City of Minneapolis
Minnesota

Fire Department Agency Evaluation and Master Plan

May 2012

Emergency Services Consulting International

25200 SW Parkway Ave. Suite 3 ● Wilsonville • Oregon • 97070 • www.ESCI.us ● 800-757-3724

City of Minneapolis

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Fire Department Agency Evaluation and Master Plan

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Prepared by:

Dave Austin
Kent Greene
Joe Parrott
Mike Price
Jack Snook
Steve Trunck

Emergency Services Consulting International

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Cam Gordon, Councilor Ward 2

Diane Hofstede, Counselor Ward 3

Barbara Johnson, Counselor Ward 4

Don Samuels, Councilor Ward 5

Robert Lilligren, Councilor Ward 6

Lisa Goodman, Councilor Ward 7

Elizabeth Glidden, Councilor Ward 8

Gary Schiff, Councilor Ward 9

Meg Tuthill, Councilor Ward 10

John Quincy, Councilor Ward 11

Sandy Colvin Roy, Councilor Ward 12

Betsy Hodges, Councilor Ward 13

R.T. Rybak, Mayor

Minneapolis Fire Department

Alex Jackson, Fire Chief

David DeWall, Assistant Fire Chief

John Fruetel, Assistant Fire Chief (Appointed Fire Chief 1 March 2012)

Cherie Penn, Assistant Fire Chief

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Officer, Staff and Employees of MFD

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Executive Summary

The City of Minneapolis engaged Emergency Services Consulting International (ESCI) to conduct a comprehensive evaluation of the Minneapolis Fire Department (MFD) to determine how the department compares against similar departments serving similar populations, and to provide recommendations to address short-, mid- and long-range strategies to increase efficiency, improve effectiveness and prepare for future challenges. The overall project consists of three phases including: Stakeholder Input, Evaluation of Current Conditions, and Future Delivery System Models. Stakeholder Input was completed during 2011 and a summary report was provided to the organization. This document is the culmination of Phase II and serves as a report on current conditions and short-term strategies to improve overall department effectiveness and efficiency. The report begins with a general description of the department and an overview of each function used in daily operations. This section includes an overview of organizational management components, risk management, staffing, personnel management, capital assets, service delivery and performance and support programs.

Minneapolis Fire Department (MFD) was founded in 1879 as a charter department within the governance of the City of Minneapolis. Today, the department serves a population of 382,578 in an area of approximately 58.4 square miles. In addition to the area within the city, MFD also provides fire protection services by contract to the City of Richfield that consists of 35,228 persons within 7.1 square miles. The department operates from 19 stations distributed throughout the city with 19 engines/pumpers, six aerial apparatus (including one rescue company), one mobile command unit, one salvage unit and one 'board-up' unit. These stations and apparatus are staffed by a total of 408 personnel including administrative and operations staff.

MFD is slightly below both the national and regional averages of personnel per 1,000 population served as will be discussed later in this report. It should be noted, however, that this comparison benchmark data published by the National Fire Protection Association includes statistics of departments that participate in transport emergency medical services (EMS). Non-transport fire departments are not segregated within the benchmark data provided.

Being a service provider to a diverse urban community, MFD faces 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 MFD's efforts in this area and preparation for the future health of the organization, including foundational policies, critical issues and challenges, internal and external communications, document control and security, reporting and recordkeeping and strategic planning.

The current Operations Manual is updated regularly and is a living document as the community environment changes. In addition, the manual is made available to all personnel and updates are distributed appropriately. MFD should be commended for the completeness and comprehensive nature of their current SOG/SOPs. Critical issues currently facing the department included:

1. Inability to maintain adequate staffing and cover necessary overtime.
2. Current economic environment causing financial strains on city, department.
3. Increasing sick-time usage, injury rates and overtime costs.

As with critical issues, it is important for any agency to have an appropriate level of future thinking. This permits an agency to identify what external challenges may present themselves to the organization in the coming years. This awareness of future challenges ensures that the department does not miss out on opportunities or blindly stumble into crisis unprepared.

Again, further exploration of future challenges should be part of a complete strategic planning process, but the following items have been identified by the officers of the department as external challenges likely to be faced by the agency in the coming few years.

1. Need to stabilize funding.
2. Ability to maintain adequate staffing while reducing injuries, sick time and overtime usage.
3. The need to embrace a culture of change.

The department utilizes up-to-date records management software to enter and store incident information. The software is compliant with NFIRS (National Fire Incident Reporting System) 5.0 standards and incidents are entered quickly and accurately. Training records are maintained electronically, permitting easy retrieval of accurate reports on training attendance, certification status, and subject matter. Code enforcement activities and occupancy records are maintained in KIVA Software to permit analysis of prevention activities, community risks, and trends. Maintenance records for apparatus and equipment are computerized to increase the efficiency of the fleet management program. MFD is to be praised for its proactive efforts in this respect and should continue to maintain

the Business Plan as a living, up-to-date document through revision meetings with its planning team at least annually.

The fire service, like most businesses, must manage risk to the extent possible in order to be successful. Organizations that fail to properly identify risk, and appropriately put processes in place to manage the risk, are often at risk for financial liability and, particularly in the emergency services business, personal injury or illness. The components of risk management that were evaluated included compliance programs, safety policies, practices and programs, and job related injury processes.

The City of Minneapolis Risk Management and Claims Division, a division of the Finance Department, administers the risk management program for the entire city and all city departments, including the fire department.

MFD adheres to risk management policies and procedures developed by the Risk Management and Claims Division as well as internal policies and procedures. Other SOPs address accidents, reporting, accident prevention, bloodborne pathogens, disease and infection/exposures, etc. The safety policies, practices and programs in place within MFD are comprehensive and are well documented. As an added benefit, a comprehensive fitness and wellness program is outlined within the collective bargaining agreement with labor. The process by which MFD personnel report injuries and/or exposures are addressed within the department's overall Operations Manual.

MFD employs career staff to accomplish its mission and deliver services to the citizens of Minneapolis. This section of the study describes the staffing and personnel management activities and provides an analysis of the organization's current staffing levels. The review of personnel management programs focuses 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

Successful organizations are typically governed by a set of clear policies that guide toward the agency's vision and provide a foundation for a productive organizational culture. Effective policies establish behavioral standards and limits without discouraging creativity and self-motivation. Policy and procedure manuals should be reviewed and revised periodically.

Rules, regulations, and codes are the policy-level direction provided by a governing body, such as a city council. Administrative rules are the responsibility of the organization's highest-level administrators; in this case, the fire chief. They provide instruction and direction for compliance with the organization's policies and provide guidance and instruction to all employees.

City personnel policies are maintained by the city's human resources department under control of the city coordinator and are in overall good condition. These HR policies and procedures apply to all city employees where collective bargaining agreements do not apply.

Before determining if overtime use is properly managed, consideration to a number of variables was identified. To begin, the number of FTEs in MFD in any given year was determined. The number of employees in the fire department has decreased steadily over the last 10 years in an effort to reduce expenditures and increase the overall efficiency of the department. MFD had a high of 483 FTEs in fiscal year 2001, and a low of 408 FTEs in the current fiscal year, 2011. Over the 10-year period, MFD has decreased FTEs an average of 1.6 percent annually with the largest percentage decrease occurring between 2010 and 2011 at 6.8 percent.

Although no official minimum staffing is in place either within ordinance or the collective bargaining agreements, MFD has established a current minimum staffing level of 94 personnel. In the minimum staffing matrix, the three non-critical units (salvage, mobile command and board-up) are not staffed, and all ladder companies retain minimum staffing of four personnel while all engine companies are reduced to three personnel. This maintains all stations in operational status without the necessity for 'brown outs' or the temporary closing of stations due to insufficient personnel.

The amount of sick, injury, and other leave used by fire department personnel varies by employee. Typically, sick leave use in fire departments of similar size and character averages between 2.5 to 4.0 shifts (60 to 96 hours) per year. However, based on information supplied by MFD, actual sick leave rates for MFD is closer to 292.2 hours per position for all personnel or 261.0 hours for operational personnel. Based on the unusually high sick/family/emergency time off usage, ESCI evaluated these absences

further to determine if a pattern exists that could be rectified in the future through alternative scheduling and/or staffing. Although there was a decline in unscheduled time off from 2008 to 2009, that amount doubled between 2009 and 2010.

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. 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. MFD's ratio of administrative and support staff to total personnel equals 6.1 percent (based on current allocation of personnel.

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, as the frequency of fires diminishes, the need for a ready group of personnel has increased. Along with a quick response, a robust, well-trained, and appropriately equipped compliment of firefighters 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 firefighters 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. The population of the study area is approximately 382,578. The ratio of firefighters per 1,000 population is 1.07 including all career personnel. The firefighters per 1,000 population is below the regional median as well as below the national median for similar communities

Three basic resources are required to successfully carry out the emergency mission of a fire department — trained personnel, firefighting equipment, and fire stations. Because firefighting is an extremely physical task, the training and capacity of personnel resources is a vital concern. However, no matter how competent or numerous the firefighters, the department will fail to execute its mission if it lacks sufficient fire equipment deployed in an efficient and effective manner.

The City of Minneapolis engages in citywide strategic planning every five years to develop citywide goals and strategic directions. These citywide goals and strategic directions set guidelines for each department to develop its business plan. Early in 2010, the elected officials and department leadership participated in three sessions which aimed at setting a future direction for the City within the financial parameters anticipated. Fire stations play an integral role in the delivery of emergency services for a number of reasons. A station's location will dictate, to a large degree, response times to emergencies. A poorly located station can mean the difference between confining a fire to a single room and losing the entire structure. The location of a station can even make the difference between saving and losing a life.

Fire stations need to be designed to adequately house equipment and apparatus, as well as meet the needs of the organization and its employees. It is essential to research needs based on call volume, response time, types of emergencies, and projected growth prior to making a station placement commitment. Locating fire stations is also a matter of the greater community (region) need. MFD delivers emergency services out of 19 fire stations strategically located throughout the city. A review of each facility was conducted and a description is provided within the body of the report.

Other than the firefighters assigned to stations, response vehicles are probably the next most important resource of the emergency response system. If emergency personnel cannot arrive quickly due to unreliable transport, or if the equipment does not function properly, then the delivery of emergency service is likely compromised.

Fire apparatus are unique and expensive pieces of equipment, customized to operate efficiently for a narrowly defined mission. A pumper may be designed such that the compartments fit specific equipment and tools, with virtually every space on the vehicle designed for function. This same vehicle, with its specialized design, cannot be expected to operate in a completely different capacity, such as a hazardous materials unit or as a rescue squad. For this reason, fire apparatus are very expensive and offer little flexibility in use and reassignment. As a result, communities across the country have sought to achieve the longest life span possible for these vehicles.

MFD rents emergency apparatus of varying types and life expectancy from fleet services. The department maintains a front line fleet of 19 engines, six aerial ladder trucks, two rescue units and one command van. Reserve apparatus includes five engines, and four ladder trucks. The apparatus fleet also includes a number of staff and support vehicles. Additionally the department houses numerous

pieces of apparatus, trailers, boats and equipment for Minnesota Task Force 1, a State Urban Search and Rescue (USAR) Team. Fleet Services provides maintenance, repair and service to the USAR Team apparatus and equipment.

Based on the amount of physical resources currently in place within MFD, the department has three fewer stations and four fewer engines than the National Median.

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

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

MFD provided access to its detailed Emergency Reporting System and Computer Aided Dispatch (CAD) records for call data between January 1, 2008, and December 31, 2010, as well as partial year data for 2011 through July 30. In addition, the department provided National Fire Incident Reporting System (NFIRS) data for the period covering January 1, 2006, through December 31, 2010. An evaluation of service demand was conducted that reviews demand as an aggregate as well as temporally; by month, day, and hour of day. ESCI also evaluated how service demand was distributed across the various types of service provided by the department.

In addition to service demand, ESCI evaluated the department's ability to concentrate resources across the entire response area based on the distribution and travel models from each existing station. Based on the travel model, 97.7 percent of the service demand experienced during calendar year 2010 could have been reached within four minutes of travel from an existing station. The exception lies on the eastern edge of the city between Stations 15 and 19, as well as a small pocket between Stations 16 and 22 on the west side of the city. These areas, however, have a lower general service demand than the remainder of the jurisdiction.

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

Turnout time is the first of the response phases controllable by the fire department. This phase begins at notification of an emergency in progress by the dispatch center and ends when personnel and apparatus begin movement towards the incident location. Personnel must don appropriate equipment, assemble on the response vehicle, and begin travel to the incident. Good training and proper fire station design can minimize the time required for this step. MFD's current target performance objective for turnout time is within 60 seconds, 90 percent of the time. Overall, turnout time for all incidents is within 1 minute 41 seconds, 90 percent of the time.

Response time is defined as that period between the notification of response personnel by the dispatch center that an emergency is in progress, until arrival of the first fire department response unit at the emergency. Within the MFD response performance objectives, five minutes is allowed for response time (turnout time plus travel time) within the City of Minneapolis. Overall, response time for all city incidents is within 5 minutes 53 seconds, 90 percent of the time.

The final component of the evaluation process reviewed the support service provided within the department, namely technical rescue, hazardous materials response programs, incident control and management, mutual aid systems, training and life-safety services including public education and code enforcement activities.

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 its 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, those in positions of fire service leadership within the City of Minneapolis 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 MFD is not already operating at a high level. In fact, ESCI is pleased to report all available evidence shows that the fire department consistently provides excellent service to the citizens

of Minneapolis. 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, ESCI offers recommendations to assist the city in implementing the strategies that will best benefit the public. To this end, ESCI developed a number of recommendations intended to provide the department with short-term corrections to improve overall effectiveness and efficiency in daily operations. These recommendations include:

- Ensure all life safety rope is properly inventoried with its use tracked per NFPA 1983.
- Ensure a system is developed to document annual confined space entries per OSHA 1910.146 for each employee expected to make confined space entries.
- Develop an in-house skills tracking mechanism for initial and continued training based on NFPA 1670/1006: Standard for Technical Rescuer Professional Qualifications.
- Develop a basic water rescue training program to ensure all responders can function safely and effectively at water rescue incidents.
- The department should ensure that all personnel are receiving the proper continuing education and training commensurate with their level of credentials.
- Continue to develop and employ a formal evaluation process to annually measure and verify competency of individuals and companies.
- Store active PPE (turnout gear) in a separate, ventilated room rather than on the apparatus floor where it is exposed to vehicle exhaust.
- MFD should work with Hennepin County to ensure that patient information is shared both on scene and post-incident to improve continuity of care and quality improvement functions.
- Develop a training plan that incorporates monthly skills training and quarterly scenario-based exercises.
- Develop a bid-back system that prioritizes personnel with technical rescue training to be placed at stations that deliver these services to the city as a means of efficiently training for deployment.
- The department should determine the appropriate level of initial hazardous materials training for all personnel.
- The department should work with the city to ensure that proper funding is applied to the hazardous materials program based on the level of commitment to that function.
- Continue the development of training lesson plans.
- Offer a chief officer program and develop future leadership for the department.
- Increase the inspection capabilities and frequency of all High, Medium and Low Risk Occupancies by using appropriate census data.
- The department should implement a formal personnel recruitment and retention program that can assist in mitigating the attrition the department is experiencing.

- The formal succession plan that is currently in place should be utilized more fully to ensure that a leadership vacuum is not realized in the very near future.
- The department should develop strict and formal guidelines for the appointment of personnel to administrative support positions based on a minimum set of requirements and standards.
- Evaluate funding options to maintain 15 year life cycle for MFD apparatus.
- Include capital equipment in vehicle replacement cost estimates.
- Complete development of the AMP (asset management plan).
- Aggregate like item equipment purchases with a total value of $5,000 or more and include in the department's asset management plan.
- MFD should seek involvement with the Hennepin County EMS Council and request an active seat within the group.
- MFD should ensure that the department's occupational health and CISD functions are maintained.
- Evaluate the effectiveness of maintaining powered hydraulic tools on the engine companies.
- Upon completion of an equipment inventory and determination of future deployment commitment, the department should condense resources to fewer locations and specialize those resources appropriately.
- Continue to research fire service best practices to ensure training program remains up to date and relevant.
- Continue the development of a comprehensive Urban Search and Rescue (USAR) training ground.
- Continue the development of a video conferencing system.
- Evaluate options to increase revenue and manage costs to ensure the training program is adequate in current and future budget climates.
- Ensure that all training objectives and measurements are clearly defined, distributed and understood.
- Document an inventory of all training equipment, materials and supplies.
- Ensure the checkout procedure is compatible with inventory system.
- Develop a Risk-Based Community Assessment Standard and incorporate into ordinance as a means of ensuring community safety.
- Establish a process for identifying and measuring the Community Risk Level for the purpose of development of both short term and long term service delivery requirements.
- The city should work with all department heads to understand the rational for centralization of work and the reason for the allocation of cost.
- The department head needs to ensure that all department personnel understand that the assets are the responsibility of the department and that they must be treated as if they own them.

- Elected officials should be periodic attendees at labor-management meetings to ensure continuity of communications.
- Develop a fee schedule supported by city ordinance to bill technical rescue events, such as vehicle extrications and hazardous materials incidents.
- Consider a vehicle/machinery program delivered by MFD instructors to all recruits after completing their initial fire training.

Phase III of this project is currently underway and will provide policy-makers with detailed information relative to future delivery of emergency services within the City of Minneapolis. This phase of the project will focus on the three primary areas of facilities, apparatus and personnel necessary to meet the city's future service demand and community expectations.

Evaluation of Current Conditions

The City of Minneapolis engaged Emergency Services Consulting International (ESCI) to conduct a comprehensive evaluation of the Minneapolis Fire Department (MFD) to determine how the department compares against similar departments serving similar populations, and to provide recommendations to address short-, mid- and long-range strategies to increase efficiency, improve effectiveness and prepare for future challenges. This document is the culmination of that project and serves as a report on current conditions and future planning strategies. The report begins with a general description of the department and an overview of each function currently used in daily operations.

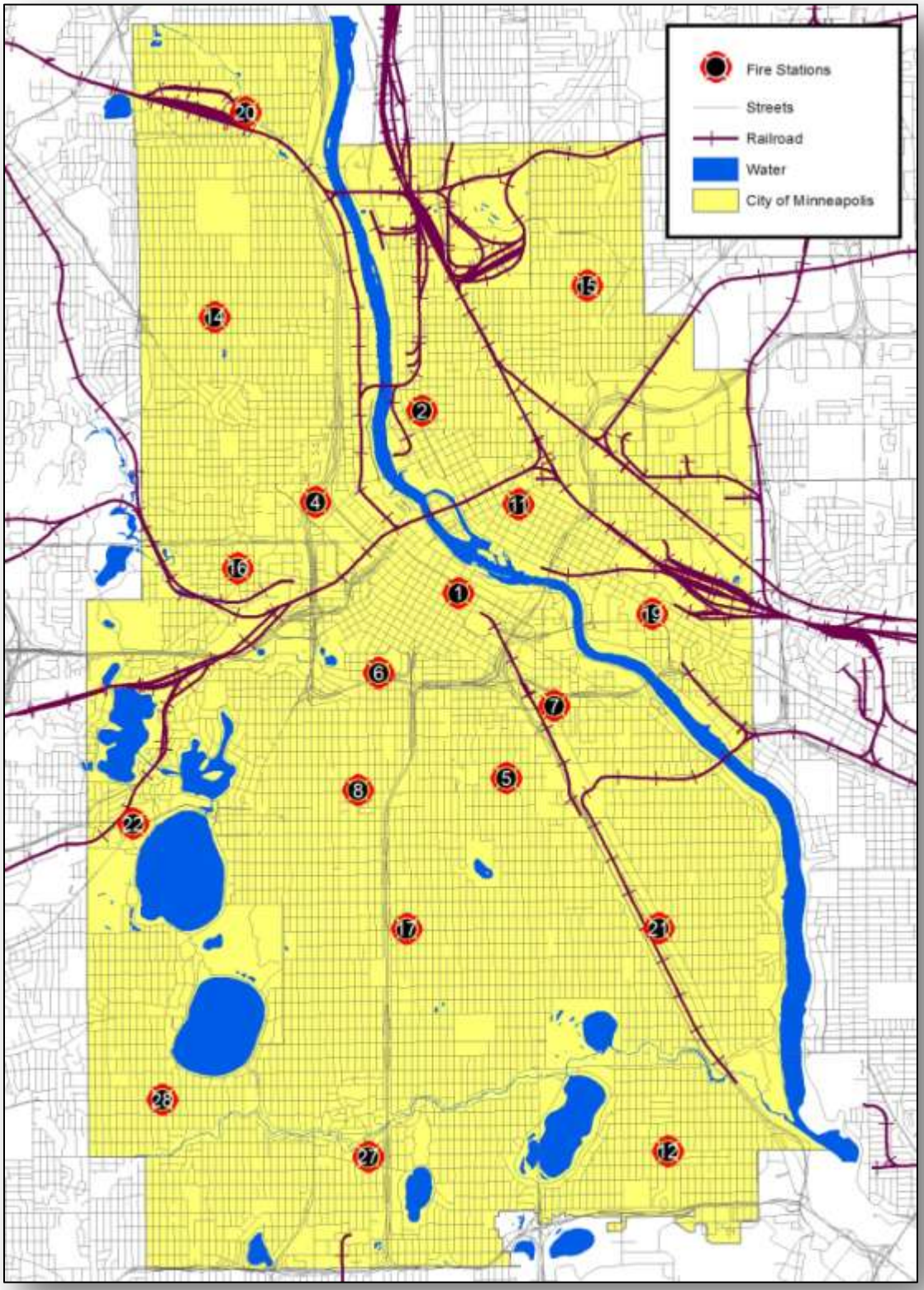
Organizational Overview

Minneapolis Fire Department (MFD) was founded in 1879 as a charter department within the governance of the City of Minneapolis. Today, the department serves a population of 382,578[1] in an area of approximately 58.4 square miles. In addition to the area within the city, MFD also provides fire protection services by contract to the City of Richfield that consists of 35,228 persons within 7.1 square miles. The department operates from 19 stations distributed throughout the city with 19 engines/pumpers, six aerial apparatus (including one rescue company), one mobile command unit, one salvage unit and one 'board-up' unit. These stations and apparatus are staffed by a total of 408[2] personnel including administrative and operations staff.

MFD is slightly below both the national and regional averages of personnel per 1,000 population served as will be discussed later in this report. It should be noted, however, that this comparison benchmark data published by the National Fire Protection Association includes statistics of departments that participate in transport emergency medical services (EMS). Non-transport fire departments are not segregated within the benchmark data provided. The following map illustrates the extent of the MFD service area and its station locations.

[1] 2010 U.S. Census Bureau.
[2] Accurate as of time of data collection.

Figure 1: Service Area and Station Locations



Responsibilities 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.

Organizational Structure

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.

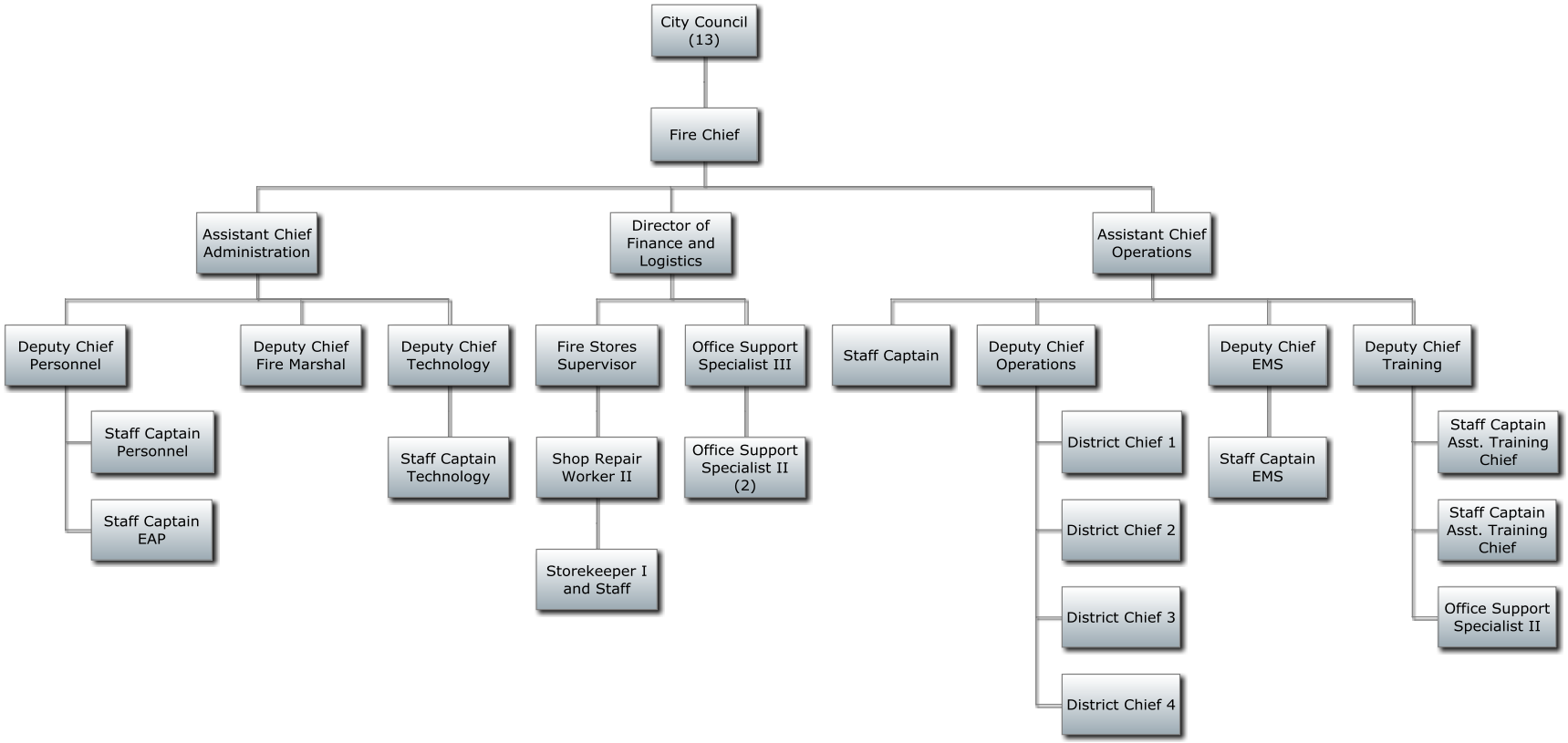
A review of MFD's organizational chart reveals that they are organized in a typical top-down hierarchy. The organizational structure of the department demonstrates a clear unity of command, in which each individual member reports to only one supervisor (within the context of any given position) and is 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. Those departments that have clarified their programs with titles, assigned leadership, resources, budget appropriations, performance objectives and accountability are among the most successful.

The MFD organizational structure is 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 are clarified by the division's key functions within the mission statement. Those individuals supervising or operating within a specific division are positively clear as to the role of the division and its goals and objectives.

The department has 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. The

following figure is an illustration of the department's organizational structure with specific divisions and sections identified where appropriate.

Figure 2: MFD Organizational Structure



Budget, Funding and Financial Resources

The Minneapolis Fire District operates as a department of the City of Minneapolis with the oversight of the city council and the mayor. The council establishes budget policies and guidelines through the city budget director.

The City of Minneapolis, including the fire department, uses a one-year budget cycle for the preparation the operating budget. The fire department budget governance follows the city guidelines for preparation and submission of the budget. The fire department budget is managed by the director of finance and logistics. Internally in the fire department, the budget is approved by the fire chief with input from staff personnel. Once the chief has approved the department budget, it is summited to the city budget director for inclusion in the total city budget for presentation to the mayor. The mayor reviews and recommends changes as necessary. When the mayor has approved the budget, it is presented to city council for approval. After public hearings, the budget is modified if required, and approved by the council to become the adopted budget.

The City of Minneapolis operates with a centralized methodology for controlling expenditures for like types of functions/costs. By centralizing costs in control departments, the actual cost of operations for a specific department isn't readily available through financial reporting without an allocation methodology to record charge appropriate costs to specific departments. The City utilizes allocations to move costs to various departments. Included in the 2012 budget for the fire department are allocated costs totaling 10.78 percent of the total budget.

Included in the adoption process of the budget is the approval for the city's projected revenue for the budget year. In 2012, the total adopted budget revenue is $1.168.5 billion dollars. Of this amount, 4.47 percent is required to cover fire department expenditures. The figure below provides a snapshot of the City's revenue with a comparison of 2011 revised revenue versus the 2012 adopted budget. [3]

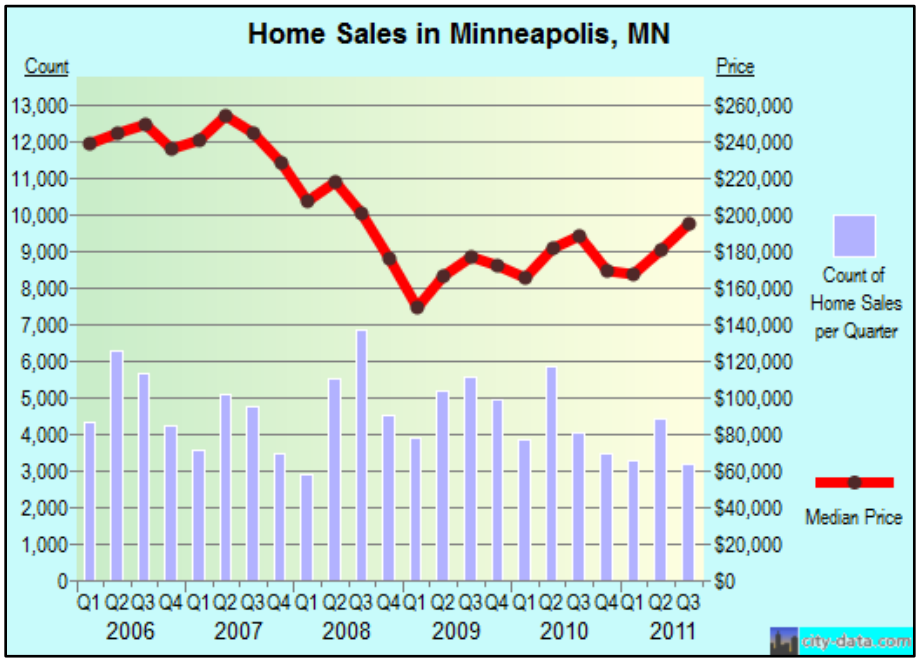
[3] As identified on page 76 of the 2012 Council Adopted Budget.

Figure 3: City of Minneapolis Revenue, 2011 - 2012

Revenue Categories	2011 Revised	2012 Adopted Budget	2012 Percent of Total Revenue
Charges for Services/Sales	400.2	408.8	35.0%
Federal Government	52.1	31.0	2.7%
Fines and Forfeits	10.9	10.8	0.9%
Franchise Fees	27.8	27.5	2.4%
License and Permits	31.4	31.8	2.7%
Local Government	7.5	11.9	1.0%
Other Misc. Revenues	63.7	82.3	7.0%
Property Taxes	347.1	328.0	28.1%
Rents	54.6	54.1	4.6%
Sales and Other Taxes	59.6	65.4	5.6%
Special Assessments	21.7	22.4	1.9%
State Government	107.5	94.4	8.1%
Total Revenue	**1,184.2**	**1,168.5**	**100.0%**

The decline in revenue is reflective of the state's budget crisis caused by the economic down turn and reduced property values. The City of Minneapolis is also seeing the effects of a declining property market as seen in the figure below depicting residential retail sales of homes from 2006 through 2011.

Figure 4: City of Minneapolis Home Sales, 2006 - 2011[4]



[4] http://www.city-data.com/city/Minneapolis-Minnesota.html.

The figure above shows the peak of the housing market in 2006/2007 and the rapid decline in 2008 and gradual improvement through 2011. The above housing market retail sales and transaction pricing has a direct impact on the taxable appraised value of property and ultimately the amount of property tax that can be collected. The figure below is historical view of taxable appraised value for the City of Minneapolis.[5]

Figure 5: Taxable Appraised Value, 2008 - 2012

Year	Amount	% Change from previous year
2007	39,943,095,000	
2008	43,857,249,000	9.799%
2009	43,473,340,000	-0.875%
2010	39,746,514,000	-8.573%
2011	33,511,317,400	-15.687%

The TAV reduced on average from 2008 – 2012 by 3.8 percent. However, 2010 and 2011 average valuation declined by 12.1 percent.

The next figure displays the historical revenue for the fire department from 2008 – 2012.

Figure 6: MFD Revenue, 2008 - 2012

Description	2008 Actual	2009 Actual	2010 Actual	2011 Budget	2012 Budget
City Contribution to Fire Department	48,029,874	48,129,484	49,810,147	48,904,377	48,334,995
Rental Housing License	0	810,440	810,440	859,796	0
Commercial Inspection Program	0	711,395	738,778	560,000	0
Other License and Permits	1,388,314	484,050	661,100	0	1,383,000
Amortized Aid	1,568,310	1,580,300	1,826,858	1,863,000	1,830,000
Minnesota Department of Public Safety	0	0	70,000	0	0
Labor Services	0	0	666,034	0	0
Other Services Provided	84,394	317,637	285,788	121,000	674,000
Charge for Sales	290	332	249	250	250
Vacant & Boarded Regular	0	0	4,972	0	0
Vacant & Boarded Emergency	0	0	10,175	0	0
Boarded/Abandoned Buildings	0	0	0	400,000	0
FEMA Grant	672,513	479,476	2,011	0	0
Homeland Security Grant	0	0	168,033	0	0
State Grant	0	2,039	0	0	0
Contributions	82,131	15,721	2,981	10,000	10,000
Miscellaneous Revenue	245,710	258,092	135,534	160,000	0
Jury Services & Witness Fees	0	345	494	0	0
Total Revenue	**52,071,536**	**52,789,311**	**55,193,594**	**52,878,423**	**52,232,245**
City Contribution percent of total Revenue	92.24%	91.17%	90.25%	92.48%	92.54%

[5] Information taken from 2010 CAFR and 2012 is from page 110 of the 2012 budget package.

The city contribution line is the required revenue needed from the city to cover the costs associated with fire operations after specific revenue items are recorded. The city support for the fire department is 92.54 percent in the 2012 budget. Amortized aid of $1.8 million is state money that is transferred to the department's budget to offset a portion of the active firefighters pension cost. The next figure is the historical cost from 2008 – 2012 for fire department expenses.

Figure 7: MFD Expenditures, 2008 - 2012

Description	2008 Actual	2009 Actual	2010 Actual	2011 Budget	2012 Budget
Expenditures					
Salaries	32,115,885	32,133,255	33,149,222	31,494,805	30,834,397
Fringes	10,897,010	12,345,758	13,257,603	13,040,367	12,630,251
Contractual Services	6,257,643	5,984,681	5,722,764	5,590,927	6,425,276
Supplies & Other	2,245,969	1,822,672	1,653,729	2,004,045	2,203,395
Capital Outlay	0	0	21,816	136,739	138,926
Prior Year Rollover	555,030	502,945	1,388,460	611,540	0
Total Expenditures	**52,071,537**	**52,789,311**	**55,193,594**	**52,878,423**	**52,232,245**

The reduction in salaries is due to the reduction of 13 firefighter positions that were funded in 2011 by a one-time source. One additional position was reduced based on the mayor's recommendation for a total of 14 position reductions in the 2012 budget. These reductions also created a reduction in total fringe costs for the department. The breakdown by percentage of expense category is shown in the next figure:

Figure 8: MFD Expenditures by Percent, 2008 - 2012

Description	2008 Actual	2009 Actual	2010 Actual	2011 Budget	2012 Budget
Salaries	61.68%	60.87%	60.06%	59.56%	59.03%
Fringes	20.93%	23.39%	24.02%	24.66%	24.18%
Contractual Services	12.02%	11.34%	10.37%	10.57%	12.30%
Supplies & Other	4.31%	3.45%	3.00%	3.79%	4.22%
Capital Outlay	0.00%	0.00%	0.04%	0.26%	0.27%
Prior Year Rollover	1.07%	0.95%	2.52%	1.16%	0.00%
Total Expenditures	100.00%	100.00%	100.00%	100.00%	100.00%

In the 2012 budget, 84.2 percent of total costs are personnel related with 59.0 percent being wage and overtime related and 24.2 percent for fringe benefits and taxes. Of the remaining 15.8 percent, 10.8 percent of total costs are for allocated services from other city departments leaving the remaining 5.0 percent to cover other cost incurred by the department. The next figure identifies the components of the fringe and tax cost by percentage:

Figure 9: MFD Historical Fringe and Tax Expenditures by Percent 2011 – 2012

Description	2008 Actual	2009 Actual	2010 Actual	2011 Budget	2012 Budget
Workers Comp	4.45%	4.62%	4.62%	5.02%	5.54%
Retirement	11.99%	13.29%	13.21%	13.87%	13.66%
Medical	14.64%	17.67%	19.32%	19.45%	18.91%
Life & LTD	0.03%	0.04%	0.04%	0.31%	0.31%
Taxes	1.46%	1.44%	1.47%	1.69%	1.47%
Severance	1.03%	1.09%	1.07%	1.05%	1.05%
Total	28.12%	32.44%	34.03%	41.39%	40.93%

Medical and retirement costs are the largest cost in this expense category. Both of these costs are controlled by collective bargaining agreements and costs are recorded based on these agreements. The next largest fringe category is workers comp. Workers comp is self- insured through the city. The worker comp rate for City departments is calculated through the self- insurance rate model using information supplied by the city actuary. The actuary determines the total City payout for workers compensation and allocates a percentage of this payment to each City department according to the historical use of workers compensation by each department. Fire is allocated 22.560 percent for 2012. The total worker comp rate consists of three calculations using the following activities and criteria:

1. Employee services (payments to employees related to worker comp claims and payments to State of Minnesota related to worker comp special assessments and reinsurance): accounts 80 percent of the total charge and is calculated using the actuary percentage
2. Risk Management admin costs: accounts for 18 percent of the charge and uses actuary percentages for workers comp to determine the amount allocated to each City department.
3. Return to work costs: accounts for 2 percent of the charge and is allocated by department FTEs.

The next figure shows the allocated amounts from other city departments from 2010 – 2012.

Figure 10: MFD Allocated Cost by Account 2010 - 2012

Description	2010 Actual	2011 Budget	2012 Budget
Benefit Admin	123,411	131,954	119,203
BIS Application Support	216,322	253,139	249,721
BIS Operating Charges	489,418	449,451	490,167
BIS Data Connectivity Charges	8,373	6,865	6,509
BIS Telephone Connectivity Charge	11,552	8,393	19,231
BIS Special Charges	82,592	91,155	83,375
Property Services Rent	1,178,919	1,109,667	1,131,726
Fleet Supply ESD	1,572,625	1,536,617	1,790,504
Equipment Labor ESD	633,863	699,873	690,264
ESD Contractual Repairs	72,891	100,482	227,615
ESD Equipment Parts	420,742	382,435	384,869
ESD Equipment Fuel	273,208	368,660	435,000
Total Allocated Costs	**5,083,916**	**5,138,691**	**5,628,184**

The allocation methodology varies by each department. As an example, the rent for property is allocated based on a three year average cost of maintenance plus inflation.

The centralization of costs in various departments is a good way to minimize costs to the city. However, there are some down sides when reviewing a specific department in the city to determine actual cost of operation. Potential downsides are:

- Allocated cost tend to be averages of total city costs and not specific to the individual department which could create an overstatement or understatement of the actual cost for that department. In an environment of trying to reduce costs, departments could be ask to cut more than they can achieve based on the allocated numbers that are not in their control.
- Capital assets are not purchased by the department that requires them. The authorization/priority of these purchases is not in the department heads control.
- If the City incurs debt to purchase capital assets, the debt costs are either allocated or remain in the department that incurred the debt. Without a clear understanding of the long term nature of debt, some decision could be made that are not in the best interest of the fire department.

Recommendations:

- The city should work with all department heads to understand the rationale for centralization of work and the reason for the allocation of cost.
- The department head needs to ensure that all department personnel understand that the assets are the responsibility of the department and that they must be treated as if they own them.

The next figure provides a historical summary of MFD from 2008 – 2012

Figure 11: MFD Historical Summary 2008 – 2012

Description	2008 Actual	2009 Actual	2010 Actual	2011 Budget	2012 Budget
Revenue	52,071,536	52,789,311	55,193,594	52,878,423	52,232,245
Expenditures					
Salaries	32,115,885	32,133,255	33,149,222	31,494,805	30,834,397
Fringes	10,897,010	12,345,758	13,257,603	13,040,367	12,630,251
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Supplies & Other	2,245,969	1,822,672	1,653,729	2,004,045	2,203,395
Capital Outlay	0	0	21,816	136,739	138,926
Prior Year Rollover	555,030	502,945	1,388,460	611,540	0
Total Expenditures	**52,071,537**	**52,789,311**	**55,193,594**	**52,878,423**	**52,232,245**

The summary information clearly shows that the fire department total costs of operations are essentially equal to 2008.

Management Components

Being a service provider to a diverse urban community, Minneapolis Fire Department faces 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 MFD's efforts in this area and preparation for the future health of the organization.

Foundational Policies

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 Board 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 (SOGs) – 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.

MFD's Standard Operating Procedures are contained within a comprehensive Operations Manual. The manual contains the following sections:

- Department Organization
- Department Rules and Regulations
- Administrative Policies
- Station Administrative Standards
- Uniforms and Grooming
- Fire Prevention
- Fire Investigation
- Fire Motor Operators Manual
- Fire Operations
- Basic Practices
- Hazardous Materials
- Emergency Medical Services

The current Operations Manual is updated regularly and is a living document as the community environment changes. In addition, the manual is made available to all personnel and updates are distributed appropriately. MFD should be commended for the completeness and comprehensive nature of their current SOG/SOPs.

Critical Issues and Challenges

It is extremely important that there is a clear understanding of critical issues facing the department. Without such an understanding, department leadership cannot be prepared to face these issues. In addition, the enunciation of critical issues to employees and members increases their awareness of the organization's priorities and assists them in becoming focused on solutions.

A further exploration of critical issues should be completed during strategic planning processes but, for now, the following issues should be given serious consideration for inclusion in the final list. These are

items that have been identified by the officers of the department as issues with significant potential for impacting the success of the organization and the effectiveness of its service. They are:

1. Inability to maintain adequate staffing and cover necessary overtime.
2. Current economic environment causing financial strains on city, department.
3. Increasing sick-time usage, injury rates and overtime costs.

As with critical issues, it is important for any agency to have an appropriate level of future thinking. This permits an agency to identify what external challenges may present themselves to the organization in the coming years. This awareness of future challenges ensures that the department does not miss out on opportunities or blindly stumble into crisis unprepared.

Again, further exploration of future challenges should be part of a complete strategic planning process, but the following items have been identified by the officers of the department as external challenges likely to be faced by the agency in the coming few years.

1. Need to stabilize funding.
2. Ability to maintain adequate staffing while reducing injuries, sick time and overtime usage.
3. The need to embrace a culture of change.

Internal and External Communications

Quality communications is an achievable goal for any organization, but one that always seems to be most elusive. However, it is extremely important. There were various communication efforts within MFD that were described to ESCI as efforts to provide opportunities for department personnel to be informed, to be heard and to be involved.

Regular staff meetings have been initiated and include all primary staff and officers on a monthly basis. Such meetings encourage the sharing of ideas, issues, and concerns and encourage a teamwork approach to overall department management. Minutes or summaries of these staff meetings are made available for review by all members of the organization.

Written, formal memorandums are regularly utilized for distribution of information, ensuring that all members receive critical data in an organized and consistent fashion. Group email is often used for minor issues, while all major policies and issues are handled through paper correspondence. This process provides a critical written record of internal communications that are important to

organizational efficiency. A systematic method for distribution of written communications is in place and is followed regularly in order to make certain that no members are left out of the information loop. When certain types of critical memos or policies are released, a system using signature receipts has been established for verification of the distribution to all personnel. This system provides a record of confirmation that the information was received and improves accountability. Departmental bulletin boards are adequately controlled and organized, with information being sorted and updated on a regular basis.

Departmental business email addresses have been issued to all personnel, offering an efficient and verifiable method of information distribution. Individual member mailboxes or station/shift mailboxes are used to exchange important hard-copy documents and prevent missing or misplaced documents. Voicemail has been put in place for primary staff and officers, permitting other members, or the external customer, to efficiently and quickly leave personal contact messages. Primary officers also have cellular phones issued for immediate means of communications of critical issues.

Various efforts are currently made to communicate with the public. The City publishes news items for distribution to the public; the fire department participates in this process as well as having independent public information campaigns. This effort permits the release of specific and detailed information, authored directly by the fire department, to those served by its programs and is an excellent tool for improved public relations. A formal procedure has been established for handling complaints from the public and is intended to make certain such complaints are handled consistently, quickly, and with due process.

An active and useful website is currently maintained and provides an additional means of distributing information and communicating with the public. The site is kept up to date and provides contact information for major programs operated by the department.

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. State law requires public access to certain fire and EMS department documents and data. Clear written procedures are in place to provide for public records access through the department staff.

Paper records (hard copy files) are adequately secured with passage and/or container locks with limited access. Important computer files are backed-up to a secure data location on a regular and consistent basis.

MFD has a significant investment in facilities, apparatus, equipment and other items, along with its financial assets. Protecting these assets is very important. Stations are reported to be consistently locked and secure from unauthorized entry. Public access to the buildings is limited to business areas or when accompanied by an employee. Locks should be changed, at least occasionally, to prevent orphan keys and unauthorized entry. All stations have a security key swipe system for entry control already in place. No security alarm systems are used to provide for automatic notification of unauthorized entry or break-in. Monitored fire alarm systems provide early smoke and fire detection for buildings, as well as an additional life-safety measure for occupants in the event of a fire.

Department computers are programmed with password security on sensitive file access and software to provide an additional level of security and data integrity. Firewall protection is in place for computers accessing the internet and other outside servers. The protection is adequately up to date and capable of preventing most unauthorized network intrusions. Up-to-date virus protection software is utilized on all incoming email and files or operating systems are regularly scanned for undetected virus infection.

The agency maintains a current inventory of capital assets. A process is in place to maintain this inventory and new assets are logged and recorded at the time of purchase. No business-related cash is routinely kept on the premises of any station, reducing or eliminating risks associated with burglary and theft. General-use credit cards, such as VISA™ or MASTERCARD™, are issued to key managers; but strict account controls, low credit limits, and zero liability fraud protection are in place. Written, formal purchasing policies and procedures are in place and are strictly enforced.

Reporting and Recordkeeping

The department utilizes up-to-date records management software to enter and store incident information. The software is compliant with NFIRS (National Fire Incident Reporting System) 5.0 standards and incidents are entered quickly and accurately. Training records are maintained electronically, permitting easy retrieval of accurate reports on training attendance, certification status, and subject matter. Code enforcement activities and occupancy records are maintained in KIVA Software to permit analysis of prevention activities, community risks, and trends. Maintenance records

for apparatus and equipment are computerized to increase the efficiency of the fleet management program.

Personnel records are complete and up to date and are maintained in a manner that protects private medical information. Records are maintained on employment history, discipline, commendations, work assignments, injuries and exposures and leave time. Financial activities, including budgets, expenditures, revenues, purchase orders, and other encumbrances are kept in a financial records management software system permitting consistent and up-to-date monitoring of all financial activities and accounts.

Mission, Vision, and Strategic Planning

The process of strategic planning involves clarifying an organization's mission, articulating its vision for the future, and specifying the values within which it will conduct itself.

MFD has completed a strategic planning process, which included key department staff as well as select City representatives. This process assisted the fire chief in the development of the current business plan that covers the period 2010 to 2014. The department's mission statement is valid and up-to-date, and clear values have been articulated in writing. A vision is provided by the document, enabling readers to identify where the department intends to be in the next several years.

Through its strategic planning process, the department has stated the specific goals and objectives whereby it intends to meet its vision. These goals and objectives provide clear guidance in decision-making and focus the agency's efforts on the most critical issues that will impact its success in the future. In addition, the plan attempts to provide the members with clear direction on the future and how they each fit in.

MFD is to be praised for its proactive efforts in this respect and should continue to maintain the Business Plan as a living, up-to-date document through revision meetings with its planning team at least annually.

Risk Management

The fire service, like most businesses, must manage risk to the extent possible in order to be successful. Organizations that fail to properly identify risk, and appropriately put processes in place to manage the risk, are often at risk for financial liability and, particularly in the emergency services business, personal injury or illness.

Compliance Programs

Within each fire department in the United States, there are several occupational standards, rules and regulations that must be complied with in order to meet legal requirements. Among these is the National Fire Protection Association (NFPA) *1710: Standard for the Organization and Deployment of Fire Suppression, Operations, Emergency Medical Operations and Special Operations to the Public by Career Fire Departments*, the Healthcare Insurance Portability and Accountability Act (HIPAA) of 1996, Minnesota Occupational Safety and Health and the National Incident Management System (NIMS) to name just a few.

Fire departments should write long-range plans that describe how they will meet fire suppression and other emergency needs in their communities given their current human, physical and financial resources. These plans should be integrated with broader community comprehensive plans and should detail compliance with the various standards, rules and/or regulations currently in place.

Although most departments place an emphasis on compliance with response standards, it is rare that fire departments have a comprehensive compliance plan in place to address the various laws, statutes and standards currently in force. Perhaps the most overlooked of the standards are those pertaining to occupational risk or occupational health. *NFPA 1500: Standard on Fire Department Safety and Health Programs* outlines a model compliance plan for fire departments. Although not a law or requirement for fire departments to meet, NFPA 1500 provides guidance for fire departments to reach a level of compliance with other national requirements such as U.S. Occupational Safety and Health Administration rules, Environmental Protection Agency (EPA) rules and regulations, etc.

In some states, state and local government employees are not required to meet OSHA regulations. This is not the case in Minnesota as the state has adopted its own occupational safety and health program. The basic OSHA requirements include:

- OSHA Respirator Training – Respiratory protection equipment standards are covered under 29 CFR 1910.134 including fitting instructions, wearing practice and written procedures requirements.
- Structural Fire Training – "…frequent enough to assure that each member of the fire [department] is able to perform assigned duties in a safe manner so as not to endanger [other] personnel]…" Training must be conducted before performing any emergency activities and employees must receive annual training thereafter. 29 CFR 1910.146 requires rescue training practice at least every 12 months for permit space rescues.
- Physical Fitness – Employers are responsible under 29 CFR 1910.156 for ensuring that firefighters are physically able to perform job requirements and cannot allow employees with heart disease, epilepsy or emphysema to participate in firefighter activities without a physician's approval.
- Hazardous Materials – Fire departments that respond to hazardous materials incidents must provide hazardous materials personnel with annual physical examinations as required by CFR 1910.120.

The Minnesota Occupational Safety and Health Act of 1973 (Minnesota Statutes Chapter 182) provides job safety and health protection for workers through the promotion of safe and healthful working conditions throughout the state. The act provides coverage for all public-sector employees, except Federal, and all private-sector employees, except domestic and those under exclusive federal jurisdiction. The Minnesota Department of Labor and Industry (DLI), Occupational Safety and Health Division (Minnesota OSHA), has the sole responsibility of administering the act. Minnesota OSHA adopts occupational safety and health standards and its occupational safety and health investigators conduct inspections to ensure compliance with the act.

The City of Minneapolis Risk Management and Claims Division, a division of the Finance Department, administers the risk management program for the entire city and all city departments, including the fire department. The goals of the Risk Management and Claims Division are to:

- Promote an accident-free workplace and a positive work experience for City employees;
- Ensure that the public has a positive service experience with City employees;
- Initiate and developing risk management policies and procedures;
- Monitor, analyze and reassess loss experience and exposure.[6]

The goals are accomplished through policy analysis, workers' compensation administration, loss prevention and tort liability. As a component of the larger risk management program, MFD has policies

[6] City of Minneapolis Finance Department, Risk Management and Claims Division website. Accessed 6 January 2012.

in place within the Operations Manual to address work-related injuries, accident reviews, infectious disease control and respiratory protection.

Safety Policies, Practices and Programs

Occupational Health and Safety compliance programs focus on reducing preventable workplace injuries and illnesses among fire department personnel. Risk management strategies include determining the nature and causes of work-related injury and illnesses, evaluating work-related hazards, developing, implementing and evaluating firefighter health and safety programs, and serving as a resource to department personnel for issues related to firefighter health and safety.

The first step in a comprehensive risk management strategy is to develop a written compliance program that addresses at least the following topics:

- Bloodborne Pathogen Exposure
- Confined Space
- Fall Protection
- Fire Prevention Plans
- Hearing Conservation
- Respiratory Protection
- General Safety

As mentioned previously, MFD adheres to risk management policies and procedures developed by the Risk Management and Claims Division as well as internal policies and procedures. Other SOPs address accidents, reporting, accident prevention, bloodborne pathogens, disease and infection/exposures, etc. The safety policies, practices and programs in place within MFD are comprehensive and are well documented. As an added benefit, a comprehensive fitness and wellness program is outlined within the collective bargaining agreement with labor.

Job Related Injury Processes

It is important for personnel to understand and follow established procedures for reporting injuries and/or exposures. DLI publishes a First Report of Injury (FROI) that must be submitted for all work-related injuries or exposures. Deaths and serious injuries must be reported within 48 hours and all other injuries or exposures must be reported within 10 days if a claimed disability exceeds three calendar days. Employers, not employees, are responsible for completing the FROI form.

DLI also requires that the Minnesota Workers' Compensation Employee Rights and Responsibilities poster be displayed in all workplaces. This poster gives general directions to employees as to how to report an injury and the importance of doing so. The poster also covers general information concerning benefits an employee should expect to receive.

The process by which MFD personnel report injuries and/or exposures are addressed within the department's overall Operations Manual.

Staffing and Personnel Management

MFD employs career staff to accomplish its mission and deliver services to the citizens of Minneapolis. This section of the study describes the staffing and personnel management activities and provides an analysis of the organization's current staffing levels. The review of personnel management programs focuses 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."[7] 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; in this case, MFD.

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.[8] 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

[7] Merriam-Webster Online Dictionary, 2010.

[8] 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 endeavor 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.

Policies, Rules, Regulations, and Handbooks

Successful organizations are typically governed by a set of clear policies that guide toward the agency's vision and provide a foundation for a productive organizational culture. Effective policies establish behavioral standards and limits without discouraging creativity and self-motivation. Policy and procedure manuals should be reviewed and revised periodically.

Rules, regulations, and codes are the policy-level direction provided by a governing body, such as a city council. Administrative rules are the responsibility of the organization's highest-level administrators; in this case, the fire chief. They provide instruction and direction for compliance with the organization's policies and provide guidance and instruction to all employees.

City personnel policies are maintained by the city's human resources department under control of the city coordinator and are in overall good condition. These HR policies and procedures apply to all city employees where collective bargaining agreements do not apply. In other words, the primary HR document for a union employee is the collective bargaining agreement but, if the Collective Bargaining Agreement (CBA) doesn't cover specific issues and or situations, the city HR policies come into play. ESCI reviewed the fire department's rules, guidelines, and policies and concluded that appropriate documents do exist and are available to all employees either in paper form or online through the City's intranet. There is, however, no formalized schedule for policy review or update, although all policies appear to have been updated recently.

Regardless of the quality or condition of such policies and guidelines, their availability and familiarity to all personnel is critical. A significant financial and legal risk exists when day-to-day practice does not follow guidelines, procedures, or policy. A number of factors can cause a practice to shift gradually away from policy. An out-of-date policy is one of the factors where practice commonly does not match policy. When this occurs, the policy-making authority must either enforce the policy or change it to match the practice. Additionally, standard operating procedures or guidelines (SOPs or SOGs) must reflect any legal mandates affecting the department. When policies are driven by regulation, the practice must match the policy.

The review and adoption process of policies and guidelines varies depending on the topic or subject. A SOP committee is currently in place and tasked with the continuous review and update of all policies and procedures. This committee meets periodically to determine the need for any revisions. Prior to dissemination of policies, they are reviewed and approved (signed) by the fire chief. MFD probationary employees and current employees receive initial and on-going education on rules, guidelines, and policies.

Labor-Management Relationships

The City of Minneapolis is a party to several CBAs regarding fire department personnel. The first is with the International Association of Fire Fighters (IAFF) Local 82, AFL-CIO as authorized by Minnesota State Statutes. The current agreement's effective dates are from January 1, 2008, to December 31, 2010. As identified, the most recent contract has expired and is currently in negotiations for renewal. The fire fighters unit CBA establishes policies for grievances, mediation, salaries, overtime, allowances, benefits, promotional examinations, work assignments, discipline, etc. The current agreement applies to all MFD personnel holding the rank of staff captain and below as well as the Chief's in contract discussions.

The second contract is with the American Federation of State, County and Municipal Employees, District Council No. 5, Local Union No. 9, AFL-CIO. This unit applies to general office clerical and technical personnel. The current agreement's effective dates are from January 8, 2008, and December 31, 2010. Like the IAFF CBA above, this contract is currently expired and is in negotiations for renewal. The clerical and technical unit CBA establishes policies for discipline and discharge, seniority, grievances, the filling of vacant positions, layoffs and recalls, wages and payrolls, hours of work and overtime, and leave and benefits. The current agreement applies to all office and other technical personnel not covered by another contract and not appointed to the position of supervisor.

The third and final contract is with the City Employees' Union, Local Union No. 363 a/w Laborers' International Union of North America, AFL-CIO. The current contract's effective dates are from January 1, 2008, to December 31, 2010. As with the previous two contracts, this agreement is also expired and is currently under renegotiation. The agreement establishes policies for settlement of disputes, grievances, discipline and discharge, appeals, seniority, filling of vacant positions, layoff and recall, wages and payroll, work schedules, overtime, benefits and safety. This contract applies to those positions not otherwise covered by another contract or those that are supervisory positions.

Internal stakeholder interviews with fire department personnel were conducted by ESCI with personnel from all ranks and branches of the fire department. Several themes developed that were consistent throughout virtually all interviews. Comments received by ESCI indicate that there is a morale issue department-wide, primarily due to recent budget cuts and personnel layoffs. The potential of more layoffs on the horizon has furthered the current lack of positive attitudes throughout the department.

Redeployment of personnel and resources with the potential for temporarily 'closing' some fire stations has caused an additional layer of problems within the department. Labor is adamantly against any reductions in staff and/or physical resources, while management is forced to work with the funding provided by the city general fund in a depressed economic environment. Although there is regular communication between labor leadership and department management, the current issues remain unresolved and, therefore a certain level of mistrust between labor and management is the result.

The current CBA between the city and the fire fighters unit, although expired, mandates that periodic joint labor-management meetings take place and that a formal labor-management committee be formed. The labor-management committee is currently scheduled to meet monthly but ESCI would suggest that periodic meetings be held with elected officials as a part of the labor-management committee.

Recommendation:

- Elected officials should be periodic attendees at labor-management meetings to ensure continuity of communications.

Disciplinary Processes

Maintaining discipline in a public safety organization is a crucial component of a well-run department. Members must be allowed latitude to perform using wisdom and judgment, but must also be held accountable for actions, whether good or less agreeable. It is important to establish a method by which employees are encouraged to exhibit behavior that reflects a high moral standard and creates and maintains a safe and healthy working environment. Disciplinary policies that focus on coaching, counseling, and behavioral modification instead of punishment have been shown to produce positive results.

Each of the respective collective bargaining agreements with the bargaining units identifies and describes disciplinary processes and each CBA addresses the availability of appeals and grievance processes.

Counseling Services

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 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 the 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.

The City of Minneapolis offers employees an EAP through the local public and mental health agencies that provide free, confidential counseling and referral services for employees and their dependents. In addition, MFD has a staff captain that oversees and coordinates the EAP efforts within the organization.

Recruitment, Application and Retention Programs

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.

The Americans with Disabilities Act (ADA) prohibits discrimination against individuals with physical disabilities but permits employers to establish reasonable physical standards required to perform the primary functions of any job safely and effectively. History has shown that the most effective method of avoiding ADA litigation is through reasonable and consistent application of job-relevant pre-employment physical ability testing.

Experience within the fire service industry has shown that relaxing the requirements for entry-level positions is not the answer for recruiting an employee. Instead, most departments have had the 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.

While recruitment and application is an important process for ensuring the survivability of a department's personnel by bringing new members into the system, the retention of current personnel is even more critical to an organization's survival. Current personnel receive an enormous amount of training and equipment, at a very high cost to the department, to be able to function without direct oversight. As these personnel gain experience and spend more and more time in the organization, they gain insight into specific operations and become experts in their field. These are the individuals that will lead the department into the future and they should be treated and trained as such. Effective retention programs through competitive salary and benefits packages can keep some personnel from leaving an organization, but research has shown that competence of management and the ability for career progression are much stronger incentives to stay.

MFD is currently under a hiring freeze and is not recruiting new personnel. Under normal circumstances, however, personnel test for a position on a hiring list from which the department fills open positions. Based on interviews, the current hiring list is approximately seven years old and is in need to replacement.

Although collective bargaining agreements with the various labor groups identify specific salaries and benefits for personnel, no formal retention program has been established within MFD. In fact, although certain issues were bargained for in the past, issues such as an annual draw for station assignments can act as a deterrent to longevity. Additionally, although some improvement was identified during ESCI's interviews, continued training and officer development education is one issue that line personnel would view as a positive retention effort.

A larger issue for MFD than retention is attrition. The department has historically maintained a very low turnover rate, which has now translated into a large number of personnel that will soon be eligible for retirement. This will create an experience vacuum within the department if action is not taken now to recruit and train a suitable cadre of personnel to fill soon-to-be vacant positions. The formal succession plan that is currently in place should be utilized more fully to ensure that a leadership vacuum is not realized in the very near future.

Recommendations:

- The department should implement a formal personnel recruitment and retention program that can assist in mitigating the attrition the department is experiencing.
- The formal succession plan that is currently in place should be utilized more fully to ensure that a leadership vacuum is not realized in the very near future.

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 will provide documentation about a person's ability to perform responsibilities and provide 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,

Testing of technical competency will be covered during the evaluation of the department's training program later in this document. Issues pertaining to promotion within the operational structure of the department are defined within the CBA of each bargaining unit. Administrative positions are appointed by the fire chief and are based on a non-formal process of identifying technical expertise and abilities. The department should develop strict and formal guidelines for the appointment of personnel to administrative support positions based on a minimum set of requirements and standards.

Recommendation:

- The department should develop strict and formal guidelines for the appointment of personnel to administrative support positions based on a minimum set of requirements and standards.

Health and Wellness Programs

Keeping members safe and healthy, once thought of as an expensive and unneeded extra, is an important component of a fire department's method of operation. It has been clearly documented that it is cheaper to prevent injury than to pay for rehabilitation and work replacement.[9] 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 preventative 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 develop required physical training to keep personnel ready for the tasks to be performed and reduce the possibility of injury while on the job.

[9] *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.

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: Standard on Comprehensive Occupational Medical Program for Fire Departments*. 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). Death from trauma, including internal and head injuries, is the second leading cause of death (27 percent). Asphyxia and burns account for 20 percent of firefighter fatalities.[10]

As of the date of ESCI interviews and stakeholder input, MFD employed an emergency medical services coordinator that was also a registered nurse. This position also coordinated the occupational health

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

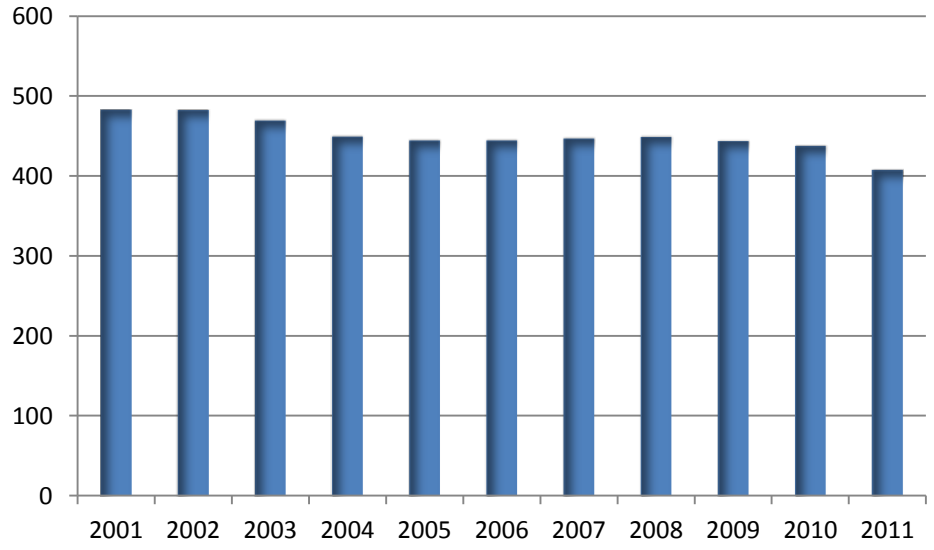
program for the department as well as Minneapolis Police Department. The coordinator ensured that all personnel received the proper physical examinations annually as well as all fit-testing for respirators and titer testing for specific communicable diseases. Since ESCI's interviews, this position has been eliminated and the current status of the department's occupational health program is uncertain.

In addition to occupational health, the CBA with the fire fighters unit specifies membership in a health club as agreed upon by both the city and the bargaining unit. This allows for personnel to receive fitness instruction, nutritional assistance, and exercise facilities not otherwise available. This is a rare benefit and the city should be commended for opting for this level of dedication to overall employee health and fitness.

Staffing Levels and Personnel Deployment

Before determining if overtime use is properly managed, consideration to a number of variables was identified. To begin, the number of FTEs in MFD in any given year was determined. The number of employees in the fire department has decreased steadily over the last 10 years in an effort to reduce expenditures and increase the overall efficiency of the department. The following chart illustrates this decline.

Figure 12: FTEs, Fiscal Years 2001 – 2011[11]



[11] City of Minneapolis, Minnesota, *Comprehensive Annual Financial Report, Fiscal Year Ended December 31, 2010*, Schedule 16, plus 2011 actual personnel provided by department.

MFD had a high of 483 FTEs in fiscal year 2001, and a low of 408 FTEs in the current fiscal year, 2011. Over the 10-year period, MFD has decreased FTEs an average of 1.6 percent annually with the largest percentage decrease occurring between 2010 and 2011 at 6.8 percent.

Deployment

Although no official minimum staffing is in place either within ordinance or the collective bargaining agreements, MFD has established a current minimum staffing level of 94 personnel. The figure below lists minimum staffing by unit and position and is based on staffing levels at the time of data collection.

Figure 13: Minimum Staffing by Unit and Position

Apparatus	Apparatus Type	Location	Minimum Staffing
Engine 1	Engine	Station 1	3
Engine 2	Quint	Station 2	3
Engine 4	Engine	Station 4	3
Engine 5	Engine	Station 5	3
Engine 6	Engine	Station 6	3
Engine 7	Engine	Station 7	3
Engine 8	Engine	Station 8	3
Engine 11	Engine	Station 11	3
Engine 12	Engine	Station 12	3
Engine 14	Engine	Station 14	3
Engine 15	Quint	Station 15	3
Engine 16	Engine	Station 16	3
Engine 17	Engine	Station 17	3
Engine 19	Engine	Station 19	3
Engine 20	Quint	Station 20	3
Engine 21	Engine	Station 21	3
Engine 22	Engine	Station 22	3
Engine 27	Engine	Station 27	3
Engine 28	Engine	Station 28	3
Ladder 2	Quint	Station 21	4
Ladder 3	Tiller	Station 7	4
Ladder 4	Platform	Station 4	4
Ladder 5	Quint	Station 17	4
Ladder 10	Tiller	Station 14	4
Ladder 11	Platform	Station 6	4
Rescue 1	Rescue	Station 6	4
Rescue 9	Rescue	Station 11	4
Salvage		Station 5	0
Mobile Command		Station 1	0
Board-up		Station 6	0
		Subtotal	**89**
Deputy Chief	Command	Station 1	1
Battalion Chief 1	Command	Station 6	1
Battalion Chief 2	Command	Station 8	1
Battalion Chief 3	Command	Station 7	1
Battalion Chief 4	Command	Station 2	1
		Subtotal	**5**
		Total	**94**

In the minimum staffing matrix, the three non-critical units (salvage, mobile command and board-up) are not staffed, and all ladder companies retain minimum staffing of four personnel while all engine companies are reduced to three personnel. This maintains all stations in operational status without the necessity for 'brown outs' or the temporary closing of stations due to insufficient personnel.

Based on the rank and number of positions required to meet minimum staffing there are a given number of slots to fill per year. The following table (Figure 14) summarizes the number of shifts.

Figure 14: Number of Shifts per Year, Minimum Staffing

	Deputy Chief	District Chief	Captain	FMO	Firefighter	Total
Minimum Staffing	1	4	27	27	35	94
Average Days per Shift	122	122	122	122	122	122
Positions to Fill per Shift	122	488	3,294	3,294	4,270	11,468
Total Requirement	**366**	**1,464**	**9,882**	**9,882**	**12,810**	**34,404**

A total of 34,404 shifts are required to meet minimum staffing. MFD lists a total of 394 emergency operations personnel. The figure below shows a breakdown of the number of authorized positions by rank.

Figure 15: Number of Authorized Positions by Shift[12]

	A Shift	B Shift	C Shift	Total
Deputy Chief	1	1	1	3
District Chief	4	4	4	12
Captain	32	32	32	96
Fire Motor Operator (FMO)	32	32	32	96
Firefighter	61	61	61	183
Total Authorized	**130**	**130**	**130**	**390**

The next figure shows the potential number of shifts available based on authorized positions.

[12] Actual allocated FTEs differ based on position vacancies. Actual FTEs are as follows: Fire Captain – 98, FMO – 97, Firefighter – 184. Based on the 'Classic Position Management' Report dated 3 October 2011, and supplied by MFD.

Figure 16: Number of Available Shifts by Position per Year

	Deputy Chief	District Chief	Captain	FMO	Firefighter	
Positions	3	12	98	97	184	
Shifts per Position	122	122	122	122	122	**Total**
Total Shifts	**366**	**1,464**	**11,956**	**11,834**	**22,448**	**48,068**

A gross total of 48,068 shifts are available compared to 34,404 required to be filled at minimum staffing; a net difference of 13,664 shifts. However, vacation, sick and injury leave, compensatory, and other leaves reduce the number of available shifts for personnel to work (net shifts available).

Scheduled and Unscheduled Leave

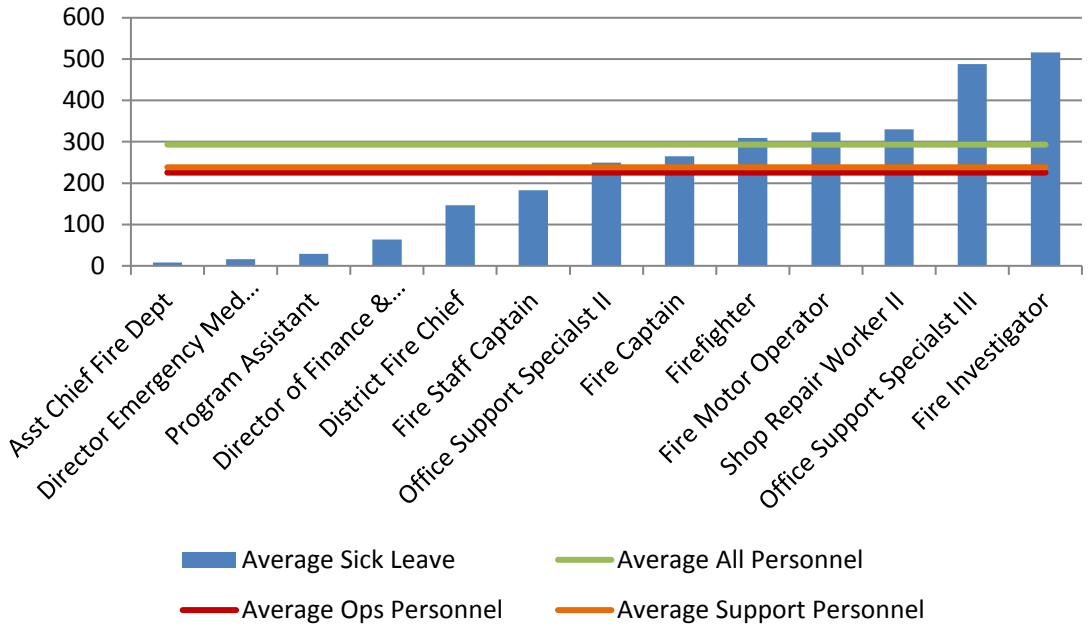
The number of hours an employee has for leave time (holidays and vacation) is based on the years of completed service.[13] The following accrual rate is effective October 1, 2010:

- 0 to 7 years, six working days
- 8 to 15 years, eight working days
- 16 to 20 years, 10 working days
- 21 or more years, 12 working days

The amount of sick, injury, and other leave used by fire department personnel varies by employee. Typically, sick leave use in fire departments of similar size and character averages between 2.5 to 4.0 shifts (60 to 96 hours) per year. However, based on information supplied by MFD, actual sick leave rates for MFD is closer to 292.2 hours per position for all personnel or 261.0 hours for operational personnel as illustrated in the following figure, which includes sick leave, family leave and emergency time off.

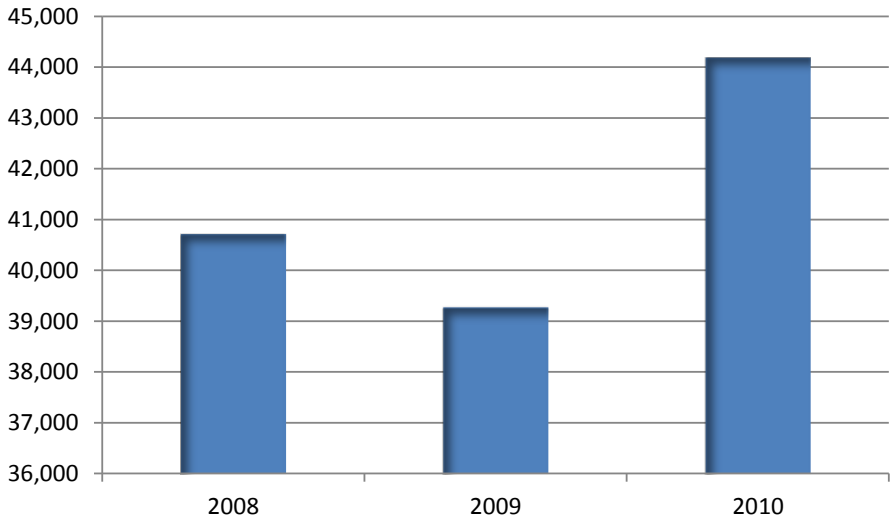
[13] Collective bargaining agreement between the City of Minneapolis and IAFF Local 82. Current CBA.

Figure 17: Time Off Usage per Position[14]



Based on the unusually high sick/family/emergency time off usage, ESCI evaluated these absences further to determine if a pattern exists that could be rectified in the future through alternative scheduling and/or staffing. The project team began this evaluation by examining the total amount of time used annually as illustrated below.[15]

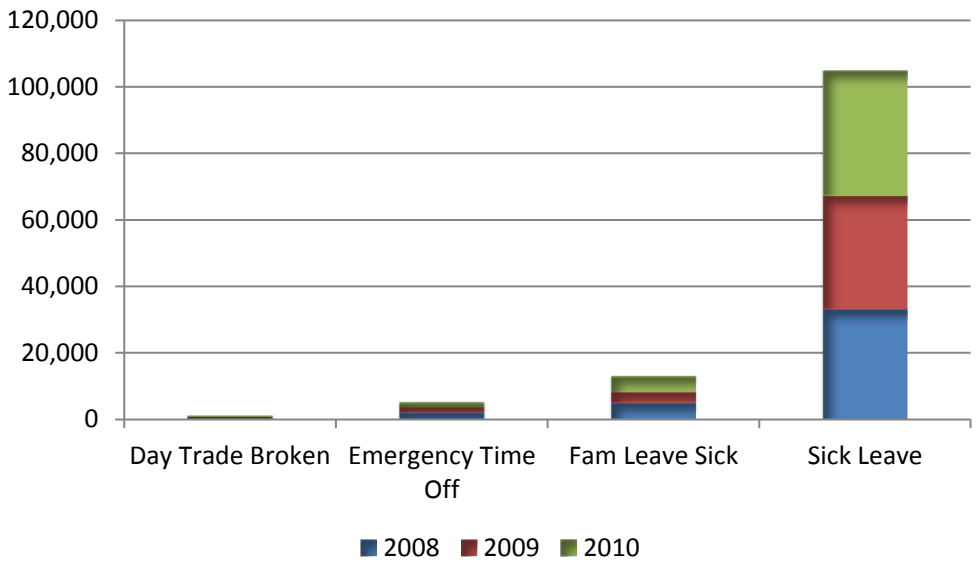
Figure 18: Unscheduled Hours Used by Year



[14] Based on raw data provided by the fire department and analyzed by ESCI.
[15] Ibid.

As can be seen in the prior figure, although there was a decline in unscheduled time off from 2008 to 2009, that amount doubled between 2009 and 2010. It is also useful to understand how unscheduled leave is used, or for what purpose. The figure below breaks down the annual unscheduled leave into the types recorded by MFD: Sick, Family, Emergency and Day Trade Broken.

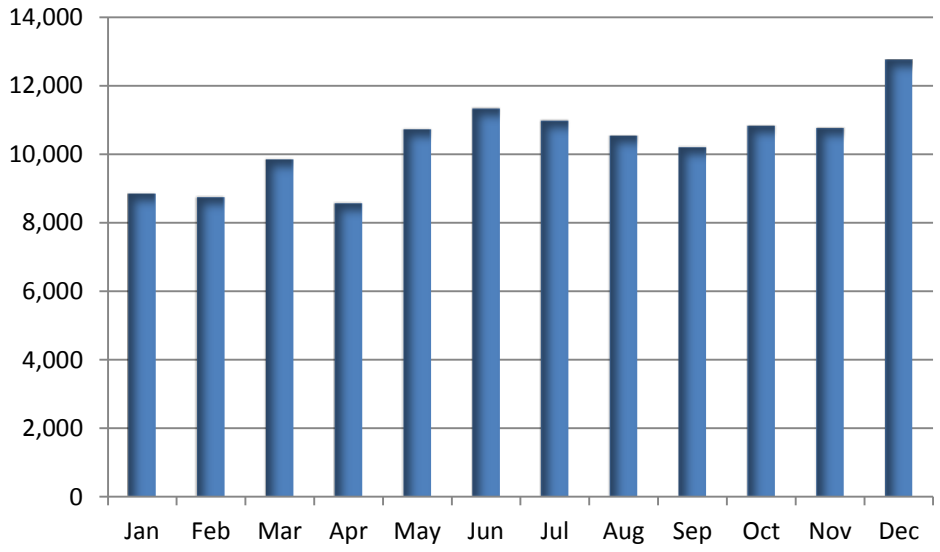
Figure 19: Unscheduled Hours by Type – Annually



This analysis continues with an examination of unscheduled time usage by month. [16] This illustration uses 2010 data only.

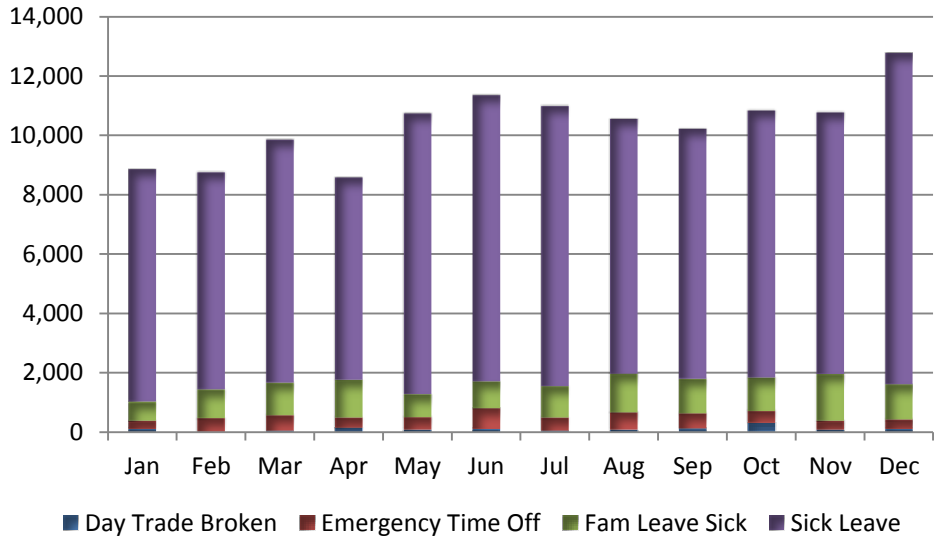
[16] Ibid.

Figure 20: Unscheduled Hours Used by Month - 2010



Temporal analysis by month indicates that the highest month of unscheduled leave usage is December at 12,768 hours followed by June at 11,342 hours. The month with the lowest unscheduled leave usage was April at 8,575 hours. As presented earlier, this analysis was also completed by leave type as illustrated below.

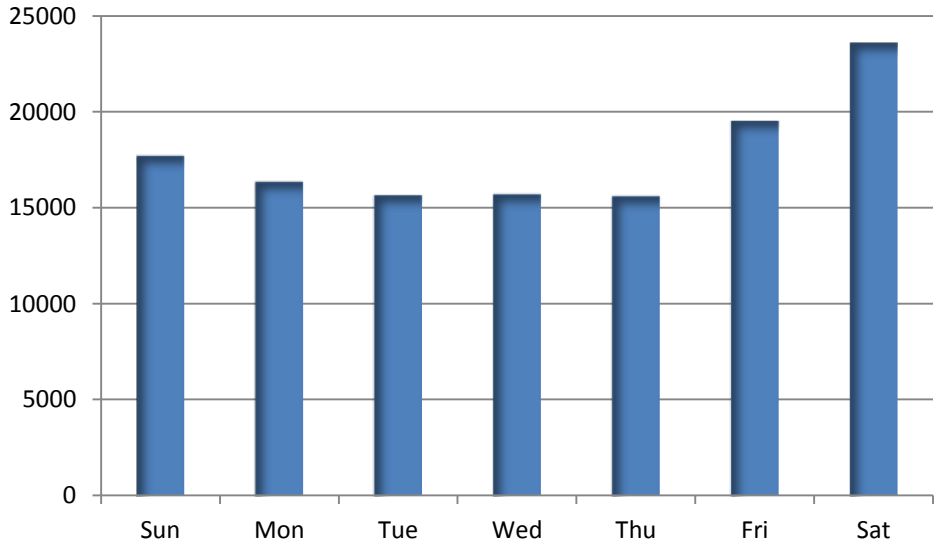
Figure 21: Unscheduled Hours by Type – Month of Year[17]



[17] Ibid.

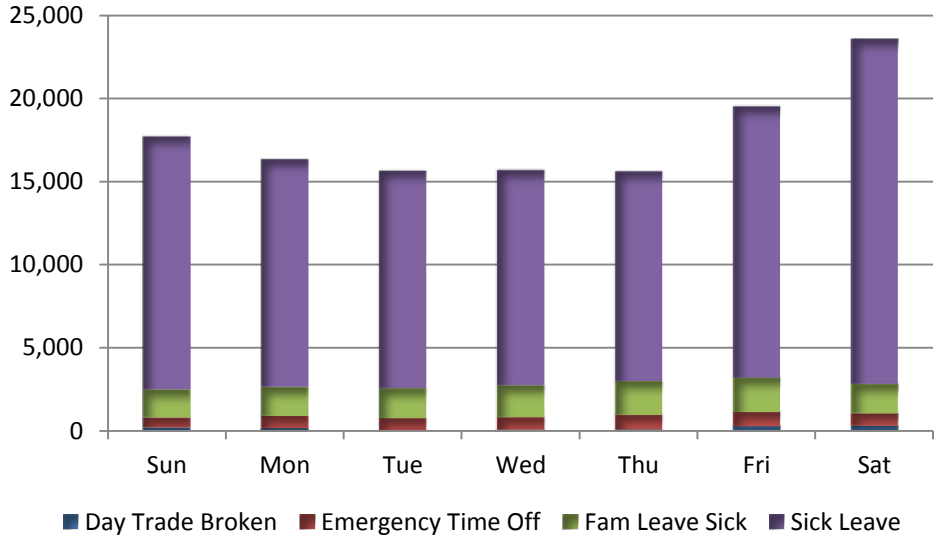
The final analysis displays unscheduled leave usage by day of week. [18]

Figure 22: Unscheduled Hours Used by Day of Week - 2010



The figure above indicates that Saturday is the single day of the week that experiences the most usage of unscheduled leave followed by Friday and Sunday. As presented previously, the following figure illustrates unscheduled leave usage by type based on day of week. [19]

Figure 23: Unscheduled Leave by Type – Day of Week



[18] Ibid.
[19] Ibid.

The figure below uses the total annual available shifts and deducts those required for minimum staffing, vacation leave, holiday, sick and injury, training, and other leaves to arrive at the number of unallocated shifts. In addition to vacation, sick and injury hours, 48 hours for training and other leave per year per employee were included in the following calculation.

Figure 24: Number of Shifts Available Less Minimum and Leaves per Year

Category	Shifts
Gross Number of Shifts	48,068
Less Minimum Staffing	34,404
Less Vacation	3,366
Less Sick and Injury	3,611
Less Training and Other Leaves	1,584
Unallocated Balance	**5,103**

Assuming an average of 8.5 shifts of leave time, 12.0 shifts of sick and injury leave (12.0 shifts for 8-hour employees; 6 shifts for 24-hour employees), and 4.0[20] shifts for training and other leave per employee, a total of 5,103 shifts are unallocated.

Administrative and Support Staffing

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 figures outline the corporate, administrative, and/or support organizational structure and complement of the fire departments.

[20] Based on ESCI's experience with other departments of similar size. Data for MFD was not available.

Figure 25: Administrative and Support Positions[21]

Position	Number
Fire Chief	1.0
Assistant Fire Chief	2.0
Deputy Fire Chief	3.0
Staff Captain	12.0
Director of Finance and Logistics	1.0
Office Support Specialist	3.0
Storekeeper and Stores Staff	3.0
Total	**25.0**

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. MFD's ratio of administrative and support staff to total personnel equals 6.1 percent (based on current allocation of personnel.

Operational Staffing

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, as 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. In the 1970s, scientists at the National Institute of Standards and Technology found that after a fire breaks out, building occupants had about 17 minutes to escape before being overcome by heat and smoke. Today, that estimate is three minutes.[22] The necessity of firefighters arriving on the scene of a fire in the shortest span of time is more critical now than ever.

[21] Based on staffing levels at the time of data collection.

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

Along with a quick response, a robust, well-trained, and appropriately equipped compliment of firefighters 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 firefighters 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. The following figures summarize the personnel assigned to street-level service delivery as provided by the department. [23]

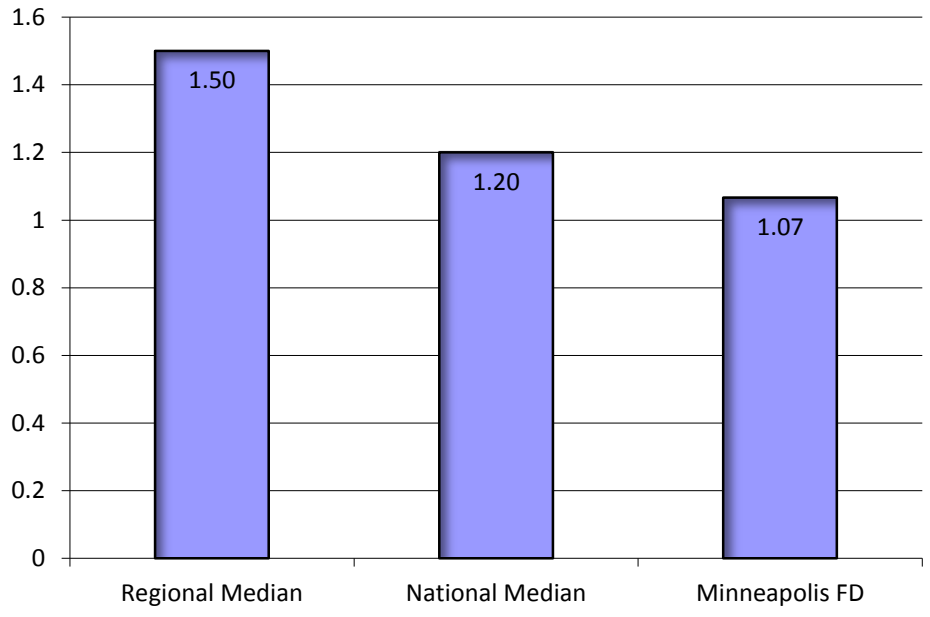
Figure 26: Operations Complement

Position	Number
Deputy Chief	4.0
District Chief	12.0
Captain	98.0
Fire Motor Operator	97.0
Firefighter	184.0
Fire Investigator	4.0
Total	**399.0**

The population of the study area is approximately 382,578.[24] The ratio of firefighters per 1,000 population is 1.07 including all career personnel. The firefighters per 1,000 population is below the regional median as well as below the national median for similar communities as illustrated in the following figure. [25]

[23] Accurate at time of data collection.
[24] Based on 2010 Census data.
[25] Karter, Michael J. Fire Departments in Canada, 2006-2008. January 2010. Table 1 Career Firefighter Rates by Population Protected, 2006-2008. p. 2.

Figure 27: Career Firefighters per 1,000 Population



Although the figure above based on U.S. Fire Administration fire department self-assessment data indicates that MFD is staffed below both regional and national medians, it should be noted that the statistics from which this benchmark was obtained makes no distinction between departments that provide transport EMS, thereby increasing the total number of personnel in most cases. Therefore, this benchmark is presented here simply to illustrate how MFD compares against other similar communities when using similar data.

Staffing Performance for Incidents

It takes an adequate and well-trained staff of emergency service responders to put apparatus and equipment to its best use in mitigating an emergency incident. Too few personnel at an emergency scene lessen the effectiveness of the response and increases the risk of injury to those present at the scene.

Critical tasks are those activities that must be conducted in a timely manner by firefighters at emergency incidents in order to control the situation, stop loss, and to perform necessary tasks required for a medical emergency. The MFD is responsible for assuring that responding companies are capable of performing all of the described tasks in a prompt, efficient and safe manner.

Fires - Critical tasking for fire operations is the minimum number of personnel needed to perform the tasks required to effectively control a fire in the listed risk category. Major fires (beyond first alarm) will require additional personnel and apparatus.

Emergency Medical – Critical tasking for emergency medical incidents is the minimum number of personnel needed to perform the tasks required to support the identified condition based on the department's adopted medical protocol. The following figures illustrate sample critical tasking for various types of incidents and responses.

Figure 28: Low Rise Residential Structure Fire

Task	Number of Personnel
Command/Safety	2
Pump Operations	1
Attack Line	2 / 2
Search and Rescue	2
Ventilation	4
RIT	4
Other (hydrant)	1
Total	**18**

Figure 29: High Rise Residential Structure Fire

Task	Number of Personnel
Command/Safety	2
Pump Operations	1
Attack Line	6
Search and Rescue	4
Ventilation	4
RIT	4
Other	1
Total	**22**

Figure 30: Moderate Risk Commercial Structure Fire

Task	Number of Personnel
Command/Safety	2
Pump Operations	1
Attack Line	4
Search and Rescue	2
Ventilation	4
RIT	4
Other	2
Total	**19**

Figure 31: High Risk Commercial Structure Fire

Task	Number of Personnel
Command/Safety	3
Pump Operations	2
Attack Line	4
Search and Rescue	4
Ventilation	4
RIT	4
Other	2
Total	**23**

Figure 32: Grass/Brush Fire

Task	Number of Personnel
Command/Safety	1
Pump Operations	1
Attack Line	2 / 2
Other	2
Total	**8**

Figure 33: Car Fire

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

Figure 34: Emergency Medical

Task	Number of Personnel
Patient Management	1
Patient Care	3
Documentation	1
Total	**5**

Figure 35: Motor Vehicle Accident

Task	Number of Personnel	
	Surface street	Freeway
Scene Management	1	2
Patient Care	2	2
Extrication	4	4
Fire Protection	2	2
Documentation	1	1
Other		1
Total	**10**	**12**

Figure 36: Technical Rescue – Water

Task	Number of Personnel
Command	1
Rescue Team	6
Backup Team	4
Patient Care	3
Other	1
Total	**15**

Figure 37: Technical Rescue – Confined Space

Task	Number of Personnel
Command/safety	3
Rescue Team	4
Backup/support team	4
Patient Care	4
Other	5
Total	**20**

Figure 38: Technical Rescue – Trench

Task	Number of Personnel
Command/safety	3
Rescue Team	4
Backup/support team	2
Patient Care	4
Shoring	6
Total	**19**

Figure 39: Hazardous Materials

Task	Number of Personnel
Command/Safety	5
Entry Team	2
Backup Team	4
Decontamination	6
Research	2
Support	4
Other	3
Total	**26**

The following figure illustrates how well the department is doing at producing its own personnel for structure fire responses, those incidents requiring the highest number of responders.

Figure 40: Average Structure Fire Staffing by Hour of Day

Year	Average Staffing
2007	13.9
2008	22.5
2009	22.5
2010	21.6

As can be seen from the figure above, staffing for structure fires is relatively stable over the last three years. This does not include mutual aid or automatic aid from departments outside the City of Minneapolis. Based on the critical tasking for the various types of structure fires presented previously, MFD has been able to meet the immediate needs for all but the highest risk fires over the past three years.

Capital Assets and Capital Improvement Programs

Three basic resources are required to successfully carry out the emergency mission of a fire department — trained personnel, firefighting equipment, and fire stations. Because firefighting is an extremely physical task, the training and capacity of personnel resources is a vital concern. However, no matter how competent or numerous the firefighters, the department will fail to execute its mission if it lacks sufficient fire equipment deployed in an efficient and effective manner.

The City of Minneapolis engages in citywide strategic planning every five years to develop citywide goals and strategic directions. These citywide goals and strategic directions set guidelines for each department to develop its business plan. Early in 2010, the elected officials and department leadership participated in three sessions which aimed at setting a future direction for the City within the financial parameters anticipated. As a result of the decisions developed in these sessions, a new vision, five-year goals, and strategic directions were adopted.

The City of Minneapolis adopted the following philosophy in its business plan:

Equipment and Space Plan

> *The equipment and space plan should ensure that capital assets (facilities, apparatus and equipment) fulfill the needs of the department's personnel and enhance the ability of the department to fulfill its mission of being thoroughly trained and ready to protect lives, property and the environment by responding to emergency runs and/or hazardous situations. We are committed to proactively working with the community to reduce risk to life, property and the environment*[26]

Facilities

Fire stations play an integral role in the delivery of emergency services for a number of reasons. A station's location will dictate, to a large degree, response times to emergencies. A poorly located station can mean the difference between confining a fire to a single room and losing the entire structure. The location of a station can even make the difference between saving and losing a life.

Fire stations need to be designed to adequately house equipment and apparatus, as well as meet the needs of the organization and its employees. It is essential to research needs based on call volume, response time, types of emergencies, and projected growth prior to making a station placement commitment. Locating fire stations is also a matter of the greater community (region) need.

[26] City of Minneapolis Business Plan

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

- The housing and cleaning of apparatus and equipment
- Residential living space for on-duty crew members (male and female)
- Administrative or management office(s)
- Training, classroom, and library areas
- Firefighter wellness/fitness area

While this list may seem rudimentary, the lack of dedicated space compromises the ability of the facility to support all of these functions and can detract from its primary purpose.

The fire department's administrative offices are located within the Minneapolis City Hall at 350 S. 5th St. in Room 233. The Minneapolis City Hall and Hennepin County Courthouse (also known as the "Municipal Building"), is the main building used by the city government of Minneapolis, as well as by Hennepin County, Minnesota. The building was constructed circa 1888-1909. The structure has served many different purposes since it was built; although today the building is 60 percent occupied by the city and 40 percent occupied by the County. The building is jointly owned by the city and county divided down the middle and controlled by the Municipal Building Commission.

MFD delivers emergency services out of 19 fire stations strategically located throughout the city. The following figure provides a summary of each MFD station, the year built, square footage, condition and general appearance.

Figure 41: Facilities Overview and Summary of Condition

Fire Station No.	Year Built/ Purchased	Square Footage	Condition	General Appearance
Headquarters	1888-1909/2010	3,759	Good	Good
Fire Station 1	1990	10,875	Poor	Poor
Fire Station 2	1961	9,346	Fair	Fair
Fire Station 4	1940	11,130	Poor	Poor
Fire Station 5	1962	8,226	Poor	Poor
Fire Station 6	2003	27,160	Fair	Fair
Fire Station 7	1962	13,164	Poor	Fair
Fire Station 8	1940	11,093	Poor	Poor
Fire Station 11	1970	15,106	Poor	Poor
Fire Station 12	1974	11,288	Poor	Fair
Fire Station 14	2006	14,301	Excellent	Excellent
Fire Station 15	1945	9,070	Poor	Poor
Fire Station 16	1958	9,140	Poor	Poor
Fire Station 17	1992	11,444	Good	Good
Fire Station 19	1976	11,265	Fair	Fair
Fire Station 20	1963	9,284	Fair	Fair
Fire Station 21	1961	14,729	Fair	Poor
Fire Station 22	1993	12,624	Good	Good
Fire Station 27	1993	15,461	Good	Good
Fire Station 28	1993	15,823	Good	Good
Training Center	2010	9 Acres	Excellent	Excellent
Office		9,366		
Storage		733		
Garage		11,653		

The following figures provide a more detailed inventory and condition of the fire stations and facilities operated by the Department.

Fire Station 1

6th Avenue South 3rd Street, Minneapolis, MN. 55415

Fire Station 1 was originally constructed in 1879, rebuilt in 1909, remodeled in 1963 and again in 1990. The 2 story building is 10,875 square feet, with 2 back -in bays.

This station houses Engine 1, one Mobile Command Van, one utility vehicle and the Duty Deputy vehicle.

It is staffed with a D/C, two Captains, FMO and two Firefighters.

Condition of the building is generally poor, but does have a new roof.

Design	This two story fire station has a downtown commercial store front design with vintage folding apparatus doors. Although it blends well with surrounding area, it does not seem adaptable to current or future needs of the community due to size (not adequate for current use) and inadequate parking for staff and visitors. Apparatus exiting from the station is not safe due to the very busy intersection. Office space is available for the Duty Deputy and a Station watch space for radio and phones.
Construction	This structure is constructed of brick and mortar with a brand new flat roof. Unusual construction features a hay-loft. The heating system is hot water boiler using natural gas for fuel. Central air conditioning in 100% of the building.
Safety	Not sprinklered; has local smoke detection with adequate building fire extinguishers, but no heat detection or smoke/heat local or monitored. The kitchen has commercial cooking equipment with proper hood, duct and grease filters, but no central point shut down and no fixed fire extinguishing systems. Automatic door stops installed and operational, but security access is not monitored. Bio-hazard area – Flammable and combustible liquids and pressure cylinders are in approved storage. A back-up emergency generator, fueled by natural gas, supplies limited power to building. Eyewash station available. Energy audit completed.
Environment	Apparatus exhaust removal system by direct connect. Bay drainage with oil and sand separator.
Code Compliance	ADA compliant/compliance with fire and life safety.
Staff Facilities	Inadequate space for working in, on and around apparatus or working on equipment, hoses, tools, etc. Inadequate space for safe and rapid turnout. The kitchen size is inadequate for cooking and eating. The day room and kitchen are connected. For sleeping areas, there is a co-ed dorm with a co-ed bathroom/shower/locker making this compromising for two-gender staffing. The flooring in the dorm area needs replacement. Space is inadequate for training and company drills, but an exercise/workout area is available. Storage space is in the basement and residential laundry is available.

Fire Station 2

13th Avenue NE & Main Street, Minneapolis, MN 55413

Fire Station 2 was originally built in 1879, rebuilt in 1892 and the present building in 1961.

The single story building is 9,346 square feet, with 2 back-in bays.

The station houses Engine 2, Battalion Chief 4, USAR Boats 1 & 2. It is staffed with a BC, Captain, FMO and 1-2 Firefighters.

Condition of the building is fair.

Design	Station design is a 1960's modern style. Although the size of the facility is adequate currently, it does not seem to blend well with the surrounding area due to architectural design. Apparatus exit is safe for traffic flow, but parking is inadequate for staff and visitors. Meeting room office space is available for BC's and a space is available for station-watch.
Construction	This structure is constructed of brick and a flat membrane roof in fair condition. The heating system is hot water boiler using natural gas for fuel. About 40% of the station has central air conditioning. Water in the basement from ground seepage, sump pumps are installed, but maintenance is required.
Safety	Not sprinklered. Local smoke detection with adequate building fire extinguishers, no heat detection. Commercial cooking equipment present with proper hood, duct and grease filters, no central point shut down or fixed fire extinguishing system. Automatic door stops are operational, security access not monitored. Bio-hazard area – flammable and combustible liquids and pressure cylinders are in approved storage. A back-up emergency generator, fueled by natural gas, supplies limited power to building. Eyewash station available. Energy audit completed.
Environment	Apparatus exhaust removal system by direct connects. Apparatus floor drain with oil separation is in use.
Code Compliance	ADA compliant, the building meets fire and life safety standards in place at the time it was constructed.
Staff Facilities	There is adequate space for working with apparatus, equipment, tools, hoses, etc. Safe and rapid response turnout is adequate. Adequate space for company drills and training. There is plenty of space for sleeping (co-ed), and bathroom/ shower/locker usage, however because of design, when one gender is using the bathroom area the entire room is locked. Day room and kitchen with adequate space for cooking and eating. Exercise/workout area and residential type laundry available in the basement. No storage area.

Fire Station 4

11th Avenue North & 6th Street Minneapolis, MN 55411

Fire Station 4 was originally built on Plymouth Avenue North in 1879, relocated twice to present location in 1940.
The two story building is 11,130 square feet, with 3 back -in bays.
The station houses Engine 4, Ladder 4, Boat 4 and Boat 4 Tow vehicle. It is staffed with 2 Captains, 2 FMOs and 3-4 Firefighters.
Condition of the building is poor.

Design	The fire station has a historic federalist style design. The size is not adequate for current use nor does it blend well with surrounding area, but can adapt to future needs. Safe traffic flow exit for apparatus and adequate parking available. There is a station-watch space.
Construction	The station is constructed in brick and mortar with a flat roof. The roof is in fair condition. The heating system is steam boiler using natural gas for fuel. The boiler is noted at needing replaced. About 65% of the station has central air conditioning.
Safety	Not sprinklered; local smoke detection with fire extinguishers, but no heat detection or smoke/heat local or monitored. Commercial cooking equipment with proper hood, duct and grease filters are in place, but no central point shut down and no fixed fire extinguishing systems. Automatic door stops installed and operational. Security access - not monitored. Bio-hazard area – Flammable and combustible liquids and pressure cylinders are in approved storage. A back-up emergency generator, fueled by natural gas, supplies limited power to building. Eyewash station available. Energy audit completed.
Environment	Apparatus exhaust removal system by direct connects. Bay drainage with oil and sand separator.
Code Compliance	ADA compliant/compliance with fire and life safety
Staff Facilities	Inadequate space for working in, on and around apparatus or working on equipment, hoses, tools, etc. Inadequate space for safe and rapid turnout. Space is adequate for training and company drills and an exercise/workout area is available. Dormitory has adequate space for sleeping, with co-ed dormitory. There is a single co-ed restroom, shower and locker available, making this inadequate for personnel hygiene. The day room and kitchen are connected, kitchen inadequate for cooking and eating. No storage area. Residential type laundry in basement.

Fire Station 5

27th & Bloomington Avenue South Minneapolis, MN 55407

Fire Station 5, originally housed in 1879, was relocated a year later and again in 1887, finally relocated to its present location in 1962. The single story building has 8,226 square feet with two back -in bays.
The station houses Engine 5 and a salvage vehicle.
It is staffed with 1 Captain, 2 FMOs and 1-2 Firefighters.
Condition of the building is poor.

Design	Station design is a 1960's modern style, small with limited space. The station does not blend well with surrounding area or seem adaptable to current or future needs of the community due to size (not adequate for current use), inadequate parking for staff and visitors, and a busy street with no warning for traffic. There is a history of vehicle vandalism in the rear parking lot. A station watch space is available.
Construction	Building is constructed of brick with flat/membrane roof in fair condition. The heating system is hot water boiler using dual fuel account gas for fuel. About 30% of the station has central air conditioning. HVAC system is in need of replacement.
Safety	Not sprinklered; local smoke detection with fire extinguishers, no heat detection. Commercial cooking equipment present and proper hood, duct, and grease filters, but no central point shut down. Fixed fire extinguishing system not present. Automatic door stops installed and operational, security access not monitored. Bio hazard area - flammable and combustible liquids and pressure cylinders are in approved storage. A back-up emergency generator, fueled by natural gas, supplies limited power to the building. Energy audit completed. Eyewash station available.
Environment	Bay drainage with oil and sand separator. The apparatus bay has an exhaust system for each apparatus.
Code Compliance	ADA compliant/compliance with fire and life safety
Staff Facilities	There is inadequate space for working in, on and around apparatus. Not safe for rapid response turnout, training or company drills. There is adequate space for working on equipment, hose, tools, etc. Building contains a day/lounge area. Sleeping space is adequate, but compromises are necessary for co-ed staffing, and bathrooms, (co-ed, includes shower and lockers.) Living quarters needs new windows in dorm and captain's rooms. Residential laundry present with storage area in a small closet. Exercise/workout area in basement. SCBA compressor/fill station available at this station.

Fire Station 6

1st Avenue South & East 15th Street, Minneapolis, MN 55403

Fire Station 6 was originally used as a fire station in 1884, relocated twice to present location in 1982, and then remodeled in 2003. The two story building is 27,160 square feet, with 4 drive-thru bays, BC room, and a station watch room.

This station is the Technical Rescue Station, and houses Engine 6, Ladder 11, Board up Truck, Battalion Chief 1 vehicle, and Rescue 1.

It is staffed with a BC, 3 Captains, 3 FMOs, and 9-10 Firefighters.

Condition of the building is fair.

Design	The building is a contemporary design. The stations size is adequate now and into the future, blending well into the neighborhood. Apparatus can exit into traffic safely. Parking is adequate. Meeting Room/Conference/Classroom available, the only station to have this (a community room is available in station 14). A station-watch space is available.
Construction	Structure is framed/constructed of brick with a flat membrane roof in good condition. The heating system is hot water boiler and radiant heat on apparatus floor, using natural gas for fuel. About 60% of the station has central air conditioning.
Safety	Part of station is sprinklered. Local smoke detection with adequate building fire extinguishers. Alarms available only for smoke detection, not for heat detection, smoke/heat or security. Commercial cooking equipment present with proper hood, duct, and grease filters, but no central point shut down. Fixed fire extinguishing system not present. Automatic doors stops are present and operational. Bio hazard area - flammable and combustible liquids and pressure cylinders are in approved storage. A back-up emergency generator, fueled by natural gas, supplies limited power to the building. Eyewash station available. Energy audit completed.
Environment	Bay drainage with oil and sand separator. The apparatus bay has an exhaust system for each apparatus.
Code Compliance	ADA compliant/compliance with fire and life safety
Staff Facilities	There is adequate space for working in, on and around apparatus, small equipment, hose, tools, etc., as well as safe rapid turnout. Company drills and training have adequate space. Adequate space for cooking and eating in a kitchen/day room Sleeping space adequate with private male and female dorms and 2 male and 2 female restroom/shower/lockers areas. A large work out area is in the basement which includes a storage area and two residential type laundry machines as well as a commercial washing/gear extractor.

Fire Station 7

2000 East Franklin Avenue, Minneapolis, MN 55404

Fire Station 7, originally built in 1884, has been relocated twice to the present location in 1962. It is a single story building that covers 13,164 sq. feet and has 3 back-in bays.
Housed here is Engine 7, Ladder 3 and Battalion Chief 3 vehicle. It is staffed with a B/C, 2 Captains, 2 FMOs and 3-4 Firefighters.
Condition of the building is poor.

Design	The station design is 1960's modern. Although the facility blends well with the surrounding area, the size currently and into the future does not meet demands. Parking is adequate. Apparatus exit is not safe for traffic flow, as it is a busy street at an intersection. Meeting rooms include Battalion Chief's and station-watch space.
Construction	Building is constructed of brick with a flat membrane roof in fair condition. The heating system is hot water boiler and radiant heat on apparatus floor, fueled by natural gas. About 30% of the station has central air conditioning.
Safety	Not sprinklered, but local smoke detection with fire extinguishers, but no heat detection or smoke/heat local or monitored. Commercial cooking equipment present with proper hood, duct and grease fillers, but no central point shut down and no fixed fire extinguishing system. Automatic door stops operating properly, but security access is not monitored. Bio-hazard area - flammable and combustible liquids and pressure cylinders are in approved storage. A back up emergency generator, fueled by natural gas, supplies limited power to building. Eyewash station available. Energy audit completed.
Environment	Apparatus exhaust removal system by direct connects. Bay drainage with oil and sand separator.
Code Compliance	ADA compliant/compliance with fire and life safety
Staff Facilities	There is inadequate space for working in, on and around apparatus, or for drills and training. Adequate room is provided for working on small equipment, hoses, tools, etc. and for safe and rapid response turnout. Adequate space in kitchen for cooking and eating in the dayroom/kitchen. Sleeping space is adequate, but compromises are necessary for two-gender staffing: sleeping and bathrooms are co-ed and shower and bathrooms are small. Lockers fill up much of the room. Exercise / work out area in the basement. Residential laundry available. No storage area.

Fire Station 8

Blaisdell Avenue South & 28th Street, Minneapolis, MN 55403

Fire Station 8, originally built in 1885, was rebuilt in 1940.
The two story building is 11,093 square feet, with 3 back -in bays.
The station houses Engine 8, Battalion Chief 2 vehicle, USAR Unit #3 Truck and Trailer.
It is staffed by a BC, Captain, FMO, and 1-2 Firefighters.
Condition of the building is poor.

Design	This station is a Federalist style with a commercial store front design. The size of the facility is adequate for current use. It fits into the future needs of the community and blends well with the neighborhood. Parking is adequate. Apparatus exit to traffic flow is safe. Office space for Battalion Chief and station-watch space.
Construction	Structure is framed/constructed of brick with a flat roof type in fair condition. The heating system is steam boiler and fueled by dual fuel account. About 45% of the station has central air conditioning and a window A/C unit in the kitchen.
Safety	Not sprinklered. Alarm present in this building is the smoke detection. No heat detection, smoke/heat monitoring or security alarms. Adequate building fire extinguishers. Commercial cooking equipment with proper ventilation, but no central point shut down. Automatic doors stops are operating properly. Flammable and combustible liquids and pressure cylinders are properly stored. A backup generator, fueled by natural gas supplies limited power to building. Eyewash station available Energy audit completed.
Environment	Apparatus exhaust removal system by direct connects. Bay drainage with oil and sand separator.
Code Compliance	ADA compliant/compliance with fire and life safety
Staff Facilities	There is adequate space for working in, and around apparatus, small equipment, hoses, tools, etc. Adequate space for rapid turnout. Inadequate area for training and company drills. Sleeping space is co-ed, but adequate. Small bathroom for personal hygiene that is co-ed. (includes bath, shower and lockers) Small kitchen it is adequate for cooking and eating. There is an exercise area. Residential laundry available. Storage area in basement.

Fire Station 11

3rd Avenue SE & 6th Street, Minneapolis, MN 55414

Fire Station 11 was originally built in 1873 and relocated in 1926 to present location. An addition was completed during the 1970s.
The two story building is 15,106 square feet, with 2 back-in bays.
The station is the Hazmat station and houses Engine 11, Rescue 9 and Mobile Lab.
It is staffed with 2 Captains, 2 FMOs, and 7-8 Firefighters.
Condition of the building is poor.

Design	Station design type is a Federalist style building with a separate building attached. This design blends well in the surrounding area, but the structure size is not adequate now or into the future. Parking is adequate. Apparatus exit to street appears safe. There is a station-watch space.
Construction	Structure is framed/constructed of brick with a flat membrane roof in fair condition. The heating system is steam boiler and fueled by dual fuel account. About 60% of the station has central air conditioning.
Safety	Not sprinklered. Smoke Detection local with adequate building fire extinguishers, but no heat detection or smoke/heat local or monitored. Commercial cooking equipment present with proper hood, duct and grease fillers in place, but no central point shut down and no fixed fire extinguishing system. Automatic door stops installed. Security access not monitored. Bio-hazard area - flammable and combustible liquids and pressure cylinders are in approved storage. A back-up generator fueled by natural gas supplies limited power to the building. Eyewash station available. Energy audit completed.
Environment	Apparatus exhaust removal system by direct connects. . Bay drainage with oil and sand separator.
Code Compliance	ADA compliant/compliance with fire and life safety
Staff Facilities	There is inadequate space for working in, on and around apparatus or for drills and training, or rapid and safe response turnout. , Adequate space available for working on small equipment, hoses, tools, etc. Inadequate space for cooking and eating. Adequate sleeping dorm, although not mixed gender appropriate, and bathroom/ shower/ locker not adequate. Living quarters include a day room. Work out are in basement and with storage area. Residential laundry available, as well as a commercial extractor for FPE.

Fire Station 12

33rd Avenue South & 54th Street, Minneapolis, MN 55417

Fire Station 12 was originally built in 1886, was vacated in 1920, and put back in service in 1974 at present location.
The single story building is 11,288 square feet, with 2 back -in bays.
The station houses Engine 12, Boat 12 and Boat 12 Tow Vehicle.
It is staffed with a Captain, FMO, and 1-2 Firefighters.
Condition of the building is poor.

Design	Station design type is a 1960s modern style with vintage folding apparatus doors. The structure is adequate for current use and into the future. It blends well with the surrounding areas. Apparatus exit to traffic flow appears safe. Adequate parking is available for staff and visitors. A station watch space is available.
Construction	Structure is framed/constructed of brick with a flat membrane roof in fair condition. The heating system is hot water boiler and radiant heat on apparatus floor, fueled by dual fuel account. About 50% of the station has central air conditioning.
Safety	Not sprinklered. Smoke Detection local with adequate building fire extinguishers, but no heat detection or smoke/heat local or monitored. Commercial cooking equipment present with proper hood, duct and grease fillers in place, but no central point shut down and no fixed fire extinguishing systems. Automatic door stops operating properly. Security access is not monitored. Bio-hazard area - flammable and combustible liquids and pressure cylinders are in approved storage. A back-up generator fueled by natural gas supplies limited power to the building. Eyewash station available. Energy audit completed.
Environment	Apparatus exhaust removal system by direct connects. Bay drainage with oil and sand separator.
Code Compliance	ADA compliant/compliance with fire and life safety
Staff Facilities	There is adequate space for working on and around apparatus, small equipment, hoses, tools, etc. and rapid safe turnout. Only a very old hose dryer is available. Adequate space for training and company drills. A co-ed sleeping area and shared restroom/shower/locker space is adequate for personal hygiene. Cooking and eating areas adequate in kitchen/day room. No storage space. Residential laundry available. Exercise/workout area available.

Fire Station 14

2002 Lowry Avenue North, Minneapolis, MN 55412

Fire Station 14 was originally built in 1888, and relocated twice, in 1940 and last in 2002.

The two story building is 14,301 square feet, with 3 drive-thru bays.

The station houses Engine 14, Ladder 10 and USAR Unit #1 Freightliner/trailer and EMS trailer. It is staffed with 2 Captains, 2 FMOs, and 3-4 Firefighters.

Condition of the building is good to excellent.

Design	Station design type is downtown urban commercial design. The structure is adequate for current use and into the future. It blends well with the surrounding area providing apparatus to exit to traffic flow safely. Adequate parking is available for staff and visitors. Community Room available as well as a station-watch space.
Construction	Structure is framed/constructed of brick with a flat membrane roof in good condition. The heating system is hot water boiler and radiant heat on apparatus floor, natural gas otherwise. About 50% of the station has central air conditioning.
Safety	This station is sprinklered. Smoke detection local with adequate building fire extinguishers. Alarms are present for heat detection and smoke and heat. Commercial cooking equipment present with proper hood, duct and grease fillers in place. Central point shut down is installed, as well as fixed fire extinguishing systems. Automatic door stops operating properly. Security access is not monitored. Bio-hazard area - flammable and combustible liquids and pressure cylinders are in approved storage. A back-up generator fueled by natural gas supplies limited power to the building. Eyewash station available. Energy audit completed.
Environment	Bay drainage with oil and sand separator. The apparatus bay has an exhaust system for each apparatus.
Code Compliance	ADA compliant/compliance with fire and life safety.
Staff Facilities	There is adequate space for working on and around apparatus, small equipment, hoses, tools, etc. and rapid safe turnout. Adequate space for training and company drills. Sleeping area is adequate, male/female private dorms, the 5 bathrooms are shared/co-ed not gender specific. Cooking and eating areas are adequate in kitchen/day room. Residential laundry is available. Exercise/workout area is available. No storage space.

Fire Station 15

27th Avenue Northeast & Johnson Street, Minneapolis, MN 55418

Fire Station 15 was originally built in 1916 as Fire Station 29, and was renumbered to Station 15 in 1945. The two story building is 9,070 square feet, with 2 back -in bays.
A ladder bay addition was done in 1964. The station houses Engine 15.
It is staffed by a Captain, FMO and 1-2 Firefighters.
Condition of the building is poor.

Design	Station design type is a Federalist style with a brick commercial addition. The structure is adequate for current use and into the future. It blends well with the surrounding area providing apparatus to exit to traffic flow safely. Adequate parking is available for staff and visitors. A station-watch space is available.
Construction	Structure is framed/constructed in brick with a flat roof in fair condition. The heating system is hot water boiler and radiant heat on apparatus floor, natural gas otherwise. About 35% of the station has central air conditioning.
Safety	Not sprinklered. Smoke Detection local with adequate building fire extinguishers, but no heat detection or smoke/heat local or monitored. Commercial cooking equipment present and proper. There is no fixed fire extinguishing system. . Automatic door stops operating properly. Security access not monitored. Bio-hazard area - flammable and combustible liquids and pressure cylinders are in approved storage. A back-up generator fueled by natural gas supplies limited power to the building. Eyewash station available. Energy audit completed.
Environment	Bay drainage with oil and sand separator. The apparatus bay has an exhaust system for each apparatus
Code Compliance	ADA compliant/compliance with fire and life safety.
Staff Facilities	There is adequate space for working on and around apparatus, small equipment, hoses, tools, etc. and rapid safe turnout. Inadequate space for training and company drills but an exercise/workout area is in the basement. Sleeping area is adequate, but co-ed only. The single bathroom/ shower/locker area is also shared/co-ed- compromising for two gender staffing. Cooking and eating areas adequate in kitchen/day room. No storage space is available. Residential laundry is available.

Fire Station 16

Glenwood Avenue & Cedar Lake Road, Minneapolis, MN 55405

Fire Station 16 was originally built in 1890, and relocated in 1958 to present location. The single story building is 9,140 square feet, with 2 back -in bays.

The station houses Engine 16, EAP officer car and Staff Captain Admin Fire Prevention Education vehicle.

It is staffed with a Captain, FMO and 1-2 Firefighters.

Condition of the building is poor.

Design	Station design type is a 1960's modern commercial building. The structure is adequate for current use and into the future. It blends well with the surrounding area providing apparatus to exit to traffic flow safely. Adequate parking is available for staff and visitors. A station-watch space is available.
Construction	Structure is framed/constructed of brick with a flat membrane roof in fair condition. The heating system is hot water boiler and fueled by dual fuel account. About 30% of the station has central air conditioning.
Safety	Not Sprinklered. Smoke Detection local with adequate building fire extinguishers, but no heat detection or smoke/heat local or monitored. Commercial cooking equipment present with proper hood, duct and grease fillers in place, but no central point shut down. There is no fixed fire extinguishing system. Automatic door stops operating properly. Security access not monitored. Bio-hazard area - flammable and combustible liquids and pressure cylinders are in approved storage. A back-up generator fueled by natural gas supplies limited power to the building. Eyewash station available. Energy audit completed.
Environment	Bay drainage with oil and sand separator. The apparatus bay has an exhaust system for each apparatus.
Code Compliance	ADA compliant/compliance with fire and life safety.
Staff Facilities	There is adequate space for working on and around apparatus, small equipment, hoses, tools, etc. and rapid safe turnout. Adequate space for training and company drills. Sleeping area is adequate but co-ed only compromising two gender staffing. The single bathroom/shower/locker area is also shared/co-ed, but is adequate for personal hygiene. Bathroom is of major concern. The urinal drain in front bathroom behind the wall needs to be replaced. This will require major reconstruction. Property services have put this repair off for over a year. Cooking and eating areas adequate in kitchen/day room. Storage area is in a closet next to the dorm. Residential laundry available. Exercise/workout area available.

Fire Station 17

4th Avenue South & East 38th Street, Minneapolis, MN 55409

Fire Station 17 was originally built in 1890, relocated twice to present location in 1992. The single story building is 11,444 square feet, with 2 back -in bays.

The station houses Engine 17, Ladder 5 and Staff Captain Admin EP SUV, and 2008 Ford Escape XLT.

It is staffed with 2 Captains, 2 FMOs and 3-4 Firefighters.

Condition of the building is good. As a double house the living quarters are inadequate.

Design	This station is a contemporary design with colonial design features. The structure is not adequate for current use, but could be adaptable to future needs of the community. It blends well with the surrounding area and provides apparatus a safe exit into traffic. Parking is not adequate for staff and visitors. A station-watch space is available. Living quarters are too small for a double house.
Construction	Structure is framed/constructed of brick with a flat membrane roof in good condition. The heating system is hot water boiler and radiant heat on apparatus floor, natural gas otherwise. About 75% of the station has central air conditioning.
Safety	Part of the fire station is sprinklered. Smoke Detection is locally monitored with adequate building fire extinguishers. There are no monitors for smoke and heat. Commercial cooking equipment present with proper hood, duct and grease fillers in place, and a central point shut down is in place. Fixed fire extinguishing system with partial coverage. Automatic door stops operating properly. Security access is not monitored. Bio-hazard area - flammable and combustible liquids and pressure cylinders are in approved storage. A back-up generator fueled by natural gas supplies limited power to the building. Eyewash station available. Energy audit completed.
Environment	Bay drainage with oil and sand separator. The apparatus bay has an exhaust system for each apparatus
Code Compliance	ADA compliant/compliance with fire and life safety.
Staff Facilities	There is inadequate space for working in, on and around apparatus or for working on small equipment, hoses, tools, etc. Inadequate space for drills and training, but there is an exercise/workout area. Inadequate for rapid and safe response turnout. Adequate space for cooking and eating in kitchen/day room. For sleeping areas, there are private rooms for each male and female, but a shared bathroom/shower/locker between the rooms. Basement has a storage area. Residential laundry available.

Fire Station 19

1976 Ontario & Beacon Streets Southeast. Minneapolis, MN 55414

Fire Station 19 was originally built in 1894 and relocated to its present location in 1976

The single story building is 11,265 square feet, with 2 drive-thru bays.

The station houses Engine 19, Engineering Officer SUV, 2 Decontamination units at 24 ft. and 50 ft., both with their towing vehicles. These units fill up the apparatus bay.

It is staffed with 1 Captain, FMO, and 1-2 Firefighters.

Condition of the building is fair.

Design	The station is a contemporary commercial/industrial design. The building is not adequate for current use or adaptable to future needs of the community. It blends well with the surrounding area and allows apparatus to exit to traffic flow safely. Parking is adequate for staff and visitors. A station-watch space is available.
Construction	Structure is framed/constructed of brick with a flat membrane roof in good condition. The heating system is hot water boiler with dual fuel account type. About 50% of the station has central air conditioning. There is no hose tower. Drying racks are inaccessible due to decontamination trailers in the way. Solar water heating is new this year.
Safety	Not sprinklered; local smoke detection with fire extinguishers, but no local heat detection. Smoke and heat not monitored. Commercial cooking equipment present with proper hood, duct and grease fillers in place, but no central point shut down. There is no fixed fire extinguishing system. Automatic door stops operating properly. Security access not monitored. Bio-hazard area - flammable and combustible liquids and pressure cylinders are in approved storage. A back-up generator fueled by natural gas supplies limited power to the building. Eyewash station available. Energy audit completed.
Environment	Bay drainage with oil and sand separator. The apparatus bay has an exhaust system for each apparatus.
Code Compliance	ADA compliant/compliance with fire and life safety.
Staff Facilities	There is inadequate space for working in, on and around apparatus or for working on small equipment, hoses, tools, etc. There is only a very old hose dryer available. Inadequate space for rapid and safe response turnout. Adequate space for training and company drills. Adequate space for cooking and eating in kitchen/day room. For sleeping areas, there is only a co-ed dorm with a co-ed bathroom/shower/locker making this compromising for two-gender staffing. Storage area in basement. Residential laundry is available. Workout/exercise area is available in the basement.

Fire Station 20

46th & Humboldt Avenue North, Minneapolis, MN 55412

Fire Station 20 was originally built in 1895 and relocated to its present location in 1963. The single story building is 9,284 square feet, with 2 back -in bays.
The station houses Engine 20, USAR Unit #2 30 foot trailer, and its tow vehicle.
It is staffed with a Captain, FMO, and 1-2 Firefighters.
Condition of the building is fair.

Design	Station 20, a 1960's modern design blends well in the neighborhood The size of the facility is adequate currently and adaptable into the future. There is safe traffic flow exiting for apparatus along with adequate parking for staff and visitors. There is a station-watch space.
Construction	Structure framed/constructed of brick and a flat membrane roof newly replaced in 2010. The heating system is hot water boiler with natural gas combined with dual fuel account type fuel. About 50% of the station has central air conditioning.
Safety	Not Sprinkled. Smoke detection local with adequate building fire extinguishers, but no local heat detection. Smoke and heat not monitored. Commercial cooking equipment present and proper hood, duct and grease fillers in place, but no central point shut down. There is no fixed fire extinguishing system. Automatic door stops operating properly. Security access not monitored. Bio-hazard area-flammable and combustible liquids and pressure cylinders are in approved storage. A back-up generator fueled by natural gas supplies limited power to the building. Eyewash station available Energy audit completed.
Environment	Apparatus exhaust removal system by direct connects Bay drainage with oil and sand separator.
Code Compliance	ADA compliant/compliance with fire and life safety
Staff Facilities	There is adequate space for working on and around apparatus, small equipment, hoses, tools, etc. and rapid safe turnout. Inadequate space for training and company drills but an exercise/workout space is available in dorm area. Sleeping area is adequate but co-ed only. The single bathroom/ shower/locker area is also shared/co-ed- but is adequate for personal hygiene although compromises necessary for two gender staffing. Cooking and eating areas adequate in kitchen/day room. Storage area is in basement. Residential laundry available.

Fire Station 21

3209 East 38th Street, Minneapolis, MN 55406

Fire Station 21 was originally built in 1901 and relocated in 1961 to the present location.
The single story building is 14,729 square feet, with 3 back -in bays.
The station houses Engine 21, Ladder 2, Air Boat 21 with its tow vehicle and trailer.
It is staffed with 2 Captains, 2 FMOS and 3-4 Firefighters.
Regulatory Services uses the basement which has a separate access.
Condition of the building is fair.

Design	Station design is a 1960's modern design. The size of the facility is adequate for current use and meets needs into the future. It blends well into the surrounding area and apparatus can exit safely onto traffic. Major issue is parking since Regulatory Services uses the basement space and requires parking spaces in the back parking lot. Not many spaces are left for the fire station. Regulatory Services leases the area through property services. A station-watch space is available.
Construction	Structure is framed/constructed of brick with a flat membrane roof in good condition. The heating system is hot water boiler and radiant heat on apparatus floor with dual fuel account type fuel. About 30% of the station has central A/C.
Safety	The station is not sprinklered; local smoke detection with fire extinguishers (not fixed), but no local heat detection. Smoke and heat not monitored. Commercial cooking equipment present with proper hood, duct and grease fillers in place, but no central point shut down. Automatic door stops operating properly, security access not monitored. Bio-hazard area - flammable and combustible liquids and pressure cylinders are in approved storage. A back-up generator fueled by natural gas supplies limited power. Eyewash station available. Energy audit completed.
Environment	The station is on the end of a water main. Water has a strong odor, but water tests have proved negative. Apparatus exhaust removal system by direct connects. Bay drainage with oil and sand separator.
Code Compliance	ADA compliant/compliance with fire and life safety.
Staff Facilities	There is adequate space for working on and around apparatus, small equipment, hoses, tools, etc. and rapid safe turnout. Adequate space for training and company drills. Sleeping area is adequate. The single bathroom/ shower/locker area is shared/co-ed- and is inadequate for personal hygiene. Bathroom is especially small for a double house. Cooking and eating areas are adequate in kitchen/day room. No storage area. Residential laundry available. Exercise/workout area available in basement.

Fire Station 22

Market Place & West Lake Street Minneapolis, MN 55416

Fire Station 22 was originally built in 1901, demolished in 1932, and rebuilt in 1993 at present location. The single story building is 12,624 square feet, with 2 back -in bays.
The station houses Engine 22, Boat 22 with its SUV tow vehicle, and Arson Investigator Unit 2007 Chevy Tahoe.
It is staffed with a Captain, FMO, fire investigator and 1-2 Firefighters.
Condition of the building is good.

Design	Station design is contemporary commercial. The size of the facility is adequate for current use and meets needs into the future. It blends well into the surrounding area and apparatus can exit safely onto traffic. Adequate parking is available. A station-watch space is available.
Construction	Structure is framed/constructed of brick with a flat membrane roof in good condition. The heating system is forced air furnaces and radiant heat on apparatus floor. It is fueled by natural gas. About 60% of the station has central air conditioning.
Safety	Part of the station is sprinklered. Smoke Detection local with adequate building fire extinguishers, but no local heat detection. Smoke and heat not monitored. Commercial cooking equipment present wtih proper hood, duct and grease fillers in place, and a central point shut down. Fixed fire extinguishing systems not present. Automatic door stops operating properly. Security access not monitored. Bio-hazard area - flammable and combustible liquids and pressure cylinders are in approved storage. A back-up generator fueled by natural gas supplies limited power to the building. Eyewash station available. Energy audit completed.
Environment	Apparatus exhaust removal system by direct connects. Bay drainage with oil and sand separator.
Code Compliance	ADA compliant/compliance with fire and life safety.
Staff Facilities	There is adequate space for working on and around apparatus, small equipment, hoses, tools, etc. and rapid safe turnout. There is not adequate space for training and company drills, but there is an exercise/work out area in the basement. Sleeping area is adequate and male and female rooms are private, however the single shared bathroom/shower/locker area is between the private rooms. Cooking and eating areas adequate in kitchen/day room. Storage area in the basement. Residential laundry in the basement.

Fire Station 27

5410 Nicollet Avenue, Minneapolis, MN 55419

Fire Station 27 was originally built in 1911, relocated twice since, then to its present location in 1993. The single story building is 15,461 square feet, with 3 back -in bays.
The station houses Engine 27 and MCI Van motor home.
It is staffed by a Captain, FMO, and 1-2 Firefighters.
Condition of the building is good except for some water seepage issues.

Design	Station 27 is contemporary commercial design. The size of the facility is adequate for current use and meeting needs into the future. It blends well into the surrounding area and apparatus can exit safely onto traffic. Inadequate parking, the lot located behind the station is too small. A station-watch space is available.
Construction	Structure is framed/constructed of brick with a membrane roof in good condition. The heating system is forced air furnaces and radiant heat on apparatus floor. They are fueled by natural gas. About 50% of the station has central air conditioning. Water problem from ground seepage present in the basement.
Safety	Part of the station is sprinklered. Smoke Detection local with adequate building fire extinguishers, but no local heat detection. Smoke and heat not monitored. Commercial cooking equipment present and proper hood, duct and grease fillers in place, and in this station there is a central point shut down. Fixed fire extinguishing systems present in the kitchen area. Automatic door stops operating properly. Security access not monitored. Bio-hazard area - flammable and combustible liquids and pressure cylinders are in approved storage. A back-up generator fueled by natural gas supplies limited power to the building. Eyewash station available. Energy audit completed.
Environment	Apparatus exhaust removal system by direct connects. Bay drainage with oil and sand separator.
Code Compliance	ADA compliant/compliance with fire and life safety.
Staff Facilities	There is adequate space for working on and around apparatus, small equipment, hoses, tools, etc. and rapid safe turnout. There is not adequate space for training and company drills, but there is an exercise/workout area available in basement. Sleeping area is adequate and male and female rooms are private, however the single shared bathroom area is between the private rooms. Cooking and eating areas are adequate in kitchen. Residential laundry available. Storage area in the basement.

Fire Station 28

Upton Avenue South & 50th Street, Minneapolis, MN 55410

Fire Station 28 was originally built in 1914, relocated to present location in 1993. The single story building is 15,823 square feet, with 2 back -in bays. The station houses Engine 28 and a bus.
It is staffed with a Captain, FMO, and 1-2 Firefighters.
Condition of the building is good.

Design	This station design is contemporary commercial. The size of the facility is adequate for current use and meeting needs into the future. It blends well into the surrounding area and apparatus can exit safely onto traffic. Inadequate parking, the lot located behind the station is too small. A station watch space is available.
Construction	Structure is framed/constructed of brick with a flat membrane roof in good condition. The heating system is forced air furnaces and radiant heat on apparatus floor. They are fueled by natural gas. About 60% of the station has central air conditioning.
Safety	Part of the station is sprinklered. Smoke Detection local with adequate building fire extinguishers, but no local heat detection. Smoke and heat not monitored. Commercial cooking equipment present with proper hood, duct and grease fillers in place, and a central point shut down. Fixed fire extinguishing systems-present in kitchen. Automatic door stops operating properly. Security access not monitored. Bio-hazard area - flammable and combustible liquids and pressure cylinders are in approved storage. A back-up generator fueled by natural gas supplies limited power to the building. Eyewash station available. Energy audit completed.
Environment	Apparatus exhaust removal system by direct connects. Bay drainage with oil and sand separator.
Code Compliance	ADA compliant/compliance with fire and life safety.
Staff Facilities	There is adequate space for working on and around apparatus, small equipment, hoses, tools, etc. and rapid safe turnout. There is not adequate space for training and company drills except for a workout area in the basement. Sleeping area is adequate and male and female rooms are private, however the single bathroom area is between the private rooms. Cooking and eating areas are adequate in kitchen/dayroom. Residential laundry available. No storage area.

Emergency Operations and Training Facility

25 37th Avenue NE, Minneapolis, MN

The training facility, built in 2010, is a modern, state-of-the-art facility that provides an efficient training environment. It consists of classrooms, EOC, six-story drill tower with attached 2-story commercial and residential structure, live fire burn building, Hazardous Materials props, and additional training props with an open area.

The outside training area and props include an area for fire extinguisher training, vehicle extrication, defensive driving, and roof ventilation.

Design	The Emergency Operations and Training Facility is a modern, attractive facility that provides for a safe and efficient training environment. Apparatus exit to traffic flow is not safe and effective due to blind areas in the parking lot and west thoroughfare. Parking is not adequate for the use of the facility.
Construction	Classroom/EOC is a Type V construction. The tower and burn building are constructed of steel, rebar, and concrete. The building has 100% central air conditioning.
Safety	The center has adequate space for multiple operations to occur simultaneously in a safe manner. The classroom/EOC building is sprinkled, and has local smoke detection. The center has a security fence, locked gates, no intrusion alarm for the classroom/EOC. Additional fire extinguishers should be installed along with proper storage of flammable/combustibles in boiler room. A standby power generator should be installed and tested under load with the equipment for the EOC operations. A controlled entrance is needed on the fire department side of the facility.
Environment	The EOTF complies with environmental requirements.
Code Compliance	The facility met all fire and life safety code requirements at the time of construction.
Staff Facilities	Provided in the Training campus are 4 department administrative offices and six office cubicles, conference/classroom, and a training library. Cooking and eating areas adequate in kitchen/dayroom. The classrooms EOC provide adequate space for both the students and instructors, as well as adequate space for EOC functions. There is adequate space for training and company drills but inadequate for small equipment, hoses, tools, etc. No sleeping areas are provided. There are 2 restrooms/shower/locker rooms for each gender, but more showers would be preferred as personal hygiene is compromised. There are problems with poor water pressure and hot water temperature control. No workout areas or laundry available. There is an EMS storeroom which is secured.

Apparatus

Other than the firefighters assigned to stations, response vehicles are probably the next most important resource of the emergency response system. If emergency personnel cannot arrive quickly due to unreliable transport, or if the equipment does not function properly, then the delivery of emergency service is likely compromised.

Fire apparatus are unique and expensive pieces of equipment, customized to operate efficiently for a narrowly defined mission. A pumper may be designed such that the compartments fit specific equipment and tools, with virtually every space on the vehicle designed for function. This same vehicle, with its specialized design, cannot be expected to operate in a completely different capacity, such as a hazardous materials unit or as a rescue squad. For this reason, fire apparatus are very expensive and offer little flexibility in use and reassignment. As a result, communities across the country have sought to achieve the longest life span possible for these vehicles.

MFD rents emergency apparatus of varying types and life expectancy from fleet services. The department maintains a front line fleet of 19 engines, six aerial ladder trucks, two rescue units and one command van. Reserve apparatus includes five engines, and four ladder trucks. The apparatus fleet also includes a number of staff and support vehicles. Additionally the department houses numerous pieces of apparatus, trailers, boats and equipment for Minnesota Task Force 1, a State Urban Search and Rescue (USAR) Team. Fleet Services provides maintenance, repair and service to the USAR Team apparatus and equipment.

The following figure provides a summary of the front line apparatus used by MFD in service delivery.

Figure 42: MFD Frontline Apparatus Summary

Apparatus Designation	Type	Year	Make	Condition	Pump (GPM)	Tank (Gal)
Engine 1	Engine	2004	General	Good	2,000	750
Engine 2	Quint	2004	General	Good	2,000	500
Engine 4	Engine	2011	Freightliner	Excellent	1,500	500
Engine 5	Engine	2008	Pierce	Good	2,000	750
Engine 6	Engine	2009	Pierce	Good	2,000	650
Engine 7	Engine	2008	Pierce	Good	2,000	750
Engine 8	Engine	2011	Freightliner	Excellent	1,500	500
Engine 11	Engine	2011	Freightliner	Excellent	1,500	500
Engine 12	Engine	1998	Freightliner	Fair	1,500	500
Engine 14	Engine	2011	Freightliner	Excellent	1,500	500
Engine 15	Engine	2004	General	Good	2,000	500
Engine 16	Engine	2011	Freightliner	Excellent	1,500	500
Engine 17	Engine	2004	Spartan	Excellent	2,000	750
Engine 19	Squirt	2004	Spartan	Good	2,000	750
Engine 20	Quint	2004	General	Good	1,500	500
Engine 21	Engine	2008	Pierce	Good	2,000	750
Engine 22	Engine	1998	Freightliner	Fair	1,500	500
Engine 27	Engine	1998	Freightliner	Fair	1,500	500
Engine 28	Engine	1998	Freightliner	Fair	1,500	500
Ladder 2	Quint	2004	General	Good	2,000	500
Ladder 3	Aerial	2001	Pierce	Fair	N/A	N/A
Ladder 4	Aerial	1998	Sutphen	Fair	1,500	500
Ladder 5	Quint	2004	General	Good	1,000	500
Ladder 10	Aerial	2001	Pierce	Fair	N/A	N/A
Ladder 11	Ladder	2004	Pierce	Good	1,500	300
Rescue 1	Specialty	2000	Pierce	Good	N/A	N/A
Rescue 9	Specialty	2002	Pierce	Fair	N/A	N/A
Mobile Command Van	Specialty	2003	Pierce	Good	N/A	N/A

The front line vehicles are generally in good to excellent condition; no critical issues were identified. The project team was impressed with what was found to be a very high level of cleanliness and organization in all of the department's apparatus — well above what is typically observed. The department uses a committee to assist in developing the specifications and purchasing of new apparatus which places a high priority on the safety of the fire fighters.

Unfortunately, no piece of mechanical equipment can be expected to last forever. As a vehicle ages, repairs tend to become more frequent, parts are more difficult to obtain, and downtime for repair increases. Given the emergency mission that is so critical to the community, downtime is one of the most frequently identified reasons for apparatus replacement.

Because of the expense of fire apparatus, most communities develop replacement plans. To enable such planning, communities often turn to the accepted practice of establishing a life cycle for the apparatus that results in an anticipated replacement date for each vehicle. The communities then set aside incremental funds during the life of the vehicle so cash is available when needed. This decision is influenced by many factors:

- Actual hours of use of any specific piece of equipment can vary significantly in comparison to other similar apparatus, even within the same fire department. Attempts to shuffle like apparatus among busy and slower fire stations to distribute hours of use more evenly have proven difficult. Frequent changes in apparatus create familiarity and training challenges. In addition, certain response areas may have equipment and tool requirements that are not common to others.
- Actual hours of use, even if evenly distributed, do not necessarily equate to intensity of use. For example, a pumper making mostly emergency medical responses will not age as rapidly as a pumper with a high volume of working fire incidents that require intense use of the pump or hydraulics. However, for every hour you idle an engine, it is equivalent to driving 33 to 35 miles of wear and tear. Likewise, road mileage can also be a poor indicator of deterioration and wear.
- Technology, which is increasingly a factor in fire equipment design, becomes outdated even if the apparatus wear is not as significant. In some departments, crews at different fire stations deal with widely different technology on pumpers simply because of the age of the equipment. These differences can be significant, affecting everything from safety and lighting systems to automated digital pump pressure controls and injection foam generation.

NFPA 1901: Standard for Automotive Fire Apparatus is a nationally recognized standard for the design, maintenance, and operation of fire suppression apparatus.[27] The issue of replacement cycles for various types of apparatus has been discussed for many years in the committee that develops the standards. In developing its latest edition, the NFPA Fire Department Apparatus Committee called for a life cycle of 15 years for front-line service and five years in reserve status for engines, and 15 years in front-line service and five years in reserve status for ladder trucks.

Does this mean that a fire engine cannot be effective as a front-line pumper beyond 15 years? A visit at many departments in the United States might prove otherwise. Small, volunteer fire departments with only a hundred or so calls per year often get up to 25 years from a pumper, though the technology is admittedly not up to date. Likewise, busy downtown city fire stations in some urban communities move their engines out of front-line status in as little as eight years.

The reality is that it may be best to establish a life cycle for use in the development of replacement funding for various types of apparatus; yet, apply a different method (such as a maintenance and

[27] NFPA 1901: *Standard for Automotive Fire Apparatus*, 2009 edition.

performance review) for actually determining the replacement date in real life, thereby achieving greater cost efficiency when possible.

Fire service apparatus is expensive albeit vital to an effective and reliable emergency service delivery system. MFD's apparatus replacement schedule is updated annually.

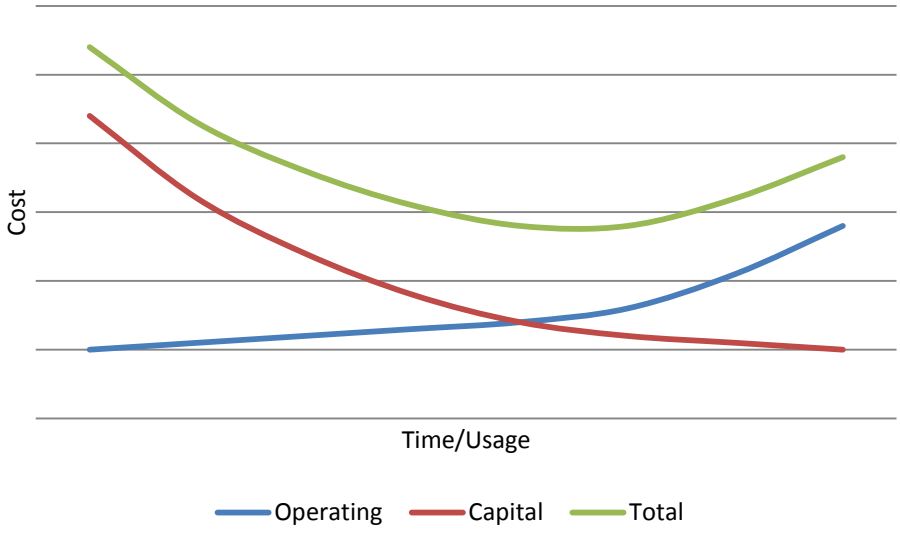
The fleet manager for MFD has a growing concern about the aging of the fleet and the current replacement schedule. As the frontline units are aging, Fleet Services is experiencing higher costs and more down time for repairs and maintenance. The Fleet Services Supervisor recommends that apparatus be replaced at 15-year intervals; 10 years for front line service and serve only 5 in reserve status.

Recommendation:

- Evaluate funding options to maintain 15-year life cycle for MFD apparatus.

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

Figure 43: Economic Theory of Vehicle Replacement



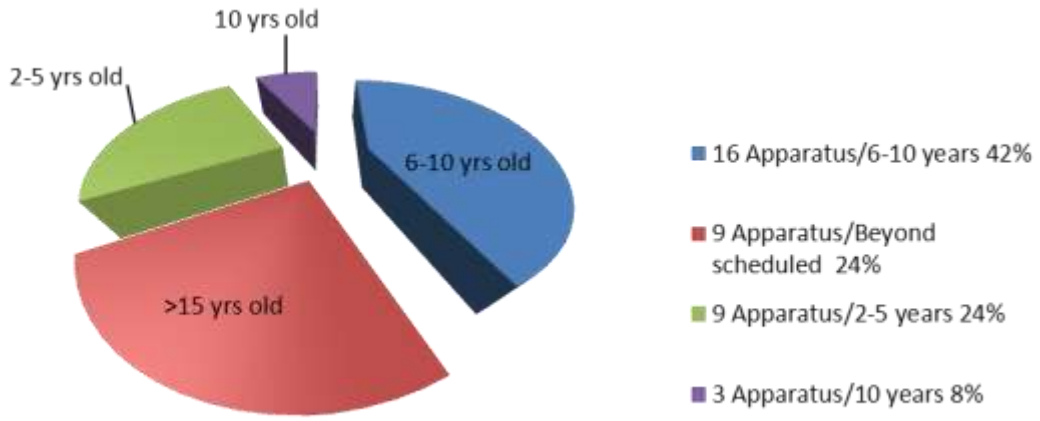
Shortening the replacement cycle to this window allows an apparatus to be replaced at optimal savings to the department. If the agency does not routinely replace equipment in a timely manner, the overall reduction in replacement spending can result in a quick increase of maintenance and repair expenditures.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

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

Regardless of its net effect on current apparatus costs, the deferral of replacement purchases unquestionably increases future replacement spending need.

The goal of Fleet Services is to replace the apparatus every 15 years. However with the current financial situation, Fleet Services has extended the service life of some apparatus. The current status of the fire apparatus is: 24 percent is beyond scheduled replacement; 24 percent need to be replaced in the next 2 -5 years; 42 percent need to be replaced in the next 6 - 10 years and 8 percent will need to be replaced after 10 years.. The following chart shows the replacement schedule on the recommended cycle.

Figure 44: Apparatus Replacement Schedule on 15 year Cycle



To improve the funding for the fleet, the department sought, and was awarded, Community Development Block Grant (CDBG) funding. The department, along with Fleet Services, revised and improved the purchasing process for the replacement of engines. First, the apparatus design and equipment specifications were set based on the functional needs of the firefighters, and standardized so that the equipment can be found in the same place on each and every rig. Next, the engine specifications were identified, so that all of the engines on all of the units are the same, reducing the need to inventory multiple types of routine maintenance parts. MFD worked with Fleet Services to develop a multi-year replacement bidding process and were able to reduce the cost of the 2011 purchases, and lock in prices for the 2012 purchases, which allowed the city to stretch the CBDG dollars further.

The City of Minneapolis has received millions of dollars in grant-funded equipment over the past five to seven years. As all of this equipment reaches the end of its useful life, it will need to be replaced. None of the grants included maintenance or replacement funding. This issue will need to be addressed in the next five to ten years.

Replacement costs include emergency response vehicles, but not capital equipment carried on the vehicles. Capital equipment includes radios, breathing apparatus, hose, appliances, rescue tools, and ground ladders. This equipment is sometimes overlooked in replacement planning. It is advised that both age and condition of the equipment be a consideration of replacement.

A capital equipment replacement schedule should include at a minimum:

- Turnout gear
- Self-Contained Breathing Apparatus
- Hydraulic rescue tools

ESCI recommends that the replacement schedule and costs include capital equipment.

Recommendation:

- Include capital equipment in vehicle replacement cost estimates.

The following provides a more detailed inventory and condition of the MFD fire apparatus.

Engine 1

2004 General SP Engine
Unit #: 71402
Seating Capacity: **6**
Pump Capacity: **2,000**
Tank Capacity: **750**
Condition: **Good**
Mileage: **66,548**

Additional Comments or Observations: **Located at Station 1**

Mobile Command Van

2003 Pierce Enforcer Mobile Command Unit
Unit #: 72524
Seating Capacity: **7**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **6,076**

Additional Comments or Observations: **Located at Station 1**

Photo Unavailable

Mobile Command Van

2004 Chevrolet Tahoe SUV
Unit #: 72377
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **75,350**

Additional Comments or Observations: **Located at Station 1**

Duty Deputy

2008 Chevrolet Suburban 4WD SUV
Unit #: 72387
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Excellent**
Mileage: **22,543**

Additional Comments or Observations: **Located at Station 1**

Engine 2

2004 General SP Quint
Unit #: 71804
Seating Capacity: **6**
Pump Capacity: **2,000**
Tank Capacity: **500**
Condition: **Good**
Mileage: **61,912**

Additional Comments or Observations: **Located at Station 2**

Battalion Chief 4

2010 Chevrolet Tahoe Spec S SUV
Unit #: 72397
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/a**
Condition: **Excellent**
Mileage: **15,211**

Additional Comments or Observations: **Located at Station 2**

Rescue Boat-1 & 2 USAR Equipment

2008 Connector BO Boat
Unit #: 72549, 72550
Seating Capacity: **3**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **N/A**

Additional Comments or Observations: **Located at Station 2**

Engine 4

2011 Freightliner M2 112 Engine
Unit #: 71412
Seating Capacity: **4**
Pump Capacity: **1,500**
Tank Capacity: **500**
Condition: **New**
Mileage: **3,500**

Additional Comments or Observations: **Located at Station 4**

Ladder 4

1998 Sutphen TS95 Aerial Aerial
Unit #: 71340
Seating Capacity: **4**
Pump Capacity: **1,500**
Tank Capacity: **500**
Condition: **Fair**
Mileage: **16,293**

Additional Comments or Observations: **Located at Station 4**

Boat 4

1999 Armstrong Cuddy Cabin Boat
Unit #: 72711
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **N/A**

Additional Comments or Observations: **Located at Station 4**

Boat 4 Tow Vehicle

2004 Ford F350 Super-cab Pick up Truck
Unit #: 72374
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Fair**
Mileage: **6,640**

Additional Comments or Observations: **Located at Station 4**

Engine 5

2008 Piercce Arrow XT Engine
Unit #: 71407
Seating Capacity: **6**
Pump Capacity: **2,000**
Tank Capacity: **750**
Condition: **Good**
Mileage: **32,008**

Additional Comments or Observations: **Located at Station 5**

Salvage

2003 Sterling L9500 Air Bottles/Filling Station
Unit #: 72525
Seating Capacity: **2**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **99,879**

Additional Comments or Observations: **Located at Station 5**

Engine 6

2009 Pierce Arrow XT Engine
Unit #: 71409
Seating Capacity: **6**
Pump Capacity: **2,000**
Tank Capacity: **650**
Condition: **Good**
Mileage: **24,553**

Additional Comments or Observations: **Located at Station 6**

Ladder 11

2004 Pierce Dash Platform Ladder
Unit #: 71301
Seating Capacity: **6**
Pump Capacity: **1,500**
Tank Capacity: **300**
Condition: **Good**
Mileage: **58,527**

Additional Comments or Observations: **Located at Station 6**

Board Up Truck

1997 Ford F350 2 WD Pickup
Unit #: 72382
Seating Capacity: **2**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Poor**
Mileage: **64,121**

Additional Comments or Observations: **Located at Station 6**

Battalion Chief 1

2010 Chevrolet Tahoe Spec SUV
Unit #: 72394
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Excellent**
Mileage: **11,372**

Additional Comments or Observations: **Located at Station 6**

Rescue 1

2000 Pierce Lance 7000 Specialty
Unit #: 72522
Seating Capacity: **8**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **84,088**

Additional Comments or Observations: **Located at Station 6**

Engine 7

2008 Pierce Arrow XT Engine
Unit #: 71408
Seating Capacity: **6**
Pump Capacity: **2,000**
Tank Capacity: **750**
Condition: **Good**
Mileage: **37,021**

Additional Comments or Observations: **Located at Station 7**

Ladder 3

2001 Pierce Dash 2000 Aerial
Unit #: 71011
Seating Capacity: **5**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Fair**
Mileage: **81,809**

Additional Comments or Observations: **Located at Station 7**

Photo Unavailable

Battalion Chief 3

2010 Chevrolet Tahoe Spec SUV
Unit #: 72396
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Excellent**
Mileage: **14,485**

Additional Comments or Observations: **Located at Station 7**

Engine 8

2011 Freightliner General Engine
Unit #: 71411
Seating Capacity: **4**
Pump Capacity: **1,500**
Tank Capacity: **500**
Condition: **Excellent**
Mileage: **3,500**

Additional Comments or Observations: **Located at Station 8**

Battalion Chief 2

2010 Chevrolet Tahoe Spec SUV
Unit #: 72395
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Excellent**
Mileage: **14,120**

Additional Comments or Observations: **Located at Station 8**

Photo Unavailable

USAR Unit #3 Truck

1990 IHC Pirsch Tow Vehicle
Unit #: 71020
Seating Capacity: **3**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Poor**
Mileage: **101,715**

Additional Comments or Observations: **Located at Station 8**

Photo Unavailable

USAR Unit #3 Trailer

2002 Mickey AT-A Trailer
Unit #: 72533
Seating Capacity: **0**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Fair**
Mileage: **N/A**

Additional Comments or Observations: **Located at Station 8**

Engine 11

2011 Freightliner General Engine
Unit #: 71405
Seating Capacity: **6**
Pump Capacity: **1,500**
Tank Capacity: **500**
Condition: **Excellent**
Mileage: **77,952**

Additional Comments or Observations: **Located at Station 11-Need New Picture**

Rescue 9

2002 Pierce Lance Specialty
Unit #: 72523
Seating Capacity: **8**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Fair**
Mileage: **45,333**

Additional Comments or Observations: **Located at Station 11**

Mobile Lab

2006 IHC 4400 Specialty
Unit #: 72536
Seating Capacity: **2**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **2,025**

Additional Comments or Observations: **Located at Station 11**

Photo Unavailable

Engine 12

1998 Freightliner FL106 E
Unit #: 71430
Seating Capacity: **6**
Pump Capacity: **1,500**
Tank Capacity: **500**
Condition: **Fair**
Mileage: **131,166**

Additional Comments or Observations: **Located at Station 12**

Boat 12

1969 Alumacraft Boat
Unit #: 72710
Seating Capacity: **3**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Poor**
Mileage: **N/A**

Additional Comments or Observations: **Located at Station 12**

Boat 12 Tow Vehicle

1999 Ford Explorer SUV
Unit #: 72361
Seating Capacity: **3**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Poor**
Mileage: **105,414**

Additional Comments or Observations: **Located at Station 12**

Engine 14

2011 Freightliner M2 112 Engine
Unit #: 71413
Seating Capacity: **4**
Pump Capacity: **1,500**
Tank Capacity: **500**
Condition: **Excellent**
Mileage: **3,500**

Additional Comments or Observations: **Located at Station 14**

Ladder 10

2001 Pierce Lance 2000 Aerial
Unit #: 71012
Seating Capacity: **5**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Fair**
Mileage: **64,762**

Additional Comments or Observations: **Located at Station 14**

USAR Unit #1

2005 Freightliner MZ Tow Vehicle
Unit #: 72526
Seating Capacity: **2**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **2,674**

Additional Comments or Observations: **Located at Station 14**

USAR Unit #1 Trailer

2005 JP Trailer 48316GRUT162 Trailer
Unit #: 72537
Seating Capacity: **0**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **N/A**

Additional Comments or Observations: **Located at Station 14**

Engine 15

2004 General SP Engine/Quint
Unit #: 71801
Seating Capacity: **6**
Pump Capacity: **2,000**
Tank Capacity: **500**
Condition: **Good**
Mileage: **56,912**

Additional Comments or Observations: **Located at Station 15**

Engine 16

2011 Freightliner General Engine
Unit #: 71405
Seating Capacity: **6**
Pump Capacity: **1,500**
Tank Capacity: **500**
Condition: **Excellent**
Mileage: **77,952**

Spare-Engine 16

1999 Freightliner FL106 Engine
Unit #: 71480
Seating Capacity: **4**
Pump Capacity: **1,500**
Tank Capacity: **500**
Condition: **Fair**
Mileage: **98,734**

Additional Comments or Observations: **Located at Station 16**

Engine 17

2011 Freightliner General Engine
Unit #: 71405
Seating Capacity: **6**
Pump Capacity: **1,500**
Tank Capacity: **500**
Condition: **Excellent**
Mileage: **77,952**

Additional Comments or Observations: **Located at Station 17**

Ladder 5

2004 General SP Ladder/Quint
Unit #: 71803
Seating Capacity: **6**
Pump Capacity: **1,000**
Tank Capacity: **500**
Condition: **Good**
Mileage: **52,140**

Additional Comments or Observations: **Located at Station 17**

Engine 19

2008 Pierce Arrow XT Engine
Unit #: 71408
Seating Capacity: **6**
Pump Capacity: **2,000**
Tank Capacity: **750**
Condition: **Good**
Mileage: **37,021**

Additional Comments or Observations: **Located at Station 19**

Decon 24'

2003 Wells Cargo EW2425 Trailer
Unit #: 72023
Seating Capacity: **0**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Fair**
Mileage: **N/A**

Additional Comments or Observations: **Located at Station 19**

Decon 50'

2003 Wells Cargo CVG5039 Trailer
Unit #: 72024
Seating Capacity: **0**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Fair**
Mileage: **N/A**

Additional Comments or Observations: **Located at Station 19**

Decon Tow for 24'

1976 IHC 1700 Flatbed
Unit #: 72500
Seating Capacity: **2**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Very Poor**
Mileage: **27,633**

Additional Comments or Observations: **Located at Station 19 Miles may have turned over possibly twice**

Decon Tow for 50'

1990 IHC Pirsch 2674 Tractor
Unit #: 71030
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Poor**
Mileage: **80,520**

Additional Comments or Observations: **Located at Station 19**

10-81 Engineering Officer 8 hrs

2007 Chevrolet Tahoe SUV
Unit #: 72385
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **45,294**

Additional Comments or Observations: **Located at Station 19**

Engine 20

2004 General SP Quint
Unit #: 71805
Seating Capacity: **6**
Pump Capacity: **1,500**
Tank Capacity: **500**
Condition: **Good**
Mileage: **52,539**

Additional Comments or Observations: **Located at Station 20**

USAR Unit #2 30'

2005 Hackney Trailer
Unit #: 72528
Seating Capacity: **0**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **N/A**

Additional Comments or Observations: **Located at Station 20**

USAR Unit #2 Tow

2005 Spartan Tow
Unit #: 72527
Seating Capacity: **2**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **4,160**

Additional Comments or Observations: **Located at Station 20**

Engine 21

2008 Pierce Arrow XT Engine
Unit #: 71408
Seating Capacity: **6**
Pump Capacity: **2,000**
Tank Capacity: **750**
Condition: **Good**
Mileage: **37,021**

Additional Comments or Observations: **Located at Station 21**

Ladder 2

2004 General SP Ladder
Unit #: 71802
Seating Capacity: **4**
Pump Capacity: **2,000**
Tank Capacity: **500**
Condition: **Good**
Mileage: **56,610**

Additional Comments or Observations: **Located at Station 21**

Boat 21

2005 American Air Ranger Air Boat
Unit #: 72713
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **277**

Additional Comments or Observations: **Located at Station 21**

Boat 21 Tow

2006 Ford F250 Crew Cab Airboat Tow
Unit #: 72383
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **2,060**

Additional Comments or Observations: **Located at Station 21**

Engine 22

1998 Freightliner FL106 Engine
Unit #: 71450
Seating Capacity: **4**
Pump Capacity: **1,500**
Tank Capacity: **500**
Condition: **Fair**
Mileage: **114,832**

Additional Comments or Observations: **Located at Station 22**

Boat 22

2005 Crestliner 1600 Angler 16' Boat
Unit #: 72529
Seating Capacity: **3**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **N/A**

Additional Comments or Observations: **Located at Station 22**

Boat 22 Tow

1999 Ford Expedition SUV
Unit #: 72363
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Fair**
Mileage: **87,563**

Additional Comments or Observations: **Located at Station 22**

10-50 Arson Investigator

2007 Chevrolet Tahoe LS SPE SUV
Unit #: 72384
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **53,341**

Additional Comments or Observations: **Located at Station 22**

Engine 27

1998 Freightliner 106 Engine
Unit #: 71440
Seating Capacity: **4**
Pump Capacity: **1,500**
Tank Capacity: **500**
Condition: **Fair**
Mileage: **124,052**

Additional Comments or Observations: **Located at Station 27**

MCI Van

1995 Spartan Motor Home Bus
Unit #: 72551
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Fair**
Mileage: **82,216**

Additional Comments or Observations: **Located at Station 27 Miles may have turned over possibly twice**

Engine 28

1998 Freightliner FL106 Engine
Unit #: 71460
Seating Capacity: **4**
Pump Capacity: **1,500**
Tank Capacity: **500**
Condition: **Fair**
Mileage: **101,143**

Additional Comments or Observations: **Located at Station 28**

Bus

1981 IHC Bus
Unit #: 72610
Seating Capacity: **30**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Very Poor**
Mileage: **25,037**

Additional Comments or Observations: **Located at Station 28**

Spare Ladder 14

1995 IHC Pirsch Ladder Truck
Unit #: 71050
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Poor**
Mileage: **46,012**

Additional Comments or Observations: **Located at MFD Repair Shop**

Spare Engine 7

1992 Ford LS9000 Engine
Unit #: 71570
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Poor**
Mileage: **147,122**

Additional Comments or Observations: **Located at MFD Repair Shop**

Spare Engine 20

1988 IHC f2674 Engine
Unit #: 71520
Seating Capacity: **4**
Pump Capacity: **1,500**
Tank Capacity: **500**
Condition: **Poor**
Mileage: **171,610**

Additional Comments or Observations: **Located at MFD Repair Shop**

Spare Engine 28

1992 Ford LS9000 Engine
Unit #: 71550
Seating Capacity**: 4**
Pump Capacity: **1,500**
Tank Capacity: **500**
Condition: **Poor**
Mileage: **118,650**

Additional Comments or Observations: **Located at MFD Repair Shop**

Photo Unavailable

Spare Ladder 8

1998 Sutphen TS 100 Ladder
Unit #: 71330
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Poor**
Mileage: **106,563**

Additional Comments or Observations: **Located at MFD Repair Shop does not have a pump or tank**

Spare BC (Royalston)

2005 GMC Yukon SUV
Unit #: 72381
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Fair**
Mileage: **54,063**

Additional Comments or Observations: ***Located at*** **MFD Repair Shop; this is an old BC's vehicle**

Stores

2004 Chevrolet Tahoe SUV
Unit #: 72375
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Fair**
Mileage: **130,714**

Additional Comments or Observations: **Located at MFD Repair Shop**

Photo Unavailable

Plow Truck

2002 Ford F350 Crew Cab Pickup
Unit #: 72373
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Fair**
Mileage: **63,763**

Additional Comments or Observations: **Located at Training Tower**

Spare BC

2004 Chevrolet Tahoe SUV
Unit #: 72378
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Fair**
Mileage: **63,142**

Additional Comments or Observations: **Located at Training Tower**

Training

2000 Ford Expedition XLT SUV
Unit #: 72367
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Poor**
Mileage: **87,280**

Additional Comments or Observations: **Located at Training Tower**

Deputy Chief of EMS

Photo Unavailable

2008 Chevrolet Suburban SUV
Unit #: 72388
Seating Capacity: **5**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **39,999**

Additional Comments or Observations: **Located at Training Tower, Pending assignment**

EMS Staff

2001 Chevrolet Malibu Vehicle
Unit #: 72647
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Poor**
Mileage: **40,162**

Additional Comments or Observations: **Located at Training Tower**

USAR Unit #4 MNTF1

2005 Crystal WE JP Trailer
Unit #: 72667
Seating Capacity: **0**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Fair**
Mileage: **N/A**

Additional Comments or Observations: **Located at Training Tower USAR**

USAR Unit #4 Tow Vehicle

1997 Freightliner FL 70 Tow
Unit #: 72532
Seating Capacity: **2**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **136**

Additional Comments or Observations: **Located at Training Tower USAR Miles may have turned over once**

Engine (old E8)

2004 General SP Engine
Unit #: 7
Seating Capacity: **4**
Pump Capacity: **2,000**
Tank Capacity: **750**
Condition: **Good**
Mileage: **79,787**

Additional Comments or Observations: **Replacement rigs for active companies to be determined**

Engine (old E14)

2004 General SP Engine
Unit #:
Seating Capacity: **4**
Pump Capacity: **2,000**
Tank Capacity: **750**
Condition: **Good**
Mileage: **81,946**

Additional Comments or Observations: **Replacement rigs for active companies to be determined**

Engine (old E4)

2004 General SP Engine
Unit #:
Seating Capacity: **4**
Pump Capacity: **2,000**
Tank Capacity: **750**
Condition: **Good**
Mileage: **69,480**

Additional Comments or Observations: **Replacement rigs for active companies to be determined**

10-1 Chief

2010 Ford Explorer XLT SUV
Unit #: 72393
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Excellent**
Mileage: **13,971**

Additional Comments or Observations: **Administrative Staff Take Home Vehicles**

10-2 Asst Chief

2008 Chevrolet Tahoe Spec S SUV
Unit #: 72367
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **44,930**

Additional Comments or Observations: **Administrative Staff Take Home Vehicles**

10-3 Asst Chief

2008 Ford Explorer XLT SUV
Unit #: 72399
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Poor**
Mileage: **54,484**

Additional Comments or Observations: **Administrative Staff Take Home Vehicles**

IT Staff Captain

2008 Ford Escape Hybrid SUV
Unit #: 72389
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Fair**
Mileage: **41,822**

Additional Comments or Observations: **Administrative Staff Take Home Vehicles**

USAR Unit #5

1976 Ford LT9000 Pirsch
Unit #: 71090
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Dead**
Mileage: **79,875**

Additional Comments or Observations: **Located at Training Tower/dead**

Photo Unavailable

Spare Ladder 12

1996 SUTPHEN 3074F Hale Ladder Truck
Unit #:71320
Seating Capacity: **4**
Pump Capacity: **1500**
Tank Capacity: **500**
Condition: **Poor**
Mileage: **84,507**

Additional Comments or Observations: **Located at Station 10 or 12**

Spare Engine 16

1992 Ford LS 9000 Engine
Unit #: 71560
Seating Capacity: **4**
Pump Capacity: **1,500**
Tank Capacity: **500**
Condition: **Dead**
Mileage: **163,523**

Additional Comments or Observations: **Located at Training Tower/Out of Service**

Training

2005 GMC Yukon SUV
Unit #: 72392
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Fair**
Mileage: **80,247**

Additional Comments or Observations: **Located at Training Tower**

Admin Staff

2008 Ford Escape XLT Vehicle
Unit #: 72398
Seating Capacity: **4**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **37,772**

Additional Comments or Observations: **Administrative Staff/Parked at Station 17**

Photo Unavailable

Fuel Truck

1984 Ford T8000 Tanker Truck
Unit #: 72521
Seating Capacity: **2**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Fair**
Mileage: **142,635**

Additional Comments or Observations: **Located at Currie Shop- To be removed from service in 2012**

Photo Unavailable

MNTF1

2004 Polaris Ranger 4 wheeler
Unit #: 72538
Seating Capacity: **2**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **3H**

Additional Comments or Observations: **Located at Training Tower**

Photo Unavailable

USAR Unit #6

1999 IHC 4900 Tow Vehicle
Unit #:72546
Seating Capacity: **2**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **102,239**

Additional Comments or Observations: **Located at Training Tower**

USAR Unit #6

1993 Kent Moving Van T Trailer
Unit #: 72547
Seating Capacity: **0**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Dead**
Mileage:

Additional Comments or Observations: **Located at Trainnig Tower/dead**

Trailer EMS

2008 Haul Rite Rescue One Trailer
Unit #: 72548
Seating Capacity:
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: 0

Additional Comments or Observations: **Located at Station 14**

Training

2001 Bobcat 773 Bobcat
Unit #: 72552
Seating Capacity: **1**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Good**
Mileage: **8,595 H**

Additional Comments or Observations: **Located at Training Tower**

Mechanics Van

1987 GMC TP31442 Utility Truck
Unit #: 72591
Seating Capacity: **1**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition: **Poor**
Mileage: **35,580**

Additional Comments or Observations: **Located at Currie Shop**

Photo Unavailable	**Staff** ***1999 Chevrolet Malibu LS Vehicle*** Unit #: 72657 Seating Capacity: **4** Pump Capacity: **N/A** Tank Capacity: **N/A** Condition: **Good** Mileage: **28,063**

Additional Comments or Observations: **Spare Staff Vehicle/Parked at Royalston Shop**

Airboat Trailer

2005 American AirBoat Trailer
Unit #: 72714
Seating Capacity: **0**
Pump Capacity: **N/A**
Tank Capacity: **N/A**
Condition:
Mileage:

Additional Comments or Observations: **Located at Fire Station 21, under Air Boat**

Other Capital Assets

Support and Small Equipment

Small equipment can be a significant part of a fire department's annual budget. It can be expensive to acquire and maintain and may have a limited technological life. ESCI surveyed a sampling of MFD small equipment and found most equipment to be in good condition. The small equipment inspected includes:

- Self-contained breathing apparatus
- Small tools
- PPV (positive pressure ventilation fans)
- Computers
- Radios
- Breathing air compressors
- Hydraulic rescue tools
- Rescue tools
- Power saws

Maintenance and repair of small equipment and tools are handled both in-house by the fire departments "stores" and the radio shop - both which have certified technicians to work on the equipment. Also the fire department personnel and private sector vendors provide maintenance, service and repair.

Apparatus Maintenance

Vehicle maintenance is provided by Fleet Services and is the responsibility of the Fleet Services Supervisor. Most work is accomplished in-house, with warranty and specialty work outsourced to private sector vendors. The City designed and built the maintenance facility in 2000. The facility was designed specifically for the existing needs and to service heavy equipment and the apparatus of MFD. Following are the components of the PM (Preventive Maintenance) schedule:

- Fire station personnel manually provide updated apparatus mileage information every time they fuel the apparatus/vehicles. Fleet Services utilizes the same database to verify and "cross check" the information and help schedule service.
- The fleet manager reviews mileage/hour report and pending work orders to schedule weekly maintenance.
- The maintenance schedule is based on mileage/hours, pending work orders, manufacturer recommendations, *NFPA 1901*[28], or other recognized sources.
- Staff vehicles are serviced every 3 - 4 months (about 2,500 miles) or upon receipt of work orders. One of the annual services includes a DOT CMV Inspection.

The Fleet Services Division uses activity-based costing to bill MFD for use of apparatus and vehicles. This method establishes a fleet rental rate that covers the replacement cost of the apparatus/vehicles after the useful life. Maintenance, repairs and fuel costs of the fleet are charged separately. These charges are billed at a rate that allows the Fleet Services Division to match revenue to expense.

The Fire Department's 2010 - 2014 Business Plan contains a fire apparatus replacement schedule. The schedule was developed in conjunction with the Fleet Services Division of the Public Works department and also contains improvements to the purchasing process to maximize efficiency and reduce costs as previously discussed. Six new fire engines are scheduled to arrive by the end of 2012, and plans are underway for the purchase of a new aerial Ladder Truck in 2014.

ESCI found that maintenance of apparatus is a high priority for MFD. Equipment and apparatus appear to be kept in good working order and condition.

[28] *NFPA 1901: Standard for Automotive Fire Apparatus*, 2009 Edition.

Pump, Hose, and Ladders

Pump and hose testing are two important processes that need to be performed and documented annually. The purpose of testing the fire hose is to have a reasonable assurance of firefighter safety and that the hose and couplings will work as designed. The life expectancy of a section of fire hose is often determined by the care it receives. Hose is susceptible to mechanical injury, heat and fire damage, mold and mildew, and damage due to chemical contact and excessive pressure. Inspection, care, and maintenance should apply to all appliances, nozzles, and small tools.

An inventory of all fire hoses should be maintained, along with a history of each section of hose. MFD's recordkeeping and hose-testing program meet all requirements of *NFPA 1961: Standard on Fire Hose,* 2007 Edition. Annual hose testing is assigned to the operational personnel at fire stations.

Fire pumps are one of the most important and expensive parts of any fire apparatus. The care and routine check of a fire pump is a necessity and should be completed by personnel on a regular schedule. Fire pumps are tested annually by Fleet Services. Records are maintained in electronic format in the department's RMS.

Aerial ladders are tested annually by a third party - American Test Center.

Personal Protective Equipment (PPE) Maintenance

Statistical data has shown that buildup of contaminants on turnout gear has a direct impact on the health and safety of firefighting personnel. Firefighters who are exposed to contaminated PPE (turnouts) have a much higher risk of disease. The health and safety risks associated with contaminated turnout gear are addressed in *NFPA 1500, 1851,* and *1971*. Standards require that protective clothing be cleaned at least once every six months. While this standard may seem excessive, ESCI has found that regular cleaning and maintenance will extend the life expectancy of turnout gear. Proper care enables fire departments to lengthen the replacement cycle of PPE.

MFD has made provisions for regular cleaning of firefighting PPE. All fire stations have both residential washer/dryers and stations 6, 11, 14 and the department's "*stores"* facility have commercial extractor machines. Commercial extractors are the only units approved for cleaning PPE when used in conjunction with approved cleaning solutions. Turnout drying and storage areas are provided in each fire station. A consistent problem is turnout gear being stored in the apparatus bay or in an adjacent room with no doors and/or ventilation.

Recommendations:

- Store active PPE (turnout gear) in a separate, ventilated room rather than on the apparatus floor where it is exposed to vehicle exhaust.
- Complete development of the AMP (asset management plan).

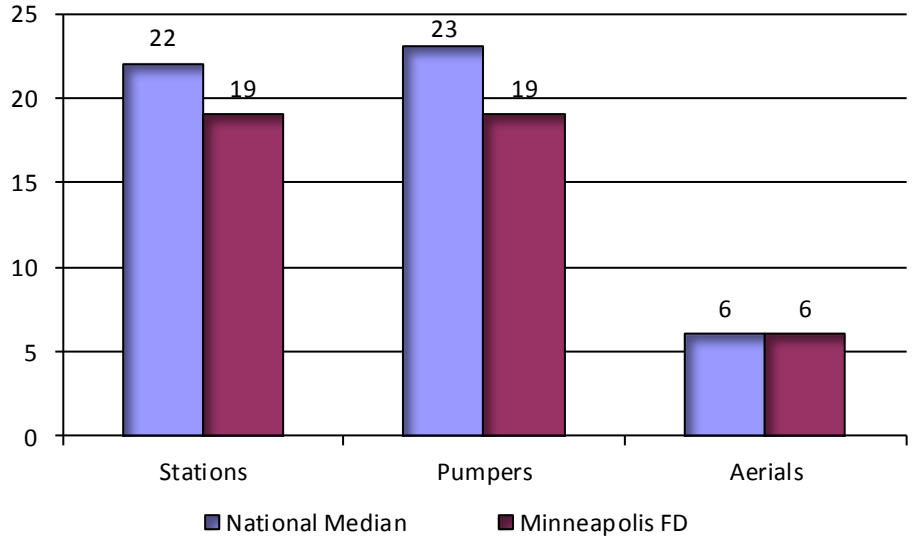
ESCI recommends that MFD consider aggregating like multiple equipment which is purchased in quantity with a total value of over $5,000. Examples include firefighter PPE and SCBA. Establishing these items as a capital asset and contributing to an annual replacement fund is appropriate. While a single set of firefighter's PPE is approximately $2,000, acquiring ten complete sets would exceed $20,000. It is understood that funding would need to follow the normal budget process, but anticipating the purchase requirement is prudent.

Recommendation:

- Aggregate like item equipment purchases with a total value of $5,000 or more and include in the department's asset management plan.

Based on the amount of physical resources currently in place within MFD, the department has three fewer stations and four fewer engines than the National Median, as illustrated in the following figure.

Figure 45: Comparison of Physical Resources



Capital Improvement Programs

The City has a five-year capital improvement plan (CIP). Annually, City departments and independent boards and commissions prepare new and/or modify existing capital improvement proposals. The Finance Department, Community Planning & Economic Development Department (CPED) and the Capital Long-Range Improvement Committee (CLIC) review the capital improvement proposals (CLIC is a citizen advisory committee to the Mayor and City Council). Departments and boards formally present their needs and offer explanations for their requests before CLIC. Proposals are rated using a rating system with three specific criteria – project priority, contributions to city goals and operating cost implications, and qualitative criteria. A numerical ranking is created for each project. Highest-ranking priorities are then balanced against available resources by year to arrive at a cohesive five-year capital improvements program recommendation to the Mayor and City Council. CLIC's recommendations serve as the basis from which the Mayor and City Council's decisions are made. The Mayor makes recommendations on the capital budget as well as the operating budget. The Council adopts the five-year capital plan simultaneously with the operating budget.

A CIP has a significant effect on the image and operation of a city and its capital assets. Policies should be designed to help ensure that current and future assets/projects are maintained at a high level and that capital projects do not restrict the city's financial ability to provide basic services. A city must preserve its current physical asset inventory and plan in an orderly manner for future capital investments, including the operating costs associated with those projects.

The fire department actively participates in the development of the City of Minneapolis CIP. An internal plan for the maintenance of facilities, apparatus, and capital equipment is considered appropriate and prudent.

MFD currently has an equipment, space and facilities plan as part of the Department 2010 - 2014 Business Plan. Construction of a new fire station is a part of the City's current five-year CIP and the Department will be proposing two additional stations for future consideration.

In a recent White Paper produced by the Fire Apparatus Manufacturer's Association, the authors surveyed 1,200 fire chiefs from across the country in regard to apparatus condition and usage in an attempt to identify optimum usage and replacement criteria. Of those who responded to the survey, 30 percent were career organizations and 82 percent were serving populations less than 50,000. Of the total, 25 percent identified themselves as urban while 46 percent identified themselves as suburban and

48 percent identified themselves as rural. For purposes of comparison, the suburban statistics were used here. The information in the figures below is an excerpt from that report, specifically focusing on career departments.[29]

Figure 46: Average Apparatus per Department by Type

Apparatus Type	Average
Pumper/Engine	5.8
Aerial	1.5
Rescue	2.5

Figure 47: Estimated Life Expectancy (Active Service)

Apparatus Type	Average
Pumper/Engine	16
Aerial	19
Rescue	15

Figure 48: Estimated Life Expectancy (Reserve Service)

Apparatus Type	Average
Pumper/Engine	11
Aerial	10
Rescue	7

Figure 49: Estimated Total Service Life (Rural Department)

Apparatus Type	Average
Pumper/Engine	27
Aerial	29
Rescue	22

This information corresponds to call volumes as indicated in the figure below. Call volume significantly below the noted averages would tend to lengthen the average service life of all vehicles.

[29] Lackore, Roger. *Fire Apparatus Duty Cycle White Paper*, Fire Apparatus Manufacturer's Association, Technical Committee. August 10, 2004.

Figure 50: Average Annual Call Volume

Apparatus Type	Average
Pumper/Engine	780
Aerial	520
Rescue	832

The information provided is intended to illustrate national trends and is in no way presented here as a standard to equipment replacement. When considering replacement of capital equipment, organizations must bear in mind the typical vehicle usage, climate factors that may shorten life expectancy and overall maintenance issues that tend to increase as vehicles age. An example capital replacement plan will be provided in Phase III of this project that covers future service delivery and planning efforts.

Service Delivery Performance

The delivery of fire suppression and rescue services requires efficient notification of an emergency, rapid response from well-located facilities using 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 MFD.

Alarm Systems, Communications Infrastructure and Dispatch Capabilities and Methods

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.

Dispatch Management

MFD is provided communications and dispatch services through the Minneapolis Emergency Communications Center (ECC), an independent department within the organizational structure of the City of Minneapolis. The dispatch center is the primary Public Safety Answering Point (PSAP) for the entire City. This center functions as the dispatch point for all police, fire and EMS calls within Minneapolis, as well as after-hours calls for a number of non-emergency agencies.

The ECC is managed by a 911 Supervisor, who reports to the City Coordinator. There are approximately 80 personnel employed by the ECC and the center maintains two fire dispatch personnel on duty 24 hours per day, as well as five to seven call-taker positions that handle fire, EMS and law enforcement calls as well as non-emergency calls.

Dispatch Workload

The center handled approximately 360,000 incoming calls in 2011, or a daily average of approximately 1,000. This includes all fire, police and ambulance calls; emergency and non-emergency alike. Statistics or raw data was not provided to conduct an independent analysis of dispatch workload.

The City will need to closely monitor the performance of the ECC to ensure that non-emergency ancillary functions do not interfere with critical tasks related to public safety dispatching. In particular, QA personnel should closely monitor emergency telephone ring times (ring to answer) and call processing times (answer to dispatch) by hour of day to determine if there are trends that correlate to the workload created by incoming administrative calls. The City may also wish to consider a professional staffing audit for the ECC to more specifically calculate necessary staffing levels for optimum efficiency.

Dispatch Processes

There are 28 incoming 9-1-1 telephone trunk landlines and additional lines for wireless carriers. The center's system is compliant with Phase Two cellular location identification.

Formal call answering time standards have been adopted. As stated earlier, quality assurance is being conducted by a Communications Supervisor and compliance reports are issued monthly. The center is in the process of fully implementing the Pro-QA™ software quality assurance module to further improve performance analysis.

Computer-aided dispatch software is available to the fire dispatcher. Call processing and dispatch is handled quickly, with automated processes that take place in order to identify the correct unit or stations to dispatch. The CAD system is manufactured by OSSI™ and is a geo-based system running on a Windows™-based server. The system relies on geographic information maintained by the City geographical information system (GIS) department and updated regularly. The geospatial information available to the dispatcher includes hydrant locations, special hazard locations and can integrate with vehicle location through GPS when this function is operating correctly.

Notification of companies takes place by *specific unit dispatch*, with programmed assignment of specific apparatus quantities and types. Apparatus availability for the department is tracked automatically by the CAD system and back-up assignments are determined with assistance from the CAD software. Computer tracking of dispatch, arrival and control times is available and tracked by CAD as well.

Although the CAD is capable of integrating mutual aid resources in the back-up alarm assignment, it is currently programmed with only city apparatus assignments. There is a quantity of back-up alarm recommendations sufficient to deplete all city fire resources. After that, dispatchers would contact a Deputy Chief or would manually determine what to dispatch next. At this time, no mutual aid units from surrounding agencies have been programmed into the routine back-up response recommendation layers for any types of calls. The complete exhaustion of the City's fire and EMS resources prior to any use of mutual aid is unwise and could result in extremely long response times during periods of heavy demand or concurrent calls. Further analysis of resource drawdown should be used to implement reasonable mutual aid programming in the back-up layers in order to optimize service delivery through cooperation with neighboring agencies.

The system has also not been programmed for variation in response assignment based on the presence, or lack thereof, of pressurized hydrants. Consideration should be given to increasing the initial apparatus assignment to structure fire incidents where insufficient municipal water supplies are a known issue, thus averting an initial attack without sufficient supply to support the gallon per minute flow.

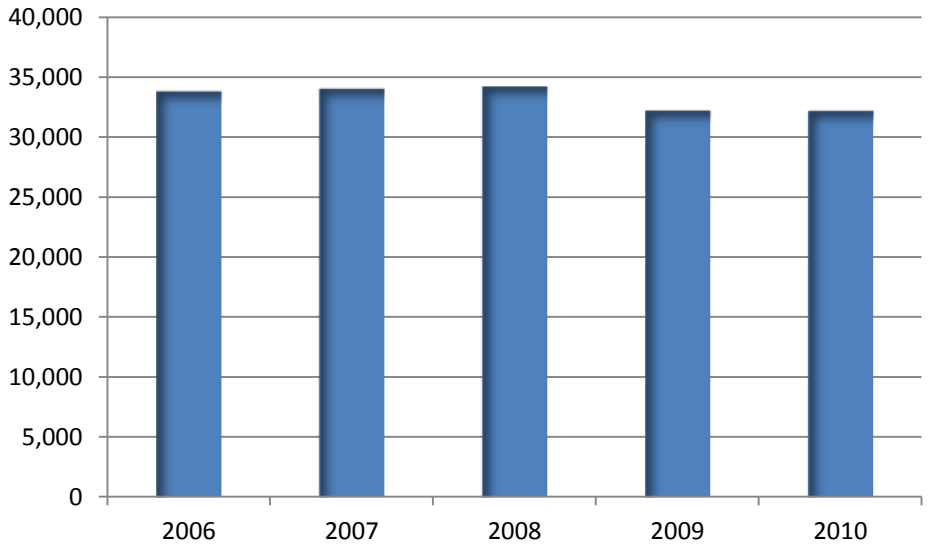
The dispatch center has adequate contingency plans for system failure. Back-up power is in place with spare consoles available. Evacuation and transfer drills should be conducted at least annually to train dispatchers for emergency relocation and other system failure procedures. The center has adequate security, with electronic swipe cards for staff and required visual recognition for visitors prior to entry.

Service Demand

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

MFD provided access to its detailed Emergency Reporting System and Computer Aided Dispatch (CAD) records for call data between January 1, 2008 and December 31, 2010, as well as partial year data for 2011 through July 30. In addition, the department provided National Fire Incident Reporting System (NFIRS) data for the period covering January 1, 2006 through December 31, 2010. The following details the volume of calls by type over the 2006 - 2010 period for full-year evaluation.

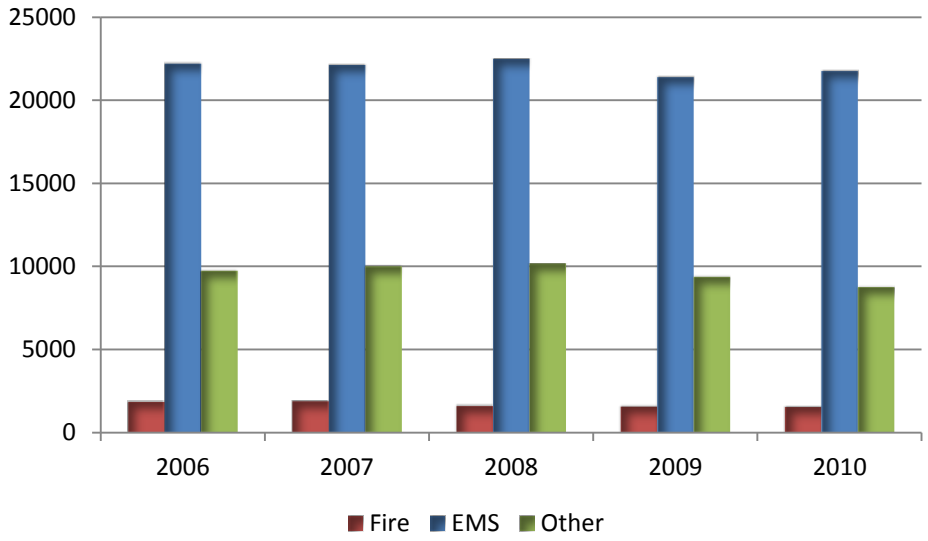
Figure 51: Workload Historical Data



It should be noted that the number of incidents in all major categories have been somewhat inconsistent during the period. Currently calls for medical assistance make up the majority of service demand. This is not unusual for fire departments that provide either first responder or ambulance transport services.

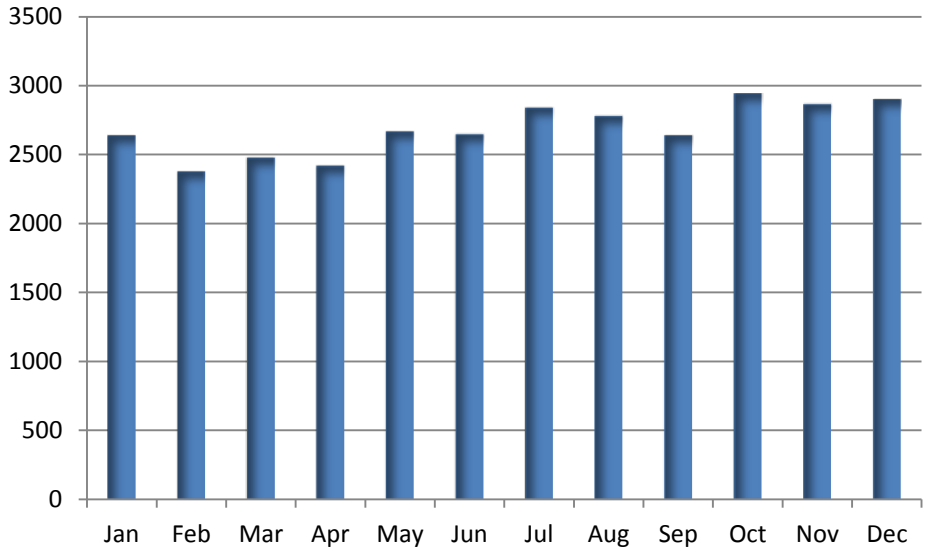
The total service demand noted above is segregated further in the following figure illustrating how workload is distributed across the various incident types and is grouped into three primary categories.

Figure 52: Workload by Incident Type



A review of incidents by time of occurrence also reveals when the greatest response demand is occurring. The following charts show how activity and demand changes for MFD based on various measures of time. ESCI began by breaking down yearly workload into monthly increments for 2010.

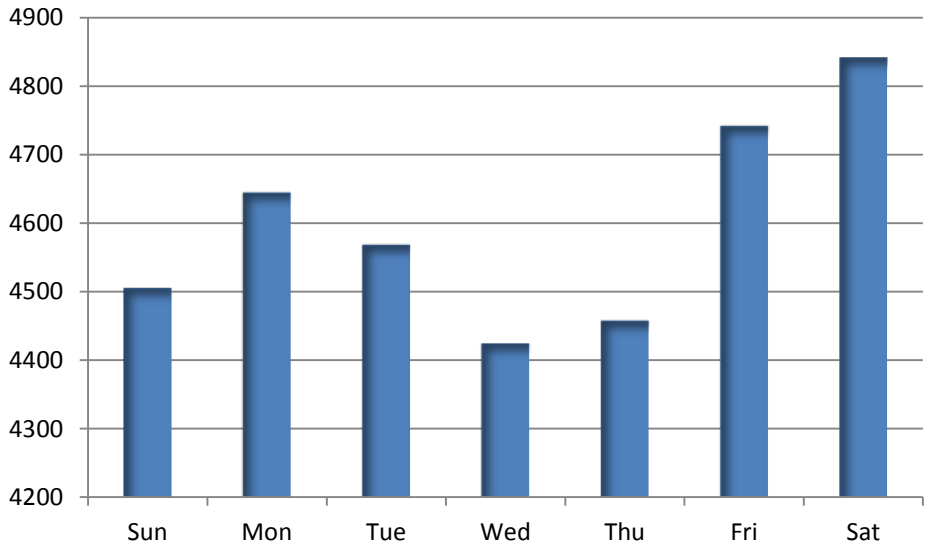
Figure 53: Monthly Workload – 2010



Monthly workload for emergency services varies in any given year. Generally, service demand is slightly higher in the mid-summer and mid-winter months. In further analysis, workload is examined by day of

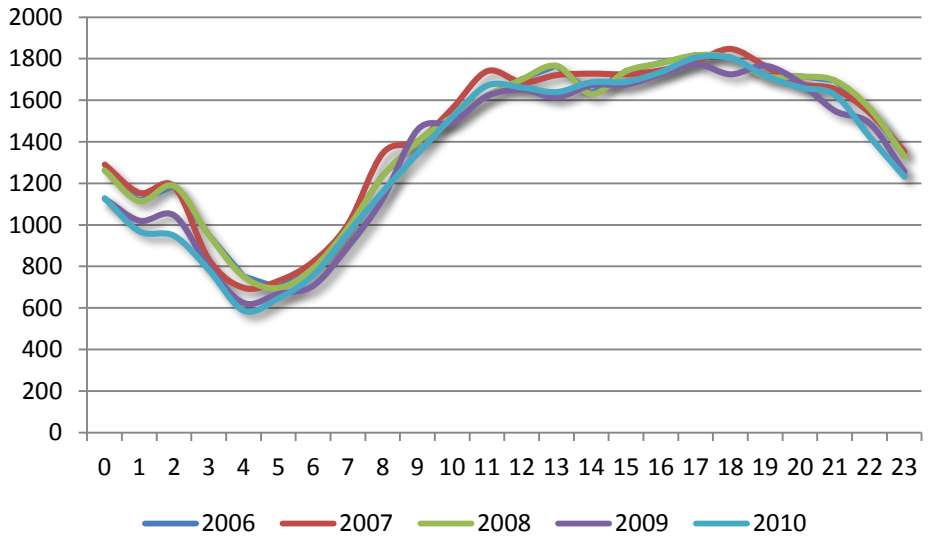
the week, showing a significant increase in volume on Friday and Saturday as demonstrated in the following figure.

Figure 54: Workload by Day of Week



The final analysis of historical workload concludes with examination of service demand by hour of day. Understanding when peak activity occurs begins the process of reviewing deployment strategies and needs assessment. This figure represents an aggregate of the data period evaluated rather than any one single year of incidents to show an overall trend of hourly workload. A multi-year example is provided here to illustrate how workload is consistent across the five year period when evaluated on an hour of day basis.

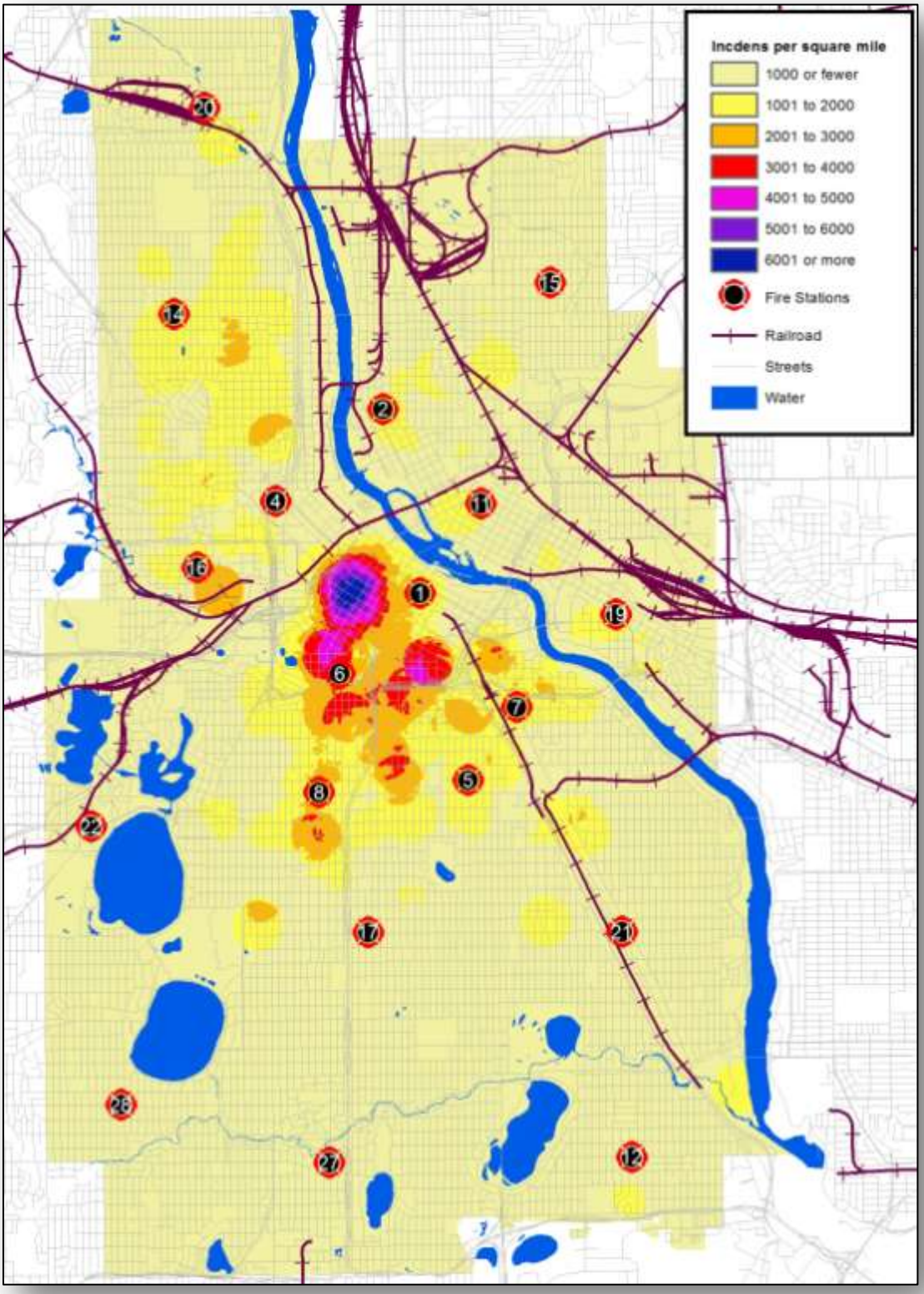
Figure 55: Workload by Hour of Day



Emergency services activity generally begins to increase between the hours of 6:00 a.m. and 7:00 a.m., reaching peak volume during the midday hours before gradually declining into the evening. Peak activity times can be reflected in response time performance in certain cases. The impact of response time on the outcome of emergency incidents has been exhaustively studied, both in the laboratory and in historical data, with a predictable correlation between the two. Though seemingly intuitive, it is still useful to review how longer response times can have a negative effect on the ability to suppress fires, particularly in structures, or to successfully intervene in a life-threatening medical emergency. Response time performance is examined in a separate section of this report.

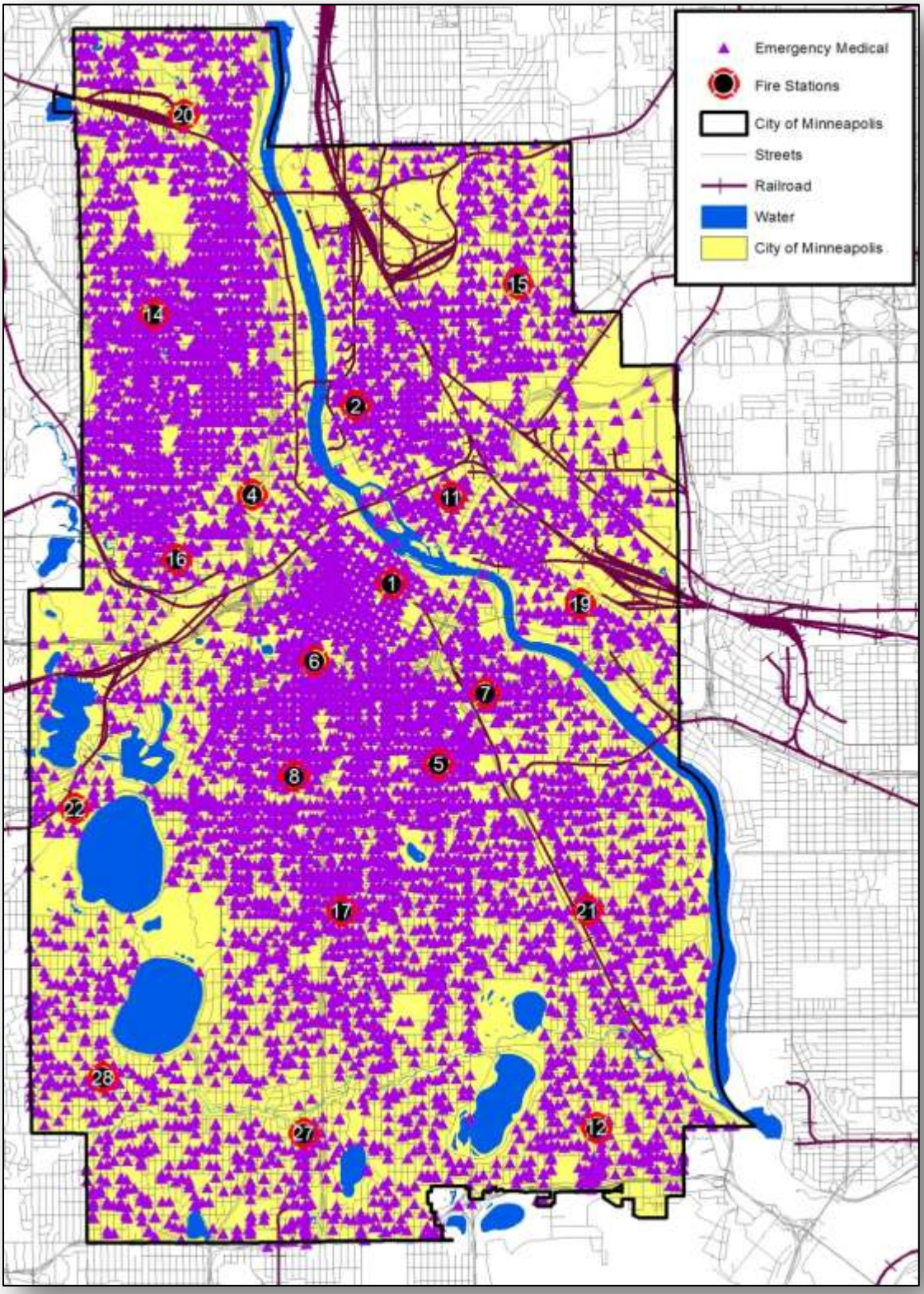
In addition to the temporal analysis of the current service demand, it is useful to examine geographic distribution of service demand. This analysis will allow for assessing the location of stations in comparison to the actual service demand within the area. The following map indicates the distribution of emergency incidents responded to during calendar year 2010.

Figure 56: Service Demand Concentration



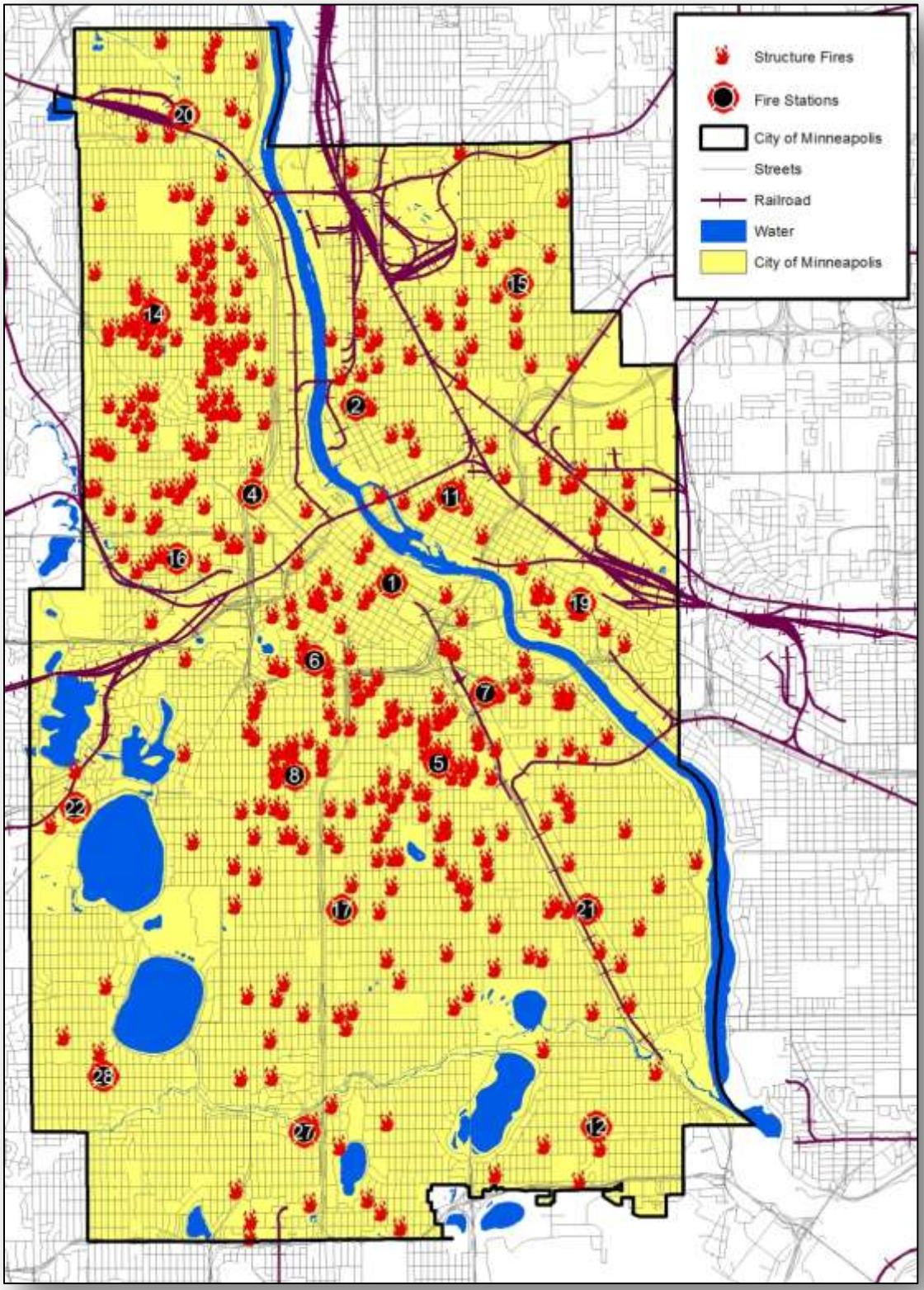
The area of greatest service demand is in the City's central area and the area between of Fire Stations 1 and 6. However, the previous figure can be influenced by the predominance of medical requests within the dataset. The following figure isolates the instances of medical incidents within the department's primary response area.

Figure 57: Service Demand Concentration – Medical Incidents



The following figure isolates the instances of structure fires within the department's primary response area. Similarly, fires occurred in the areas with more development present and many occurred near the fire stations.

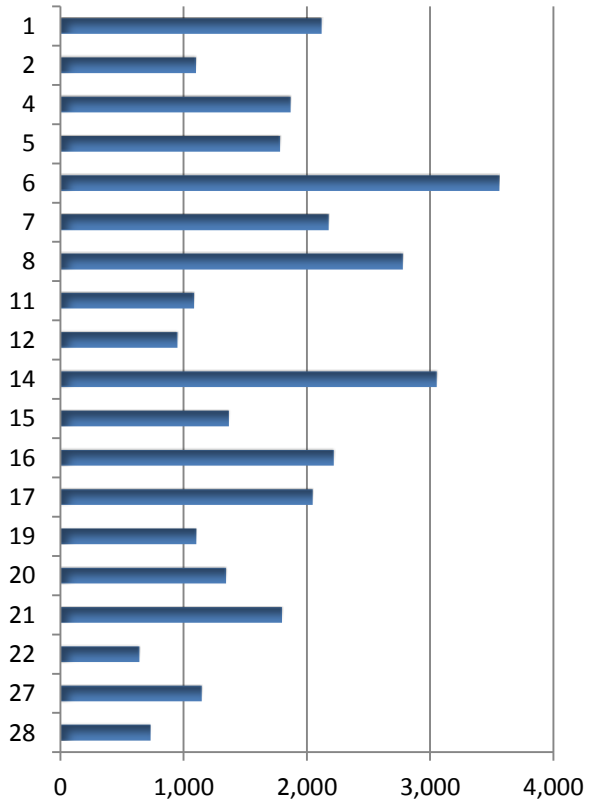
Figure 58: Structure Fires



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

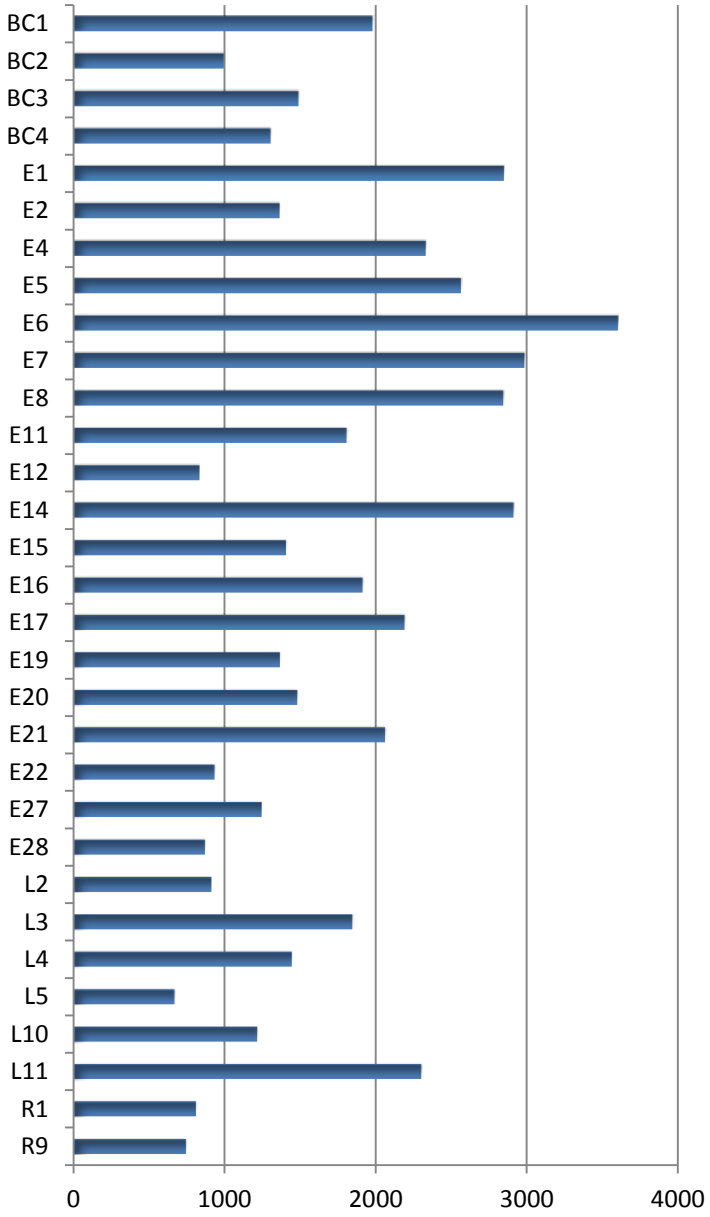
As noted earlier, response workload is not evenly distributed across the City of Minneapolis. Areas of higher population typically present a greater demand for fire department services. The following table lists response activity by fire station area during calendar year 2010. Workload in the Fire Station 6 area is the highest.

Figure 59: Responses by Fire Station Area – 2010



The workload on individual response units during calendar year 2010 is shown in the following table. Individual response unit workload can be greater than the workload in its home station area. Many incidents, such as structure fires, require more than one response unit. Engine 6 is the department's busiest response unit at 3,604 responses during 2010.

Figure 60: Response Unit Workload – 2010



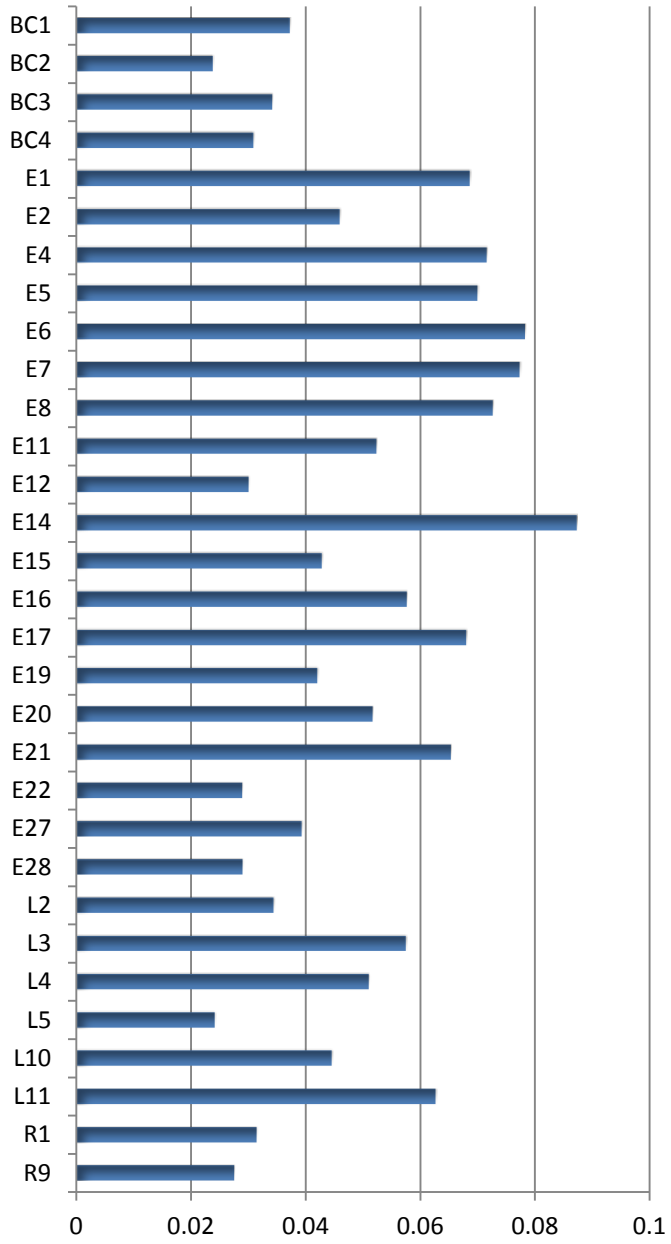
The amount of time a given unit is committed to an incident is also an important workload factor. The following table illustrates the average time each unit was committed to an incident, from initial dispatch until it cleared the scene.

Figure 61: Average Time Committed to an Incident by Unit

Unit	Average Time Committed (Minutes)
R9	19.46
R1	20.36
L11	14.31
L10	19.24
L5	19.00
L4	18.55
L3	16.37
L2	19.83
E28	17.50
E27	16.58
E22	16.29
E21	16.66
E20	18.35
E19	16.17
E17	16.31
E16	15.84
E15	16.00
E14	15.76
E12	18.95
E11	15.22
E8	13.42
E7	13.61
E6	11.42
E5	14.34
E4	16.14
E2	17.69
E1	12.67
BC4	12.44
BC3	12.06
BC2	12.59
BC1	9.90

Unit hour utilization is an important workload indicator. It describes the amount of time a unit is not available for response since it's already committed to an incident. The larger the number, the greater a unit's utilization and the less available it is for assignment to an incident.

Figure 62: Unit Hour Utilization

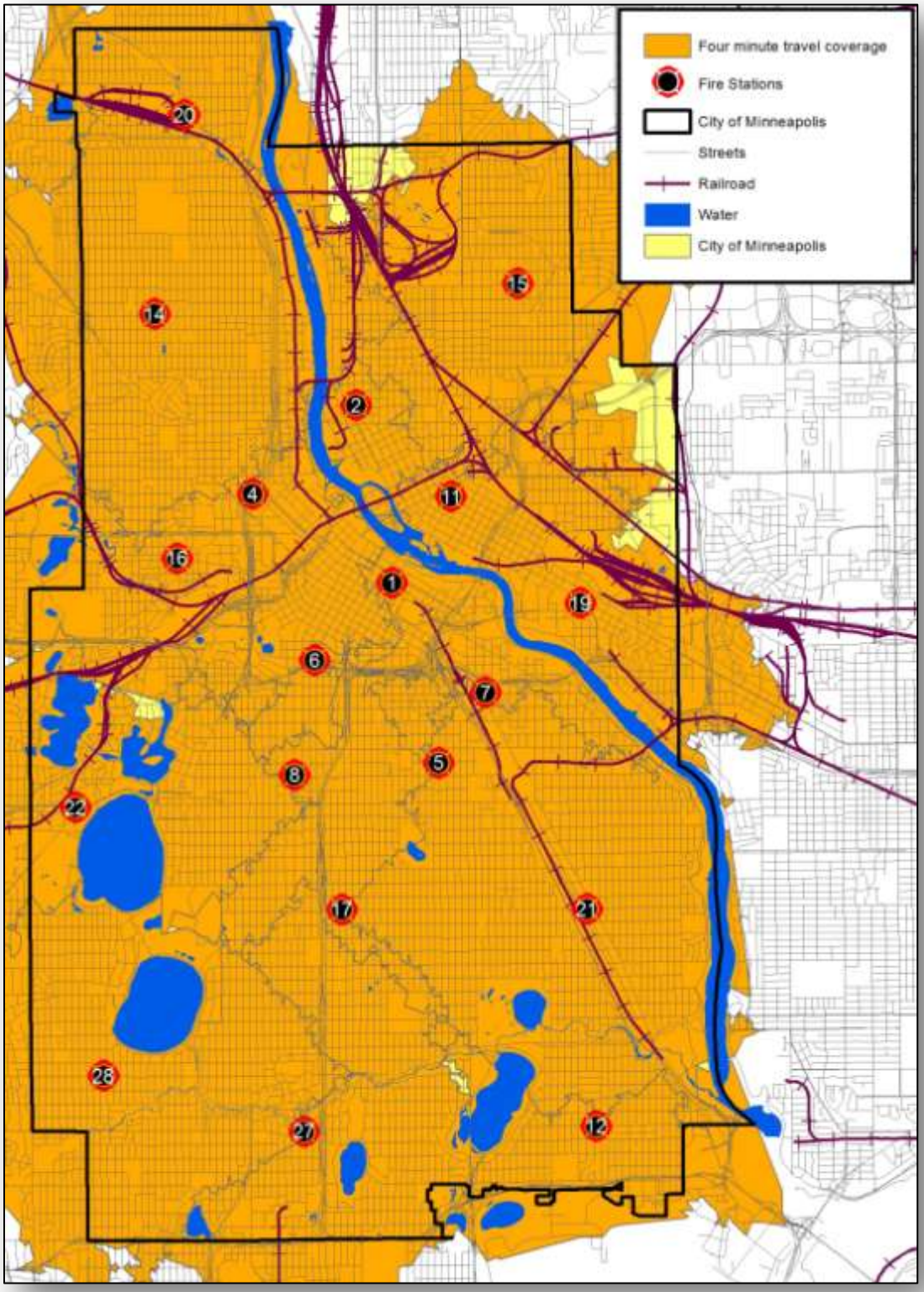


Unit hour utilization is an important statistic to monitor for those fire agencies using percentile based performance standards, as does MFD. In the case of Minneapolis, where performance is measured at the 90th percentile, unit hour utilization greater than 0.10 means that the response unit will not be able to provide on-time response to its 90 percent target even if response is its only activity. None of MFD's response units are approaching a unit hour utilization of 0.10 except Engine 14.

Distribution

Minneapolis Fire Department operates 19 facilities within a 58.4 square mile area. Travel time is potentially the longest of the response phases. The distance between the fire station and the location of the emergency influences total response time the most. The quality and connectivity of streets, traffic, driver training, geography, and environmental conditions are also factors. This phase begins with initial apparatus movement towards the incident location and ends when response personnel and apparatus arrive at the location of the emergency. Within MFD's target response performance objectives, four minutes is allowed for travel time. Adjustments to speed capability of the streets were made to account for negotiating turns and intersections. The first map shows the travel distance and any overlap between stations, while the second map overlays the incidents from the study date onto this coverage model.

Figure 63: Four-Minute Travel Time Capability



Based on the travel model, 97.7 percent of the service demand experienced during calendar year 2010 could have been reached within four minutes of travel from an existing station. The exception lies on the eastern edge of the city between Stations 15 and 19, as well as a small pocket between Stations 16 and 22 on the west side of the city. These areas, however, have a lower general service demand than the remainder of the jurisdiction.

Response Performance

Incident data for the calendar year 2010 was evaluated in detail to determine MFD's current performance. Data was obtained from department incident reports and the dispatch center's computer aided dispatch system.

Only incidents that were dispatched as a "priority" incident are included in the analysis. Priority incidents involve emergencies to which the fire department responded "code 3" (using warning lights and sirens) all the way to the incident location. Incidents downgraded to a non-emergency response and those initially dispatched as non-emergency responses were excluded.

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

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

Detection

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

Call Processing

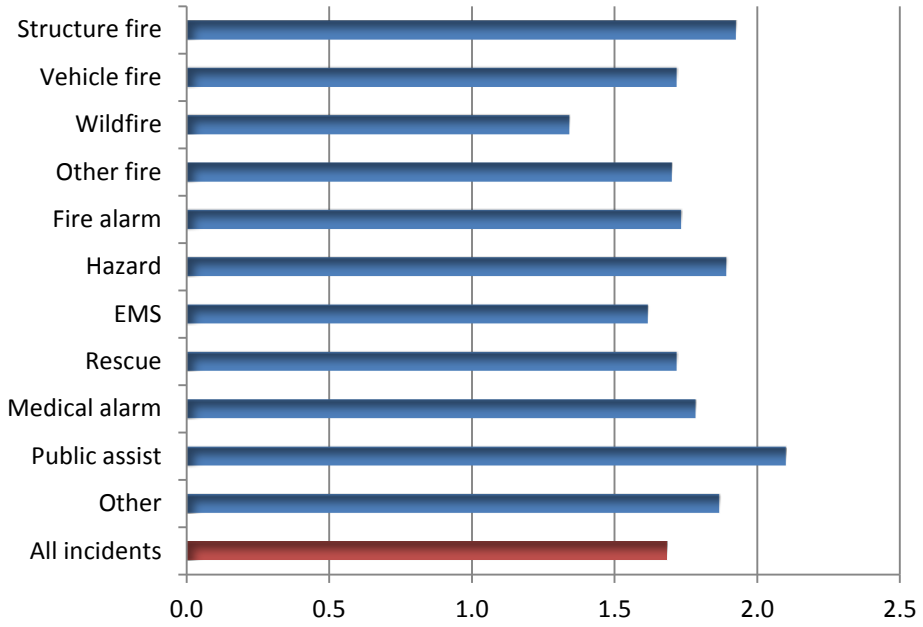
Today most emergency incidents are reported by telephone to the 9-1-1 center. Call takers must quickly elicit accurate information about the nature and location of the incident from persons who are apt to be excited. A citizen well-trained in how to report emergencies can reduce the time required for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

National Fire Protection Association Standard 1221 sets a standard for call processing performance. The standard expects that an incident will be dispatched to response personnel within 60 seconds of the receipt of the call at the dispatch center. Data was requested, but not provided to ESCI, that would allow an evaluation of current dispatch center performance.

Turnout Time

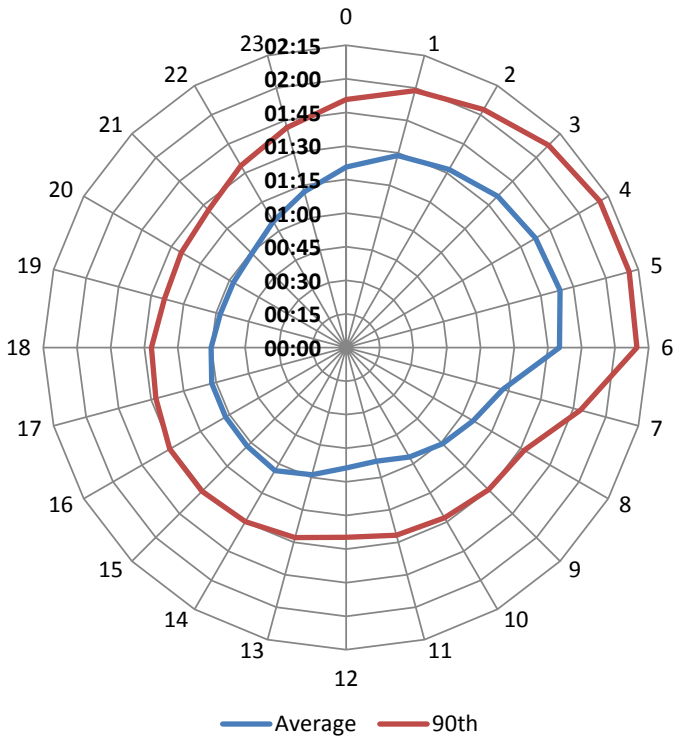
Turnout time is the first of the response phases controllable by the fire department. This phase begins at notification of an emergency in progress by the dispatch center and ends when personnel and apparatus begin movement towards the incident location. Personnel must don appropriate equipment, assemble on the response vehicle, and begin travel to the incident. Good training and proper fire station design can minimize the time required for this step. MFD's current target performance objective for turnout time is within 60 seconds, 90 percent of the time. The following chart lists turnout time for all incidents as well as specific incident types. Overall, turnout time for all incidents is within 1 minute 41 seconds, 90 percent of the time as illustrated in the following figure.

Figure 64: Turnout Time Performance - 2010



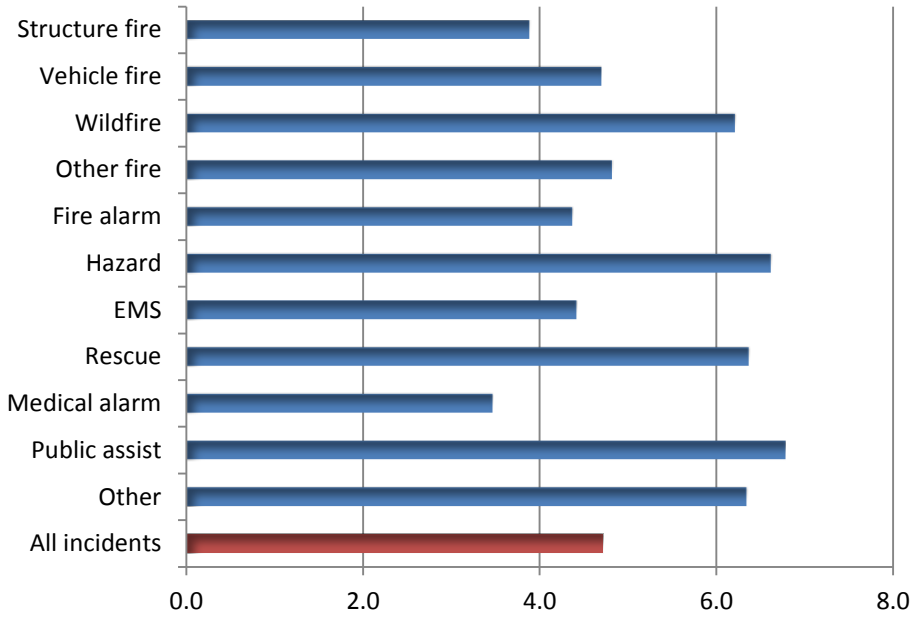
Turnout time can vary by hour of day. In this case, turnout time varies by nearly 90 seconds between the early morning hours and daytime hours as illustrated in the following figure.

Figure 65: Turnout Time by Hour of Day



The following figure lists travel time for all incidents as well as specific incident types. Overall, travel time for all incidents within the City of Minneapolis is within 4 minutes 43 seconds, 90 percent of the time.

Figure 66: City Incidents Overall Travel Time Performance – First Arriving Unit

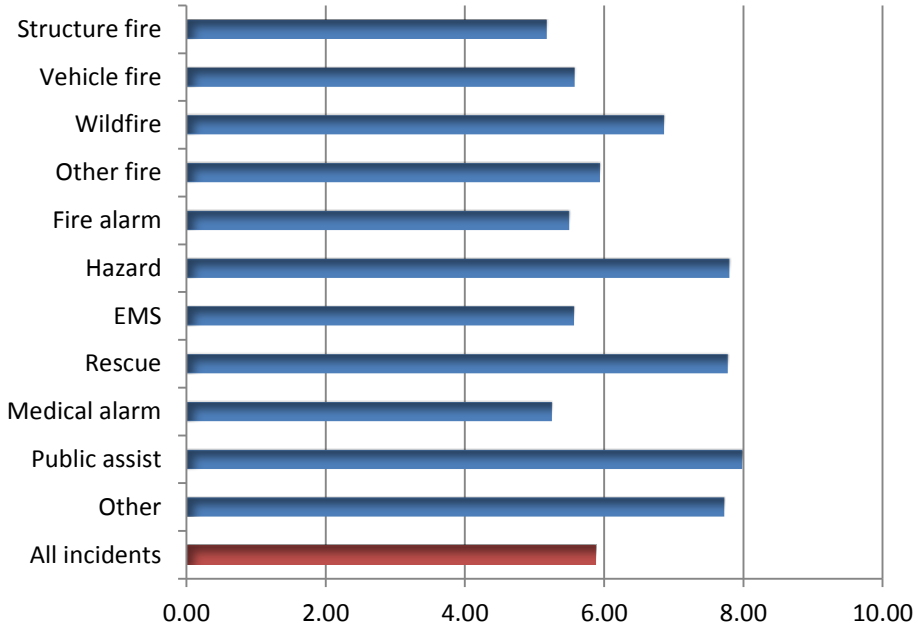


Travel time can, in some situations, vary considerably by time of day. Heavy traffic at morning and evening rush hour can slow fire department response. Travel time varies by about 90 seconds during the course of the day.

Response time is defined as that period between the notification of response personnel by the dispatch center that an emergency is in progress, until arrival of the first fire department response unit at the emergency. Within the MFD response performance objectives, five minutes is allowed for response time (turnout time plus travel time) within the City of Minneapolis.

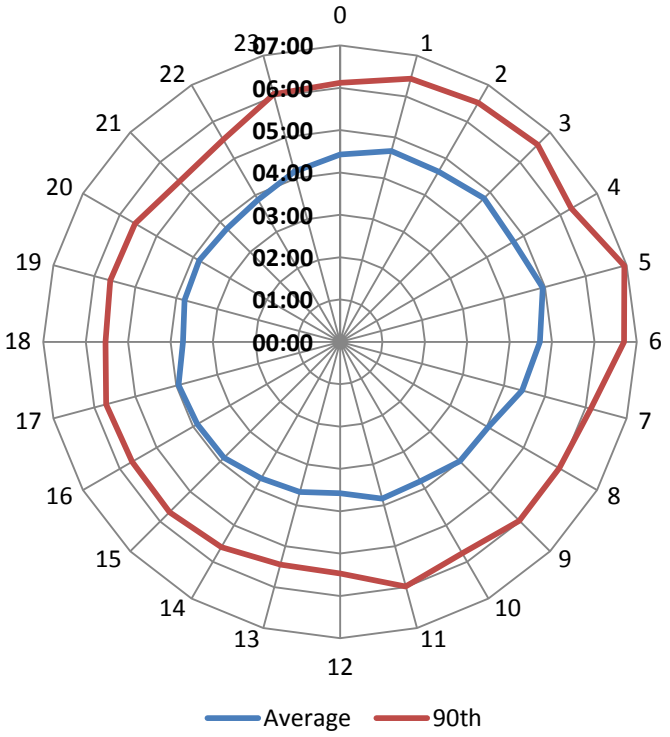
The following chart illustrates response time for all incidents as well as specific incident types. Overall, response time for all city incidents is within 5 minutes 53 seconds, 90 percent of the time.

Figure 67: City Incidents Overall Response Time Performance – First Arriving Unit



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

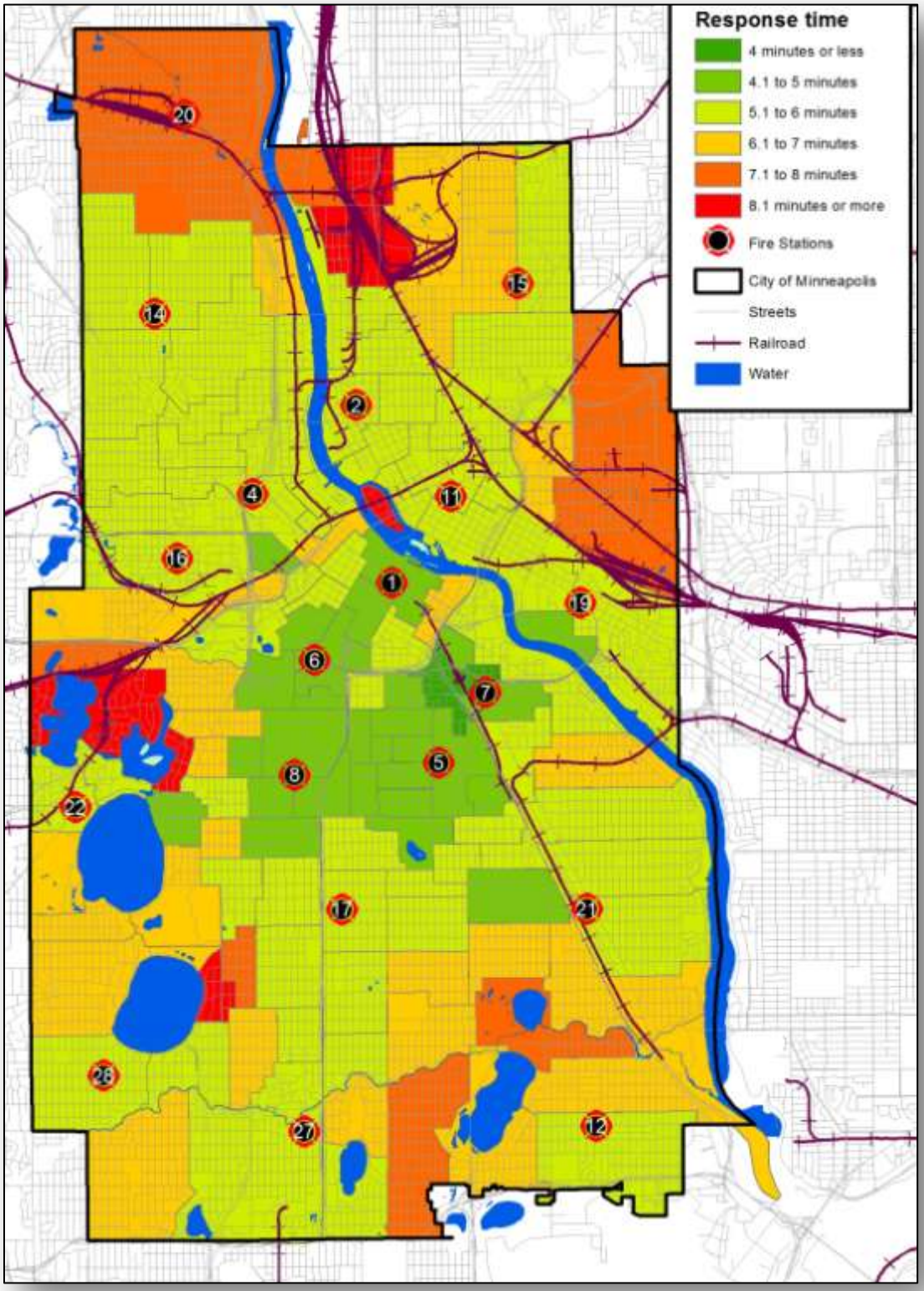
Figure 68: Hourly Response Time Performance



Response time performance by region is highly variable. This is influenced by a number of factors including individual station area workload and the number of times a station must cover another station's area. Additional factors include the size of the station area and the street system serving it. More highly connected, grid patterned, street systems contribute to faster response times than do areas with meandering streets with numerous dead-ends. The following map graphically displays response time performance for priority incidents by response box sub-areas within the MFD service boundaries.

The best response time performance by sub-area is within 3 minutes 53 seconds, 90 percent of the time.

Figure 69: Response Time Performance by Response Box



Concentration and Current Effective Response Force Capability Analysis

Effective Response Force (ERF) is the number of personnel and apparatus required to be present on the scene of an emergency incident to perform the critical tasks in such a manner to effectively mitigate the incident without unnecessary loss of life and/or property. The ERF is specific to each individual type of incident, and is based on the critical tasks that must be performed. Moderate risk structural fires are used as the primary risk category for this analysis as these present the most frequent type of incident requiring multiple response units and greater numbers of firefighters assigned to the incident.

The concentration analysis begins with a review of the physical capability of MFD's resources to achieve a target ERF response time to the city. Then analysis will determine whether or not MFD's *actual* ERF assembly performance matches this physical concentration capability.

For the purpose of this analysis, a full effective response force to a moderate risk structure fire is three fire engines, one ladder truck, and one battalion chief, with total staffing of 14 firefighters.

The MFD has established the following response performance targets for the delivery of the full effective response force to moderate risk incidents.

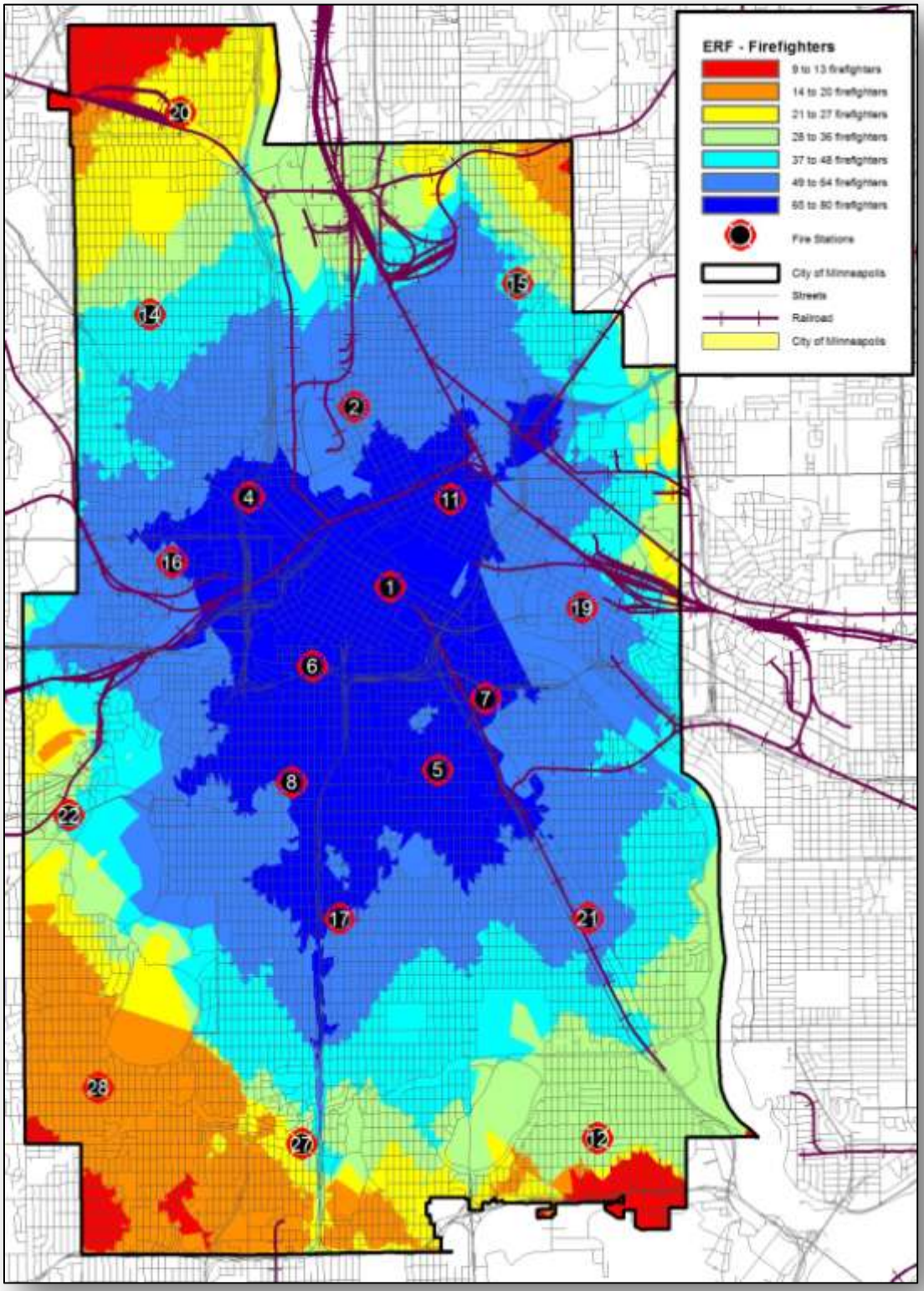
> *For moderate risk incidents, the Minneapolis Fire Department shall assemble an Effective Response Force (ERF) consisting of personnel sufficient to effectively mitigate the incident based on risk within nine minutes 20 seconds from receipt of the call at the dispatch center, 90 percent of the time.*

Current performance for moderate risk structure fires that occurred within the City of Minneapolis is within 8 minutes 55 seconds, 90 percent of the time.

The following maps depict the physical capability of MFD to assemble various concentrations of apparatus and firefighters within each area. The modeled analysis shown assumes that all response units are available.

The first map shows the area that can be reached by the number of firefighters that make up the target ERF based on the City of Minneapolis performance target. Eight travel minutes are allowed to assemble 14 firefighters on scene.

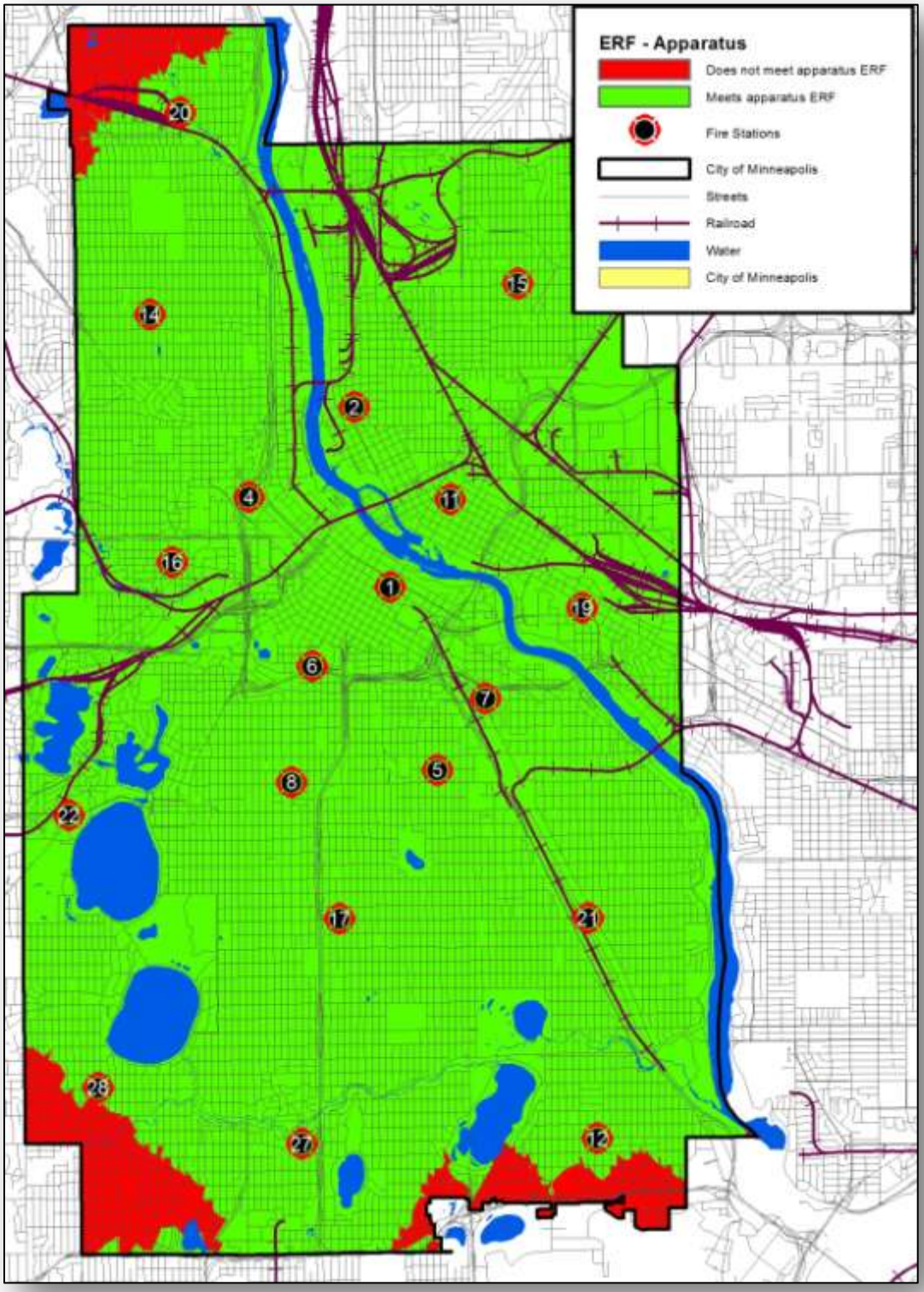
Figure 70: Effective Response Force – Firefighters



The previous figure illustrates that all but the outer corners of the city can be served with the minimum 14 firefighters needed for a moderate risk structure fire within the target response time.

The next map shows the area that can be reached by the number of apparatus that make up the target ERF based on the City of Minneapolis performance target. This includes three fire engines, one ladder truck, and one battalion chief. Eight travel minutes are allowed to assemble these apparatus on scene.

Figure 71: Effective Response Force - Apparatus



Call Concurrency, Reliability and Canceled Responses

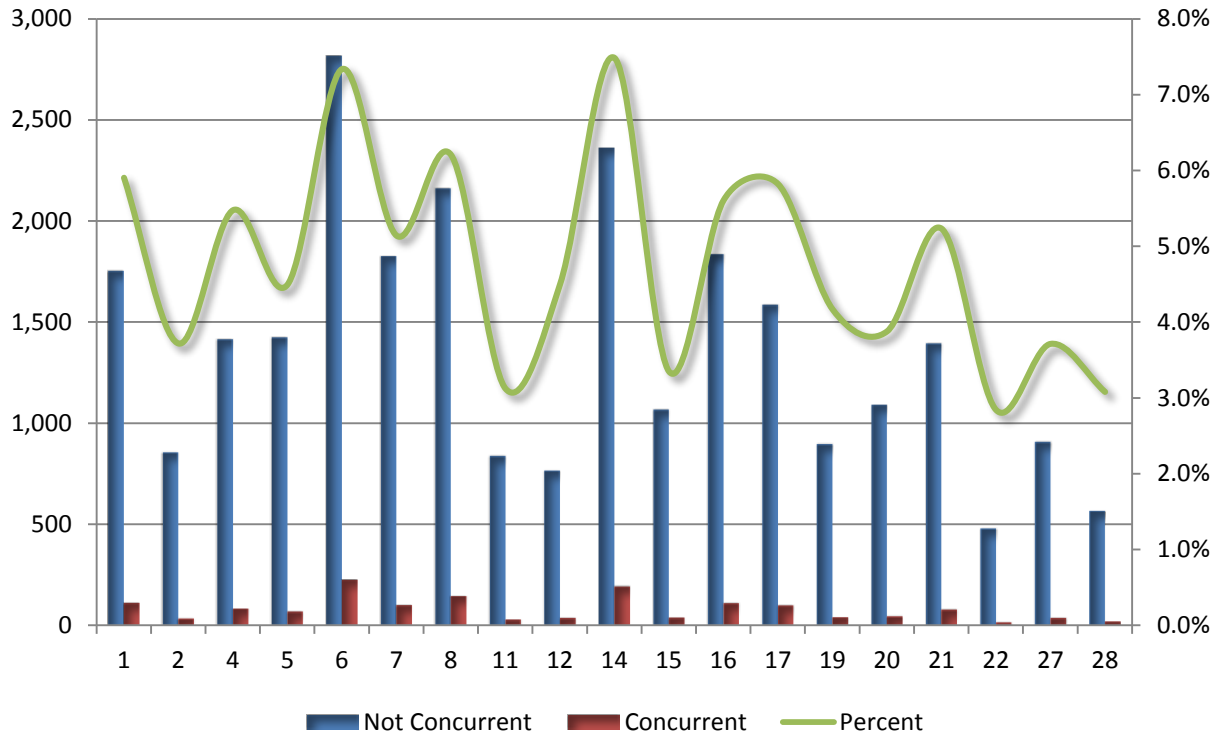
When evaluating the effectiveness of any resource deployment plan, it is necessary to evaluate the workload of the individual companies to determine to what extent their availability for dispatch is affecting the response time performance. In simplest terms, an engine company cannot make it to an incident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

Concurrency

One way to look at resource workload is to examine the number of times multiple calls happen within the same time frame on the same day in each station area. Calls during 2010 were examined to determine the number of times multiple calls occurred within a station's response area at one time. This is important because more calls occurring simultaneously can stretch available resources and extend response times by causing the community to rely on more distant responding apparatus.

The following chart shows the number of concurrent and non-current calls for each MFD station during 2010. Concurrent calls were highest in the Station 14 area at 7.5 percent of total, and lowest in the Station 22 area at 2.8 percent of total.

Figure 72: Call Concurrency Rates by Station



When the reliability of a station to respond within its prescribed territory is lower, response time performance for the back-up station/apparatus can also be negatively affected.

Reliability

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

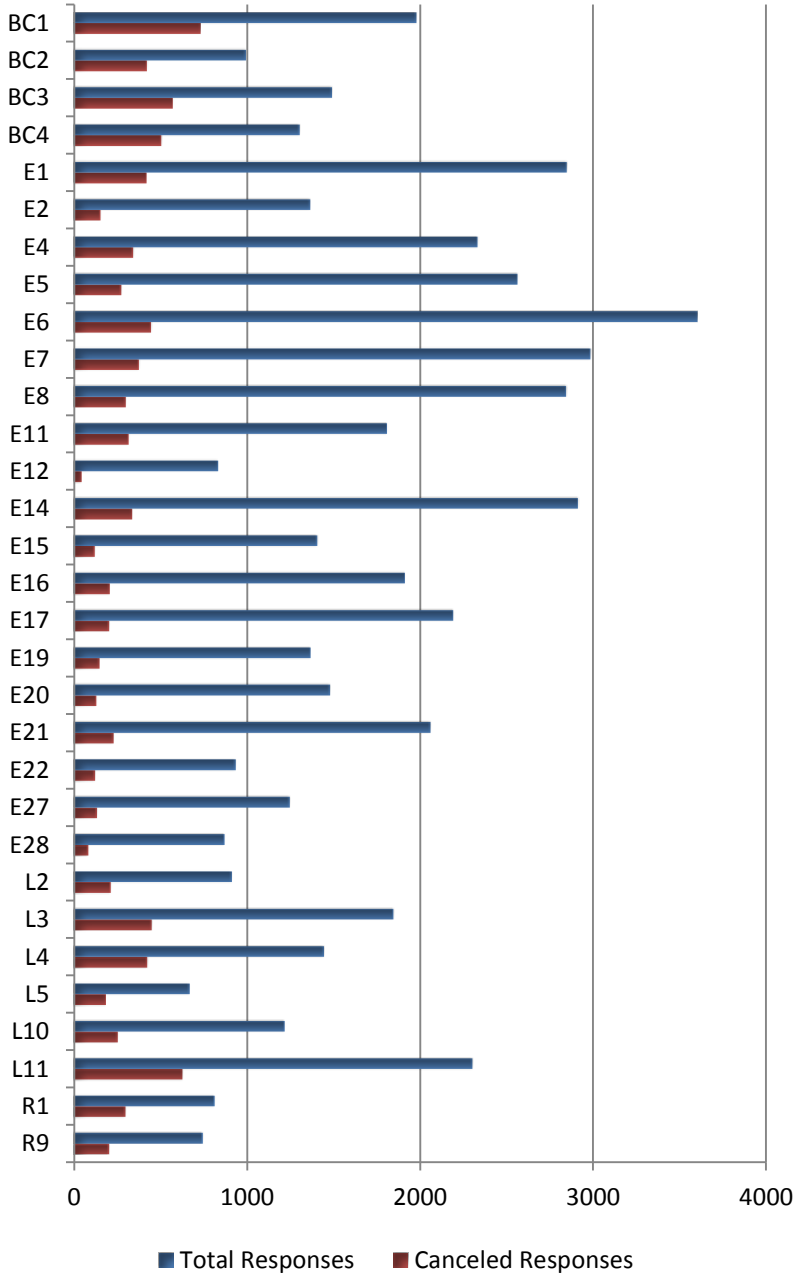
Response units from the "home station" may be unavailable for a variety of reasons including response to another emergency or being out of its area for training or other activities. Data was requested, but not provided, that would have allowed an evaluation of unit reliability.

Canceled Responses

Sometimes response units are cancelled prior to arrival at the incident. This can occur when the person reporting the emergency calls back to the dispatch center that no real emergency existed. More often it is when another response unit arrives and determines no additional response units are needed. While cancelled responses are unavoidable, minimizing them helps improve unit reliability. An unnecessary response makes the unit unavailable for a concurrent request for service.

MFD units respond frequently to calls for service that end up as canceled responses.

Figure 73: Unit Responses and the Number Cancelled Before Arrival



Fire and EMS Integration

MFD is not a provider of transport Emergency Medical Services (EMS), but does play a critical role in the overall delivery of EMS to the community. All MFD personnel are certified to the Emergency Medical Technician (EMT) level and all apparatus provide first response services throughout the city in support of Hennepin County Medical Center and North Memorial Ambulance.

As a component of the overall EMS system, MFD contracts with Hennepin Faculty Associates for medical direction. Dr. Brian Mahoney serves as the department's individual medical director and assists with issues involving clinical care within the department. Hennepin County Medical Center serves as the lead entity for overseeing the EMS system and operates under a clear management structure through hospital administration. An emergency preparedness committee involving a diverse group of first responders throughout the county meets with hospital and other EMS representatives to plan for system design and resource utilization. An EMS advisory committee (Hennepin County EMS Council) is also a formalized group that directs system planning, but MFD is not represented within the council.

Recommendation:

- MFD should seek involvement with the Hennepin County EMS Council and request an active seat within the group.

Transport EMS services are provided through Hennepin County Medical Center EMS, which functions as a dynamic deployment system. This means that EMS response and transport units are not located at fixed facilities, but rather roam and post to specific locations based on system demand. Hennepin County Ordinance 9 dictates EMS response throughout the County and the Hennepin County Council is responsible for ensuring ordinance compliance. Although the primary transport provider is using a pen-based patient care reporting system, the first responder system is not linked to the transport agency and patient information is not shared between the agencies. No annual reporting is done except through response performance reports and quality assurance issues are only discussed on an as needed basis.

Recommendation:

- MFD should work with Hennepin County to ensure that patient information is shared both on scene and post-incident to improve continuity of care and quality improvement functions.

All MFD personnel were required to complete four EMS training modules each year until recently when this requirement was reduced to three modules annually. These three modules are completed from November 1 to April 30 to allow more fire specific training during the warmer months. Topics to be covered are dictated by the EMS Regulatory Board (EMSRB), which also determines skill hours. The region, however, does not have a mechanism by which to ensure compliance with training requirements.

At the time of data collection and interviews, MFD had a dedicated Deputy Chief of EMS, but that position has since been eliminated. This position also served as the single point of contact for most occupational health issues within the department. The department should ensure that these functions are not lost along with the position.

Recommendations

- MFD should ensure that the department's occupational health and CISD functions are maintained.

Technical Rescue Programs

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 MFD and offers recommendations to improve or enhance the existing program.

MFD delivers its technical rescue services independently, calling for assistance outside the city in rare circumstances such as a large scale/long duration incident. MFD incident commanders have the ability to call for mutual-aid with neighboring departments as needed, which include Edina and St. Paul who also have personnel and equipment to assist with technical rescue.

The majority of specialized rescue equipment maintained by MFD was gained from grant funding as part of MN-TF-1, the state USAR team. The majority of specialized training has also been gained through grant funding. The department has adequate supplies and materials to respond to and train for technical rescue incidents.

The technical rescue program is managed by the Chief of Training and his staff, in addition the management and delivery of fire training. EMS training was recently added to this division. Light-duty personnel are sometimes assigned to assist the training division. Technical rescue has no dedicated budget, as funding for these services all fall under the Operations Chief and comes from the state.

The state of Minnesota has no technical rescue certification program, as it is left to the Authority Having Jurisdiction (AHJ) to establish its own training requirements. MFD strives to meet standards established by NFPA when it comes to technical rescue training.

The current bid-back system appears to greatly hinder the department's ability to assign personnel with specialized training to specialized stations. This results in the following:

- Reoccurring training costs when non-specialized trained personnel bid-back to specialized stations, thus require training.
- No uniform response orders can be established, as incident commanders must summon multiple apparatus to deliver personnel with specialized training to the scene.
- Training to maintain skills for personnel already trained is difficult to execute, as they are assigned to various stations across the city.

Vehicle/Machinery Response

Vehicle/Machinery rescue includes the rescue/recovery of victims trapped by various vehicles and machinery. The department provides service for this discipline with two primary heavy rescue trucks that split the city north and south. Rescue 1 is a heavy rescue that carries a variety of specialized rescue equipment. Once staffed with 4 - 6 personnel, it is currently not staffed. Members from Engine 6 or Ladder 11 must deploy Rescue 1. Rescue 9 is the primary vehicle for hazardous materials response; however, it carries a complete set of powered hydraulic rescue tools. Engine and ladder companies also respond to these incidents based on first due coverage areas.

Engine companies carry light extrication capability in the form of powered hydraulic combination (spreading/cutting) tools. Ladder companies carry powered hydraulic tools consisting of spreaders, cutters, and rams, in addition to sawz-alls and basic cribbing for passenger vehicle stabilization.

Previous response to a confirmed entrapment was an engine, truck, and heavy rescue. This response placed 7 - 10 personnel on the scene, in addition to a Battalion Chief.

All ladders carry extrication equipment including powered hydraulic tools of various makes and models. Tool maintenance is provided by the department maintenance shop. The department has applied for an Assistance to Firefighters grant (AFG) to address hydraulic tool compatibility, while bringing some of the aging equipment up to date. Other equipment replacement and upgrades under the submitted grant includes saw-zalls, possibly air chisels, and additional cribbing. Rescue 1 has high-medium-low pressure bags.

Currently there are no defined vehicle/machinery training levels for ladders-engines-rescues, as the majority of training is considered "on the job" training.

Rope Rescue

The department responds to emergencies that may involve accessing and/or removing trapped victims from high angles or low-grades with specialized rope equipment. All apparatus currently carry life safety rope. Specialized rope rescue is carried out by the members of Rescue 1. Currently there are no members at Rescue 1's quarters that are trained in rope rescue. The current deployment model requires the on-scene Battalion Chief to special-call various companies from around the city to assemble the personnel needed to conduct a specialized rope rescue. This results in a delay of beginning rescue operations.

All current rope rescue equipment is carried on Rescue 1 with all companies carrying life safety rope. There is no comprehensive life safety rope tracking system in place per *NFPA 1983: Standard on Life Safety Rope and Equipment for Emergency Services.* New rope is currently at the training facility and the department intends to go back to a color-coded system for tracking. The system will be maintained on paper, and then transferred to an electronic records management system.

The majority of department members that are trained in rope rescue have received their training via grant funded classes as part of the state USAR team. These members are trained to the Technician level per *NFPA 1670: Standard on Operations and Training for Technical Search and Rescue Incidents*. Inconsistencies of procedures were noted during the on-site survey.

Tower/Antenna Rescue

Due to infrastructure changes needed to support technology and communications, towers and antennas are more prevalent in the city. The department currently has no specialized training in tower/antenna rescue. The fire department must contact an outside agency that is trained and equipped to mitigate this type of emergency.

Confined Space Rescue

Confined space rescue is performed in places as defined in OSHA's Standard 1910.146 that have limited means of entrance/egress; contain, or have the potential to contain, a hazardous atmosphere; or means of engulfment. Examples include manholes, utility vaults, tanks, hoppers, or bins. The department provides service for this discipline at the technician level.

The deployment model for this service requires the on-scene Battalion Chief to special-call companies from around the city to assemble the trained personnel needed to perform this type of rescue or recovery.

Equipment for this discipline is carried on USAR apparatus stored and deployed by MFD. A full assortment of equipment for confined space is carried.

The majority of department members that are trained in confined space rescue have received their training via grant funded classes as part of the state USAR team. These members are trained to the Technician level per *NFPA 1670: Standard on Operations and Training for Technical Search and Rescue Incidents*. The agency currently has no means to document annual confined space entries made per 1910.146. The goal is to begin this tracking system in 2012, documenting initial and continued training entries.

Trench Rescue

Trench rescue takes place when a cut or cavity is made into the earth in which the cut is deeper than it is wide, and 8' or greater. Trenches are commonly found in new construction for utility installation, repair to utilities, or renovations.

The deployment model for trench rescue requires the on-scene Battalion Chief to special-call companies from around the city to assemble the trained personnel needed to perform this type of rescue or recovery.

Equipment for trench rescue is carried on USAR apparatus stored and deployed by MFD. A full assortment of equipment for trench rescue is carried, including specialized trench panels and shoring.

The majority of department members that are trained in trench rescue have received their training via grant funded classes as part of the state USAR team. These members are trained to the Technician level per *NFPA 1670: Standard on Operations and Training for Technical Search and Rescue Incidents*, which includes trenches deeper than 8' and intersecting.

Structural Collapse Rescue

Structural collapse rescue is conducted when victims are trapped in a building that has been structurally compromised by events generated by natural disasters, improper construction, and impact by vehicles, or terrorist events.

The deployment model for collapse rescue requires the on-scene Battalion Chief to special-call companies from around the city to assemble the trained personnel needed to perform this type of rescue or recovery.

Equipment for collapse rescue is carried on USAR apparatus stored and deployed by MFD. A full assortment of equipment for this discipline is carried including concrete breeching/breaking (saws and hammers), heavy duty cutting (torches), and pneumatic/timber shoring.

The majority of department members that are trained in collapse rescue have received their training via grant funded classes as part of the state USAR team. These members are trained to the Technician level per *NFPA 1670: Standard on Operations and Training for Technical Search and Rescue Incidents*, which includes concrete reinforced buildings.

Water Rescue

Water rescue involves the rescue of victims from the surface of static, moving, or ice covered water. This includes ponds, lakes, rivers, and flood events. MFD responds to all surface water rescue incidents independently or jointly with other agencies depending on the body of water. MFD maintains and deploys three primary water craft with personnel from its fire companies. MFD also shares a boat on the water with EMA-PD-Port Authority. Water Patrol handles dive recovery events. Mustangs (exposure) suits are carried on all ladder, rescue, and engine companies.

The MFD currently has no uniformed water rescue training.

Recommendations:

- Ensure all life safety rope is properly inventoried with its use tracked per NFPA 1983.
- Develop a fee schedule supported by city ordinance to bill technical rescue events, such as vehicle extrications and hazardous materials incidents.
- Ensure a system is developed to document annual confined space entries per OSHA 1910.146 for each employee expected to make confined space entries.
- Develop a training plan that incorporates monthly skills training and quarterly scenario-based exercises.
- Evaluate the effectiveness of maintaining powered hydraulic tools on the engine companies.
- Develop a bid-back system that prioritizes personnel with technical rescue training to be placed at stations that deliver these services to the city as a means of efficiently training for deployment.
- Consider a vehicle/machinery program delivered by MFD instructors to all recruits after completing their initial fire training.
- Develop an in-house skills tracking mechanism for initial and continued training based on NFPA 1670/1006: Standard for Technical Rescuer Professional Qualifications.
- Develop a basic water rescue training program to ensure all responders can function safely and effectively at water rescue incidents.

Hazardous Materials Response

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 regards 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.[30]

All personnel from MFD are trained and equipped to provide hazardous materials response at the "Operations" level. This level permits defensive operations for purposes of containment, but does not permit aggressive forward tactical efforts focused on corrective action, clean-up, or handling of hazardous substances (with a few exceptions) as discussed above. In addition, approximately 220 MFD personnel are certified at Technician level (minimum seven Technicians on duty at all times). All personnel hired after 1996 are required to be certified at Technician level but, reportedly, little follow-

[30] 29 CFR 1910.120

up or continuing education has been completed except for personnel assigned to specific hazardous materials units; Engine 11 and Rescue 9.

In addition to the personnel listed above, one Deputy Chief has been assigned as the hazardous materials coordinator, but this is not a fully recognized position. All Battalion Chiefs must be certified to Specialist as does any Captain assigned to Station 11. Firefighters and Fire Motor Operators (FMOs) assigned to Station 11 must be at least Technician certified.

The State of Minnesota funds and deploys a statewide hazardous materials emergency response team. The closest team to the City of Minneapolis is located in St. Paul with additional Chemical Assessment Teams (CAT) located north of the city (North Metro CAT), at the airport (55th Civil Support Team) and west of the city (Hopkins CAT). MFD chose not to operate as a state resource due to funding, and the current hazardous materials functions remains unfunded as a separate line in the department's overall operating budget, however the function is absorbed as an operating cost within the overall departmental budget.

The cost of establishing and maintaining a full-blown Hazardous Materials Response Team capable of mitigating all types of hazardous substance incidents at the Technician or Specialist level can be astronomical. Establishing such teams in all but the largest of metropolitan departments is ill-advised from the standpoint of cost, necessary personnel, and ability to retain skill levels. Instead, the development of regional hazardous materials mitigation programs is encouraged in order to take advantage of larger manpower pools and greater resources, while spreading the cost across a larger area. Although MFD operates dedicated hazardous materials personnel, this is not a singular function. If a major hazardous materials incident occurs, assistance from surrounding teams is readily available. In addition, the incidence of hazardous materials responses in the City of Minneapolis is low and the department has not made a Level A entry in the last five years.

Although incident of hazardous materials response is low, the fact remains that the risk does exist within the city. Thus, the hazardous materials function should be an element of the fire department that receives sufficient and appropriate attention and funding. In order to operate such a specialized function, proper policies and procedures should be in place. In addition to policies and procedures, adequate training is the next fundamental that must be given sufficient attention.

Although new personnel are required to obtain certification to the Technician level, no formal continuing education is required for those personnel. OSHA 1910.120 mandates that personnel receive sufficient ongoing education and training to maintain the credential under which they operate. The department should re-think the requirement to train all personnel to the Technician level based on the cost involved in that process without proper maintenance of the credential. If future training opportunities are to be limited to Operations level scenarios, that should be the required minimum initial training.

Once the previous elements have been addressed, the department should ensure that the specialized equipment necessary for a hazardous materials response is adequate and properly maintained. In addition to Engine 11 and Rescue 9, the department also maintains a mobile lab as well thousands of dollars' worth of other equipment such as protective suits, monitors, detectors, dosimeters, and other electronic equipment. There is no formalized replacement plan nor is there a formalized equipment testing schedule with all maintenance and calibration of equipment done in-house. A decontamination unit (two trailers) is housed at Station 19 and a 38 year old truck is used to tow the equipment when necessary. The department should begin now to plan for the replacement of critical equipment and make a determination as to the city's level of commitment in regards to hazardous materials response.

Recommendations:

- The department should determine the appropriate level of initial hazardous materials training for all personnel.
- The department should work with the city to ensure that proper funding is applied to the hazardous materials program based on the level of commitment to that function.
- The department should ensure that all personnel are receiving the proper continuing education and training commensurate with their level of credentials.
- Upon completion of an equipment inventory and determination of future deployment commitment, the department should condense resources to fewer locations and specialize those resources appropriately.

Incident Control and Management

MFD uses standardized response assignments based on the type of call dispatched. These assignments are intended to provide the quantity and type of apparatus needed for the incident, as well as the correct number of staff to accomplish the critical tasks necessary to mitigate the emergency.

City maps are available in all department apparatus as well as a mobile mapping program that is reportedly unreliable due to connectivity issues. Pressurized hydrants are identified on the maps, but no information on main sizes of hydrant flow capacity is available to the Incident Commander. No static water points have been mapped, nor have any pre-designated water shuttle plans been prepared in the event of water system failure.

The department currently maintains one deputy chief and four battalion chiefs per shift, using captains at each station as the primary first line of supervision, ensuring that at least one individual designated for incident command will be available 24 hours a day. The agency also reports that the Incident Command System is used on all calls. A fire ground accountability system is in place for the department and personnel indicate that the system is used on all major or long-term incidents.

Mutual and Automatic Aid

There are numerous mutual aid agreements, both formal and informal, in place between fire, police, and emergency medical agencies in the City of Minneapolis and surrounding areas. Mutual aid is typically employed only on an “as needed” basis where units are called for and specified one by one through an Incident Commander. There are three basic types of mutual aid that are available to most fire departments as described below.

Basic Mutual Aid upon Request

This form of mutual aid is the most basic and is typically permitted under broad public laws that allow communities to share resources upon request during times of disaster or during local and regional emergencies. Often, these broad laws permit communities to make decisions quickly regarding mutual aid under specified limitations of liability, allowing a community to tap into resources from their immediate neighbors, as well as very distant resources in communities with which they have very little day-to-day contact. Under this level of mutual aid, specific resources are typically requested by the fire department, through the chain of command, and sometimes coordinated by local or regional emergency management personnel. Depending on the level of the request, the response can sometimes be slow and the authorization process may be cumbersome due to the exchange of official information or even elected officials’ approval that may be required.

Written Mutual Aid Agreements

This form of mutual aid goes one step further by formalizing written agreements between communities (typically immediate neighbors in a region) in an effort to simplify the procedures and cut response times. Usually, these written agreements include a process that takes the request and response authorization down to a lower level in the organization, such as the Fire Chief or other incident commander. By signing such agreements, communities are "pre-authorizing" the deployment of their resources under specified circumstances as spelled out in the agreement. Most often, these agreements are generally reciprocal in nature and rarely involve an exchange of money for service, though they may include methods for reimbursement of unusual expenses for long deployments.

Automatic Aid Agreements

This form of mutual aid takes the process an additional step further by spelling out certain circumstances under which one or more specific resources will respond automatically upon notification of a reported incident in the neighboring community. In essence, automatic aid agreements expand a community's initial first alarm response to certain types of incidents by adding resources from a nearby neighbor to that response protocol. Typically, such agreements are for specific geographic areas where the neighbor's resource can be expected to have a reasonable response time and are only for specific types of incidents. An example of such an agreement would be having a neighboring community's engine respond to all reported structure fires in an area where that apparatus would be closer than the second or third-due engine from the home community. In other cases, the agreement might cover a type of resource, such as a tanker or aerial apparatus that the home community does not possess. An example of this would be having a neighboring community's tanker respond to all reported structure fires in the areas of the home community that do not have pressurized hydrants.

Automatic aid agreements may be purely reciprocal or they may involve the exchange of money for the services provided. Purely reciprocal agreements are common, but typically are used where each community has some resource or service it can provide to the benefit of the other. These services or resources need not be identical. For instance, one community may send an engine to a second community on automatic response to structure fires, while the second community agrees to send a tanker to the first community's structure fire calls in exchange. These reciprocal agreements are sometimes made without detailed concern over quantification of the equality of the services exchanged, since they promote the effectiveness of overall services in both communities. In other cases, the written

agreements spell out costs that one community can charge the other for services, typically where no reasonable reciprocation can be anticipated.

One primary purpose of automatic aid agreements is to improve the regional application of resources and staffing. Since fire protection resources are most frequently established because of the occupancy risks in a community and not necessarily a heavy workload, these resources may be idle during frequent periods of time. While fire departments make productive use of this time through training, drills, pre-incident planning, and other functions, the fact is that these expensive resources of apparatus and staff are not heavily tied up on emergency incidents. Communities that share certain resources back and forth are, in essence, expanding the emergency response workload of those units across a larger geographic area that generally ignores jurisdictional lines. This expanded use of resources can strongly benefit both communities that might otherwise have significantly increased costs if they had to procure and establish all the same resources alone. Automatic aid can be used effectively to bolster a community's fire protection resources, or to reduce unnecessary redundancy and overlap between communities.

The department has entered into mutual aid agreements with several other agencies and is a party to agreements with Hennepin County, departments within the North Suburban and Southwest areas and the City of St. Paul as well as a long-standing automatic aid agreement for certain alarms with the City of Richfield.

Support Programs

Training

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 MFD. Anthony Granito, author of *Fire Service Instructor's Guide*, makes the following statement:

> *A good training program is undoubtedly the single most important factor producing and maintaining a high proficiency in any fire department. It not only produces high efficiency initially, but also affects future efficiency when we consider that the rawest recruit now being trained may be chief of the department or at least a senior officer in 20 or 30 years.*

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 firefighter's 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 City of Minneapolis supports this philosophy in their adopted business plan and the Standard of Excellence:[31] *The pursuit of excellence and high professional standards is vital to our success and is achieved in our organization through;*

- *Skills training instilling a value of life-long learning*
- *Development of leadership traits*
- *Ensuring a focus on wellness, health and safety*

Today's industry standards outline certain areas that are considered integral to effective training programs. The program should include the following:

- General training competencies
- Training administration and scheduling
- Training facilities and resources
- Training procedures, manuals, and protocols
- Record keeping (records management system)
- Organizational priority to training

Training Administration

The training chief and training captains administer and coordinate fire training for the department. There is an office support specialist to provide clerical services for the division. All positions are full-time (40 hours per week) positions and are illustrated below.

Figure 74: Training Division Staffing

Position	Number of Personnel
Deputy Chief	1.00
Captain-Special Ops	1.00
Captain-Fire Suppression	1.00
Captain-EMS	1.00
Office Specialist	1.00
Total	**5.00**

[31] City of Minneapolis Fire Department 2010 Business Plan

Figure 75: Staff Special Duties

Chief of Training	Staff - Captain	Staff - Captain	Staff - Captain
Health and Safety Officer	Special-Ops Officer	Fire Suppression Officer	EMS Officer
Incident Safety Officer	Technical Rescue: **Rope Rescue* **Rope Logs* **Confined Space*	Captain's Duties: **Conference* **Orientation* **Out of Grade* **Remedial* **Probationary*	CEU Monitor
Business Plan	Water Rescue: *Swift water Rescue *Static water Rescue *Boat Operator *Ice-Rescue	Vacant/Boarded Buildings	MCI Van
Strategic Planning	Equipment Maintenance	Firefighters: **Rookie School* **Probationary Tracking*	AED Program
Agency Interface	USAR Operations	MCI Van	Health Fair
Training Focus Group	Burn Building Operator	Burn Building Operator	Fit Test
Training Curriculums			Patient Care Guidelines
Battalion Chief's Duties: **Conferences* **Out of Grade* **Orientation*			Infection Control Exposure Reporting
Monthly Newsletter			Incident Rehabilitation
Consolidated Schools			Chempack POC Service Contracts HIPPA/OSHA Compliance Patient Referrals MCI POC Curriculum Development

The training division has expanded many of the responsibilities beyond what are considered minimums, and continues to exploit new techniques, equipment, and methods of instruction. Following are a few examples:

- Defensive Driving EVOC
- Positive Pressure for Fire Attack
- Forcible Entry- Tool Lab
- ICS and Radio Communications
- Search and VES Introduction
- Advanced technical training

Recommendation:

- Continue to research fire service best practices to ensure training program remains up to date and relevant.

Training Facilities

MFD operates a modern, state-of-the-art training center that provides an efficient training environment. The facility has classrooms, computerized AV (audio visual) equipment, computer projection capability, a training library, and a full service training grounds with a 6-story tower - with a 2-story commercial and 2 1/2 –story residential structure attached (all smoke fed), burn building - 2-story with (3 burners), and numerous training props. Training props include a tank car (used for applying chlorine kits and confined space), tank car w/ live fire (propane fed), spill and bobcat live fire (attached to tank car), confined space and technical rescue maze, MC 407 and 312 cars, 3 separate chlorine cap kit props and a roof ventilation prop.

Live Fire Burn Building

The burn building provides safe, controlled, realistic fire conditions, multi-platform burn scenarios, and a 3-sided approach. Smoke generators as well as live fire are utilized in the building for the various scenarios. The burn building is a computer controlled, natural gas fueled, live fire training system that is designed to provide safe, comprehensive, and realistic firefighter training. Computerized operation provides control of multiple fire scenarios.

With safety as a primary concern, fire platforms are staffed by trained operators that control smoke, burners, ventilation, flashover effects, and emergency shutdown of each fire area. The building exhaust fans ventilate the compartments to maintain safe operating temperature and gas levels. If temperature levels reach 700º F, or gas levels reach 25% Lower Explosive Limit, the building fans ventilate the compartments and the safe-guard system shuts down all gas valves.

Training Tower

- 6-story training tower, with attached 2-story commercial and residential provides a platform for ladder, high-rise and high angle rescue scenarios.
- Pre-piped smoke generation available to obscure visibility and increase realism.
- Search and Rescue Maze.
- Ventilation training area with replaceable panels for cutting and ventilation practice.

Hazardous Materials

- A Fuel Spill Burn Area (FSBA) with a tanker truck mock-up. The FSBA presents firefighters with realistic live fire complications encountered in the suppression of fuel spill fire.
- Railroad tanker fire prop, replicates a tanker car with a leaking flange gasket with flames impinging on the side of the car. The tanker also replicates an internal pressure relief valve that discharges, with a flame erupting into the air.
- MC-331 Truck Tanker Fire prop.
- 150 pound Propane Cylinder Fire prop.
- 1,000 gallon propane storage tank prop.

The drill ground area and props provide for hose, ladder, and other "hands-on" training opportunities. Books, videotapes, and reference materials are available at the facility and are available in duplicate form at fire department headquarters and/or stations.

The development of a comprehensive Urban Search and Rescue (USAR) training ground for Minnesota Task Force One is in progress.

Recommendation:

- Continue the development of a comprehensive Urban Search and Rescue (USAR) training ground.

An extensive, professionally produced videotape library that includes American Heat and Fire Education Training Network (FETN) productions is maintained at the training center. Videotapes are indexed and categorized for ease of retrieval and can be checked out for non-scheduled training. Videotaped resources are no longer used as a part of the regular training program due to the logistics of circulating them through the department, and the subscription service has been cancelled. The city is working on installation of a video conferencing system between the fire stations with the hopes of developing the ability to deliver VOD (video on demand) and the many other benefits of this system.

Recommendation:

- Continue the development of a video conferencing system.

Another key challenge for the Fire Department will be costs associated with the new training facility/emergency operations center. Lease agreements with other fire departments for use of the

training facility were a projected source of revenue to help off-set operational costs. The economic conditions will likely reduce the amount of training dollars other municipalities are able to allocate, thus reducing the number of revenue generating lease agreements. The Department is working with the Public Works/Property Management Division and BIS to reduce annual operational costs.

Recommendation:

- Evaluate options to increase revenue and manage costs to ensure the training program is adequate in current and future budget climates.

General Training Competencies

Like any other activity, training should be conducted under a comprehensive plan. The plan should include a clear definition of the goals and objectives of the training program and a schedule of training activities to achieve them. The Training Chief should ensure that lesson plans are developed, approved, and easily accessible; training objectives and measurements are clearly defined; and record keeping and documentation is seamless throughout the department. Frequent monitoring and mentoring of all members during training sessions by the training officers is important for continuity among companies and personnel. The Training Division has established goals and objectives and has developed a multi-year plan.

Recommendations:

- Continue the development of training lesson plans.
- Ensure that all training objectives and measurements are clearly defined, distributed and understood.

MFD's current training plan includes:

- Identification of performance standards for all personnel.
- Provisions for periodic review of individual and company level performance.
- Scheduled training to prevent skills degradation.
- Scheduled skills improvement training.
- Comprehensive training objectives for each training session presented.
- Process for evaluating the amount of learning that occurred.
- Scheduling outside training opportunities.

To ensure quality emergency scene performance, the training provided should be based on established standards of practice. MFD has selected the International Fire Service Training Association (IFSTA) and the National Fire Protection Association (NFPA) as its main sources for standards and training materials. Both are considered to be industry standards and representative of best practices.

Competency is a demonstrated ability to perform a defined skill successfully according to an established standard. MFD is committed to a competency-based training methodology. Competency-based (performance-based) training ensures that firefighters will be capable of responding and providing service to the community in an effective and safe fashion. Document sources for skill based training include National Fire Protection Association, International Fire Service Training Association, Hennepin County Medical Center Medical Protocols, Department of Homeland Security, International Fire Service Accreditation Congress and Minnesota Board of Firefighter Training and Education (MBFTE).

The MBFTE was established by the Minnesota Legislature in Minnesota Statutes, Chapter 299N. The Board's function is to:

1. Review fire service training needs and make recommendations on training to Minnesota fire service organizations;
2. Establish standards for educational programs for the fire service and develop procedures for continuing oversight of the programs;
3. Establish qualifications for fire service training instructors in programs; and
4. Establish standards under which reimbursement will be provided for training and education.

The 2009 Minnesota Legislature passed a bill making Minnesota the first state in the nation to license firefighters. The MBFTE were designated to be the licensing agency. This legislation defined how the licensing process should be conducted in Minnesota.

State licensing of MFD personnel is based on a competency-based training program. The MBFTE established that all career fire fighters are required to be licensed. In order to become a licensed firefighter, one must obtain IFSAC Firefighter II (2002 or newer) certification and must be employed by a Minnesota Fire Department. These certificates are based on the requirements of the International Fire Service Accreditation Congress (IFSAC). By requiring an IFSAC accredited State of Minnesota certificate, MFD is assuring that its firefighters are capable of performing their job tasks in an efficient, effective, and safe manner

Details of firefighter licensing:

- All full-time firefighters must be licensed by July 1, 2011 as a condition of their employment.
- There is one license regardless of the employment status of a firefighter.
- The license fee is $75. The license must be renewed every three years, each renewal costing $75.
- Every three years a licensed firefighter must complete 72 hours of MBFTE-approved continuing firefighter education.

Competency-based training requires that skills (e.g. hose evolutions, ladder raises, ventilation, and rescue) are identified, taught, practiced, and evaluated. Evaluation and certification of firefighters is an important component of the training process and can be used to identify where further skill development is needed. A good evaluation process lends credence to certification and allows firefighters to demonstrate competency and ensure that minimum performance standards are met. Certification may also be used as a qualification for promotion, helps maintain credibility with the community, and reduces MFD's exposure to liability.

In addition to state and national standards, MFD uses internal department recruit training standards. A formal tracking system guides and tracks the process of each recruit. The system consists of manuals, a series of forms, check off sheets, and task books or packets. Documents contain operational tasks and standard operating procedures relevant to probationary firefighter and acting Fire Motor Operator (FMO) and officer positions (in development). Performance goals describe and list measures for completing each task accurately, safely and in a timely manner. Training documents are updated as needed and can be accessed in electronic and hard copy format.

Recruit Training

New firefighters complete a 6 month recruit academy administered by Hennepin Technical College that covers all the requirements for basic firefighter and EMT-Basic. After the academy, recruits spend 4 - 8 weeks assigned to the department training division for MFD specific policies and procedures. The recruits then are assigned to a company with a formalized training schedule. When assigned to a response unit, new personnel are provided with ongoing and refresher training to avoid a degradation of basic skills. New personnel are evaluated daily and monthly by their company officer using a standard form, and are administered bi-annual written and practical examinations by the training division.

Each new firefighter must complete a task manual or packet during the first year of employment. The manual provides direction for comprehensive training at the company level, and helps to foster personal

development. A signature by the supervising company officer is required, as is reviewed by the line (shift) battalion chief, and finally the training division before the new recruit is off probation.

One of the most important issues addressed in NFPA Standards is firefighter accountability and safety while operating on the emergency scene. Accountability practices found in *NFPA 1500* are used by fire captains and battalion chiefs to maintain control on emergency incidents.[32] MFD delivers routine training to all members on how to use and comply with this system, called the Personnel Accountability System (PAS) or PAR system. MFD has placed a high priority on safety and intends to participate in the IAFC program *Everyone Goes Home,* a firefighter life safety initiative program**.**

MFD plans on participating in the annual Safety, Health and Survival Week (Safety Week). Safety Week is a collaborative program sponsored by the IAFC (International Association of Fire Chiefs) and the IAFF (International Association of Fire Fighters). During Safety Week, fire departments are encouraged to suspend all non-emergency activity and instead focus entirely on safety, health and wellness-related training, and education until all shifts and personnel have participated. The week is dedicated to ensuring each shift, company, and firefighter can spend time focusing on these critical issues.

Department personnel at all levels of the organization receive instruction and use the National Incident Management System (NIMS) on emergency incidents. First line company officers (fire captains) and Battalion Chiefs have received training (or are in process) and are certified (or are in process) in the following NIMS courses:

- ICS – 100 Introduction to Incident Command
- ICS – 200 Basic Incident Command
- ICS – 300 Intermediate Incident Command System
- ICS – 400 Advanced Incident Command for Command and General Staff
- IS – 700 NIMS, an Introduction
- IS – 800 National Response Framework, an Introduction

Emergency Medical Services (EMS) training is coordinated by the EMS Bureau Chief and Hennepin County Medical Center. MFD is a Minnesota-approved and certified training center at the EMT-basic level. Training is delivered primarily by paramedics and other classes are presented by physicians, nurses, and the EMS educator from Hennepin County Medical Center. EMS training is scheduled during

[32] *NFPA 1500: Standard on Fire Department Occupational Safety and Health Program*, 2007 Edition.

the first and last quarters of the year to allow for hands-on fire training during optimum weather months. Training should remain a high priority as the highest percentage of response requests are medical related.

Special Operations

MFD responds to any number of events outside of fire and EMS incidents. Classified as special operations, incidents include hazardous materials, water rescue, and technical rescue. These high-risk/low frequency incidents pose a high safety risk to both victims and firefighters. These incidents tend to be outside the "normal" realm of emergency response, and require highly specialized equipment and skilled technicians to safely and effectively perform rescue operations.

Specialty teams are group(s) made up of individuals having areas of expertise in roles outside the level of training considered as normal for fire suppression personnel. Public expectation has increasingly focused on fire departments as the logical source to staff, equip, train, certify, and maintain specialty teams. A specialty team may concentrate on one or more disciplines. Examples of specialty teams for MFD include:

- Hazardous materials
- Technical rescue
- Water rescue
- AHIMT members

MFD specialty teams strive to recruit, retain, and maintain highly trained and motivated individuals for these special events.

Specialized operations also require a continuous commitment from the department. Personnel must complete rigorous initial training and certification, and annual continuing education to maintain certification. Specialty teams also require equipment that is incident specific.

A challenge fire departments face when developing specialty teams is that the probability of an event requiring a specialty team is relatively low. However, the cost of developing and maintaining a team is quite high. One strategy to deal with this problem is to regionalize specialty teams, as is the case with the All Hazard Incident Management Team (AHIMT) and Minnesota Task Force 1 (MNTF1) a state asset of specially trained personnel in technical rescue.

Hazardous Materials

Required specialized on-going training is mandatory for participants. All MFD personnel are trained and equipped to provide hazardous materials response at the specialist level. Personnel receive annual programmed training that meets or exceeds all local, state, and federal training requirements for hazardous materials. A monthly training schedule was developed for 2011.

When a hazardous materials incident occurs, Hazmat team members respond to the incident on the specially designed hazardous materials response unit. The Hazmat unit is a multi-functioning piece of apparatus with specialized equipment, communications, information gathering electronics, air monitoring devices, chemical analysis materials, and a full complement of tools to affect an entry into a hazardous atmosphere.

Water Rescue

MFD is the primary provider of surface water rescue in the City. Periodic training by the water rescue team involves surface, ice and swift water rescue. All department personnel receive annual refresher training in basic water rescue and ice operations.

Technical Rescue

Some members of MFD are tasked with responding to emergency operations that involve:

- Structural Collapse – Victim search and rescue from all types of structures that have become unstable and/or collapsed. Given a probability of victims in open or void spaces, the members search the collapse for survivors.
- Trench and Excavation Collapse – Securing trenches and removing victims from trench and excavation cave-ins.
- Confined Space Rescue – Rescues in areas with limited accessibility, e.g., manholes, utility vaults, silos, ducts, industrial vats, and sewers; and areas with the possibility of other hazards, including chemical leaks, lack of oxygen, or mechanical threats. These incidents are among the most dangerous for rescuers.
- High-Angle Rope Rescue – Rescue from high-rise buildings and retrieval from ravines or severe slopes.
- Low-Angle Rope Rescue – Rescues involving below grade or difficult angle areas.

MFD provided programmed training on a variety of subjects in 2011 - 2012; the following classes (many with an emphasis on safety) were delivered:

- Traffic Safety/DOT Review
- EVOC (Emergency Vehicle Operator Course)

- Search and VES Introduction
- Reading Smoke
- Professional skills and confidence
- Truck/Engine Functions
- Fire Motor Operator (driver, pump operator, aerial) certification

Training Procedures, Manuals, and Protocols

MFD firefighters are provided with all the required reference and educational materials to be used in training. Additional videotapes and reference manuals are maintained in the fire training center library. Task books, Job Performance Requirements (JPR's), IFSTA manuals, reference manuals, and other material are readily available. Training equipment and props are not inventoried however, a check out procedure is in place.

Recommendations:

- Document an inventory of all training equipment, materials and supplies.
- Ensure the checkout procedure is compatible with inventory system.

Training Methodology

A variety of methods are used in the delivery of entry level and ongoing training to members of the MFD. The centerpieces for training are:

- Company Training - Basic practices under the direction of the captain, refreshing basic and essential skills. This is primarily to ensure that the skill set and overall proficiency of firefighters are continuously maintained and improved. This training is extremely important, as it ensures that firefighters are proficient in the use of their equipment and tools. New and innovative tools are always being introduced, so it is important that firefighters undergo continuous fire department training to keep their knowledge of equipment up to date.
- Consolidated company schools - four sessions annually in EMS, two sessions annually in Firefighting.
- Captain/FMO Conferences - On-going training and development for the promotional positions - two sessions for Captain, one session for FMOs.
- HOT - Acronym for "*hands on training*".

The monthly training calendar outlines and specifies training activities, subjects, and delivery modes. Training is also divided into four general areas:

1. Company – training is held in the individual fire stations and conducted/coordinated by the company officer.
2. Equipment Drill – covers use and care of hand tools, ropes, and power equipment.
3. Apparatus Drills – primarily training on engines, aerials, other apparatus, ladders, and use of hose lines, etc.
4. Multi Company Drills – units from more than one fire station meet for multi-unit training on hose evolutions, driver workshops, and other scenarios requiring more than one company.

During the last fiscal year (January 1 to December 31, 2010), MFD delivered numerous classes for a total of 18,662 training hours. Suppression division personnel averaged approximately 148 training hours in 2010.

The training division recently initiated a systematic process to conduct annual company and individual performance evaluations. Performance evaluations are used to verify and validate the skills and competency of firefighters or fire companies. Until recently, verification of competencies was measured ad hoc, inconsistently, and was not department wide.

The role of the Training Division will be as a facilitator and instructor, as-needed; not as an evaluator. Performance evaluations are within the chain of command, with assistance provided from the Training Division where necessary. For documentation, the Training Division creates an individual Annual Training Record. This document will record individual training, evaluate competency and will be an addendum to the Performance Appraisal (on a yearly basis). The Annual Training Record is the department's method of maintaining State Certification through MBFTE, as well as providing a blueprint for day-to-day training for company officers.

MFD should continue to develop and employ a formal evaluation process to annually measure and verify competency of both the individual and the company.

Recommendation:

- Continue to develop and employ a formal evaluation process to annually measure and verify competency of individuals and companies.

Training Record Keeping (Records Management System)

Most of the department's training records are maintained on a records management system (RMS) called *Fire House™*. *Fire House™* is capable of producing reports showing the training received by

individual (employee/member), category (or type of training), and number of hours. This RMS tool is an excellent resource for the department to assist in developing long range plans for employee certifications, training, and educational needs. Company officers, training staff, and instructors input training data in RMS daily, or at the completion of a training experience, continuing education session, or training course.

Targeted Training

Industry best practices suggest that personnel demonstrate the skills and knowledge required of a more responsible position prior to promotion. Pre-promotional training is often supplied as a means to ensure that candidates meet the minimum educational and certification requirements. A selection process is then used to identify the most qualified individual based on a demonstration of proficiency.

Fire Motor Operator (FMO)

MFD has developed a Certified Relief FMO Program. The nexus was to provide training, experience, and a certification process to improve and broaden the operational skills, knowledge, and capabilities of all candidates. The program gives prospective FMOs the opportunity to drive and operate various fire apparatus. It consists of standards and task performances that must be mastered, and a certification examination, after which the successful candidates are placed onto a list for assignment as a relief driver when the need arises. The program is also required for promotion.

Company Officer

MFD is developing an Acting Officer Program. The program goal is to provide training, experience, and an examination to insure the safety of a company officer and those under his/her command. The program is designed to improve and broaden the operational skills, knowledge, and capabilities of future officers. The program will consist of standards, task performances and an assessment center. After successful completion, a candidate will be eligible to be an acting officer. The program ultimately will be required for promotion. MFD does not require State certification for company officers.

The department has not developed a chief officer or a formal leadership program.

Recommendation:

- Offer a chief officer program and develop future leadership for the department.

Organizational Priority to Training

Senior management of the City of Minneapolis and the fire department believe in the value of firefighter training and make it a high priority. Historically, the department has been in a financial position to provide generously for training programs. In recent years, the training chief has had the ability to request (during budget preparation) new equipment and to sponsor attendance for personnel at offsite training, seminars, and professional conferences. This practice has changed given the new reality of local and state financial constraints.

Although the training chief can make requests for training funding during the budget preparation period, the fire chief is the ultimate department-level authority in what is submitted within the departmental budget. The Succession Plan that is in place outlines the fire chief's vision for departmental and organizational advancement and all training and education, particularly those programs focused on career development, must match the human resources component of the succession plan. Therefore, the educational priority is directly tied to the vision of the succession plan.

Fire Prevention and Public 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. This can be accomplished affectively and most safely by having fire service crews increase their familiarity with the buildings within their response areas. This is easily accomplished through frequent pre-incident planning surveys of target hazards and other buildings. While it is the prerogative of the jurisdiction having the authority over the fire service to determine the level of planning it supports within its jurisdiction even those who determine not to plan are in fact doing a form of planning since , “A failure to plan is in fact a plan for failure.”

Even with the most conscientious code enforcement and public education efforts, fire departments must be prepared to aggressively fight the fires that do occur. MFD must take a balanced and coordinated approach to accomplish these goals by using fire inspectors, public educators and in-service crews in the right mix to provide these services.

As of the 2010 Annual Report, MFD's fire prevention and life safety education programs function under the direction of the Assistant Chief of Administration and is comprised of a Fire Marshal (Deputy Chief), Assistant Fire Marshal and the Fire Prevention Bureau.

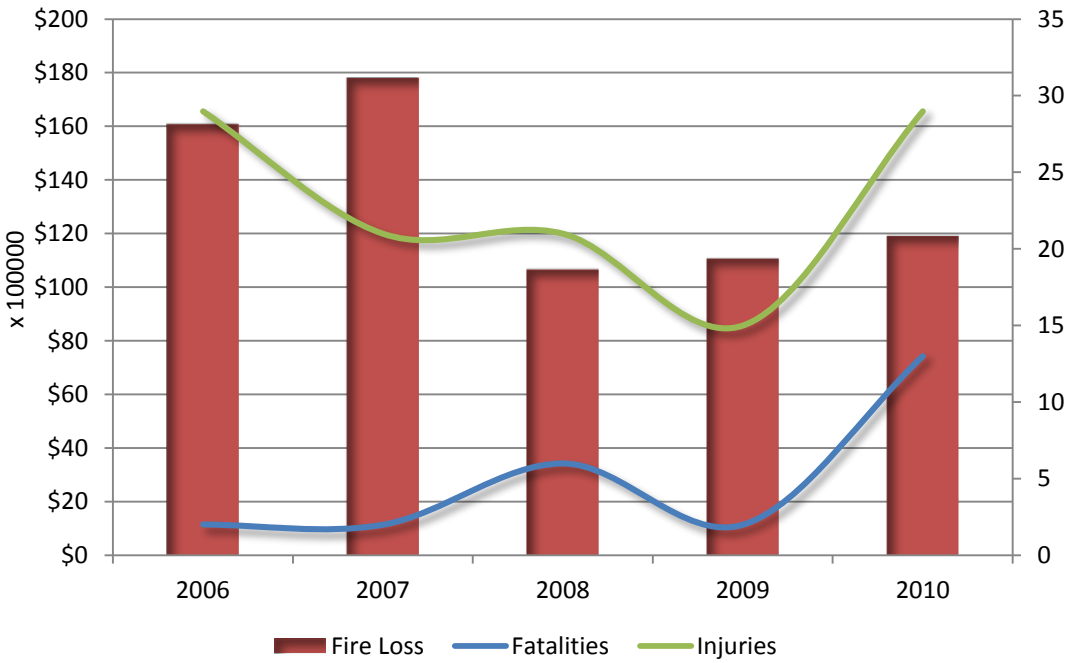
The Fire Prevention Bureau is mandated to uphold and enforce all parts of the Minnesota Fire Code and is expected to monitor compliance through a program of permit issuance, plans examination, site inspection, and follow-up inspections, using appropriately certified and designated code officers.

The Fire Prevention Bureau works in partnership with Regulatory Services (Fire Inspection Services Division) to provide inspections for the City's approximately 3,000 residential structures with four or more units and the more than 5,000 commercial and mixed use structures. It is the mission of the joint program to inspect each of the aforementioned properties every three years based on fire code enforcement authorities outlined in the Minnesota Fire Code (MFC).

Fire investigations are conducted to determine the origin and cause of fires where a death, injury, or property loss occurs in accordance with departmental SOPs. The lead investigator may arrange for additional municipal, law enforcement, state or other resources as required to assist with the investigation. In the event of a fire resulting in a death, or where arson is suspected, the investigation will include immediate notification of the State Fire Marshal.

Due to budgetary cutbacks, the department has been forced to reduce the Fire Prevention Bureau and transfer some responsibilities to Regulatory Services, thus reducing its capacity to perform proactive investigations and/or inspections. The Fire Marshal`s position is currently the sole member of the fire prevention program at this time with two staff captains working under their direction. The current program lacks a specific public education focus due to limited resources. The following figure illustrates that, although fire loss has decreased over the past five years, both injuries and fatalities have increased. The correlation between the change in focus of the Fire Prevention Bureau and the resulting increase in both injuries and fatalities is unable to be determined, but should be monitored for future trends.

Figure 76: Fire Loss Compared to Civilian Injuries and Fatalities



Special Risk Inspections

Existing occupancy inspections of special risk properties are performed by Fire Inspection Services personnel within Regulatory Services. Fire Inspection Services conducts regular inspections and issues permits to business owners who have hazardous chemicals or materials stored on their property.

New Construction Plans Review

The Fire Prevention Bureau has a very strong linkage to the planning and development department through Regulatory Services, and this long-standing relationship results in the fire service being consulted on all elements of the planning and development process. This includes townhouse, condo and apartment development including secondary suites and industrial development, excluding residential housing applications. The review of new construction plans is currently a function of Fire Inspection Services (FIS), formally the Fire Prevention Bureau.

Fire Prevention is also involved in the development at a macro level in municipal planning which sets the standards for the entire community; all structure and subdivision plans, and in all land use amendment classifications by using its own filters of standards and requirements when reviewing these applications. It is their goal to identify the criteria that is necessary to ensure fire safety is consistently applied. In the past, MFD has requested that additional safety measures be enacted concurrently with mandated code

measures. This has included commenting on street designs, such as traffic calming initiatives. Moving forward, any newly developed ordinances should include verbiage that will allow the fire service to make its own community standards for community safety.

Key Box Entry Program

Key box entry systems allow building owners to cooperate with fire department personnel by placing a secure key box on the exterior of their building. This key box contains a key that firefighters can use to gain access to the structure in the case of an emergency. Most key box systems are tightly controlled and each usage of the key is logged by the system, thereby reducing department liability.

The MFC authorizes the fire department to require key boxes when access to building is restricted or where immediate access is needed for life saving or firefighting. MFD does not specifically define when key boxes are required. Policy 5-1 indicates that all multi-unit residential buildings with a common entrance door or any building that has a fire sprinkler or fire alarm system must also participate in the key box program. In addition, Minneapolis Ordinance 174.400 requires that all commercial buildings register with MFD annually for the purposes of inspection and code compliance.

The current practice requires fire suppression staff to inform fire prevention staff when buildings employing lock boxes fail to meet expectations or required occupancies fail to install key boxes. With limited resources this is not considered a priority as the focus of the department is to prevent risk of public safety through fire prevention.

General Fire Inspection Programs

As stated previously, nearly all general inspection duties and responsibilities have been transferred to the Fire Services Division within Regulatory Services. MFD conducts annual inspections of commercial and residential structures containing four units or more. In addition, the following inspection programs are currently active within the Fire Prevention Bureau.

Figure 77: Inspection Program Descriptions and Frequencies

Program	Description	Frequency	Legislation
Existing Commercial Occupancy Inspections	Complaint or request basis-Problematic properties prioritized, i.e. frequent alarms, fire crew observations,	3-year cycle	MFC
Special Risk Inspections	Hazardous materials	As required	MFC
Licensing Inspections	New occupancies	As required	Local
Storage Tank Inspections	Includes large above ground and below ground tanks.	As required	MFC
Rental Inspections	Apartments and multi-family housing,, student housing, rental property, hotel/motel, etc.	3-year cycle	MFC
Single Family Courtesy Inspections	Limited Involvement	Ad hoc-request basis	None

Previous programs by MFD included car seat installation programs and home inspection programs which have been discontinued because they were considered to be low value, low risk and produced low results. Instead, school programs were introduced (i.e. 911 for kindergarten children). It is common that many urban communities experience a high rate of non-functioning smoke alarms and poor battery maintenance after the original installation. Due to the migration of inspection services to Regulatory Services, it may be feasible to have on-duty crews conduct cursory smoke alarms inspections while performing community services (if circumstances permit) or as an added service during an EMS response once all patient care has been completed. Problem occupancies can be flagged and followed up by the Fire Prevention Bureau.

Community Risk and Occupancies

Community risk level is typically established through an overall profile of the community based on the unique mixture of demographics, socioeconomic factors, occupancy risk, fire management zones, and the level of services currently provided. The property category is of particular interest to the fire service. Each property or structure in a community can be considered a hazard that carries inherent risks based on occupancy type as it relates to fire load. Occupancy risk is sublevel of property risk and is established through an assessment relative risk to life and property resulting from a fire inherent in a specific building, structure or generic occupancy classes (e.g. high-rise residential).

The NFPA Fire Protection Handbook defines hazard levels of occupancies as three basic types. Each hazard level carries inherent risks:

Figure 78: Occupancy Hazard Classifications

High-Hazard Occupancies	Schools, hospitals, nursing homes, explosive plants, refineries, high-rise buildings and other highlight hazard or large fire potential occupancies
Medium-Hazard Occupancies	Apartments, offices, mercantile and industrial occupancies not normally requiring extensive rescue by firefighting forces.
Low-Hazard occupancies	One, two, or three-family dwellings and scattered small business and industrial occupancies

Fire services assess the number and location of each type of occupancy and its associated hazard level and then plan resource deployment to ensure that sufficient fire department resources are dispatched to adverse events that occur in the occupancy.

Inspection Frequency for High Risk Occupancies

Based on current city ordinances, all commercial occupancies within the city are required to register with the Fire Prevention Bureau. It is the department's goal to perform high risk occupancy inspections annually, but is limited by the amount of resources that are available at this time. The use of in-service crews may be affected by the on the job training requirements of this integrated service. Firefighters will have to split the inspection time with the training time required to remain current in fire, EMS and inspection professional competencies. In order for the inspection program to be successful, it must be a department goal that the inspections are not just slotted into the time schedule but instead considered a priority. A failure to prioritize will result in competing time management issues.

Medium Risk Occupancies

In Minneapolis, medium risk occupancies are slated for inspection every other year, or at least every three years. The Fire Prevention Bureau sets inspections for these types of occupancies if appropriate resources are made available. While these types of occupancies may pose a reduced risk over the high target occupancies due to the transient nature of the business, and the frequency of changes in these occupancies, a greater risk is inherently present for responders and neighboring occupancies. Many times, changes in occupancies result in a new business occupying a building that was designed for a different business and hazard type. Quite often, lease hold changes result in different floor plan arrangements and fire load complications. These types of occupancies, while maybe not capable of the same very large fire risk found in large industry and/or special hazard occupancy, may contain greater risk which can pose a higher danger to emergency responders. Added emphasis on this type of occupancy should be a focus of MFD.

Low Risk Occupancies

These types of occupancies represent the average residential occupancy. From a fire risk perspective, they have the potential for the least amount of fire damage where the fires tend to be confined to the original occupancies, but they result in the most fire deaths of all of the risk occupancies. More than 70 percent of the fire fatalities in North America occur in individual residential occupancies. While the risk occupancies listed above have greater potential for loss of life and fire spread, they are also the most regulated through fire code enforcement. Thus, are probably better protected and served through the fire code than are the residential properties. Residential properties are the least regulated and least inspected and thus pose the greatest risk of loss of life for the inhabitants. As such, residential properties of four units or more must be a focal point of any MFD inspection program.

Recommendations:

- Develop a Risk-Based Community Assessment Standard and incorporate into ordinance as a means of ensuring community safety.
- Establish a process for identifying and measuring the Community Risk Level for the purpose of development of both short term and long term service delivery requirements.
- Increase the inspection capabilities and frequency of all High, Medium and Low Risk Occupancies by using appropriate census data.

Public Education

Public education is an activity coordinated by the Fire Prevention Bureau and is staffed by a Community Risk Reduction Public education topics include, but are not necessarily limited to:

- Calling 911
- Stay at Home Alone program
- The Sparky program
- Attend special events, trade shows, parades
- First Aid CPR courses
- Seniors Fall program
- Publications Available to the public (including some on-line)

Fire safety brochures and publications are available for the following topics:

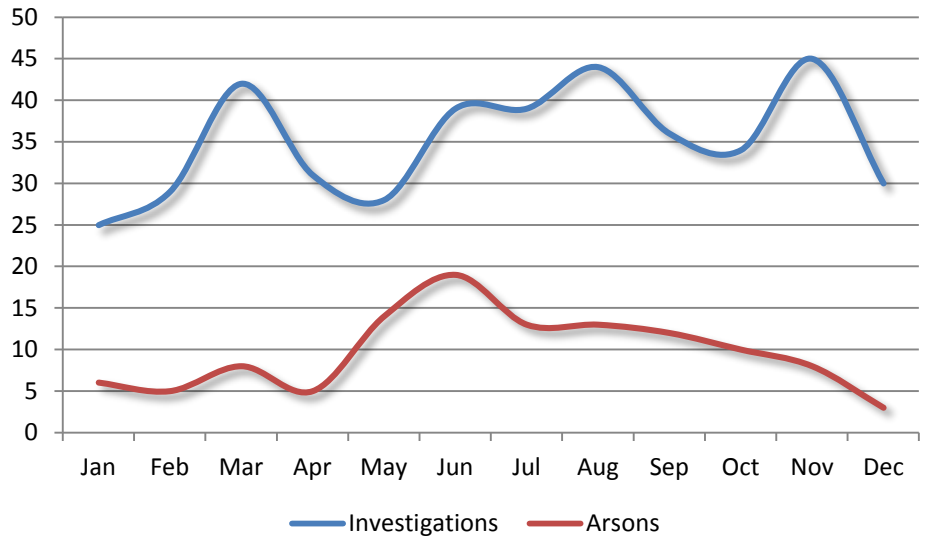
- Arson Prevention
- Burn Prevention
- Campus Fire Safety
- Candle Safety
- Carbon Dioxide Safety
- Fire Prevention
- Fire Safe Celebrations
- Fireworks Safety
- Flammable Liquid Safety
- Heating Safety
- Holiday Fire Safety
- Hot Weather: Safety concerns during the hot and dry conditions
- Ice Safety
- Kitchen Fire Safety
- Lightning Fire Safety
- Match and Light Safety
- Residential Sprinkler Systems
- Scald Burns
- School Fire Prevention
- Smoke Alarms
- Smoking and Alcohol
- Turkey Fryer Safety
- Water Safety
- Wildland Fire Safety

Fire Investigations

As stated previously, the Fire Marshal is the primary position responsible for fire investigations with assistance provided by two investigators assigned to each operational shift. These individuals provide on-scene origin and causes determination and investigative services up to the point of prosecution. The Investigation practices are best described as following the intent of *NFPA 921: Guide for Fire & Explosion Investigations*, as elements of NFPA 921 are built into the MFD Investigation SOG.

Due consideration should be given on the merits and feasibility of cross training on duty senior officers to provide additional afterhours investigation services. This will require a new training component, but will provide unprecedented depth of resources and almost immediate response on a 24 hour basis in addition to the investigators currently on shift. In addition to benefitting origin and cause determination, these same resources may be able to augment the arson investigation requirements described below. The figure illustrates the trend in investigations and arson activities during 2010.

Figure 79: Investigations versus Arson Determinations



As is evident in the figure above, the number of investigations increases slightly throughout the year, while the number of actual arson determinations typically declines over the same period.

Arson Investigation and Awareness Training

Arson Investigation and Awareness Training is provided on an ad hoc basis within the department and there is no formalized officer training provided at this time, other than the education requirements provided in *NFPA 1021* and *1041: Standard for Fire Officer and Fire Instructor*, respectively. External education is provided through state schools, seminars and certification programs The SOG stipulates who is called, and when, and it contains built-in contingencies that utilize outside resources as required.

Findings and Recommendations

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 its 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, those in positions of fire service leadership within the City of Minneapolis 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 MFD is not already operating at a high level. In fact, ESCI is pleased to report all available evidence shows that the fire department consistently provides excellent service to the citizens of Minneapolis. 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, ESCI offers recommendations to assist the city in implementing the strategies that will best benefit the public.

The following list summarizes all of the recommendations provided throughout this report that are achievable in the short or mid-term, typically within the next five years. These recommendations have been compiled into a prioritized list for easy reference and include the page number where they are located within the body of the report.

Priority 1 – Immediate Internal Safety

The recommendation deals with an improvement or initiative that solves an issue affecting the safety of firefighters and/or other personnel. These are not matters that simply make it easier to do a particular function but in fact make a currently unsafe situation, safe.

No Priority 1 recommendations noted.

Priority 2 – Legal or Financial Exposure

The recommendation resolves a situation that is creating, or is likely to create, the opportunity for legal action against the entity or its officials. It also may be a situation that could subject the entity to a significant expense.

- Ensure all life safety rope is properly inventoried with its use tracked per NFPA 1983. 159

- Ensure a system is developed to document annual confined space entries per OSHA 1910.146 for each employee expected to make confined space entries. 159
- Develop an in-house skills tracking mechanism for initial and continued training based on NFPA 1670/1006: Standard for Technical Rescuer Professional Qualifications. 159
- Develop a basic water rescue training program to ensure all responders can function safely and effectively at water rescue incidents. 159
- The department should ensure that all personnel are receiving the proper continuing education and training commensurate with their level of credentials. 163
- Continue to develop and employ a formal evaluation process to annually measure and verify competency of individuals and companies. 179

Priority 3 – Corrects a Service Delivery Issue

The recommendation addresses a service delivery situation that, while it doesn't create an immediate safety risk to personnel or the public, does affect the ability to deliver service in accordance with its standards of performance. For example, adding a response unit to compensate for a growing response workload or delivering training needed to allow personnel to deal effectively with emergency responses already being encountered.

- Store active PPE (turnout gear) in a separate, ventilated room rather than on the apparatus floor where it is exposed to vehicle exhaust. 117
- MFD should work with Hennepin County to ensure that patient information is shared both on scene and post-incident to improve continuity of care and quality improvement functions. 153
- Develop a training plan that incorporates monthly skills training and quarterly scenario-based exercises. 159
- Develop a bid-back system that prioritizes personnel with technical rescue training to be placed at stations that deliver these services to the city as a means of efficiently training for deployment. 159
- The department should determine the appropriate level of initial hazardous materials training for all personnel. 163
- The department should work with the city to ensure that proper funding is applied to the hazardous materials program based on the level of commitment to that function. 163
- Continue the development of training lesson plans. 172
- Offer a chief officer program and develop future leadership for the department. 180
- Increase the inspection capabilities and frequency of all High, Medium and Low Risk Occupancies by using appropriate census data. 188

Priority 4 – Enhances the Delivery of a Service

The recommendation improves the delivery of a particular service. For example, relocating a fire station to improve response times to a particular part of town or adding a piece of equipment that will improve the delivery of a service.

- The department should implement a formal personnel recruitment and retention program that can assist in mitigating the attrition the department is experiencing. 41
- The formal succession plan that is currently in place should be utilized more fully to ensure that a leadership vacuum is not realized in the very near future. 41
- The department should develop strict and formal guidelines for the appointment of personnel to administrative support positions based on a minimum set of requirements and standards. 42
- Evaluate funding options to maintain 15-year life cycle for MFD apparatus. 87
- Include capital equipment in vehicle replacement cost estimates. 90
- Complete development of the AMP (asset management plan). 117
- Aggregate like item equipment purchases with a total value of $5,000 or more and include in the department's asset management plan. 117
- MFD should seek involvement with the Hennepin County EMS Council and request an active seat within the group. 153
- MFD should ensure that the department's occupational health and CISD functions are maintained. 154
- Evaluate the effectiveness of maintaining powered hydraulic tools on the engine companies. 159
- Upon completion of an equipment inventory and determination of future deployment commitment, the department should condense resources to fewer locations and specialize those resources appropriately. 163
- Continue to research fire service best practices to ensure training program remains up to date and relevant. 170
- Continue the development of a comprehensive Urban Search and Rescue (USAR) training ground. 171
- Continue the development of a video conferencing system. 171
- Evaluate options to increase revenue and manage costs to ensure the training program is adequate in current and future budget climates. 172
- Ensure that all training objectives and measurements are clearly defined, distributed and understood. 172
- Document an inventory of all training equipment, materials and supplies. 178
- Ensure the checkout procedure is compatible with inventory system. 178
- Develop a Risk-Based Community Assessment Standard and incorporate into ordinance as a means of ensuring community safety. 188

- Establish a process for identifying and measuring the Community Risk Level for the purpose of development of both short term and long term service delivery requirements. 188

Priority 5 – A Good Thing to Do

The recommendation doesn't fit within any of the above priorities, but is still worth doing and can enhance the District's morale or efficiency.

- The city should work with all department heads to understand the rationale for centralization of work and the reason for the allocation of cost. 23
- The department head needs to ensure that all department personnel understand that the assets are the responsibility of the department and that they must be treated as if they own them. 23
- Elected officials should be periodic attendees at labor-management meetings to ensure continuity of communications. 38
- Develop a fee schedule supported by city ordinance to bill technical rescue events, such as vehicle extrications and hazardous materials incidents. 159
- Consider a vehicle/machinery program delivered by MFD instructors to all recruits after completing their initial fire training. 159

Corporate Offices
25200 SW Parkway Avenue, Suite 3
Wilsonville, Oregon 97070
800.757.3724

Eastern Region Office
111 Kilson Drive, Suite 208
Mooresville, North Carolina 28117
704.660.8027

National Capital Region Office
4025 Fair Ridge Drive
Fairfax, Virginia 22033
703.273.0911

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