FIRE STATION PLACEMENT REVIEW AND RECOMMENDATIONS FOR EXPANSION DES MOINES FIRE DEPARTMENT CITY OF DES MOINES, IOWA

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CITY OF DES MOINES

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December 30, 2014

John TeKippe, Fire Chief
Des Moines Fire Department
2715 Dean Avenue
Des Moines, Iowa 50317

Dear Chief TeKippe:

I am pleased to submit with this letter our Report on the Fire Station Placement Review and Expansion Study.

The Study Team acknowledges the excellent cooperation that we received from City officials and many members of the Des Moines Fire Department. Please contact my office if you have any questions relative to this Study.

Sincerely,

Leslie D. Adams
President

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ACKNOWLEDGMENTS

The Study Team extends genuine appreciation to the City of Des Moines officials and staff and members of the Des Moines Fire Department for their cooperation and assistance in conducting this Study to develop the Fire Station Placement Review and Recommendations for Expansion of the Des Moines Fire Department.

This project was unique given the extensive support and assistance provided to the Study Team by Des Moines project members. A sincere "thank-you" is extended to these individuals for their support, assistance and contributions to the completion of this Study.

EVALUATION METHODOLOGY

This Study was developed through a process of interviews, data collection, research, literature review, on-site observations, analysis of data and comparative evaluations with "best business" practices and standards in fire protection and emergency medical services. The Study Team's experiences as fire and EMS officials and fire and EMS consultants in every region of the U.S. were incorporated as appropriate.

STRUCTURE OF THE STUDY REPORT

This report contains eight chapters. To assist the reader, the Study Team has included detailed background information on state-of-the-art fire and EMS station location and condition-related practices and standards to assist with understanding the basis for some conclusions, options, and recommendations.

Chapters Three through Seven contain recommendations at the end of each chapter. The recommendations are numbered to correspond with the subject matter in the chapter.

Chapter Eight contains a suggested Vision for the Future related to implementation and a suggested timeline for consideration.

The final document in this report is a sequential listing of recommendations verbatim from each respective chapter.

STUDY TEAM MEMBERS

This Study of the fire station placement and expansion in City of Des Moines was conducted by three consultants and two office staff of Public Safety Solutions, Inc. (PSSi). The consultants each have more than 25 years of fire and EMS experience, and they have supervised and served as fire and EMS services providers. One has served as a Peer Assessor with the Commission on Fire Accreditation International (CFAI). The various Study Team members have been conducting fire station location and condition related work since 1975. They are hereinafter referred to as the Study Team.

Leslie D. Adams

Mr. Les Adams served as the corporate and on-site project director responsible for project completion. As the former Deputy Fire Chief and second in command of the Montgomery County, Maryland, Fire and Rescue Department, he has 28 years of fire and EMS management experience. He has served as the operations deputy fire chief of a fire department that serves a large metropolitan population. He has been responsible for all duties of fire services, including operations, personnel management, planning and research, facilities, apparatus, staffing, training, dispatch, and administration.

Mr. Adams conducted his first fire station location analysis in 1975 for Montgomery County that included 600 square miles and 33 fire and rescue stations. He has conducted more than 60 fire and EMS projects involving the assessment of fire and rescue stations and locations.

Mr. Adams has managed fire and EMS operations in a county with 33 fire stations, 818 paid firefighters and 900 volunteer members, 31 engines, 14 trucks, 35 Basic Life Support units, 13 Advanced Life Support units and 120 paramedics. This department provides fire services to 900,000 residents.

Mr. Adams holds a B.S. in Business Administration from the Columbia Union College and has completed course work on a Master's Degree in General Administration.

He has taught at the National Fire Academy on modern techniques in fire services operations and has been on the faculty of Montgomery Community College teaching Fire Science Administration.

Mr. Adams has served as the Chairman of the International Association of Fire Chiefs (IAFC) Personnel Management Committee.

Mr. J. Robert Brown

Chief J. Robert "Rob" Brown, Jr., retired after 32 years in the fire and emergency services, serving most recently as Fire Chief of Fresno, California. During his fire service career, he served a combined 20 years as fire chief for departments in the metropolitan areas of Washington, DC; Kansas City, Missouri; Cincinnati, Ohio; and Denver, Colorado, providing fire, rescue, EMS, ambulance transport, Haz-Mat, ARFF, marine firefighting, dive rescue and Urban Search and Rescue (US&R) services.

Chief Brown's experience serving as fire chief of a large metro fire department allows him to bring proven solutions to a variety of issues facing emergency service leaders today. Chief Brown is a recognized expert in strategic planning and resource deployment, EMS, and special operations—formerly serving as adjunct faculty for the National Fire Academy in EMS Special Operations, and Emergency Response to Terrorism.

During his career as fire chief, he was instrumental in setting up a regional communications authority; implementing multiple ambulance transportation systems in the fire department; and consolidating and implementing numerous cost-recovery programs generating millions of dollars in EMS and other service related revenue. Chief Brown is also known as an expert on "green" initiatives in fire station design and operation, as well as "green" fleet operation initiatives. Additionally, Chief Brown developed an organizational management program for fire and EMS, based on the popular law enforcement CompStat model, which maximizes performance and promotes an empowered workforce.

His expertise in fire and EMS management led the IAFC President to appoint him as Chair of the IAFC's Economic Crisis Task Force. He led the task force in developing the IAFC's landmark guide on surviving and thriving during the economic crisis—"Weathering the Economic Storm: Fiscal Challenges for the Fire and Emergency Medical Services." In addition, Chief Brown has extensive experience in Emergency Management and Homeland Security integration in the fire service and represented the IAFC EMS Section on the DHS/FBI Active Shooter working group.

Chief Brown has served on the Board of the EMS Section of the International Association of Fire Chief's (IAFC) for 10 years and is past President of the Missouri Valley Division of the IAFC, the Colorado State Fire Chiefs Association, and the Northern Virginia Fire Chiefs. Additionally, Chief Brown serves on the Editorial Board of the *Journal of Emergency Medical Services* (JEMS), and is a member of the IAFC/NFPA Metropolitan Fire Chiefs.

Chief Brown holds a Bachelor's Degree from the University of Missouri and is a graduate of the Executive Fire Officer program at the National Fire Academy. He is also a Chief Fire Officer Designate through the Center for Public Safety Excellence.

Robert K. McNally

Robert K. McNally provided the operational data and geographic information system (GIS) analysis for the project. He was integral in the planning of future deployment strategies. Mr. McNally has consulted for over 110 municipalities of all sizes across the United States and Canada. He is a firehouse software expert related to data analysis.

Mr. McNally has a Master's Degree from the University of North Carolina-Charlotte in Urban/Regional Planning. The emphasis of his academic research has been on the application of GIS in public safety and homeland security sectors. As an award-winning researcher, Mr. McNally has been a speaker at several academic conferences and industry seminars. In addition, he has been published in several academic journals and reports based upon his collegiate work that helped earn him the prestigious Graduate Research Award from the North Carolina Association of GIS. Earlier, he graduated magna cum laude from Kean University with a BA in Public Administration.

Mr. McNally has been involved in emergency services for over 20 years. Beginning in the volunteer ranks as a firefighter, his experience includes 14 years of urban emergency medical services (EMS) as a paramedic in Metropolitan Newark, New Jersey. He also served as an EMS manager in suburban New Jersey and as an EMS training officer in Charlotte, North Carolina. Mr. McNally has been the recipient of several professional awards in excellence for his EMS professional work.

EXECUTIVE SUMMARY

This is the Executive Summary of our report resulting from the provision of services by Public Safety Solutions, Inc., (PSSi) related to the preparation of the detailed analysis for the City of Des Moines Fire Station Placement Review and Recommendation for Expansion Study.

THE CITY OF DES MOINES

The City of Des Moines, which was named after the Des Moines River, was incorporated on September 22, 1857. It is located at the confluence of the Des Moines and Raccoon rivers. The City is primarily located in Polk County near the intersection of east-west Interstate 80 and the north-south Interstate 35. US Highway 69 bisects the City into east and west.

The City is a major center for the U.S. insurance industry and has been considered the third largest insurance capital of the world. It is also the headquarters for a number of major insurance companies, including the Athene USA Insurance, Principal Financial Group, and Wellmark Blue Cross Blue Shield.

The skyline of Des Moines includes several skyscrapers, including the 25-story Financial Center, the 36-story Ruan Center, and the Principal Financial Group's 46-story tower, which is Iowa's tallest building.

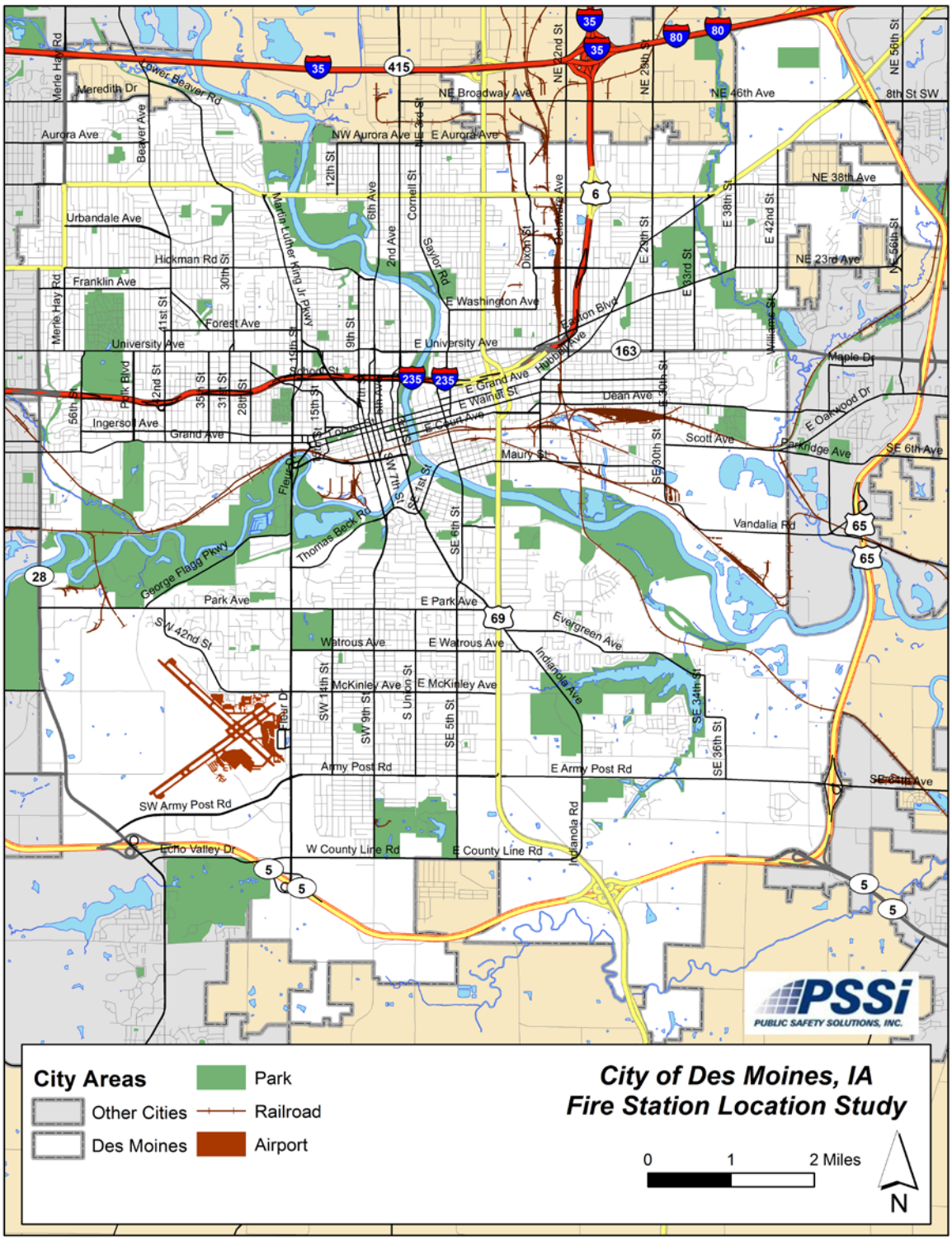
Demographics

The City consists of 203,433 residents according to the 2010 U.S. decennial Census. The population in the year 2000 was 198,682 persons, which is 0.2% annualized growth. The rate of population has increased, as the estimated 2013 population is 207,510. Geographically, the City comprises 90 square miles.

Governance of the City

The City is governed by a council-manager form of government. The City Council consists of a mayor, two at-large members, and four members representing each of the City's four wards. The City Manager is responsible for the direction and oversight of the various City departments and takes direction from the Council.

DES MOINES CITY LIMITS



FIRE DEPARTMENT

The Des Moines Fire Department is a progressive state-of-the-art fire and emergency medical services delivery agency. It has a distinguished history of providing all-hazards services to the Des Moines community. The many varied services provided by the DMFD include:

1. Fire suppression;
2. Emergency medical care and transport;
3. Teaching fire safe behaviors to the public;
4. Inspecting commercial properties;
5. Smoke detector familiarization;
6. Fire cause investigations;
7. School education programs;
8. Health care facilities staff fire extinguisher training;
9. Water rescue and recovery;
10. Hazardous materials response and mitigation;
11. Fire and EMS apparatus maintenance and repair;
12. Fire/EMS facilities maintenance and upkeep; and,
13. Airport fire and EMS services response.

Current Fire Station Locations

The following lists the DMFD fire stations, their locations, and assigned fire and EMS apparatus:

Fire Station 1 – 1330 Mulberry St. / Engine 1, Truck 1, Medic 1, Hazmat 1, District Chief
Fire Station 2 – 1727 E. Walnut St. / Engine 2, Water Emergency Team
Fire Station 3 – 2458 Easton Blvd. / Engine 3, Truck 3, Medic 3, Hazmat 3
Fire Station 4 – 917 University Ave. / Engine 4
Fire Station 5 – 711 42nd St. / Engine 5, Medic 5
Fire Station 6 – 1919 SE 6th St. / Engine 6, Water Emergency Team
Fire Station 7 – 3500 E. 12th St. / Engine 7, Medic 7, Technical Rescue
Fire Station 8 – 1249 McKinley Ave. / Engine 8, Truck 8, Medic 8
Fire Station 9 – 4800 Douglas Ave. / Engine 9, Truck 9, Medic 9
Fire Station 10 – 5900 E. Indianola Ave. / Truck 10, Medic 10

The number and type of fire and EMS risks, as well as workload, in a municipality typically drives the number and location of stations. As a general rule, response times are utilized in the determination of locating fire and rescue stations. In some instances, availability of land and funding has a major bearing on locations of stations.

The location of an emergency services station for a specific community depends on the ability to travel within the geography, the demographics, and, specifically for the fire department, the distribution of commercial, industrial, and residential property. There are nationally recognized benchmarks for locating a fire station. These include the Insurance Services Office (ISO) and selected National Fire Protection Association standards, which were utilized in the conduct of this Study.

The fire station location options and recommendations include:

1. Incorporating a "responding from" data point in the incident record to better analyze the frequency of "on the fly" responses from other than the assigned station house;
2. Evaluating and upgrading the process of MDT acknowledgement and ensuring communication connectivity for accurate time stamping;
3. Reducing the first alarm measurement from the current assembly to a proposed 3 Engine 1 truck and 1 medic unit;
4. Adopting a five-minute response time benchmark for first arriving apparatus in line with industry guideline and keeping the eight minute travel time for a first alarm assignment to structure fire calls;
5. Relocating Fire Station 3 to Hubbell Avenue between 31st and 32nd streets to better serve the northeast area of the City;
6. Moving Truck 3 and Medic 3 to Station 2 if Station 3 is relocated to aid in emergency response force assembly for higher risk structures and EMS workload demand in the downtown area; and,
7. Relocating Fire Station 10 to the 6800 block of 14th St (Highway 69) to better serve the south side of the City and also be able to reach the far southwest and southeast parts of the city easier.

FIRE STATION FACILITIES

The City of Des Moines is faced with an aging inventory of fire stations facilities. With the exception of the new Station 1 downtown (completed in 2013) and the temporary Station 10 in the southeast (completed in 1999), all Des Moines fire stations were constructed in the 1950s, 1960s, and early to mid-1970s.

While it is evident that these facilities have been well maintained throughout the years, the aging process of materials used and the 24/7 nature of fire station facilities has taken its toll on these facilities. Additionally, the changing scope of services provided by today's modern fire department and the training and physical fitness requirements render most facilities constructed before 1990 inadequate. Changes in technology and the need to reduce cross contamination and environmental concerns further reduce the service-ability of many fire station facilities constructed before 2000.

The fire station facilities options and recommendations include:

1. Station 1 – Evaluating the feasibility of relocating the living/sleeping area to reduce turnout time;
2. Station 2 – Planning to replace or fund a major renovation by 2025;
3. Station 3 – Conducting Radon testing and provide for mitigation of Radon found;
4. Station 3 – Conducting testing on the structural issues to assess building safety and correcting deficiencies to extend the life span of the facility until the facility is replaced;
5. Station 3 – Planning to replace with a new facility by 2020;
6. Station 4 – Planning for replacement by 2028;
7. Station 5 – Planning for replacement or fund a major renovation by 2026;
8. Station 6 – Immediately repairing the roof leak;
9. Station 6 – Planning for replacement or funding a major renovation by 2026;
10. Station 7 – Immediately repairing the water leak and tile issues in the bathroom facilities;
11. Station 7 – Planning for replacement or funding a major renovation by 2025;
12. Station 8 – Planning for replacement by 2027;
13. Station 8 – Exploring options to relocate Station 8 to the DSM ARFF facility or constructing a new Station 8/ARFF facility to serve DSM and adjacent area of the City;
14. Station 9 – Immediately repairing tile and corrosion issues in bathroom facilities;
15. Station 10 – Planning for replacement by 2019;

16. All Stations – Conducting environmental allergen (mold) testing at all fire stations older than 10 years to establish a baseline and mitigate any environmental issues found;
17. All Stations – Upgrading First-In Westnet system to enhance station alerting to address turnout time and clarity of dispatch audio;
18. All Stations – Conducting a station egress traffic preemption study to identify the need for signals at each station;
19. All Stations – Conducting a sustainable energy study to identify energy saving through the use of active and passive energy saving systems;
20. All Stations – Placing a high priority on adequate funding for annual station maintenance and upgrades of facilities to protect and/or extend the lifespan of the fire station facilities; and,
21. All Stations –Considering restoring the personnel in the DMFD Maintenance Division to perform facility maintenance tasks in-house in a timely manner.

EMERGENCY MEDICAL SERVICES

The DMFD has a long and distinguished history of providing exceptional emergency medical care and a proven record of working diligently to always meet the future emergency medical needs of the community. The DMFD EMS program came about during the last major station construction program in the 1970s. The placement of future fire stations and the design program to meet emerging disease issues for prevention of cross contamination and community health care needs must be a future consideration.

Current and future demands on the EMS program in the DMFD will define the largest share of the workload in the department. Exploring options afforded under the ACA, pursuing Community Paramedicine, and refining and embracing further development of the paramedic engine and/or adaptive response unit concept is essential. Implementation of these options cannot only improve response times, they can reduce unit and system demand, especially where EMS is being misapplied to respond to non-emergent healthcare needs. These options can enhance overall healthcare delivery in the City of Des Moines by improving access to non-emergent healthcare needs and freeing up DMFD emergency units to respond to actual healthcare emergencies.

Central to the success of EMS now, and in the future, is a continued strong partnership with the Des Moines medical community and DMFD Medical Director.

The emergency medical services options and recommendations include:

1. Implementing a formal paramedic engine program, which identifies paramedic engines as such in the computer aided Dispatch (CAD) system, and deploying them accordingly;
2. Implementing EMS protocols to maximize the deployment of paramedic engines to relieve workload on transport units (ambulances);
3. Pending the potential relocation of Fire Station 3, contract with the Township of Delaware to place a medic ambulance or medic engine in the Northeast area, potentially at the current unstaffed Township fire station located in the City annexed area at 3992 E. Broadway Avenue;
4. Immediately developing agreements with the City of Altoona and the Township of Delaware to implement automatic mutual aid with their fire and EMS services to be dispatched automatically on certain types of fire and EMS calls in the Northeast part of the City;
5. Tracking EMS system transport time components to monitor the full impact on first-due and City-wide response time and use these data to place paramedic engines in the highest and best deployment location;
6. In partnership with the DMFD Medical Director, implementing and institution-alizing a comprehensive EMS peer review program to include a Peer Review Committee for oversight;
7. In partnership with the DMFD Medical Director, studying the opportunities for implementation of a Community Paramedicine program to increase the level service to the citizens and reduce workload on the current transport units (ambulances);
8. In partnership with the DMFD Medical Director, beginning discussion with the Des Moines ACOs to maximize revenue and reduce workload on current transport units (ambulances);
9. Formalizing the involvement of the DMFD Medical Director as part of the DMFD Command Staff, reporting to the fire chief, to maximize opportunities in this changing health care environment;
10. Exploring federal grants programs that can assist in funding a study and/or pilot programs to implement Community Paramedicine;
11. Ensuring that future fire station building programs involve EMS staff to provide input on station design for future inclusion of Community Paramedicine; and,

12. Ensuring that future fire station building programs involve EMS staff to provide input on station design to address universal precautions, cross contamination, and emerging disease issues.

AIRPORT IMPACT

The departure of the ARFF services provided by the I-ANG was an unfortunate loss to DSM and the DMFD. The change in DSM operations and ownership from the City to the DMAA has brought questions as to how the DMAA must provide and fund all-hazards emergency services to DSM. However, this change in operations, ownership, and the loss of no-cost ARFF from the I-ANG should serve to ignite discussions between the DMFD and DMAA regarding a partnership that can enhance services and save both agencies future operational and infrastructure costs.

While a private contractor may appear to be more economical from a personnel cost standpoint, creative staffing levels supplemented by existing DMFD resources may serve to offer several operational enhancements, while reducing costs through elimination of duplicative services.

In considering service at DSM, workload data cannot be the only factor. As stated earlier, while a major aircraft incident is of low probability, the consequences of such an incident are extremely high and require the immediate need of adequate fire and rescue resources as DSM continues to grow and market the airport to passengers and cargo carries, ARFF safety must be just as much of a prime consideration as security and police services.

Regardless, with the recent changes in operations and ownership, and the reduction in resources provided by DMAA ARFF contractor, further study and discussions are needed to ensure the long-term viability of emergency services, to include ARFF, and the short-term operational effectiveness expected by all stakeholders and air travelers at DSM.

The airport options and recommendations include:

1. Closely monitoring aircraft emergency data at DSM in light of the reduction in ARFF staffing on October 1, 2014, and issuing an annual report of findings and costs to the City and the DMAA;
2. Closely monitoring EMS response data at DSM in light of the reduction in ARFF staffing on October 1, 2014, and issue an annual report of findings and costing to the City and the DMAA;

3. Exploring the option of co-locating DMFD Station 8 in the current ARFF Station at DSM, or jointly constructing a new ARFF/DMFD Station 8 facility on the grounds of DSM; and,
4. Commissioning a study to identify the full cost of providing "all-hazards" services and ARFF to DSM. This study should identify partnerships between the DMFD and DMAA to enhance emergency services and eliminate duplicative costs and efforts, to include the DMFD providing ARFF services, prior to the expiration of the current ARFF contract on September 30, 2016.

COOPERATIVE SERVICES DELIVERY

Cooperative services initiatives and successes are a national trend in the provision of public safety services. The Study Team has extensive knowledge and experience with the consolidation and regionalization options and related benefits available to cities and towns for consolidation and regionalization of various functions, including fire and emergency medical services. It is for that reason that a full chapter of this Report is dedicated to this subject for consideration by City of Des Moines officials, services providers, and taxpayers.

This Report outlines a number of fire, emergency medical, and dispatch options available to the City for consideration.

The cooperative services options and recommendations include:

1. Implementing in-service mutual aid training as an integral and substantive part of the DMFD training programs;
2. Implementing an appropriate form of cooperative fire protection services delivery with participating surrounding municipalities;
3. Establishing a cooperative services implementation task force in cooperation with adjacent municipalities to develop a related plan for appropriate cooperative services;
4. Encouraging the full implementation of closest available automatic mutual aid between area fire departments;
5. Developing an initiative to include potential PSAP consolidation to assure the efficient and timely dispatch of fire department apparatus as automatic mutual aid is implemented;

6. Immediately implementing automatic closest unit available mutual aid involving the City of Altoona and Township of Delaware fire and EMS units in order to up-grade services to the northeast part of the City;
7. Developing and implementing common operating and safety guidelines/ procedures in support of the implementation of automatic mutual aid; and
8. Exploring joint operation of a fire station in the northeast area of the City involving the placement of a medic ambulance or medic engine at the Township of Delaware fire station.

TIMELINE FOR DECISIONS AND ACTIONS

This comprehensive Fire Station Placement Review and Recommendations for Expansion Study for the Des Moines Fire Department should be considered as a strategic planning tool for the future. Additional issues may need consideration in the future. The plan should be used as a flexible guide for decisions relative to the organization, management, and provision of fire/EMS fire stations and related resources by the Des Moines Fire Department.

Figure 8.1 contains a listing of options and recommendations with a suggested priority level and completion date.

ANNUAL UPDATES

The City is encouraged to assign City staff along with Fire Department staff to update this Study on an annual basis.

CHAPTER ONE
INTRODUCTION

A brief overview of the City of Des Moines in this Chapter includes: the setting; history and governance of the City; the brief description of the Des Moines Fire Department; current fire station locations; and personnel survey.

This Chapter also summarizes the scope of services and methodology for conducting this Fire Station Placement Review and Recommendation for Expansion being referred to as the Study in this report.

THE SETTING

As describe in the City and Fire Department website, the City of Des Moines is located at the confluence of the Raccoon and Des Moines rivers. It is the state capital as well as the state's most populated city. Its geography is an area of 90 square miles (1.7 square miles of which is water). It is 850 feet above sea level.

The City is located near the intersection of east-west Interstate 80 and the north-south Interstate 35. US Highway 69 bisects the City into east and west. US Highway 6 is along the north side and US Highway 65 winds outside the City to meet State 5 on the south side.

The City is surrounded by a number of suburban communities including Altoona, Ankeny, Bondurant, Carlisle, Clive, Grimes, Johnston, Norwalk, Pleasant Hill, Urbandale, Waukee, West Des Moines and Windsor Heights. The City includes 58 recognized neighborhood associations.

Demographics

The City consists of 203,433 residents according to the 2010 U.S. decennial Census. The population in the year 2000 was 198,682 persons, which is 0.2% annualized growth. The rate of population has increased as the estimated 2013 population is 207,510.

The median age of the Des Moines population is 33.5 compared to 38 for the State and 37.2 for the Nation. Eight percent of the City's population is less than five years of age and 11% are over age 65.

CITY GOVERNANCE

The City functions under a council-manager form of government. The City Council consists of a mayor, two at-large members, and four members representing each of the City's four wards.

The City Manager is responsible for the direction and oversight of the various City departments. The City Manager takes direction from the Council.

DES MOINES FIRE DEPARTMENT

The Des Moines Fire Department is a progressive state-of-the-art fire and emergency medical services delivery agency. It has a distinguished history of providing all-hazards services to the Des Moines community. The many varied services provided by the DMFD include:

1. Fire suppression;
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5. Smoke detector familiarization;
6. Fire cause investigations;
7. School education programs;
8. Health care facilities staff fire extinguisher training;
9. Water rescue and recovery;
10. Hazardous materials response and mitigation;
11. Fire and EMS apparatus maintenance and repair;
12. Fire/EMS facilities maintenance and upkeep; and,
13. Airport fire and EMS services response.

Des Moines Fire Stations

The following lists the DMFD fire stations, their locations, and assigned fire and EMS apparatus:

Fire Station 1 – 1330 Mulberry St. / Engine 1, Truck 1, Medic 1, Hazmat 1, District Chief
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Fire Station 8 – 1249 McKinley Ave. / Engine 8, Truck 8, Medic 8
Fire Station 9 – 4800 Douglas Ave. / Engine 9, Truck 9, Medic 9
Fire Station 10 – 5900 E. Indianola Ave. / Truck 10, Medic 10

Note: As a point of information, reportedly, all DMFD trucks are equipped with a pump and water tank, therefore, they are technically known as "quint aerial devices" however since DMFD trucks are dispatched and generally utilized for typical "truck work" on incidents, they are referred to in their generic designation of "truck/s" in this report.

FIRE STATION LOCATIONS

There are many varied considerations that, either directly or indirectly, enter into any typical analysis and resulting plan involving a determination of the total number, location, and configuration of fire stations and related resources. These may include:

1. The public's fire services delivery expectations of the fire department, as determined by municipal or other decision makers;
2. How soon after arrival at the scene of a fire is the fire department to initiate interior firefighting, e.g., immediately or when the second fire unit arrives;
3. Geographic layout of the fire services area;
4. Geographic barriers to apparatus response, e.g., bays, lakes, rivers and creeks;
5. Age of the community and building stock;
6. Density of population and development;
7. Level of consistency with national standards/guidelines and accepted practices;

8. Distance between fire stations;
9. Roadways and their design;
10. Type and age of fire apparatus;
11. General fiscal condition of the municipality;
12. Community water supply;
13. Type of staffing approach, paid, volunteer or combination;
14. Actual and projected response times of apparatus;
15. Availability of mutual aid fire apparatus response;
16. Unique aspects of the service area, e.g., waterfront, island services delivery;
17. Current and projected call workload;
18. Quality of dispatch agency;
19. Relative level of training of personnel;
20. Is the fire department to provide EMS first responder and/or transport services;
21. Is the fire department to provide unique services, e.g., boat service, airport rescue;
22. Is the fire department to provide light (auto extrication) and/or heavy rescue services;
23. Labor contract provisions;
24. The quality and coverage of radio and dispatch systems and sub-systems;
25. Is the fire department to provide a level of fire prevention services, e.g., building inspections, fire investigations, building plans review and public fire education;
26. Is the fire department responsible for its own apparatus repair and maintenance; and
27. Is the fire department responsible for its own radio maintenance and repair.

The reader will come to understand, as this Study is reviewed, how these and other considerations enter into the determination of a fire department's fire station locations, configuration, condition, and related future investments. Further, the reader will come to appreciate that decisions regarding the overall facilities of a fire department are driven by many factors and considerations that are largely based on the nature of the service area, the type and quality of services to be delivered, and relative cost of fire and EMS services delivery. For these reasons, it should be understood there is no single factor in determining the appropriate overall staffing of a fire department and that municipal decision makers have a complex job to perform in determining the appropriate level of staffing for their fire and EMS department. **The purpose of this Fire Station Placement**

Review and Recommendation for Expansion is to provide decision makers and services providers with a recommendation, as well as, the information and tools with which to make informed decisions.

STUDY SCOPE OF SERVICES

As stated in the City of Des Moines Request for Proposals the Scope of Services is as follows.

"The City is seeking a consultant who is to review the current location of stations and resources, forecast future demands for services provided by the Des Moines Fire Department, and make recommendations regarding the use of current and location of future fire stations according to community needs.

The specific tasks within the Scope of Services are:

1. Review and analyze current state of the fire department to include
    a. Location of stations and resources
    b. Unit call volume
    c. Unit response times
2. Forecast future demands for service considering
    a. Population growth
    b. Community development
    c. Risks and demands of the City
    d. Interviews with stakeholders
    e. GIS analysis
3. Recommend changes to current station usage and propose location of new stations and resources. Recommendations are to maintain or improve the following
    a. ISO rating (3/8B)
    b. Compliance with NFPA 1710 unit response guidelines
    c. Other recognized standards for deployment and response.
4. Work collaboratively with Fire Department officials to determine the appropriate number of conference calls, on site visits, and other meetings appropriate and necessary to complete the project. The City and the Fire Department will make available all available information necessary to complete the project."

STUDY METHODOLOGY

In conducting this Study for the City of Des Moines, the Study Team utilized a proven and consistent approach to conduct and complete fire department analysis. This methodology incorporates eight distinct, but interrelated, phases.

Eight-Step Approach

The development of this Study for the City of Des Moines provides Des Moines officials, the leadership of the fire and EMS service, and the public with a "blueprint" for the future, relative to the location of fire stations in Des Moines. Rather than identifying the anticipated needs on a year-to-year basis, this evaluation provides policy makers with a guide for making decisions that impact 1 to 10 years into the future.

The Study Team completed this project in eight distinct, but interrelated, steps: data collection; interviews with key individuals; on-site observations; analysis of data; comparative analyses; alternatives and recommendations; submission of this well-documented written Study; and subsequent oral briefing.

The following eight-step approach was utilized in the completion of this Study:

Step 1: Data Collection
Step II: Interviews
Step III: On-Site Observations and Fact Finding
Step IV: Analysis of Data
Step V: Comparative Analysis
Step VI: Alternatives and Recommendations
Step VII: Comprehensive Written Report
Step VIII: Oral Briefing

Firefighter & Officer Input

It should be noted that as part of the interview and on-site observations and fact-finding phases of this Study process, every fire station was visited and inspected for conditions and many discussions with firefighters and officers a number of times. The Study Team

was provided a conditions inspection tour of each fire station by the individual responsible for fire station maintenance, upkeep, and repair.

Every DMFD fire station was visited for meetings with the on-duty crews to discuss the Study and obtain input and thoughts from those who work in these facilities every day. During this station visit process, the Study Team met and spoke with more that 75 DMFD uniformed staff.

Further, in an effort to maximize input to the Study Team, a unique comprehensive computerized survey was used to provide the opportunity for broad-based input. Sixty DMFD firefighters and officers completed the survey providing their input for this Study.

Sincere thanks to all who provided information to the Study Team in the completion of this Study. Their participation is appreciated.

In addition, the following Study guides were considered.

Fire Department Accreditation

The framework for this analysis incorporated the model developed by the Accreditation Committee of the International Association of Fire Chiefs (IAFC) [now the Commission on Fire Accreditation International (CFAI)].

The Commission on Accreditation of Law Enforcement Agencies (CALEA) had previously developed a police department accreditation process for use by police departments. The Commission on Fire Accreditation International developed a similar analysis model for fire department to use on a voluntary basis. Inclusion of this model as a framework for the Des Moines Study assured that the "latest thinking" was considered for this Study.

There are ten major analysis categories included in the CFAI accreditation model. The analysis categories included in the CFAI accreditation model are as follows:

1. Governance and Administration
2. Assessment and Planning
3. Goals and Objectives

4. Financial Resources
5. Programs
6. Physical Resources
7. Human Resource
8. Training and Competency
9. Essential Resources
10. External Systems Relations

Within each of these categories, there are specific criteria and considerations weighed by the Study Team in the process of conducting this Des Moines analysis.

The applicable performance indicators associated with these categories and criteria were considered and addressed where appropriate in this Study.

The CFAI's manual, entitled "Creating and Evaluating Standards of Response Coverage for Fire Departments," provides guidance and direction on the conduct of fire rescue station, apparatus, staffing, and related risk assessment studies. The Study Team utilized the latest of this CFAI guide in the performance of this Study.

The reader will note that a number of the chapters and sections of this Study report include performance indicators for the respective subject covered in the material following the CFAI reference**.**

Standards and Accepted Practices

The Study Team also utilized published fire protection standards and information on accepted principles and practices for the operations and management of fire services as background and guidelines for the conduct of this Des Moines Study.

Some of the key organizations with standards and publications that were utilized as part of this Study include the following:

- National Fire Protection Association (NFPA)
- ISO Commercial Risk Services, Inc. (ISO)
- International Association of Fire Chiefs (IAFC)

- American Heart Association (AHA)
- American Medical Association (AMA)
- National Institute of Standards and Technology

The National Fire Protection Association follows a nationally recognized process for the establishment of many standards that are applicable to fire protection operations and administration. In many jurisdictions, some of the NFPA standards have been adopted and fully implemented for pursuing further improvement in safety and services, while in others NFPA standards are utilized as general guidelines. Chapters of this Study review standards and guidelines as it relates to the City of Des Moines.

The following list includes a number of the key NFPA standards utilized by the Study Team in conducting this Study for Des Moines.

NFPA 1201 - Standard for Providing Fire and Emergency Services to the Public
NFPA 1500 - Standard on Fire Department Occupational Safety and Health Program
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

These and other written standards and nationally recognized documents, such as the *NFPA Fire Protection Handbook*, were utilized by the Study Team as reference materials.

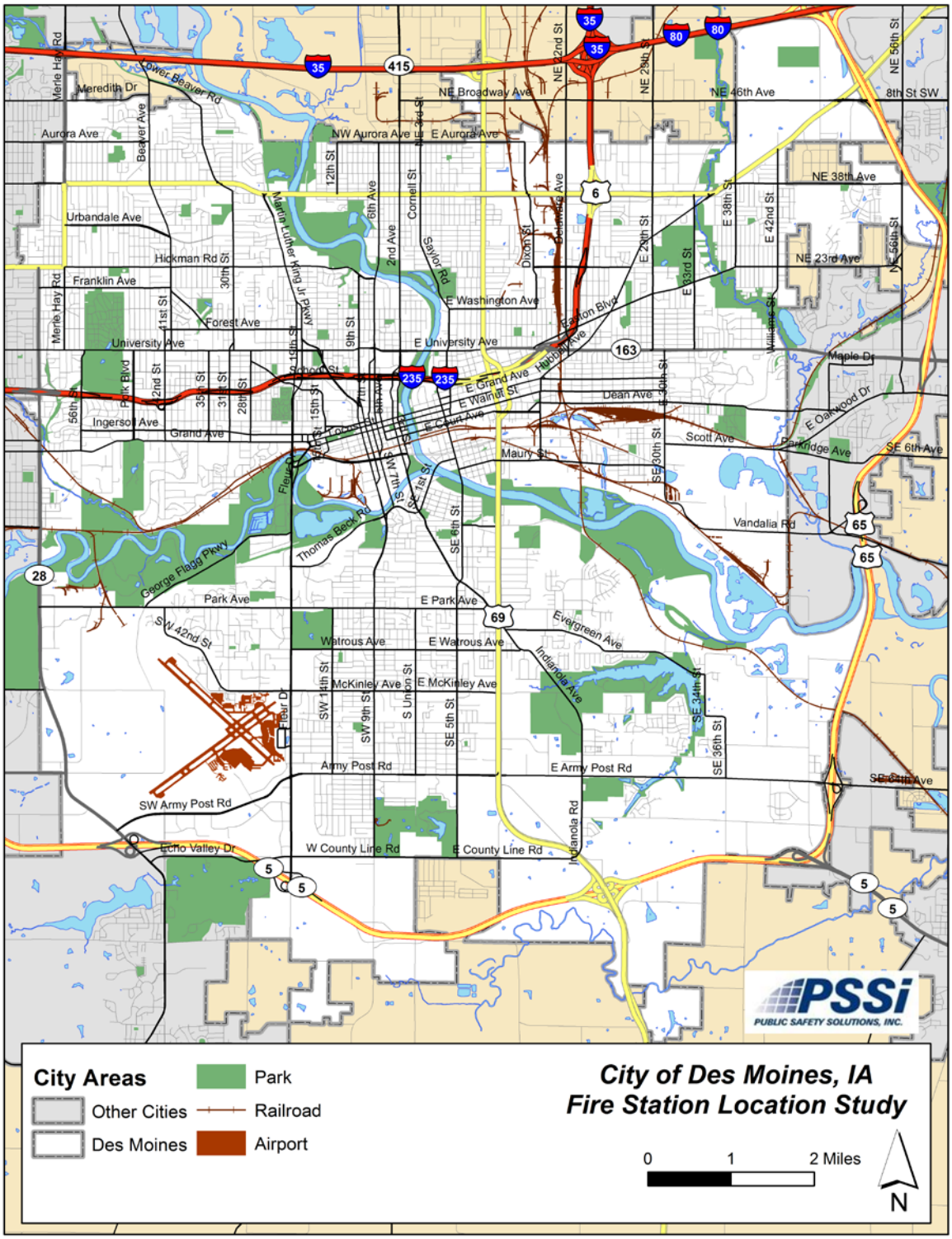
CHAPTER TWO
DEMOGRAPHICS & RISKS

SERVICE AREA DESCRIPTION

The City of Des Moines, located at the confluence of the Raccoon and Des Moines rivers, is the state capital as well as the state's most populated city. Its 90-square-mile area is home to several industries, most notably over 50 financial and insurance companies, several agribusiness industries, and a large publishing firm. The City is also home to the World Food Prize, given for innovation in food production to reduce world hunger, and the Iowa State Fair. Several colleges are located within the City including Drake University, Grand View University, Des Moines University, and AIB College of Business.

Des Moines is located near the intersection of east-west Interstate 80 and the north-south Interstate 35. The spur Interstate 235 sweeps travelers into the downtown area. US Highway 69 bisects the City into east and west. US Highway 6 runs along the north side, and US Highway 65 winds outside the City to meet State Highway 5 on the south side. Several riverside parks and attractions, along with a growing downtown nightlife, keep the City vibrant. The airport, which has hosted more presidential candidates than probably any other, is on the City's southwest corner.

Figure 2.1
CITY LIMITS

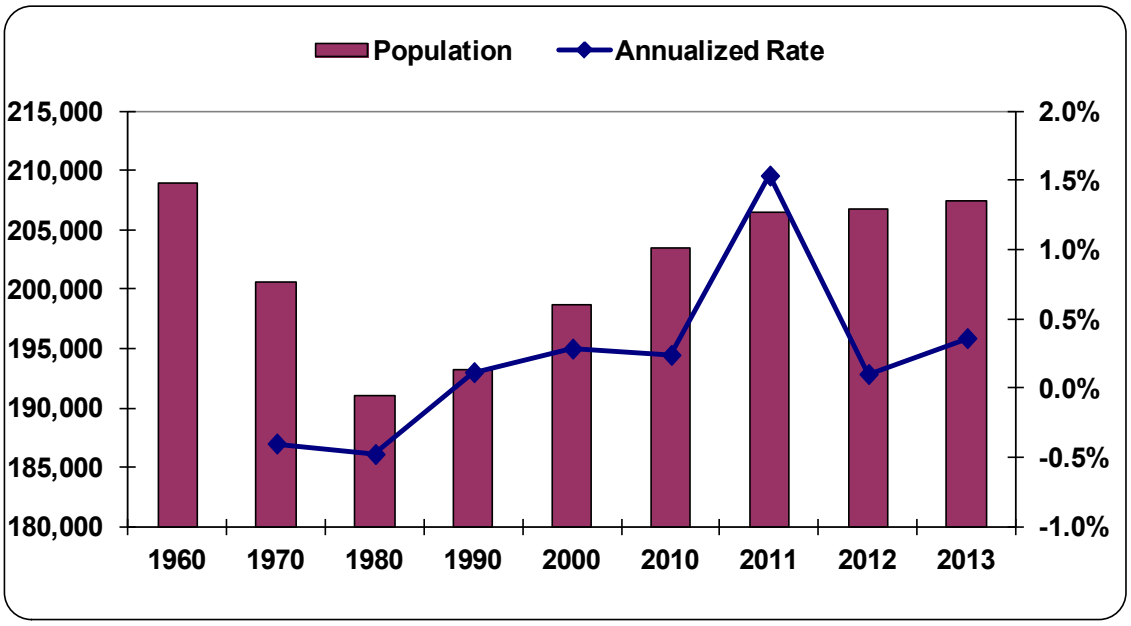


Railroads cross the center of town and join a line going north just west of I-235. Railroads and interstates can impede street network connectivity and cause delays for apparatus due to traffic or poor quality crossing. Minor league sports compete in downtown facilities and residents enjoy historical and recreational venues such as the zoo, amphitheater, and city parks.

POPULATION & HOUSING

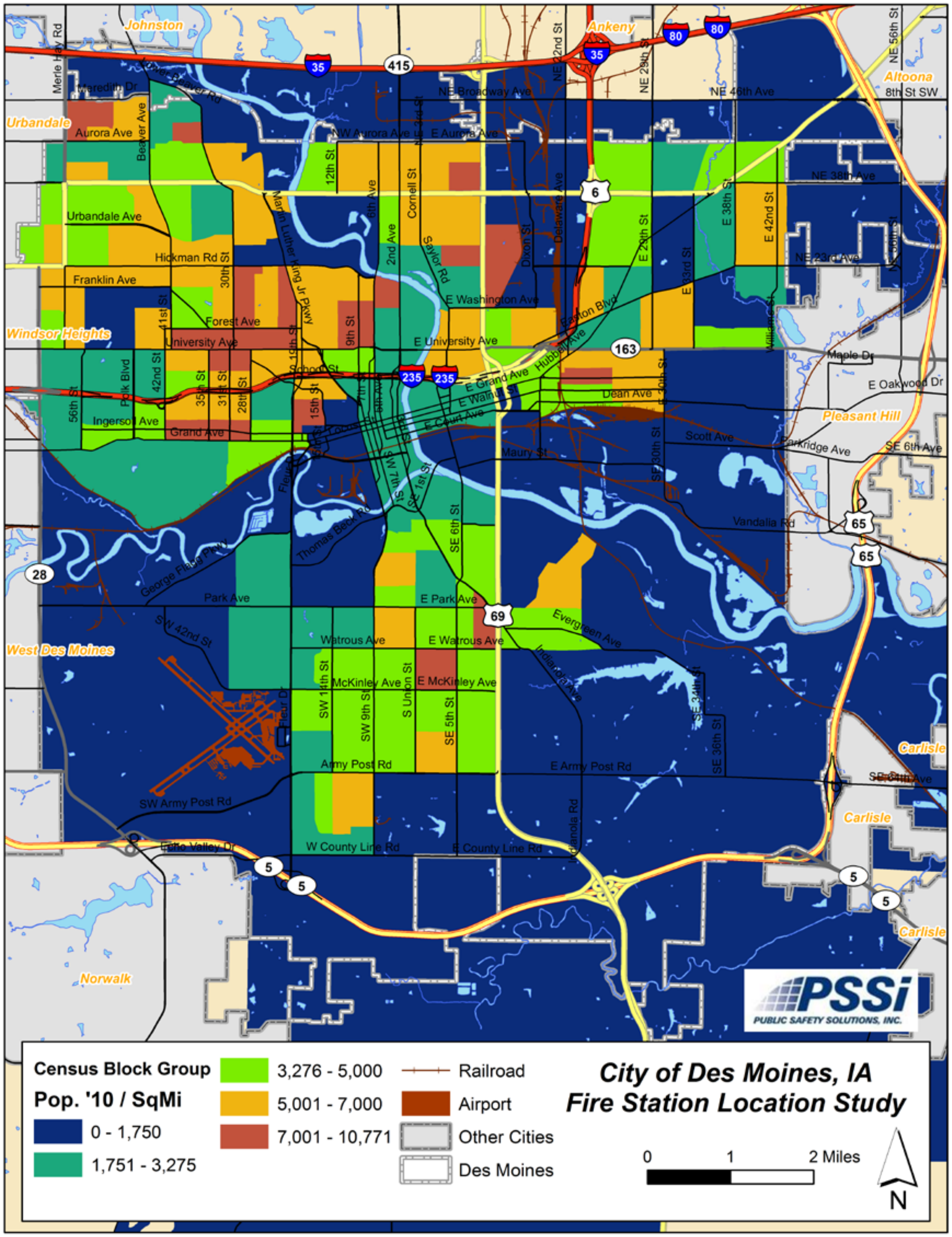
The population of the City includes 203,433 residents according to the 2010 U.S. decennial census. The population in the year 2000 was 198,682 persons, which translates into a 0.2% annualized growth. The rate of population has increased as the estimated 2013 population is 207,510. Figure 2.2 shows the historic population levels in Des Moines. Declining since the 1960s, the population rebound in the 1980s..

Figure 2.2
HISTORIC POPULATION



These figures represent residential population and do not account for the variation during the daytime hours for commuters, shoppers, and out-of-area employees. It is estimated that the City increases in population by 18% due to commuting patterns. The residential population is also not evenly distributed. It is understood that demand for emergency services correlate with areas of higher population. Figure 2.3 shows the concentration of residential population by census block group areas.

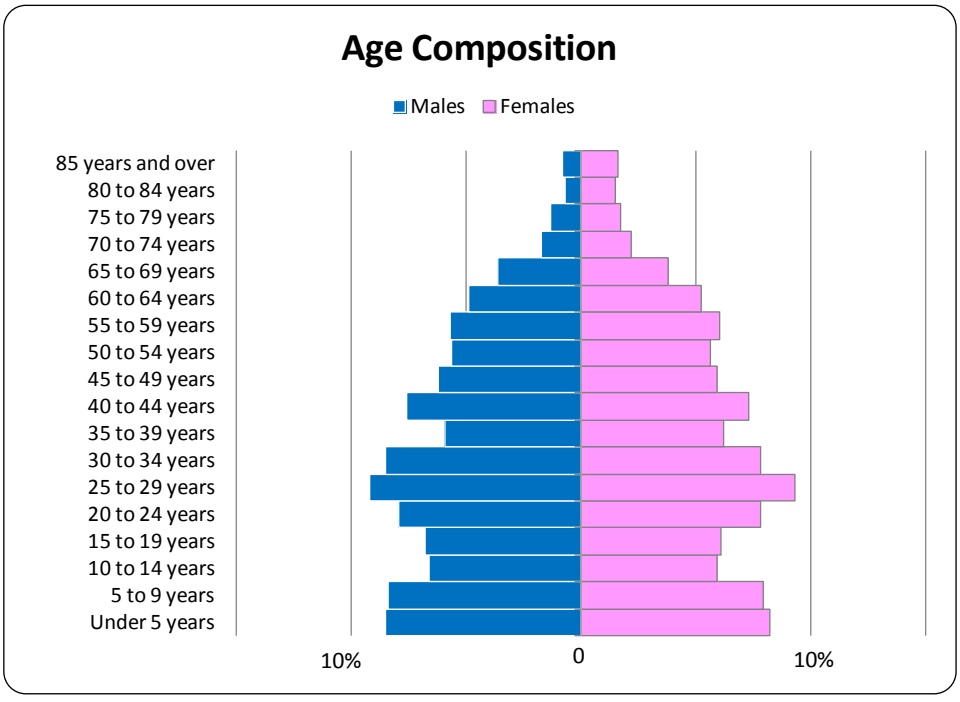
Figure 2.3
POPULATION DENSITY



The northeast area of the City contains the highest residential population. There are also pockets of higher residential areas on the northwest and south central areas of the City. Notice the less population density in the downtown area due to the concentration of government buildings. Redevelopment in this area for more residential housing will be discussed later in this chapter.

Although general population levels play a role in the geographic distribution of demand for fire and medical services, it is important to examine the composition of the population since the aged and pediatric populations are more prone to serious medical emergencies and to succumb to smoke and fire due to their behavioral tendencies during a fire. Children often hide making an interior search by firefighters more difficult, while mobility issues limit the ability of the aged to escape. Figure 2.4 illustrates the levels of population by age group in Des Moines.

Figure 2.4
CURRENT POPULATION BY AGE GROUP



The median age is 33.5 compared to 38 for the state and 37.2 for the nation. Eight percent of the City's population is less than five years of age, while 11% are over age 65. Together with the younger population, efforts for fire prevention and fire escape procedures should be emphasized with these groups.

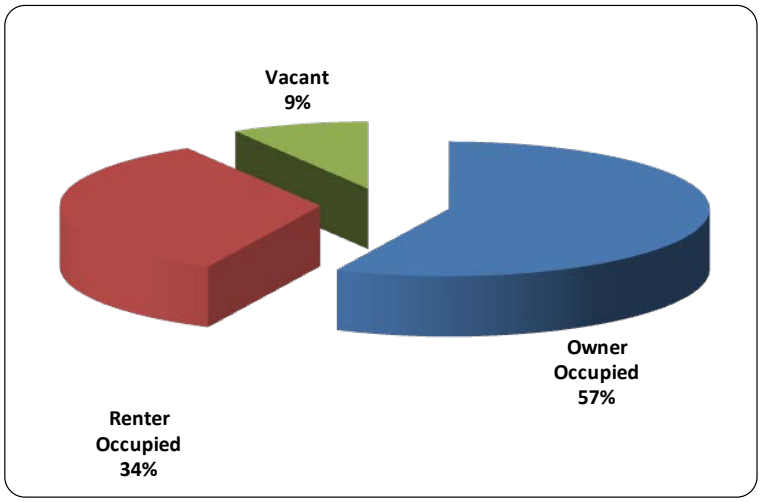
The older age cohorts (55-64) have grown in population numbers. Within the next ten years the bulk of the 'baby boomer' population is poised to enter the ranks of the 'senior citizen' (generally those above the age of 65). It is expected that demand for medical emergencies will rise and the threat of fatal fire death may also increase based upon the age progression of the population. Since the last Census, the senior population decreased, while growth in the middle-aged groups grew as shown in the Figure 2.5.

Figure 2.5
POPULATION CHANGE

Demographic Change- 2000 to 2012								
	Total Pop	Age <5	5 to 24	25 to 44	45 to 54	55 to 64	65 to 74	75 and up
2012 est.	206,571	16,510	57,002	61,533	26,350	22,552	12,298	10,326
2000	198,682	14,893	55,506	63,210	25,037	15,477	11,934	12,625
change	4%	11%	3%	-3%	5%	46%	3%	-18%

In Figure 2.6, housing is examined by occupancy types. It should be noted that a higher than average statewide rate of rental and vacant properties exists in the City. This is important because areas of lower vacancy and rental properties are typically reflective of better economic means that correlate with lower demand for emergency services.

Figure 2.6
HOUSING BY OCCUPANCY



The amount of rental properties has increased since the last census. Vacant properties have increased significantly reflective of the housing crisis that spurred the recession that began in 2009. Figure 2.7 details the housing changes in Des Moines since 2000.

Figure 2.7
HOUSING OCCUPANCY CHANGES

Housing Information- 2000 to 2012				
	Housing Units	Owner Occupied	Renter Occupied	Vacant
2012 est.	88,376	50,431	30,400	7,545
2000	85,067	52,119	28,385	4,563
change	4%	-3%	7%	65%

RISKS

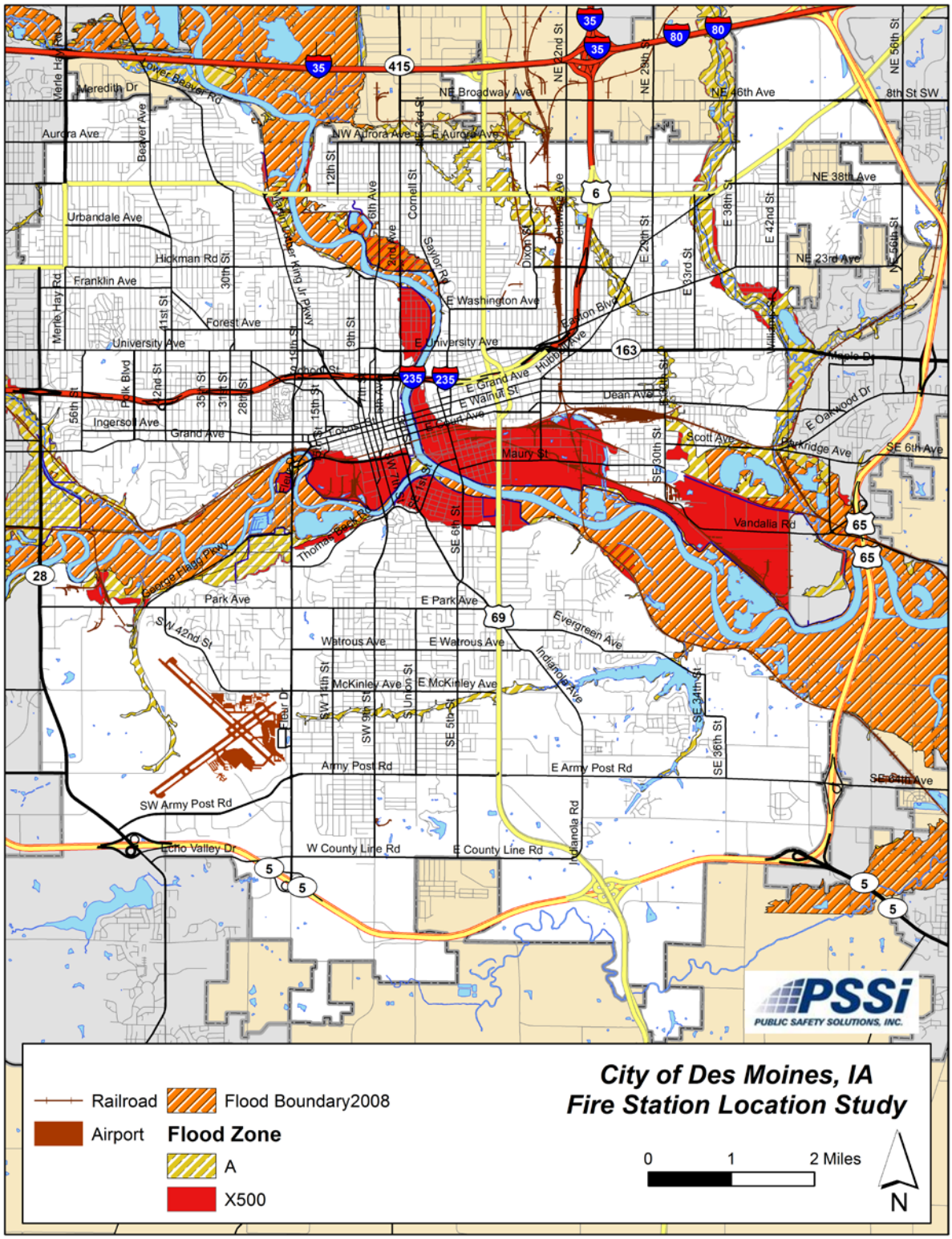
The City of Des Moines is accustomed to being in the spotlight. As the largest city and the state capital, the City generates news and focused attention on its activities. Every four years, the national presidential campaigns kick-off with the Iowa Caucuses. As a major city in the state, it faces many risks. In this section, many of the major risks are identified.

The risk to the City via civil unrest or terrorism is high due to its prominence in the state and, at times, the nation. Events where there is a large assembly of people, such as sports arenas, state fair, and marathons, lend themselves to the potential of multi-casualty incidents. High-rise firefighting is a skill that must be practiced by the fire department on a routine basis due to the collection of such structures in the downtown area.

Facilities such as the airport present unique risks not experienced in most other communities, due to large assembly of people, security issues, medical emergencies, and of course, aircraft emergencies. There is a detailed section regarding the airport later in this report. Transportation along several major roadways not only creates potential fatal collisions, but also the risk of hazardous material spill from an incident involving a tractor trailer. This hazardous material release risk is also heightened by the frequent freight rail traffic and yards within the City limits.

Being at the confluence of two rivers, the chance of severe weather and snow melt makes flooding a high probability in the City. Figure 2.8 shows areas in the City where flooding is at risk. Zone A is defined by FEMA as an area inundated by a 1% annual chance of flooding (100-year event), but the depth from such an event has not been determined. Zone X500 is also known as the 500-year event and has a lower probability (0.2%) or areas protected by levees (as is the case in Des Moines) from a 100-year event. Levees protect Des Moines from flooding and restrict them to the areas shaded in the orange hash.

Figure 2.8
FLOODING RISK



Aside from severe winter weather, the City also experiences summer storms that can often produce tornadoes. The most notable was a 15-mile, 400-foot-wide Fujita Scale 4 tornado on June 18, 1974, at 9:35 PM that moved southeast from Ankeny through the City that killed 2 people and injured 50.

There are also risks associated with the use of property and the facilities that operate within them. These risks will be discussed in more detail in a later chapter.

FUTURE TRENDS

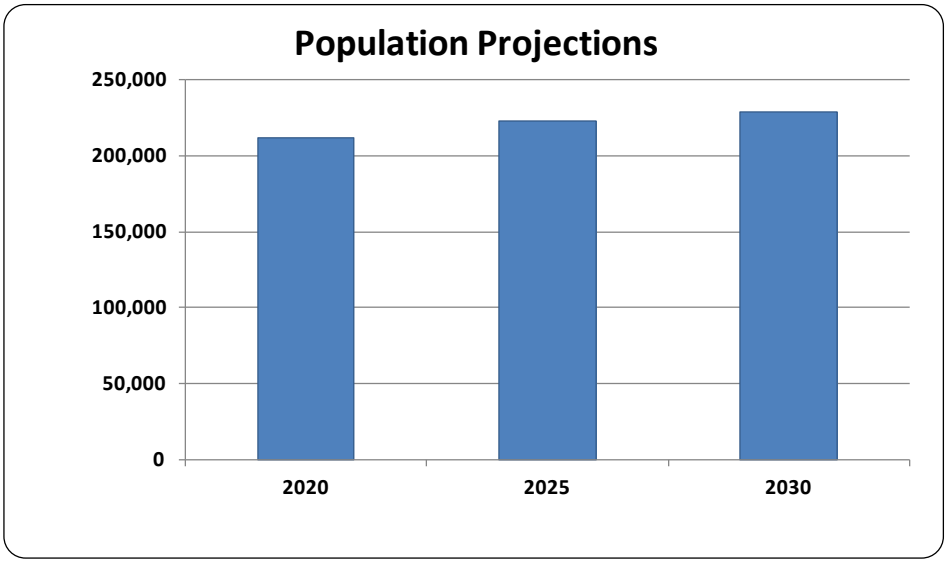
The City of Des Moines is expected to maintain a slow growth pattern. Growth is constrained in many ways by the large amount of property used for City, county, and state government. However, new high-rise office complexes downtown have created a demand for conversion housing nearby. According to City staff, over $3 billion has poured into the downtown area for apartments, condominiums, hotels, restaurants, and nightlife venues.

According to our interviews with City staff, single-family housing development has not been robust due in part to the recent recession and the perception of such customers regarding City life, taxes, and City services. In the long term, potential commercial and residential development might occur along the southern City border and the northeast area recently annexed. Further annexation is constrained due to other jurisdictional boundaries that abut the City, along with the provision of sewer and water service. The City planning department is encouraging new housing developments to be contiguous, so that patchy development does not unnecessarily spread City resources thin.

New transportation projects are also in the works linking downtown with US 65/ Iowa 5 Beltway. One is the Southeast Connector and the other one is the Southwest Connector. Reportedly, the Scott Avenue Bridge is nearing the end of its expected use period and may need to be closed.

The Study Team expects population growth to reflect the modest pace that has been experience over the last decade. Given this, Figure 2.9 projects the level of population growth in the future.

Figure 2.9
POPULATION PROJECTIONS



It is not the intent of this Study to be a definitive authority for the projection of future population in the City. Since demand for emergency agencies is based almost entirely on human activity, it is important to have a population-based projection of the future size of the community.

CHAPTER THREE
FIRE STATION LOCATIONS

This Chapter examines the locations of the fire stations within the City of Des Moines in relation to geographic distribution, response capability, demographics, and insurance rating recommendations. The performance of the respective crews to respond to emergency incidents is assessed based on time travel and service demand patterns. Finally, related conclusions and recommendations are provided for consideration.

CFAI FIXED FACILITIES CRITERIA

The Study Team considered criteria from the Commission on Fire Accreditation International (CFAI) as the DMFD facilities are considered as part of this Fire Study.

The CFAI accreditation criteria related to fire department fixed facilities are as follows:

Fixed facility resources are designed, maintained, managed and ***adequate to meet the agency's goals and objectives****.*

Performance Indicators

1. Space allocations are adequate for agency functions such as operations, fire prevention, training, support services and administration.
2. Buildings and grounds are clean and in good repair. Maintenance is conducted in a systematic and planned fashion.
3. Physical facilities are adequate and **properly distributed in accordance with stated service level objectives and standards of cover**.
4. Facilities are in compliance with federal, state and local regulations.

The CFAI items in bold are addressed in this Chapter while the remaining items are covered in a subsequent chapter.

CURRENT FIRE STATION LOCATIONS

Currently, the Des Moines Fire Department provides fire and EMS transport and first responder services from the following fire station facilities:

Des Moines Fire Stations

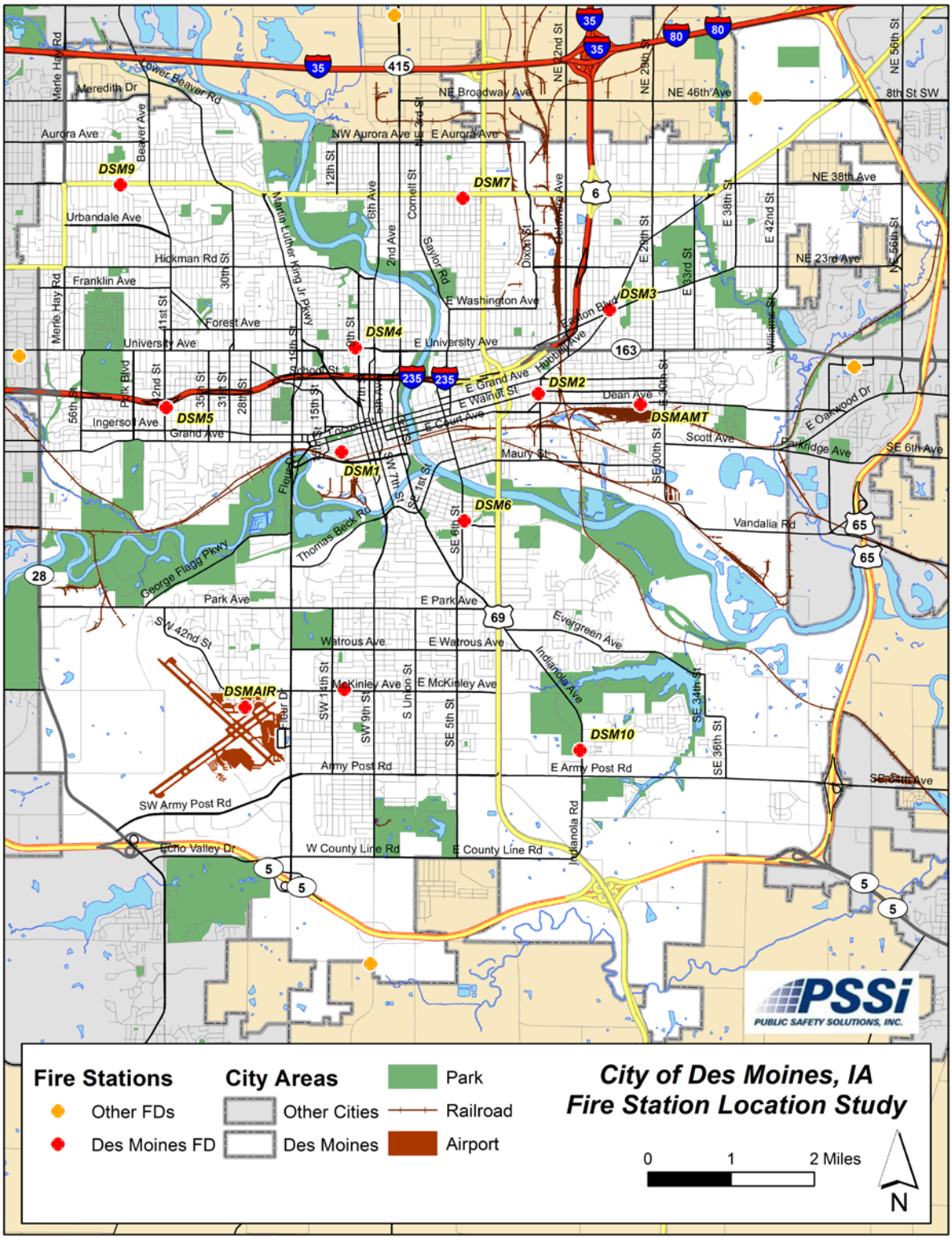
Fire Station 1 – 1330 Mulberry St. / Engine 1, Truck 1, Medic 1, Hazmat 1
Fire Station 2 – 1727 E. Walnut St. / Engine 2, Water Emergency Team (WET)
Fire Station 3 – 2458 Easton Blvd. / Engine 3*, Truck 3, Medic 3, Hazmat 3
Fire Station 4 – 917 University Ave. / Engine 4*
Fire Station 5 – 711 42nd St. / Engine 5, Medic 5
Fire Station 6 – 1919 SE 6th St. / Engine 6*, Water Emergency Team (WET)
Fire Station 7 – 3500 E. 12th St. / Engine 7, Medic 7, Technical Rescue Team
Fire Station 8 – 1249 McKinley Ave. / Engine 8*, Truck 8, Medic 8
Fire Station 9 – 4800 Douglas Ave. / Engine 9, Truck 9, Medic 9
Fire Station 10 – 5900 E. Indianola Ave. / Quint 10, Medic 10
*Paramedic Level Engine

FIRE STATION AND APPARATUS DISTRIBUTION

This section will examine the deployment, risks, and performance in delivering emergency services within the City. Figure 3.1 displays the locations of the fire stations relative to the City area and roadway network. Note that the fire station labeled "DSMAMT" is the location of the fire department administrative offices, maintenance, and training center. Apparatus do not typically respond from that location, with the exception for district chief level personnel.

In addition, the fire station labeled "DSMAIR" by the airport is the location of the aircraft crash & rescue units currently operated by a private provider as the City-owned airport has now become a governmental authority and has contracted with Protech, Inc., for this service on the airport grounds. The Des Moines Fire Department continues to be a primary responder to major aircraft incidents as well as medical transportation for events that are within the terminal or on aircraft.

Figure 3.1
FIRE STATIONS



When comparing the locations of the fire stations to Figure 2.3 (Population Density) in Chapter 2, it can be seen that the fire stations coincide with areas of higher residential concentration.

STATION LOCATION ASSESSMENT

The location of an emergency services station for a specific community depends on the ability to travel within the geography, the demographics, and, specifically for the fire department, the distribution of commercial, industrial, and residential property. There are nationally recognized benchmarks for locating a fire station that will be discussed in the sections that follow.

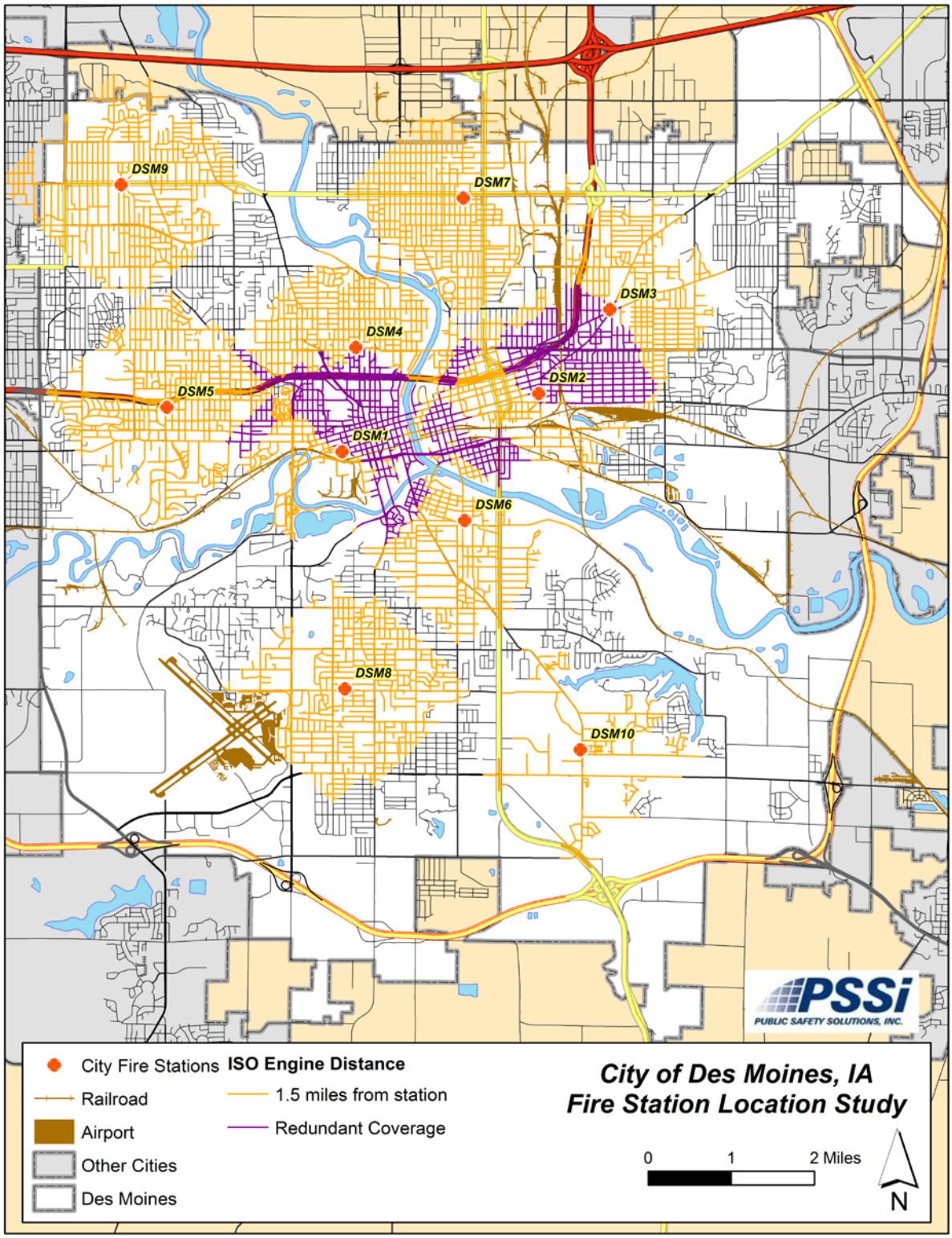
ISO Criteria

The Fire Suppression Rating Schedule utilized by the Insurance Services Office (ISO) in its evaluation of municipal fire suppression capabilities includes fire station location analysis with objective mileage-based criteria. Item 560 in the Fire Suppression Grading Schedule, Edition 6-80, reads as follows:

> "The built-upon area of the City should have a first-due engine company within 1.5 miles and a ladder-service company within 2.5 miles."

The ISO considers the optimum physical location of engine companies and ladder companies essential to earning maximum credits under the Fire Department Item in the Schedule. Because engine companies and ladder companies are placed in fire stations, it is the location of the fire station that becomes important to the evaluation process used by the ISO. These are very conservative estimates. The problem with using mileage alone is that speed capability of the road affects the time travelled; the ISO criterion does not take this into account. It should be strongly noted that ISO apparatus distance is only one of many criteria to which the ISO evaluates a department. Others include equipment, testing, and dispatching. Nonetheless, Figure 3.2 shows the 1.5-mile distance of the Engine Company from the station.

Figure 3.2
ISO ENGINE DISTANCE



There are streets outside of the recommended distance north of Easter Lake and the airport. Additionally, there are areas on the north side of the City, as well, that are outside the recommended distance. Insurance rates for these property owners may be affected. The previous Figure 3.2 also shows that there is overlapping coverage between several stations. While no risk is involved, this does not benefit the property owners. Of the buildings[1] within the City, 66.5% are within the recommended distance of a fire engine, with notable exception of Broadlawns Hospital.

Figure 3.3 illustrates the 2.5-mile distance for ladder trucks from its station that serves the City. Truck apparatus, with their long ladders, are able to reach higher buildings and larger-square-foot structures, such as 'big box stores'. Fire departments typically position them near an area that contains many such structures.

The apparatus at Station 10 is a quint-type, which means it has attributes of both an engine and a ladder and, for the sake of ISO, can be credited as both. Examining the ISO ladder distance against buildings over 25,000 square feet reveals that 76% are within the recommended distance of a truck company. Data of structural height was provided and also compared to the ISO truck distance coverage. It was also found that 75% of the structures over 35 feet were within the recommended distance. While structures[2] at this height and above are across the city landscape, the highest buildings are located downtown. It was determined that 120 buildings are classified as low-rise (3 to 10 stories), 36 are high-rise structures (10 to 20 stories), 14 high-rise garages (4 to 10 floors), and 5 skyscrapers were reported in Des Moines[3]. They are:

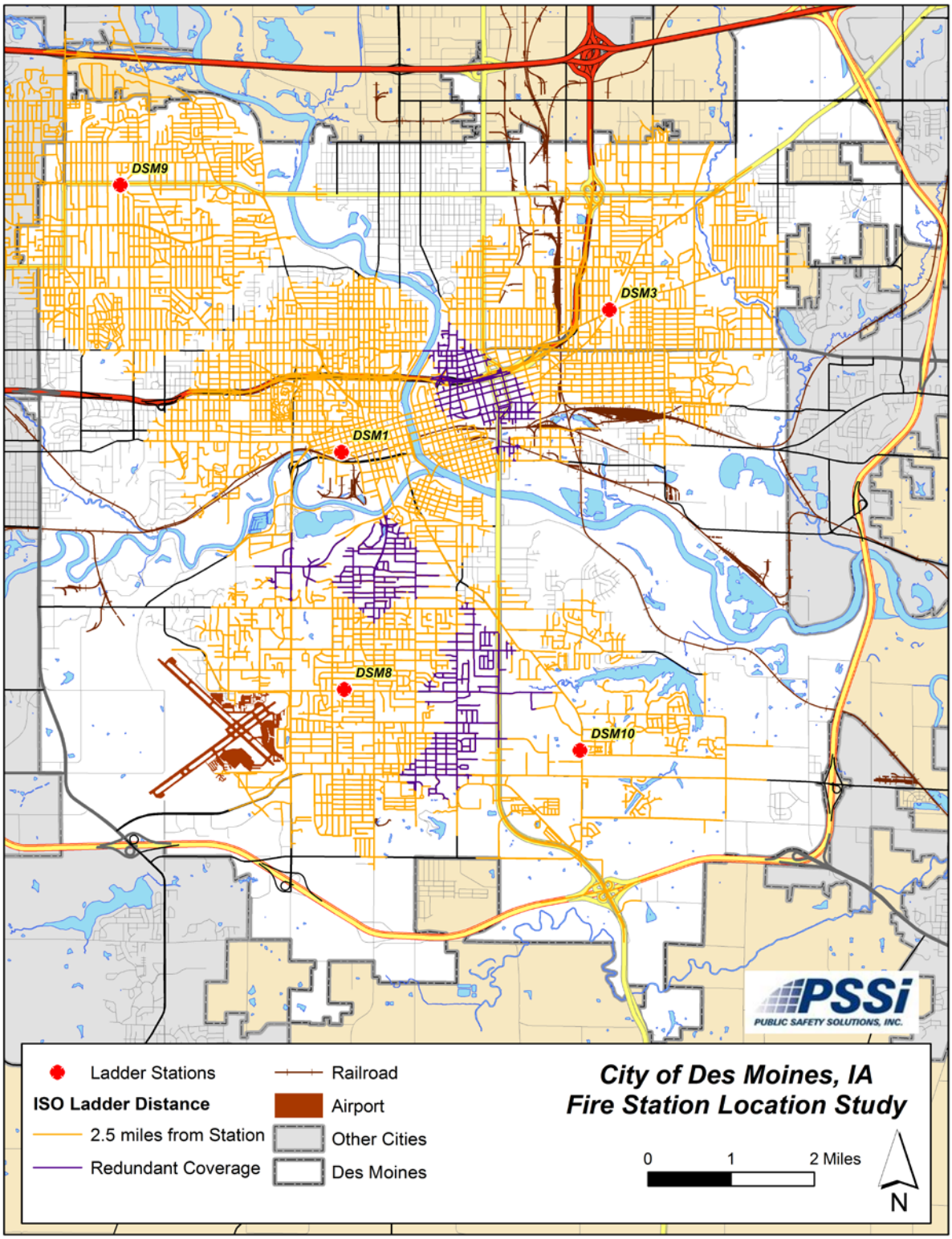
- 801 Grand, 630 feet
- Ruan Center, 460 feet
- Marriott Hotel, 365 feet
- Financial Center, 345 feet
- Plaza building, 340 feet

[1] City GIS PLM Building Data

[2] Not necessarily buildings. LIDAR data can record tall utility structures as well.

[3] http://www.emporis.com/statistics/tallest-buildings

Figure 3.3
ISO LADDER DISTANCE



Community Risk Criteria

Another way of approaching this issue is to define levels of land-use risk and assign a response-time requirement to each risk, rather than use straight mileage response. These risks can be defined as follows:

1. Highest – Refineries, large industry, hospitals, school dormitories, lumber yards, and propane storage facilities without built-in suppression or detection systems;
2. High – High-rise hotels and residential buildings, large shopping centers, and industrial complexes;
3. Medium – Commercial and industrial facilities with sprinkler systems, small shopping centers, and high-density, medium density residential buildings;
4. Low – Lower density Single-family dwellings
5. Minimum – Wide separation of single family dwellings and farm land.

In the International City Management Association's (ICMA) study on Fire Station Location Analysis: A Comprehensive Approach, the following data on the response time requirements of some cities were provided in an article by Susan B. Benton and Neal B. Carpenter entitled, "A Computerized Approach to Fire Station Location."

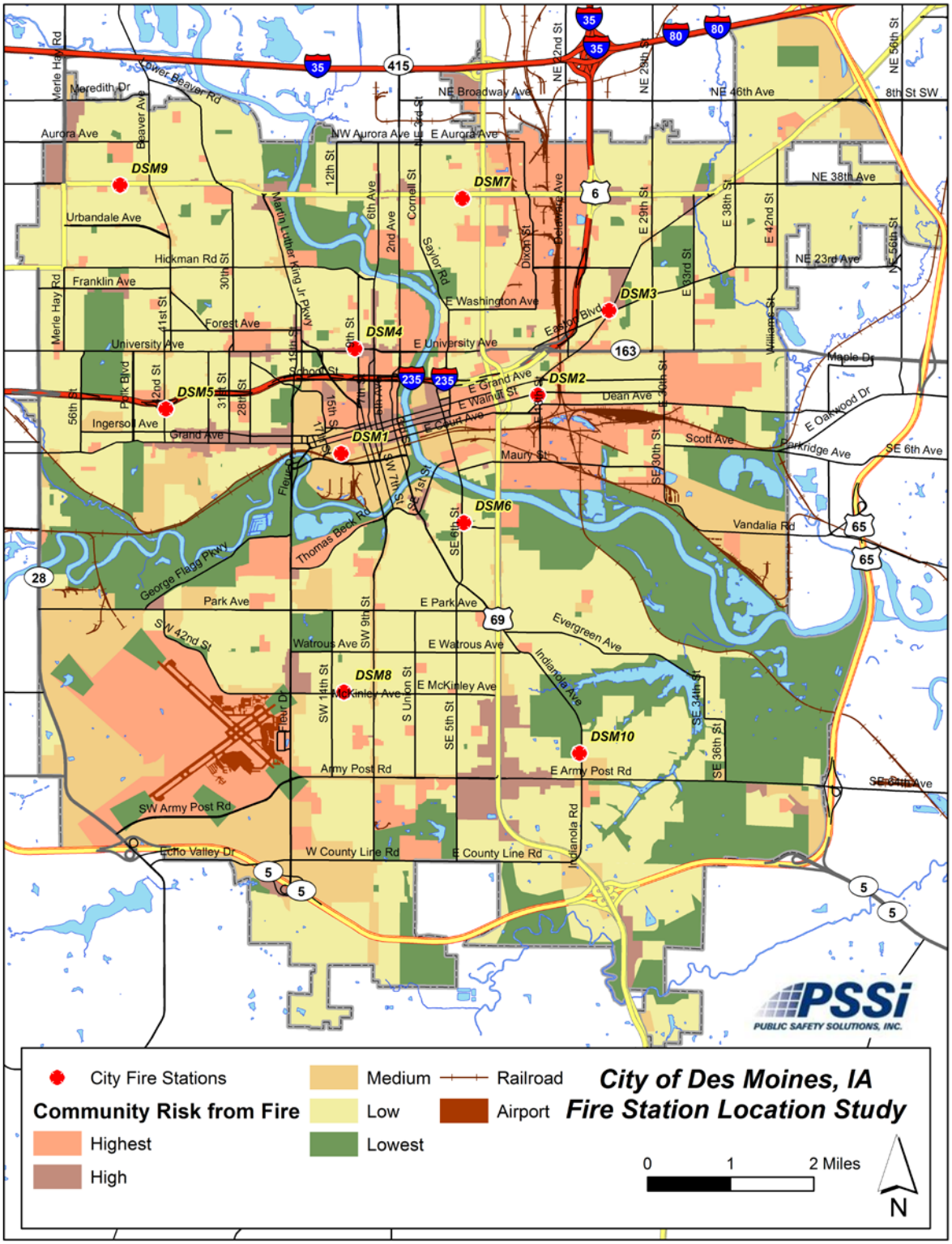
Figure 3.4
COMPARATIVE RESPONSE BY RISK

	Risk Category					
City	1	2	3	4	5	
San Antonio, TX	2.5	3	3.5	4	6	Minutes
Salt Lake City, UT	2.5	3	3.5	4	6	
Lynchburg, VA	3	4	5	6	7	
Memphis, TN	2.3	2.7	3.3	4.3	5.8	
Davenport, IA	3	3.5	4	4.5	5	

Some of these response-time goals are conservative and the pattern of response is unrealistic given the scattered nature of land-use risk in most communities. Nonetheless, it is useful to examine Des Moines land-use risk relative to fire hazard in comparison to the fire station locations. In Figure 3.5, the Future Land Use classifications[4] were re-categorized generally into the five risk levels described above.

[4] City of Des Moines 2020 Land Use Plan

Figure 3.5
LAND-USE RISK



The majority of the City of Des Moines is classified as lower risk according to the risk index. This is expected since the majority of the City is residential in nature. Higher risk in the downtown area, along the railroad, and near major thoroughfares can be discerned when looking at Figure 3.5. There are more fire stations clustered in the area of higher risk in the downtown region.

Response Time Capability Criteria

The response time of fire and EMS apparatus to the scene of an emergency incident is an essential determining factor as to the magnitude of the fire or medical emergency that the fire department must handle upon arrival on the scene of the incident. The theory is the shorter the response time, the smaller the fire that must be extinguished and the better opportunity for paramedics to save critical patients.

Time-related criteria for determining and evaluating fire station locations may be viewed from the perspective of two broad categories of types of incidents: fire and emergency medical service related incidents.

Fire-Related Response Time Considerations

One of the key factors to consider in assessing response times to fires is the time from ignition to flashover. The instantaneous eruption into flames generates a tremendous amount of heat, smoke, and pressure, with enough force to push beyond the room of origin through doors and windows. The combustion process then speeds up because there is an even greater amount of heat to move to unburned objects.

The time from ignition until water is applied to a fire should be no longer than the six to nine minutes it takes for flashover to occur with a free-burning fire. Again, flashover is defined as the instant burning of an explosive mixture of heated air, smoke, and gases that flashes through openings around the fire area, such as doors and windows. This does not include a smoldering fire, which can burn for hours before breaking out into the free-burning stage.

Flashover is a critical stage of fire growth for two reasons. First, no living thing in the room of origin will survive, so the chances of saving lives drop dramatically. Second, flashover causes a quantum jump in the rate of combustion, and a significantly greater amount of water is needed to cool the burning material below its ignition temperature.

More firefighters are needed for fire attack and there exists the likelihood of reduced fire safety. Figure 3.6[5] is a summary of the significance of flashover in the process of fighting fire.

Figure 3.6
FLASHOVER COMPARISON

SIGNIFICANCE OF FLASHOVER	
Pre-Flashover	**Post-Flashover**
Limited to One Room	May Spread Beyond One Room
Requires Smaller Attack Lines	Requires Larger, More Attack Lines
Search & Rescue Is Easier	Compounds Search & Rescue
Initial Assignment Can Handle	Requires Additional Companies

For these reasons, it is critical that fire suppression forces reach a fire as quickly as possible in order to initiate effective suppression efforts prior to flashover. **Travel time must be kept short enough to ensure that it does not exceed the six-to-nine-minute flashover requirement for a reported fire in a structure.**

EMS-Based Response Time Considerations

Time is one of the most important factors relating to patient outcomes in emergency medical situations. Rapid delivery of EMS is essential in the acute situation of cardio-respiratory arrest; a measurable factor is the time from heart stoppage and cessation of breathing (clinical death) to when irreversible brain damage begins (biological death). Although the time varies with patients and conditions, the generally recognized intervention time to prevent biological death is four to six minutes. Time is also critical in heart attacks, stroke, and major trauma where time to hospital interval recommendations for emergency crews have been established by the American Heart and Stroke Associations and by trauma surgeons.

NFPA 1710 Standard

There are a number of applicable NFPA standards and practices that include response time considerations important to labor and fire officials nationwide. NFPA 1710 (Standard for the Organization and Deployment of Fire Operations) response time-related provisions are described in the following sections.

[5] Source: Creating and Evaluating Standards of Response Coverage for Fire Departments, 3rd Edition - Summer 2001, CFAI

NFPA 1710 is an industry standard that serves as a benchmark for the fire department organization and deployment of services offered by firefighters. It is the standard for paid/career fire departments that describes the requirements for delivery of services, response capabilities, incident management, and strategy. This Standard includes the following benchmarks related to call receipt and processing time, turnout time, and response (travel) time:

- Turnout time (time from dispatch to being enroute to an assignment) of eighty seconds on fire suppression calls and sixty seconds for EMS calls;
- The fire department's fire suppression resources are deployed to provide for the arrival of an engine company within a four-minute travel time and/or the initial full alarm assignment within an eight-minute travel time to 90 percent of the incidents;
- The fire department's EMS basic life support (BLS) resources with automatic defibrillator equipment deployed to provide for the arrival of a BLS unit (EMS first responder or transport unit) within a four-minute travel time; and,
- The fire department's EMS resources providing advanced life support (ALS) service deployed to provide for the arrival of an ALS company within an eight-minute travel time to 90 percent of the incidents.

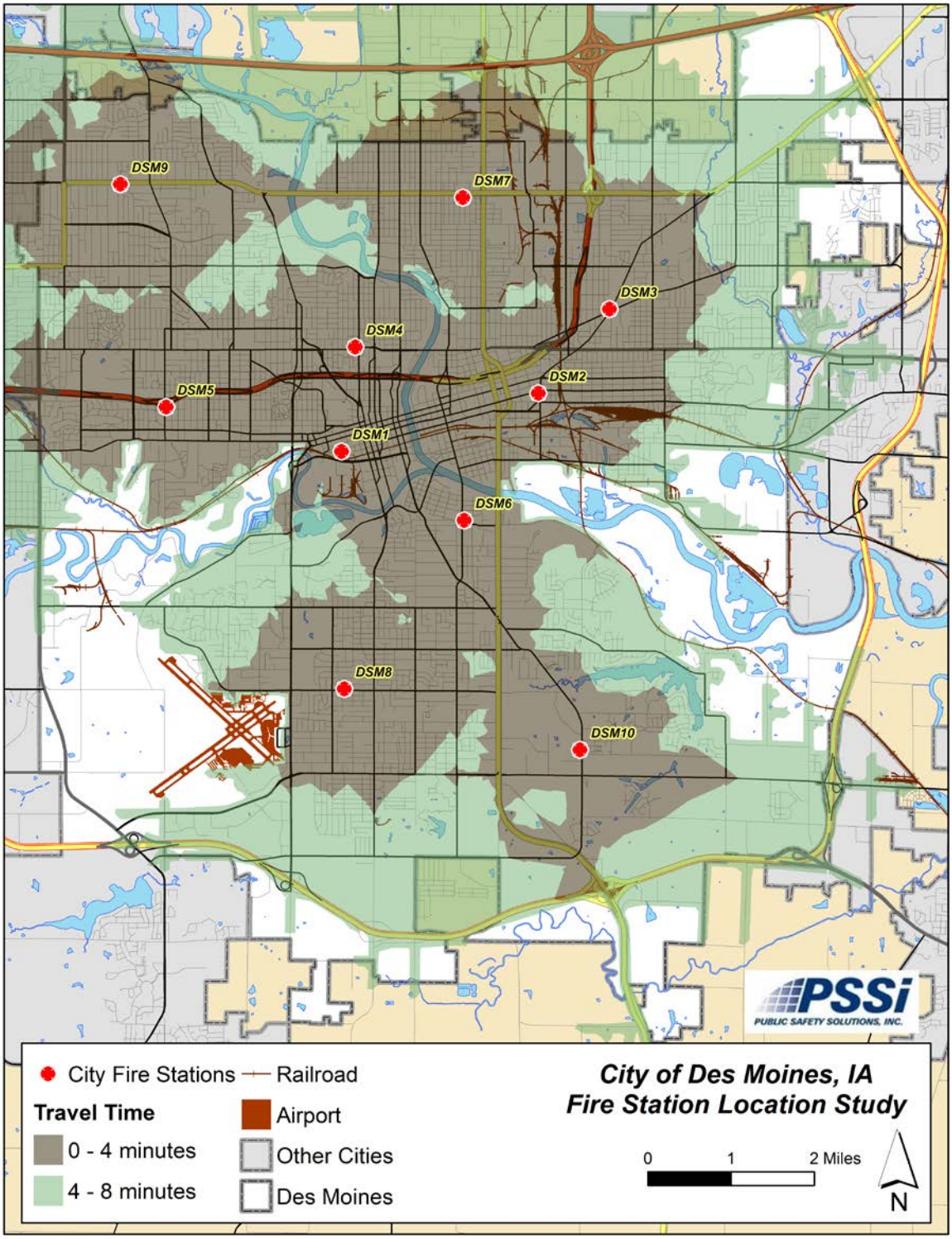
It should be noted that the various standards and criteria discussed in previous sections placed a high priority on both the effective delivery of fire and EMS service in the protection of life and property. Moreover, the safety of the firefighters and officers delivering the services and safety for the customer and stakeholder were important considerations in the development of these standards and to their application.

The Des Moines Fire Department has adopted an eight-minute travel time as a goal to reach 90% of dispatches. This does not include an adopted goal of 80 seconds for fire calls and 60 seconds for medicals for turnout time. Not all requests for services to the fire department ought to be construed as requiring apparatus to respond emergently or within the short time constraints. These should be limited to the most critical emergencies in which they were designed.

Figure 3.7 models the travel time of apparatus from each of the current fire stations. The model utilizes the street network of the City and surrounding areas calculating the travel time extent via distance and speed capability of streets. Actual posted speed limits were utilized and time penalties were assessed for negotiating turns and intersections. This model assumes departure from the fire stations, which may not always be the case. It also

does not take into account weather conditions, traffic congestion, construction, or detours. It does respect the one-way restrictions as they are in place.

Figure 3.7
TRAVEL TIME EXTENT

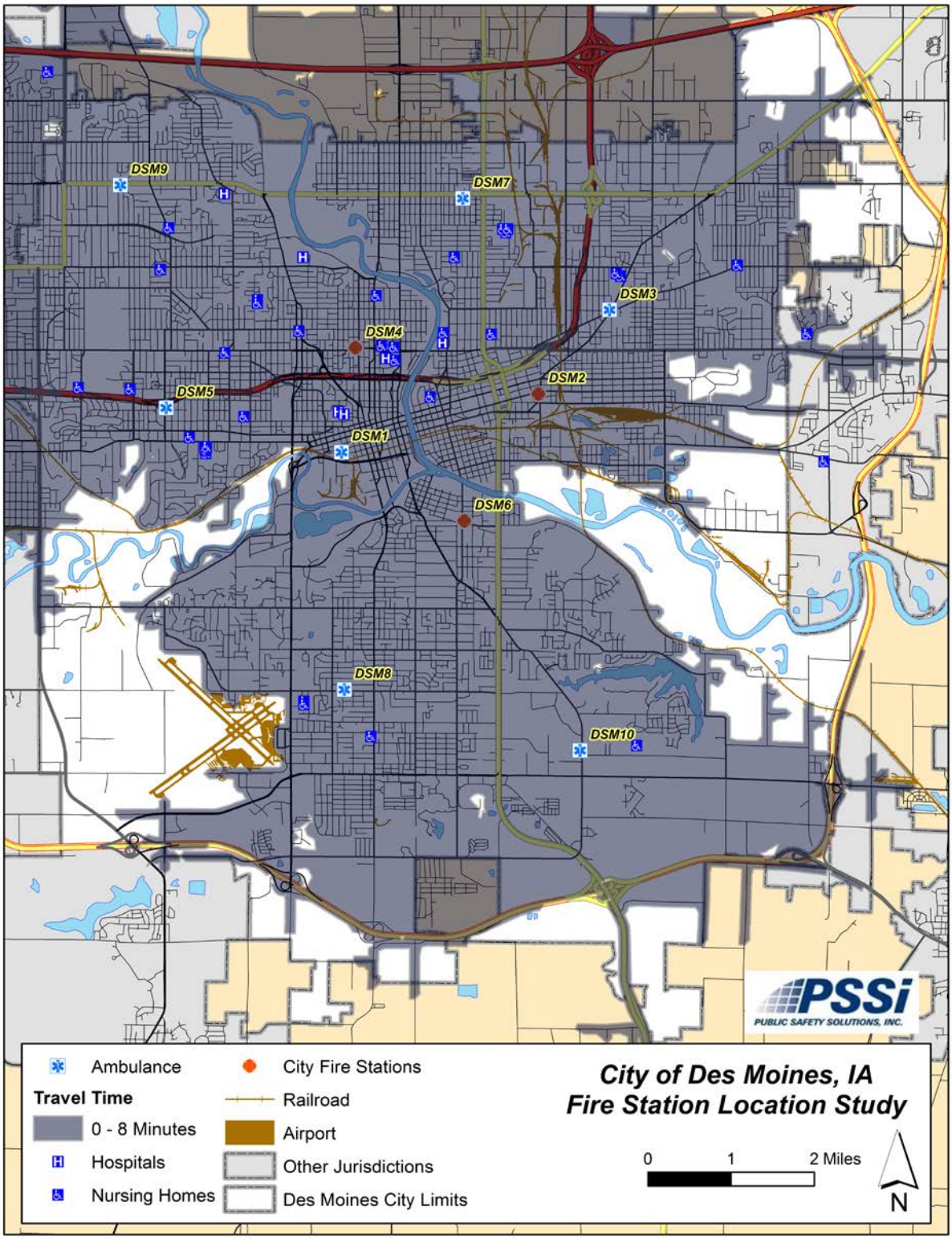


This particular model in Figure 3.7 represents the capability and geographic extent when responding to the most critical of incidents. Certain areas of the City will require slightly more time to reach than those areas that are naturally closer to the existing fire stations. It can be seen that virtually all of the City can be reached within an eight-minute travel time of a fire station.

While all the fire apparatus respond to medical calls, most care is at a basic responder level. More advanced care paramedics are on the ambulances that are assigned to some stations and on four engines housed in stations 3, 4, 6, and 8. However, critical calls require not only fast initial response and treatment, but also transportation to the hospital. The longer it takes for this transportation capability to reach any patient, not only delays definitive care in the hospital but also keeps a fire apparatus unavailable to respond to other incidents. Figure 3.8 illustrates the travel time capability and City area coverage of an ambulance from its assigned station.

Although the map is representative, it must be remembered that since most of the calls in the incident record are EMS related and there are less ambulances than fire apparatus, the ambulances may be responding quite frequently not from their station. Responding from a hospital after declaring themselves available for assignment is a frequent experience for City ambulance units. Unfortunately, where a unit is responding from is not recorded in the dispatch record, but ought to be considered for future analysis purposes.

Figure 3.8
AMBULANCE TRAVEL TIME EXTENT



CURRENT SERVICE DEMAND ANALYSIS

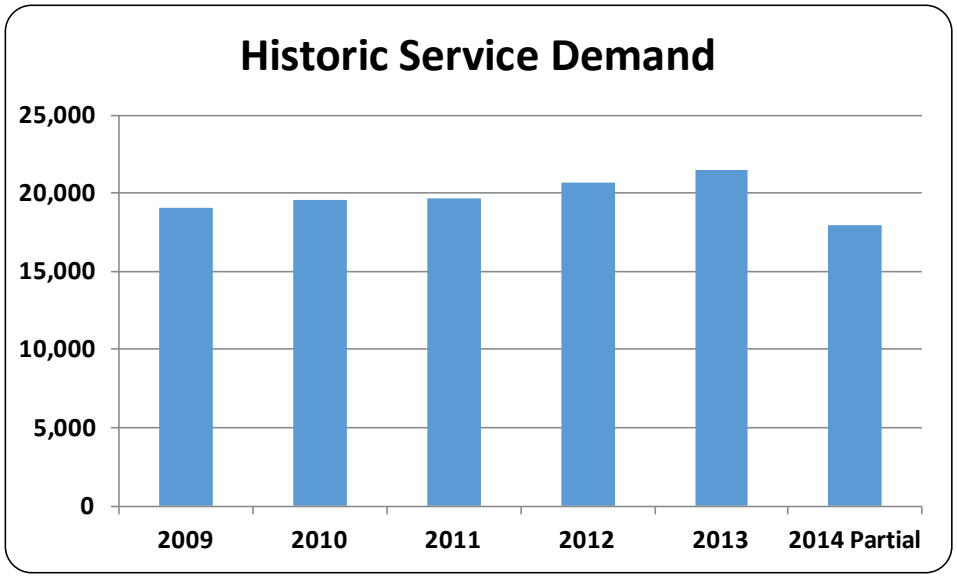
Thanks to the preventive programs, enforcement of improved construction codes, and sprinkler systems, actual fires are fortunately fewer than in decades past, but remain a potential serious threat. The fire department in Des Moines typically responds to every perceived emergency outside of those involving the enforcement of law and civil order. Demand for the services of the fire department range from medical incidents, to rescues, to trees down on wires, to calls for trapped people or animals, to name a few.

The EMS units of the Des Moines Fire Department are responding to an increasing amount of medical requests. The continuing education for EMS providers is ever expanding as medical technologies improve.

Department Level

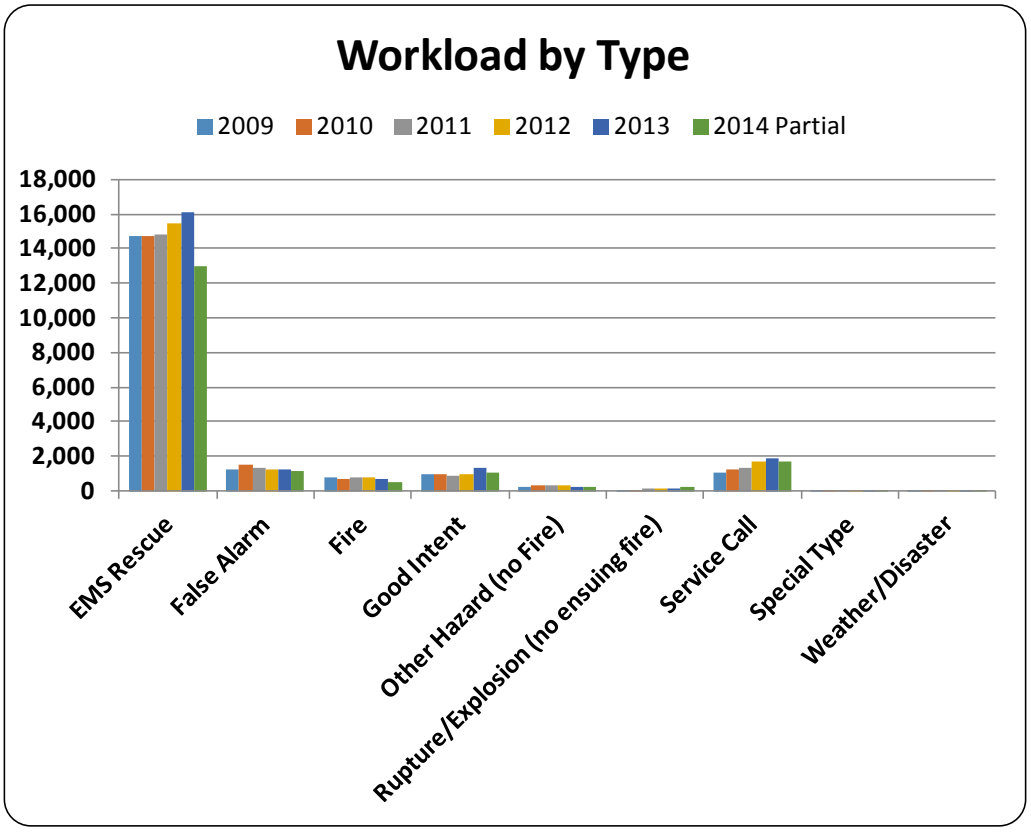
Records of incidents from the Des Moines Fire Department were acquired through an export of its records data management system from 2009 through late October 2014. Figure 3.9 shows the growth in service demand experienced by the fire department over nearly six years of data.

Figure 3.9
FIRE DEPARTMENT HISTORIC SERVICE DEMAND



The call types discussed in the following analysis are categorized as they are found upon arrival of fire personnel not necessarily what was reported or dispatched initially. This disposition and reclassification reporting is the fire officer's responsibility. Figure 3.10 illustrates the change in volume for categories of reported fire, medical and all other categories of incidents (alarm, hazard, spill, and all other).

Figure 3.10
HISTORIC WORKLOAD BY CALL TYPE



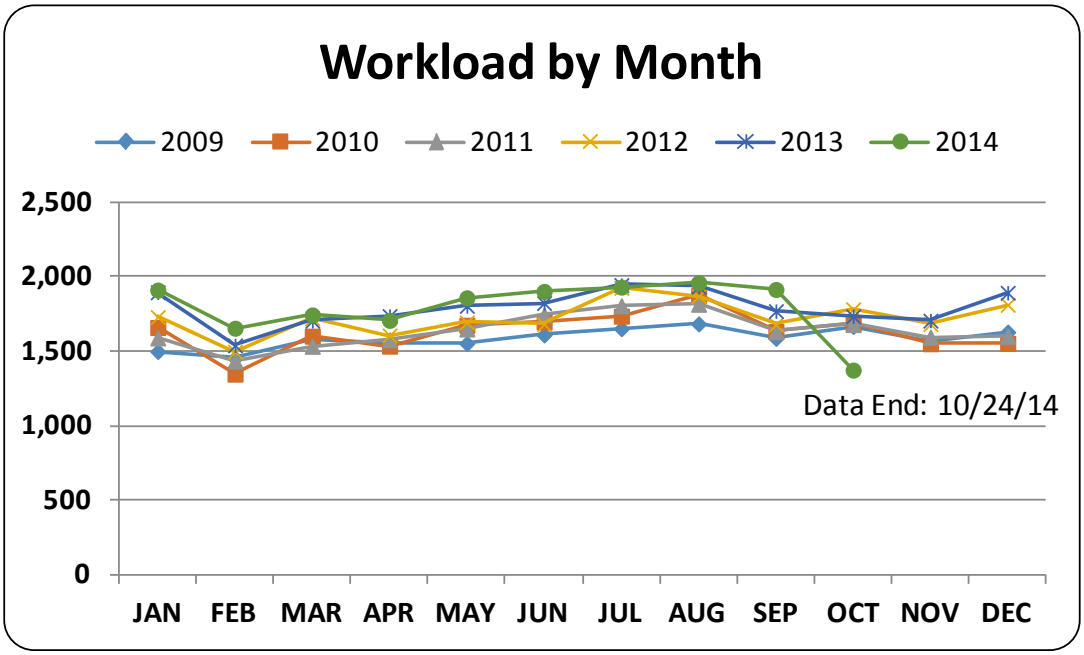
It can be seen that medical calls account for about 74% of overall service demand for the fire department and has increased since 2009. Reported fire calls are approximately 3.6% overall, while other types of service calls account for the remainder.

The fire department is dispatched following a protocol system, which is based on the criticality as determined by a set of dispatcher questions. This works by prioritizing 911 emergency calls into call types and categories. For example, a simple nosebleed would be categorized as a Response 1 call type while more serious types of emergencies are dispatched at Response 3 (Lights & Siren). Given that dispatching criticality system, the

incidents in the record indicated that 70% of the calls are dispatched with the highest criticality (Priority 3), which requiring lights and siren response.

Examining the last year of data more closely, changes in demand can be seen on a monthly basis. Figure 3.11 illustrates that fire service demand averages about 1,690 calls per month or 56 per day.

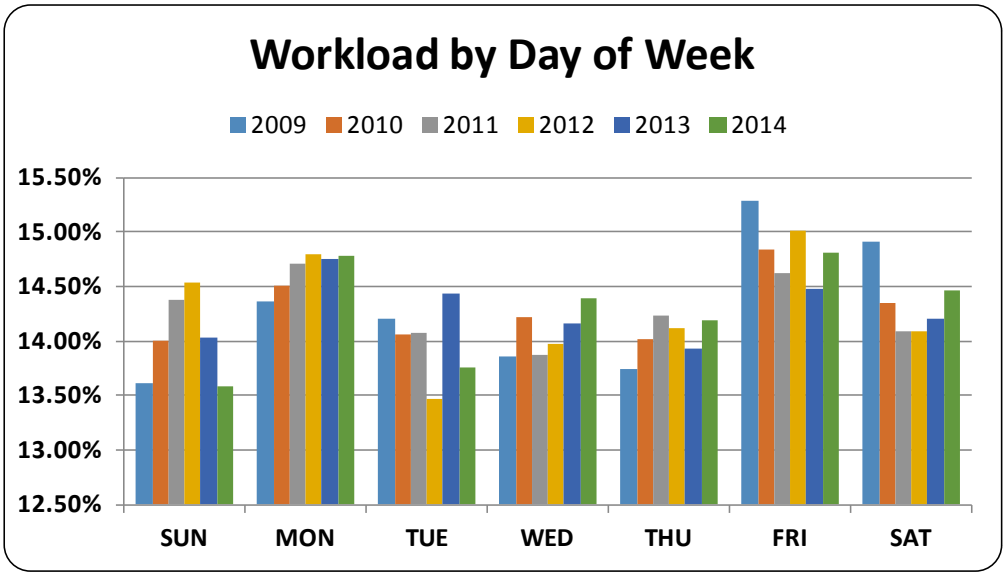
Figure 3.11
WORKLOAD BY MONTH OF YEAR



It appears that service demand for the fire department has followed a similar monthly pattern over the past several years. Demand gradually grows as the weather begins to warm and subsides as it cools, except for spiking around the year-end holidays. February is the slowest month for the fire service in Des Moines.

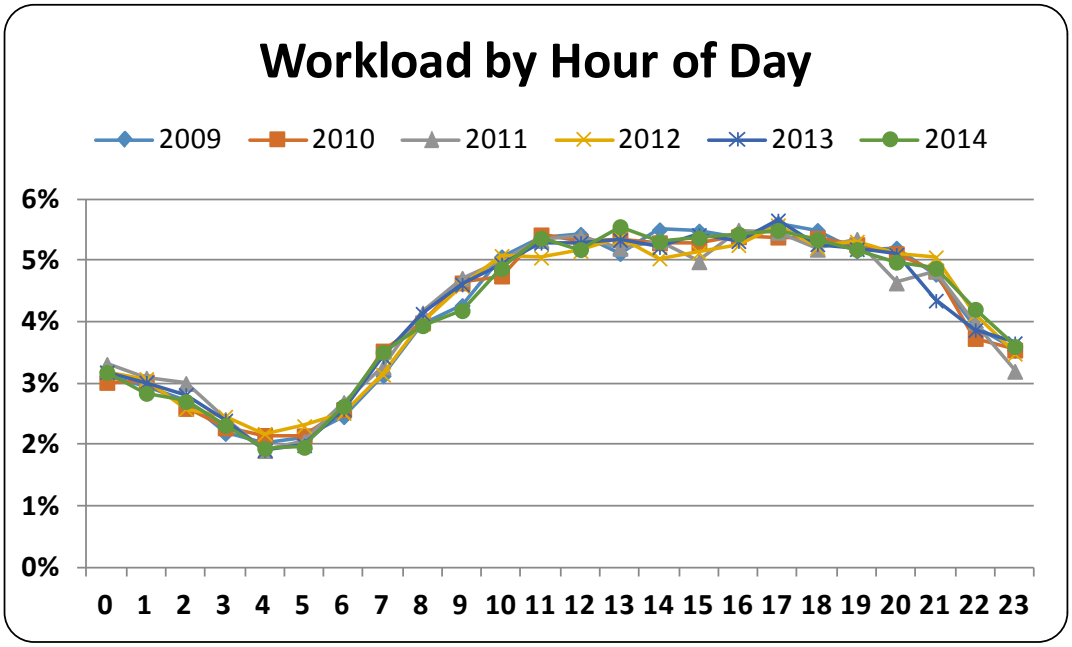
Figure 3.12 shows the service demand by the day of the week, which reveals that Fridays and Mondays are consistently the busiest days of the week for the fire service in Des Moines.

Figure 3.12
FIRE WORKLOAD BY DAY OF WEEK



Next, the workload was examined on an hourly basis; it can be seen in Figure 3.13 that service demand increases with daytime human activity. Not surprisingly, service demand volume surges beginning at 5 AM and grows until after 8 PM. when it begins to decline. Once again, this is very consistent over the years of data on record.

Figure 3.13
WORKLOAD BY HOUR OF DAY



Demand for service is not typically distributed evenly within an area. There are areas where incident calls occur frequently and near each other, as well as other places where demand is less intense and the occurrence is further from each other. Service demand is typically higher in areas of higher population, not just residential, but as offices and shopping centers fill with people as well. Figure 3.14 illustrates the level of demand for fire and rescue services over the last year in Des Moines.

Because of the predominance of medical calls in the incident data represented in Figure 3.14, the next map (Figure 3.15) pinpointed locations of structural fires over the last year in the City of Des Moines.

When compared to modeled travel times from primary fire stations that serve the City, 84% of incidents were reached within four minutes of travel capability and nearly all (99%) within eight minutes of travel time. For ambulances, 92% of EMS service demand is within eight minutes of travel. Since demand is variable and shifts in volume and geography depending upon the hour of day, other elements of risk were also analyzed including building stock, land use based upon risk, and resident population. The results, based upon ISO distance guidelines and response travel time, are shown Figure 3.16.

Figure 3.14
FIRE SERVICE DEMAND

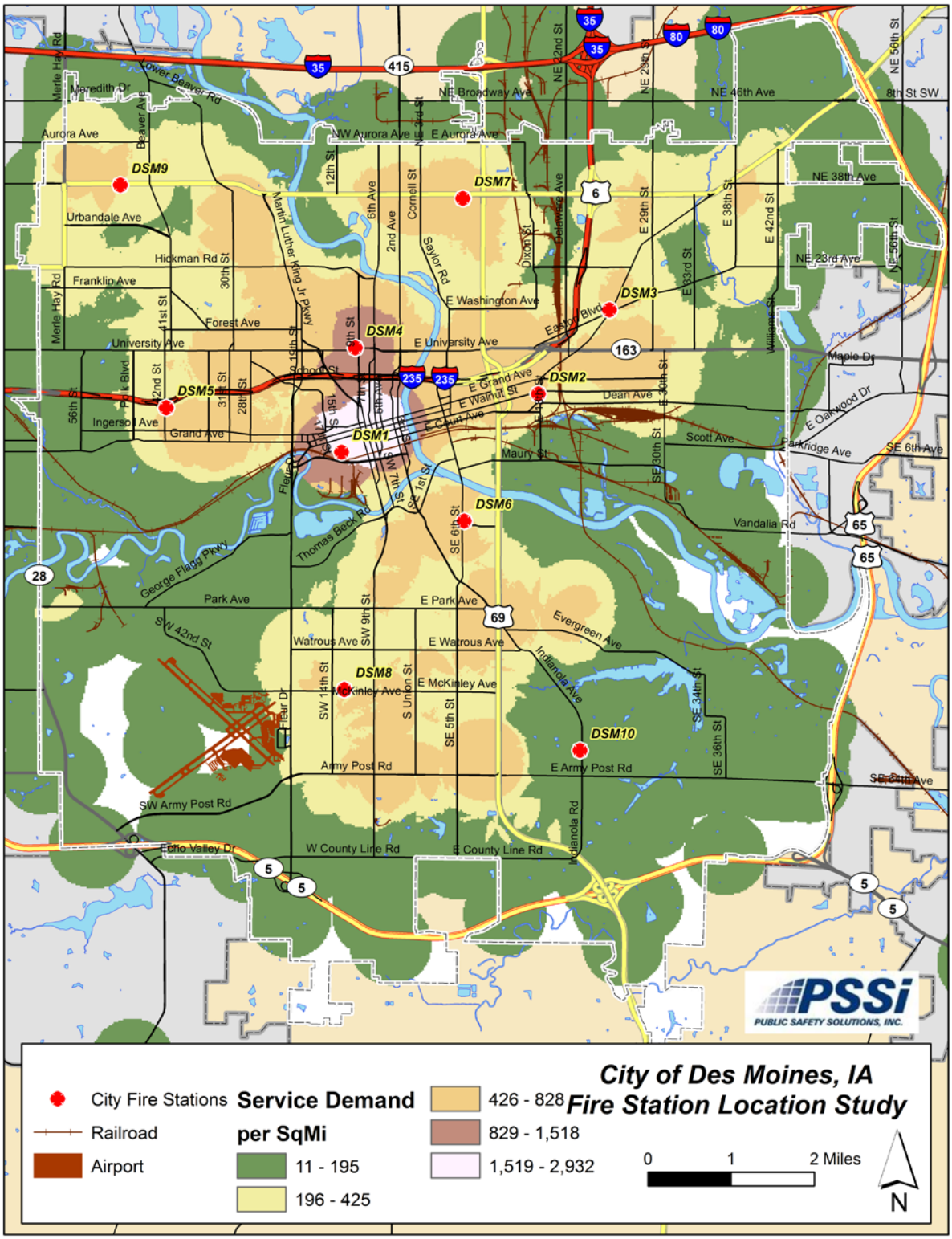


Figure 3.15
STRUCTURE FIRE INCIDENTS IN THE CITY

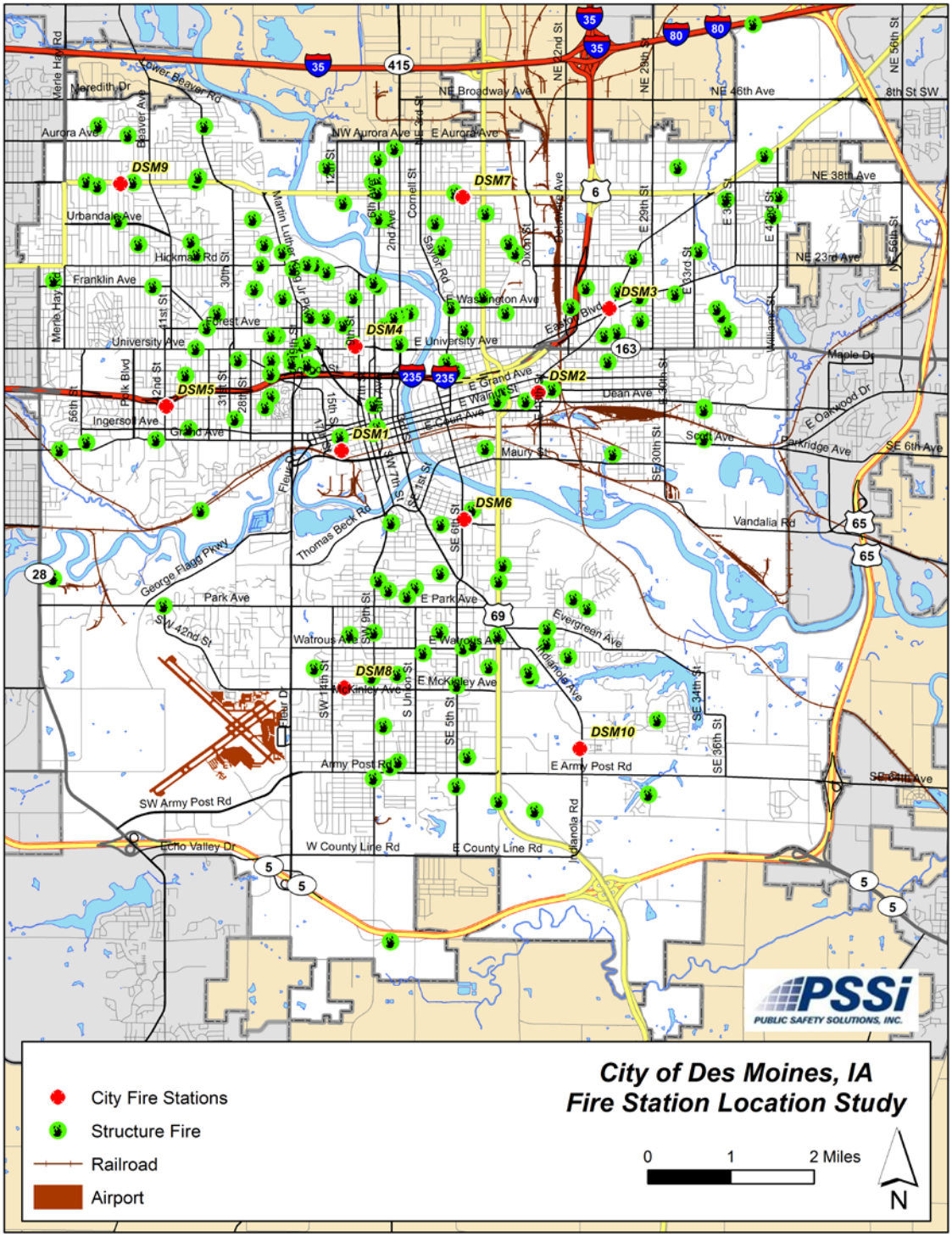


Figure 3.16
COVERAGE STATISTICS

Risk Element	ISO Engine (1.5 miles)	ISO Truck (2.5 miles)	4 min Travel	8 min Travel
Buildings	57%	76%	75%	99%
Buildings over 25k	49%	75%	76%	95%
Highest Risk	69%	83%	88%	100%
High Risk	67%	83%	90%	100%
Moderate Risk	59%	78%	75%	98%
Low	59%	79%	77%	95%
Population	66%	84%	83%	99%
Demand	60%	83%	84%	99%

Figure 3.16 also shows that the city is well covered at the eight-minute travel model and that the department should receive favorable ISO credit for distribution in its rating.

EFFECTIVE RESPONSE FORCE

Examining the eight-minute travel model as shown in Figure 3.7 might indicated that that the eight-minute travel time from some stations overlap others. This would be correct; however, when there is a reported structure fire, an assembly of multiple apparatus and personnel are needed to effectively fight the fire to preserve life and property. The DMFD operates in order to be able to responds to 2 regular alarms and 3 medic calls simultaneously. The Des Moines Fire Department has determined that an effective response force (ERF) for a reported structure fire is to dispatch the closest available set of 3 Engines, 2 Trucks/Ladders, 2 ambulances, and the district chief who responds typically from Station 1 downtown. With the current staffing of 3 firefighters per fire apparatus and 2 firefighter/paramedics per ambulance, this brings the total manpower to 20 for the first alarm. Many fire departments have varying levels of an ERF depending on the level of risk of the property. Figure 3.17 illustrates the geographic extent of DMFDs assembly of apparatus and manpower within the eight minute travel time objective adopted. An alternate ERF is also shown for comparison purposes.

Many times the district chief may be at the fire department administration building on Dean Ave when a structure fire alarm comes in or may be otherwise unavailable that would cause another chief officer to respond. Figure 3.18 shows how the ERF changes in this scenario.

Figure 3.17
EFFECTIVE RESPONSE FORCE WITH DISTRICT CHIEF FROM STATION 1

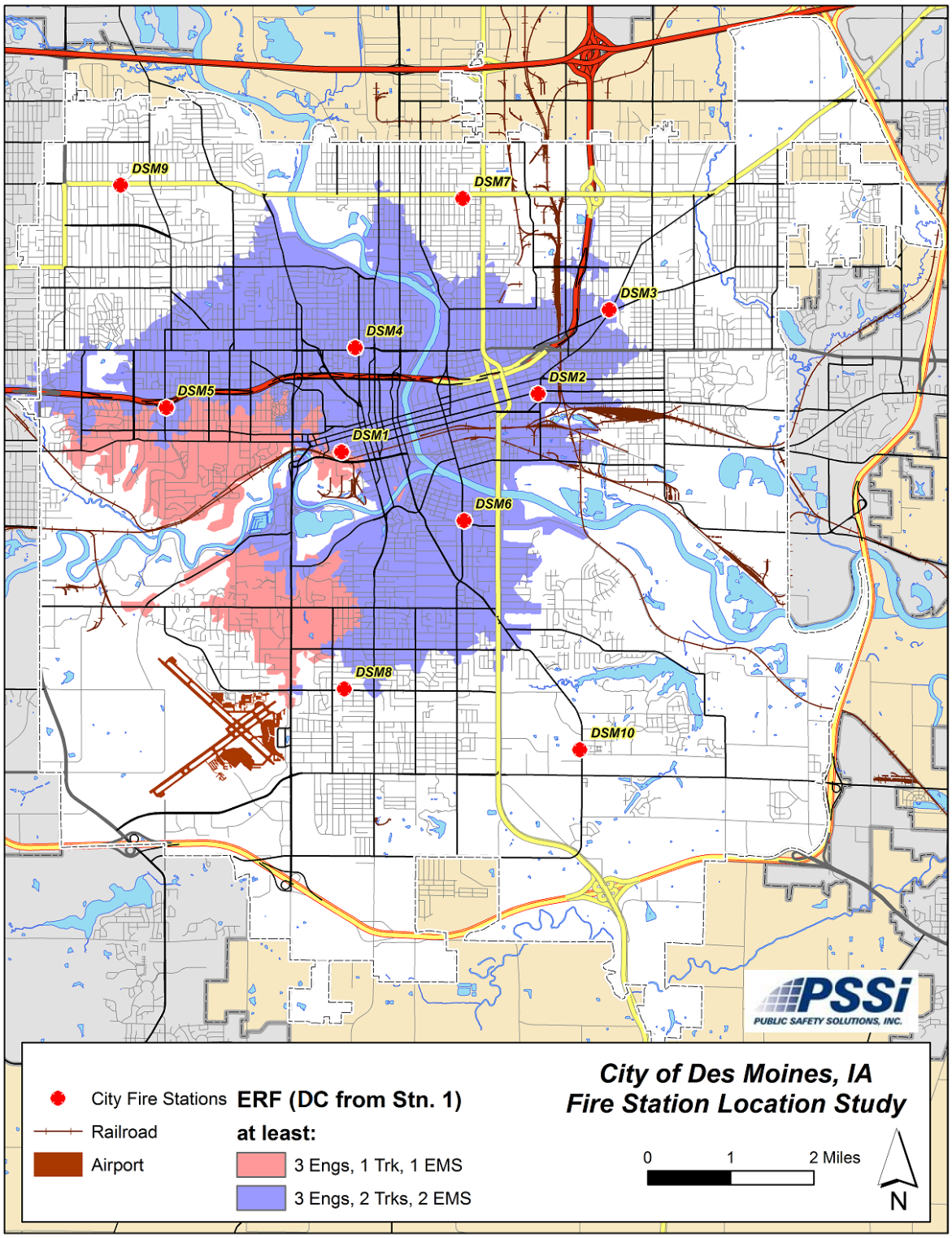
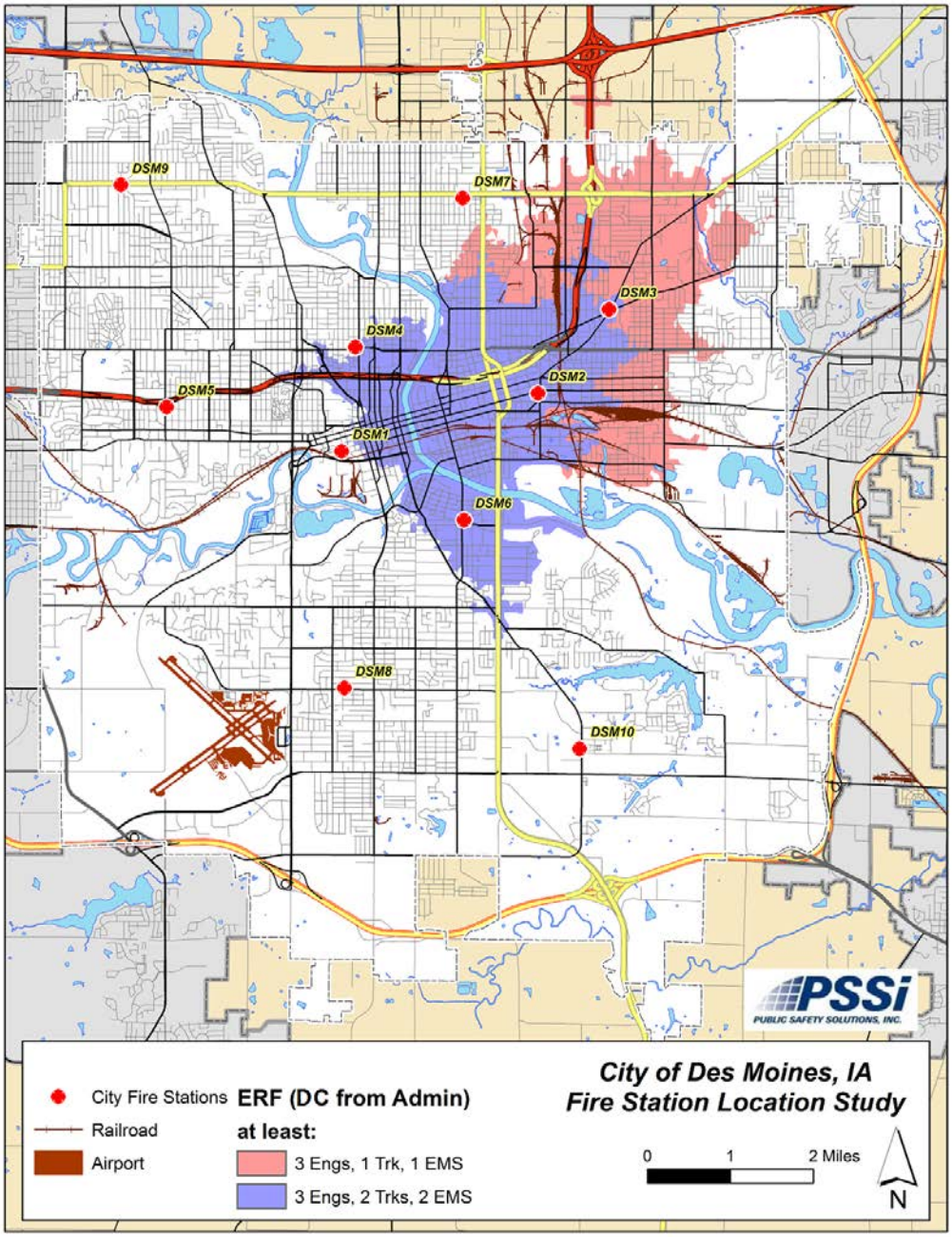
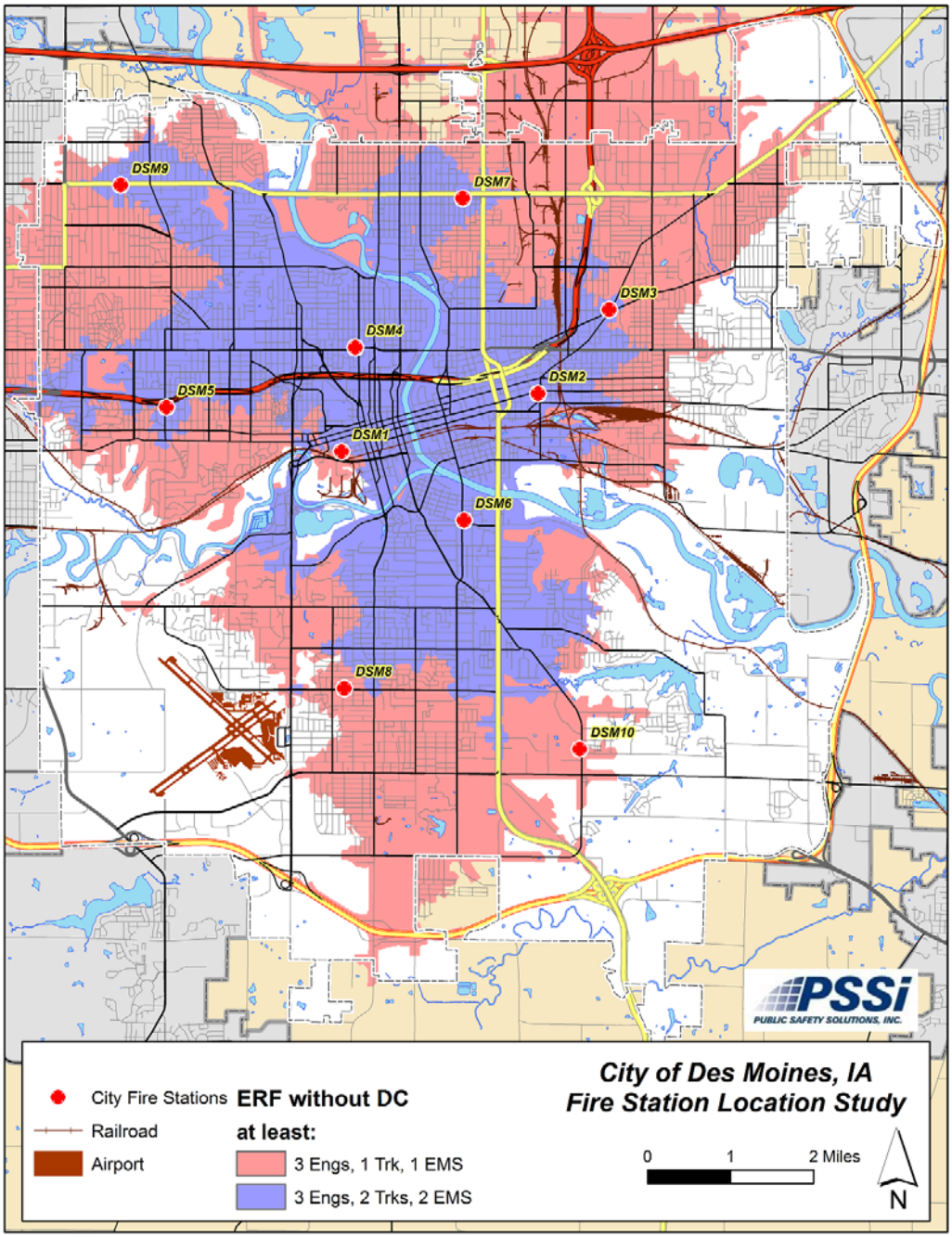


Figure 3.18
EFFECTIVE RESPONSE FORCE WITH A CHIEF FROM FIRE ADMIN. BLDG



Considering that any chief officer available may be at any one location in the city, Figure 3.19 exhibits the ERF without regard to a chief's location, which is the most limiting factor in the geographic extent capability of the multiple fire apparatus.

Figure 3.19
EFFECTIVE RESPONSE FORCE WITHOUT A CHIEF INCLUDED



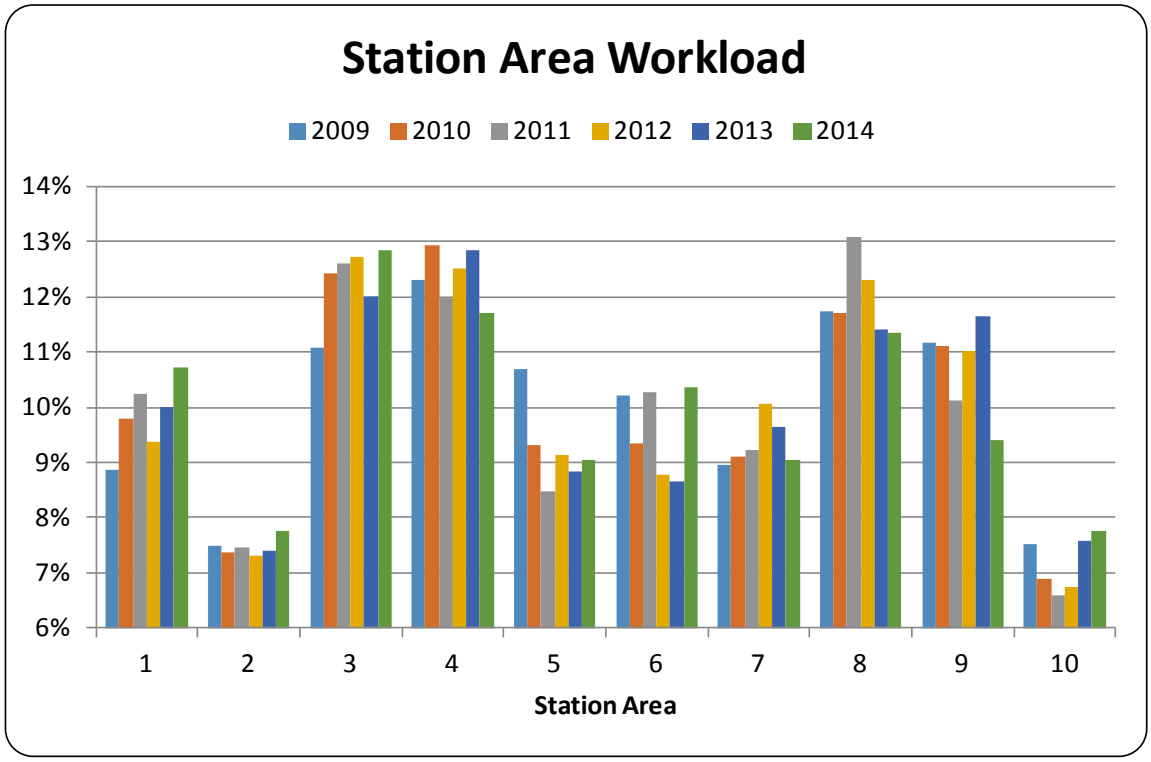
It is discernible from the previous geographic representations, that more ground is covered with an ERF of two less apparatus and 15 firefighters versus 20. DMFD may want to consider the measurement of the ERF assembly time utilizing the configuration

with less units. In practice, this configuration of less units leaves others available in the case of a simultaneous event or for second alarm incidents.

Station & Unit Level Workload

Each incident within the dispatch data recorded the station area that the incident occurred. Station area workload is dependent upon size and is a guide for dispatchers to send the closest available. Figure 3.20 shows the workload per station area.

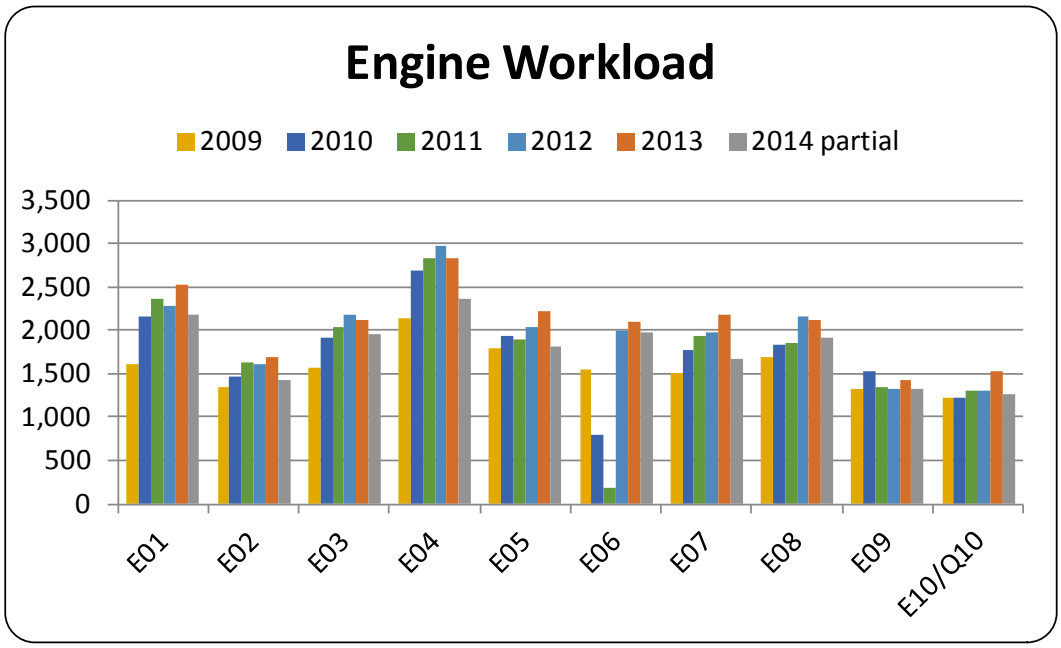
Figure 3.20
STATION AREA WORKLOAD



The record indicates that the area designated as Station 3 and 4 have the most frequency of incidents. Since all these areas are not the same size in geography, the per-square-mile demand map in Figure 3.14 more accurately reflects the intensity and volume of demand. Because the closest available unit is used primarily for dispatching purposes, unit level workload does not necessarily mirror the station area workload above. This is also true because not all stations have all the basic types of apparatus (notably ladder truck and& ambulance). Assessing the unit workload will help determine if adjustments to the

collection of apparatus is needed. Please note that this analysis is incident workload and does not reflect the hours of training, station, duties, inspections, and other activities that make up the day to day activities of the firefighters. Figure 3.21 shows the workload for engine apparatus in the City for the period of available data.

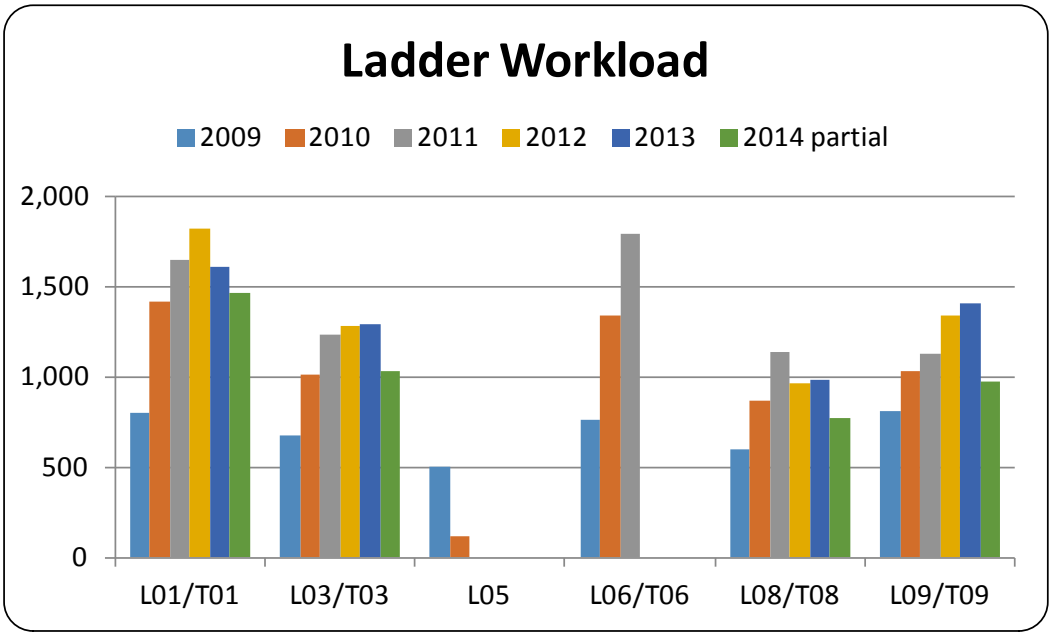
Figure 3.21
ENGINE WORKLOAD



Engine 4 is the busiest apparatus in the City, followed closely by Engine 1. Ladders typically have lower workloads because they are often housed with engines and not sent to all call types as are engines. The exception in the City is the apparatus at Station 10 included in the previous figure. Figure 3.22 illustrates the ladder workload in the City.

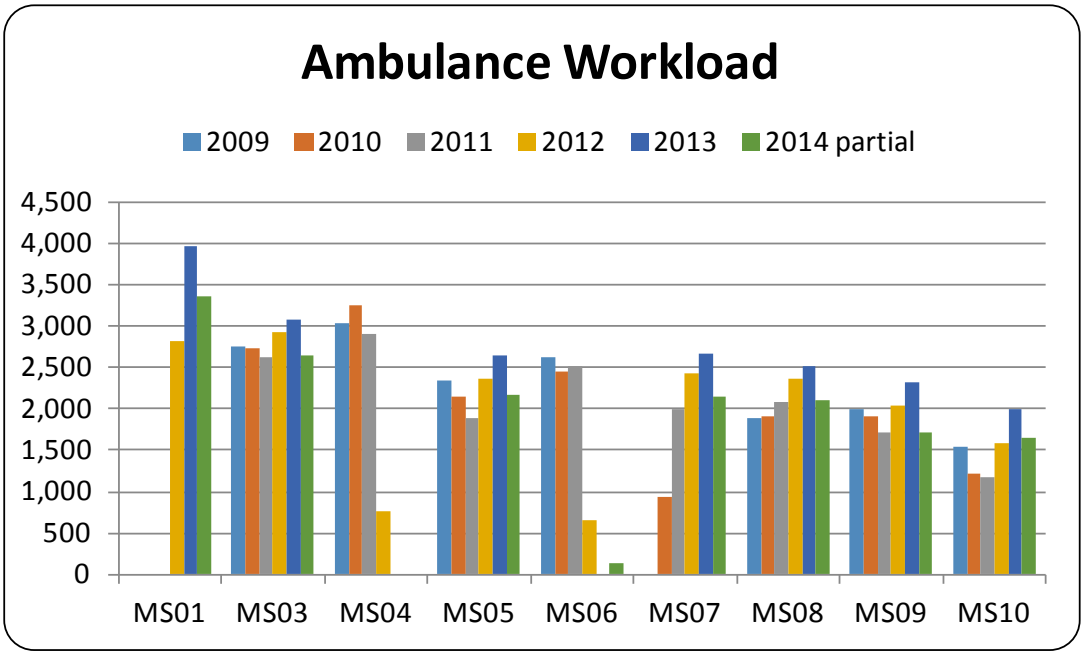
Perhaps not surprising, due to the high-rise buildings nearby, Ladder 1 is the busiest truck apparatus in the City except briefly in 2011 when Ladder 6 was the busiest, which was decommissioned in 2012.

Figure 3.22
LADDER WORKLOAD



Because medical calls are prevalent and their numbers are less than engines, ambulance units are busier. Figure 3.23 details the workload among the ambulance units in the City.

Figure 3.23
AMBULANCE WORKLOAD



Currently, Medic 1 is the busiest ambulance. Medic 1 was created when Medic 4 and Medic 6 were decommissioned in 2012. Previously, Medic 4 was the busiest, followed by Medic 3. In 2014, Medic 6 was deployed on a trial basis at certain times.

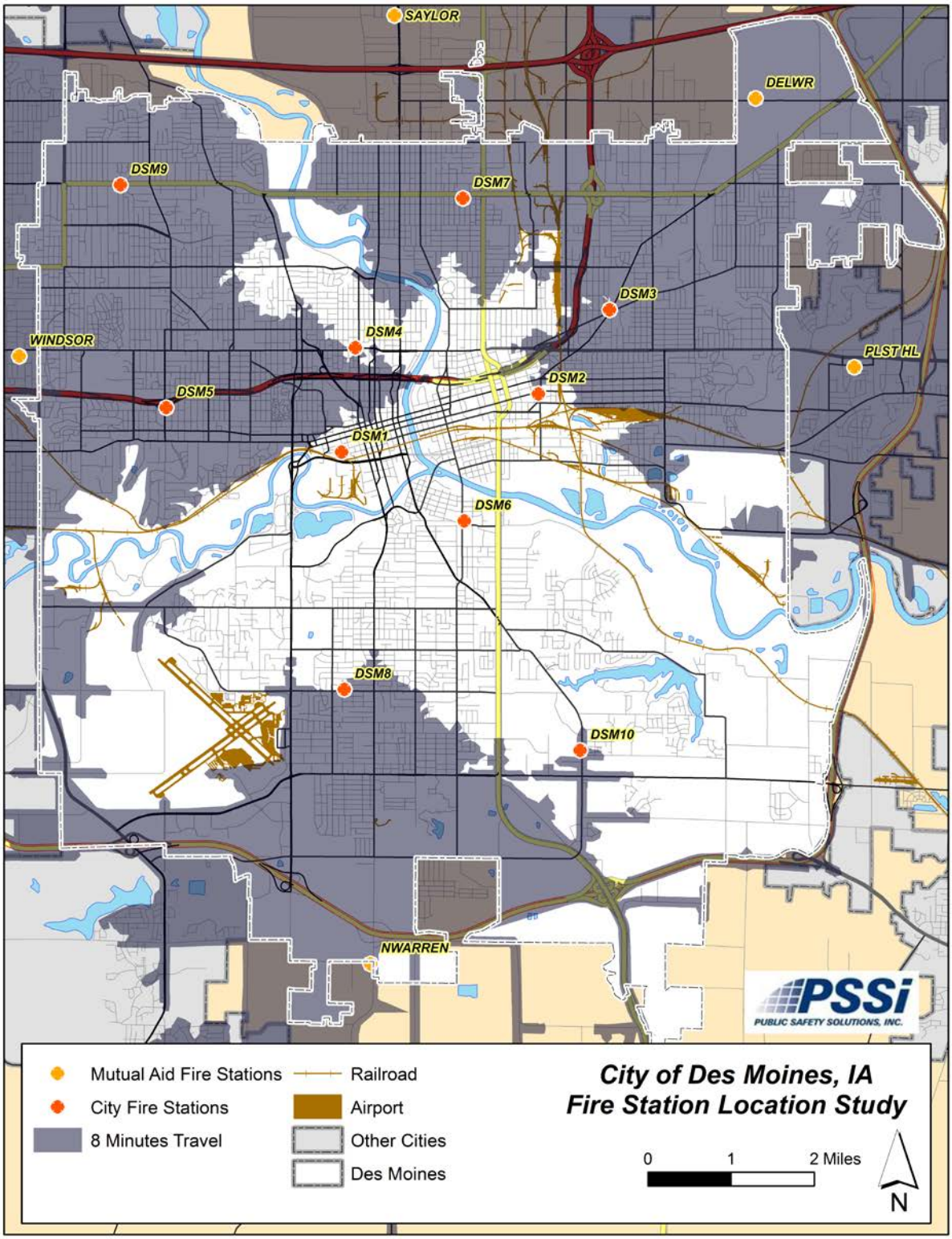
While the workload of a unit is reflective of the relative demand in the area, it belies the actual busyness of a unit because it does not include time on assignment. While it is known that structure fires can involve a unit for an extended period of time, the transportation and transfer of patients involves a consistently longer time on assignment than experienced by other apparatus. Factoring in time to assignment yields that ambulances are 2.5 times more involved on assignments. In addition, the extra training involved in being a paramedic, in addition to a firefighter, adds to the workload.

MUTUAL AID

Occasionally, the fire department is requested to scenes outside of the City limits. Response to outside jurisdictions accounted for less than 1% of the fire department's workload. The Polk County Correctional Facility is the most often responded to location outside of the City jurisdiction.

Depending upon the availability, staffing model, and capability of surrounding departments, the use of these departments for mutual and automatic aid should be considered since they could reach a sizable portion of the City within an eight-minute travel time as shown in the Figure 3.24.

Figure 3.24
MUTUAL AID TRAVEL TIME CAPABILITY



SPECIALTY UNITS

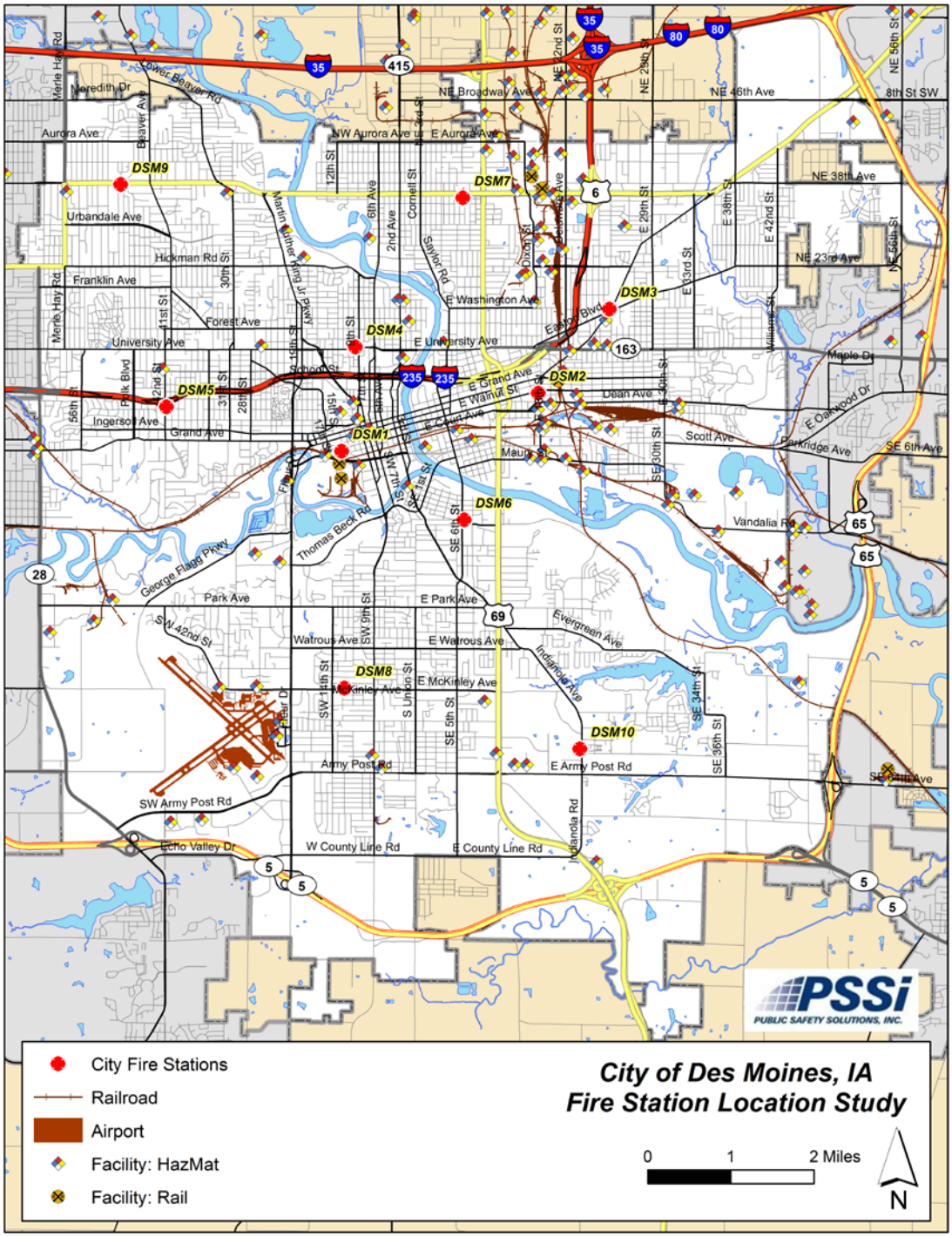
DMFD operates several types of specialized units for extraordinary situations. Incidents involving hazardous materials can occur in facilities that have reported to contain them and on roadways most commonly through commercial truck accidents and industrial spills. These incidents threaten environmental quality and can lead to acute or chronic illnesses. DMFD operates two hazardous material teams with specialty apparatus located in Station 1 and Station 3. In comparison to the known threats of hazardous materials in the community through self-reporting by facilities, the placement of these hazmat response apparatus is favorable. In some cases, facility capacity is a determinate of apparatus placement.

The Hazmat team is comprised of at least six specially trained responders who are otherwise on shifts serving on other apparatus, since the occurrence of hazmat incidence is low while the consequence is high. This team also contracts with seven surrounding counties (Boone, Dallas, Madison, Marshall, Polk, Story, and Warren) to provide Hazmat team services per 28E agreements.

A technical rescue team can also be assembled for high angle rescues, confined space, and trench rescue incidents. Equipment for this team is stored at Station 7. Rescue boats are stored at Station 2 and Station 6 for the cold water and swift water rescue teams (WET). The boats are deployed nearby at boat ramps. One of these boat ramps is located at Principal Park and reportedly can be very difficult to deploy from in normal or low water level conditions at that location, as opposed to other available boat ramps.

Figure 3.25 shows the locations of the hazardous facilities.

Figure 3.25
HAZARDOUS MATERIAL FACILITIES



RESPONSE TIME ANALYSIS

The most important measure of performance of any emergency service provider, especially to those they serve, is how fast does help arrive. Discussions of the reasons for and the specific parameters of the establishment of national response time guidelines from the NFPA have been outlined in an earlier subsection in this chapter. As a reminder, DMFD has adopted an objective that all the apparatus responding to a fire alarm or a serious medical emergency arrive within eight minutes of being enroute, 90% of the time. Figure 3.26 illustrates the response time performance for the first arriving fire apparatus using the Fire RDMS dataset[6] over the last year.

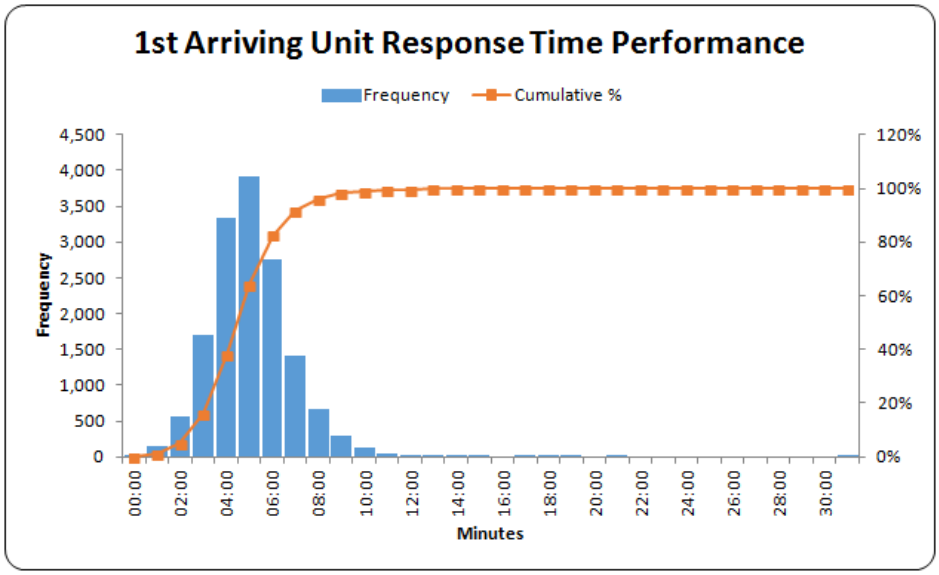
It should be noted that the dataset utilized in the analysis is an export from the fire departments RDMS (Firehouse) software. While it is auto-populated with information from the computer-aided dispatch (CAD) system, the timestamp values are modifiable by the report input user. There were unsubstantiated reports of sporadic process and procedure issues that may, at times, affect the data initially entered by CAD, including dispatch delay in time stamping as well as mobile data terminal acknowledgement delays/misses, with some speculation that it is due to user error or 'dead zones' of radio capability.

Figure 3.26 shows the average response time for first arriving fire apparatus is four minutes and twenty-five seconds (0:04:25), while 90% of **all emergent calls**[7] within the city were answered within six minutes and twenty-nine minutes (0:06:29). Response time includes the turnout time and the travel time of a unit's response. This is within the adopted objectives for the Des Moines Fire Department.

[6] Mutual Aid and Non-Emergent Calls as Identified were removed

[7] Accounts for 69% of the service demand volume since 2009.

Figure 3.26
RESPONSE TIME PERFORMANCE



The average turnout time for fire apparatus was eighty four seconds and 90% of the time, the first arriving unit was out the door within two minutes and ten seconds. Turnout time is the only element of response time within total control of the crew. Weather, construction, distance and obstacles during travel create variables that can be challenging during a response. Other units may have had better turnout times but arrived later on the scene. To review the average turnout times by unit, refer to Figure 3.27.

The average travel time for the first arriving apparatus is three minutes and eleven seconds (0:03:11), while 90% of **all emergent calls** were travelled to within five minutes and twelve seconds (0:05:12).

While the police department dispatchers also dispatch the fire department, it was found upon analysis that 90 percent of all assignments are dispatched with 42 seconds, the average was 21 seconds. Both time results are commendable when compared to best practices.

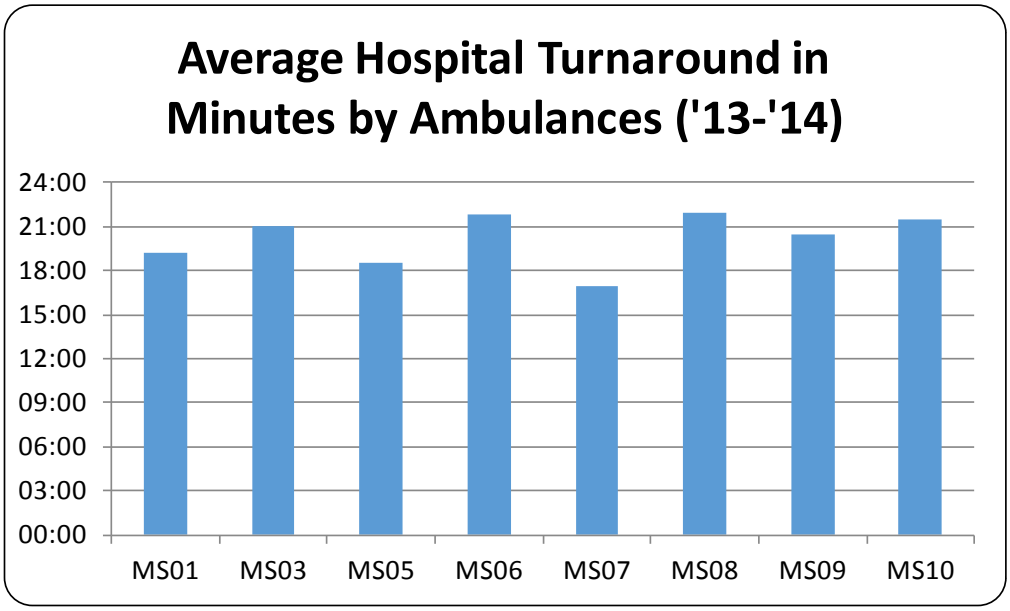
Figure 3.27
AVERAGE TURNOUT TIME BY UNIT

Unit	2009	2010	2011	2012	2013	2014	Grand Total
E01		0:01:37	0:01:32	0:01:29	0:01:43	0:01:43	0:01:37
E02		0:01:35	0:01:37	0:01:31	0:01:40	0:01:35	0:01:36
E03		0:01:30	0:01:33	0:01:31	0:01:40	0:01:33	0:01:34
E04		0:01:31	0:01:33	0:01:37	0:01:29	0:01:24	0:01:31
E05		0:01:30	0:01:31	0:01:28	0:01:29	0:02:40	0:01:43
E06		0:01:30	0:01:40	0:01:25	0:01:30	0:01:39	0:01:32
E07		0:01:36	0:01:41	0:01:32	0:01:37	0:01:31	0:01:35
E08		0:01:32	0:01:42	0:01:34	0:01:34	0:01:31	0:01:35
E09		0:01:27	0:01:32	0:01:22	0:01:31	0:01:30	0:01:28
E10		0:01:45	0:01:50				0:01:48
L01	0:01:43	0:01:39					0:01:42
L03	0:01:38	0:01:42					0:01:39
L05	0:01:35	0:01:33					0:01:34
L06	0:01:43	0:01:44					0:01:44
L08	0:01:35	0:01:32					0:01:34
L09	0:01:34	0:01:32					0:01:34
MS01				0:01:18	0:01:29	0:01:37	0:01:29
MS03	0:01:13	0:01:20	0:01:24	0:01:18	0:01:23	0:01:23	0:01:20
MS04	0:01:18	0:01:19	0:01:25	0:01:27			0:01:21
MS05	0:00:33	0:01:18	0:01:25	0:01:18	0:01:21	0:01:18	0:01:11
MS06	0:01:17	0:01:21	0:01:25	0:01:35		0:01:41	0:01:22
MS07		0:01:23	0:01:27	0:01:19	0:01:58	0:01:16	0:01:31
MS08	0:01:11	0:01:15	0:01:29	0:01:26	0:01:28	0:01:25	0:01:23
MS09	0:01:13	0:01:17	0:01:27	0:01:18	0:01:26	0:01:22	0:01:20
MS10	0:01:28	0:01:35	0:01:42	0:01:32	0:01:26	0:01:29	0:01:31
P01	0:01:31	0:01:38					0:01:33
P02	0:01:35	0:01:37					0:01:35
P03	0:01:23	0:01:24					0:01:23
P04	0:01:26	0:01:31					0:01:27
P05	0:01:20	0:01:27					0:01:22
P06	0:01:30	0:01:32					0:01:30
P07	0:01:36	0:01:35					0:01:36
P08	0:01:24	0:01:28					0:01:25
P09	0:01:24	0:01:27					0:01:25
P10	0:01:39	0:01:39					0:01:39
RE02						0:00:02	0:00:02
RE04					0:01:48	0:01:23	0:01:43
RE05					0:01:28	0:01:34	0:01:30
T01		0:01:44	0:01:45	0:01:39	0:01:54	0:01:57	0:01:48
T03		0:01:46	0:01:41	0:01:35	0:01:43	0:01:38	0:01:40
T06		0:01:38	0:01:34				0:01:35
T08		0:01:42	0:01:40	0:01:42	0:01:48	0:01:46	0:01:44
T09		0:01:35	0:01:39	0:01:38	0:01:46	0:02:00	0:01:44
T10			0:01:49	0:01:47	0:01:50	0:01:42	0:01:47
Grand Total	**0:01:20**	**0:01:28**	**0:01:32**	**0:01:28**	**0:01:34**	**0:01:34**	**0:01:30**

It was pointed out to the Study Team that a social services shelter building is located next door to Station 1. That may skew the response time analysis because of the large number of calls and short travel time. Indeed, this address was the most dispatched since 2013, but only accounts for nearly 2.6% of the incidents analyzed during the time period and as expected, the response time is short. Prior to that facility opening in 2013, a 15th Street and a Grand Ave address were the most frequent in previous years. This facility does not have a significant skewing effect upon the overall departmental performance, but would upon Station 1's travel time performance and subsequently overall response time.

There was no appreciable difference in response times between fire engines and ambulances to incidents. There are other elements of EMS time performance that can be analyzed and perhaps improved. While EMS providers do bring an enormous amount of skill and knowledge to the scene of the incident, a lengthy scene time is not usually an issue except in cases of cardiac arrest and trapped victims. The time to travel to the hospital is infinitely variable and dependent upon the scene location and distance to the chosen facility. Once at the facility, the EMS crew must give a report to the facility, transfer the patient from their stretcher, clean and restock the unit, and complete paperwork. While some calls require more effort in these tasks than others, such as serious trauma, cardiac arrests, childbirth, and complicated medical situations, the goal for many systems is for the unit to be available, returning to their station/zone within 30 minutes. Some systems ask their units to only declare themselves available when they are in their primary response area; nonetheless, it is an important measure as additional unit resources are finite and in many aspects (but not all, i.e., bed availability, triage, nurse to accept report) can be controlled by the ambulance crew.

Figure 3.28
POST RESPONSE EMS PERFORMANCE

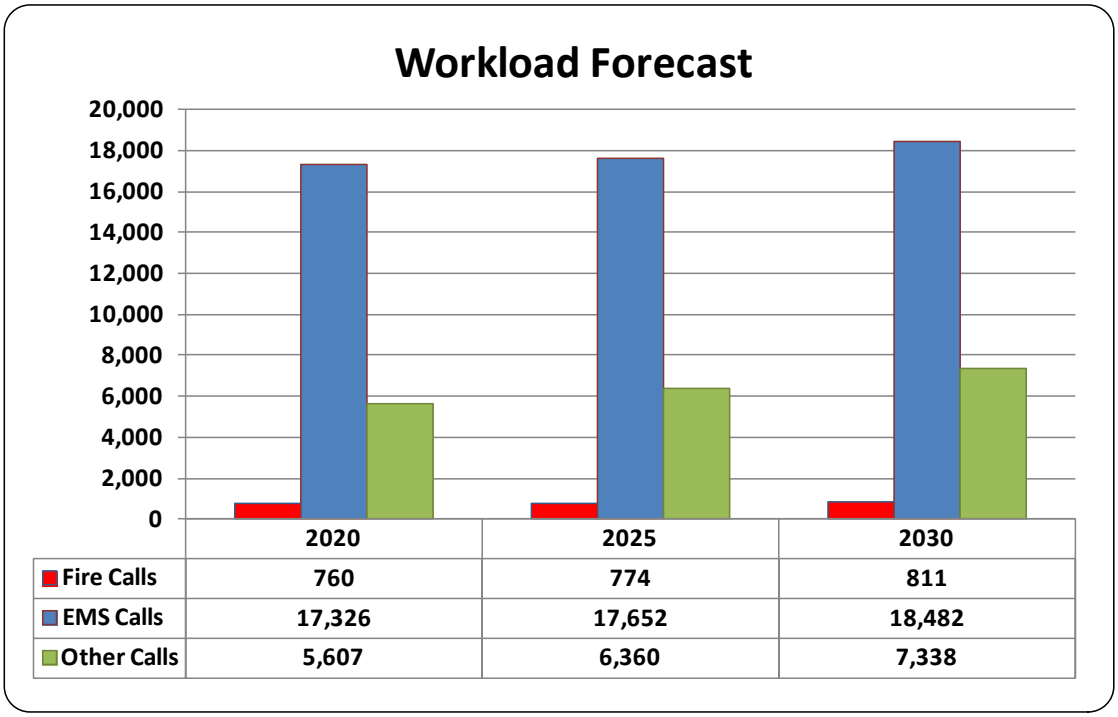


STATION LOCATION ANALYSIS

From this analysis it is not recommended that a reduction in fire stations be made, nor the addition of any stations be considered. Rather, the locations of select stations are analyzed further to improve response performance to the citizens of Des Moines. The fire department has an impressive response time performance in each of the parameters measured including call processing, turnout, and first alarm arrival. The only concern that is found is the workload, combined with training and other duties for the medic units. The need for an additional unit in the busier area of downtown needs to be explored in the future. Alternatively, other methods to reduce service volume as discussed in the EMS chapter, especially at the social services shelter, should also be explored.

Due to projected growth in population and development, a projection of service demand has been developed utilizing the average per capita rate of demand along with a forecasted growth of this rate based upon historical measures multiplied to the projected population levels in the city from the earlier demographics chapter. The results in Figure 3.29 show the expected service demand for the fire department.

Figure 3.29
PROJECTED WORKLOAD



	2020	2025	2030
Fire Calls	760	774	811
EMS Calls	17,326	17,652	18,482
Other Calls	5,607	6,360	7,338

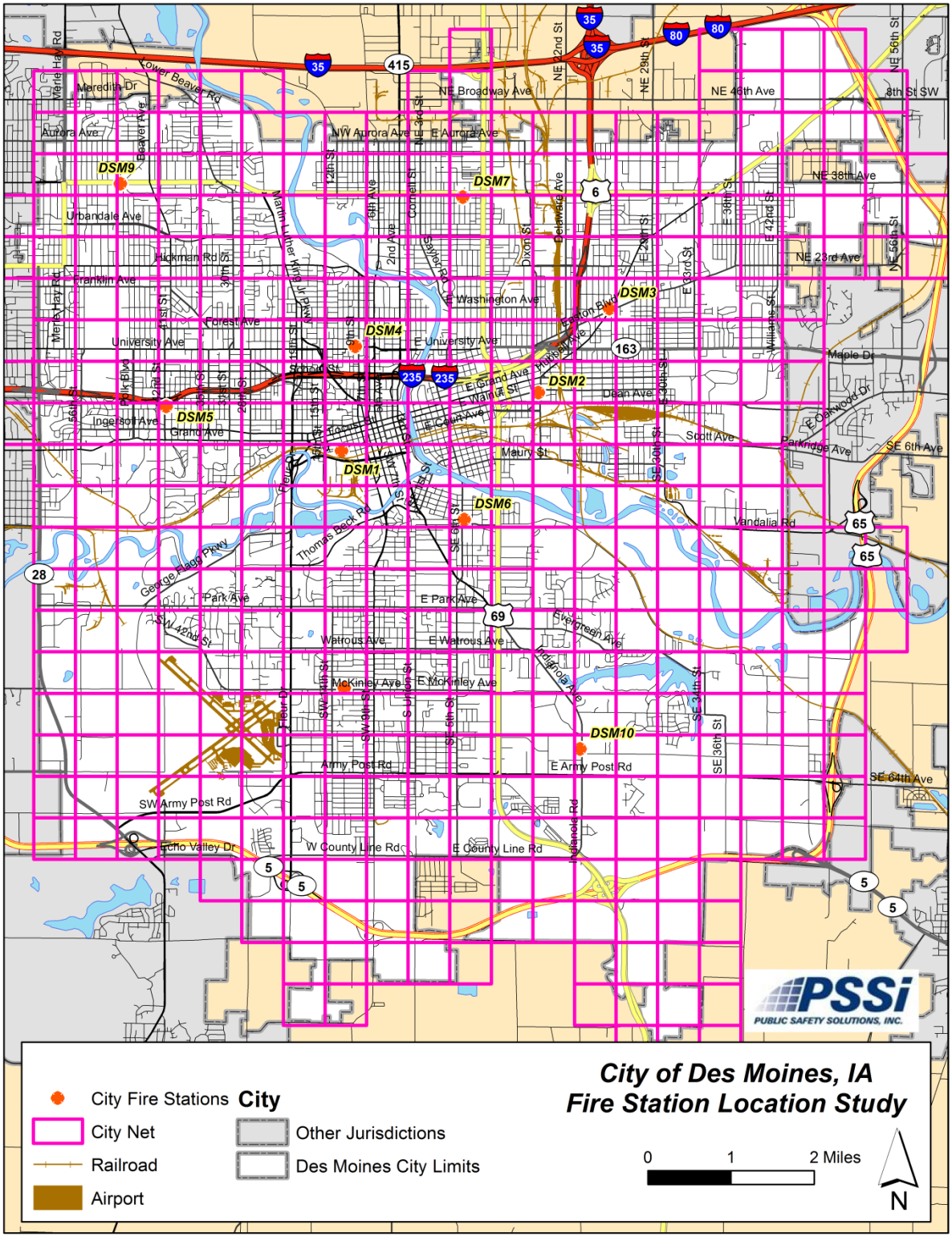
Given that development has been primarily infill downtown multifamily residential and converted properties, service demand patterns will generally stay similar to today. It will likely only change with perimeter development northeast and along the bypass route to the south. There is also a possibility that the fire department may assume operations at the airport, if the contracted service provider no longer has that responsibility.

In examining fire station locations, often the current locations are a result of the growth patterns over time. Many times downtown area stations are closer together reflecting a time when the city was less developed elsewhere and the apparatus were slower or, even in some cases, horse driven. It is the finding of the Study Team that due to the geography, street network travel capability, and workload, no additional stations ought to be considered and no stations should be eliminated. Rather, the locations of select stations are reviewed. In conversations with fire department staff, including maintenance and physical station tours by the Study Team, certain stations can be considered for relocation. This is only true if it improves response capability, otherwise renovations as needed on current sites would be the route for the future.

The section on fire station facilities describes the conditions in detail. Briefly, the Administration building and Station 1 are recently constructed. Station 6 was recently remodeled and plans for future renovations at Stations 2, 5, 7, and 9 are proposed. Stations that are of concern according to fire department maintenance staff are Station 3, 4, 8, and 10. Surveys of the firefighters themselves finds some issues with all stations, but generally the popular opinion is that Station 2 and Station 3 are too close together, and Station 10 also needs to be considered for relocation. To find the optimal location for the select stations, a geographic analysis was undertaken to determine where a station should be located in relation to demand, development, and to other stations. It is impractical to explore a scenario in which all stations would be evaluated for relocation, especially given the recent construction of Station 1 and renovations in Station 6. Additionally, the matter of cost, land availability, and citizen concern would be prohibitive.

The analysis utilizes a "net" or grid over the city configured in half mile squares as possible candidates for a new station. Certain current fire stations that are not considered for relocation are "locked" in place to provide service coverage. Other stations (in this case, Station 3 and Station 10) are "free" to be relocated if necessary. The analysis is based upon the closest station by street network to service demand. Figure 3.30 illustrates the "net" or grid.

Figure 3.30
CITY GRID

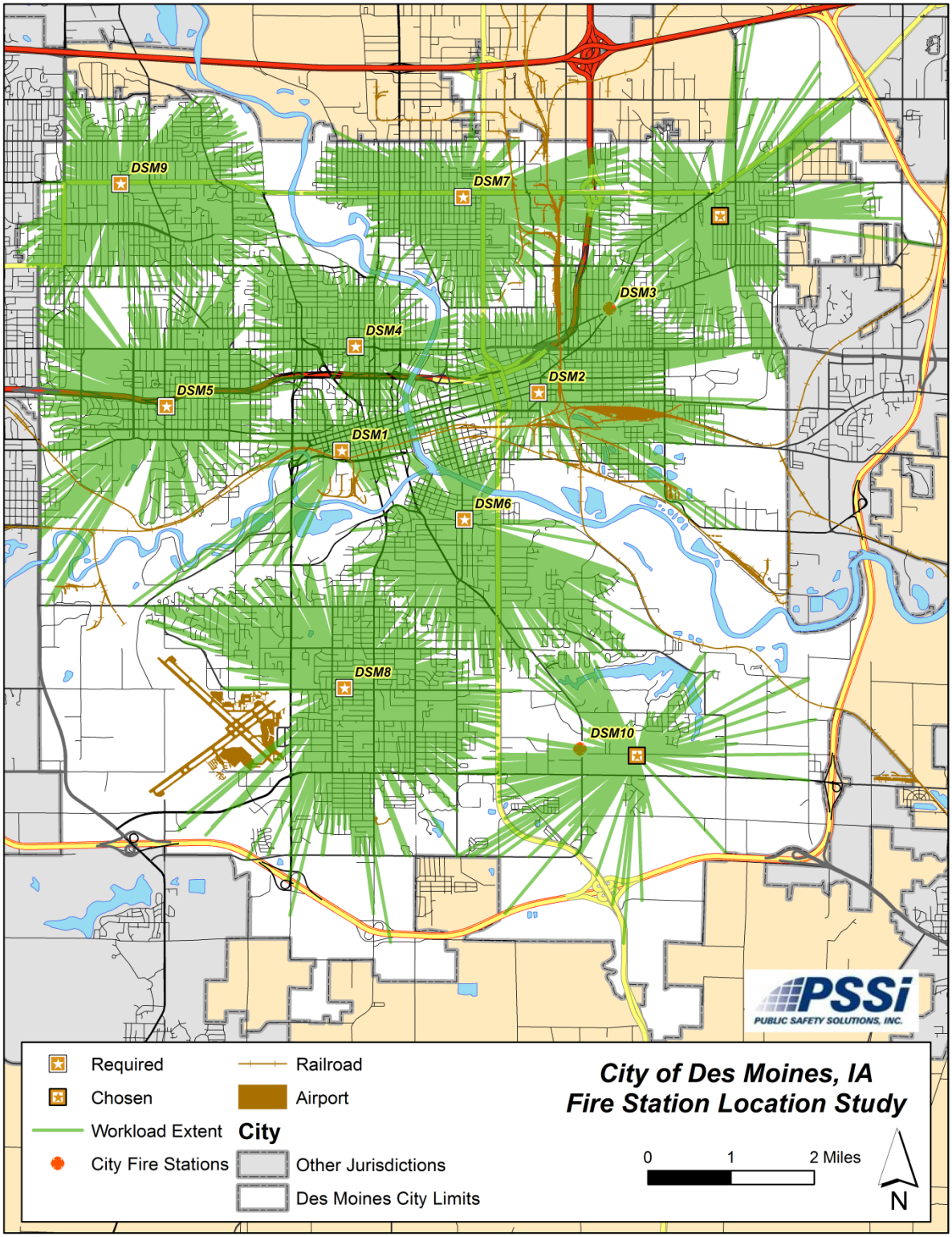


Scenario A

In this scenario, all the fire stations remain in place except Station 3 and Station 10. These are two stations identified by fire department staff as viable for relocation since concerns were expressed as the response time to the northeast side of town in the newly annexed areas and the condition of Station 10. In addition, these areas are potential development areas due to open land. A travel time of eight minutes was used in this analysis to find the best location for coverage. Once again, eight locations are "locked down," and two are to be found relative to demand and development.

The analysis found that Station 3 would better serve the city being moved northeast in the vicinity of 35th St. and Hubbell Ave. A new location for Station 10 was found in this analysis to be very close to its current location off Army Post Rd between Indianola Rd and SE 35th Ct and, therefore, should not necessarily relocate. It would be wise though to move the ladder apparatus to Station 2 given the proximity to more of the high-rise buildings. Hazmat can still respond from the NE Station 3, since it is not a primary apparatus and has access to arterial roadways. Pulling the medic unit further to the northeast would benefit these areas; however, the closest unit to the heaviest workload remains Medic 1, already the busiest in the city. The medic unit would also need to be relocated to Station 2, Station 6, or Station 4. Alternatively, an additional medic unit would alleviate the workload on Medic 1 and Medic 3 can still provide coverage in the northeast part of the city. Figure 3.31 shows the chosen locations for Station 3 and Station 10 relative to their current locations.

Figure 3.31
SCENARIO A STATION DEPLOYMENT (8 MINUTES TRAVEL)

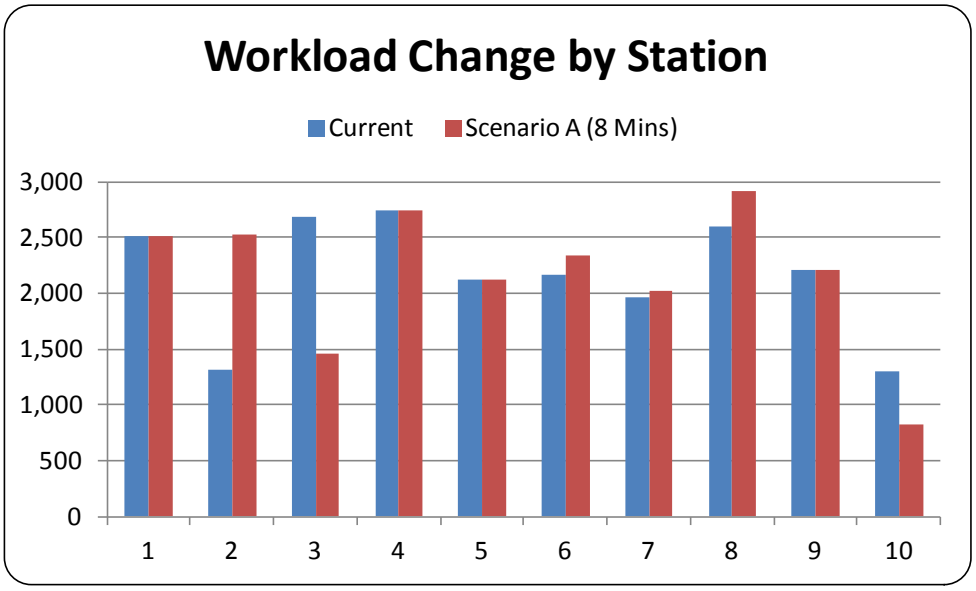


While the lines on the map from each station to its closest calls are linear, it reflects the actual modeled time using the roadway network. Figure 3.32 compares coverage statistics between this scenario and the current deployment model. Briefly, it can be seen that the scenario model can cover marginally more total calls in essentially the same amount of travel time. Of course, moving Station 3 to the northeast reduces its workload, but increases Station 2's workload and slightly increases Station 7's workload. With Station 10 moving east, workload is increased for Station 6 and Station 8, as they become closer to overall demand in the southern part of the City.

Figure 3.32
SCENARIO A EIGHT MINUTE COVERAGE

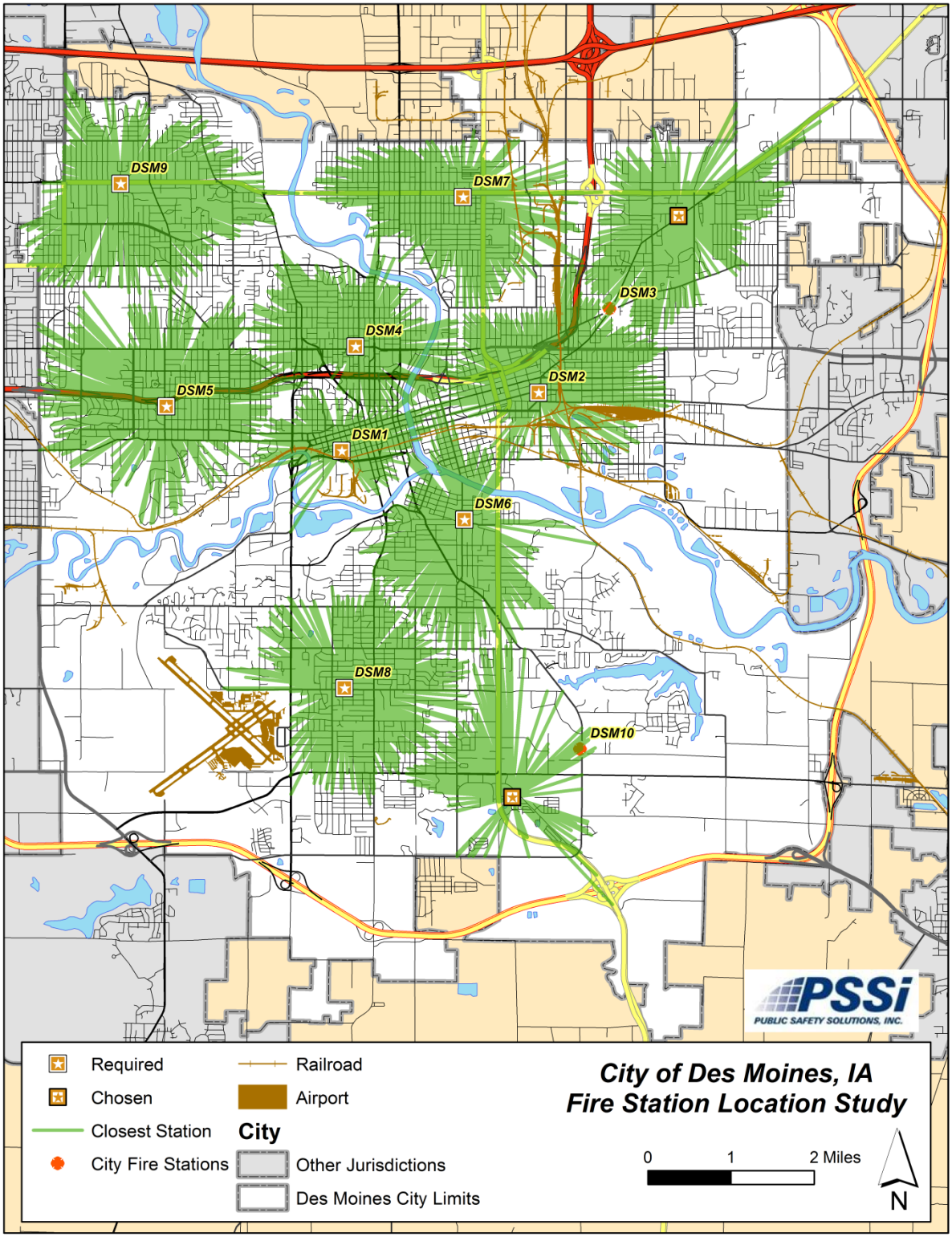
8 Mins	Current Locations			Scenario A			Comparison		
Station	Workload	Total Travel Time (hrs)	90th Travel Time (minutes)	Workload	Total Travel Time (hrs)	90th Travel Time (minutes)	Workload	Total Travel Time (hrs)	90th Travel Time (minutes)
1	2514	66.69	2.77	2514	66.69	2.77	0	0.00	0.00
2	1316	54.06	4.19	2525	128.02	4.39	1209	73.95	0.20
3	2681	165.30	5.89	1457	77.43	5.19	-1224	-87.86	-0.70
4	2746	102.47	3.72	2746	102.47	3.72	0	0.00	0.00
5	2128	96.45	4.31	2128	96.45	4.31	0	0.00	0.00
6	2173	102.07	4.79	2341	115.44	4.93	168	13.37	0.14
7	1966	79.59	3.59	2028	83.46	3.81	62	3.87	0.22
8	2605	140.14	5.09	2919	166.27	5.34	314	26.13	0.25
9	2209	96.14	4.01	2209	96.14	4.01	0	0.00	0.00
10	1308	75.46	4.75	832	62.32	5.61	-476	-13.14	0.86
Total	21646	978.37	4.60	21699	994.68	4.68	53	16.32	0.08

Figure 3.33
STATION WORKLOAD CHANGE (SCENARIO A 8 MINUTES TRAVEL)



If the time parameter was changed to reflect the best coverage in this scenario using a four-minute travel time, the differing results are notable. Station 3 still relocates northeast but not as much; on Hubbell Ave. between 31st and 32nd Streets. Station 10 relocates southwest to the 6800 block of 14th St (Highway 69). The reason for this is because of the demand for service towards downtown pulls a new Station 3 closer to maximize coverage at four minutes. Similarly in the south side of town, the demand around Station 8 pulls a potential Station 10 west for the four-minute maximum coverage. Figure 3.34 illustrates these locations and the closest unit travel directional for each station.

Figure 3.34
SCENARIO A STATION DEPLOYMENT (4 MINUTES TRAVEL)



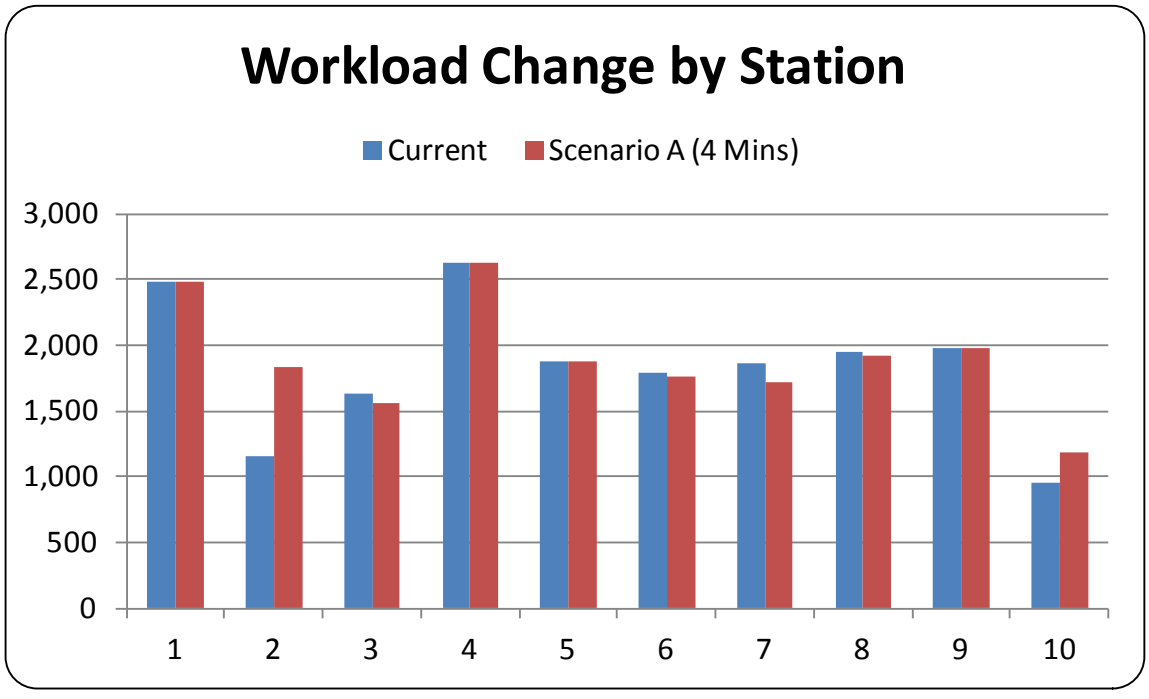
Naturally, a four minute travel model provides less overall coverage than the longer 8 minute travel model would. However, the reconfigured deployment yields a better increase in coverage at this level than the longer travel time scenario. Figure 3.35 details the results.

Figure 3.35
SCENARIO A (4 MINUTE COVERAGE)

4 Mins	Current Locations			Scenario A			Comparison		
Station	Workload	Total Travel Time (hrs)	90th Travel Time (minutes)	Workload	Total Travel Time (hrs)	90th Travel Time (minutes)	Workload	Total Travel Time (hrs)	90th Travel Time (minutes)
1	2482	64.01	2.77	2482	64.01	2.77	0	0.00	0.00
2	1162	41.76	3.48	1842	77.90	3.68	680	36.13	0.20
3	1634	71.03	3.76	1561	68.57	3.43	-73	-2.46	-0.34
4	2636	94.49	3.43	2636	94.49	3.37	0	0.00	-0.06
5	1872	71.36	3.37	1872	71.36	3.54	0	0.00	0.17
6	1794	71.57	3.57	1769	70.03	3.32	-25	-1.53	-0.25
7	1859	71.28	3.35	1723	63.98	3.59	-136	-7.30	0.24
8	1957	84.57	3.64	1918	82.08	3.69	-39	-2.49	0.06
9	1984	79.86	3.69	1984	79.86	3.56	0	0.00	-0.13
10	956	48.13	3.74	1186	47.64	3.71	230	-0.49	-0.02
Total	18336	698.07	3.56	18973	719.93	3.54	637	21.86	-0.02

In addition, there is a less dramatic shift in workload transference between the stations as shown Figure 3.36.

Figure 3.36
STATION WORKLOAD CHANGE (SCENARIO A 4 MINUTES TRAVEL)



Anytime stations are relocated, it can affect the distribution credit of the ISO rating of the department. The following table illustrates some changes in results criteria that may affect the current ISO rating

Figure 3.37: SCENARIO A POTENTIAL ISO COVERAGE CHANGES

	Current Station Deployment		Scenario A (8 Minute Travel) Station Deployment		Scenario A (4 Minute Travel) Station Deployment	
Risk Element	ISO Engine (1.5 miles)	ISO Truck (2.5 miles)	ISO Engine (1.5 miles)	ISO Truck (2.5 miles)	ISO Engine (1.5 miles)	ISO Truck (2.5 miles)
Buildings	57%	76%	62%	67%	64%	67%
Buildings over 25k SqFt	49%	75%	64%	75%	68%	76%
Buildings over 32 ft tall	68%	75%	69%	69%	72%	70%
Highest Risk	69%	83%	79%	76%	79%	76%
High Risk	67%	83%	79%	78%	84%	76%
Moderate Risk	59%	78%	66%	73%	67%	69%
Low	59%	79%	59%	71%	56%	70%
Road Miles	62%	73%	62%	69%	63%	67%
Hydrants	59%	74%	59%	69%	61%	68%

Scenario B

In this scenario, the Study Team proposes a plan in which the DMFD assumes airport firefighting operations and develops a combined station along the perimeter of the airport where runway apparatus exit onto the field and City apparatus can exit onto the adjacent roadway. This station could be a replacement for Station 8 in this scenario, and by moving it west would affect Station 10 at the least. Figure 3.37 shows the location of Station 8 along the north side perimeter of the airport where the airport fire station is located currently and the change in location for Station 10 given the best coverage at an eight-minute travel time. In this scenario as the previous, only Station 10 and Station 3 are 'unlocked' or able to be relocated.

Station 3 moves to where it was determined in Scenario A (8 minutes travel time). It can be seen that Station 6 due to the street network and speed capacity, absorbs most of the demand now unreached by Station 8 within eight minutes versus Station 10. Station 10 is located to the extreme east to pick up the remainder and satisfies the computer model algorithm for 10 located stations. Though this does place Station 10 into an area of potential future development, the concern is that the workload would cause a ripple effect of pulling from other stations because Station 6 is overloaded. Again at eight minutes, the additional events covered improve marginally.

Figure 3.38
SCENARIO B STATION DEPLOYMENT (8 MINUTES TRAVEL)

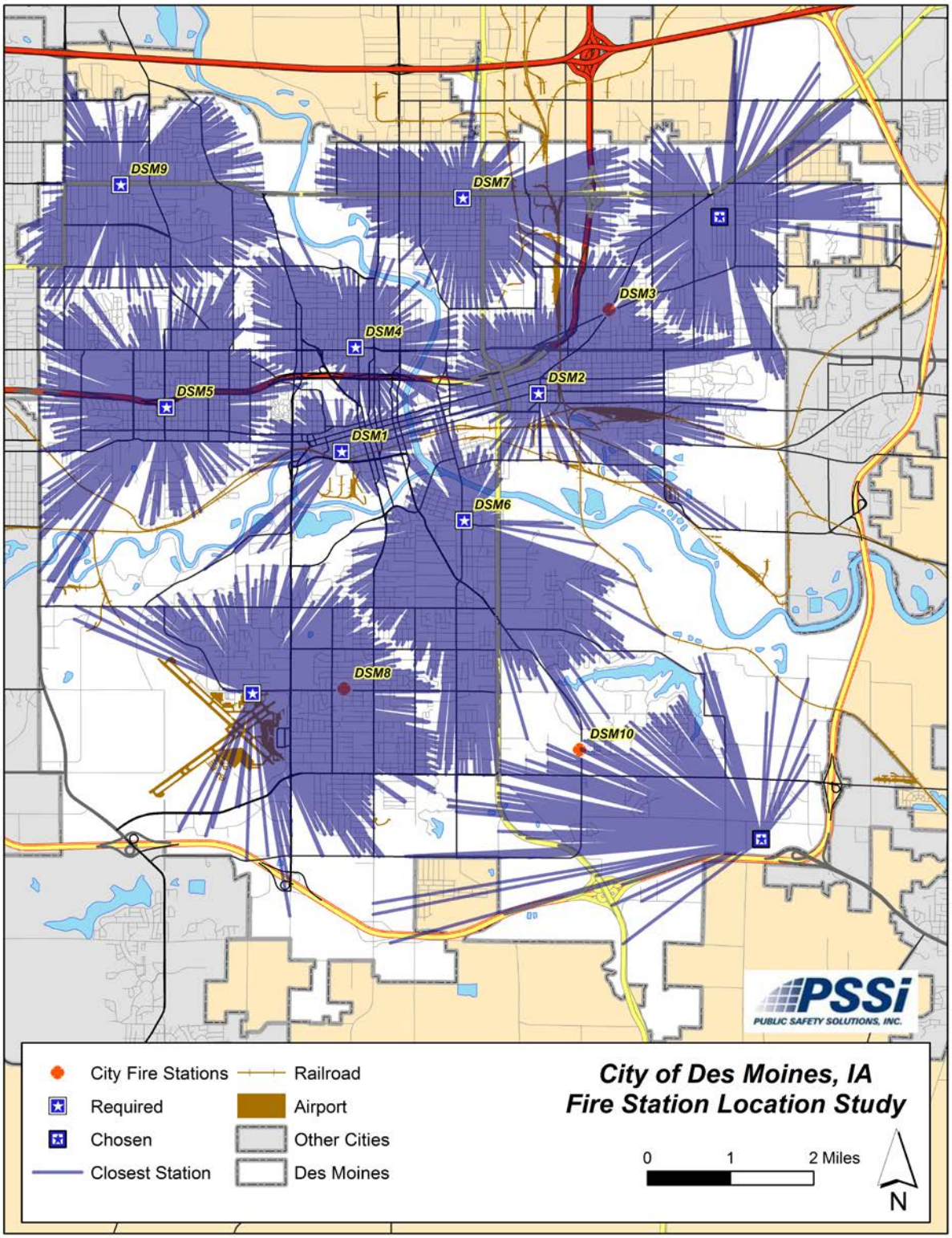
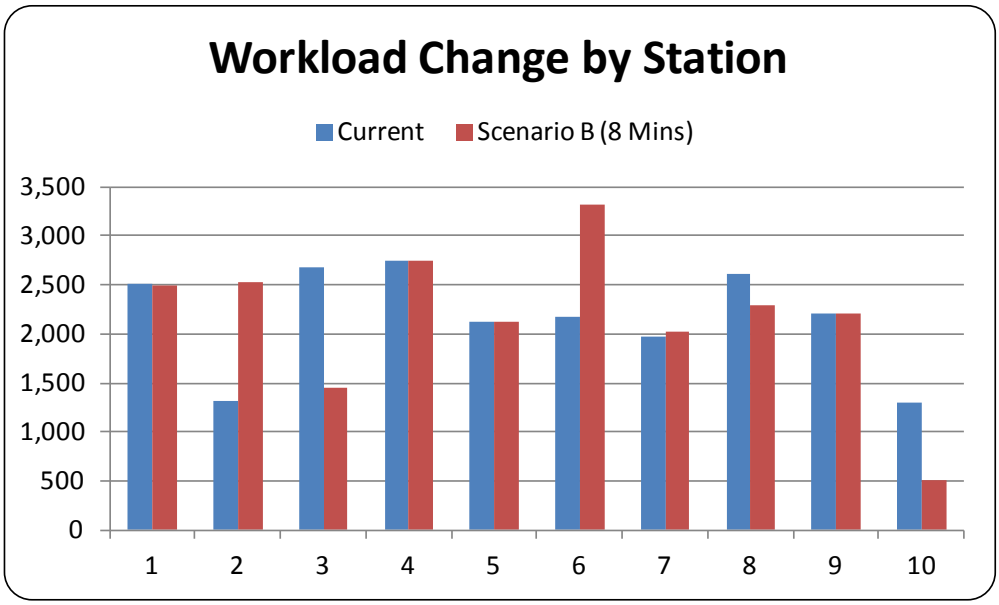


Figure 3.39
SCENARIO B EIGHT MINUTE COVERAGE

8 Mins	Current Locations			Scenario B			Comparison		
Station	Workload	Total Travel Time (hrs)	90th Travel Time (minutes)	Workload	Total Travel Time (hrs)	90th Travel Time (minutes)	Workload	Total Travel Time (hrs)	90th Travel Time (minutes)
1	2514	66.69	2.77	2499	65.33	1.57	-15	-1.36	-1.20
2	1316	54.06	4.19	2525	128.02	3.04	1209	73.95	-1.15
3	2681	165.30	5.89	1457	77.43	3.19	-1224	-87.86	-2.70
4	2746	102.47	3.72	2746	102.47	2.24	0	0.00	-1.48
5	2128	96.45	4.31	2128	96.45	2.72	0	0.00	-1.60
6	2173	102.07	4.79	3316	204.96	3.71	1143	102.89	-1.08
7	1966	79.59	3.59	2028	83.46	2.47	62	3.87	-1.12
8	2605	140.14	5.09	2296	169.87	2.61	-309	29.72	-2.48
9	2209	96.14	4.01	2209	96.14	5.50	0	0.00	1.48
10	1308	75.46	4.75	506	46.35	4.44	-802	-29.11	-0.31
Total	21646	978.37	4.60	21710	1070.48	2.96	64	92.11	-1.64

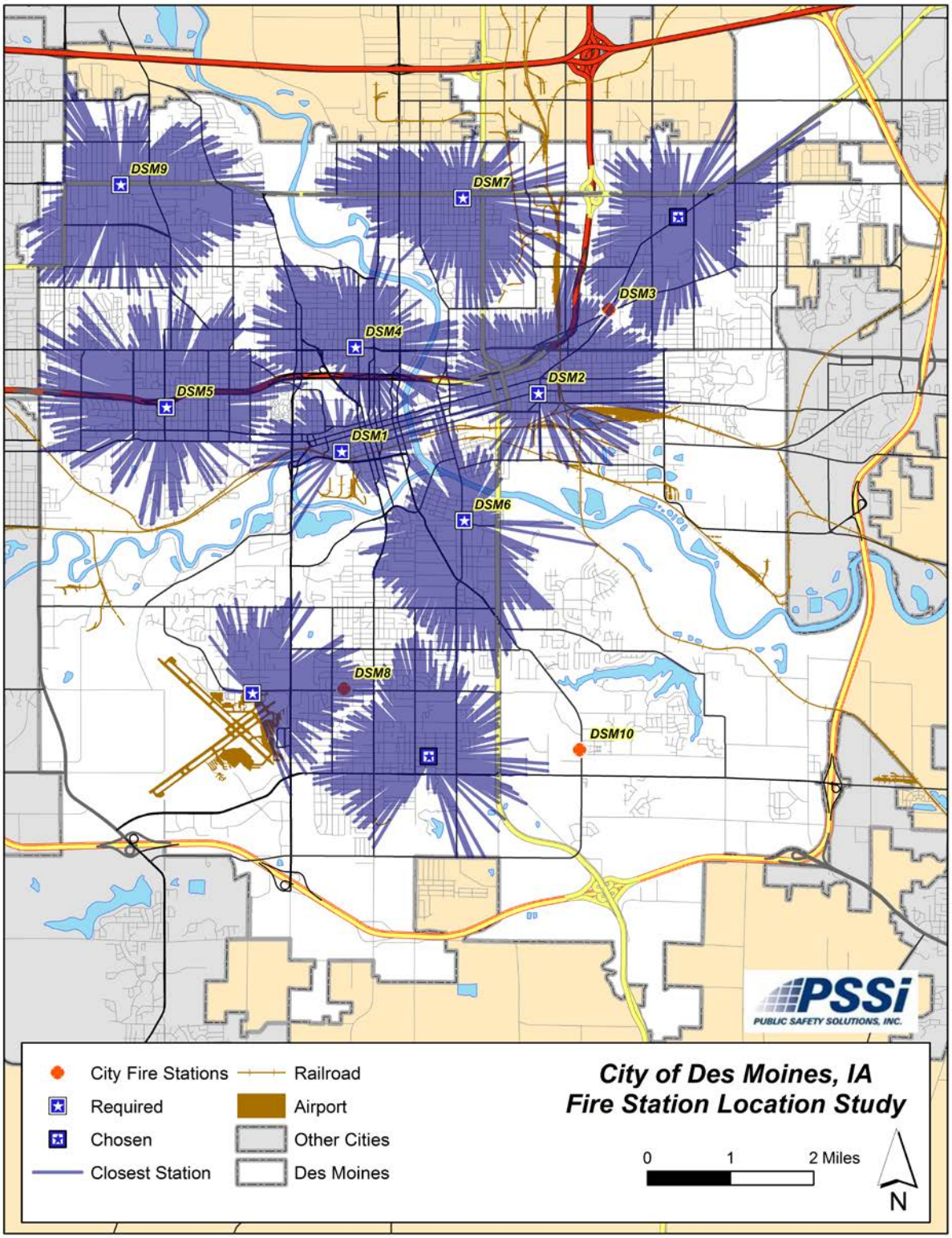
Station 6's workload increases by over 50% in this scenario while Station 10, already the least busy station, has its workload cut by more than half. Figure 3.39 illustrates the overall change in workload by station.

Figure 3.40
STATION WORKLOAD CHANGE (SCENARIO B 8 MINUTES TRAVEL)



With a four-minute travel model, Station 3 moves as it did in Scenario A (4 minute travel model) but Station 10's location changes dramatically. Station 10 moves west to the vicinity of E. Army Post Road and S. Union St as shown in Figure 3.40.

Figure 3.41
SCENARIO B STATION DEPLOYMENT (4 MINUTES TRAVEL)

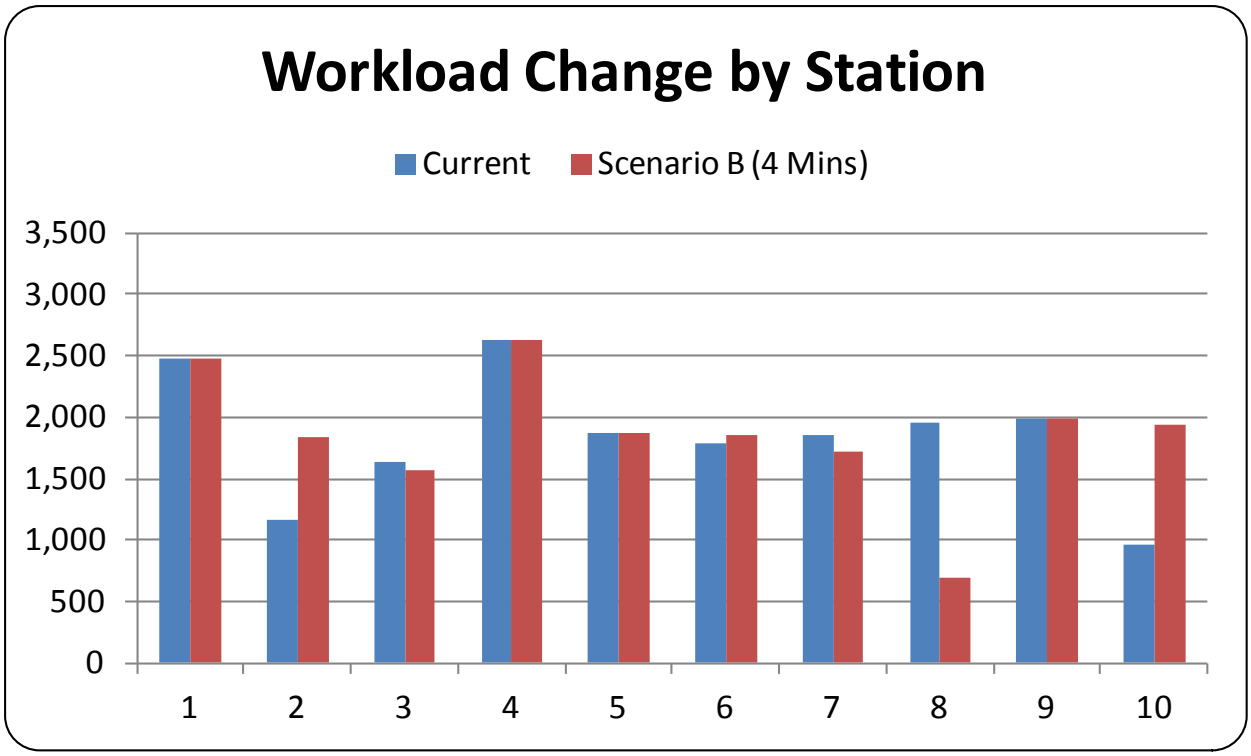


The workload balance is more evenly distributed in this scenario than the previous eight-minute travel configuration. The workload of the former station 8 is absorbed primarily by the new Station 10 which would house an Engine and a Truck while the new Station 8 could house the quint apparatus. Figure 3.41 details the results.

Figure 3.42
SCENARIO B (4 MINUTE COVERAGE)

4 Mins	Current Locations			Scenario B			Comparison		
Station	Workload	Total Travel Time (hrs)	90th Travel Time (minutes)	Workload	Total Travel Time (hrs)	90th Travel Time (minutes)	Workload	Total Travel Time (hrs)	90th Travel Time (minutes)
1	2482	64.01	2.77	2482	64.01	2.77	0	0.00	0.00
2	1162	41.76	3.48	1842	77.90	3.68	680	36.13	0.20
3	1634	71.03	3.76	1561	68.57	3.71	-73	-2.46	-0.05
4	2636	94.49	3.43	2636	94.49	3.43	0	0.00	0.00
5	1872	71.36	3.37	1872	71.36	3.37	0	0.00	0.00
6	1794	71.57	3.57	1850	74.94	3.54	56	3.38	-0.03
7	1859	71.28	3.35	1723	63.98	3.32	-136	-7.30	-0.03
8	1957	84.57	3.64	702	30.86	3.59	-1255	-53.71	-0.05
9	1984	79.86	3.69	1984	79.86	3.69	0	0.00	0.00
10	956	48.13	3.74	1947	82.08	3.56	991	33.95	-0.17
Total	18336	698.07	3.56	18599	708.05	3.54	263	9.99	-0.02

Figure 3.43
STATION WORKLOAD CHANGE (SCENARIO B 4 MINUTES TRAVEL)



The following table details the potential coverage changes that could affect the ISO rating with this scenario's station relocation options.

Figure 3.44
SCENARIO B POTENTIAL ISO COVERAGE CHANGES

	Current Station Deployment		Scenario A (8 Minute Travel) Station Deployment		Scenario A (4 Minute Travel) Station Deployment	
Risk Element	**ISO Engine (1.5 miles)**	**ISO Truck (2.5 miles)**	**ISO Engine (1.5 miles)**	**ISO Truck (2.5 miles)**	**ISO Engine (1.5 miles)**	**ISO Truck (2.5 miles)**
Buildings	57%	76%	55%	60%	62%	67%
Buildings over 25k SqFt	49%	75%	63%	71%	69%	77%
Buildings over 32 ft tall	68%	75%	63%	62%	70%	70%
Highest Risk	69%	83%	74%	72%	79%	76%
High Risk	67%	83%	78%	76%	84%	76%
Moderate Risk	59%	78%	63%	69%	62%	72%
Low	59%	79%	50%	63%	53%	61%
Road Miles	62%	73%	58%	64%	62%	66%
Hydrants	59%	74%	59%	69%	60%	67%

SUMMARY

With an eight-minute travel time goal, reconfiguring station locations does not yield significant results and renovation of existing locations is preferable versus the cost of new construction, site acquisition, and design fees. However, it can be seen that in the eight-minute models, the travel time was not over five minutes in either case. This means a lower objective of four-minutes travel can be achieved with reconfigured station locations and close to 90 percent of demand is covered with a relatively balanced workload and reflects first due guidelines of NFPA 1710. In addition, while there are potential changes to the ISO Engine Distribution credit, they are relatively minor and the Study Team anticipates the department will maintain and perhaps improve its ISO rating based upon the recommended scenario.

While a multitude of scenarios can be thought of to relocate one or more stations, this analysis focused on the most pressing, given the reported and observed conditions of facilities and the plan for future development. For the curious, there was little room to relocate Station 4 within the downtown area to aid in the busy workload there. Station 2, if unlocked, moved between its current location and the current location of Station 3 after

it relocated to the northeast in the four minute model. Not enough distance to warrant discussion and pulls it further from the downtown core. In the eight-minute model, it was moved to the extreme east and like Scenario B, eight-minute model with Station 10; other busy stations absorbed the workload. These are not recommended scenarios. At the eight minute travel goal currently adopted by the fire department, renovations to stations where they are currently located are the most cost effective without affecting workload, response times, or ISO rating.

OPTIONS AND RECOMMENDATIONS

3-1 The Fire Department should incorporate a "responding from" data point in the incident record to better analyze the frequency of "on the fly" responses from other than the assigned station house.

3-2 The Fire Department should evaluate the process of MDT acknowledgement and ensure communication connectivity for accurate time stamping.

3-3 The Fire Department should consider reducing its first alarm measurement from the current assembly to a proposed 3 Engine 1 ladder and 1 medic unit.

3-4 The Fire Department should adopt a five-minute response time benchmark for its first arriving apparatus in line with industry guidelines. It should keep its eight minute travel time for a first alarm assignment to structure fire calls

3-5 The Fire Department should consider, given the conditions of Station 3 and the end of life for Station 10, the relocation of these facilities as shown in Scenario A, 4 minute travel model if the department adopts Recommendations 3-5 above.

3-6 Station 3 should relocate to Hubbell Ave. between 31st and 32nd Streets to better serve the northeast area of the City.

3-7 The Ladder and Medic unit in Station 3 should move to Station 2 if Station 3 is relocated to aid in emergency response force assembly for higher risk structures and EMS workload demand in the downtown area.

3-8 Station 10 should relocate to the 6800 block of 14th St (Highway 69) to serve the south side of town better and also be able to reach the far southwest and southeast parts of the city easier.

3-9 Should the Fire Department reject Recommendations 3-5 through 3-8; the stations can be renovated in place to avoid costlier relocation options.

CHAPTER FOUR
FIRE STATION FACILITIES

Chapter Four addresses the Study Team's evaluation and analysis of the functional and operational viability of the current Des Moines fire stations.

The City has a substantial investment in fire station facility infrastructure valued in excess of $40 million (depreciated cost). While the City recently invested in a new downtown station (Station 1) and constructed a temporary station in the growing southeast area of Des Moines in 1999, the last true fire station building program was initiated in 1973, as a result of the 1970 Gage-Babcock survey, and completed in 1976 with the construction of Des Moines Fire Department (DMFD) Fire Station 5.

In conducting the evaluation, each Des Moines fire station was first visited by Study Team members in conjunction with DMFD Superintendent of Maintenance Dave Harmon to gain a thorough understanding of the facility history, past renovations, upgrades, and ongoing maintenance issues. Subsequent follow-up visits were conducted at the fire stations to gain input from the firefighters regarding issues and/or challenges and opportunities for improvement and living conditions at the fire stations.

In 1984, the World Health Organization (WHO) issued a report suggesting that up to 30% of new and remodeled buildings worldwide may suffer from environmental contamination issues such as caused by inadequate ventilation, chemical contaminants from indoor or outdoor sources, and/or biological contaminants.

Cross contamination has become a major focus in fire stations as it has been in hospitals and other high-risk facilities. Fire station facilities constructed more than 10 years ago have been found not to employ new technologies and building materials that reduce cross contamination between individuals in the fire station.

The Study Team looked for obvious issues but recommend that all fire stations be tested annually for surface bacteria and molds, volatile organic compounds, and air quality.

The Study Team rated each fire station for condition, estimated remaining lifespan, adequacy of apparatus and living space, and disposition recommendation. The following

summary reflects the resulting analysis of the condition of each fire station and the need for appropriate action by the City for the continued serviceability of each fire station.

CFAI FIXED FACILITIES CRITERIA

The Study Team considered criteria from the Commission on Fire Accreditation International (CFAI) as the DMFD facilities are considered as part of this Fire Study.

The CFAI accreditation criteria related to fire department fixed facilities are as follows:

Fixed facility resources are designed, maintained, managed and adequate to meet the agency's goals and objectives.

Performance Indicators

1. Space allocations are adequate for agency functions such as operations, fire prevention, training, support services and administration.
2. Buildings and grounds are clean and in good repair. Maintenance is conducted in a systematic and planned fashion.
3. Physical facilities are adequate and **properly distributed in accordance with stated service level objectives and standards of cover**.
4. Facilities are in compliance with federal, state and local regulations.

The CFAI item in bold above was previously addressed in this Study report in the Fire Station Locations Chapter.

CURRENT DMFD FIRE STATIONS

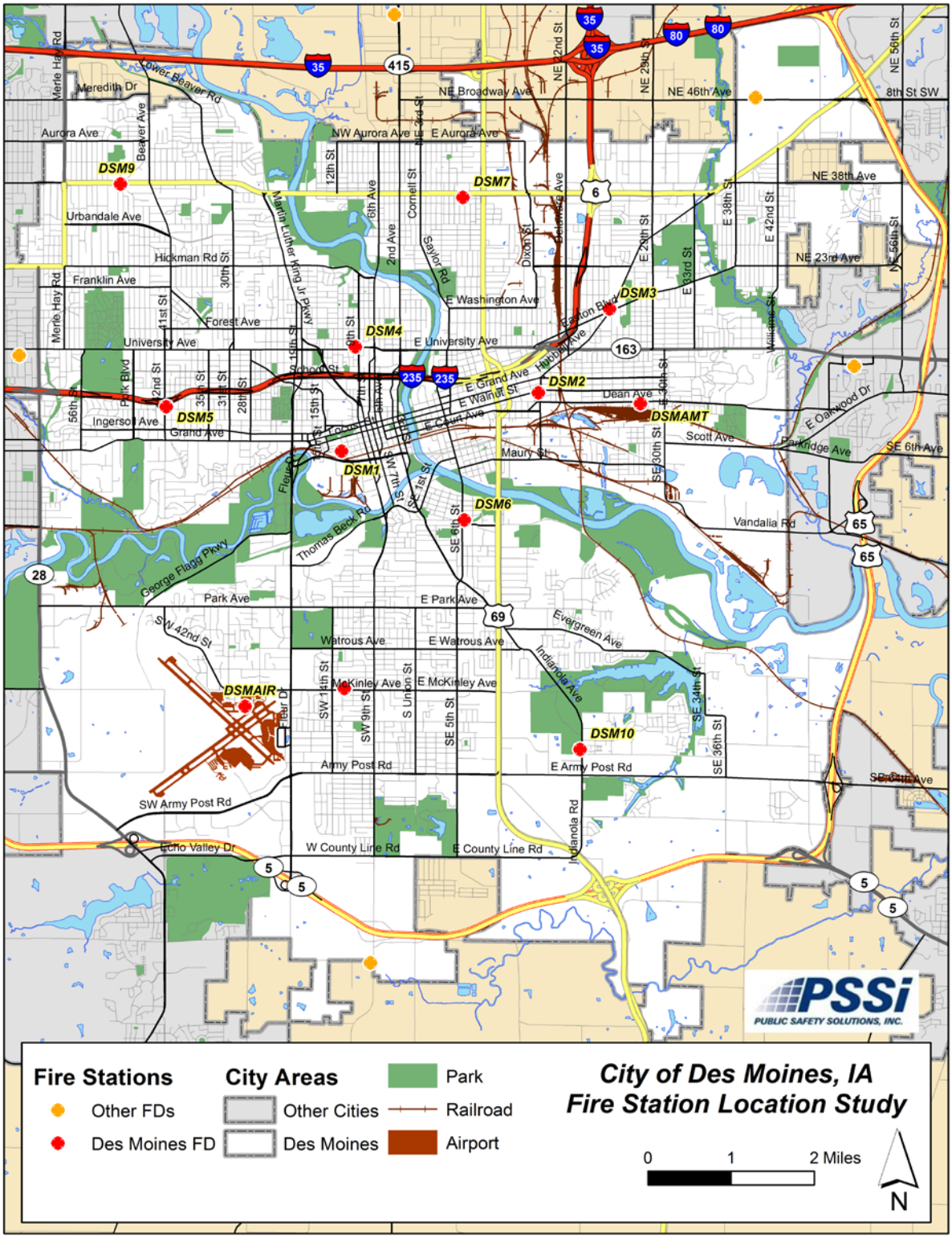
The Des Moines Fire Department provides "all-hazards" emergency services from 10 fire stations strategically located throughout the city to serve the citizens of Des Moines. See Figure 4.1.

Currently, the Des Moines Fire Department provides fire and EMS transport and first responder services from the following fire station facilities:

Des Moines Fire Stations

Fire Station 1 – 1330 Mulberry Street
Fire Station 2 – 1727 E. Walnut Street
Fire Station 3 – 2458 Easton Blvd.
Fire Station 4 – 917 University Avenue
Fire Station 5 – 711 42nd Street
Fire Station 6 – 1919 SE 6th Street
Fire Station 7 – 3500 E. 12th Street
Fire Station 8 – 1249 McKinley Avenue
Fire Station 9 – 4800 Douglas Avenue
Fire Station 10 – 5900 E. Indianola Avenue

Figure 4.1
FIRE STATIONS



FUNCTIONAL AND OPERATIONAL VIABILITY

The following sections review each DMFD fire station and provide the Study Team's analysis of the functional and operational viability.

Fire Station 1

Fire Station 1 primarily serves the downtown area. However, the City's only Shift Commander is also housed at Fire Station 1 and serves the entire City from this location. Station 1 is located at 1330 Mulberry Street (Figure 4.2) and was constructed in 2013. This station is a 23,435-square-foot, metal, and masonry construction, six-bay/double-deep drive-through facility situated on a 300 × 347 lot and served by all public utilities. Room for future expansion is limited.

Figure 4.2
FIRE STATION 1

Fire Station 1 is designed to house 12 personnel and the shift commander. Fire Station 1 includes 8,184 square feet of apparatus floor; 990 square feet office area to support two company officers and one shift commander; 1,511 square feet of kitchen and living space; and 1,711 square feet of dormitory space to include separate officer's dormitory space. Adequate locker room, shower, and toilet facilities are provided for female and male personnel.

Figure 4.3 lists Fire Station 1's fire apparatus.

Figure 4.3
FIRE STATION 1 APPARATUS

Engine/s	**1**	Command Vehicles	**1**
Truck/s	**1**	Fire Boat/s --WET	**0**
Rescue Squad/s		Air Unit	
Medic Units	**1**	HazMat	**1**
		Utility Vehicles	
Car/s		Other Vehicle/s	**1***
Tech Rescue	**0**	Grass/Brush	**0**
Power Unit	**0**	Light Truck	**0**
Special Operations Support	**1**		

* Reserve Medic Unit

Condition of structure: Excellent
Expected lifespan: 50 years
Estimated remaining life: 49 years
Adequacy of apparatus space: Ample, no restrictions
Adequacy of living quarters: Sufficient
Disposition in fire station plan: Retain

This facility is easily serviceable for the expected 50-year life span of the materials used, and the lifespan of this fire station could be easily extended to 75 years with regular routine maintenance, upgrades, and remodels as needed.

Fire Station 2

Fire Station 2 is located at 1727 East Walnut and serves a large area east of downtown to the City limits including the Iowa State Fair Grounds. Fire Station 2 (Figure 4.4) was constructed in 1975 and is an 8,266-square-foot, brick and block construction, three-bay/double-deep drive-through facility situated on a 0.67 acre lot and served by all public utilities. Room for future expansion is limited. Apparatus ingress and egress is unimpeded.

Figure 4.4
FIRE STATION 2

Fire Station 2 is designed to house 9 personnel and includes 3,350 square feet of apparatus floor; 244 square feet of office area to support report writing and company officers; 913 square feet of kitchen and living space; and 1,096 square feet of dormitory space to include separate officer's dormitory space. Adequate space for locker room, shower, and toilet facilities are provided for female and male personnel. However, upkeep and repair of these spaces is needed.

Figure 4.5 lists Fire Station 2's fire apparatus.

Figure 4.5
FIRE STATION 2 APPARATUS

Engine/s	**1**	Command Vehicles	**0**
Truck/s	**0**	Fire Boat/s --WET	**1**
Rescue Squad/s		Air Unit	
Medic Units	**0**	HazMat	**0**
		Utility Vehicles	
Car/s		Other Vehicle/s	**0**
Tech Rescue	**0**	Grass/Brush	**0**
Power Unit	**0**	Light Truck	**0**
Special Operations Support	**0**		

Condition of structure: Good
Expected lifespan: 50 years
Estimated remaining life: 10 years
Adequacy of apparatus space: Suitable, with restrictions
Adequacy of living quarters: Suitable, maintenance needed
Disposition in fire station plan: Retain

This facility is nearing the expected 50-year life span of the construction materials used and will require additional remodeling and structural improvements to remain service-able. Structures of this age should be continually examined for environmental issues such as surface bacteria and molds, volatile organic compounds, and air quality.

Fire Station 3

Fire Station 3 is located at 2458 Easton Boulevard and serves the east and rapidly expanding northeast areas of the city. Fire Station 3 (Figure 4.6) was constructed in 1950 and is a 7,987-square-foot, brick and block construction, four-bay non-drive-through facility situated on a 300 × 347 lot and served by all public utilities. Room for future

expansion is limited. Apparatus ingress and egress is difficult due to converging roadways in front of the station.

Figure 4.6
FIRE STATION 3

Fire Station 3 is designed to house 11 personnel and includes 4,787 square feet of apparatus floor; 131 square feet of office area to support report writing and company officers; 913 square feet of kitchen and living space; and 990 square feet of dormitory space to include separate officer's dormitory space. Adequate space locker room, shower and toilet facilities are provided for female and male personnel. However, adequate space for physical fitness is not provided and storage of firefighter protective clothing is inadequate.

Figure 4.7 lists Fire Station 3's fire apparatus.

Figure 4.7
FIRE STATION 3 APPARATUS

Engine/s	**1**	Command Vehicles	**0**
Truck/s	**1**	Fire Boat/s --WET	**0**
Rescue Squad/s		Air Unit	
Medic Units	**1**	HazMat	**1**
		Utility Vehicles	
Car/s		Other Vehicle/s	**0**
Tech Rescue	**0**	Grass/Brush	**0**
Power Unit	**0**	Light Truck	**0**
Special Operations Support	**0**		

Condition of structure: Fair
Expected lifespan: 50 years
Estimated remaining life: 5 years
Adequacy of apparatus space: Suitable, with restrictions
Adequacy of living quarters: Suitable, maintenance needed
Disposition in fire station plan: Replace

This facility has exceeded the expected 50-year life span of the materials used and will require extensive remodeling and structural, electrical, and plumbing improvements to remain serviceable. Current upgrades and remodel should allow for up to another 5 years of service. However, the basement in this facility should be tested for Radon and should be considered a priority for mitigation if unaccepted levels are detected. Structural issues should be monitored closely and mold and bacteria issues should be examined and mitigated as a priority.

Fire Station 4

Fire Station 4 is located at 917 University Avenue and serves the central and north-central areas of the city. Fire Station 4 (Figure 4.8) was constructed in 1960 and is an 8,532-square-foot, brick and block construction, three-bay limited drive-through facility

situated on a 0.524 acre lot and served by all public utilities. Room for future expansion is limited. Apparatus ingress and egress is acceptable.

Figure 4.8
FIRE STATION 4

Fire Station 4 is designed to house 13 personnel and includes 3,579 square feet of apparatus floor; 150 square feet of office area to support report writing and company officers; 1,111 square feet of kitchen and living space; and 1,010 square feet of dormitory space and provides for separate officer's dormitory space. Adequate locker room, shower, and toilet facilities are provided for female and male personnel.

Figure 4.9 lists Fire Station 4's fire apparatus.

Figure 4.9
FIRE STATION 4 APPARATUS

Engine/s	**1**	Command Vehicles	**0**
Truck/s	**0**	Fire Boat/s --WET	**0**
Rescue Squad/s		Air Unit	
Medic Units	**0**	HazMat	**0**
		Utility Vehicles	
Car/s		Other Vehicle/s	**1***
Tech Rescue	**0**	Grass/Brush	**0**
Power Unit	**1**	Light Truck	**0**
Special Operations Support	**0**		

* 1 Reserve Engine

Condition of structure: Fair
Expected lifespan: 50 years
Estimated remaining life: 13 years
Adequacy of apparatus space: Suitable, with restrictions
Adequacy of living quarters: Suitable, maintenance needed
Disposition in fire station plan: Retain, Plan for replacement in 2028

This facility reached the expected 50-year life span of the materials used in 2010. However, the station renovation project in 2008 extended the life span of this facility for another 20 years to 2028. Structures of this age should be continually examined for environmental issues and mitigated. Cosmetic (paint) issues were noted that should be addressed to ensure materials longevity.

Fire Station 5

Fire Station 5 is located at 711 42nd Street and serves the central and west central areas of the city. Fire Station 5 (Figure 4.10) was constructed in 1976 and is a 9,000-square-foot, brick and block construction, four-bay/double-deep drive-through facility situated on a 1.076 acre lot and served by all public utilities. Room for future expansion is limited. Apparatus ingress and egress is acceptable.

Figure 4.10
FIRE STATION 5

Fire Station 5 is designed to house 9 personnel and includes 4,152 square feet of apparatus floor; 123 square feet of office area to support report writing and company officers; 913 square feet of kitchen and living space; and 881 square feet of dormitory space to include separate officer's dormitory space. Adequate space for locker room, shower, and toilet facilities are provided for female and male personnel. However, upkeep and repair of these spaces is needed.

Figure 4.11 lists Fire Station 5's fire apparatus.

Figure 4.11
FIRE STATION 5 APPARATUS

Engine/s	**1**	Command Vehicles	**0**
Truck/s	**0**	Fire Boat/s --WET	**0**
Rescue Squad/s		Air Unit	
Medic Units	**1**	HazMat	**0**
		Utility Vehicles	
Car/s		Other Vehicle/s	**2***
Tech Rescue	**0**	Grass/Brush	**0**
Power Unit	**0**	Light Truck	**0**
Special Operations Support	**0**		

* 1 Reserve Truck and 1 Reserve Medic Unit

Condition of structure: Good
Expected lifespan: 50 years
Estimated remaining life: 11 years
Adequacy of apparatus space: Suitable
Adequacy of living quarters: Suitable, maintenance needed
Disposition in fire station plan: Retain

This facility is nearing the expected 50-year life span of the construction materials used and will require additional remodeling and structural improvements to remain service-able. Structures of this age should be continually examined for environmental issues and mitigated.

Fire Station 6

Fire Station 6 is located at 1919 SE 6th Street and serves the south-central and southeast areas of the city. Fire Station 6 (Figure 4.12) was constructed in 1976 and is an 8,136-square-foot, brick and block construction, three-bay/double-deep drive-through facility

situated on a 2.43 acres lot and served by all public utilities. Room for future expansion is available. Apparatus ingress and egress is acceptable.

Figure 4.12
FIRE STATION 6

Fire Station 6 is designed to house 8 personnel and includes 3,118 square feet of apparatus floor; 132 square feet of office area to support report writing and company officers; 913 square feet of kitchen and living space; and 856 square feet of dormitory space to include separate officer's dormitory space. Adequate space for locker room, shower, and toilet facilities are provided for female and male personnel. However, up-keep and repair of these spaces is needed.

Figure 4.13 lists Fire Station 6's fire apparatus.

Figure 4.13
FIRE STATION 6 APPARATUS

Engine/s	**1**	Command Vehicles	**0**
Truck/s	**0**	Fire Boat/s --WET	**1**
Rescue Squad/s		Air Unit	
Medic Units	**0**	HazMat	**0**
		Utility Vehicles	
Car/s		Other Vehicle/s	**2***
Tech Rescue	**0**	Grass/Brush	**0**
Power Unit	**0**	Light Truck	**0**
Special Operations Support	**0**		

* 1 Reserve Truck and 1 Reserve Medic Unit

Condition of structure: Good
Expected lifespan: 50 years
Estimated remaining life: 11 years
Adequacy of apparatus space: Suitable
Adequacy of living quarters: Suitable, maintenance needed
Disposition in fire station plan: Retain

This facility is nearing the expected 50-year life span of the construction materials used and will require additional remodeling and structural improvements to remain service-able. Structures of this age should be continually examined for environmental issues and mitigated.

Fire Station 7

Fire Station 7 is located at 3500 E. 12thth Street and serves the north area of the City including the Polk County Jail through a 28E agreement for ambulance service. Fire Station 7 (Figure 4.14) was constructed in 1975 and is an 8,173-square-foot, brick and block construction, three-bay/double-deep drive-through facility situated on a 0.66 acre

lot and served by all public utilities. Room for future expansion is limited. Apparatus ingress and egress is acceptable.

Figure 4.14
FIRE STATION 7

Fire Station 7 is designed to house 9 personnel and includes 3,209 square feet of apparatus floor; 147 square feet of office area to support report writing and company officers; 927 square feet of kitchen and living space; and 1,012 square feet of dormitory space to include separate officer's dormitory space. Adequate space for locker room, shower, and toilet facilities are provided for female and male personnel. However, upkeep and repair of these spaces is needed.

Figure 4.15 lists Fire Station 7's fire apparatus.

Figure 4.15
FIRE STATION 7 APPARATUS

Engine/s	**1**	Command Vehicles	**0**
Truck/s	**0**	Fire Boat/s --WET	**0**
Rescue Squad/s		Air Unit	
Medic Units	**1**	HazMat	**0**
		Utility Vehicles	
Car/s		Other Vehicle/s	**1***
Tech Rescue	**1**	Grass/Brush	**0**
Power Unit	**0**	Light Truck	**0**
Special Operations Support	**0**		

* 1 Tender

Condition of structure: Good
Expected lifespan: 50 years
Estimated remaining life: 10 years
Adequacy of apparatus space: Suitable
Adequacy of living quarters: Suitable, maintenance needed
Disposition in fire station plan: Retain

This facility is nearing the expected 50-year life span of the materials used and will require additional remodeling and structural improvements to remain serviceable. Water leak issues were noted in the kitchen and bathrooms ceilings and floor of the officer's bedroom. Significant tile repair is needed in the shower stalls. Structures of this age should be continually examined for environmental issues and mitigated.

Fire Station 8

Fire Station 8 is located at 1249 McKinley Avenue and serves the south and southwestern areas of the City including the Des Moines International Airport. Fire Station 8 (Figure 4.16) was constructed in 1959 and is an 8,275-square-foot, brick and block construction,

three-bay non-drive-through facility situated on a .624 acre lot and served by all public utilities. Room for future expansion is limited. Apparatus ingress and egress is acceptable.

Figure 4.16
FIRE STATION 8

Fire Station 8 is designed to house 13 personnel and includes 3,547 square feet of apparatus floor; 155 square feet of office area to support report writing and company officers; 1,111 square feet of kitchen and living space; and 1,050 square feet of dormitory space, to include separate officer's dormitory space. Adequate locker room, shower, and toilet facilities are provided for female and male personnel.

Figure 4.17 lists Fire Station 8's fire apparatus.

Figure 4.17
FIRE STATION 8 APPARATUS

Engine/s	**1**	Command Vehicles	**0**
Truck/s	**1**	Fire Boat/s --WET	**0**
Rescue Squad/s		Air Unit	
Medic Units	**1**	HazMat	**0**
		Utility Vehicles	
Car/s		Other Vehicle/s	**0**
Tech Rescue	**0**	Grass/Brush	**1**
Power Unit	**0**	Light Truck	**0**
Special Operations Support	**0**		

Condition of structure: Fair
Expected lifespan: 50 years
Estimated remaining life: 12 years
Adequacy of apparatus space: Suitable, with restrictions
Adequacy of living quarters: Suitable
Disposition in fire station plan: Replace and Relocate

In 2009, this facility reached the expected 50-year life span of the construction materials used. However, the station renovation project in 2007 extended the life span of this facility for another 20 years to 2027. Structures of this age should be continually examined for environmental issues and mitigated.

Fire Station 9

Fire Station 9 is located at 4800 Douglas Avenue and north and northwest areas of the city. Station 9 (Figure 4.18) was constructed in 1976 and is an 8,356-square-foot, brick and block construction, three-bay/double-deep drive-through facility situated on a 1.205

acres lot and served by all public utilities. Room for future expansion is available. Apparatus ingress and egress is challenging.

Figure 4.18
FIRE STATION 9

Station 9 is designed to house 9 personnel and includes 3,165 square feet of apparatus floor; 144 square feet of office area to support report writing and company officers; 927 square feet of kitchen and living space; and 964 square feet of dormitory space to include separate officer's dormitory space. Adequate space for locker room, shower, and toilet facilities are provided for female and male personnel. However, upkeep and repair of these spaces is needed.

Figure 4.19 lists Fire Station 9's fire apparatus.

Figure 4.19
FIRE STATION 9 APPARATUS

Engine/s	**1**	Command Vehicles	**0**
Truck/s	**1**	Fire Boat/s --WET	**0**
Rescue Squad/s		Air Unit	
Medic Units	**1**	HazMat	**0**
		Utility Vehicles	
Car/s		Other Vehicle/s	**1***
Tech Rescue	**0**	Grass/Brush	**0**
Power Unit	**0**	Light Truck	**0**
Special Operations Support	**0**		

* 1 Reserve Medic Unit

Condition of structure: Good
Expected lifespan: 50 years
Estimated remaining life: 11 years
Adequacy of apparatus space: Suitable
Adequacy of living quarters: Suitable, maintenance needed
Disposition in fire station plan: Retain

This facility is nearing the expected 50-year life span of the materials used and will require additional remodeling and structural improvements to remain serviceable. Significant tile repair is needed in the shower stalls and corrosion on urinal dividers was noted. Structures of this age should be continually examined for environmental issues and mitigated.

Fire Station 10

Fire Station 10 is located at 5900 East Indianola and serves the south and southeast areas of the city. Station 10 (Figure 4.20) was constructed in 1999 as a temporary facility and is an 5,600-square-foot, wood frame construction, three-bay drive-through facility, situated

on a 37.91 acres and served by public water and a septic system with grease trap. Room for future expansion is available. Apparatus ingress and egress is acceptable.

Figure 4.20
FIRE STATION 10

Station 10 is designed to house 9 personnel and includes 2,740 square feet of apparatus floor; 135 square feet of office area to support report writing and company officers; 827 square feet of kitchen and living space; and 1,000 square feet of dormitory space that includes individual rooms for all personnel. Adequate space for locker room, shower, and toilet facilities are provided for female and male personnel.

Figure 4.21 lists Fire Station 10's fire apparatus.

Figure 4.21
FIRE STATION 10 APPARATUS

Engine/s	**0**	Command Vehicles	**0**
Truck/s	**1**	Fire Boat/s --WET	**0**
Rescue Squad/s		Air Unit	
Medic Units	**1**	HazMat	**0**
		Utility Vehicles	
Car/s		Other Vehicle/s	**1***
Tech Rescue	**0**	Grass/Brush	**0**
Power Unit	**0**	Light Truck	**0**
Special Operations Support	**0**		

* 1 Tender and 1 Reserve Medic Unit

Condition of structure: Good
Expected lifespan: 20 years (10 as a fire station and 10 as Parks Facility)
Estimated remaining life: 4 years
Adequacy of apparatus space: Suitable
Adequacy of living quarters: Suitable
Disposition in fire station plan: Replace and relocate

This facility was constructed as a temporary fire station and is nearing the expected 20-year life span of the materials used and will require additional remodeling and structural improvements to remain serviceable. Significant wear and tear was noted due to the type of construction. Structures of this age should be continually examined for environmental issues and mitigated.

ALL STATIONS

All DMFD fire stations are equipped with apparatus bay exhaust systems and CO sensors to evacuate diesel exhaust and monitor atmospheric conditions in the apparatus bay. The City and Fire Department should be commended for taking this progressive action.

The Study Team noted, with the exception of Station 1, that there is a general lack of space in DMFD fire station facilities for physical fitness equipment activities. Many of

the stations bunking capacity has been reduced due to the need to make space for even minimal physical fitness equipment. The City and Fire Department should continue to support the participation of firefighters and officers in the Peer Fitness program to encourage staff to remain in good physical condition and reduce work-related injuries. The DMFD should be commended for implementing the Peer Fitness program, as firefighter fitness is essential to the safety and health of the personnel who provide the City's fire protection and EMS services.

All DMFD fire stations are equipped with emergency power generators and a basic Westnet alerting system. The Study Team noted that the DMFD has made excellent use of federal grant programs to enhance operational readiness such as the Assistance to Firefighters Grant (AFG) funds acquired to retrofit stations with emergency power generators.

The Study Team would recommend exploring funding to enhance and upgrade the Westnet alerting system. Strategically upgrading this system will assist in station alerting and improve turn-out response time and will address the issues that were noted at all stations regarding the audible clarity and volume of the current speaker systems.

The Study Team took particular notice in the use of geo-thermal exchange to heat and cool the new DMFD Fire Station 1. The Study Team commends the City and the Fire Department for taking this progressive action and should seek further sustainable energy options for all fire stations in the future.

General Condition of Des Moines Fire Stations

Fire station buildings are staffed 24 hours a day, seven days a week. In addition, due to the rough nature of the work performed by firefighting personnel in and out of their fire stations, fire station buildings typically receive rougher treatment and 24-hour use than compared to the average office, commercial, or government buildings. The amount of maintenance and repair work necessary to keep fire stations in good condition is generally greater than that typically required in other municipal buildings that are normally only used during general business hours.

While adequately funded at the present time, it should be noted that inadequately funded fire station maintenance programs result in fire station facilities falling into a state of continual disrepair, present a very poor image to the public and inadequately support the work performed by the firefighting personnel.

In addition, inadequately maintained facilities may become a safety or health hazard to the firefighters and officers and a significant financial liability for future maintenance and repairs. The Study Team suggests a high priority should continue to be placed on the funding of the maintenance, repair, and general upkeep of the Des Moines Fire Department fire stations.

Ultimate responsibility for the maintenance and upkeep of fire stations rests with the owner: the City of Des Moines. It has been the experience of the Study Team, however, that a strong partnership effort on the part of the municipality, the fire department leadership, and the firefighters working in the fire stations is the best approach to providing well-maintained, functional, and livable fire station facilities. Although each of these three groups (City, Fire Department leadership, and firefighters) have worked to support the maintenance effort in the past, this continued effort needs to be maintained to keep Des Moines Fire Department fire stations at an acceptable level.

The Study Team would like to note the exceptional degree of ownership and effort by Superintendent Dave Harmon and his staff to keep up with the aging inventory of fire stations in the City of Des Moines. Consideration should be given by City officials and the Fire Chief to increase funding to more quickly address the environmental and general maintenance issues and to fund replacement fire stations and future full-scale remodels to extend the life span of aging facilities.

General Conditions of Furnishings and Equipment

Fire stations are 24/7 facilities that must sustain the personnel and equipment needed to fulfill the provision of fire and EMS services. DMFD firefighters work 24-hour shifts. Fire stations must support 24-hour living and operations and provide for:

- Garage for vehicular apparatus;
- Maintenance location for preventative maintenance for apparatus and equipment;
- Training area for fire department personnel;

- Kitchen and eating area for personnel;
- Living and sleeping area for on-duty personnel;
- General working and office location for personnel; and,
- Physical fitness facility to keep the personnel fit-for-duty.

To support these functions, fire stations must be equipped with a broad range of furniture and equipment. Although many of the furnishings and equipment found in fire stations are what would be found in normal office or other business facilities, fire stations also need to include furnishings and equipment to support 24/7 living for the shift personnel. This includes equipment to support emergency operations such as fire station alerting systems, breathing apparatus air stations, equipment decontamination wash facilities, etc.

Some examples of the furnishings that are unique to fire stations as work sites include: physical fitness equipment; maintenance tools; equipment and supplies; kitchen tables, appliances and supplies; living area and televisions; and bathing and sleeping area furnishings such as beds, pillows, and lockers. These, and many other similar furniture and equipment items, are essential and are required to be commercial grade to hold up to the rigors of 24/7 operations.

The City of Des Moines maintains clean, safe, and adequately furnished fire station facilities. The City and Fire Department should continue to place a high priority on providing and replacing, as necessary, the furniture and equipment required for the general operation of the Des Moines Fire Department fire stations. A sufficiently funded line item should remain in every annual budget for the replacement of fire station furniture and equipment.

SUMMARY

The City of Des Moines is faced with an aging inventory of fire stations facilities. With the exception of the new Station 1 downtown (completed in 2013) and the temporary Station 10 in the southeast (completed in 1999), all Des Moines fire stations were constructed in the 1950s, 1960s, and early to mid-1970s.

While it is evident that these facilities have been well maintained throughout the years, the aging process of materials used and the 24/7 nature of fire station facilities has taken a toll on these facilities. Additionally, the changing scope of services provided by today's modern fire department and the training and physical fitness requirements render most facilities constructed before 1990 inadequate. Changes in technology and the need to reduce cross contamination and environmental concerns further reduce the serviceability of many fire station facilities constructed before 2000.

OPTIONS AND RECOMMENDATIONS

This study was completed independent of the current DMFD Capital Improvement Plan (CIP). As such, some recommendations may be incongruent with the adopted DMFD CIP. The City and Fire Department are encouraged to consider and implement, as appropriate, the following options and recommendations relating to Des Moines Fire Station facilities.

4-1 Station 1 – Evaluate feasibility to relocate living/sleeping area to reduce turnout time. This may be a long-term goal to be explored when the station requires remodel.

4-2 Station 2 – Plan to replace or fund a major renovation by 2025.

4-3 Station 3 – Conduct Radon testing and provide for mitigation of Radon, if found.

4-4 Station 3 – Conduct testing on the structural issues to assess building safety and correct deficiencies to extend the life span of the facility until the facility can be replaced.

4-5 Station 3 – Plan to replace with a new facility by 2020.

4-6 Station 4 – Plan for replacement by 2028.

4-7 Station 5 – Plan for replacement or fund a major renovation by 2026.

4-8 Station 6 – Immediate attention is needed to repair roof leak.

4-9 Station 6 – Plan for replacement or fund a major renovation by 2026.

4-10 Station 7 – Immediate attention is needed to repair water leak and tile issues in the bathroom facilities.

4-11 Station 7 – Plan for replacement or fund a major renovation by 2025.

4-12 Station 8 – Plan for replacement by 2027.

4-13 Station 8 – Explore option to relocate Station 8 to the DSM ARFF facility or construct a new Station 8/ARFF facility to serve DSM and adjacent area of the City.

4-14 Station 9 – Immediate attention is needed to repair tile and corrosion issues in bathroom facilities.

4-15 Station 10 – Plan for replacement 2019.

4-16 All Stations – Conduct environmental allergen (mold) testing at all fire stations older than 10 years to establish a baseline and mitigate any environmental issues found.

4-17 All Stations – Upgrade First-In Westnet system to enhance station alerting to address turnout time and clarity of audio in all stations.

4-18 All Stations – Conduct a station egress traffic preemption study to identify the need for signals at each station.

4-19 All Stations – Conduct a sustainable energy study to identify energy saving through the use of active and passive energy saving systems.

4-20 All Stations – Place a high priority on adequate funding for annual station maintenance and upgrades of facilities to protect and/or extend the lifespan of the fire station facilities.

4-21 All Stations – While the use of contracted maintenance and repair services for fire station facilities may save on costs, this practice should be reviewed from an operational readiness standpoint and consideration to restoring the personnel in the DMFD Maintenance Division to perform these tasks in-house should be given great consideration.

CHAPTER FIVE
EMERGENCY MEDICAL SERVICES

This chapter includes review and recommendations of the DMFD EMS system as it relates to station placement and facility construction when engaging different EMS delivery models.

OVERVIEW

The delivery of quality emergency medical care is one of the most basic services that a local government must ensure is available to its citizens. The actual delivery of such service is just one component of an EMS system. An EMS system consists of those organizations, resources, and individuals from whom some action is required in order to ensure a timely and medically appropriate response to medical emergencies.

The basic goal of an EMS system in the past was to transport the patient to a definitive care facility in a timely manner so that no further harm occurs to the patient. With the focus on curbing overall healthcare costs in the United States, more focus is being placed on treat and release or treat and refer to a provider or facility other than the traditional emergency room.

Traditionally, there are 13 recognized essential elements of the pre-hospital component of an EMS system.

1. Prevention and early recognition;
2. Bystander action and system access;
3. Call taking and dispatching function;
4. Telephone protocols and pre-arrival instructions;
5. First responder dispatch;
6. Ambulance dispatch;
7. First responder services;
8. Ambulance services—basic and advanced life support;
9. Direct on-line medical control;
10. Transport;
11. Receiving facility interface;
12. Off-line medical control; and
13. Record keeping and evaluation.

Emergency medical care can be delivered through a variety of methods, which include: contracting the service through a private ambulance company; delegating the service to a volunteer agency in the community; providing direct service through government employees; or any combination of the above.

As EMS in the United States has evolved, so have the different models or profiles of organizational structures for the delivery of the service. In the early 1980s, the United States Fire Administration published *Fire Service/EMS, A Program Management Guide*. This publication identified 28 different profiles for the delivery of EMS. Twenty-six of the profiles included participation of the fire department in some aspect of the pre-hospital EMS system. Each profile has its own particular strengths and weaknesses. The profiles, identified 30 years ago, still accurately portray fire-service-based EMS today. The original profiles identified in the *Management Guide* are built around five primary variables:

1. Dual-role vs. cross-trained vs. "civilian" providers;
2. Career only vs. career and volunteer vs. volunteer-only organizations;
3. First responder vs. EMT vs. paramedic certifications;
4. Transporting units vs. non-transporting units; and,
5. Engine or truck company first response vs. no engine or truck company first response.

These variables can be combined into 52 different ways of EMS delivery; it is most likely that every variable has been tried and is probably in service today somewhere in the United States. The variables also can be pieced together as necessary to meet the needs and resources of a particular community. Many jurisdictions have started out with one profile and changed to another as their EMS systems have grown and resources shifted.

The combination of these variables can be classified into one of four main categories of pre-hospital emergency medical service delivery:

1. *Third-Party Service.* EMS services are delivered by a separate public safety agency that usually holds equal status with other agencies in the community, such as the fire department and police department. Career, volunteer, or a combination of career and volunteer personnel may provide these third-party services.
2. *Hospital-based Service*. EMS services are delivered from a medical facility, normally a local or regional hospital. Personnel delivering the services are usually

hospital or health care system employees and hospital funding commonly supports the services.

3. *Private Service.* EMS services are delivered by a privately owned company for a fee, on a for-profit basis. A local government would most likely enter into a written agreement with the private ambulance company identifying the level of services provided and cost of said services.
4. *Fire Department-based Service.* EMS services are delivered by fire department personnel (career, volunteer, or combination). Fire department personnel are trained as EMS care providers and are equipped to provide care and transport for sick and injured patients.

By far, the majority of pre-hospital emergency care in the United States is provided by the fire service.

COMMISSION ON FIRE ACCREDITATION INTERNATIONAL

The Commission on Fire Accreditation International (CFAI) emphasizes the importance of emergency medical services delivery in today's fire department operations. Progressive fire departments use this criterion, and others, as a benchmark for determining the best practices for EMS delivery. The CFAI *Emergency Medical Service* Criterion Performance Indicators are provided below:

Criterion 5G: Emergency Medical Service (EMS)
There is an Emergency Medical Services program providing the community with a designated level of out-of-hospital emergency medical care.

Performance Indicators

1. Given the agency's "standard of response coverage" and emergency deployment objectives as described in Criterion 3A.2, the agency meets their response time, apparatus and equipment objectives for each type and magnitude of emergency medical deployment objective.
2. There is adequate staffing to meet agency objectives.
3. There is adequate apparatus and equipment to meet state and national standards.
4. There are adequate supplies and materials to meet the stated level of response.

5. There are standard operating procedures, standing orders, protocols and methods in place to meet the stated level of response.
6. There is an information system in place to record and analyze the effectiveness of the EMS program.
7. There is a patient care record maintained for each patient contacted by the EMS System. This report should contain patient history, incident history, data by which treatment was determined, rendered and the patient disposition recorded. The report should be protected from public access and maintained as per local and state records retention requirements.
8. There is an independent review of patient care records. The agency has a quality assurance program in place.
9. On-line and off-line medical control is available to the agency.
10. The agency has a quality assurance program in place.

The Study Team considered the CFAI criteria during their assessment of Des Moines Fire Department's delivery of EMS.

HISTORY OF EMS IN THE FIRE SERVICE

There is a long history of fire department involvement in the delivery of EMS services in the United States. As early as 1928, a few fire departments began providing first aid services to citizens suffering from heart attack symptoms or having trouble breathing. These services were provided with equipment that the firefighters carried to treat other firefighters who would be overcome with smoke at fire incidents. Later in the 1930s, fire departments began developing special vehicles that they used to provide assistance to citizens in their communities who became ill or injured. These specialized units included vehicles used for heavy rescue and extrication operations.

During the 1940s and 1950s, many fire departments continued to provide ambulance service, consisting primarily of basic first aid and transport operations. As new techniques were developed for the care of the ill or injured outside of the hospital setting, fire departments in major cities such as Baltimore, Seattle, Los Angeles, Milwaukee, and Columbus were the first to implement the techniques.

In 1966, the National Traffic and Motor Vehicle Safety Act was passed authorizing the U.S. Department of Transportation to set EMS guidelines and establish the National Highway Traffic Safety Administration, which was charged with improving emergency medical services. As pre-hospital care started to become more sophisticated with the introduction of national standards for training of Emergency Medical Technicians (EMT) and Paramedics, fire department involvement in EMS grew throughout the United States.

In 2004, it was estimated that more than 60 percent of all fire departments in the United States were involved in providing some level of emergency medical service. Those fire departments that provided EMS services to their community found that at least 50 percent (and up to as high as 80 percent) of their total emergency incidents handled each year were EMS related.

In 2012, the Des Moines Fire Department (DMFD) responded to over 20,707 calls for service of which 74% were EMS related.

For a fire department to deliver quality EMS service, local government officials, fire department leadership, and EMS care providers must all embrace the importance of the service and must all understand the demands that a quality EMS program places on departmental resources.

The International Association of Fire Fighters (IAFF), one of the largest unions of the AFL-CIO, has taken a pro-active position on fire-based EMS delivery. To quote Harold A. Schaitberger, General President of the IAFF, "Fire department based EMS systems are—and will continue to be—the frontline responders for medical emergencies in the pre-hospital environment and the safety net for all citizens without access to primary care." In fact, in some U.S. communities, the delivery of EMS services is being returned to the local fire department after struggling with various models of private sector involvement.

Many leaders in the fire service at the national level believe the fire departments that have been involved in the direct delivery of EMS services have also been the fire departments that have remained the most stable through the difficult up-and-down economic times of the last 20 years. The fire service has truly taken on an "all-hazards" approach to its response capabilities in recent years, and those fire departments that only

respond to the report of fire are the fire departments that will continue to have their future in jeopardy.

A well-staffed, well-trained, and well-equipped fire engine can mean so much more to a community than just a fire response vehicle. If that vehicle is staffed with trained and equipped medical providers, it becomes the neighborhood first-aid unit that helps people with cut hands, broken bones, asthma attacks, and life threatening emergencies. Going on an EMS run should not be an inconvenience to a fire department; it should be an opportunity to aid and interact with the citizens that the department serves.

Every fire truck in the City of Des Moines is much more than a fire response vehicle; it delivers trained EMS providers – quickly – to the doorsteps of the community.

THE MODERN EMS AGENCY

The progressive EMS delivery agency is really a complex agency that has many customers—one of which is the patient receiving the care. EMS customers also include the patient's family; the citizens of the community; local medical professionals; the local hospital emergency room staff; trauma and specialty referral centers; local nursing and long-term care facilities; health care insurance providers; health care educators; 911 call takers and dispatchers; and, of course, the EMS providers themselves.

Modern EMS delivery is actually an aggressive EMS delivery that begins before the 911 call is initiated. Public health care awareness and injury prevention education are often delivered by local or regional hospital resources, as well as the EMS provider agency in hopes that the 911 call can be prevented, or at least made early in the event. In communities where public health care education has been prioritized as an important part of the EMS system, the outcome is quite often improved patient survivability and outcome. As a community's population changes in age and cultural composition, the need for public health care education grows increasingly more important.

When the 911 call is made, the progressive EMS agency will answer with an Emergency Medical Dispatch (EMD) trained call taker who will also provide pre-arrival instructions to the calling party so that basic lifesaving interventions can be started prior to the arrival of trained EMS providers. That progressive agency will have in place a tiered-type of response system that brings both basic and advanced life support services to the patient

within nationally accepted response time criteria. Ultimately, the patient will be properly diagnosed, treated, and transported to a medical facility capable of providing definitive care.

THE IDEAL CHAIN OF SURVIVAL EVENTS

In the "ideal" EMS system, a patient with a life-threatening medical emergency, such as a heart attack, should first encounter a family member or bystander who is CPR trained and who also recognizes the signs and symptoms of the medical emergency. The bystander or family member would activate the local EMS system through a 911 call and would initiate basic first aid and CPR care.

If needed, the EMD trained 911 call taker would provide nationally recognized pre-arrival care instructions via telephone while emergency responders were being dis-patched. These pre-arrival instructions would continue until the arrival of the trained emergency responders. If this emergency was occurring in a public venue, such as a shopping mall or health club, an Automatic External Defibrillator (AED) would be immediately available for use along with an AED-trained staff member or security person.

The first emergency response personnel to arrive on the scene would be trained at least to the EMT-B (Basic) level and equipped with a first-aid bag, oxygen delivery equipment, and an AED. Within a few minutes, a trained paramedic (or two) would arrive with advanced life support equipment capable of providing cardiac monitoring, intravenous medication therapy, and advanced airway management techniques. Using standing medical protocols, the patient would receive a 12-lead electrocardiogram, lifesaving medications, and other cardiac therapies in order to diagnose and treat the medical emergency.

The patient would be stabilized, loaded into a transport unit, and begin a short trip to a definitive care facility capable of handling cardiac emergencies. While enroute to the care facility, the paramedics would consult via radio or telephone with emergency care physicians to obtain orders for further pre-hospital interventions. The patient would arrive at the care facility having received appropriate advanced life support care (ALS) within the delivery time criteria established by the American Heart Association.

Patient care would be transferred to the emergency room staff and an accurate and clearly written transfer report would be provided. The transfer would be seamless and timely and the care providers would ready their equipment for the next response with minimal delay.

Back at their station, the care providers would finalize any reports and file them using a computer-based data collection system. The data would be used for billing, State reporting, departmental analysis of service delivery, and EMS system master planning—in addition to simply documenting the incident.

Finally, a Quality Assurance staff member would review the care provider's written report for accuracy and protocol compliance and then send a customer service survey to the patient within 30 days of the incident.

As stated previously, how all these system components arrive in the time required is really a complex process that varies from community to community throughout the United States. When multiple agencies are required to provide the system components listed above, inter-agency cooperation and coordination are paramount to successful patient outcome. Should one component fail, then the system fails to provide the best care.

EMS IN THE CITY OF DES MOINES

The Des Moines Fire Department provides Advanced Life Support (ALS) EMS to the City of Des Moines, as well as the Des Moines International Airport and Polk County Jail through various agreements.

Responding to emergency medical and rescue incidents has been a part of the DMFD since the mid-1900s. On April 2, 1974, the DMFD entered the era of fire-based EMS when they assumed the responsibility for providing emergency ambulance service and charging a fee of $25. In 1975, as the DMFD was working to enhance the level of pre-hospital care, registered nurses volunteered to assist with the Medic Squads, DMFD firefighters began formal Emergency Medical Technician (EMT) training, and in 1976 the formal positions of Fire Medic and Senior Fire Medic were created.

EMS entered a new era in 1982 when the DMFD appointed their first EMS Coordinator and began providing ALS services to the community. As such, in May of 1982, DMFD

Fire Medics were required to upgrade to EMT-Intermediate and, later, EMT-Paramedics as the City of Des Moines sought to improve the level of service provided to the citizens.

Today, the DMFD is the largest and busiest fire-based emergency medical service provider in the State of Iowa with nearly 280 DMFD personnel providing basic and advanced life support pre-hospital and including ambulance transportation, serving more than 15,000 patients annually.

The DMFD EMS delivery system consists of Engine and Truck companies staffed with cross-trained firefighter/EMTs and firefighter/paramedics who respond to medical emergencies with ambulances staffed by firefighter/paramedics. This collaborative effort results in quick response times to provide the best care for those citizens who request help.

Dr. Chad Torstenson, M.D., who serves as the Medical Director for the DMFD, provides medical direction to the highly skilled professionals who deliver EMS in the DMFD. Working hand-in-hand, Dr. Torstenson and the dedicated staff of the DMFD EMS Division ensure that the highest level of medical care is provided and that certifications in basic life support, advanced cardiac life support, pre-hospital trauma life support, and pediatric education is maintained by all DMFD pre-hospital providers.

Figure 5.1
DMFD MEDIC AMBULANCE

MEDICAL DIRECTION

The success of any fire-based EMS program is directly related to strong oversight and participation of the physician (Medical Director) overseeing the program. The Medical Director serves as the medical practitioner who extends the ability to "practice" medicine to the EMTs and Paramedics under his/her direction.

As EMS now dominates the lion's share of the DMFD's workload, and will grow larger in the future, a strong interactive partnership is vital between the Medical Director and the Fire Chief. Routine peer-review of patient care provided by the DMFD is a high priority that must be institutionalized in the DMFD EMS culture. That is essential to the recommendations in this Chapter.

The Study Team met directly with DMFD Medical Director Chad Torstenson, M.D., and found him to be highly committed, progressive, and willing to embrace new ideas and the fire service's changing role with the implementation of the Affordable Care Act.

MEDIC LOCATIONS

The DMFD covers the City of Des Moines with paramedic-staffed Engines and Ambulances to ensure rapid response in accordance with national standards.

Station 1 - Medic Ambulance (Paramedic)
Station 2 - None
Station 3 - Medic Ambulance and Medic Engine (Paramedic)
Station 4 - Medic Engine (Paramedic)
Station 5 - Medic Ambulance (Paramedic)
Station 6 - Medic Engine (Paramedic)
Station 7 - Medic Ambulance (Paramedic)
Station 8 - Medic Ambulance and Medic Engine (Paramedic)
Station 9 - Medic Ambulance (Paramedic)
Station 10 - Medic Ambulance (Paramedic)

Figure 5.2 illustrates the location of medic ambulances and medic engines in the City.

Figure 5.2
MEDICAL ENGINE AND AMBULANCE LOCATIONS

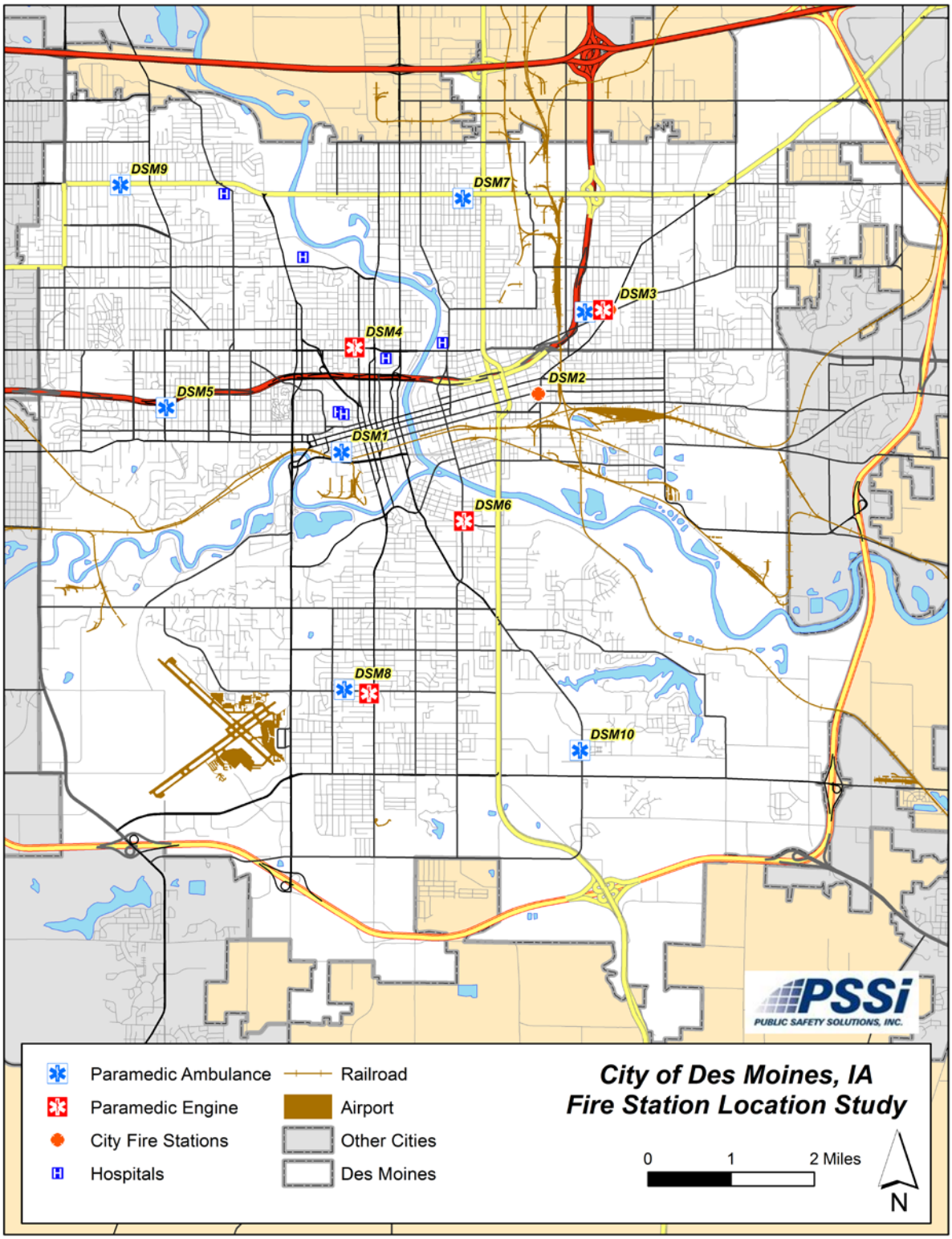
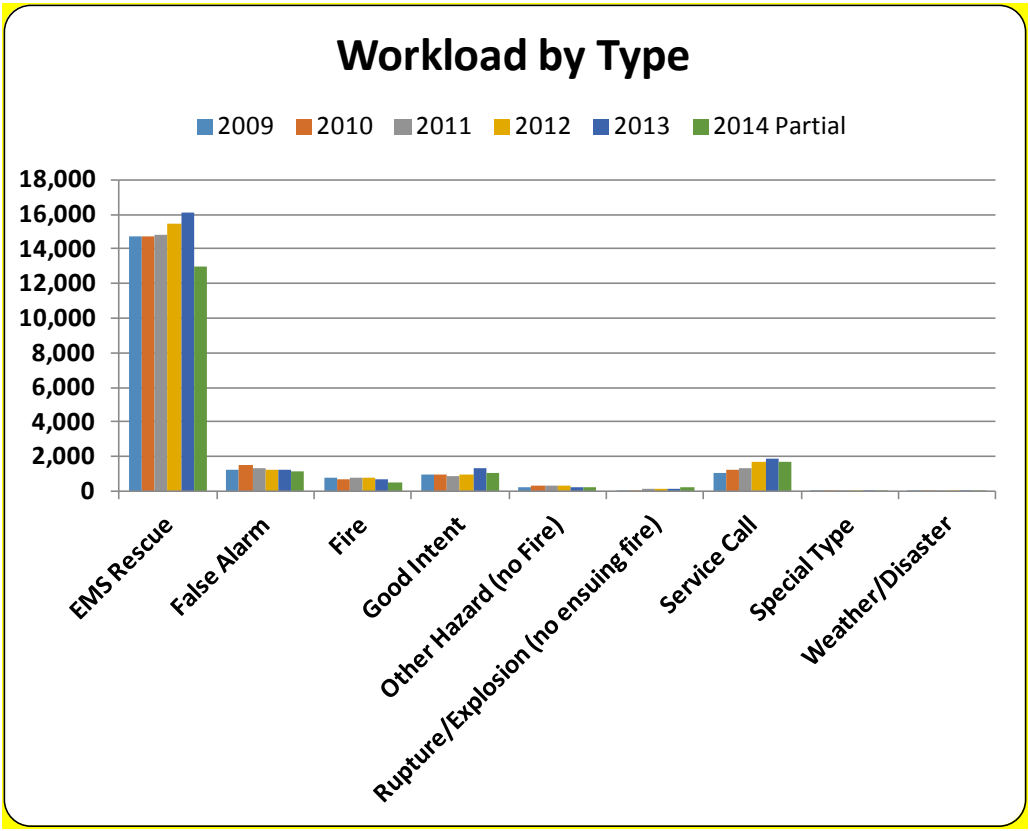


Figure 5.3 illustrates the change in volume for categories of reported fire, medical and all other incident categories.

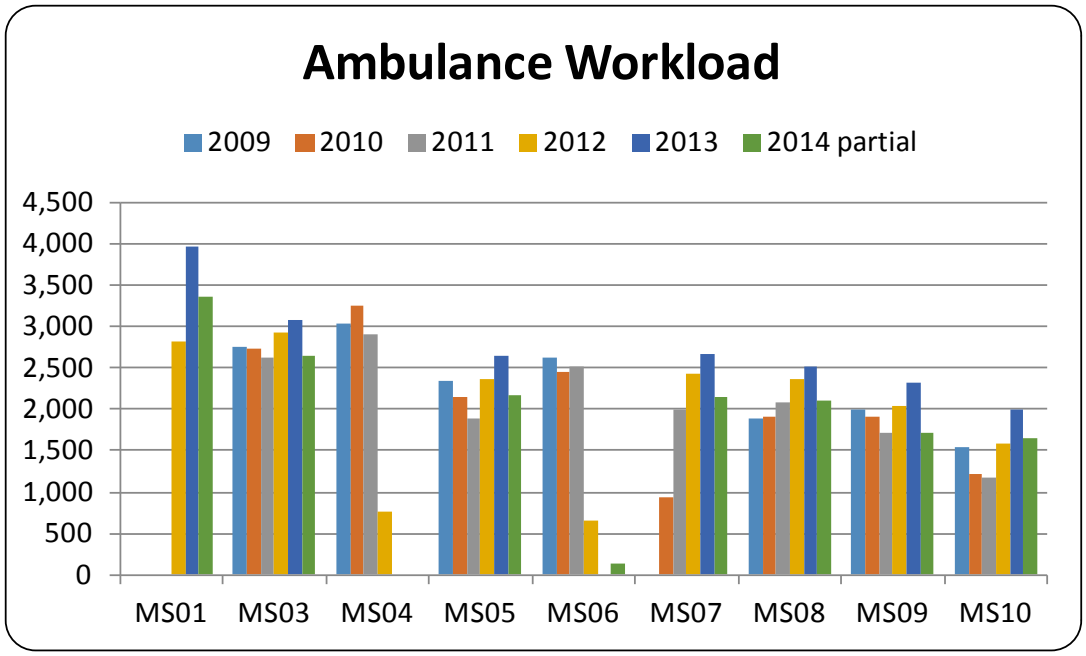
Figure 5.3
HISTORIC WORKLOAD BY CALL TYPE



Medical calls account for approximately 74% of the overall service demand for the fire department and has increased since 2009.

Because medical calls are prevalent, ambulance units are in high demand. Figure 5.4 details the workload among the ambulance units in the City.

Figure 5.4
AMBULANCE WORKLOAD



Currently, Medic 1 is the busiest ambulance. It was placed in service when Medic 4 and Medic 6 were decommissioned in 2012. Previously, Medic 4 was the busiest, followed by Medic 3. In 2014, Medic 6 was deployed on a trial basis at certain times.

While the workload of a unit is reflective of the relative demand in the area, it may give a false impression of the actual busyness of a unit because it does not include time on assignment. While it is known that structure fires can involve a unit for an extended period of time, the transportation and transfer of patients involves a consistently longer time on assignment than experienced by other apparatus. Factoring in time to assignment yields that ambulances are 2.5 times more involved on assignments. Considering the extra training involved in becoming and in remaining a paramedic, in addition to a firefighter, adds to the workload and ought to be evaluated by fire administration to make sure that provider fatigue does not adversely affect response and care of patients by these units. Additional medic units may need to be considered.

Northeast Medic Coverage

The need for DMFD fire and EMS coverage in the Northeast part of the City in the direction of the City of Altoona and Delaware Township was addressed in the Fire

Station Locations Chapter of this report. It is for that reason that the Study Team recommended that the City consider the relocation of current Fire Station 3 to an appropriate location on Hubbell Ave. between 31st and 32nd Streets.

As illustrated in Figure 5.4 Medic Ambulance 3 that responds from Fire Station 3 is the second busiest medic ambulance in the City. Medic Ambulance 3 is the first responding medic ambulance to respond into the northeast area of the City. Figure 5.5 illustrates the four and eight minute projected response area for Medic Ambulance 3 responding into the Northeast area of the City from its quarters at 2458 Easton Blvd. As can be seen, if Medic Ambulance 3 is in quarters there are long response times into the Northeast area with most of that area projected to experience response times of 4-8 minutes, which exceeds the nationally recognized goal.

As discussed in detail in the Fire Station Locations Chapter, rapid delivery of EMS is essential in the acute situation of cardio-respiratory arrest; a measurable factor is the time from heart stoppage and cessation of breathing (clinical death) to when irreversible brain damage begins (biological death). Although the time varies with patients and conditions, the generally recognized intervention time to prevent biological death is four to six minutes.

Of course, if Medic Ambulance 3 is not in quarters and is unavailable, which would occur often with the second busiest medic ambulance in the City, the next closest medic ambulance would likely be Medic Ambulance 7 if it is available and in quarters at 3500 E. 12th Street. It is understood that with most EMS incidents the next closes DMFD engine/medic engine or truck would be dispatched at the same time as the closest medic ambulance. However, the travel time for the medic ambulance would be well beyond the goal for EMS incidents and the time the other DMFD units dispatched would be substantially increased.

Pending the recommended relocation of Fire Station 3 further into the Northeast area of the City, as outlined in the Fire Station Locations Chapter, the Fire Department and City should consider two actions.

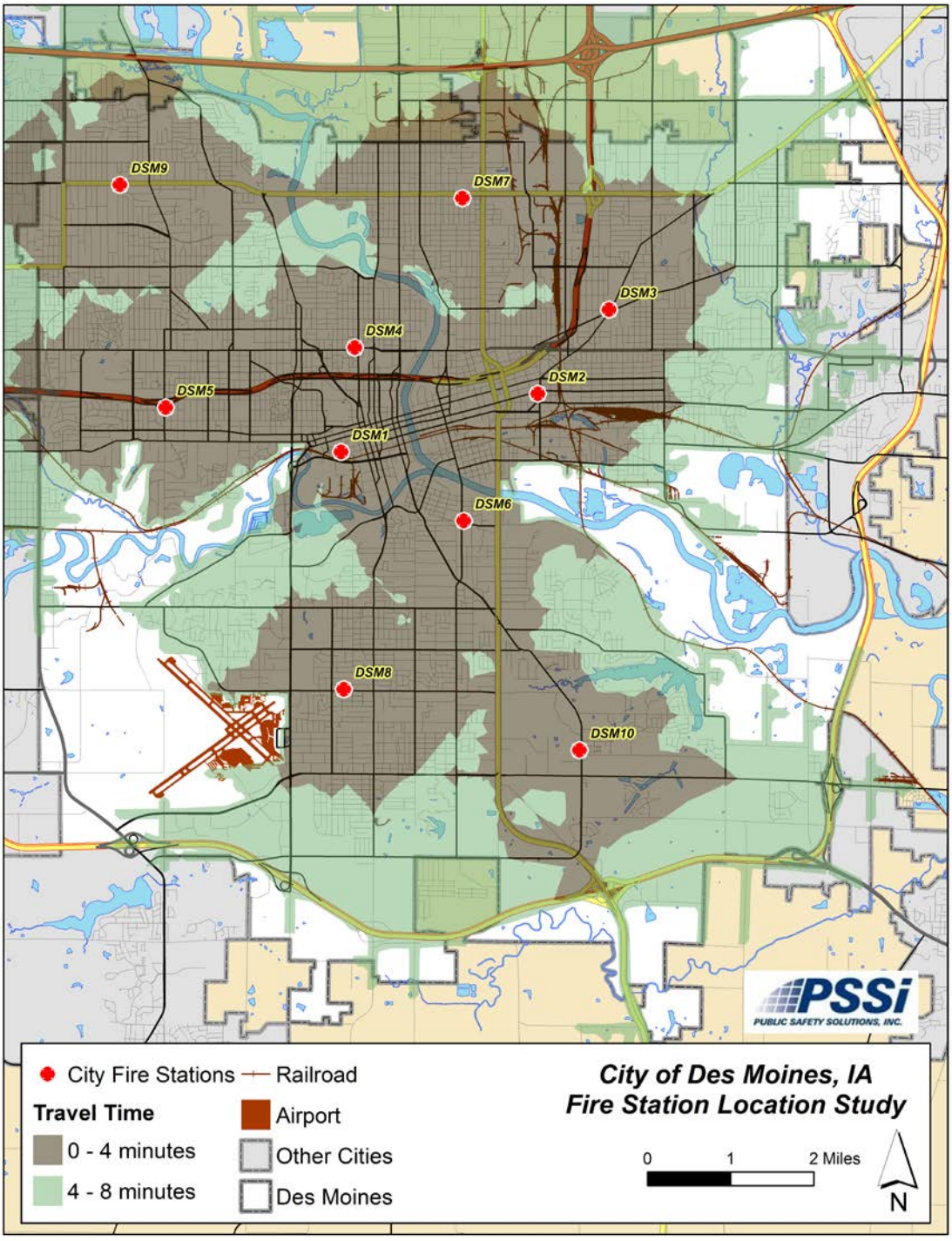
- First, temporarily contract with the Township of Delaware to place a medic ambulance or medic engine in the Northeast area, potentially at the current unstaffed Township fire station located in the City annexed area at 3992 E.

Broadway Avenue. The Study Team met with the Delaware Township Fire Chief during the Study and was advised that fire station is generally unstaffed with volunteer personnel responding to the station on a call by call basis.

The temporary placement of a DMFD EMS-staffed unit (engine or ambulance) at this location would not only meet the immediate needs of the City for Northeast EMS coverage, but, would also substantially improve the EMS services delivery to an area of Delaware Township which is reportedly largely provided EMS services by a private provider located in Downtown Des Moines when qualified volunteer staff may be unavailable. This approach for joint operations of fire stations is discussed in further detail in the Cooperative Services Chapter of this report.

- The second immediate action recommended to improve fire and EMS services delivery to the Northeast area of the City is to develop agreements with the City of Altoona and the Township of Delaware to implement automatic mutual aid with their fire and EMS services to be dispatched automatically on certain types of fire and EMS calls. Automatic mutual aid is also discussed in detail in the Cooperative Services Chapter of this report.

Figure 5.5
FOUR AND EIGHT MINUTE RESPONSE AREAS



Deployment Of Medic Engines

Today's modern fire engine is more than just a "fire" engine. Fire engines today are equipped for response to many different types of incidents — not just fires. Paramedic Engines, which are staffed by an officer, an engineer, and a firefighter/paramedic, are specially equipped apparatus that, in addition to all of the other functions, offer ALS (including drug therapy for cardiac-related emergencies, advanced airway procedures and other equipment for a variety of unpredictable emergency calls) to support the delivery of EMS services in the City of Des Moines.

As with all other engines, paramedic engines respond to hazardous materials incidents, traffic accidents; structure and car fires; multi-casualty events; wildfires; terrorism incidents; water rescue incidents; search and rescues; and medical emergencies and traumatic injuries.

As the national focus on EMS moves from "transport everyone" to assess for the ability to "treat and release" or "treat and refer", paramedic engines and other adaptive response units have gained in importance and popularity. Many fire departments find that converting to an all paramedic engine concept allows for implementing dispatch protocols by which a Paramedic Engine can respond to some calls without an accompanying ambulance, thus relieving the need for additional transport units (ambulances) and ensuring that transport is available when needed. If the paramedics on the engine need a transport unit, one is dispatched.

Additionally, many fire departments deploying paramedic engines find that their cardiac-arrest-save rate increases with paramedic engine implementation as compared to a single tier paramedic ambulance system. While many factors come into play, the very fact that once a call is terminated, the paramedic engine is immediately available for another call. Whereas in a single tier ambulance only program, the area served by the ambulance remains uncovered during the transport to the hospital – this transportation time includes driving, the time the ambulance spends at the hospital, and the travel time back to that ambulances service area.

The Study Team believes implementing a formal paramedic engine program, which identifies paramedic engines as such in the computer aided dispatch (CAD) system and deploys them accordingly, may offer relief to the current workload of paramedic

ambulances. With Medical Director support, the DMFD currently employs the number of paramedics needed to move quickly in the direction of a full paramedic engine program. Costs associated with implementation for DMFD would need definition. However, equipping paramedic engines with just the immediate needed ALS intervention equipment can save thousands of dollars in start-up costs over equipping a paramedic ambulance.

Additionally, The DMFD should track EMS system transport time components to monitor the full impact on first-due and City-wide response time and use this data to place paramedic engines in the highest and best deployment location.

AFFORDABLE CARE ACT – COMMUNITY PARAMEDICINE

In the current health care economy, the future of EMS is changing. While many felt that physician reluctance to having paramedics treat a patient and release them or refer them to another level of care other than an emergency room was the driving force behind transporting every patient treated, the truth of the matter is that reimbursement models often drove the traditional model of treat and transport. In other words, if paramedics responded to an asthmatic and were able to administer care that negated the need to be transported, EMS had no means of charging and collecting for the services provided.

Discussions centering on the need for changes in paramedic scope of practice to allow for treat and release/refer and subsequent reimbursement have gone on for some time now. Enter the Patient Protection and Affordable Care Act (also known as ACA) signed into law March 23, 2010, by President Obama.

The ACA created the Accountable Care Organizations (ACOs). ACOs are groups of doctors, hospitals, and other health care providers that coordinate to decrease costs and increase the quality of health care they provided to patients. To accomplish decreased costs, the ACO receives a bundled payment for all services provided for a patient. This includes the ER treatment, diagnostic/radiographic tests, physician payments, hospital-ization (if required), and surgical procedures.

This bundle can now include services provided by EMS, as well. If the ACO can provide care for less than the bundled payment amount for that patient, they make a profit. If they do not, they absorb the cost and must seek more efficient ways in which to manage patients.

In addition, under the ACA, hospitals now receive performance-based bonuses or penalties based on two main measures: (1) value-based purchasing (VBP) and (2) readmission rates for specific diagnostic related groups (DRGs), like myocardial infarction, heart failure and pneumonia.

These cost curbing measures become an opportunity for EMS as it stands today and open the door for mobile integrated health care options that can easily be provided by EMS. Many have termed this service "Community Paramedicine."

Community Paramedicine is an evolving model of community-based health care in which paramedics function outside their customary emergency response and transport roles in ways that facilitate more appropriate use of emergency care resources and/or enhance access to primary care for medically underserved populations. Community Paramedicine programs typically are designed to address specific local problems and take advantage of locally developed linkages and collaborations between and among EMS and other health care and social service providers and, thus, are varied in nature. Figure 5.6 shows an example of a Community Paramedic unit in Dallas, Texas.

Figure 5.6
DALLAS (TX) FIRE COMMUNITY PARAMEDIC UNIT

As noted above, interest in Community Paramedicine has substantially grown in recent years based on the belief that it may improve access to and quality of care while also reducing costs. Some of the delivery system problems targeted by Community Paramedicine programs include overuse of the 911 system for social or psychological problems; the need for alternative means to manage patients who do not require transport to a general acute care hospital emergency department; repeat ED visits or hospital readmissions due to gaps in care between hospital and outpatient primary care or specialty management; limited or no capacity for short-notice home visits, especially during off hours; and supplementing primary care shortages in underserved areas.

How can Community Paramedicine add value to the citizens of Des Moines and have a positive impact on the overburdened EMS system provided by the DMFD? Specifically assigned paramedics could shift from a sole focus on emergency response to: (1) providing follow-up care for people recently discharged from the hospital to prevent unnecessary readmissions; (2) providing community-based support for people with diabetes, asthma, congestive heart failure, or multiple chronic conditions; and/or (3) partnering with community health workers and primary care providers to address mounting numbers of behavioral-health calls related to substance abuse, psychiatric issues and anxiety.

These three areas could serve to:

1. Generate additional revenue;
2. Reduce health care costs for both the provider and patient and the impact of costly and time-consuming trips to the hospital; and
3. Reduce overall responses to unnecessary EMS calls saving valuable DMFD resources for true emergencies.

Recently, the University of California (UC)–Davis, Institute for Population Health Improvement, released a report entitled "Community Paramedicine: A Promising Model for Integrating Emergency and Primary Care." The report concludes that "expanding the role of paramedics is a promising solution to efficiently increasing access to care, particularly for underserved populations." Further, it recommends the development of pilot projects to refine and evaluate the role of Community Paramedicine.

The Mesa (AZ) Fire and Medical Department is already doing just that, and their program can serve as an example of how the DMFD might go about implementing a Community Paramedicine program.

Using a $12.5 million grant from the Centers for Medicare and Medicaid Services, the Mesa Fire and Medical Department (MFMD) implemented 2-person "Community Care Units" whose mission was to free up medic units and engines to handle more serious situations. One of the units (termed the PA or Physician Assistant Unit) was accomplished by collaborating with Mountain Vista Medical Center to replace one paramedic with a physician assistant or nurse practitioner (see Figure 5.7). Those professionals, working alongside the MFMD firefighter/paramedic, can suture wounds, test for urinary-tract infections, provide slings, administer flu and tetanus shots, and write prescriptions on-site, making the MFMD PA Unit comparable to a traditional urgent care.

Figure 5.7
MESA (AZ) FIRE/MEDICAL COMMUNITY CARE UNIT

This unit has also offered assistance to the police department by providing at-scene treatment to patients under arrest so officers do not have to accompany them to an emergency room. Another mission of the PA Unit is to follow up with and refer recurrent patients to avoid repeat 911 calls for non-emergent illness or injury thus avoiding unnecessary EMS system draw-down.

With the success of the PA Unit, the MFMD placed another Community Care Unit in service to help address mounting numbers of behavioral-health calls related to substance abuse, psychiatric issues, and anxiety. This unit, termed the BU or Behavioral Unit, paired a MFMD firefighter/paramedic with a crisis counselor who could determine whether patients needed to go to a hospital or behavioral facility.

Before the creation of the BA Unit, fire and police personnel would have to transport patients to an emergency room, and a crisis counselor would see them there. With more

than 1,000 such "behavioral holds" reported in a single month in Mesa, the previous approach tied up both emergency rooms and Mesa's public-safety officials.

Thus far, the program has been deemed a success in lowering health care costs and reducing the demand on public safety resources. To ensure the ongoing success of the program, MFMD officials have partnered with community health care providers and ACOs and have drafted an ordinance allowing the department to charge insurance companies or private health-care providers for certain services not covered by government programs, such as non-emergency transports to behavioral-health facilities, at the expiration of the grant program.

As the City of Des Moines and the DMFD wrestle with balancing the resources to provide EMS throughout the City, implementing a program like the City of Mesa's can address the growing challenge of EMS misapplication and the high call volume in certain areas of the City that result from behavioral issues and/or persons with limited or no access to health care other than the EMS system. Additionally, partnering with the health care community and ACOs in Des Moines can serve as a presently untapped revenue resource that could fund these types of units. The exact revenue to be realized, including fee structures and methodologies are region specific. Each ACO and/or healthcare provider establishes their own criteria. Discussions with the Des Moines ACOs and healthcare providers would be needed.

EMS CONSIDERATIONS IN STATION DESIGN

The DMFD EMS program came about during the last major station construction program in the 1970s. At this time, attention to emerging diseases and the need to protect DMFD personnel and prevent cross contamination became an issue not anticipated when the vast majority of DMFD fire stations were designed and constructed. Additionally, any thought of fire stations being used for community health care applications had not even been discussed.

The placement of future fire stations and the design program to meet emerging disease issues for prevention of cross contamination and decontamination, such as station layout, automated lavatory fixtures, door design, antimicrobial building materials, and HEPA filtering needs must be taken into consideration. As station replacement programs are

developed for the future, discussions should take place as to how the fire station facility may also serve as a Community Paramedicine facility as well.

SUMMARY

The DMFD has a long and distinguished history of providing exceptional emergency medical care and a proven record of working diligently to always meet the future emergency medical needs of the community. The DMFD EMS program came about during the last major station construction program in the 1970s. The placement of future fire stations and the design program to meet emerging disease issues for prevention of cross contamination and community health care needs must be a future consideration.

Current and future demands on the EMS program in the DMFD will define the largest share of the workload in the department. Exploring options afforded under the ACA, pursuing Community Paramedicine, and refining and embracing further development of the paramedic engine and/or adaptive response unit concept is essential. Implementation of these options cannot only improve response times, they can reduce unit and system demand, especially where EMS is being misapplied to respond to non-emergent healthcare needs. These options can enhance overall healthcare delivery in the City of Des Moines by improving access to non-emergent healthcare needs and freeing up DMFD emergency units to respond to actual healthcare emergencies.

Central to the success of EMS now, and in the future, is a continued strong partnership with the Des Moines medical community and DMFD Medical Director.

OPTIONS AND RECOMMENDATIONS

The City and Fire Department are encouraged to consider and implement, as appropriate, the following options and recommendations relating to Des Moines Fire Department EMS.

5-1 Implement a formal paramedic engine program, which identifies paramedic engines as such in the computer aided Dispatch (CAD) system, and deploy them accordingly.

5-2 Implement EMS protocols to maximize the deployment of paramedic engines to relieve workload on transport units (ambulances).

5-3 Temporarily, pending potential relocation of Fire Station 3, contract with the Township of Delaware to place a medic ambulance or medic engine in the Northeast area, potentially at the current unstaffed Township fire station located in the City annexed area at 3992 E. Broadway Avenue.

5-4 Develop agreements with the City of Altoona and the Township of Delaware to implement automatic mutual aid with their fire and EMS services to be dispatched automatically on certain types of fire and EMS calls in the Northeast part of the City.

5-5 Track EMS system transport time components to monitor the full impact on first-due and City-wide response time and use these data to place paramedics' engines in the highest and best deployment location.

5-6 In partnership with the DMFD Medical Director, implement and institutionalize a comprehensive EMS peer review program to include a Peer Review Committee for oversight.

5-7 In partnership with the DMFD Medical Director, study the opportunities for implementation of a Community Paramedicine program to increase the level service to the citizens and reduce workload on the current transport units (ambulances).

5-8 In partnership with the DMFD Medical Director, begin discussion with the Des Moines ACOs to maximize revenue and reduce workload on current transport units (ambulances).

5-9 Formalize the involvement of the DMFD Medical Director as part of the DMFD Command Staff, reporting to the fire chief, to maximize opportunities in this changing health care environment.

5-10 Explore federal grants programs that can assist in funding a study and/or pilot programs to implement Community Paramedicine.

5-11 Ensure that future fire station building programs involve EMS staff to provide input on station design for future inclusion of Community Paramedicine.

5-12 Ensure that future fire station building programs involve EMS staff to provide input on station design to address universal precautions, cross contamination, and emerging disease issues.

CHAPTER SIX
AIRPORT IMPACT

This Chapter includes a review of Aircraft Rescue and Fire Fighting (ARFF) services at the Des Moines International Airport (DSM) and any resulting impacts on the Des Moines Fire Department (DMFD) as a result of the loss of the 132nd Iowa Air National Guard ARFF services and the transition to a private contractor for ARFF services.

ARFF is a special class of firefighting that involves the response, fire suppression, evacuation, and rescue of passengers and crew of an aircraft involved aircraft incident. Due to the mass casualty potential of an aviation emergency, the speed and number with which emergency response personnel and equipment arrive at the scene of the emergency is of paramount importance. The immediate arrival and the number of resources immediately deployed on the initial response to secure the aircraft against all hazards (particularly fire) increases the survivability of the passengers and crew on board, as well as any buildings or persons impacted on the ground.

AIRPORT AND ARFF SERVICES HISTORY AT DSM

The Des Moines International Airport (IATA: DSM, ICAO: KDSM, FAA LID: DSM) is a civil-military public airport located in the southwest area of the City of Des Moines. DSM serves seven major airlines with connections to 19 major airline hubs. In 2013, DSM served 2,201,388 passengers and handled 129,488,194 pounds of cargo.

Figure 6.1
DSM MAIN TERMINAL ENTRANCE

DSM was initially constructed in 1932 and was owned and operated by the City of Des Moines. In 2011, in an effort to position DSM for the future, the City transferred control to the newly created Des Moines Airport Authority (DMAA). Under this arrangement, the City retains ownership of the land, but transferred title to all property and equipment to the public authority. In turn, the authority agreed to a 99-year land lease.

DSM is situated on approximately 2,750 acres of land and serves several major tenants, including: seven commercial passenger airlines, two major air cargo airlines, seven car rental agencies, restaurant and gift shop concessionaires, two general aviation fixed-base operators, U.S. Customs Office, Federal Aviation Administration (FAA) Facilities, and the Iowa Air National Guard Headquarters.

Figure 6.2
DSM OVERALL LAYOUT

DSM also hosts the Des Moines Air National Guard Base and 132nd Fighter Wing (132 FW) of the Iowa Air National Guard (I-ANG). Congressional action in 2013 changed the wing's mission to a unit operating Remotely Piloted Aircraft, MQ-9 Reapers. The last regularly scheduled flights of the F-16s occurred in August 2013, after which the unit's 21 F-16s were transferred to the New Jersey Air Guard's 177th Fighter Wing in Atlantic City. With this change in the 132nd FW mission, the need for ARFF services at DSM for military flight operations was negated.

As with several joint civil-military airports, ARFF services were provided in-kind by the Air National Guard (ANG). As military missions are changing with the times, the loss of ARFF services can pose a financial hardship on airports that have not had to fund these services in the past. Furthermore, in most cases, the partnership between the ANG ARFF unit and the municipal fire department was long-standing and mutually reliant on one another's resources. Loss of the ANG ARFF services often triggers significant operational challenges ranging from loss of resource and operational readiness capacity to legal issues involving mutual and automatic aid agreements.

With the pending loss of ARFF service provided by the I-ANG, the DMAA issued a Request for Proposals (RFP) in September 2013 for a Services Agreement to provide ARFF services at DSM. Subsequently, the DMAA entered into an agreement with Pro-Tec Fire Services, Ltd., a corporation incorporated under the laws of the state of Wisconsin and qualified to do business in the state of Iowa, that began at 12:01 a.m. on October 1, 2014, and ends at midnight on September 30, 2016. The agreement calls for Pro-Tec Fire Service to provide ARFF and specifically defined emergency services to DSM. The DMAA has the right to extend the term of the agreement for three additional one-year periods.

IMACT ON DMFD

Providing a safe and secure environment to DSM is organized through response to emergency situations and proactive education and prevention activities. Public safety at DSM involves several partners in order to provide a broad range of programs to protect the airport community from the adverse effects of crime, fire, sudden medical emergency, or exposure to dangerous conditions.

Figure 6.3
DSM TERMINAL LAYOUT

DSM is classified as an Index C airport by the FAA and must meet the Federal Aviation Regulation Part 139 Aircraft Rescue and Firefighting certification, with service provided 24 hours a day. The International Civil Aviation Organization (IACO) classifies DSM as a Category 7 airport.

The Aircraft Rescue and Fire Fighting Requirements Working Group (ARFFRWG), a working group of the FAA's Aviation Rulemaking Advisory Committee (ARAC), was formed in 2004 to identified key tasks that ARFF services should be capable of providing at an aircraft accident/incident within specified time objectives. The location of an aircraft accident/incident, for planning purposes, should be the furthest end of the farthest runway.

These key time objectives and tasks, as follows, provide benchmarks on which to determine ARFF staffing requirements and demonstrates how the recent reduction in ARFF staffing at DSM will depend on DMFD personnel to fill the gaps left behind when the I-ANG ceased provided ARFF services at DSM:

<u>Category 6 & 7 Airports</u>

3 Minutes - Begin discharge of required agent from first required vehicle
4 Minutes - Begin discharge of required agent from all other required vehicles
Establish incident command system and request additional resources
Initiate access to aircraft cabin

5 Minutes - Begin interior aircraft rescue and firefighting
Establish rapid intervention team
8 Minutes - Initiate second access to aircraft cabin
Establish second interior aircraft rescue and firefighting team
Establish water supply and resupply required ARFF vehicles
Provide emergency medical services
10 Minutes - Provide stationary vertical access to aircraft

The key tasks identified by the ARFFRWG are described below:

a. Discharge required extinguishing agent from the first required ARFF vehicle — Adequate ARFF personnel shall be available to safely and effectively drive and operate the required ARFF vehicle. ARFF personnel shall be capable of discharging required extinguishing agent at the required discharge rate from the first required ARFF vehicle.

b. Discharge required extinguishing agent from all other required ARFF vehicles — Adequate ARFF personnel shall be available to safely and effectively drive and operate the other required ARFF vehicles. ARFF personnel shall be capable of discharging required extinguishing agent at the required discharge rate from these vehicles.

c. Establish Incident Management System — An incident management system shall be implemented and an on-scene ARFF incident commander shall be designated. The incident commander shall give an initial report to the main emergency communications facility and request, as necessary, additional resources (personnel, vehicles, etc.). Adequate ARFF personnel shall be available to perform incident management functions during an aircraft incident or accident.

d. Initiate access to aircraft cabin — ARFF personnel shall be capable of initiating access to the aircraft cabin, using forcible entry tools and ground ladders. ARFF personnel shall be capable of gaining vertical access to the aircraft by ground ladder, aerial fire apparatus, or mobile stair. ARFF personnel gaining access to the cabin shall be protected by ARFF vehicle turrets and/or handlines. Adequate ARFF personnel shall be available to safely and effectively perform these functions.

e. Begin interior aircraft rescue and firefighting — An interior ARFF team, consisting of not less than two ARFF personnel, shall be capable of entering the aircraft with a charged handline. The interior ARFF team shall be equipped with protective clothing and self-contained breathing apparatus. The interior ARFF team shall be protected by ARFF vehicle turrets and/or additional handlines. Interior aircraft and firefighting shall be conducted in accordance with 29 CFR 1910.134.

f. Establish a rapid intervention team (RIT) — A RIT, consisting of not less than two ARFF personnel, shall be prepared to rescue the interior firefighting and rescue team. RIT personnel shall be equipped with protective clothing and self-contained breathing apparatus. Interior aircraft and firefighting shall be conducted in accordance with 29 CFR 1910.134. At Category 4 and 5 airports, one member of the RIT team may act as the initial incident commander until relieved from the RIT or incident command is assumed by another qualified person.

g. Provide emergency medical services -— An advanced life support team, consisting of not less than two personnel trained at the emergency medical technician – paramedic level and two personnel trained at the emergency medical technician –basic level shall be on scene and equipped to provide basic and advanced life support, including mass casualty management. Emergency medical personnel may be non-ARFF personnel, if they are not assigned to rescue and firefighting tasks.

h. Establish second interior ARFF team — A second interior ARFF team, consisting of not less than two ARFF personnel, shall be capable of entering the aircraft with a second charged hoseline. The second ARFF team shall be equipped with protective clothing and self-contained breathing apparatus. NOTE: The second interior ARFF team may consist of non-ARFF personnel if they have been trained in interior structural firefighting and are equipped with protective clothing and self-contained breathing apparatus.

i. Establish water supply and resupply required ARFF vehicles — A continuous water supply of the rate specified shall be established for firefighting. All required ARFF vehicles shall be re-serviced to their required capacity. Adequate ARFF personnel shall be available to safely and effectively drive and operate ARFF

vehicles. Non-ARFF personnel may operate structural fire apparatus and other support vehicles to accomplish these tasks.

j. Initiate second access point to aircraft cabin — ARFF personnel shall be capable of initiating a second means of access to the aircraft cabin, using forcible entry tools. ARFF personnel shall be capable of gaining vertical access to the aircraft by ground ladder, aerial fire apparatus, or mobile stair. ARFF personnel initiating access to the cabin shall be protected by ARFF vehicle turrets and/or handlines. Adequate ARFF personnel shall be available to safely and effectively perform these functions.

k. Provide stationary vertical access to aircraft cabin — ARFF personnel shall be capable of providing stationary vertical access and a water supply of not less than 250 gpm to the aircraft cabin by means of aerial fire apparatus or other suitable platform. These tasks may be performed by non-ARFF firefighter personnel if they have been trained in interior firefighting and are equipped with protective clothing and self-contained breathing apparatus. Adequate ARFF and non-ARFF firefighter personnel shall be available to safely and effectively perform these functions.

The ARFFRWG also recommended that the minimum number of trained ARFF personnel responding to an initial alarm be based on the equivalent of 3 ARFF personnel per required ARFF vehicle. Additionally, an Incident Commander and 2 additional ARFF personnel for Rapid Intervention should be provided.

Although the DMAA has contracted with Pro-Tec Fire Services, Ltd., to provide ARFF services, in reality, the primary responsibility for "all-hazards" preparedness, prevention, and response for the majority of DSM falls within the jurisdiction of the DMFD.

The contract with Pro-Tec Fire Services, Ltd., provides for command and control of aircraft emergencies and paramedic first response services to be provided by three (3) on-duty ARFF personnel staffing three trucks. The level of service provided at DSM by the I-ANG on a daily basis was a minimum of seven (7) ARFF personnel staffing three trucks. At times, based on demand and staffing, the I-ANG could reduce staffing to 5 ARFF personnel between 10:00 p.m. and 7 a.m.

And, while this change is so recent so as not to allow for adequate data, the reduction in the staffing level alone will have a significant impact on the DSM ARFF provider's ability to provide the same level as previously provided by the I-ANG without substantial back-up response and resources provided by DMFD. This, in turn, could have an impact on the workload on the adjacent DMFD Station 8, as well as other DMFD stations, that will be pulled to back-up Station 8 units or to respond to Station 8's calls while they are responding to incidents at DSM.

For example, a routine medical emergency at DSM would require the response of two of the three ARFF personnel – leaving only one ARFF firefighter to immediately respond to aircraft emergencies. And, while simultaneous incidents are of a low probability, such an occurrence can come with an extremely high consequence. It is for this reason that Federal Aviation Regulation Part 139 ARFF standards are strictly evaluated and enforced by the FAA.

In the event of a major aircraft incident on the airfield itself, DMFD resources beyond the three ARFF personnel will be needed for rescue, EMS, and potential firefighting, as well. And, while the agreement for aircraft emergencies, fire protection, medical emergencies, medical transportation services, and hazardous material response between the City and the DMAA calls for DMAA ARFF staff to establish incident command and control at all "on-airport" aircraft emergencies, the reality of this occurring, especially in compliance with the National Incident Management System (NIMS) without significant DMFD resources, is questionable.

In the past, I-ANG ARFF had sufficient staffing to handle many calls for emergency assistance, both aircraft and EMS, at DSM without requiring the assistance of the DMFD and without jeopardizing the level of staffing for aircraft emergencies when handling EMS or other routine calls at the airport.

Regardless of who provides ARFF service to DSM, the reduction in ARFF resources provided at DSM currently will have an impact. DMFD should closely monitor the draw on DMFD resources above and beyond the impact of DSM when the I-ANG provided ARFF.

Figure 6.4
I-ANG ARFF CRASH TRUCK

The Study Team considers that the recent loss of the I-ANG services at DSM offers opportunities for further study of partnership options between the DMAA and the DMFD to enhance services and eliminate costs and duplicate efforts, and that the City and the DMAA should commission such a study and explore these options prior to the expiration of the current ARFF contract on September 30, 2016.

An appropriate recommendation for this Fire Station Placement Review Study would be the immediate exploration of a shared facility to provide emergency services to DSM and the surrounding community to address the findings in Chapter 3, Fire Station Locations, in this study, as well as offer an option to address the need for replacement of DMFD Fire Station 8 as the facility nears the end of its expected serviceable life span.

The Study Team suggests that options to be considered, consistent with the recommendations in Chapter 3 Fire Station Locations, would be to co-locate DMFD Station 8 in the current ARFF Station at DSM or jointly constructing a new ARFF/ DMFD Station 8 facility on the grounds of DSM. This would allow the station personnel to be strategically located to enhance response on and off airport property and offer enhanced service levels at DSM. Figure 6.5 illustrates the current DSM AFF Fire Station Facility.

Both joint station options will require further study and conformance with FAA regulations regarding airport operations and security.

Figure 6.5
DSM ARFF FIRE STATION FACILITY

SUMMARY

The departure of the ARFF services provided by the I-ANG was an unfortunate loss to DSM and the DMFD. The change in DSM operations and ownership from the City to the DMAA has brought questions as to how the DMAA must provide and fund all-hazards emergency services to DSM. However, this change in operations, ownership, and the loss of no-cost ARFF from the I-ANG should serve to ignite discussions between the DMFD and DMAA regarding a partnership that can enhance services and save both agencies future operational and infrastructure costs.

While a private contractor may appear to be more economical from a personnel cost standpoint, creative staffing levels supplemented by existing DMFD resources may serve to offer several operational enhancements, while reducing costs through elimination of duplicative services.

In considering service at DSM, workload data cannot be the only factor. As stated earlier, while a major aircraft incident is of low probability, the consequences of such an incident are extremely high and required the immediate need of adequate fire and rescue resources. As DSM continues grow and market the airport to passengers and cargo carries, ARFF safety must just as much of a prime consideration as security and police services.

Regardless, with the recent changes in operations and ownership, and the reduction in resources provided by DMAA ARFF contractor, further study and discussions are needed to ensure the long-term viability of emergency services, to include ARFF, and the short-term operational effectiveness expected by all stakeholders and air travelers at DSM.

OPTIONS AND RECOMMENDATIONS

6-1 The Fire Department should closely monitor aircraft emergency data at DSM in light of the reduction in ARFF staffing on October 1, 2014, and issue an annual report of findings and costing to the City and the DMAA.

6-2 The Fire Department should closely monitor EMS response data at DSM in light of the reduction in ARFF staffing on October 1, 2014, and issue an annual report of findings and costing to the City and the DMAA.

6-3 The City and the DMAA should explore the option of co-locating DMFD Station 8 in the current ARFF Station at DSM, or jointly constructing a new ARFF/DMFD Station 8 facility on the grounds of DSM.

6-4 The City and the DMAA should commission a study to identify the full cost of providing "all-hazards" services and ARFF to DSM. This study should identify partnerships between the DMFD and DMAA to enhance emergency services and eliminate duplicative costs and efforts, to include the DMFD providing ARFF services, prior to the expiration of the current ARFF contract on September 30, 2016.

CHAPTER SEVEN
COOPERATIVE SERVICES OPTIONS

This Chapter explores and provides information on the various concepts of cooperative services provision and applies those concepts to possible cooperative services opportunities in the Des Moines region.

The PSSi Study Team has extensive experience in developing, implementing, and working in cooperative services delivery environments. Further, as fire and EMS cooperative services providers, Study Team members have observed the many services delivery benefits to customers and providers.

In discussions with and observation of Des Moines area fire and EMS services providers, it seems there are limited cooperative services initiatives that have been implemented. The purpose of this Chapter is to provide information regarding the various cooperative services options that have been successfully implemented by many regional fire and EMS services across the United States. Finally, this Chapter provides suggestions as to potential implementation benefits.

FUNCTIONAL COOPERATION

Functional cooperation involves two or more fire and/or emergency medical services delivery agencies working together to either jointly or separately perform one or more functions in a fashion that shares resources and benefits. In other words, each fire services delivery agency still remains "whole" as a separate and independent entity, while allowing for the interchangeable use of equipment, facilities, and/or personnel throughout the organizations involved in the functional consolidation.

Functional consolidation can occur by one entity paying the other entity for services. Another approach in functional consolidation occurs when one fire services delivery agency agrees to perform a specific function if the other agency performs a function in exchange.

The purpose of functional consolidation is very similar to that of full consolidation:

1. Reduce duplication and redundancy;
2. Reduce the cost of providing services; and
3. Improve levels of service without associated increased expenditures of tax funds.

Another reason why fire services delivery agencies and/or municipalities pursue functional consolidation is to take advantage of another fire services delivery agency's strengths, especially when one agency can provide certain services or perform certain functions that another may not be able to perform for fiscal or other reasons.

The remainder of this section reviews the various types of functional cooperative services options that have been implemented in one form or another in a number of fire and EMS services delivery agencies throughout the United States.

Common Dispatching

The communications and dispatch function offers obvious opportunities for cooperative services delivery on the part of two or more fire/EMS services delivery agencies and/or police departments.

There is much work to be performed in creating consolidated communications and dispatch functions, as well as barriers to be eliminated. However, a large number of multiple fire services delivery agencies function at a significantly reduced cost through consolidated dispatching.

For a number of years, public safety agencies (police, fire, and emergency medical) have been served by a consolidated communications and dispatch center and, thereby, gained significant benefits and lead the way in this type of cooperative services delivery. The Study Team has assessed a number of municipal emergency dispatch centers with separate fire dispatch operations that incur increased cost of operations and perhaps reduced effectiveness due to the separate approach. Consolidated or regional emergency dispatch centers have proven to be more cost effective when properly staffed and equipped.

Hazardous Materials Service Provision

The functional cooperative services provision of specialty services can provide mutual benefits for fire services delivery agencies working together. Several of the special services are:

1. Hazmat team coverage;
2. Underwater rescue team coverage;
3. Building collapse/underground rescue team coverage;
4. High-angle rescue services;
5. Personnel/manpower squads; and
6. Technical/heavy duty rescue.

Many such services can be performed by various fire services delivery agencies and coalitions on a region-wide basis for the mutual benefit of all of the regional fire services delivery agencies involved. It would be cost-prohibitive and impractical for every fire services delivery agency to be self-sufficient in all types of specialty services areas.

Fire Prevention Functions

For all jurisdictions, the building inspection and code enforcement responsibilities consume a great deal of time. They are very technical functional areas. Although operating under the same State of Iowa codes, the various fire services delivery agencies perform these functions in different ways. In addition, where code interpretation is necessary, codes can easily be interpreted differently, especially when taking into consideration the individual's technical experience from one area of the municipality to the other.

Cooperative efforts involving certain or all aspects the fire prevention function resource commitments improves the level of service through consistent levels of service. Similar approaches are taken to the inspection of buildings as interpretation of State codes is applied.

Provision of Incident Command

It is essential that command-level coverage for the fire services delivery agencies be provided on a 24-hour-per-day basis. A major function that is essential to the success of every emergency incident is command supervision. This presence assures that all apparatus and personnel perform their functions and carry out the necessary tactics and strategy. Without command supervision to assure coordination and communication, potential safety issues develop. The need for command coverage does not stop at jurisdictional boundaries.

The concepts of command should be similar from one agency to another; therefore, functional cooperation in terms of development of shared, scheduled command duty is mutually beneficial to fire services delivery agencies. It can reduce the number of command officers necessary to perform the function. It can reduce the stress on current command officers and the number of hours that they are required to work because of an inadequate number of command officers in the fire services delivery agency. Moreover, gaps in command coverage (day, night, weekend) can be covered by command officer/s from an on-duty or on-call adjacent agency.

Standard Incident Operating Procedures

A large number of emergency incident operating procedures are essential to the efficiency and effectiveness of fire and EMS crews, particularly during emergencies. It is important to maintain a standard approach adopted for the various types of procedures to assure cohesive performance. These same types of procedures exist in many fire services delivery agencies. If firefighters from different fire services delivery agencies are expected to work together successfully, they need to be following the same operating procedures in order to assure optimum success.

Mutually adopting the same incident operating procedures is as simple as working together toward their development and implementation. Subsequent to adoption, the procedures should be included in the departments' in-service training programs to assure that all personnel are fully aware of and follow the adopted procedures.

Apparatus Dispatch Assignments

Apparatus assignments refer to the number and type of apparatus dispatched on various types of incidents. Adopting the same apparatus assignments among multiple fire services delivery agencies goes hand-in-hand with the adoption of incident operating procedures.

Incident operating procedures are often based on a certain expectation regarding the number and type of apparatus to respond on specific types of incidents. With cooperation involving incident operating procedures, the apparatus assignments should also be consistent.

Availability of Reserve Apparatus

Every fire services delivery agency needs available apparatus to back up its primary units. However, the tendency is for fire services delivery agencies to view their reserve apparatus within the confines of their jurisdictional boundaries. The end result is, when viewed collectively, more apparatus is being maintained in reserve than would otherwise be necessary if the fire services delivery agencies planned and used reserve apparatus in a joint manner.

Fire apparatus is very expensive in terms of maintenance, upkeep, and replacement. The deletion of one unit can present significant short- and long-term savings. In addition, there is less apparatus to clean and maintain in workable condition by on-duty firefighters.

Apparatus Type

The primary types of apparatus suggested for functional consolidation in this section are engines, ladder trucks, rescues, and other specialty equipment. In previous studies, the Study Team has noted during its review of the available apparatus that each department attempts to have a full complement of apparatus types. This results in fire services delivery agencies having both one or more engines and one or more trucks and rescues in their effort to provide a total cross-section of services within their own geographic boundaries.

Each of these apparatus types provides specific types of services; services can be provided equally well from a neighboring agency. Therefore, functional cooperation of types of apparatus would require fire services delivery agencies to review the types of apparatus needed and determine which units are required at every station and which ones can be provided from selected stations based on the agreed joint planning effort.

Major savings can be attained, both in terms of apparatus maintenance, upkeep and replacement, as well as staffing with this type of joint planning effort. It should be noted that functional consolidation in the type of apparatus operated from different stations is supported by implementing regular mutual aid training (in-service training involving mutual aid units), adopting standard apparatus assignment, and incident operating procedures.

Cooperative Provision of Training

Many fire services delivery agencies have one or more personnel assigned to the training function, either on a collateral duty basis or a full-time basis. Training activities are generally not dissimilar; however, if not coordinated in terms of the performance of joint training activities on a regular basis, the implementation of inconsistent training programs is more likely to occur and potentially result in safety issues.

The development and delivery of a training program is very expensive. A significant amount of time, effort, and funding are required to deliver quality training. Developing and delivering training to a large number of personnel provides opportunities for cost efficiency.

With collective cooperative delivery of training functions, the same or better level of service can be provided to each jurisdiction on a more cooperative basis. It is through concentration of training staff resources that a higher level of training of officers becomes possible.

Pre-Fire Plan Development and Use

Progressive fire services delivery agencies develop detailed information regarding the design, construction, and contents of target fire hazards within their area of responsibility.

These pre-fire plans become the basis for resource allocation and fire attack decisions on major incidents. Cooperation on this function amongst several fire services delivery agencies insures that this information is readily available to all responding fire unit. The end result is improved operations and safety.

Fire Safety Education

As with the training function, fire safety education is more effective when it is performed consistently on a larger geographic basis. Multiple fire services delivery agencies would not be competing for the same media coverage or for public attention. Fire safety education programs are more successful if they are conducted in a planned large geographic area with the same message delivered in a concentrated manner over a defined period of time.

Cooperation of this function among adjoining fire services delivery agencies, with a focus on what messages will be delivered during specific times of the year, would have a stronger impact on the public. In addition, funds expended on public education media (such as slide/tape programs and movies) could have wider use, alleviating the need for two or more fire services delivery agencies purchasing the same fire safety education materials. Duplication and repetition are expensive practices in local governments.

Joint Purchasing in Quantity

It is a proven fact that items purchased in quantity offer savings. All fire services delivery agencies purchase similar items such as station maintenance materials, clothing and uniforms, protective clothing, office supplies, and other essential items. Fire services delivery agencies may attain significant savings through cooperative quantity purchasing.

MUTUAL AID

This section reviews fire department mutual aid and its use by the Des Moines Fire Department.

"Mutual aid" as discussed in this section refers to the response of fire and EMS apparatus across jurisdictional or municipal boundaries. The effective use of mutual aid apparatus response has become a successful means for the level of fire protection service in

participating jurisdictions to be improved without increased financial commitments. During a time when many municipalities are continuing to deal with severe fiscal constraints, the implementation of mutual aid (particularly automatic mutual aid) has become an accepted national trend.

The *NFPA Fire Protection Handbook* states the following regarding the implementation of mutual aid:

> "Every fire department today should have mutual-aid or automatic-aid contracts with adjoining departments. These reciprocal agreements provide communities with the ability to share their personnel and equipment to provide sufficient resources to handle major emergencies in a timely and cost-effective manner."

The Concept

Mutual aid is the means by which one fire department or group of fire departments assist another either upon request, on an incident-by-incident basis, or on an automatic basis from the point of initial dispatch. It is virtually impossible for any local government to staff and equip its fire services to handle every potential major incident. This is especially true for smaller municipalities. The cost would be prohibitive and is entirely unrealistic, especially considering fiscal constraints facing local jurisdictions today. As a result, it is very common for fire departments to implement mutual aid agreements with the surrounding jurisdictions in order for personnel and equipment to be jointly dispatched on certain types of major incidents.

There are two types of mutual aid response approaches. One type of mutual aid is referred to as "special request" mutual aid and involves a request being made either by the incident commander or the dispatch center. The second type of mutual aid is "automatic" closest unit available dispatched mutual aid that involves a request for mutual aid being made by the dispatch center under established protocols.

Benefits of Automatic Mutual Aid

Improved fire protection service to the public can be attained in the following ways through the use of automatic mutual aid on incidents where mutual aid companies are closer:

- More timely arrival of apparatus on the scene of incidents;
- Improved firefighter safety as a result of the reduced time necessary for mutual aid units to arrive on the scene to provided needed assistance;
- Decreased response times resulting in improved delivery of fire and EMS services; and
- Improved firefighter safety.

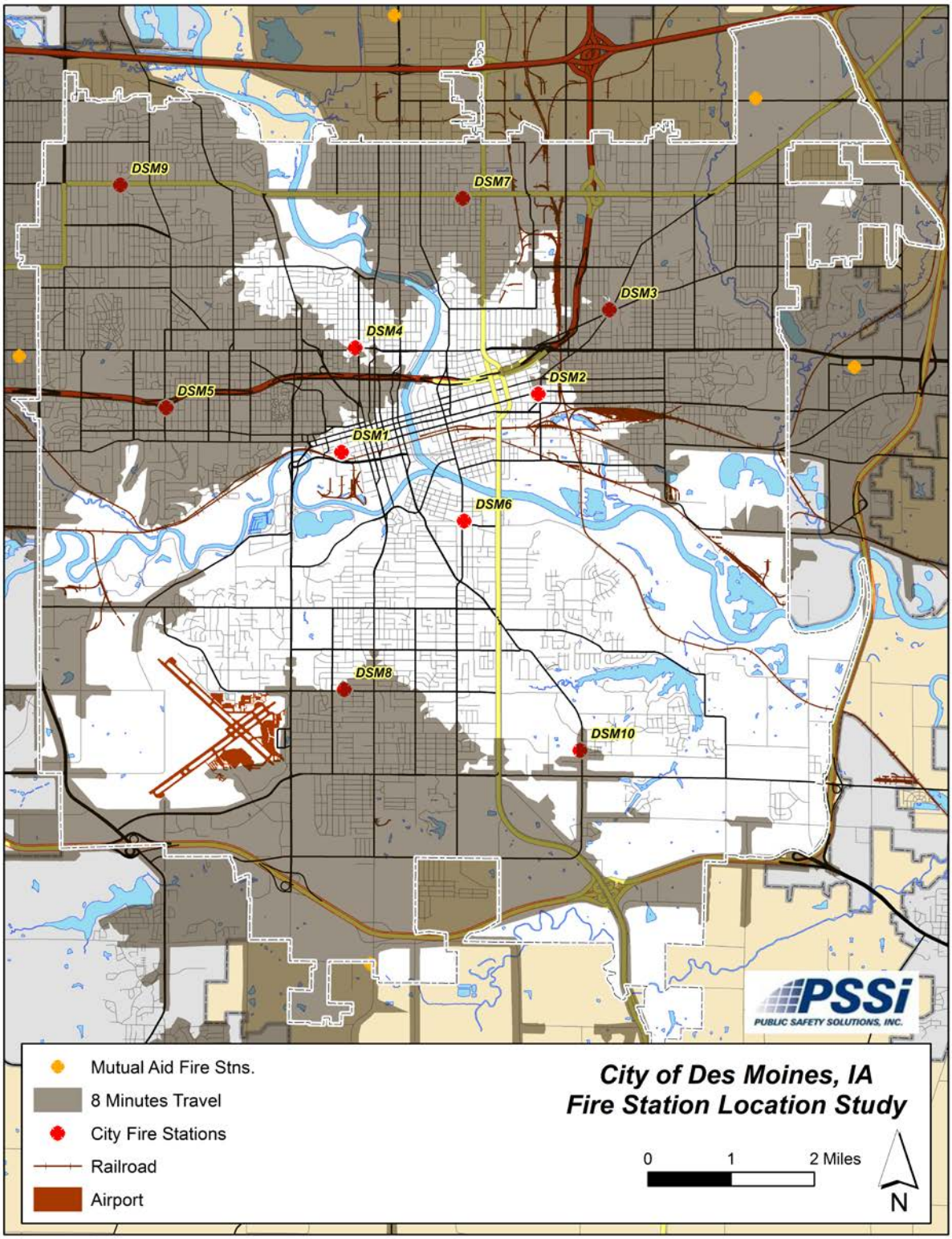
DMFD Use of Mutual Aid

There is very limited use of inter-jurisdictional mutual aid by the Des Moines Fire Department. Occasionally, the DMFD is requested to scenes outside of the City limits. Response to outside jurisdictions accounted for less than 1% of the fire department's workload. Figure 7.1 illustrates the coverage that could be provided if a form of mutual aid were to be utilized particularly in the north-east area of the City.

Automatic mutual aid is not utilized. Reportedly, the type of mutual aid used by DMFD and surrounding fire agencies is "special request" mutual aid, in that the officer in charge of the incident must request units from another fire agency through the dispatch center, who then makes arrangements to fill the request by obtaining approval from the on-duty operations chief.

To improve fire protection service in the future through reduced response times, the City of Des Moines should consider taking steps to facilitate automatic closest unit dispatched mutual aid response with the fire departments in neighboring jurisdictions and municipalities. Figure 7.1 illustrates the projected response areas of relevant mutual aid fire stations adjacent to the City of Des Moines.

Figure 7.1
MUTUAL AID TRAVEL TIME CAPABILITY



COOPERATIVE FIRE STATION OPERATION

Another form of cooperative fire and EMS services delivery involves the joint operation of a fire station by two fire departments. Typically, the fire station involved would be near the border of the two fire/EMS service areas and the municipalities/fire departments involved would agree to provide staffing and apparatus for the same fire station. The apparatus and related staff would respond to provide fire and EMS services to geographic area of both municipalities. The agreement could include a sharing of operations costs for the fire station and apparatus.

The cooperative fire station operation option is in use at West Des Moines Fire Station 22, or Westside, which is operated jointly by the cities of West Des Moines and Clive. This fire station provides fire and EMS protection for both communities. Reportedly, the fire station was dedicated in 1993 and is served by four career firefighters on duty 24 hours a day operating an ALS engine with a total of 12 career firefighters and 16 paid-on-call firefighters.

This optional approach to cooperative services delivery could be considered for the cooperative provision of services to the far northeast area of the City of Des Moines. For example, as recommended in the EMS Chapter of this report, the City could contract with the Township of Delaware to temporarily place a medic ambulance or medic engine at the Delaware Fire Department fire station pending the relocation of Fire Station 3.

FULL FIRE SERVICES DELIVERY AGENCY CONSOLIDATION

Although full consolidation may not seem to be an option for many fire and EMS agencies in the Des Moines area, the Study Team is aware of the Windsor Heights and Clive initiative that may result in one delivery agency being created in the future. For that reason, information on this option is provided in this section.

The difference between functional consolidation and full consolidation is that full consolidation results in the formation of a single fire services delivery agency organization. Creating one fully consolidated fire services delivery agency would bring about the following:

- One fire services delivery agency;

- One employer;
- One set of rules and regulations and/or standard operating procedures;
- One personnel management system;
- One union contract;
- One integrated chain-of-command; and
- One work schedule.

Fiscal Impact — Savings

The potential for fiscal savings from consolidation is very high. The primary areas for savings involve the allocation of stations, personnel, and apparatus. A summary of areas for potential savings are:

- Reduction in annual operation and maintenance costs of duplicate fire stations;
- Increase in revenue from sale of buildings and land when fire stations are closed;
- Reduction in duplicate apparatus replacement costs;
- Reduction in annual apparatus operating and maintenance expense;
- Increase in revenue from sale of excess apparatus; and,
- Reduction in annual salaries and wages for duplicate personnel.

Another aspect of fiscal impact is the ability to utilize personnel on a broader basis. The cross-use of personnel by having the ability to detail firefighters and officers from one station to another on a day-to-day basis provides for more consistent apparatus staffing levels and potential for reduced overtime costs.

At the present time, the potential participating fire services delivery agencies must negotiate a number of labor contracts on a periodic basis. Negotiating labor contracts is expensive, particularly if any aspects of those negotiations become litigated. The Study Team is not in a position at this time to estimate the cost savings by reducing the number of contracts to be negotiated. However, based on informal discussions, measurable cost savings are likely to be attained in this area.

FIRE SERVICES IMPROVEMENT BENEFITS

The national experience regarding regional fire services delivery indicates that major improvements in service to the public, or internal efficiencies that indirectly have a positive impact on the public, may be attained. Several key improvements typically include:

1. Improved fireground command and control communication;
2. Improved fireground operations by following the same standard operating procedures and working together as a team;
3. Reduced apparatus maintenance and upkeep required on the part of on-duty firefighters;
4. Reduced response times of apparatus, thus providing improved emergency service to incident scenes by dispatching the closest unit via mutual aid;
5. Improved customer and firefighter safety; and
6. Improved dispatch function through improved incident command and control.

POTENTIAL BENEFITS FROM COOPERATION

The focus of this review is to evaluate and assess opportunities for fire cooperation in an effort to determine the potential for the following types of benefits:

1. Increased efficiency;
2. Improved effectiveness;
3. Seamless delivery of services;
4. Elimination of overlaps in positions;
5. Elimination of duplicate equipment;
6. Reduced response time for units dispatched;
7. Upgrading recruit training programs;
8. Opportunity for increased promotional selectivity;
9. Increased promotional opportunity for personnel;
10. Potential revised perspective/outlook of personnel;
11. Enhanced or expanded services;
12. Improved safety of customers and services providers;
13. Reduced costs;
14. Improved incident command coverage;

15. Improved allocation and utilization of staffing;
16. Cost avoidance;
17. Coordination of planning;
18. Standardization of services and programs;
19. Potential improve ISO rating; and
20. Impact on future state and federal grant funding.

SUMMARY

In reviewing the concept of fire, rescue, and/or emergency dispatch cooperative servicers, as applied to the City of Des Moines and its fire and/or emergency medical services, it is clear that many important steps need to be taken by the City and the other participating services delivery agencies. The most important decision/s relate to the determination to consider and potentially implement an appropriate form/s of consolidation or cooperative services.

Nationally, the study and implementation of various forms of fire, rescue, and dispatch consolidation or cooperative services has clearly been the trend, particularly in the current difficult municipal fiscal climate. Likewise, discussion, study, and implementation of consolidation and cooperative services of these and other important municipal services in Iowa is being viewed by many as a potential means for appropriate municipalities to provide improved services while at the same time gaining cost savings and efficiencies.

Based on the national experience and that of the Study Team, it is clear that there are significant service improvement benefits, cost reduction, and avoidance opportunities that would benefit the taxpayers of the City of Des Moines resulting from implementation of fire, rescue, and/or emergency services functional cooperation. Further, it is also clear that there are important benefits to be provided to the involved municipal services providers resulting from implementation of appropriate forms of cooperative services and consolidation, not the least of which is improved safety and delivery of services.

During interviews of Des Moines stakeholders and officials of a number of adjacent fire and EMS agencies there seemed to be a keen interest in the pursuit of appropriate cooperative services initiatives and partnering with the DMFD in such efforts, including automatic mutual aid and joint operation of appropriate fire facilities.

OPTIONS AND RECOMMENDATIONS

7-1 The Fire Chief is encouraged to implement in-service mutual aid training as an integral and substantive part of the DMFD training programs.

7-2 The City should consider implementing an appropriate form of cooperative fire protection services delivery with participating surrounding municipalities.

7-3 The City and Fire Chief are encouraged to establish a cooperative services implementation task force in cooperation with adjacent municipalities and fire and EMS services delivery agencies to develop a related plan for appropriate cooperative services.

7-4 The City and Fire Chief should consider encouraging the full implementation of closest available automatic mutual aid between area fire departments, as future conditions and PSAP configurations and procedures allow.

7-5 Given the existence of four (4) PSAP dispatch centers that dispatch Des Moines area fire and EMS agencies an initiative should be developed, to include potential PSAP consolidation, to assure the efficient and timely dispatch of fire department apparatus as automatic mutual aid is implemented.

7-6 The City and Fire Chief should work to immediately implement automatic closest unit available mutual aid involving the City of Altoona and Township of Delaware fire and EMS units in order to upgrade services to the northeast part of the City.

7-7 The Fire Chief should pursue an effort with adjacent fire and EMS agency officials leading to the development and implementation of common operating procedures and safety initiatives in support of the implementation of automatic mutual aid.

7-8 The City and Fire Chief should consider and explore the cooperative services delivery option involving the joint operation of a fire station in the northeast area of the City, in particular involving the placement of a medic ambulance or medic engine at the Township of Delaware fire station, as recommended in the EMS Chapter.

CHAPTER EIGHT
VISION FOR THE FUTURE

This Chapter provides a suggested implementation plan and vision for the future for the City of Des Moines to consider. Clearly, the City and Fire Department need to make the final decisions on whether to implement changes and the timing of those changes.

In developing this Fire Station Placement Review and Recommendation for Expansion Study, the PSSi Team has drawn on its experiences as practitioners in fire departments, trained assessors with the Commission on Fire Accreditation International, chairpersons of International Association of Fire Chiefs (IAFC) committees, lecturers at the National Fire Academy, and consultants in fire and EMS departments of similar size to Des Moines, smaller agencies, and larger agencies to frame the findings and advisory recommendations for the City and the Des Moines Fire Department to consider.

TIMING

This plan should be viewed as a **planning tool** during the next one to ten years (2015-2025). The findings, observations and suggestions represent the professional judgment of the Study Team members at this time and are only **advisory in nature**. In the future, additional issues may need consideration; therefore, the plan should be used as a flexible guide for decisions relative to fire and EMS station location, management, and related resources.

Moreover, in considering changes in the delivery of public safety services, incremental steps in some cases are necessary.

REVIEW OF REPORT

In public safety studies, the Study Team suggests a three-month period for a review of the findings and recommendations. One cannot expect to review several hundred pages of complex material and immediately decide on which suggestions, if any, to implement and the timing for those changes. Accordingly, the City is encouraged to conduct a review of this report for up to three months.

As part of the review, the Fire Chief should be given an opportunity to provide input relative to any observations, findings, and recommendations. Des Moines firefighters, Local #4, should also be provided the opportunity to comment on relevant issues.

As noted in all reports by the Study Team, it is important to view this report in its entirety, rather than identifying one or two issues. The report should be seen as a seamless approach to expand qualitative and quantitative fire protection and emergency medical services for Des Moines stakeholders.

CUSTOMER ORIENTATION

In the judgment of the Study Team, the City of Des Moines is encouraged to embark on a course that will enhance the delivery of fire protection and EMS services. All decisions should be based on what is best for the customer in the City of Des Moines.

SUGGESTED TIMELINE

Figure 8.1 contains a listing of options and recommendations with a suggested priority level and completion date. However, all 50+ options and recommendations provided in the Study should be considered by the City. The City of Des Moines should make the final decisions on any changes in options or recommendations.

FIRE DEPARTMENT ACCREDITATION

Over a ten-year period, a committee of the IAFC, in cooperation with the International City Management Association, developed an analysis model for self-assessment fire departments and services. That fire department self-assessment process is now under the auspices of the Commission on Fire Accreditation International. The Study Team utilized portions of this model as a framework for this Study to provide established criteria for review and the reader with information on the latest trends in the fire service.

In years past, standards available to the fire service have been the product of collaborative efforts involving organizations such as the National Fire Protection Association (NFPA). There have been other systems of standards and measurements for the fire and emergency services available; however, they were created to serve interests relating to

the fire service, but not *specific* to the fire service. A good example of this type of process is the Insurance Services Office (ISO) grading schedule.

In 1988, the International City/County Management Association (ICMA) and the International Association of Fire Chiefs (IAFC) executive boards signed a memorandum of understanding that committed both organizations to the development of a voluntary national fire service accreditation system. Over a period of the intervening years, the framework for a fire department accreditation model was developed, beta test fire department accreditations were conducted, and an accreditation model was finalized and implemented under the management of the Commission on Fire Accreditation International.

The accreditation analysis categories included in the model are as follows:

1. Governance and Administration;
2. Assessment and Planning;
3. Goals and Objectives;
4. Financial Resources;
5. Programs;
6. Physical Resources;
7. Human Resources;
8. Training and Competency;
9. Essential Resources; and
10. External Systems Relations.

The Study Team considered appropriate aspects of this CFAI accreditation model for this Study, and a member of the Team has been a peer fire department assessor. Additionally, the preparation made by the Des Moines Fire Department for this Study and the data and information collected is very similar to that necessary for the Fire Department to pursue accreditation.

As stated in the CFAI accreditation manual, the City and the Fire Department could benefit from becoming an accredited fire agency. Benefits include:

1. Further promotion of excellence in the Fire Department;
2. Quality improvement through self-assessment;
3. Provision of assurance to peers and the public that the Fire Department has defined missions and objectives and strives to go beyond them;

4. Identification of strengths and weaknesses within the DMFD;
5. Provision of detailed evaluation of the DMFD and its services;
6. Establishes a method or system for addressing deficiencies and building on the strong points;
7. Growth for the Fire Department and its personnel;
8. Establishment of a forum for the communication of management and leadership philosophies;
9. National recognition for the DMFD by peers and the public;
10. Creation of a mechanism for developing concurrent documents, such as strategic and business plans and a "desktop manual" inclusive of all areas the DMFD is involved in; and
11. Further development of pride in the organization, from DMFD members, community leaders, and citizens.

The Study Team recognizes that the Des Moines Fire Department exhibits many of the characteristics of an excellent fire department. It appears that the City, the Fire Department, and stakeholders could benefit in many ways from the Des Moines Fire Department becoming an internationally accredited fire agency with the CFAI.

UPDATING THE PLAN

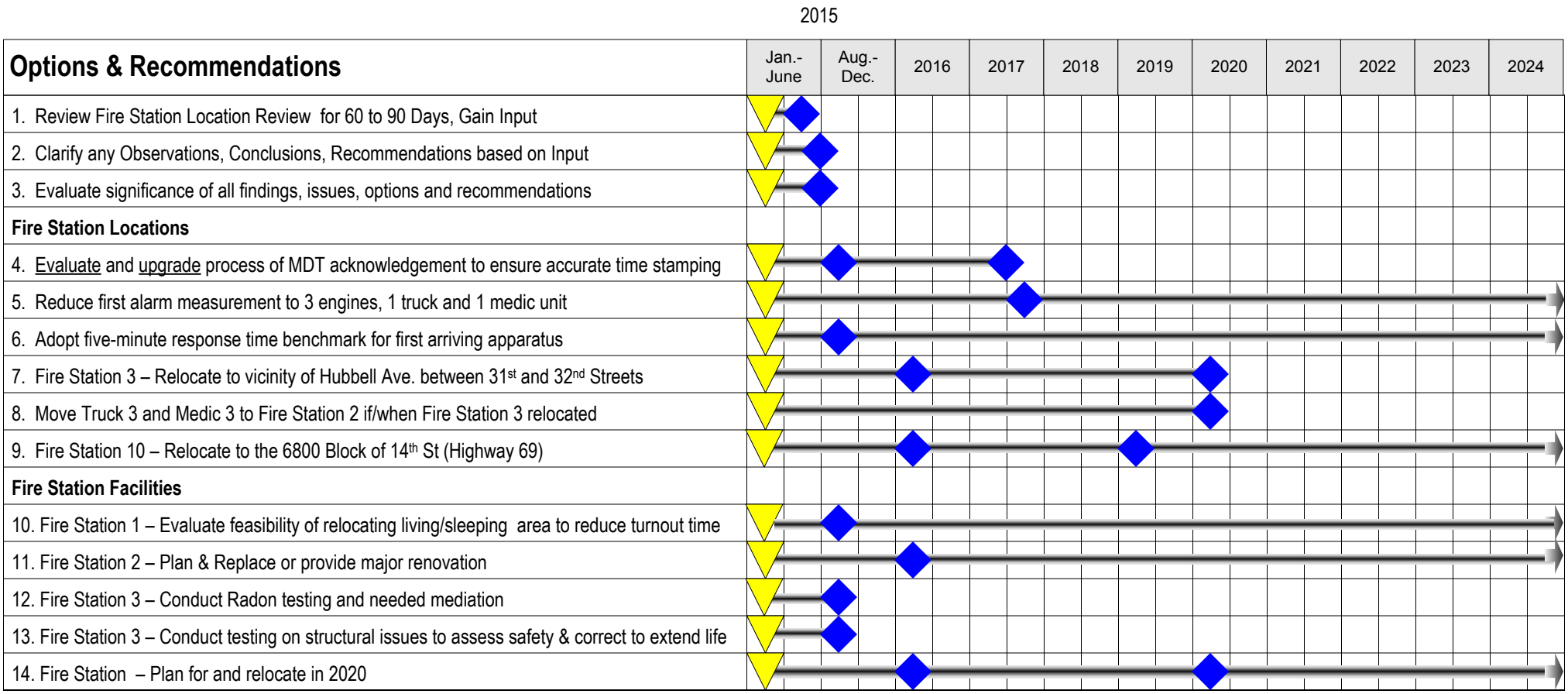
The City of Des Moines and the Des Moines Fire Department are encouraged to update this Plan each year. The update should include progress, obstacles, fiscal impacts, and anticipated outcomes.

Fire Station Placement Review & Recommendations for Expansion Study

Suggested Implementation Timeline

Page One of Four

Figure 8.1



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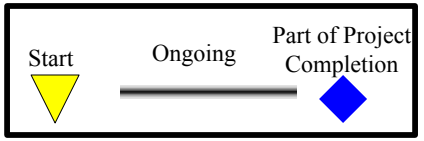

Fire Station Placement Review & Recommendations for Expansion Study

Suggested Implementation Timeline

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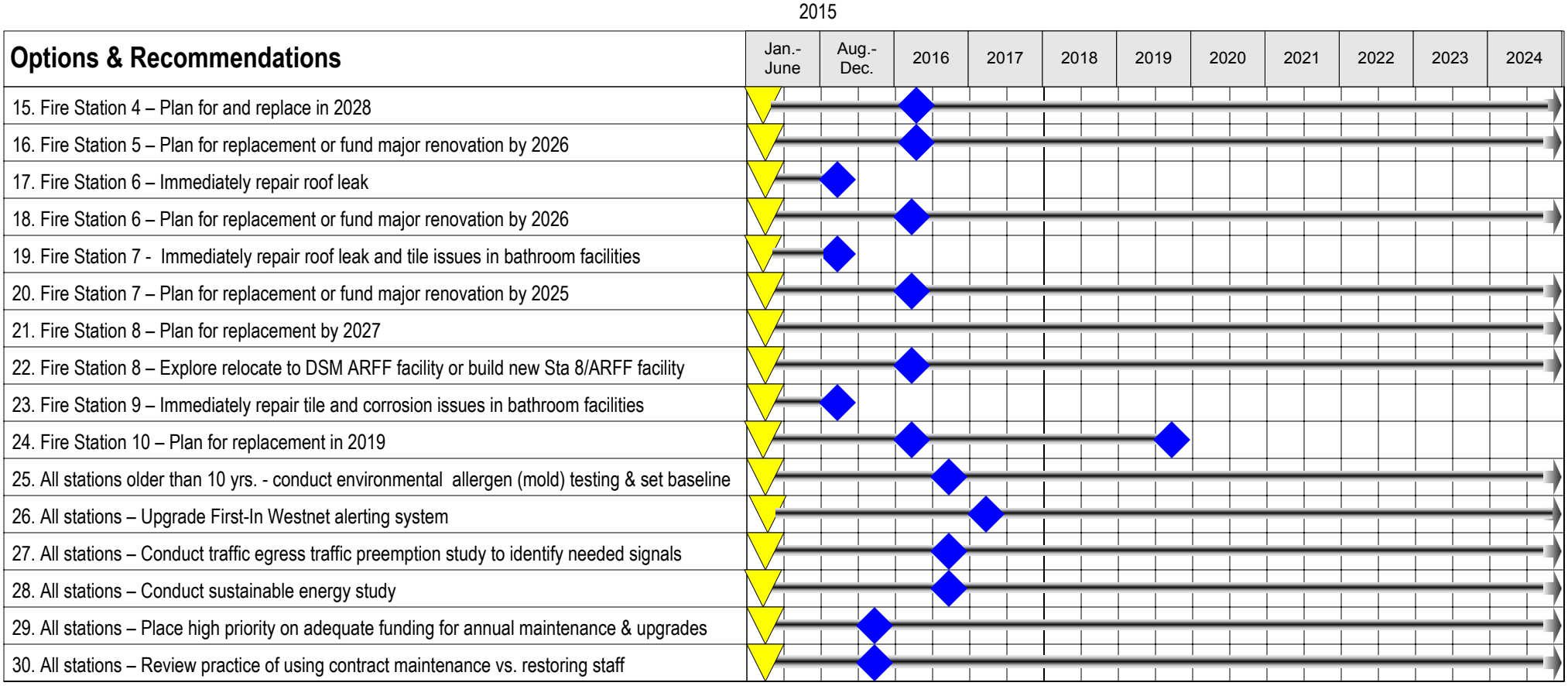

Fire Station Placement Review & Recommendations for Expansion Study

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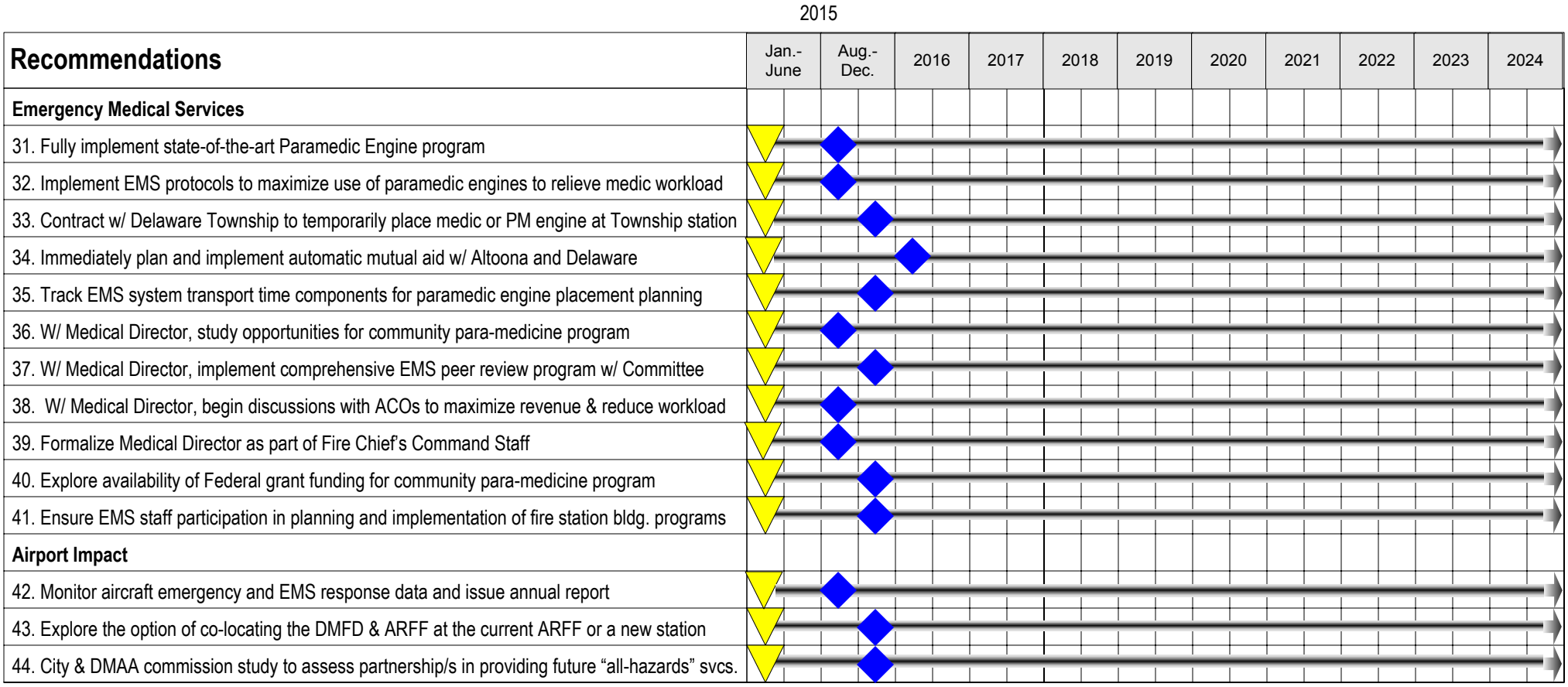

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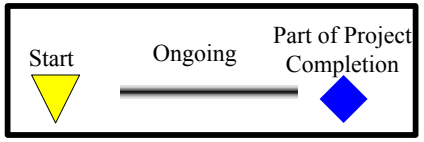

Fire Station Placement Review & Recommendations for Expansion Study

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Page Four of Four

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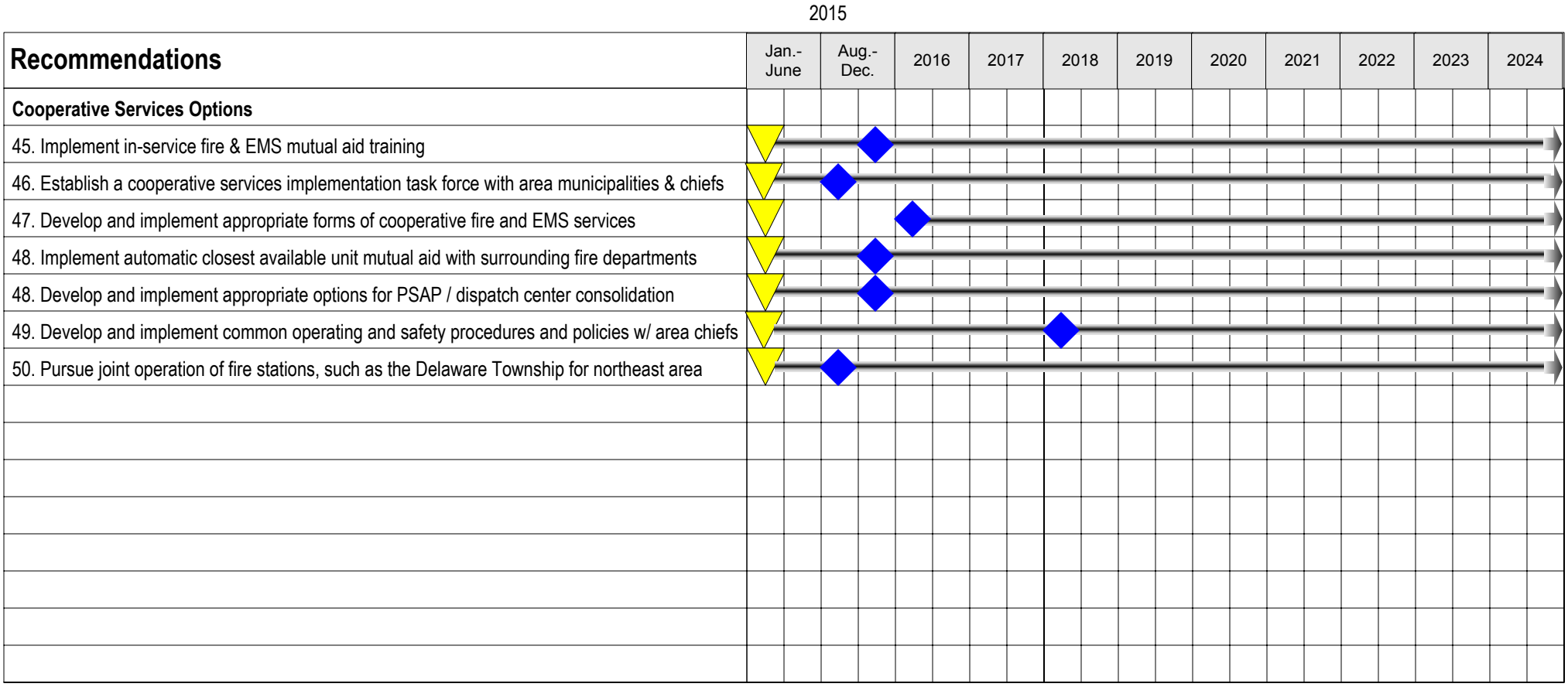

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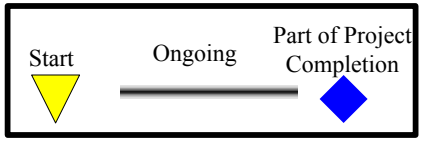

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STUDY RECOMMENDATIONS

RECOMMENDATIONS — FIRE STATION LOCATIONS

3-1 The Fire Department should incorporate a "responding from" data point in the incident record to better analyze the frequency of "on the fly" responses from other than the assigned station house.

3-2 The Fire Department should evaluate the process of MDT acknowledgement and ensure communication connectivity for accurate time stamping.

3-3 The Fire Department should consider reducing its first alarm measurement from the current assembly to a proposed 3 Engine 1 ladder and 1 medic unit.

3-4 The Fire Department should adopt a five-minute response time benchmark for its first arriving apparatus in line with industry guidelines. It should keep its eight minute travel time for a first alarm assignment to structure fire calls

3-5 The Fire Department should consider, given the conditions of Station 3 and the end of life for Station 10, the relocation of these facilities as shown in Scenario A, 4 minute travel model if the department adopts Recommendations 3-5 above.

3-6 Station 3 should relocate to Hubbell Ave. between 31st and 32nd Streets to better serve the northeast area of the City.

3-7 The Ladder and Medic unit in Station 3 should move to Station 2 if Station 3 is relocated to aid in emergency response force assembly for higher risk structures and EMS workload demand in the downtown area.

3-8 Station 10 should relocate to the 6800 block of 14th St (Highway 69) to serve the south side of town better and also be able to reach the far southwest and southeast parts of the city easier.

3-9 Should the Fire Department reject Recommendations 3-5 through 3-8; the stations can be renovated in place to avoid costlier relocation options.

RECOMMENDATIONS — FIRE STATION FACILITIES

This study was completed independent of the current DMFD Capital Improvement Plan (CIP). As such, some recommendations may be incongruent with the adopted DMFD CIP.

4-1 Station 1 – Evaluate feasibility to relocate living/sleeping area to reduce turnout time. This may be a long-term goal to be explored when the station requires remodel.

4-2 Station 2 – Plan to replace or fund a major renovation by 2025.

4-3 Station 3 – Conduct Radon testing and provide for mitigation of Radon, if found.

4-4 Station 3 – Conduct testing on the structural issues to assess building safety and correct deficiencies to extend the life span of the facility until the facility can be replaced.

4-5 Station 3 – Plan to replace with a new facility by 2020.

4-6 Station 4 – Plan for replacement by 2028.

4-7 Station 5 – Plan for replacement or fund a major renovation by 2026.

4-8 Station 6 – Immediate attention is needed to repair roof leak.

4-9 Station 6 – Plan for replacement or fund a major renovation by 2026.

4-10 Station 7 – Immediate attention is needed to repair water leak and tile issues in the bathroom facilities.

4-11 Station 7 – Plan for replacement or fund a major renovation by 2025.

4-12 Station 8 – Plan for replacement by 2027.

4-13 Station 8 – Explore option to relocate Station 8 to the DSM ARFF facility or construct a new Station 8/ARFF facility to serve DSM and adjacent area of the City.

4-14 Station 9 – Immediate attention is needed to repair tile and corrosion issues in bathroom facilities.

4-15 Station 10 – Plan for replacement 2019.

4-16 All Stations – Conduct environmental allergen (mold) testing at all fire stations older than 10 years to establish a baseline and mitigate any environmental issues found.

4-17 All Stations – Upgrade First-In Westnet system to enhance station alerting to address turnout time and clarity of audio in all stations.

4-18 All Stations – Conduct a station egress traffic preemption study to identify the need for signals at each station.

4-19 All Stations – Conduct a sustainable energy study to identify energy saving through the use of active and passive energy saving systems.

4-20 All Stations – Place a high priority on adequate funding for annual station maintenance and upgrades of facilities to protect and/or extend the lifespan of the fire station facilities.

4-21 All Stations – While the use of contracted maintenance and repair services for fire station facilities may save on costs, this practice should be reviewed from an operational readiness standpoint and consideration to restoring the personnel in the DMFD Maintenance Division to perform these tasks in-house should be given great consideration.

RECOMMENDATIONS — EMERGENCY MEDICAL SERVICES

5-1 Implement a formal paramedic engine program, which identifies paramedic engines as such in the computer aided Dispatch (CAD) system, and deploy them accordingly.

5-2 Implement EMS protocols to maximize the deployment of paramedic engines to relieve workload on transport units (ambulances).

5-3 Temporarily, pending potential relocation of Fire Station 3, contract with the Township of Delaware to place a medic ambulance or medic engine in the Northeast area, potentially at the current unstaffed Township fire station located in the City annexed area at 3992 E. Broadway Avenue.

5-4 Develop agreements with the City of Altoona and the Township of Delaware to implement automatic mutual aid with their fire and EMS services to be dispatched automatically on certain types of fire and EMS calls in the Northeast part of the City.

5-5 Track EMS system transport time components to monitor the full impact on first-due and City-wide response time and use this data to place paramedics' engines in the highest and best deployment location.

5-6 In partnership with the DMFD Medical Director, implement and institutionalize a comprehensive EMS peer review program to include a Peer Review Committee for oversight.

5-7 In partnership with the DMFD Medical Director, study the opportunities for implementation of a Community Para-medicine program to increase the level of service to the citizens and reduce workload on the current transport units (ambulances).

5-8 In partnership with the DMFD Medical Director, begin discussion with the Des Moines ACOs to maximize revenue and reduce workload on current transport units (ambulances).

5-9 Formalize the involvement of the DMFD Medical Director as part of the DMFD Command Staff, reporting to the fire chief, to maximize opportunities in this changing health care environment.

5-10 Explore federal grants programs that can assist in funding a study and/or pilot programs to implement Community Para-medicine.

5-11 Ensure that future fire station building programs involve EMS staff to provide input on station design for future inclusion of Community Para-medicine.

5-12 Ensure that future fire station building programs involve EMS staff to provide input on station design to address universal precautions, cross contamination, and emerging disease issues.

RECOMMENDATIONS — AIRPORT IMPACT

6-1 The Fire Department should closely monitor aircraft emergency data at DSM in light of the reduction in ARFF staffing on October 1, 2014, and issue an annual report of findings and costing to the City and the DMAA.

6-2 The Fire Department should closely monitor EMS response data at DSM in light of the reduction in ARFF staffing on October 1, 2014, and issue an annual report of findings and costing to the City and the DMAA.

6-3 The City and the DMAA should explore the option of co-locating DMFD Station 8 in the current ARFF Station at DSM, or jointly constructing a new ARFF/DMFD Station 8 facility on the grounds of DSM.

6-4 The City and the DMAA should commission a study to identify the full cost of providing "all-hazards" services and ARFF to DSM. This study should identify partnerships between the DMFD and DMAA to enhance emergency services and eliminate duplicative costs and efforts, to include the DMFD providing ARFF services, prior to the expiration of the current ARFF contract on September 30, 2016.

RECOMMENDATIONS — COOPERATIVE SERVICES OPTIONS

7-1 The Fire Chief is encouraged to implement in-service mutual aid training as an integral and substantive part of the DMFD training programs.

7-2 The City should consider implementing an appropriate form of cooperative fire protection services delivery with participating surrounding municipalities.

7-3 The City and Fire Chief are encouraged to establish a cooperative services implementation task force in cooperation with adjacent municipalities and fire and EMS services delivery agencies to develop a related plan for appropriate cooperative services.

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7-5 Given the existence of four (4) PSAP dispatch centers that dispatch Des Moines area fire and EMS agencies an initiative should be developed, to include potential PSAP consolidation, to assure the efficient and timely dispatch of fire department apparatus as automatic mutual aid is implemented.

7-6 The City and Fire Chief should work to immediately implement automatic closest unit available mutual aid involving the City of Altoona and Township of Delaware fire and EMS units in order to upgrade services to the northeast part of the City.

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7-8 The City and Fire Chief should consider and explore the cooperative services delivery option involving the joint operation of a fire station in the northeast area of the City, in particular involving the placement of a medic ambulance or medic engine at the Township of Delaware fire station, as recommended in the EMS Chapter.

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