needed. Operational responsibilities are managed by a Hazmat Committee, consisting of the Fire Chief of each participating department, two police Chiefs, and a Senior Director.

[35] 29 CFR 1910.120

Response management is handled by two team leaders, noted as the Hazmat Control Officers (HCO), that are accessible 24/7. A call system is in place in the event the HCO is committed to another emergency incident.

Budget for Hazmat Response

Each department in the Heights Region provides funding for operations level response through their individual budgets. The Regional Hazmat team receives its funding from 18 communities within its region that pay an annual stipend of $3,500, as well as various state and federal grant funding.

The study area does not provide funding for hazardous materials response from the regional hazmat team because the study agencies also provide technical rescue services to the region at no cost. Both entities consider this to be a fair and acceptable means of reciprocal service. The regional hazmat team will typically replace supplies used by the study area responders and follow federal guidelines for "spiller pays" billing practices.

Training and Response

The Chagrin/Southeast Regional Hazardous Materials Response Team receives training and certification at the state and federal levels. Continuing education is provided by a detailed monthly training schedule, as well as active participation in Local Emergency Planning Committee (LEPC) and federal exercises. These exercises are quite detailed and intensive and provide the team the ability to measure performance. Guidelines for response and operations are in place for all participating agencies, and are reviewed regularly to ensure best practice is achieved.

As previously mentioned, detailed response levels are in place, as well as a plan to enhance response to support an operation or to achieve National Incident Management System (NIMS) Type I or II responses. The regional hazmat team provides incident management support as well as resources for mitigation.

Equipment

The Chagrin/Southeast Regional Hazardous Materials Response Team is well equipped to meet its response mission. This includes a dedicated truck from Solon, a supply trailer from Oakwood, foam and confined space equipment from Garfield Heights, a trailer with portable shelter from Warrensville Heights, and a large mobile communications/command vehicle from Maple Heights. All equipment is

inventoried, with all specialized equipment tested and calibrated as required. The team also has adequate equipment and supplies for training.

Technical Rescue Services and Support

Technical rescue is an ancillary duty or responsibility of fire departments across the country that may also be referred to as "heavy rescue," "extrication," or "search and rescue." The discipline requires extensive training over and above that normally required by fire department personnel, and operations can be extremely dangerous. This section reviews the technical rescue program for the study agencies and offers recommendations to improve or enhance the existing programs.

The Heights Area Special Rescue Team (HASRT) provides the following technical rescue services: The HASRT agencies that combine their resources proactively follow NFPA standards 1670 and 1006 as their guide for training and deployment. This should be considered a best practice. The following services are delivered at the respective levels.

Figure 53: Heights Area Special Rescue Team Services

Discipline	Level of Delivery
Vehicle/Machinery Extrication	Technician
Rope	Technician
Tower/Antenna	Operations
Confined Space	Technician
Trench Collapse	Technician
Structural Collapse	Operations
Ice	Technician
Swift Water	Awareness
Dive	Not a Primary

Delivery of Technical Rescue Services

Technical rescue services are delivered jointly with six neighboring cities that include Shaker Heights, University Heights, Cleveland Heights, South Euclid, Euclid, and Beachwood. The team has guidelines in place for response and operations. For response, the team is activated by pager from two dispatch centers. In the event of a technician level collapse incident, Ohio Region 2 is activated. If a back-up team is needed, Hilltech is activated.

The team uses laminated tactical worksheets that are incident-specific to help guide the incident, and maintains a resource list of public and private sector assets that can be called to support a technical rescue incident.

Technical Rescue Team Management

The technical rescue team has one overall team leader, with each participating agency providing a representative. These agency representatives are selected by their respective agency. Team leader meetings are conducted quarterly and guided by a detailed agenda. Meeting minutes are recorded and distributed. The team leader produces an annual report in order to record team performance and keep executives informed.

Budget for Technical Rescue

The technical rescue team has a dedicated budget. This is achieved by a funding formula that takes into account population and assessed value-area in acres of all participating entities. All data for this formula is provided by the Cuyahoga County Planning Commission. Proposed annual budget is established by all agency representatives and presented to participating Chiefs by the team leader for approval. The budget addresses uniforms, equipment repair, maintenance, replacement, vehicle insurance, and contingency needs.

Training

The state of Ohio currently offers certification for technical rescue that is modeled on NFPA 1670. State certification is the standard established by HASRT. A detailed annual training calendar is determined by the team leaders and circulated to its members for continued education and skills maintenance. Training records are maintained for each member to ensure knowledge, skills, and abilities are maintained; which would include annual confined space entries made per OSHA 1910.146. The team also has adequate supplies to support its training needs and takes advantage of specific sites within its service area for scenario or skills-based training. Although most supplies for training are used from the response cache, it is replaced as needed to remain response-ready.

Equipment

Equipment maintained by the team meets its stated level of service. All specialized equipment is inventoried and maintained by each respective department, with a complete list maintained by the team leader. This would include maintenance and testing records, as well as accurate records for all life safety rope per NFPA 1983. At the time of the appraisal, team leaders were working on the possible purchase of a truck and trailer for Shaker Heights to deploy its trench collapse equipment.

Future Opportunities for Cooperative Services

Previous sections of this report provided a baseline evaluation of Shaker Heights and University Heights fire departments. The overall goal of this project, however, was to determine the feasibility of joining these two agencies through either functional or operational efforts to reduce costs and increase efficiency. The baseline evaluations of each organization allow the project team to build a basis for future service delivery through a combined agency by uncovering differences in service delivery, as well as cultural, political and social aspects within each community. This portion of the report takes the baseline data and develops strategies for future service delivery through cooperative efforts.

General Partnering Strategies

Three basic strategies are generally available when considering consolidation of services, beginning with a do-nothing approach and ending with complete unification of the organizations into what is, essentially, a new emergency service provider. A description of the methodologies is found below.

Functional Consolidation

Public entities usually have broad authority under law to enter intergovernmental agreements (IGAs) for the purpose of cost and service efficiency. Ohio is no different in this regard. The laws of the State of Ohio address the issue, allowing intergovernmental contracts for any lawfully authorized governmental function.

Examples of this type of cooperative effort may include any function within the study departments that allows them to deliver services, such as training, fire prevention, equipment purchasing, logistics, etc. Through functional consolidations, each agency benefits from the resources of the whole while maintaining independence as separate organizations. Many times, functional consolidations serve as a prelude to a future merger.

Operational Consolidation

This strategy joins two or more entities, in their entirety, through the execution of an intergovernmental agreement (IGA). The resulting organization features a single organizational structure and chain of command. Depending on the form of the agreement(s) establishing the organization, members may remain with the original agency, transfer to one of the other agencies, or transfer to an entirely new organization.

Unlike functional consolidation, an operational consolidation brings the actual operations of the separate organizations together into a single department that provides services to both communities but does not create a new legal entity as will be discussed next. The organizational structure, command, and operational model will depend upon the structure and format of the agreements established between the communities. Like functional consolidations, operational consolidations are sometimes considered as an intermediate step leading to a full merger. The main advantage of the strategy offers governing bodies the ability to negotiate and monitor desirable outcomes for the management of a particular service. This gives a higher level of comfort in going forward with the decision to unify fire service across a geographical region.

Legal Unification

Under certain circumstances in law, fire departments can join into a single entity. This formal approach unites not only the programs but also the organizations themselves. State laws addressing political subdivisions usually detail a process for legal unification.

Typically, state laws draw a distinction between words like *annexation*, *merger*, and *consolidation* when speaking of legal unification. Organizationally, however, the outcome of any such legal process results in one unified organization. The major differences between the legal strategies relate to governance and taxation issues. In many states, some process of *inclusion* exists that essentially involves the annexation of one entity to another, preserving the governing body and taxing authority of the surviving agency. A legal merger, on the other hand, usually entails the complete dissolution of two or more agencies with the concurrent formation of a single new entity (and governing body) in place of the former.

Cooperative Effort Strategies

In identifying potential cooperative opportunities, the project team considered the key issues now challenging each agency. Some issues represent roadblocks to integration, while others provide a unique chance for improvement. As an element of the review, affected staff and other officials provided local and internal perspective on organizational culture, community expectation, and other significant matters.

The following paragraphs provide a summary of potential shared services strategies available within the study region. Although every attempt has been made to identify all the areas of potential, intimate knowledge of the current system may allow for other areas to be explored outside the parameters of this report.

ESCI usually makes no distinction between unification, consolidation, or merger, tending to use each term interchangeably. The reader should note that when referring to the union of programs or agencies, the operative words are *functional* and *legal.*

Governing bodies should pursue the process of joining two or more fire departments only after concluding that unification is cost-effective and is likely to provide better and/or more efficient service to the public. Each agency's legal counsel should research the particular statutory steps necessary to implement a particular unification strategy. The different processes are not commonly difficult to accomplish, but because the transfer of public assets and liabilities may be involved, the procedure itself can be relatively precise. It is important, therefore, that the agencies have the benefit of competent legal advice throughout the process.

The decision to choose one unification strategy over another is a matter of local policy. Most often, officials choose a preferred course for analytical reasons; however, in certain cases politics or law may rule. For example, many states provide no basis in law for the legal unification of the fire departments of two cities, unless the jurisdictions act to merge the entire city governments. The common recourse in that case is to join the fire departments in accordance with an interlocal service agreement or contract law.

Most states actively support cooperation between governments as a matter of policy in the interest of furthering the economy and efficiencies of local government. Generally, functional and operational

strategies are always available as options, whereas the legal unification of fire departments is dependent on circumstance.

The process described above provides a kind of "snapshot" of the fiscal effects of collaborative efforts and a consolidation as if the action takes place during the fiscal 2011 budgetary year. The baseline permits a comparison of the existing fiscal policies of the agencies with the budgetary changes relating to the cooperative model. This methodology yields a comparison of the "what if" of a merger against the baseline of current budget.

While comparing the cost of emergency service to the outcome of merger in the modeled budget year is helpful, it begs the inevitable question: What might integration cost in the future? If the merger is financially feasible now, might it remain that way in the future or will changes in labor, materials, capital, and demographics change the outcome?

Baseline Budget Determination

To assist in answering this question, ESCI projects the financial result of any proposed consolidation. The forecast does not attempt to predict the finances of the departments because changes in law and politics are certain to make such forecasting wrong. Rather, ESCI's analysis shows how trends in the cost of labor and other operational expenditures act on the outcome of a consolidation based on 2011 policy and law. The figure below details the combined baseline budget of the departments for 2011.

Figure 54: Combined Budget by Category, Fiscal Year 2011[36]

Budget Category	SHFD	UHFD	Total
Personnel Services	$6,892,360	$3,387,395	$10,279,755
Materials and Services	$571,257	$320,290	$891,547
Capital Outlay	$47,037	$294,977	$342,014
Total	**$7,510,654**	**$4,002,662**	**$11,513,316**

Total costs for personnel services with benefits calculated to $10,279,755 accounting for 91.6 percent of total expenditures. Materials and services and capital outlay are approximately 8.4 percent of the total current baseline budget.

[36] Personal services includes pension expenses for each city.

Baseline Operational Personnel

The following figure lists each department's current operational personnel resources and includes only those who are assigned to emergency field operations in positions that are currently filled.

Figure 55: FTEs – Field Operations Staffing Summary[37]

Position	SHFD	UHFD	Total
Battalion Chief	4.00		4.00
Captain		4.00	4.00
Lieutenant	12.00	2.00	14.00
Firefighter/Paramedic	28.00	19.00	47.00
Firefighter	7.00	1.00	8.00
Total	**51.00**	**26.00**	**77.00**

A total of 77 positions are assigned to fire suppression, EMS, and service delivery in the study cities.

Baseline Administrative Personnel

One of the primary responsibilities of every fire department's administrative and support staff is to ensure that the operational elements of the organization have the ability and means to achieve the emergency mission. Efficient, effective administration and support are fundamental to the success of the department. Without sufficient oversight, planning, documentation, training, and maintenance, the operational parts of the department will fail any operational test.

While it is common for certain administrative personnel to be assigned responsibilities on the emergency scene, such duty typically constitutes only a minor part of the overall time spent on the job. Consequently, ESCI takes into account only the administrative and support functions of these positions when evaluating the management of a fire department.

A summary of the administrative and support complement of the fire departments is shown in the figure below.

[37] UHFD actually has four captains but one is serving as the interim fire chief and is listed in the administrative and support staffing summary.

Figure 56: FTEs – Administrative/Support Staffing Summary

Position	SHFD	UHFD	Total
Fire Chief	1.00	1.00	2.00
Assistant Chief	1.00		1.00
Fire Inspector	1.00		1.00
Accounting Clerk	1.00		1.00
Supt. Of Equipment	0.50		0.50
Total	**4.50**	**1.00**	**5.50**

A total of 5.5 positions are involved in the administrative and support functions of the study fire departments. Statistically, the departments maintain a ratio of 6.5 percent of administrative personnel to operational personnel. Based on experience with similar organizations, ESCI has determined that municipal emergency service agencies require a ratio of 10 to 15 percent administration and support to operational personnel. However, in this instance many functions normally provided internally by the fire departments are provided by the cities such as legal, financial, and administrative services.

Baseline Compensation and Benefits

Each of the fire departments uses career staffing to carry out its functions. Career fire department personnel receive pay and benefits in accordance with the terms specified in the CBAs (Collective Bargaining Agreement) made between each city and the individual IAFF, AFL-CIO (the union) local. Typical forms of compensation and benefits are provided to the full-time staff members of the departments, including salary, comprehensive medical/dental insurance, disability insurance, life insurance, and retirement pension.

The type, amount, variety of pay classification, and benefits vary from department to department. The following figure summarizes the annual wage by job title and fire department.

Figure 57: Annual Salary by Job Title and City, 2011

Position	SHFD	UHFD
Fire Chief[38]	$110,850.00	$95,044.00
Assistant Chief	$97,980.00	N/A
Fire Inspector	$70,922.00	N/A
Accounting Clerk	$46,710.00	N/A
Supt. Of Equipment[39]	$40,490.00	N/A
Battalion Chief	$86,374.00	N/A
Captain	N/A	$86,404.00
Lieutenant	$77,118.00	$77,841.00
Firefighter/Paramedic	$71,979.00	N/A
Firefighter	$68,654.00	$77,316.00

From the baselines above, ESCI generated several strategies in an attempt to identify the potential alternatives to the current service delivery model. The assumptions made in determining the feasibility of the strategies that follow are listed below:

- Administrative Staffing: The number of administrative and support jobs are maintained at the ratio now existing. In this process a merger of the departments would allow for greater specialization of administrative personnel and a cleaner delineation of responsibility.
- Operational Staffing: Firefighting positions are maintained in the consolidated models in accordance with the median of north central fire departments serving similar populations.[40] If the forecast population of the region increases, additional nonspecific operational staff positions could be added to the model as the benchmark exceeds baseline positions.
- General Fund Capital Purchase: The purchase of capital equipment from the general fund of the city budgets and the consolidated budget is assumed to continue.
- Stations and Apparatus: No additional fire stations or apparatus for a consolidated agency would be required at this time.
- General Obligation Debt: ESCI does not include a calculation of general obligation debt associated with the construction of new fire stations or the purchase/equipping of emergency apparatus in any of the general fund models. Such expenditures usually fall outside of general fund budgeting.

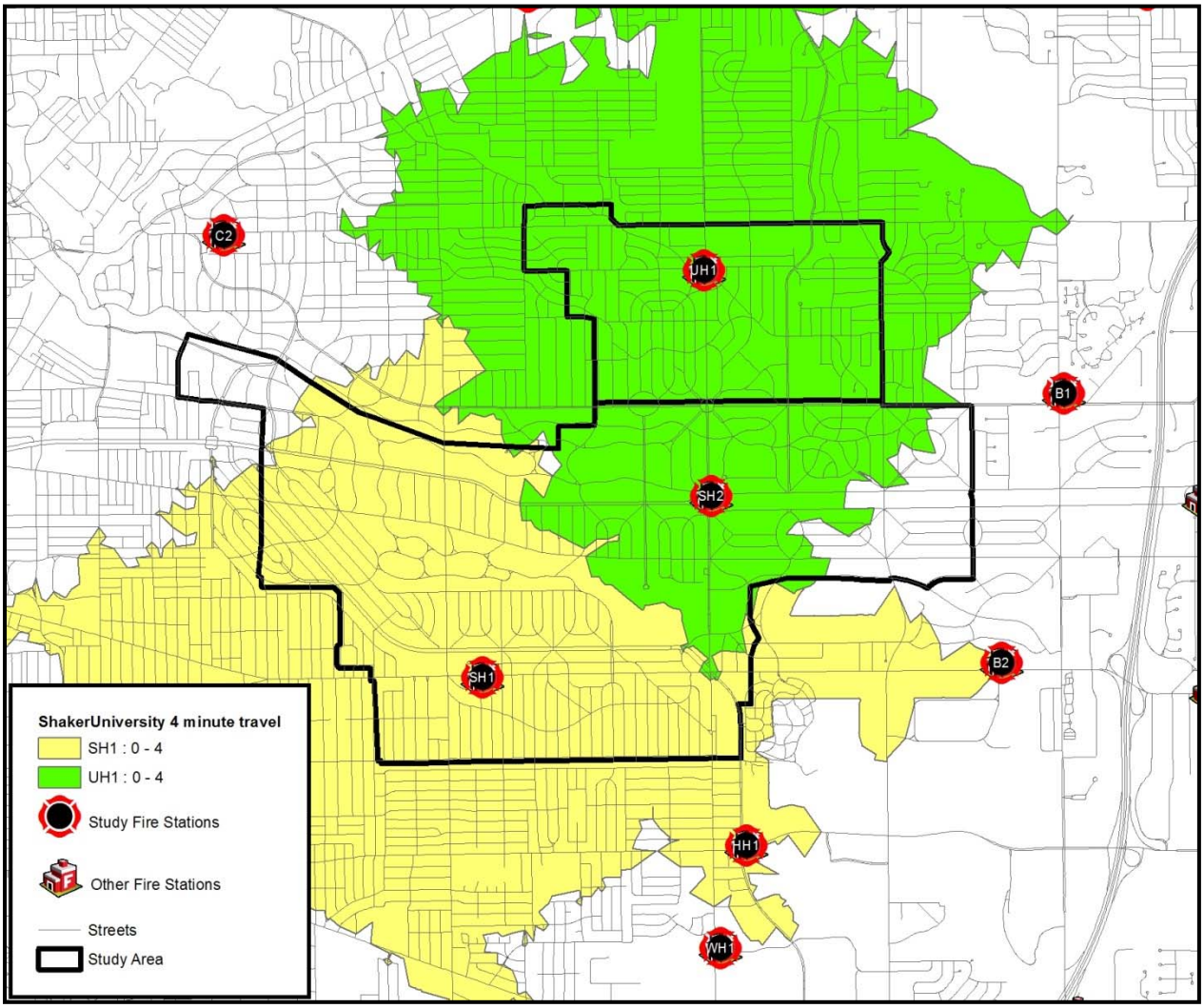
[38] Since UHFD had an interim chief at the time of data collection and analysis, the salary used for that position was derived from the UHFD captain salary plus ten percent.
[39] Based on an hourly rate of $32.4453 and an average 20 hour workweek.
[40] FEMA/NFPA, "*Four Years Later—A Second Needs Assessment of the U.S. Fire Service, A Cooperative Study Authorized by U.S. Public Law, 108-767, Title XXXVI, FA-303/October 2006*". The study divides the U.S. into Northeast, North Central, South, and Western regions. Fire departments within each of the four regions are categorized by service area population.

To begin the feasibility analysis, ESCI evaluated the complete legal merger of the two study departments. From here, the report will detail alternatives that ESCI determined are also feasible.

Feasible Strategy – Consolidation of Shaker Heights and University Heights Fire Departments

Understanding that the goal of each community is to find alternatives to the current service delivery model that will reduce costs and improve efficiency while maintaining the current level of service, ESCI evaluated the potential of reducing physical facilities in an effort to reduce overhead and fixed costs for a combined department. The first analysis involved the closure of SHFD Station 2 due to its proximity to UHFD. The figure below illustrates the resulting travel model from this analysis.

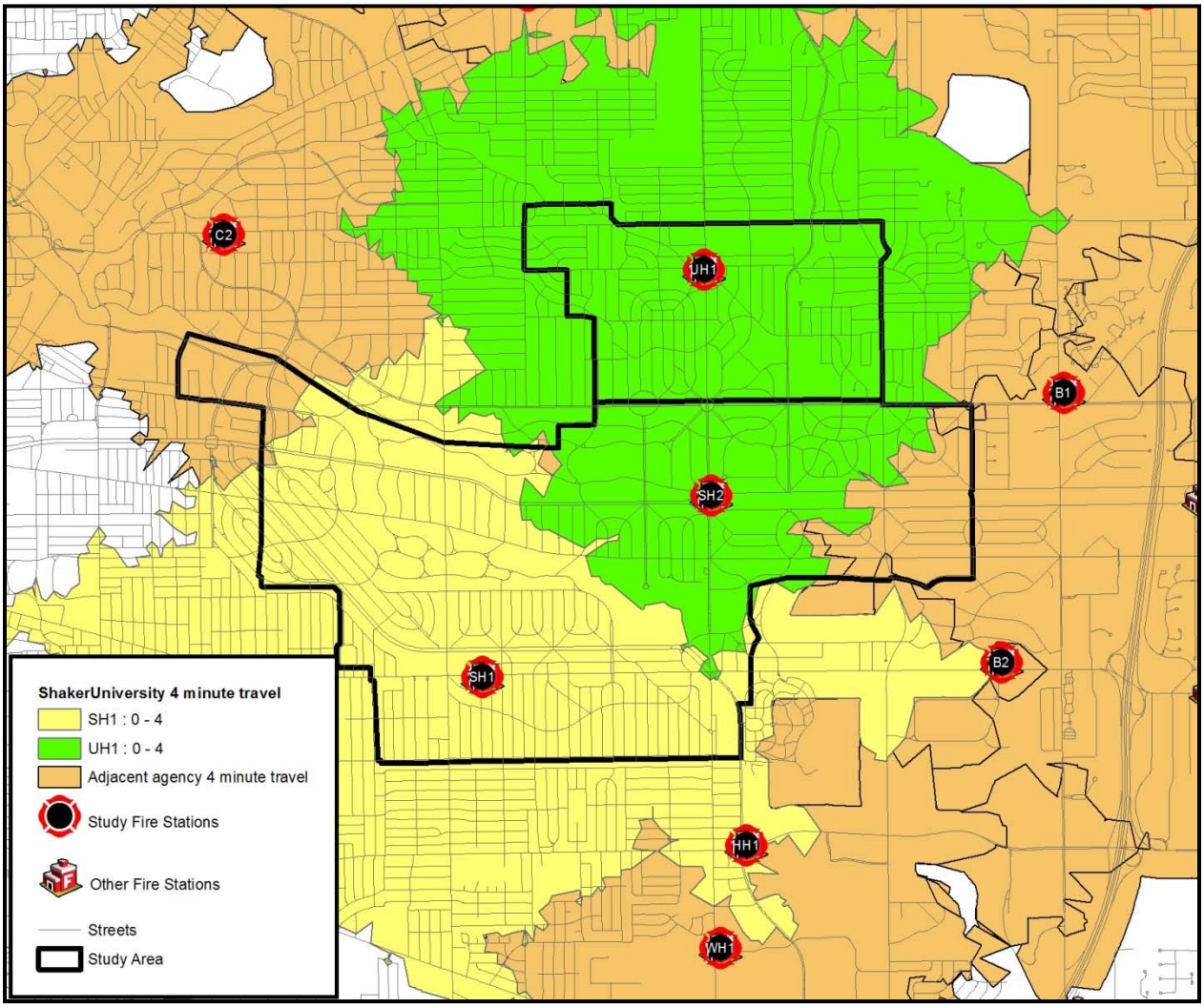
Figure 58: Travel Model without SHFD Station 2



SHFD Station 2 is visible in the map above for reference only and it is evident that a large portion of that station's response area can be covered from UHFD within four minutes of travel.

Although there is a portion of Shaker Heights (to the east) that is outside the four-minute travel model, an automatic aid agreement with one of the neighboring departments for first due coverage of that area could provide similar coverage as is provided in the remainder of the two cities.

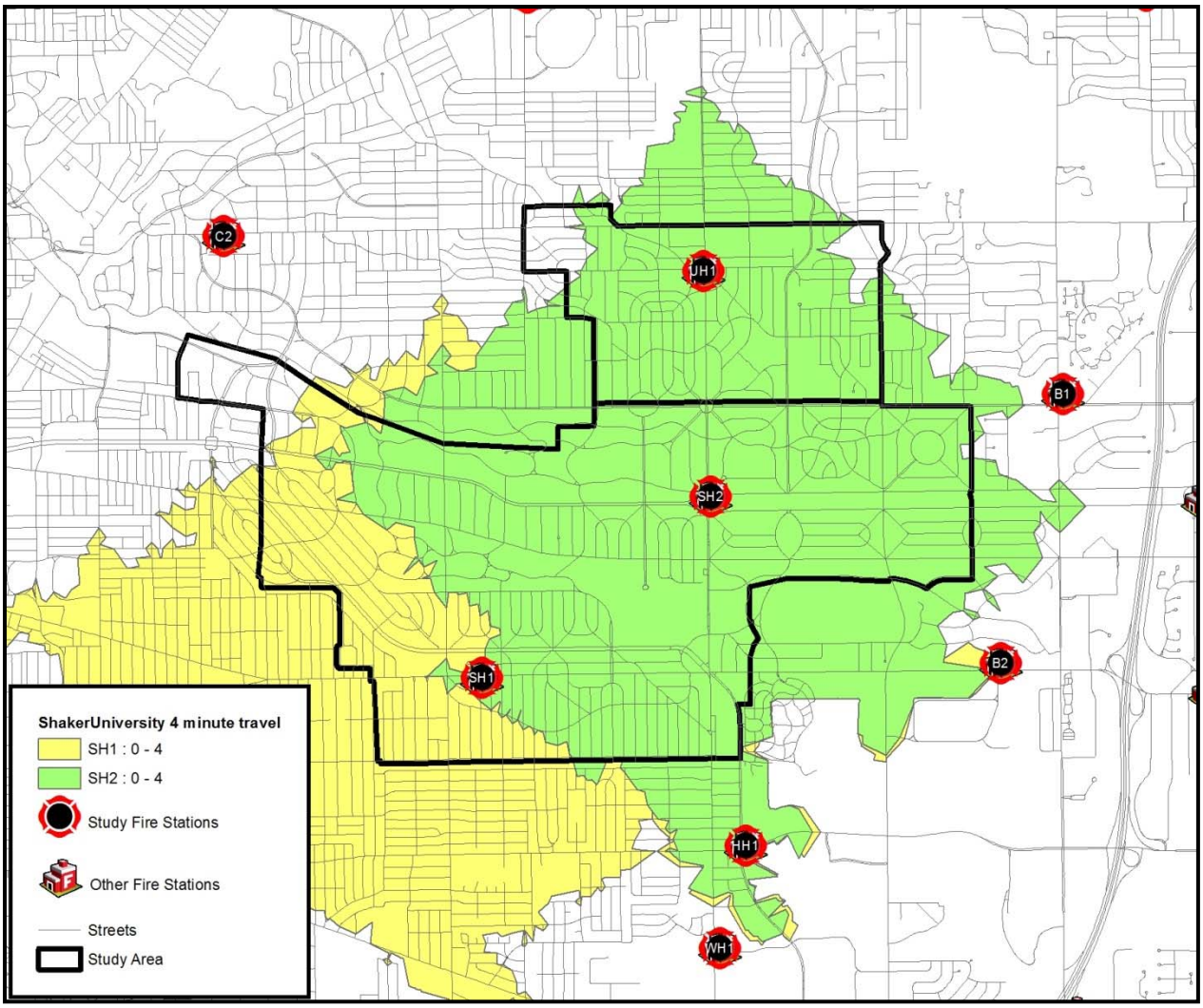
Figure 59: Travel Model without SHFD Station 2 and with Automatic Aid



Based on the travel models, 93.2 percent of last year's incidents are within four minutes of travel from a study station and 100 percent of last year's incidents are within four minutes of a regional station.

In order to ensure the most efficient model, ESCI also evaluated the potential closure of UHFD with coverage provided by SHFD Station 2. The travel model that resulted from that analysis is provided in the following figure.

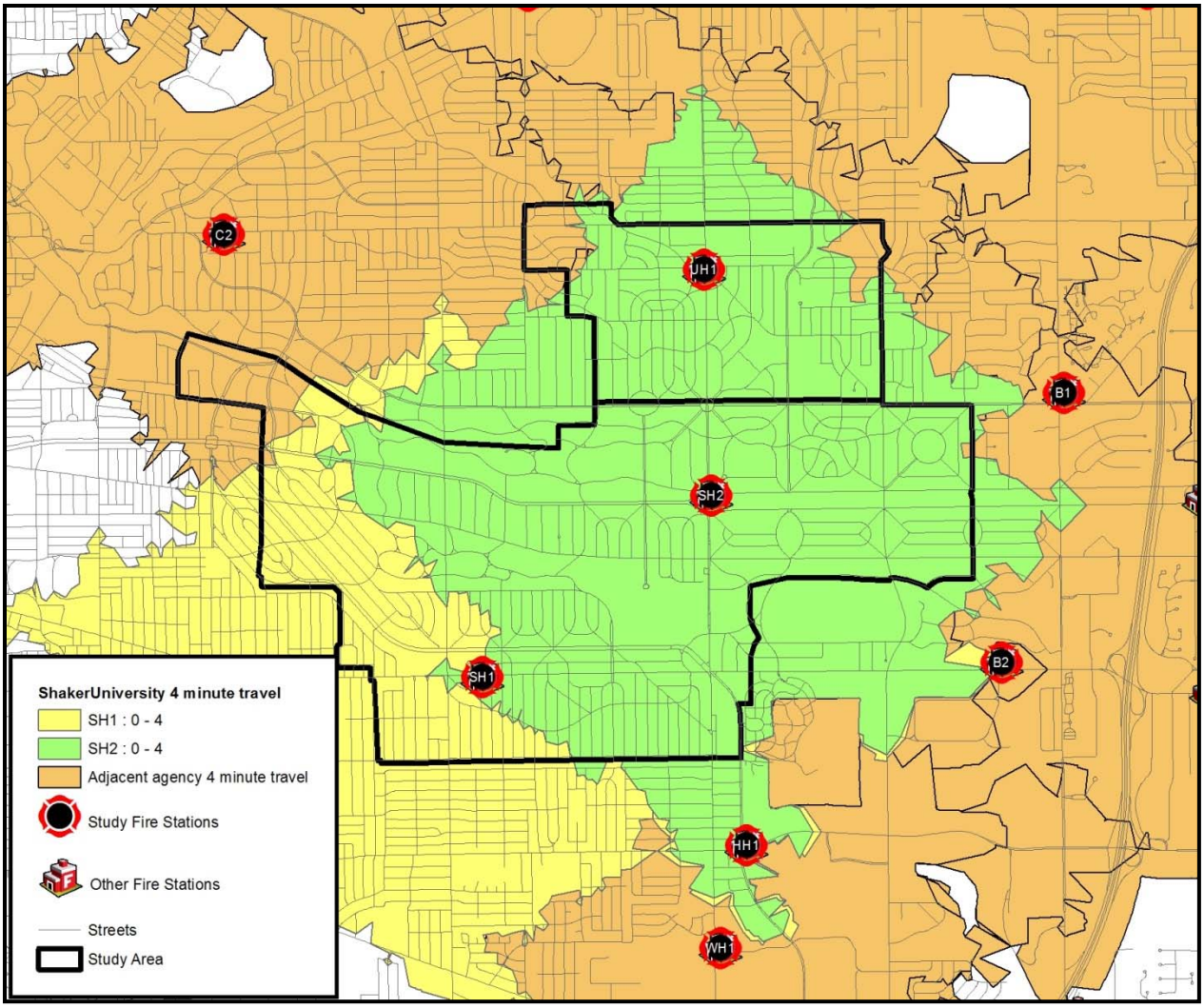
Figure 60: Travel Model without UHFD



A majority of University Heights can be covered within four minutes of travel from SHFD Station 2.

Similar to the initial analysis of the closure of SHFD Station 2, entering into automatic aid agreements with neighboring departments could provide coverage to 100 percent of University Heights within four minutes of travel is illustrated below.

Figure 61: Travel Model without UHFD and with Automatic Aid



The highest level of service demand within University Heights is in close proximity to its current fire station. Therefore, eliminating UHFD's station from the model is *not* recommended. It should also be noted that each fire department within the study region has historically planned and staffed within a vacuum. In other words, each department has made decisions regarding potential staffing reductions without considering similar reductions in adjacent jurisdictions. This type of planning can often lead to an overall reduction in the availability of mutual aid assistance throughout the region. Any decisions to close stations and rely on automatic or first due response assistance from an adjacent jurisdiction should be made only after consultation with the other departments and/or municipalities.

Level of Cooperation

- Operational

Timeline for Completion

- Long-term

Objective

- Consolidate fire and EMS entities into a single operational unit, either through Intergovernmental Agreement (IGA) or through a Joint Powers Authority (JPA).
- Provide increased fire and emergency service efficiency in the areas served by the current fire departments.

Summary

The study fire departments already benefit from some collaborative efforts, particularly in regard to emergency response and suppression activities; and it is natural that continuing the long-term strategy of cooperation should eventually lead to a single fire agency. A cost analysis of this strategy at full deployment shows an annual cost avoidance of between $930,000 and $3.2 million based on 2011 fiscal year dollars (see Figure 65), depending on the staffing model adopted and implemented.

Discussion and Financial Analysis

A concept for staffing of administration and support services of a combined fire and EMS department lists position/title and the number of positions. A total of 5.5 positions are assigned to the administration and support functions under this strategy. The following table compares the current staffing for administration and support to the concept model.

Figure 62: Current to Proposed – Administrative and Support Staff

Position	Current	Model	Change
Fire Chief	2.00	1.00	-1.00
Assistant Chief	1.00	1.00	0.00
Training Officer	0.00	1.00	1.00
Fire Inspector	1.00	1.00	0.00
Accounting Clerk	1.00	1.00	0.00
Supt. Of Equipment	0.50	0.50	0.00
Subtotal	**5.50**	**5.50**	**0.00**

While there is no net change in the number of administrative and support personnel, the concept assigns personnel to functions that did not previously have dedicated personnel, such as a Training Officer to provide educational oversight to the combined agency.

In regard to operational staffing, ESCI has developed four potential models for policymaker consideration. The figure below shows the various concepts of the number of positions for staffing operations of a single consolidated fire agency.

Figure 63: Operational Staffing Models

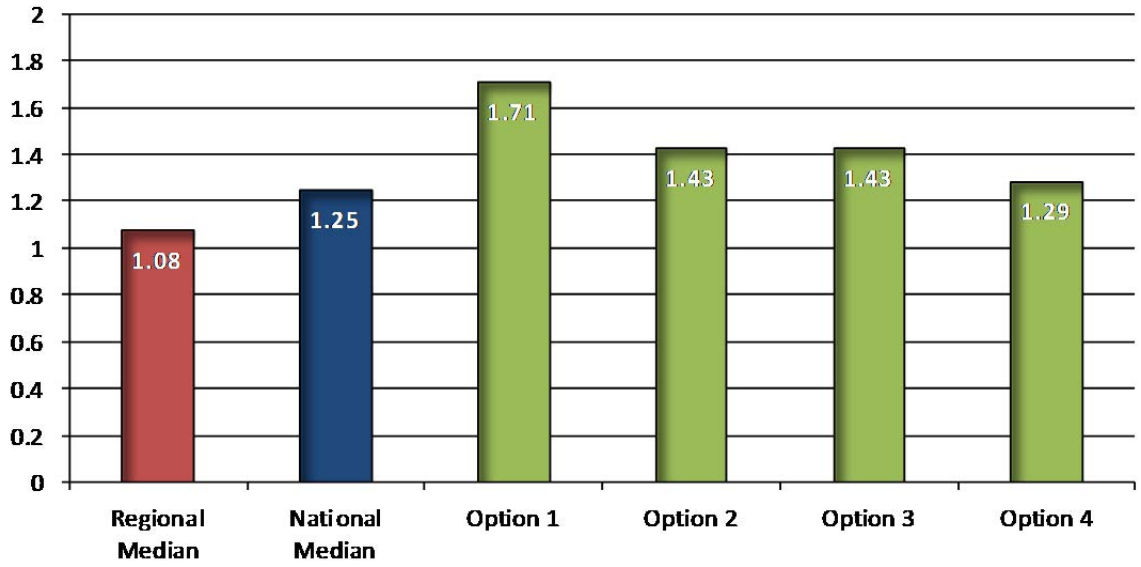
	Current	Option 1 3 Stations	Option 2 3 Stations	Option 3 2 Stations	Option 4 2 Stations
SHFD Station 1					
Engine	4	4	4	4	4
Ambulance	3	3	3	3	2
Ladder	2	2	2	2	4
Ambulance				3	2
SHFD Station 2					
Engine	4	4			
Ambulance	3	3	3		
Ambulance	Cross	Cross			
UHFD					
Engine	4	4	4	4	4
Ambulance	3	3	3	3	2
Ladder	2				
Supervision					
BC	1	1	1	1	
Total per Shift	**26**	**24**	**20**	**20**	**18**
Total Personnel	**78**	**72**	**60**	**60**	**54**
Change		**-6**	**-18**	**-18**	**-24**

The figure above was created as a baseline from which future deployment options could be evaluated. This should not be construed as a definitive recommendation and is provided as direction to policymakers as they move forward with collaborative efforts. Each staffing model involves the realignment of some functions, responsibilities, and authorities. A battalion chief will serve as a shift commander on each shift with the exception of Option 4 where no battalion chief is allocated; a captain will be assigned to each engine at each station and serve as the station commander; lieutenants will serve as company officers on the rescues/squads (3) and the aerial truck.

Note that under Options 3 and 4, one station is eliminated and, with it, a number of apparatus, which will reduce future operational costs. This model places the combined department more in line with

regional comparisons. The figure below illustrates how the new number of personnel based on each model compares to the regional and national medians.

Figure 64: Benchmark Comparison of Operational Personnel[41]



Although the resulting benchmark comparison is higher than both the regional and national medians, it should be understood that the benchmark data does not delineate between those departments that do or do not provide transport EMS. This service tends to increase the overall number of personnel within a system due to the high service demand. Because both departments provide transport EMS, the staffing per 1,000 population would be expected to be higher than the medians.

The figure below shows the baseline cost of an integration of the fire departments based on each staffing option described. Any existing debts or liabilities were excluded from this analysis. If the fire departments do pursue a consolidation, the liabilities could be transferred to the new organization. For this example, the assumption is that the debt remains where it was incurred. The following modeled budgets were developed by ESCI using financial information provided by each city. Personal services estimates are based on highest current salaries in similar classifications. Operational costs are based on the modeled expenditures developed by ESCI and do not necessarily account for each and every indirect cost not specifically identified within the current departmental budgets. The capital expenditures are

[41] Regional and National Median data obtained from the National Fire Protection Association.

based on a fully funded capital replacement plan that assumes the reduction in apparatus as discussed previously.

Figure 65: Projected Budget Models – 2011 Numbers

Operating Budget	Baseline	Option 1	Option 2	Option 3	Option 4
Personal Services	$10,279,755	$9,449,339	$8,032,907	$8,032,907	$7,324,691
Materials & Services	$891,547	$891,547	$891,547	$691,008	$691,008
Operations	**$11,171,302**	**$10,340,886**	**$8,924,454**	**$8,723,915**	**$8,015,699**
Change		**$830,416**	**$2,246,848**	**$2,447,387**	**$3,155,603**

The major savings associated with the Materials and Services budget under Options 3 and 4 are related to the operating expenses of the station that would be eliminated. Additional cost avoidance can be realized by a reduction in the number of frontline and reserve fire apparatus requirements. Major savings within the area of capital will also be realized by not having to replace the current UHFD ladder truck; a potential savings of up to $1,000,000 or annual debt service over ten years of in excess of $100,000. As the consolidated department moves forward, additional savings can be realized within each community by spreading the cost of capital purchases across both cities. A portion of the savings should be used to establish a capital reserve fund for the replacement of capital apparatus and equipment with annual contributions.

Policy Action

At this point, the cities should work closely with one another to form a joint vision for consolidated service.

Governance Options

While a number of options are available to the governing bodies of Shaker Heights and University Heights regarding how to oversee a jointly operated fire department, several of the more common methods are discussed here.

Joint Fire District

Ohio Revised Code 505.371 addresses the creation, authority, powers and duties of joint fire districts. The intent of the legislation is to provide uniformity in the creation, governance and authority of these joint districts and improve communication and coordination between them and other local governments with respect to short-range and long-range planning to meet the demands for service delivery while maintaining fiscal responsibility.

The statute is clear on how such a joint fire district is created by stating, "…the legislative authorities of two or more municipal corporations…may, by adoption of a joint resolution…create a joint fire district comprising the municipal corporations…as mutually agreed upon. A joint fire district so created shall be given a name different from the name of any participating…municipal corporation."[42] The statute goes on to say that, "The governing body of the joint fire district shall be a board of fire district trustees, which shall include…one representative from the legislative authority of each municipal corporation in the district."[43] These joint fire district trustees are also given the same general authorities that are given to the municipal corporation legislative authority such as the power to levy a tax on all property within the joint district.

Several examples of joint districts within the State of Ohio include Central Ohio Joint Fire District, Allen-Clay Joint Fire District, Perry Joint Fire District, and Deer Park-Silverton Joint Fire District. Although there are several examples of joint fire districts across Ohio, the actual governance model chosen by any jurisdiction should be based on the local level of comfort regarding taxing authority, level of operational control, and community identity with the fire department. The creation of any type of district is often viewed as establishing yet another layer of government and taxing authority and, in the current economic environment, citizens can be expected to be quite wary of such an expansion of power and authority. Another model for consideration is that of an intergovernmental agreement such as that already in place within the combined emergency communications center.

Intergovernmental Agreement

Ohio Revised Code 9.482 permits local governmental units to enter into agreements for the provision of materials and/or services. The purpose of the legislation is to make the most efficient use of local

[42] ORC 505.371 (A)
[43] ORC 505.371 (B)

government powers by enabling them to cooperate on a basis of mutual advantage in the provision of services and use of facilities.

The enabling legislation gives governing bodies of any two or more governmental subdivisions in the state, including municipal corporations, authority to enter into agreements with each other. This concept has been used successfully in several areas within Ohio to improve fire and emergency protection. A partial list of successful intergovernmental efforts can be found on the Ohio Auditor of State website.[44]

An example of an intergovernmental agreement is a simple contract between two municipal corporations for the provision of services or the use of facilities. In other words, if one municipal corporation were to cease fire protection services and instead contract with another for those services, this is a type of intergovernmental agreement. This type of collaboration is also listed on the Auditor of State's website.

Among the benefits of this type of collaboration is its inherent simplicity to set up. The municipalities involved simply need to negotiate the contents and conditions of the contract to a point where all agree to move forward. In addition, because of the relatively broad powers given to municipalities to set up such collaborations, there are very few limitations to how the agreements are designed, how equipment or personnel are exchanged or shared, and how financing for the service is distributed. However, there are also some disadvantages to this governance method. While municipal corporations can cancel the contract, based on statutory language, and resume their own delivery of services, this can be difficult to do if the original agreement involved elimination, ownership transfer, or reassignment of resources. In addition, the act of one municipality contracting a critical service to another is often seen by the citizens as subjugating that contracting municipality to the other without the ability to directly influence their own service provision. Taxpayers fear the idea of placing the fate of a critical government service into the future hands of unknown elected officials in another community for whom they do not vote.

[44] http://www.auditor.state.oh.us/sharedservices/Search.aspx?s=6.

Council of Governments

A Council of Governments allow jurisdictions to pool resources, along with the governance of those pooled resources, without usurping local authority or creating a new and fully independent taxing entity. A Council of Government involves the creation of a joint subsidiary organization to oversee and provide a service on behalf of all of the participants. In Ohio, the creation of a Council of Governments is covered by Ohio Revised Code 167, which outlines the powers and responsibilities of the Council in regard to the services that can be provided as well as the authorities that are held. This concept is believed to have an advantage over a fire tax district because it offers the true consolidation and central governance of all fire and EMS resources, while retaining the ability for all the participating municipalities to have some direct input and influence over their services and the subsequent cost of those services. In essence, it offers full consolidation without the accompanying creation of government layers and tax authorities that a fire district can create.

Critical Issues

Organizational consolidations and mergers fail for many reasons. Sometimes law prohibits the idea at the outset. Other times the proposal may be doomed by the unfavorable outcome of a public election, or the reality of finance. These issues aside, however, four major pitfalls can cause even the most feasible consolidation to go wrong. Specifically, the four are command, communication, control, and culture.

- **Command:** Undertaking any partnership as complex as a consolidation absolutely requires effective leadership be demonstrated consistently at all levels. Policymakers and administrators must guide their respective agencies, yet (at the same time) they must cooperate with partner organizations. Differing leadership styles may cause repressed friction at best and open conflict at worst. Problems with sharing control and making decisions sends the wrong message to the members of the organization, which can lead to an unraveling of even the best proposal.

- **Communication:** Silence or limited information from leaders about potential or upcoming partnerships breeds fear, mistrust, and misinformation among affected persons. The leadership of collaborating organizations must agree to communicate actively with all affected groups. Everyone must be provided the same information at the same time. Most importantly, leaders must demonstrate two-way communication skills by carefully listening to (and acting on) the concerns of all constituents.

- **Control:** Consolidation often fails because of organizational or personal ego issues. The tenets of leadership require that someone be in charge; but in the interest of greater good, some of those in leadership positions must agree to yield power. Some who are used to operating in a position of control may have trouble adjusting to new roles that require more collaboration. Personal sacrifice in the interest of community good may not always win out.

- **Culture:** Two schools of thought exist regarding organizational culture. The first camp views culture as implicit in social life, naturally emerging as individuals transform themselves into social groups (tribes, organizations, communities, and nations). The second camp offers that culture is comprised of distinct observable forms (language, use of symbols, customs, methods of problem solving, and design of work settings) that people create and use to confront the broader social environment. This second view is most widely used in the evaluation and management of organizational culture, but the first is no less important when considering bringing two discrete organizations into a closer relationship.

The general characteristics of fire department cooperation encourage the creation of a culture unique to each organization. The paramilitary structure, the reliance on teamwork, and the hazards of the work builds strong bonds between the members, who tend to share group behaviors, assumptions, beliefs, and values. Bringing multiple groups together always results in a change to both organizations. If the partnership is successful, no one organization will overcome the other—instead, a new organization will evolve from the two. If the organizations are incompatible, the partnership will often fail. Leaders must be aware of each of these characteristics and the role each plays in the wellness of the agency's heart and soul. Early recognition by leadership of the importance of these characteristics to the success of a partnership can help to overcome differences and build on strengths.

Guidance

- **Consult with service partners.** The mayors of the cities should begin a dialog with each other and their respective city councils regarding the proposed consolidation. Dialogue with neighboring communities may also be necessary to keep information flowing.
- **Consult with legal counsel.** The mayors should consult with legal counsel regarding the statutory options and requirements for consolidation and the selected form of governance.
- **Name the consolidated department.** As an element of the joint vision, the cities should establish a suitable name for the consolidated fire department. The name should reflect the identity of the entire protected area.
- **Establish communications guidelines.** The mayors should establish a plan for disseminating information regarding the consolidation to city staff, the fire department members, the community and the media in a consistent and unified voice.

Benefits of Cooperative Effort Strategies

In identifying potential cooperative opportunities, the project team considered the key issues now challenging each agency. Some issues represent roadblocks to integration, while others provide a unique chance for improvement. As an element of the review, affected staff and other officials provided local and internal perspective on organizational culture, community expectation, and other significant matters.

The section identifies 16 potential benefits to the collaborative process. Each listing includes a title and summary description. It should also be noted that some of these strategies are either already in place or being implemented presently.

A – Unified Standard Operating Procedures and Guidelines

Summary

Standard operating guidelines are used at the operations level of the fire department. They are analogous to a playbook, providing direction yet allowing for individualized company officer adjustments to situations. Currently each fire agency in this study is responsible for developing a unique set of standard operating guidelines for its organization.

B – Unified Fire Safety Education Coalition with Opportunity for Regional Expansion

Summary

Preventing fires is known to be far more cost effective than extinguishing them. One widely recognized and very successful method of preventing fires is through a multi-faceted public fire and life safety education program. The public fire safety education programs currently offered by the separate fire departments vary from well planned to non-existent.

C – Unified Occupational Medicine Program

Summary

A single method and source for providing occupational and health services may provide savings through economies of scale. *NFPA 1500, Standard on Fire Department Occupational Safety and Health Programs*, provides the minimum requirements for a fire-service related occupational safety and health

program. Along with *NFPA 1500*, *NFPA 1582, the Standard on Comprehensive Occupational Medicine Programs for Fire Departments*, and related documents, provide guidance for the creation of occupational health programs and for establishing medical requirements for current and future firefighters.

D – Unified Wellness and Fitness Program

Summary

Wellness and fitness programs have proven beneficial to employers and employees alike. Onsite visits by licensed wellness experts are part of an all-inclusive program. Services offered under a comprehensive wellness program may include:

- Wellness screening
- Health coaching
- Wellness and fitness educational materials
- Support groups
- Presentations
- Fitness evaluations
- Newsletters
- Nutritional information
- Health risk assessment
- Fitness training

E – Joint Unified Training

Summary

The 2007 version of *NFPA 1500* states, "The fire department shall provide training and education for all department members commensurate with the duties and functions that they are expected to perform."[45] The fire departments in this study address annual planning for fire and EMS training. A formalized training plan provides the guidance for meeting training requirements for all personnel. The plan and subsequent training is used to ensure that firefighters are competent, certified, and possess the ability to safely deal with emergencies. Training priorities are established by evaluating responder competencies to training mandates, requirements, desired training, and with the emergency services being delivered. Contemporary training delivery often revolves around performance or outcome-based training.

[45] National Fire Protection Association Standard 1500 *Standard for Fire Department Occupational Safety and Health Programs*, Training and Education, 2007 Edition.

An annual training plan should reflect priorities by identifying the training that will occur. Training topics, general subject matter, required resources, responsible party, tentative schedule, and instructors are all covered in the plan. Rationale for why certain topics were chosen (or not chosen) is also included

Currently, each fire department uses a records management system (RMS) for their departments independently. Each of the departments maintains training records in hard copy format to one degree or another. *NFPA 1401, Recommended Practice for Fire Service Training Reports and Records*, provides standards for record keeping systems.

F – Uniform Pre-Incident Plans

Summary

Pre-incident plans are an important part of the emergency response system to provide essential information on specific structures and processes. Through timely planning, strategy and tactics can be developed before an emergency occurs. Pre-incident planning involves evaluating protection systems, building construction, contents, and operating procedures that may impact emergency operations.

Pre-incident plans should be kept up to date. The plans should be used in company training, and should be distributed to all mutual/automatic aid partners. The standards set forth in *NFPA 1620, Recommended Practices for Pre-Incident Planning*, should be followed to guide in the development of a regional pre-incident planning system.

G –Uniform Emergency Apparatus with Elimination of Redundancy

Summary

The study fire departments use and maintain a variety of emergency apparatus types. Among the common types of apparatus (such as pumpers) each department uses equipment of different makes, models, and configurations. A standard specification and procurement process for each apparatus type would result in lower cost, faster production, and training efficiencies.

Procurement of uniform fire apparatus can translate into lower purchase prices; reduction in parts warehousing; and less money, time, and effort spent training drivers and maintenance personnel. Other benefits include greater interoperability, a potential for reducing driver training, and greater confidence and skill level among operators.

H –Joint Electronic Staffing Program

Summary

The fire departments contact personnel for regular staffing and initiating call-backs in a variety of ways. The task of notification and filling vacancies has traditionally been done via telephone, with someone having to make personal contact to fill each opening. Many departments across the country have purchased software programs for handling this function.

A key feature of these systems is that through the use of a touch-tone phone or computer, employees and volunteers can access the system using a secure ID and password. Supervisors have the advantage of an automated system for personnel management.

I –Uniform Fees for Service

Summary

The study fire departments charge fees for a variety of services. Fees for service include ambulance transport, contract for services, fire safety inspections and enforcement of the building code. The departments also charge fees for non-routine services to recover costs due to extraordinary or unusual events. Examples include response to and standby for hazardous materials incidents, recurring false automatic alarms, etc.

The departments differ on which services are (or are not) billed, and the agencies differ on the rates charged. If the fire departments follow a policy of greater interagency cooperation, some of those partnership initiatives will necessitate that the departments also align fee schedules.

J –Joint Juvenile Firesetter Intervention Program

Summary

Statistical analysis nationwide clearly demonstrates the growing problem of juvenile fire setting. While fires set by juveniles have always been a problem, fire cause determination and fire data reporting systems have not always been adequate to identify the extent of the phenomenon. Many jurisdictions simply do not realize the extent of juvenile set fires in their community.

Shaker Heights supports a juvenile fire setter program and University Heights would benefit from this program. The lack of involvement by the fire departments, law enforcement agencies, mental health professionals, schools, juvenile court, and other affected interests limits the effectiveness of the one existing fire setter program.

Conclusion

It is common for those in the fire service to tout themselves, or their department, in terms such as "a pride-driven organization that is at their best every day," or more simply, "the best." The true mark of quality of the best fire departments, however, is one that works continuously for measurable improvement in organizational performance. By undertaking this study of collaborative opportunities, the leadership of the cities of Shaker Heights and University Heights and their respective fire departments have begun the task of organizational and system evaluation that is necessary to plan for and reach the goal of truly being the best.

This is not to say that the current fire departments are not already operating at a high level. In fact, ESCI is pleased to report all available evidence shows that the fire departments consistently provide excellent service to the citizens of the protected communities. However, in keeping with the notion of continuous improvement wherein an unending loop of performance, measurement, and evaluation leads to system enhancements that would otherwise be impossible, the project team offers recommendations to assist the fire departments of Shaker Heights and University Heights in implementing the collaborative strategies that will best benefit the public.

The success of adopting and implementing change, improvement, or cooperative opportunities depends on many things. In our experience with dozens of functional, operational, and legal unifications, leadership is the single factor that most frequently determines success. Nearly always, a key staff, councillor, or governing body member champions the concept garnering the support of the various affected groups (political, labor, member, and community). In addition, good leadership fosters an organizational culture receptive to planning, calculated risk taking, and flexibility. The manner in which leaders promote a trusting relationship between all groups and aid two-way communication between them is essential.

The ESCI project team began collecting information concerning the fire services for Shaker Heights and University Heights in March 2012. The team members recognize that the report contains a large quantity of information and ESCI would like to thank the elected officials of each organization involved as well as the officers and employees of each department. ESCI would also like to thank the various individuals and external organizations for their input, opinions, and candid conversations throughout this process. It is ESCI's sincere hope that the information contained in this report is utilized to its fullest

extent and that the emergency services provided to the citizens of the Shaker Heights and University Heights area are improved by its implementation.