CENTER FOR PUBLIC SAFETY MANAGEMENT, LLC

Fire Department Operational and Administrative Analysis

Minot, North Dakota

Draft

CPSM®

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Exclusive Provider of Public Safety Technical Services for
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The International City/County Management Association (ICMA) is a 109-year-old, non-profit professional association of local government administrators and managers, with approximately 13,000 members located in 32 countries.

Since its inception in 1914, ICMA has been dedicated to assisting local governments and their managers in providing services to their citizens in an efficient and effective manner. ICMA advances the knowledge of local government best practices with its website, www.icma.org, publications, research, professional development, and membership.

CENTER FOR PUBLIC SAFETY MANAGEMENT (CPSM)

The ICMA Center for Public Safety Management (ICMA/CPSM) was launched by ICMA to provide support to local governments in the areas of police, fire, and Emergency Medical Services.

The Center also represents local governments at the federal level and has been involved in numerous projects with the Department of Justice and the Department of Homeland Security. In 2014, as part of a restructuring at ICMA, the Center for Public Safety Management (CPSM) spun out as a separate company and is now the exclusive provider of public safety technical assistance for ICMA. CPSM provides training and research for the Association's members and represents ICMA in its dealings with the federal government and other public safety professional associations such as CALEA, PERF, IACP, IFCA, IPMA-HR, DOJ, BJA, COPS, NFPA, etc.

The Center for Public Safety Management, LLC, maintains the same team of individuals performing the same level of service that it had for ICMA. CPSM's local government technical assistance experience includes workload and deployment analysis using our unique methodology and subject matter experts to examine department organizational structure and culture, identify workload and staffing needs, and identify industry best practices.

We have conducted more than 400 such studies in 46 states and provinces and more than 275 communities ranging in population size 3,300 (Lewes, DE) to 800,000 (Indianapolis, IN).

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SECTION 1. EXECUTIVE SUMMARY

The Center for Public Safety Management LLC (CPSM) was contracted by the City of Minot, North Dakota, to complete an independent analysis of the city's fire department, evaluate its current operational efficiency, and identify future fire service needs for strategic planning purposes. The principal focal points of the CPSM analysis as outlined in the city's Scope of Work include:

- Evaluate the Minot Fire Department (MFD) as related to its ability to provide service currently and meet the future needs of the City of Minot and its citizens per 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*.
- Review the 2017 Public Protection Classification Report conducted by ISO; compare the report to current service levels of the MFD to determine if improvements can be developed to enhance the city's ISO rating.
- Evaluate operational and administrative staffing, fleet, facilities, service area characteristics, response to specialized incidents, fire prevention/community risk reduction components, training and education, emergency deployment capabilities, response time components, and community risk analysis.
- Utilize GIS mapping tools to analyze response performance of the department to primary response areas from its stations using existing street and roadway networks.

The MFD is responsible for providing services that include fire suppression, first response emergency medical services, technical rescue, community risk reduction, and response to disasters both natural and human-caused. These services are provided from five stations located in the city. Response is currently made through four engine companies, one ladder company, and one Battalion Chief.

The MFD is fortunate that it is signatory to a robust Technical Rescue and Hazardous Materials Response System. The Northwest Regional Response Team is an intergovernmental system of fire departments and agencies in North Dakota led by the North Dakota Department of Emergency Services, in which four geographic regions in the state provide technical rescue, hazardous materials, medical, ambus, search and rescue teams, and other specialty equipment and staffing assets in response to an emergency. As well, the system strives for standardization among participating departments of operational policies and procedures, training and education, facilities, dispatching services, and staffing. This system significantly benefits many departments such as the MFD, which do have technical rescue and hazardous materials assets but would require assistance on large-scale and complex incidents in accordance with the NFPA 1710 standard.

A significant component of this report is an All-Hazards Risk Assessment of the Community. The All-Hazards Risk Assessment contemplates many factors that cause, create, facilitate, extend, and enhance risk in and to a community. The service demands of the community are many for the MFD and include EMS first response, fire, and low acuity fire calls. The response district is made up primarily of single-family dwellings, which represent a low hazard; however, there are business, commercial, multifamily residences, and other target hazards that fall into higher classes.

The All-Hazards Risk Assessment of the Community also contemplates projected growth in the community (population and building), which will impact the MFD's ability in the future to respond to and mitigate emergencies in a growing commercial and residential community. In this report CPSM makes planning recommendations that include alternatives for new services based on the planned growth of large footprint and other industrial/commercial buildings in the city.

CPSM also evaluated the resiliency of the MFD, using the Center for Public Safety Excellence's Standard of Cover literature. Because of the current call volume, MFD's resiliency is not significantly stressed. However, response percentages are just below acceptance rates when both engine companies are committed to an incident and should be carefully evaluated.

The response time and staffing components discussion of this report are designed to examine the current level of service provided by the MFD compared to national best practices, specifically NFPA 1710. NFPA standards are national consensus standards and not mandates or the law. These standards are based on evolving technology and identified industry needs and provide strict guidance that has a focus on firefighter and community safety. Many cities and countries strive to achieve these standards to the extent possible without adversely impacting the financial health of the community***. It is important to note here that Minot is an island city, meaning the city is not contiguous with jurisdictions providing municipal services. Fire services automatic and mutual aid are not readily available, leaving the MFD to manage multiple calls and large incidents on their own. This should be considered when contemplating staffing and deployment of resources.***

A composite profile of MFD response times is featured in the following table. Data covers the period of October 1, 2022, to September 30, 2023. Key response time parameters established for dispatch time and the first arriving engine in NFPA 1710 at the 90th percentile are as follows:

- Event processed and units dispatched less than or equal to 64 seconds 90 percent of the time.
- Travel time shall be less than or equal to 240 seconds for the first arriving engine company to fire suppression and EMS incidents 90 percent of the time.

TABLE 1-1: Average and 90th Percentile Response Time of First Arriving Unit

Call Type	Average Response Time, Min.				90th Percentile Response Time, Min			
	Dispatch	Turnout	Travel	Total	Dispatch	Turnout	Travel	Total
Medical and other	3.0	1.0	3.9	7.8	4.4	1.8	6.2	10.8
MVA	2.9	0.8	3.1	6.9	5.6	1.6	5.3	10.5
EMS Subtotal	**3.0**	**0.9**	**3.9**	**7.8**	**4.4**	**1.8**	**6.2**	**10.8**
False alarm	1.9	1.0	3.7	6.7	3.2	1.9	6.5	10.0
Good intent	1.6	0.8	4.1	6.5	3.0	1.6	7.1	9.6
Hazard	2.4	0.9	4.2	7.5	3.6	1.9	8.1	11.9
Outside fire	2.2	0.8	3.4	6.4	3.0	1.4	5.6	8.3
Public service	3.5	0.8	3.6	7.9	7.5	1.9	5.9	12.1
Structure fire	1.8	1.1	3.4	6.2	2.6	1.7	5.6	8.8
Technical rescue	4.4	0.6	3.6	8.6	12.2	1.4	6.1	16.3
Fire Subtotal	**2.1**	**1.0**	**3.8**	**6.9**	**3.5**	**1.8**	**6.7**	**10.6**
Total	**2.8**	**0.9**	**3.8**	**7.6**	**4.3**	**1.8**	**6.2**	**10.8**

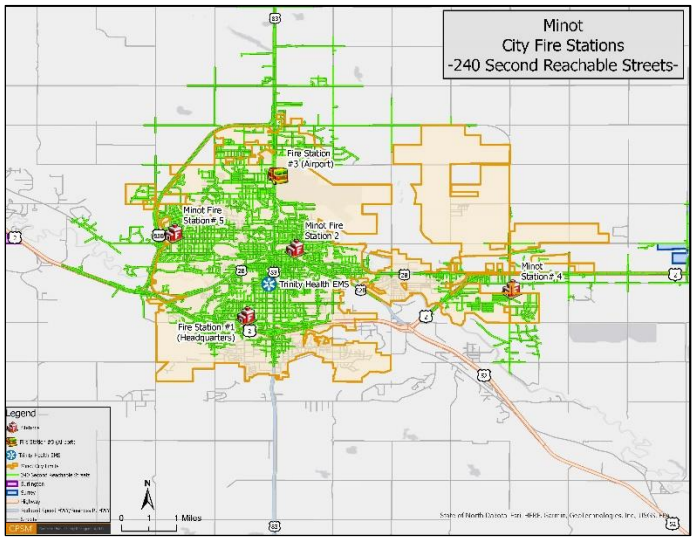
Key takeaways from the information presented in this table and our analysis are:

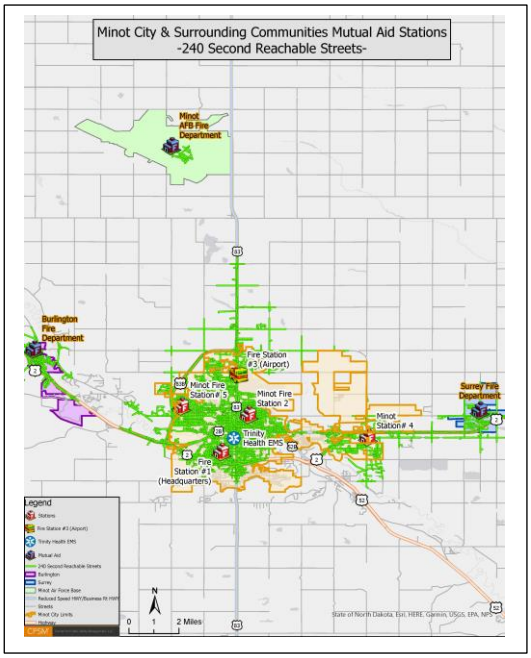
- Dispatch times for EMS incidents do not meet the NFPA standard. *This aspect of response is out of the control of the MFD.*
- Dispatch times for fire incidents do not meet the NFPA standard. This is due partly to the time it takes to prepare the CAD system with multiple units from multiple stations, using automatic aid and closest station response prior to dispatching the call. *This aspect of response is out of the control of the MFD.*
- Turnout times for EMS incidents do not meet the NFPA standard. *This aspect of response is within the control of the MFD.*
- Turnout times for fire incidents do not meet the NFPA standard. *This aspect of response is within the control of the MFD.*
- Travel times to EMS incidents do not meet the NFPA standard. Travel times are dictated by the road network and accessibility to local streets, time of day when traffic congestion is heaviest, weather, and station location with respect to the incident. *Other than station location(s), this aspect of response is out of the control of the MFD.*

CPSM used GIS mapping to develop an analysis that benchmarks response from the MFD fire stations against NFPA response time standards. Included in this analysis is response coverage data of MFD first-arriving engines in Minot, measured against an arrival of 240 seconds; the arrival of the second fire suppression unit (engine or ladder) at 360 seconds; and the arrival of the initial alarm assignment (Effective Response Force) at 480 seconds. The results of this analysis are illustrated in the following figures.

- Response coverage at 240 seconds (first arriving engine) as benchmarked against the NFPA 1710 standard shows considerable coverage with the exceptions of areas in the southeast and southwest portions of the city. Mutual aid companies of Surrey and Burlington are too far away to impact this benchmark.

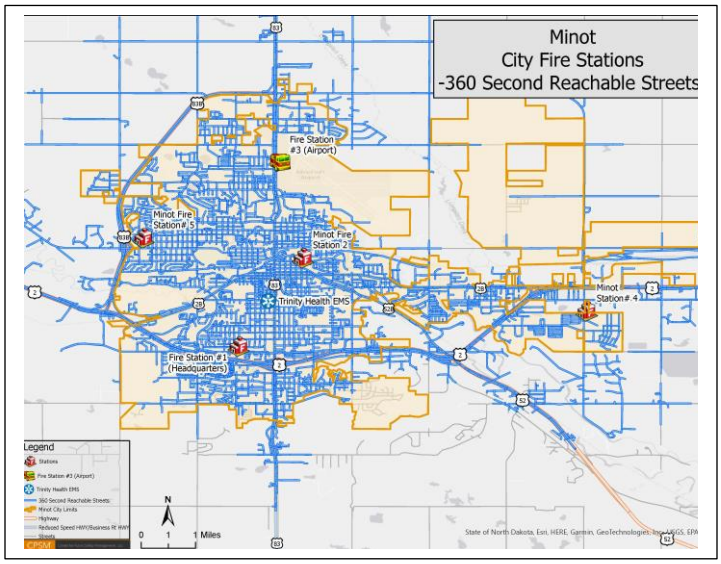
FIGURE 1-1: Response Coverage at 240 Seconds

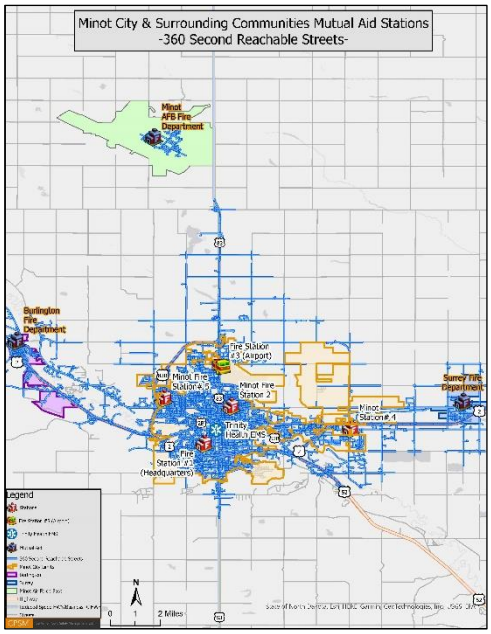




- The NFPA 1710 standard for the arrival of the second due fire unit (engine or ladder) to arrive on scene is 360 seconds. Analysis of this figure shows the majority of the built-upon area of the city is covered at the 360 second benchmark.

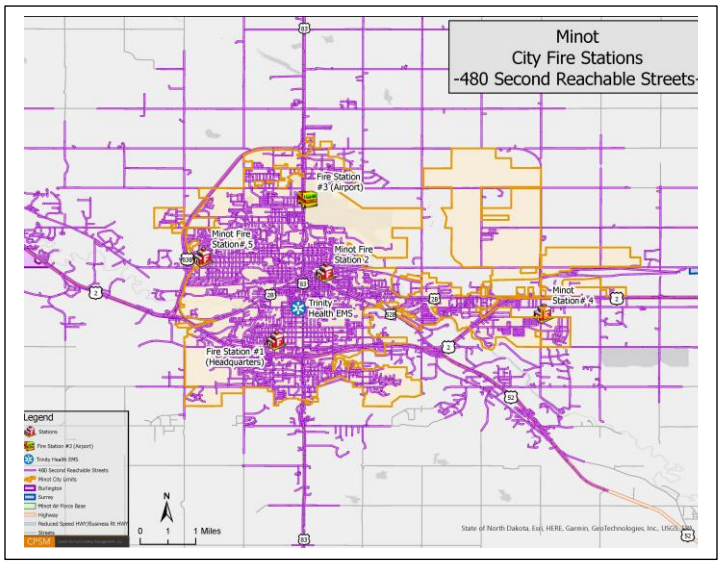
FIGURE 1-2: Response Coverage at 360 Seconds

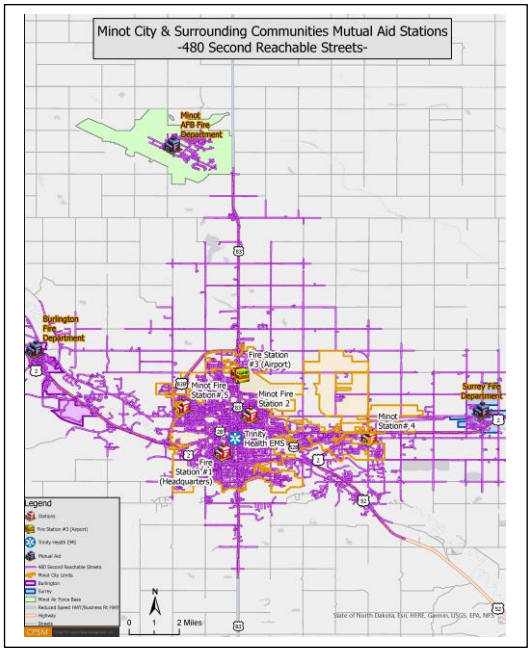




- The NFPA 1710 standard for assembling the initial first alarm assignment on scene for low/medium hazards is 480 seconds. This standard links to the incident critical tasking and the assembly of an Effective Response Force for the incident. The city is covered at the 480-seconds benchmark by the Minot fire stations. Mutual aid stations are too far away to meet the 480-second standard.

FIGURE 1-3: Response Coverage at 480 Seconds





A comprehensive risk assessment, analysis of deployable assets, and response times are critical aspects of a fire department's operation. These analyses will assist the MFD in quantifying the risks that it faces, and the MFD will be better equipped to determine if the current response resources are sufficiently outfitted and positioned. The factors that drive the service needs are examined in this report and are linked to discussions regarding the assembling of an Effective Response Force and contemplating the response capabilities needed to address existing and future risks, which encompasses the component of critical tasks needed to be performed on the fireground.

CPSM took a detailed look at positions needed in Fire Administration as well as staffing and apparatus needed in Operations. An Assistant Chief, Fire Marshal, and Administrative Assistant are recommended for Administration; an Engine Company at Company 5, three firefighters, and three field incident technicians are recommended for Operations.

It is clear that a good number of senior officer positions will retire in the next four to five years. This presents an issue for the city because fire leadership positions and experience will be leaving the department. Succession planning will be needed to offset the loss of experience and leadership.

Minot is a Basic Life Support (BLS) department that works in conjunction with Trinity Health as its BLS/ALS transport provider for all EMS calls. A steering committee was established to facilitate good communications between the parties to provide the best outcome for patients and provide for continuous improvement of both agencies. *This is noted as a best practice by CPSM and should continue*.

An evaluation was also conducted of the department's ISO Report with recommendations on how to improve its PPC score. Minot Fire is one of only three departments in North Dakota with an ISO PPC of 2. The addition of operational apparatus and staffing could result in an increase in the PPC score.

Finally, interviews were conducted by CPSM staff of the City Manager, Fire Chief and staff, EDC Director, City Engineer, Police Chief, Finance Director, and Comptroller. CPSM appreciates their time and contributions to this report.

This report contains a series of observations and recommendations provided by CPSM that are intended to help the MFD continue to deliver services more efficiently and effectively. Most importantly is the discussion in the conclusion section of the report in which CPSM contemplates service delivery in terms of additional assets (ladder company, an additional engine company, as well as improvements in the community risk reduction function).

Recommendations and considerations for continuous improvement of services are presented next. CPSM recognizes there may be recommendations and considerations offered that first must be budgeted and processes developed prior to implementation.

RECOMMENDATIONS

Administrative

(See pp. 15-24.)

1. CPSM recommends that as the MFD continues with its strategic planning process that it be inclusive of the entire department and the community; that it reexamines current mission, vision, and values statements; that it incorporates measurable and obtainable goals and objectives; and that it provide for an annual review and report to the organization and community that outlines the plan's progress.

2. CPSM recommends the MFD continue to develop and then implement the comprehensive strategic plan that it is currently working on. The plan should incorporate recommendations contained within this report and include measurable and achievable administrative, operational, fiscal, and programmatic goals and objectives. CPSM further recommends this strategic planning document cover the near-, mid-, and long-term, and be updated as appropriate at the end of the mid-term period.
3. CPSM recommends as a planning objective that once the MFD accomplishes some of the strategic plan and staffing recommendations contained in this report, it should, with support from the City of Minot, consider undertaking the accreditation process.

Organizational Guidelines and Policies

(See pp. 24-29.)

4. The MFD should continue its program of reviewing and updating the department's procedures and guidelines. In addition to the documents already completed and/or in development, attention should be given important procedures such as basic engine company and truck company operations, vehicle extrication operations, thermal imaging camera, and automatic external defibrillator use. The addition of other procedures covering additional operational, routine administrative, and training procedures should then follow.
5. The general set-up and organization of the SOG manual is an especially important consideration and the MFD must ensure that the manual/system is easy to utilize and that the necessary procedures are cross-referenced. If personnel are going to be required to learn and adhere to the department's procedures, then the format, organization, and filing of them must be user friendly, otherwise they will sit on a shelf, or on a computer drive, unused.
    - The first operational procedure should identify and explain the components of the Written Communications System, including the use and organization of the SOG Manual and other components of the system, such as standardized forms.
6. The MFD is encouraged to establish a committee to review and assist with revisions to the SOP/SOG manual in the future. The committee should be comprised of members of each rank and include specific representation by a senior officer.
7. The MFD should institute a process for issuing Training Bulletins, Safety Bulletins, and Informational Bulletins.

Community Risk Reduction

(See pp. 29-35.)

8. The MFD should fill the position of Fire Marshal, either internally or externally ASAP to provide direct, day-to-day oversight and supervision to the fire prevention staff. Recommend the Fire Marshal report directly to the Battalion Chief for Administration and Support.
9. Recommend that the MFD revise the Fire Prevention career path to make the following training and certification requirements:
    - Fire Inspector I certification through the International Code Council prior to appointment. IAAI Fire Investigation Technician within one year.
    - Fire Inspector II certification through the International Code Council within one year of appointment as a Fire Inspector I. Certification as an International Association of Arson Investigator (IAAI) Certified Fire Investigator (CFI) within two years of appointment as a Fire Inspector I.
    - Fire Marshal, in addition to the above, requires certification as ICC Fire Marshal prior to appointment.

10. The MFD should implement an in-service company inspection program at residential, medical, manufacturing, and retail business establishments throughout the city.
    - The MFD should provide appropriate training in conducting routine fire prevention inspections to all field personnel, particularly the Captains who will be responsible for supervising their companies.
11. MFD should continue to evaluate the new fee inspection program and its offset of current prevention costs. These fees may include inspections conducted by in-service fire companies.
12. Should the City of Minot implement the recommendations above, the MFD should complete a comprehensive review of the city's actual costs for providing fire prevention services. The review should include a full costing of providing all fire prevention services and reviewing the city's and national fire code(s)for updates. The review should be designed to capture the full range of services provided and capture the scope of the new fees for operational permits and certain inspections.

Fire Education, Training, and Professional Development

(See pages 35-40.)

13. The MFD should continue to develop and budget for officer training and development programs. To further enhance these programs the department should consider components that are competency-based on National Fire Protection Association (NFPA), International Association of Fire Chiefs (IAFC) and International Fire Service Training Association (IFSTA) standards, and that focus on contemporary fire service issues including community fire protection and emergency services delivery approaches, fire prevention practices, firefighter safety and risk management and labor/staff relations; reviewing, approving, or preparing technical documents and specifications, departmental policies, standard operating procedures and other formal internal communications; improving organizational performance through process improvement and best practices initiatives; and having a working knowledge of information management and technology systems.
14. The MFD should consider increasing the requirements for further professional advancement at various levels, such as the following:
    - Senior Firefighter
        - Minimum of 30 college credits.
        - Advanced engine and truck company operations.
        - Tactics and Strategy.
        - Fire Instructor I.
        - Fire Officer I.
        - NFA Command and Control for Company Level Officers.
        - IMS Level 300.
    - Captain
        - Possession of an associate degree.
        - Fire Instructor II.
        - Fire Officer II.
        - Fire Inspector I.

- NFA Command and Control of Incident Operations.
- Command and Control/ Blue Card Cert.
- Incident Safety officer.
- 1st. Leadership/Emergency Systems Management course.

□ Battalion Chief

- Bachelor's Degree.
- Fire Officer III.
- IMS Level 400.
- Health and Safety Officer.
- NFA Command and Control of Fire Department Operations at Target Hazards.
- 2nd Leadership / Emergency Services Management course.
- Fire Investigator.

15. The MFD should develop should institute written and practical skills testing and proficiency evaluations (non-punitive) as part of the department's comprehensive fire training program.
16. The City of Minot in consultation with the MFD should consider providing funding for the MFD to procure additional training props necessary to effectively and safely perform both basic and advanced/complex training evolutions for all personnel.
17. The MFD should make a concerted effort to send as many officers as possible to the National Fire Academy (NFA). This should include the Training personnel for various training-related classes, and the Fire Marshal and/or Fire Inspectors for fire prevention and community risk reduction classes. Any officers who meet the admissions criteria should be encouraged to enroll in the Academy's Executive Fire Officer Program.
18. The MFD should look for opportunities to provide periodic joint training between the department and various agencies that provide automatic/mutual aid to the city including in the evening and on weekends. Consideration should also be given to hosting large-scale exercises to test and evaluate regional interoperability.

ISO Rating

(See pp. 40-45.)

19. CPSM recommends that the MFD address the deficiencies in the most recent ISO report as reviewed in this analysis. Special emphasis should be placed on section 561, Credit for Deployment Analysis (score 5.12/10) and section 571, Credit for Company Personnel (score 7.67/15). CPSM believes that the potential enhancements to staffing and deployment by the MFD, including the addition of Station 5, and the addition of a staffed, dedicated ladder truck, should make earning a coveted ISO Class 1 rating possible for Minot.

Fleet

(See pp. 45-49.)

20. CPSM recommends that the City of Minot and MFD work collaboratively to have a complete and objective evaluation of the current condition of the MFD's apparatus fleet. If this evaluation indicates serious deficiencies in the fleet, then adjustments may need to be made to the apparatus replacement schedule.
21. CPSM recommends that the City of Minot and MFD explore options to obtain a quality pumper that can be utilized as a reliable spare. The only spare pumper the city has is in fair to poor condition. If it, or just one other unit, is out of service, the department has no spare

available. The MFD would be better served by having two spare pumpers available for when units are out of service and that can be used by off-duty personnel being recalled to work for major incidents.

Administrative and Operational Staffing

(See pp. 94-124.)

22. CPSM recommends the position of Assistant Fire Chief be implemented to assist the Fire Chief with strategic planning and provide supervision to the three Operational and two Administrative Battalion Chiefs. Upon filling this position, the Fire Chef should evaluate the duties and responsibilities of the Administrative and Training Battalion Chiefs in order to reorganize the department as needed.

23. CPSM recommends the position of Fire Marshall be implemented and assigned to Fire Prevention/Community Risk Reduction. This position should be charged with the responsibility of managing and leading the fire inspection, plans review, fire investigation, and public education programs. This position should also take the lead on program design for Community Risk Reduction programs and performance measures focused on reducing the risk of fire and improving citizen and firefighter safety.

24. CPSM recommends the addition of three firefighters to be assigned to Ladder 5 to maintain a minimum of four firefighters on this apparatus. This is consistent with NFPA 1710 and as well will support tasks associated with ladder company operations. The department should also establish a strategic and budgetary plan to meet the staffing requirements of NFPA 1710 and an Effective Response Force for the four building types for the department.

25. CPSM recommends the establishment of an additional Engine Company to be assigned with the current Ladder Company 5 to form a two-apparatus company. This will allow personnel on Ladder 5 to conduct ladder company operations and not have to function as a primary engine. This will also provide an additional company that will increase resiliency and prevent all stations being vacant on every structure fire response.

26. CPSM recommends MFD consider future planning for Field Incident Technicians to enhance and support safety and command-and-control capabilities of the Operational Battalion Chiefs; this would also serve as a key component of a succession plan to prepare members to take on future leadership roles in the department.

27. CPSM recommends the addition of an Administrative Assistant position to support the new Assistant Chief and Fire Marshal's Office. This position will assist with the demands of paperwork on the inspectors, thereby giving them more time in the field.

Operational Planning Considerations

(See pp. 125-141.)

28. CPSM recommends that the Fire Chief begin working with city leadership to begin a succession plan, given that several command level retirements will occur in the next four to five years.

29. Establish a process to improve turnout times for fire and EMS calls. The turnout time should align with current NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Departments*, 2020 Edition.

30. CPSM recommends the Fire Chief work on call processing times with the 911 Center.

31. Continue the Steering Committee with Trinity Health with fire department stakeholders; this is viewed by CPSM as a *Best Practice*.

32. CPSM recommends engaging Minot Rural Fire Department (MRFD) and Minot Air Force Base to strengthen some of their Automatic Aid and Mutual Aid Responses. MAFB and MRFD (a combination company) are the closest assistance for MFD in the event of a large incident.

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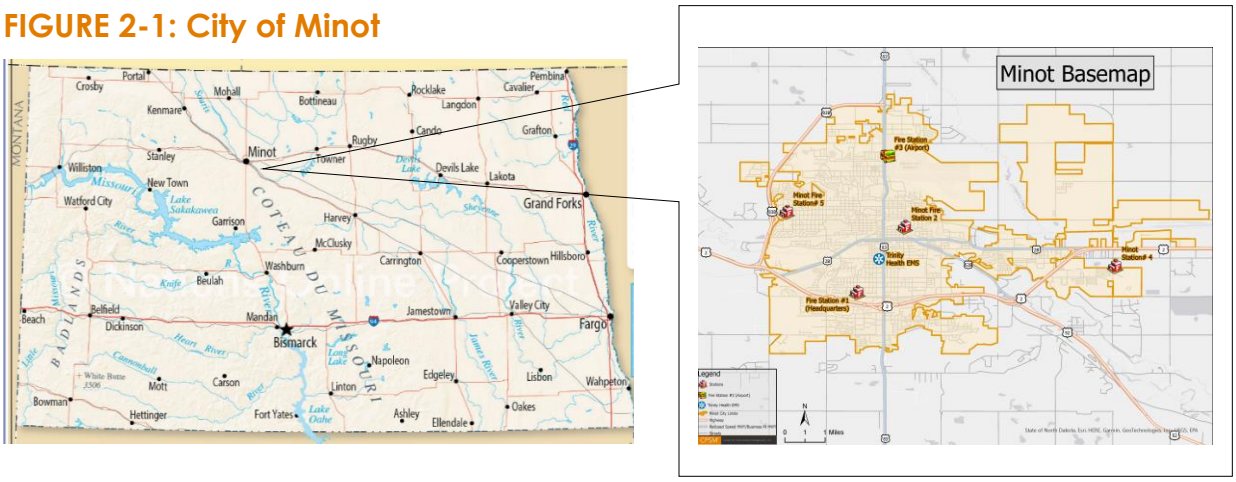
SECTION 2. AGENCY REVIEW & SERVICE DELIVERY

CITY OF MINOT OVERVIEW AND GOVERNANCE

The City of Minot is located in and the county seat of Ward County, North Dakota, which is in the in the state's north-central region. It is most widely known for the U.S. Air Force base approximately 13 miles north of the city. Founded in 1886 during the construction of James J. Hill's Great Northern Railway, Minot is also known as "Magic City," commemorating its remarkable growth in size over a short time.

FIGURE 2-1: City of Minot



Minot is the state's fourth-most populous city and a trading center for a large part of northwestern North Dakota, eastern Montana, southwestern Manitoba, and southeastern Saskatchewan. The official 2020 census population was 48,377 which represents a 18.3 percent increase over the 2010 population of 40,888.[1] According to the U.S Census Bureau the estimated 2022 population was 47,759 which represents a decline of 1.3 percent.[2] The city's population has increased by 32.3 percent since 2000.

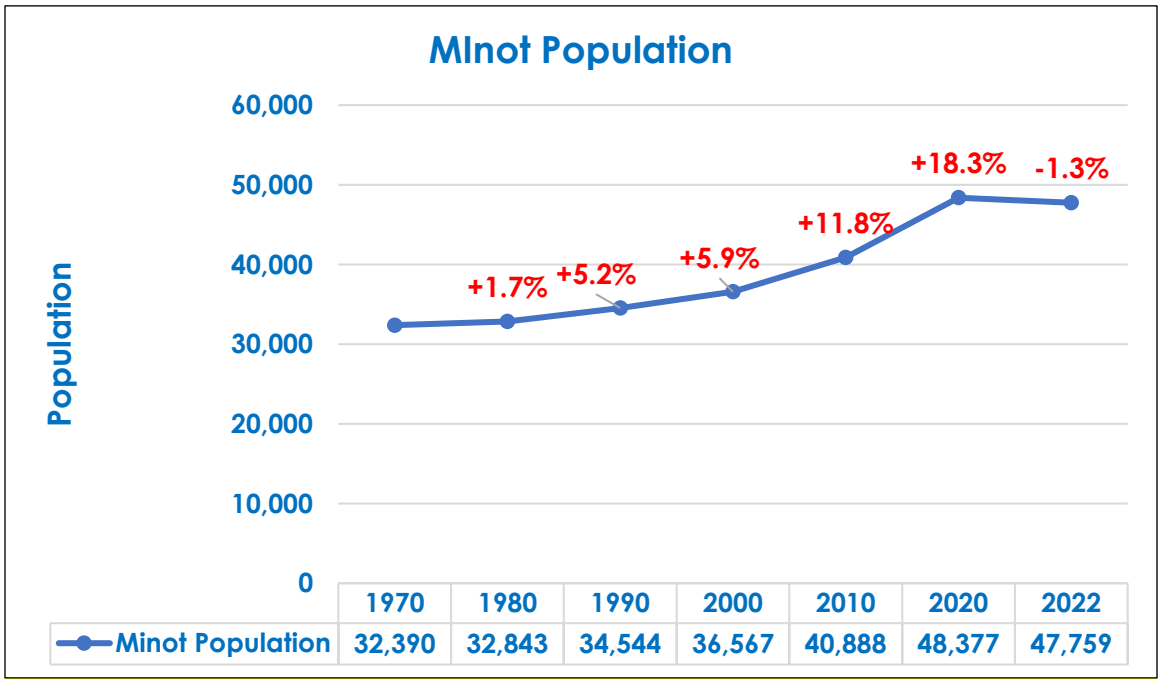
The city encompasses an area of 27.26 square miles[3] and has a mix of commercial, industrial, residential, recreation, and rural areas. The 2020 area of the city was 9.83 square miles (+56.4 percent) larger than the 17.43 square miles at the 2010 Census.[4] The city's population density in 2020 was 1,775 persons per square mile.[5] This represents a significant decease from the 2,346 persons per square mile in 2010.[6] This decrease in density is mainly attributable to the city's area increasing by 56.4 percent since the previous Census.

1. https://www.census.gov/quickfacts/fact/table/minotcitynorthdakota/PST045223
2. ibid
3. ibid
4. ibid
5. ibid
6. ibid

Minot is the principal city of the Minot micropolitan area, a micropolitan area that covers McHenry, Renville, and Ward counties and which had a combined population of 77,546 at the 2020 census.

The following figure shows the city's population and percentage increase for each Census from 1970 through 2020 plus the estimate for 2022. Projections show that the city will continue to experience significant growth, both residential and commercial, over the next several years. New development is projected to be about 60 percent commercial and 40 percent residential.

FIGURE 2-2: Minot Population Growth, 1970–2022



Minot's economy predominantly centers around the Minot Air Force Base approximately13 miles north of town, making the city's economy more robust than other cities of its size due to its large service area.

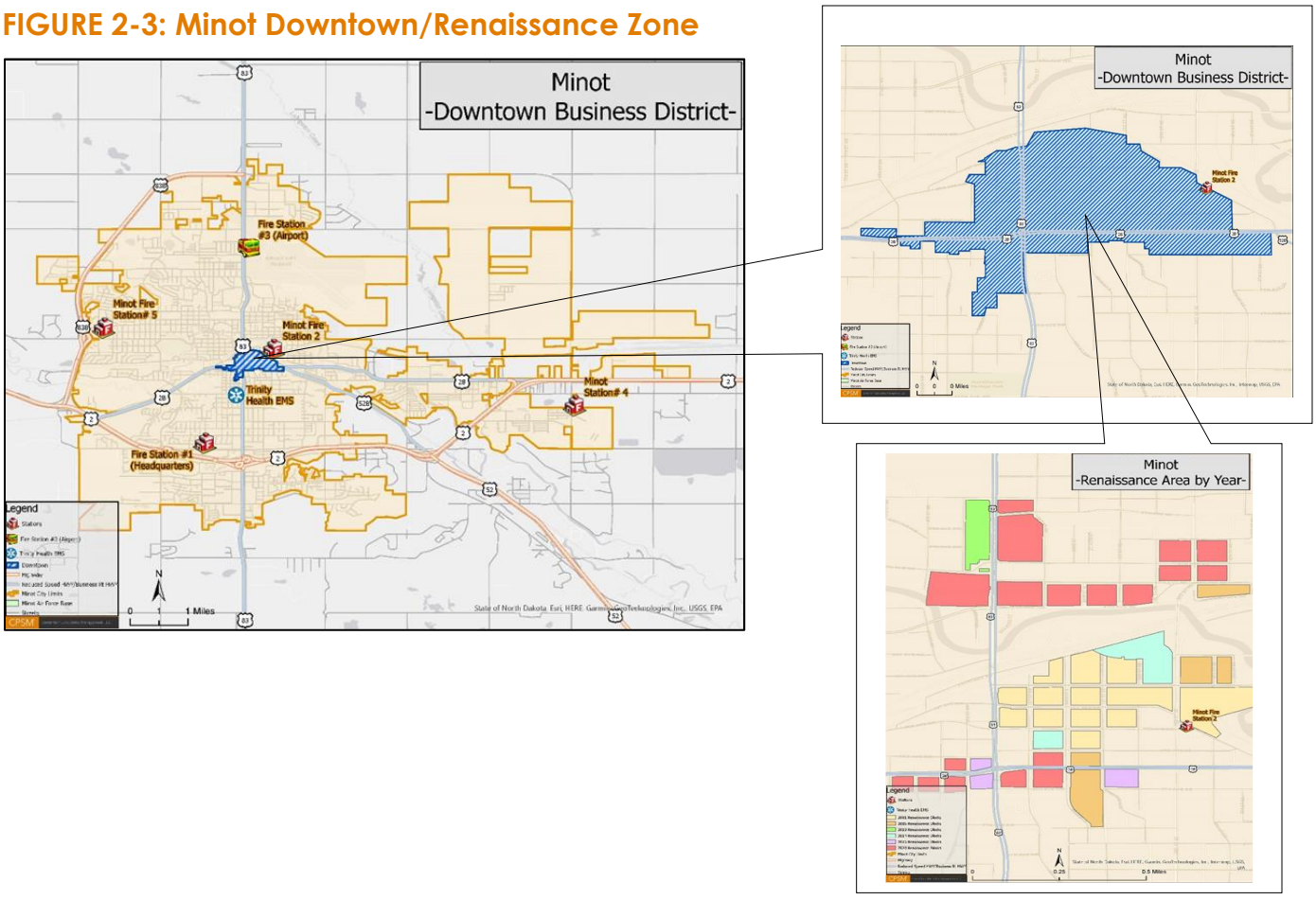
The city's largest employer group of more than 12,000 is employed by the Air Force at the base. Trinity Health Medical Center and its supporting operations, which together employ more than 2,800 people, is the largest in-city employer.

The Minot Public Schools employ more than 1,000 people while Minot State University employs more than 500 additional.

In the walkable downtown and surrounding areas, one can find multiple new restuarants and shops. Minot's arts community includes an art museum, a symphony orchestra, an opera company, a city band, several dance and theater troupes. More than 40 organizations claim membership in the Minot Area Council on the Arts. Minot has been the host to the Norsk Hostfest, North America's largest Scandinavian-American festival. Scandinavian Heritage Park, which features remembrances and replicas from each of the Scandinavian countries is located in Minot. The North Dakota State Fair is held annually in July in Minot.

Beginning in 2001, the City of Minot began designating parts of downtown Minot as a Renaissance Zone to support redevelopment of the once-bustling economic and social activity center of the city, which had generally been deteriorating since commercial relocation began several decades ago. Based on its population, the city has an official count of 40.5 blocks designated in the Renaissance Zone as of 2020. A total of 1.5 blocks are not designated. This number can increase as the population grows or whenever the city declares a block complete and removes it from the official map. A total of 17 blocks have been declared complete and have been removed from the official Renaissance Zone map.

FIGURE 2-3: Minot Downtown/Renaissance Zone

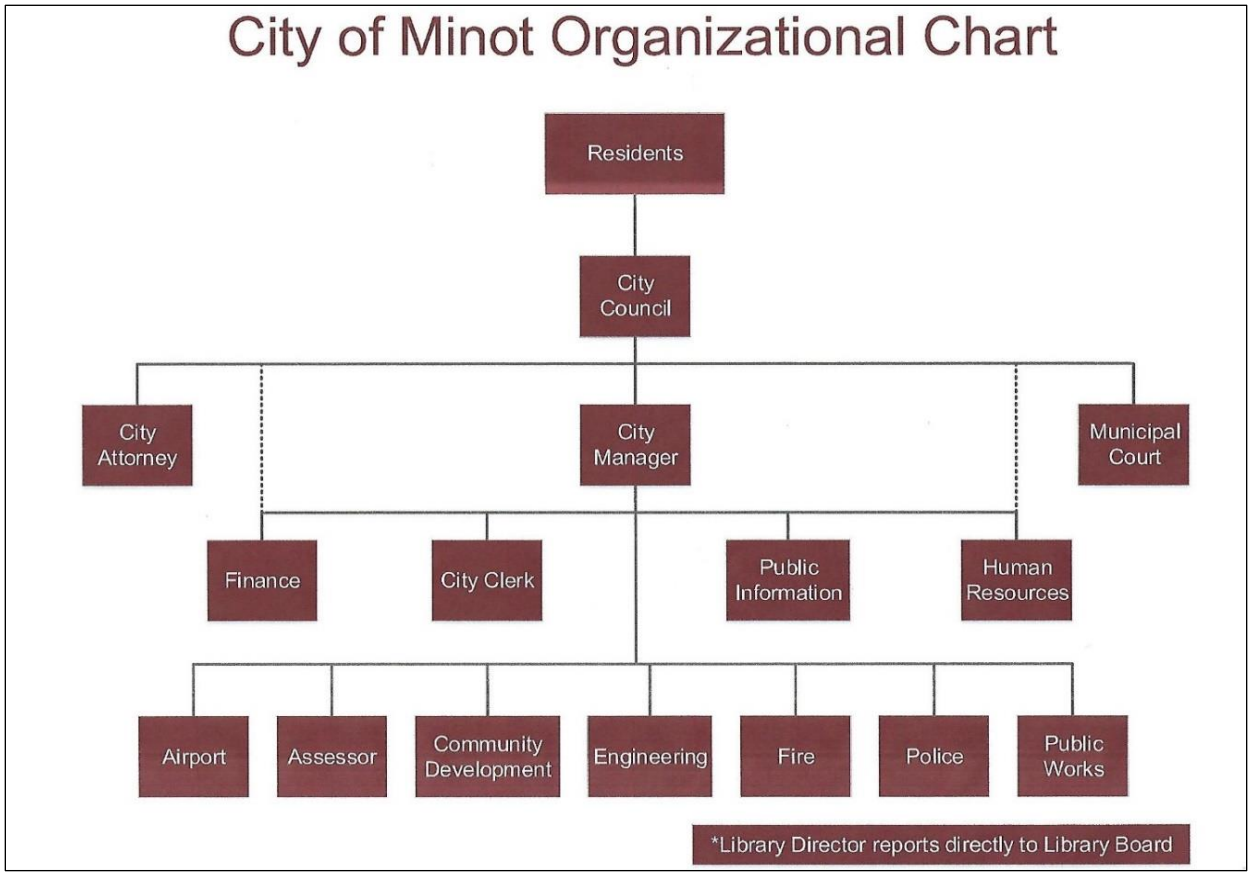


The Minot Park District operates 17 parks and natural open spaces, with various facilities that range from large urban and community parks to mini-parks including Roosevelt Park Zoo, which is one of the top zoos in the region.

Minot utilizes the council–manager system of government. The council is made up of seven members, six alderman and one mayor. As Mayor, he or she chairs the City Council, but only casts a vote to break a tie. The City Council appoints the City Manager to carry out the governing policies and ordinances established by the council, and to oversee the day-to-day operations of the city.

The City Manager reports directly to the City Council, with major functional offices and departments reporting to the City Manager. The major departments and offices reporting to the City Manager are illustrated in the organization chart for the city as shown in the following figure.

FIGURE 2-4: City of Minot Organizational Chart



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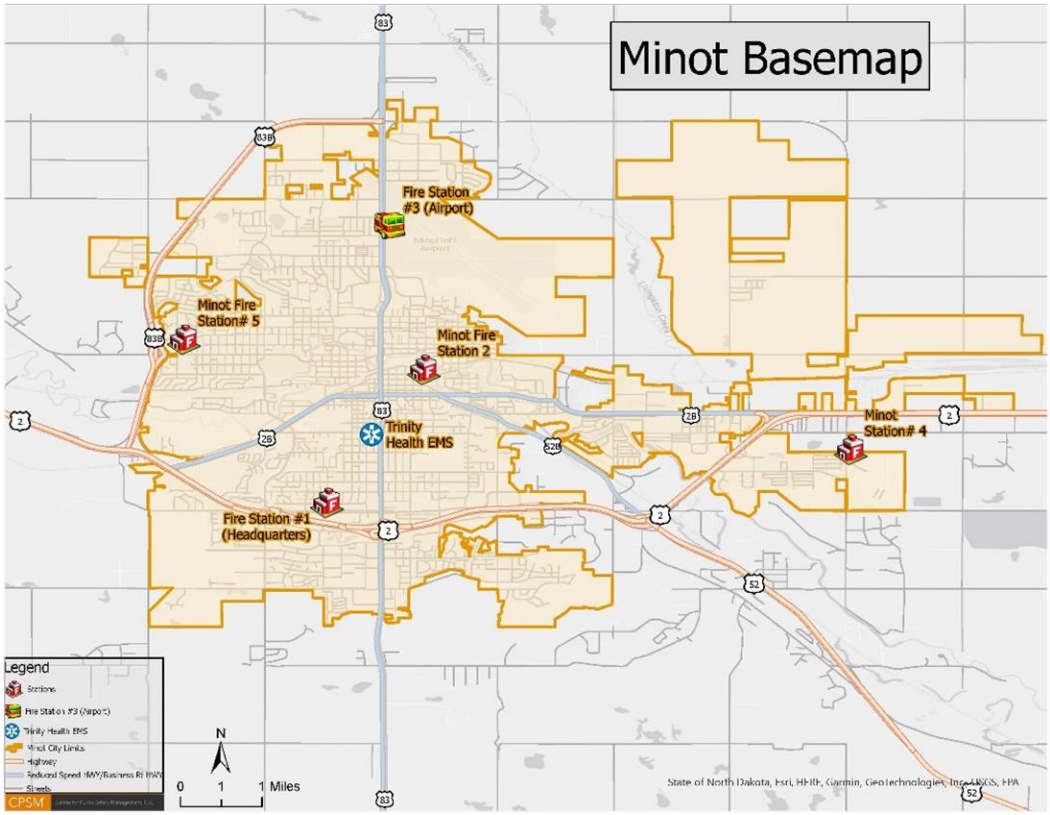
MINOT FIRE DEPARTMENT BACKGROUND, GOVERNANCE, AND ADMINISTRATION

The City of Minot's first fire company was organized Sept. 13, 1895. It is unknown where the fire wagon was housed at the beginning. It was a volunteer company with firefighters paid by the call. The team of horses that pulled the wagon was also paid.[7] By 1908. the Fire Department had its own fire horses and two paid personnel, the Fire Chief and a driver.[8] In 1931, the Minot Fire Department became a fully paid department.[9]

In January 1965, the department opened its first substation, named Station 2. This station is located at 3rd St. and 2nd Ave. Southeast. In November 1980, the department opened its second substation, Station 3, at the Minot International Airport. In March 2016, the department opened its third substation, Station 4, at 1505 55th St. Southeast. Finally, in August 2023, the MFD opened its fourth substation, Station 5, at 2611 4th Ave. Northwest.

Today, the department operates 24/7 from five stations located strategically throughout the city. Minimum on-duty staffing is 17 personnel.

FIGURE 2-5: Minot Municipal Boundaries and MFD Stations and Trinity EMS

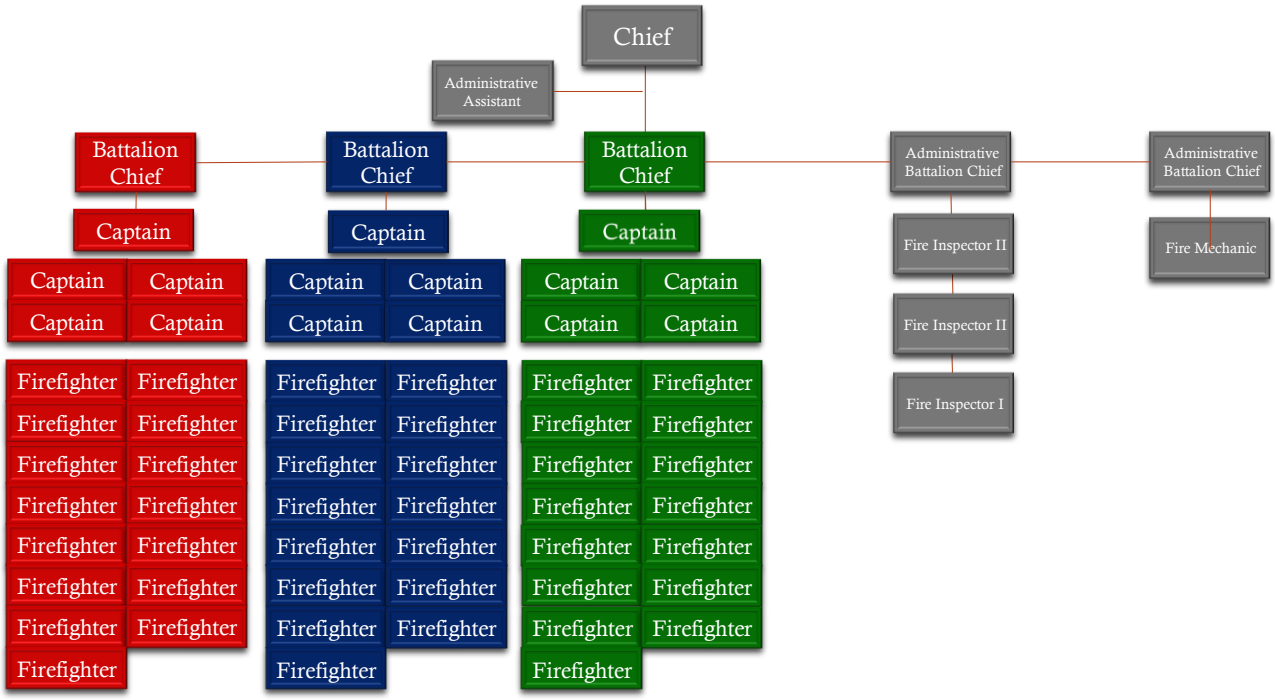


7.https://www.minotnd.gov/174/History#:~:text=The%20City%20of%20Minot's%20first,firefighters%20paid%20by%20the%20call.
8. ibid
9. ibid

Chapter 13 Fire Prevention and Protection, Article I1, Division I of the Minot Municipal Code establishes the Fire Department of the city. Additional subsections of Chapter 13 provide for qualifications of firefighters, the powers and duties of the Fire Chief, as well as the adoption of the International Fire Code and amendments made to it.

The Minot Fire Department (MFD) is a full-service, career public safety organization. The department's total authorized strength is 71 personnel. Of these, 6 to the department's three operational shifts. The remainder of the personnel are assigned a daywork schedule in administration or support services. The following figure illustrates the organizational chart of the MFD.

FIGURE 2-6: MFD Table of Organization



In 2002, the MFD began receiving funding for equipment in relation to regional response for northwest North Dakota for hazardous materials and domestic preparedness-type incidents incidents. This grew to include collapse rescue in 2004. The department continues to provide regional special operations response capabilities, including technical rescue, to northwest North Dakota today.

The MFD has established a mission statement on its web page and also displayed on its apparatus. The stations also have a vision statement and values listed. The MFD is to be commended for having these posted in the stations.

MFD Mission Statement Displayed in Stations and on Apparatus

The mission statement should provide the very foundation for the organization, its operations, and why it exists. The mission statement provides broad direction that everything else that the organization does is going to be built upon.

Services of the MFD include:

- Fire protection and suppression.
- Emergency medical services (EMS), first responder at the Basic Life Support (BLS) level.
- Pre-fire/incident planning.
- All-hazards public education.
- Fire cause and origin investigation.
- Multidisciplinary technical rescue for northwest North Dakota.
- Ice rescue.
- Hazardous materials response and mitigation (leak and spill/operations response) as host of the Regional Hazardous Materials Response Team for northwest North Dakota.
- Tactical EMS support to the Minot Police Special Operations Response Team.
- Dive rescue
- Automatic/mutual aid to neighboring jurisdictions.

The organizational structure of any organization or entity, whether public or private, establishes and illustrates the important hierarchical relationships between various people, supervisors/ subordinates, levels, divisions, and bureaus within the organization that allow it to function properly, operate effectively and efficiently in its daily operations or the pursuit of its mission. It also helps to clearly define the organizational chain of command from top to bottom, this is an

especially important consideration in a quasi-military public safety organization such as the fire department where all personnel receive and carry out orders. Effective communications in any organization, but especially public safety agencies, are essential and a cohesive chain of command allows everyone to know exactly who they report to, and/or who reports to them.

When discussing the organizational structure of fire departments, the normal perspective is to focus on the operational aspects of the department. However, in order for a fire department to be able to perform its key mission(s)—response to and mitigation of a wide range of emergency incidents—there needs to be a sufficient support system in place. The size and complexity of this support system should be dictated by the size and complexity of the community and its fire department.

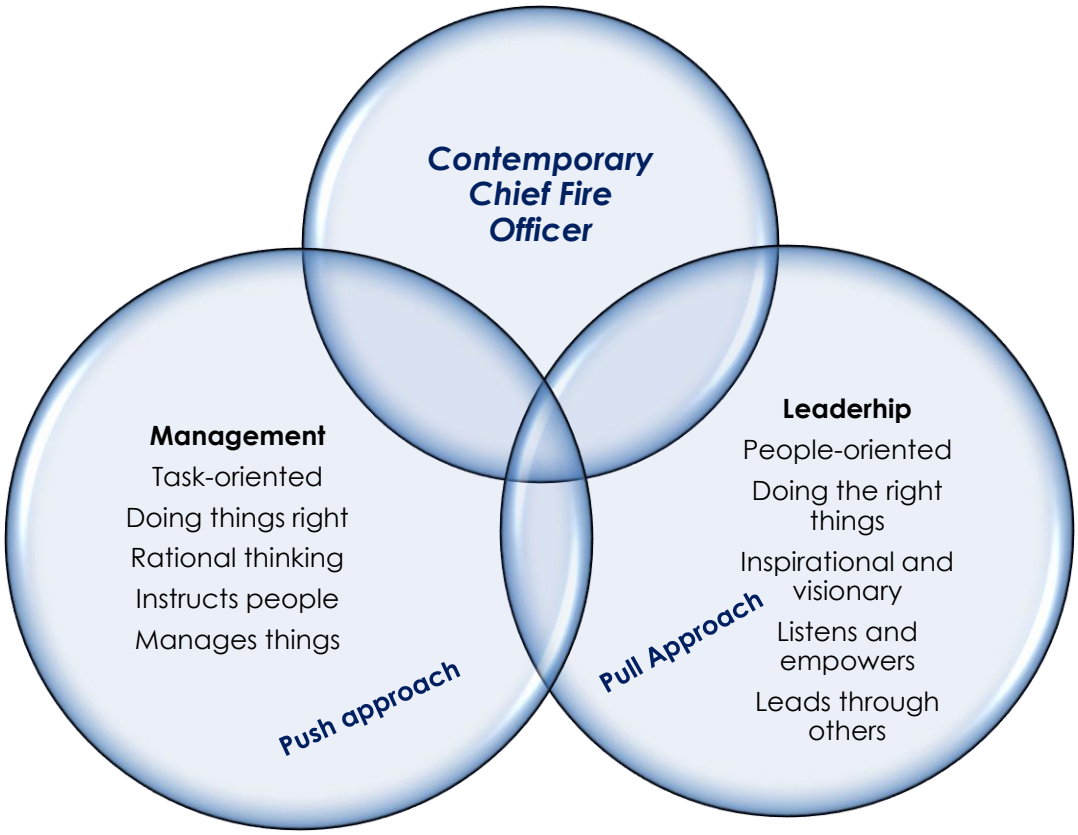
Fire Administration is the administrative and management branch of the department where the day-to-day operations of the department are coordinated and managed. This includes finance, human resources, planning (short-term and strategic), records management, fire prevention, training, and intergovernmental liaison functions.

The organizational structure of the Minot Fire Department is somewhat limited, which is not unusual in smaller departments. As currently configured, the MFD is headed by a Fire Chief who is the department's highest-ranking officer and who serves as the administrative and operational head of the department. The Chief is appointed by the City Manager. The Chief, who has held the position for about eight years, is a professional officer and effective advocate for the organization while carrying out the mission of city leadership. The Fire Chief has been successful, with the help of department members in bringing a higher level of service and effectiveness through the creation of a high-performance organization. She follows a daytime work schedule; however, as the Fire Chief she is available 24/7 when needed.

The Chief is assisted by five Battalion Chiefs, three of whom serve as operational shift commanders, and two who are assigned to administration. The two administrative Battalion Chiefs also work a daytime schedule. The department previously had an Assistant Fire Chief who served as the second in command of the department. That position was reconfigured during a previous reorganization of the department. Overall, the chief officers form a capable, well-respected, and effective command and management team. The chiefs were passionate about their agency and the community. The department members, under the leadership of the command staff, work diligently to meet the needs of the community. The City of Minot is to be commended for supporting this strong management team, with its member firefighters, who together are guiding the department forward.

The modern fire chief is not only a leader, providing vision for the department's direction, they also oversee all administrative, management, and emergency incident operations and roles with the department. They are also expected to work effectively with other city leadership and department heads, members of the public, and others to create a safer community. The MFD's chief officers perform a wide variety of leadership, technical, administrative, management, and supervisory work in planning, organizing, directing, and implementing fire prevention, fire suppression, and emergency medical services operations to prevent or minimize the loss of life and property by fire and emergency medical conditions. Highly successful contemporary chief officers *manage things* and *lead people*.

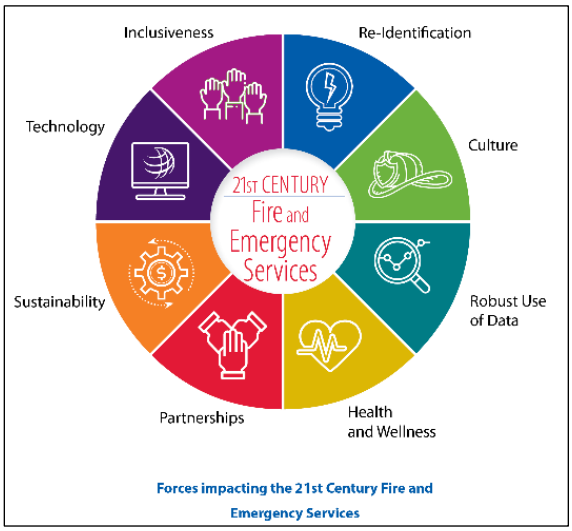
FIGURE 2-7: Contemporary Chief Officer Roles



The chief officer's job is dynamic. The chiefs are responsible for carrying out the day-to-day tasks of running a firefighting organization. Their main responsibilities largely depend upon the size of the fire department. Such tasks include supervising other officers and firefighters at an emergency scene and recruiting, training, and equipping them for their respective duties. In smaller departments such as Minot, the chiefs are often more hands-on and must take on multiple tasks and responsibilities themselves or do without certain programs. Regardless of size of the department, the chief officer typically has two core duties:

- Lead and manage day-to-day operations and ensure their department is fully operationally prepared for its core mission(s).
- Ensure the most successful outcome possible to emergency incidents they are called upon to mitigate.

FIGURE 2-8: Forces Impacting 21st Century Fire and Emergency Services



Forces impacting the 21st Century Fire and Emergency Services

Depending upon local needs and the organization, the chief may also be involved in fire prevention, fire inspection, disaster preparedness, emergency medical services, and related disciplines, as well as administrative duties such as budgets and personnel issues, research into safety and regulations, and liaison with other agencies. While many of the fire chief's duties and responsibilities are similar to those of their predecessors, the issues today are much different, more complex, and ever-evolving. These new challenges often take the chiefs into unfamiliar territory as they try to navigate the changing dynamics of the world and their department.

MFD has 71 authorized positions in the department. The Fire Chief is the only non-fire association member. Some departments of similar size to MFD have either an Assistant or Deputy Chief who serves as a clearly defined second in command for the department. Based on the job description, Assistant Chiefs report to the Fire Chief and may be responsible for personnel matters, supervision, overseeing budgetary expenditures, assisting with the development of policies and procedures, and the myriad administrative and management tasks that are associated with running a significant sized, modern, full-service emergency services provider. In the absence of the Fire Chief, the Assistant Chief will assume the duties of Fire Chief.

The MFD has a single Administrative Assistant who provides a wide range of support to the Fire Chief, Battalion Chiefs, and the department as whole.

Officers and various members of the department have assumed responsibility for ancillary duties to assist with the management, oversight, and/or coordination of activities or program areas. These are in addition to their normal emergency response duties. Many of these duties, particularly those that involve training or program coordination, may at times require additional training and/or certifications.

During interviews with various stakeholders within the MFD there was a general sense that the department's current organizational structure is no longer robust enough to keep up with the challenges the department is facing with the current and forecasted levels of development that the city is experiencing. Most communities, even those where growth is flat, are experiencing increased requests for services. These requests are amplified in communities with continued significant growth. As the number of 911 calls increases, personnel who have been performing important administrative or support duties that are ancillary to their primary emergency response duties may find they have less time to accomplish these tasks and additional administrative staff members may be needed.

Throughout this report, CPSM will make several strategic recommendations regarding the department's organizational structure and staffing. It is important to stress that these recommendations primarily focus on the level of resources and staffing provided, which CPSM believes will be necessary for the department to continue to keep up the high service level expectations of a growing community. To that end, as the City of Minot continues to grow and develop, MFD will also need to grow and evolve to keep pace with the increased numbers and

diversity of the calls for service. This includes the long-term need to expand the department's administrative and operational support staffing and functions. Like many cities, an ongoing evaluation of staff is needed to keep pace with the growing demands of administrative and operational needs.

Areas where CPSM believes that the department will need to enhance its administrative staffing to meet the needs of the department with full-time positions dedicated to these programs are Assistant Fire Chief, Fire Marshal, and Administrative Assistant. The need for the Assistant Chief has already been discussed.

A detailed recommendation for staff needs is detailed in Section 4 of this document.

STRATEGIC PLANNING

A fire and EMS department strategic plan encompasses both a baseline gap analysis of the organization and a "road map" to develop and achieve a planned response to specific factors which will or potentially will affect the organization's mission, or in the case of a public safety agency, service deliverables. A Fire and EMS Strategic or Master Plan identifies the purpose of an organization, what the organization will do, and how it will perform though goals and measurable objectives. It specifies baseline capabilities, real or potential constraints that may exist or be placed on the organization and delivers a set of goals and requirements to achieve identified objectives and desired outcomes. This process can be challenging because strategic planning requires an honest assessment of the department's current state of performance and a realistic understanding of ways to improve.

The development of vision and values must have input from the entire organization. Defining clear goals and objectives for any organization through a formal strategic planning document establishes a resource that any member of the organization, or those external to the organization, can view and determine in what direction the organization is heading, and as well how the organization is planning to get there.

The strategic planning process addresses the following:

As part of the strategic planning process, a review of the department's current mission, vision, and values statements should be undertaken, followed by an update of those statements utilizing department-wide input to align more clearly with current and anticipated future perspectives. With department-wide input, the department can then develop goals and

objectives that align with the SWOT analysis, and the updated mission, vision, and values, guided by a gap analysis that should be conducted.

Suggested steps for a successful approach to the strategic planning process include:[10]

Purpose-mission: This is the statement that describes why an organization exists. This statement should describe what customer needs are intended to be met and with what services. The organization should agree on what the mission statement/purpose is, understanding that this will evolve over the years as the organization evolves.

Stakeholder involvement: Developing a strategic plan often involves engaging with various stakeholders, including community members, firefighters, and other relevant parties. This engagement fosters a sense of inclusivity and ensures that the plan reflects the diverse perspectives and needs of those it serves.

Communication and transparency: Developing a strategic plan provides an opportunity for transparent communication about the goals, priorities, and future direction of the fire department. This transparency helps build trust among team members and the community.

Selection of goals and objectives the organization must meet to accomplish its mission: Goals and objectives are general statements about what an organization needs to accomplish to meet its purpose, or mission, and address major issues it faces. This requires organizational input.

Defining clear goals and objectives for any organization through a formal strategic planning document establishes a resource that any member of the organization, or those external to the organization, can view and determine in what direction the organization is heading, and as well how the organization is planning to get there.

In a strategic plan, it is essential that clear and achievable goals and objectives for each program area and service deliverable are developed. Each program area must then (1) define its goals; (2) translate the goals into measurable indicators of goal achievement; (3) collect data on the indicators from those who have utilized the program; and (4) compare the data from program participants and controls in terms of goal criteria.[11] Objectives should be **SMART** (**S**pecific, **M**easurable, **A**mbitious/**A**ttainable, **R**ealistic, and **T**ime-bound). Additionally, these goals should link back to the city's fiscal planning goals and the council's strategic goals and initiatives.

Identify specific approaches or strategies that must be implemented to reach each goal: The strategies are often what change the most as the organization eventually conducts more robust strategic planning, particularly by more closely examining the external and internal organizational environments. This requires organizational input.

Identify specific actions to implement each strategy: Specific activities each division or major function must undertake to ensure it is effectively implementing each goal must be identified. Goals and objectives should be clearly worded to the extent that staff and the community can

10. McNamara, C. (1996-2007), *Basic Overview of Various Strategic Planning Models*. Adapted from the *Field Guide to Nonprofit Strategic Planning and Facilitation*. (Minneapolis, MN: Authenticity Consulting LLC.)
11. Starling, *Managing the Public Sector*, 287.

assess if the goals have been met or not. Ideally, top management develops specific committees that each have a work plan or set of objectives. This requires organizational input.

Resource Allocation: A strategic plan helps in identifying and prioritizing resource needs. The fire chief can analyze existing resources, identify gaps, and allocate resources efficiently to meet the department's strategic goals.

Monitor and update the plan: Regularly reflect on the extent to which the goals and objectives are being met and whether action plans are being implemented. Perhaps the most important feedback is positive feedback from customers, both internal and external. This requires an annual review and report to the organization and community on each goal and objective and how the strategies to accomplish the goal are progressing.

Leadership Development: The strategic planning process can be an opportunity to identify and nurture leadership within the fire department. It allows for the identification of key personnel who can play crucial roles in implementing the strategic initiatives.

The Chief has been working on the development of a long-range strategic plan for the MFD covering the years 2024–2029. While it is still in draft form, CPSM was provided the opportunity to review the plan. We found it to be well done; it is being developed utilizing a collaborative community-based approach. **The Chief is to be commended for initiating and leading this process.** If the recommendations contained within this report are incorporated into the plan it will provide the city and MFD with an excellent road map for the department moving forward.

ACCREDITATION

Accreditation is a comprehensive self-assessment and evaluation model that enables organizations to examine past, current, and future service levels and internal performance and compare them to industry best practices. This process leads to improved service delivery.[12]

The Center for Public Safety Excellence's (CPSE) accreditation program, administered by the Commission on Fire Accreditation International (CFAI) enables fire and emergency service agencies to compare their performance to industry best practices in order to:

- Determine community risk and safety needs and develop community-specific Standards of Cover.
- Evaluate the performance of the department.
- Establish a method for achieving continuous organizational improvement.[13]

Particularly for emergency services, local officials need criteria to assess professional performance and efficiency. The CFAI accreditation process provides a well-defined, internationally recognized benchmark system to measure the quality of fire and emergency services.[14]

As noted in several sections of this report, the MFD appears operationally and administratively to be a very good fire department. Based upon that premise, once the department accomplishes

12. http://www.publicsafetyexcellence.org/agency-accreditation/about-accreditation-cfai.aspx
13. ibid
14. ibid

some of the strategic plan recommendations contained in this report, the MFD with support from the City of Minot should consider undertaking the accreditation process. While the accreditation process is time-consuming and labor intensive, accreditation would allow the MFD to be recognized for its excellence.

Administrative Recommendations:

- CPSM recommends that as the MFD continues with its strategic planning process that it be inclusive of the entire department and the community; that it reexamines current mission, vision, and values statements; that it incorporate measurable and obtainable goals and objectives; and that it provide for an annual review and report to the organization and community that outlines the plan's progress. (Recommendation No. 1.)
- CPSM recommends the MFD continue to develop and then implement the comprehensive strategic plan that it is currently working on. The plan should incorporate recommendations contained within this report and include measurable and achievable administrative, operational, fiscal, and programmatic goals and objectives. CPSM further recommends this strategic planning document cover the near-, mid-, and long-term, and be updated as appropriate at the end of the mid-term period. (Recommendation No. 2.)
- CPSM recommends as a planning objective that once the MFD accomplishes some of the strategic plan and staffing recommendations contained in this report, it should, with support from the City of Minot, consider undertaking the accreditation process. (Recommendation No. 3.)

MFD ORGANIZATIONAL GUIDELINES AND POLICIES

Effective communications systems are key to the successful operation of any emergency services organization. Standard operating guidelines (SOGs) and standard operating procedures (SOPs) are mission critical components of fire department daily operations and contribute to consistent, effective, and safe operations. Without them there is a tendency to "freelance" and personnel may not all be on the "same page" regarding a wide range of emergency and administrative operations.

A professionally written and up-to-date communications system including a manual of operations—the playbook if you will—can describe what to do and what not to do. Standard operating guidelines and procedures in their simplest form are very much a "how-to" guideline for firefighters to follow to achieve a desired goal. Standard operating guidelines and procedures are formal documents that specify a firefighter's course of action, thereby ensuring efficiency, predictability, consistency, and safety.

The fire service faces a dizzying array of challenges and must adapt to many things, including expanding missions, increasing legal and regulatory requirements, increasing complexity in emergency response techniques and equipment, and much more. The increasing acceptance of electric vehicles (EVs) is an example of the fire service needing to learn an all-new technology, retool, and develop comprehensive policies, procedures, and guidelines on an array of issues from new ways to provide patient extrication to extinguishing complex battery fires.

Policies are set and/or issued by the governmental authority having jurisdiction, in this case the City of Minot. Fire department rules, regulations, and policies should work in tandem with and be consistent with the overarching ordinances, rules, regulations, and policies that have been

adopted by the city. For example, policies concerning such topics as non-discrimination, sexual harassment, purchasing, freedom of information, internet, and computer usage (including social media), and smoking (on city premises or in municipal vehicles) are typically applied across-the-board to all departments and employees. While the city should provide training and familiarization concerning these policies on a regular basis (an annual review is usually adequate, with appropriate documentation), employees are obligated to be familiar with and comply with each policy. Individual departments have either Standard Operating Procedures (SOPs) or Standard Operating Guidelines (SOGs), which, among other things, can be used to implement policy at the department level and establish operational procedures that guide day-to-day activities.

The use of rules and regulations, operational procedures, and various other forms of written communications, are vital parts of a fire department's overall operations. Rules and regulations establish expected levels of conduct and general obligations of department members, identify prohibited activities, and provide for the good order and discipline necessary for the credible operation of a quasi-military emergency services organization.

Chapter 13, section 13-28, Paragraph "D" of the code of ordinances for the City of Minot states:

"Prescribe rules and regulations. The Fire Chief shall prescribe such rules and regulations for the operation of the department as are in his judgment necessary to secure the best and most efficient service."

The MFD has several rules and regulations documents that are incorporated into its written communications system as SOPs/SOGs. These include documents titled: *"General Rules," "Disciplinary Rules and Regulations,"* and *"Code of Conduct."* CPSM found these documents thorough and well written; they establish a base for both expected and prohibited behaviors by members of the MFD. There is also a document that describes the makeup and duties of the *Board of Review* which investigates complaints against, and infractions by, members of the MFD.

Operational procedures ensure the consistent, effective, efficient, and safe operation of various aspects of the department's operations, both emergency and routine. One of many common denominators among the best fire departments across the United States is that they have a comprehensive and up-to-date operational procedural manual, and their personnel are well versed and well-trained in those procedures. The inclusion of written documents, such as training and safety bulletins, serves to make the system more effective.

Standard Operating Procedures/Guidelines (SOPs/SOGs) document how operational tasks should be accomplished. They provide personal guidance relative to how to accomplish operational activities safely and consistently. To be effective, SOPs should be developed by each department through a participative process. Once developed, personnel need to be trained on the SOPs and periodically refreshed as to their content.

Standard Operating Procedures/Guidelines are developed for specific instances and based on the operations, training, resources, services delivered, and the administrative needs of a fire department. These written policies and internal regulations are typically based on recognized standards, regulations, and local government rules. These are the procedures that personnel rely on to perform their duties effectively and safely, and which the department utilizes to establish administrative processes and oversight.

Over the past 20 years or more, many agencies have shifted from Standard Operating Procedures (SOGs) to Standard Operating Guidelines (SOGs) or a combination of both. Some experts feel that the term "procedures" implies inflexible task steps or instructions, while "guidelines" implies more discretion in performing the job. Since emergency incidents are

unpredictable and flexibility is essential, these experts advise fire departments to develop SOGs, thereby reducing the need to identify exceptions, and even limiting liability due to actions by personnel. Other experts believe the opposite is true: the term "guidelines" implies too much flexibility and discretion, thus reducing control and increasing the likelihood of mistakes.[15] Whether agencies use SOGs, SOPs, or a blend of both, well-written SOGs/SOPs are essential in fire service operations. The differences between SOGs and SOPs include:

Standard Operating Guidelines (SOGs)

- SOGs tend to have more leeway or room for interpretations.
- SOGs are often an action proceeded by the word "may" or "should," which can imply greater flexibility.

Standard Operating Procedures (SOPs)

- SOPs tend to be more rigid, more of a rule, and not flexible.
- SOPs are often an action preceded by the word "shall" or "will," which is more definitive.

According to the National Fire Protection Association (NFPA), a standard operating procedure (SOP) is "**an organizational directive that establishes a standard course of action**." In other words, SOPs are written guidelines that explain what is expected and required of fire service personnel in performing their jobs. Standard operating procedures clearly spell out what is expected and required of personnel during emergency response and non-emergency activities. They provide a mechanism to communicate legal and administrative requirements, organizational policies, and strategic plans to the members. Both fire department SOPs/SOGs and policies are official documents that provide instruction, methods, procedures, and requirements for how to operationalize things such as bylaws, ordinances, plans, strategies, mutual aid agreements, and more. Both SOPs and SOGs provide a common set of standards by which every team member must follow. From the perspective of this discussion, the terms procedure and guideline can be used interchangeably, but should be applied consistently throughout the system.

Fire departments face an array of constant challenges and must adapt to many things including expanding missions, increasing legal and regulatory requirements, increasing complexity in emergency response techniques and equipment, and much more. For those reasons, procedures specific to fire department operations are more commonly found in a fire department SOP/SOG manual. The increasing acceptance of electric vehicles (EVs) is an example of the fire service needing to learn an all-new technology, retool, and develop comprehensive procedures and guidelines on an array of issues from new ways to provide patient extrication to extinguishing complex battery fires. The coronavirus pandemic (COVID-19) is another example where response procedures and use of personal protective clothing had to change. These examples are what CPSM finds important to cover in specific fire department SOPs/SOGs.

The CPSM team had an opportunity to review the MFD's current written communications system. It is our opinion that the current system is thorough, well written, and appears to follow current industry best practices for emergency operations. We believe that the communications meet the operational and administrative needs of the department. It appears that the entire SOP/SOG manual was reviewed and updated as necessary in October 2023. The department utilzes a standard format and template for SOP/SOG documents as shown in the following figure, which includes all pertinent information on the document. The MFD is now using a standardized template similar to the ones used by many other fire departments. The template includes the title of the procedure, the issue or revision date, the number, the category, the number of pages, and approval by a chief officer. It also includes a section for policy references. This is an

15. Developing Effective Standard Operating Procedures for Fire and EMS (FEMA publication)

excellent practce in that by following this template, members gain a better understanding of the SOG and can research references for additional learning opportunities.

FIGURE 2-9: MFD SOP/SOG Template

22 – MAYDAY	
	Minot Fire Department **Standard Operating Procedure/Guidelines**
Title: MAYDAY	**Section/Topic:** Mayday Operations
Number: 22	**Issue Date:** 01/20/2023
	Revised Date: 10/25/2023
Prepared By: MFD BCs	**Approved By:** Kelli Kronschnabel, Fire Chief

1.0 POLICY REFERENCE	
CFR	
NFPA	**1407, 1500**
NIMS	

2.0 PURPOSE

3.0 SCOPE

4.0 DEFINITIONS

5.0 GENERAL GUIDELINES

CPSM did note that there are no operational procedures/guidelines in place to deal with operations such as Basic Engine Company and/or Truck Company Operations, Vehicle Extrication Operations, or Thermal Imaging Camera and Automatic External Defibrillator Use, to name just a few. These are the types of operational procedures/guidelines that are most important and provide standardization and consistency of operations. On the administrative side, CPSM was not provided with policies or procedures that might cover topics such as completion of incident reports.

We also noted that the department's materials refer to the documents as Procedures/Guidelines. We believe this could cause confusion. It is our belief that the MFD should choose one term or standardize the use of the term. We would recommend this be changed to either "Procedure" or "Guideline" for all documents and they be combined into a

single manual with appropriate sections. Finally, we noted that although the procedures/guidelines are placed into categories, that fact and the numbering system could be clarified to make it easier for users to understand. They refer to "Policy" in one set of documents and "SOGs" in another so as to not be confused with city policies,

The challenge for Minot as with many fire departments is to increase organizational buy-in relative to these procedures. Once a draft of a new or significantly revised procedure is completed, it should be distributed throughout the department for review. Personnel should be given a predetermined period of time to submit comments on the draft. Where appropriate, revisions can be made based upon the comments received. The SOP can then be finalized and issued.

Fire rescue personnel provide a valuable technical resource in the development of SOPs/SOGs. The development and drafting of these procedures should not be a top-down management driven process. The personnel who are going to be required to adhere to and follow the procedures should have input into their development. Input from personnel at all levels will continue to strengthen the quality and effectiveness of SOPs/SOGs.

Moving forward the Chief may want to consider the establishment of a committee comprised of a cross-section of department members of all ranks to regularly review the current SOPs/SOGs to ensure that they reflect the organization's current operations. In addition, one SOP/SOG and one policy should be reviewed by a randomly selected member at each shift change briefing and training session. Once personnel get used to this expectation, the knowledge and respect for SOPs/SOGs will grow within the organization and become an accepted part of the department's culture.

CPSM encourages fire departments to draw upon the policies, practices, and procedures of other organizations, both local and distant. The experiences and lessons learned from other fire and rescue agencies can be extremely helpful in the development of SOPs/SOGs. There are numerous excellent SOP/SOG manuals that can be found online and which can assist with the development of necessary procedures. No emergency services provider should be expected to write a policy document from scratch or without a template.

As part of its written communications system, the MFD should include Training Bulletins, which are issued to serve as reference regarding tested and approved methods of performing tasks, and Safety Bulletins, which are issued to serve as references with regard to general and specific safety and health issues.

MFD Organizational Guidelines and Policies Recommendations:

- The MFD should continue its program of reviewing and updating the department's procedures and guidelines. In addition to the documents already completed and/or in development, attention should be given important procedures such as basic engine company and truck company operations, vehicle extrication operations, thermal imaging camera, and automatic external defibrillator use. The addition of other procedures covering additional operational, routine administrative, and training procedures should then follow. (Recommendation No. 4.)
- The general set-up and organization of the SOG manual is an especially important consideration and the MFD must ensure that the manual/system is easy to utilize and that the necessary procedures are cross-referenced. If personnel are going to be required to learn and adhere to the department's procedures, then the format, organization, and filing of them must be user friendly, otherwise they will sit on a shelf, or on a computer drive, unused. (Recommendation No. 5.)

- The first operational procedure should identify and explain the components of the Written Communications System, including the use and organization of the SOG Manual and other components of the system, such as standardized forms.

- The MFD is encouraged to establish a committee to review and assist with revisions to the SOP/SOG manual in the future. The committee should be comprised of members of each rank and include specific representation by a senior officer. (Recommendation No. 6.)
- The MFD should institute a process for issuing Training Bulletins, Safety Bulletins, and Informational Bulletins. (Recommendation No. 7.)

COMMUNITY RISK REDUCTION

Community risk reduction activities are important undertakings of a modern-day fire department. A comprehensive fire protection system in every jurisdiction should include, at a minimum, the key functions of fire prevention, code enforcement, inspections, and public education. Preventing fires before they occur, and limiting the impact of those that do, should be priority objectives of every fire department. Fire investigation is a mission-important function of fire departments, as this function serves to determine how a fire started and why the fire behaved the way it did, providing information that plays a significant role in fire prevention efforts. Educating the public about fire safety and teaching them appropriate behaviors on how to react should they be confronted with a fire is also an important life-safety responsibility of the fire department.

Fire suppression and response, although necessary to protect property, have minor impact on preventing fires. Rather, it is public fire education, fire prevention, and built-in fire protection systems that are essential elements in protecting citizens from death and injury due to fire, smoke inhalation, and carbon monoxide poisoning. The fire prevention mission is of utmost importance, as it is the only area of service delivery that dedicates 100 percent of its effort to the reduction of the incidence of fire.

Fire prevention is a key responsibility of every member of the fire department, and fire prevention activities should include all personnel. On-duty personnel can be assigned with the responsibility for "in-service" inspections to identify and mitigate fire hazards in buildings, to familiarize firefighters with the layout of buildings, identify risks that may be encountered during firefighting operations, and to develop pre-fire plans, such as the MFD does currently. On-duty personnel in many departments are also assigned responsibility for permit inspections and public fire safety education activities.

Fire prevention should be approached in a truly systematic manner, and many community stakeholders have a personal stake and/or responsibility in these endeavors. A significant percentage of all the requirements found in building/construction and associated codes are related in some way to fire protection and safety. Various activities such as plan reviews, permits, and inspections are often spread among different departments in the municipal government and are often not coordinated as effectively as they should be. Every effort should be made to ensure these activities are managed effectively between departments.

The community risk reduction (CRR) function in the MFD is commanded by one of the Administrative Battalion Chiefs who nominally oversees that function. However, CPM was informed that there is limited interaction between the chief and the three civilian Fire Inspectors. Part of this is geographical in that the inspectors do not operate out of MFD headquarters. Instead, they are based with other city inspectors.

The MFD Fire Prevention Unit has a wide-ranging portfolio of duties and responsibilities. It's responsible for administering the various codes; performing inspections, development, and new construction plan reviews; witnessing fire prevention system tests; and ensuring code compliance through inspections regarding new buildings while under construction. Like many organizations, the Fire Prevention Unit is trying to get back on track after the COVID pandemic.

At the time of this assessment the City of Minot was utilizing the following codes:

- International Fire Code 2021.
- International Building Code 2021.
- 2021 International Residential Code.
- 2021 International Mechanical Code.
- 2021 International Fuel Gas Code.
- 2021 International Existing Building Code.
- 2021 International Energy Conservation Code.
- 2018 ND Plumbing Code (2018 Universal Plumbing code; as amended by ND).
- 2020 National Electric Code (NFPA 70) and ND Wiring Standards.
- A117.1- 2017 Accessibility Code.

Automatic fire sprinklers have proven to be very effective in reducing fire loss and minimizing fire deaths in residential structures. However, many states, North Dakota among them, have been reluctant to impose code provisions that require these installations in one- and two-family dwellings. The state's current fire code does not mandate the installation of these life safety systems, nor does it permit municipalities to adopt local ordinances that require them.

Fire Prevention is responsible for approving fire protection systems and performing these types of plan reviews. This includes sprinkler systems wet/dry, fire alarms, Ansul systems, clean agent suppression, and underground pressure tests for risers and fire pumps. They do not perform plans reviews for fire alarm systems. The following are the plans reviewed for 2020 through 2022:

- 2020: 5.
- 2021: 16.
- 2022: 9.

The Fire Prevention staff, along with UCC (new construction) personnel do participate in final system inspections along with acceptance testing for all new fire protection systems and for any remodels that require systems.

The inspectors informed CPSM that they perform annual inspections on healthcare facilities, daycares, schools, restaurants, and any occupancy that requires an annual liquor license renewal. Churches are inspected every three years, and common areas in apartment complexes every five years. Fire inspections performed for 2020 through 2022 include:

- 2020: 318.
- 2021: 740.
- 2022: 967.

One of the concerns expressed to CPSM by senior fire MFD staff was that they currently do not feel that enough inspections are getting done and the fire prevention fuction needs more guidance and direct interactiion with their supervisor to assist. Based upon the number of inspections performed and the fact that there is somewhere between 2,700 and 3,200 businesses and commercial occupancies in the city this would appear to be needed.

It is our impression that for the most part the fire prevention personnel establish their own work day priorities. The lack of direct supervision of the fire prevention staff creates gaps in community risk reduction work, such as fire prevention code enforcement (noted gap between inspectable properties and actual inspections completed in 2020, 2021, and 2022). The Chief has established a career path for the fire prevention personnel; however, the current personel have been slow to embrace this opportunity especially with regard to earning Fire Marshal certification. The minimum requirements for each step are as follows:

- **Fire Inspector I** - Fire Inspector I Certification through the International Code Council within one year of hiring date and to retain such certification while in this position. IAAI Fire Investigation Technician within three years.
- **Fire Inspector II** - Fire Inspector II Certification through the International Code Council within one year of hiring date and to retain such certification while in this position.
- **Fire Marshal** - Requires certification as International Fire Code Inspector II within 1 year of appointment and ICC Fire Marshal certification within three years of appointment. Certification as an International Association of Arson Investigator (IAAI) Certified Fire Investigator (CFI) within three years of appointment.

If none of the current inspectors are interested in pursuing the Fire Marshal position, the MFD should consider bringing in someone from the outside to fill this important role and provide direct supervision and oversight to the unit.

Another reason may be that the current fire code lacks proverbial "bite" that would require the abatement of violations. The sole exception to this is establishments that require a liquor license. The initial inspection of premises and the first reinspection are done at no charge. The second reinspection and any subsequent ones result in a fee being assessed. However, the ability to enforce compliance is limited.

There are many reasons why existing buildings should be inspected for fire code compliance. The obvious purpose is to ensure that occupants of the building are living, working, or occupying a building that is safe for them to do so. Some buildings are required to have specific inspections conducted based on the type of occupancy and the use of the buildings such as but not limited to healthcare facilities (hospitals, nursing homes, etc.), schools, restaurants, and places of assembly. These inspections are mandated by various statutes, ordinances, and codes. The inspections themselves are often limited to specific areas within the building and to specific periods. The fire inspectors will also witness tests of required fire protection systems and equipment. Conversely, many businesses are not required to have any type of periodic fire safety inspections.

Fire inspections can also identify violations and lead to follow-up inspections to ensure that violations are addressed and that the fire code is enforced. In fire prevention, the term "enforcement" is most often associated with inspectors performing walk-throughs of entire facilities, looking for any hazards or violations of applicable codes. Educating the owner as to the requirements, as well as the spirit and intent, of the code can also attain positive benefits for fire and life safety.

With about 3,000 business located in Minot, several of them large, along with numerous schools, multifamily residential complexes, and other hazards, there is no consistent or comprehensive program that ensures that all businesses and commercial occupancies receive a routine "maintenance" fire prevention inspection on a regular, periodic basis.

In many departments, on-duty firefighters can be assigned with the responsibility for "in-service" inspections to identify and mitigate fire hazards in buildings, to identify risks that may be encountered during firefighting operations, and to develop pre-fire plans. On-duty personnel in many departments are also assigned responsibility for permit inspections and public fire safety education activities. Fire department personnel are often able to recognize hazards or violations, whereas inspectors are often able to identify features of a specific property that could prove important during an emergency. Effective information sharing enhances the ability of the fire department to protect the community.

Performing complex, technical inspections can be a very time-consuming, but necessary, endeavor. Nationwide, communities that have proactive fire inspection and code enforcement programs in place often have a lower incidence of fire loss because many potential fire- and life-safety hazards are identified and corrected before they cause or contribute to a fire.

Of course, having sufficient personnel to perform fire prevention inspections can be a costly proposition. To help offset these costs, the MFD will begin charging inspection fees for certain services. Fees for various permits range from $25.00 to $120.00. The new fee schedule adopted by MFD in February 2024 is as follows:

- Operating Permits: $60.00 per year
- Commercial Daycare $60.00 per year
- Home Daycare: $25.00 per year
- Pyrotechnic, Special Effects: $120.00 plus $85.00 an hour
- Tent Permit: $50.00
- Construction Permit: $85.00
- Failure to Correct Violations: $60.00, No Fee for First Visit in a Re-inspection.

The new fee inspection program is estimated to offset the current costs of Fire Prevention services by $56,000 annually.[16]

One of the newest trends in fire prevention inspections is the use of Remote Video Inspection (RVI) programs. According to the NFPA, "RVI provides an effective alternative means for building inspection, enabling one or more parties to remotely perform an inspection of a building or building component." The NFPA has released a new infographic that emphasizes the five key considerations for an RVI inspection program: procedures, communication, technology, verification, and completion.

According to the NFPA:

"RVI provides an effective alternative means for building inspection, enabling one or more parties to remotely perform an inspection of a building, or building component. Just like traditional on-site or in person inspections, an RVI typically occurs as part of a jurisdiction's permitting or inspection process. Virtual inspections are not intended to be less complete than

16. https://www.minotdailynews.com/news/local-news/2024/02/mfd-to-implement-new-inspection-fees/

an on-site inspection; they are meant to achieve the same (or enhanced) results as an on-site inspection."[17]

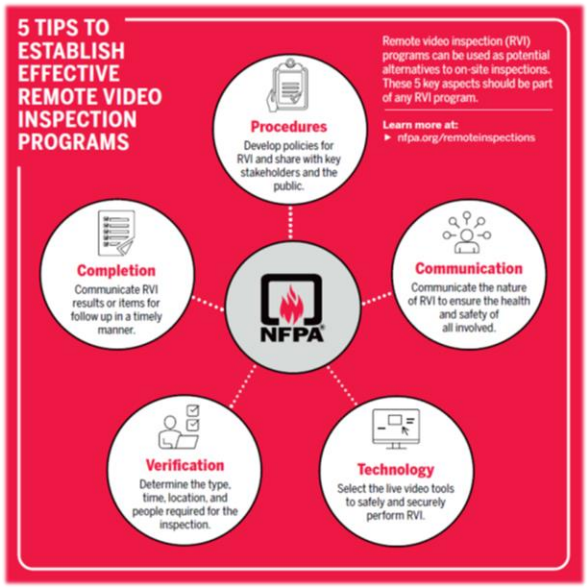


Image credit: National Fire Protection Association

Until recently, use of RVI was limited and sporadic. The COVID-19 pandemic and remote work conditions combined with a normal extensive workload have made more jurisdictions consider alternatives to traditional inspection procedures and processes. Long term, the use of a program such as this can help any fire prevention entity better manage often unrealistic inspection workloads. The MFD does have a procedure that permits the use of this technology for re-inspections but not initial inspections. This is a reasonable compromise on the use of a new system. Moving forward, the department should periodically review this procedure to determine if it can be expanded to better meet the needs of the department.

The investigation of the cause and origin of fires is also an important part of a comprehensive CRR system. Determining the cause of fires can help with future prevention efforts. At the time of this evaluation, the Fire Inspectors were charged with initiating the fire origin and cause determination process. Each was assigned as the primary investigator for one of the Department's battalions (shift). The weakness in the system as currently structured is that these personnel are only required to be Fire Investigation Technicians rather than Certified Fire Investigators. When needed, particularly when the fire involves a significant loss, injury, or fatality, the MFD can request assistance from the North Dakota State Fire Marshal to perform an in-depth investigation. The state has a local field office at MFD Station 4. The number of fire investigations completed by the FMO in 2020, 2021, and 2022 were:

- 2020: 12.
- 2021: 28.
- 2022: 20.

The MFD has an active public fire education program, which is an important component of an overall fire prevention program. **This effort is very commendable and results in time and resources well spent.** Seventy-five percent of all fires, fire deaths, and injuries occur in the home, an area where code enforcement and inspection programs have little to no jurisdiction. Public education is the area where the fire service will make the greatest impact on preventing fires and subsequently reducing the accompanying loss of life, injuries, and property damage through adjusting people's attitudes and behaviors regarding fires and fire safety. Fire prevention presentations include fire safety, extinguisher training, CPR, cooking safety, car seat checks, demonstrations, tours, ride-a-longs, community events, citizen leadership, school visits,

17. https://www.nfpa.org/News-and-Research/Publications-and-media/Press-Room/News-releases/2020/New-infographic-from-NFPA-highlights-remote-inspection

etc. Public education is presented by both the Fire Prevention office and the suppression crews. The number of public education presentations completed in 2020, 2021, and 2022 were:

- 2020:47.
- 2021:60.
- 2022: 67.

There are numerous ways the MFD can spread its fire safety (and all-hazards) messages. These include, but are certainly not limited to:

- Maximize MFD public appearances at community events.
- Add signs or marquees to fire stations with regular fire and life safety messages.
- Keep school and other presentations on track.
- Include fire safety messages in the city's community videos.
- Increase social media presence for the community to learn about their fire department and its services, along with frequent social media postings (Facebook, Instagram, etc.) on department events, disaster preparedness, all-hazards injury prevention, etc.
- Social media addresses advertised on apparatus, department letterhead, etc.
- Development of an MFD YouTube page.
- Increased social media activity during holidays (when there is an uptick in cooking fires), prior to and during major weather events, during public education events (Facebook Live, for example), and live dispatch or live updates from PIO on incidents.

Community Risk Reduction Recommendations:

- The MFD should fill the position of Fire Marshal, either internally or externally. as soon as possible in order to provide direct, day-to-day oversight and supervision to the fire prevention staff. The Fire Marshal should report directly to the Battalion Chief for Administration and Support. (Recommendation No. 8.)
- The MFD should revise the Fire Prevention career path to make the following training and certification requirements mandatory prior to appointment to a position and for the duration of their employment. (Recommendation No. 9.)
  - Fire Inspector I certification through the International Code Council prior to appointment. IAAI Fire Investigation Technician within one year.
  - Fire Inspector II certification through the International Code Council within one year of appointment as a Fire Inspector I. Certification as an International Association of Arson Investigator (IAAI) Certified Fire Investigator (CFI) within two years of appointment as a Fire Inspector I.
  - Fire Marshal, in addition to the above, requires certification as ICC Fire Marshal prior to appointment.
- The MFD should implement an in-service company inspection program at residential, medical, manufacturing, and retail business establishments throughout the city. (Recommendation No. 10.)

- The MFD should provide appropriate training in conducting routine fire prevention inspections to all field personnel, particularly the Captains who will be responsible for supervising their companies.

- MFD should continue to evaluate the new fee inspection program and its offset of current prevention costs. These fees may include inspections conducted by in-service fire companies. (Recommendation No. 11.)
- Should the City of Minot implement the recommendations above, the MFD should complete a comprehensive review of the city's actual costs for providing fire prevention services. The review should include a full costing of providing all fire prevention services and reviewing the city's and national fire code(s)for updates. The review should be designed to capture the full range of services provided and capture the scope of the new fees for operational permits and certain inspections. (Recommendation No. 12.)

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FIRE EDUCATION, TRAINING, AND PROFESSIONAL DEVELOPMENT

Training is, without question, one of the most essential functions that a fire department can perform on a regular basis. One could even make a credible argument that training is, in some ways, more important than emergency responses because a department that is not well-trained, prepared, and operationally ready will be unable to fulfill its emergency response obligations and mission. Education and training are vital at all levels of fire service operations to ensure that necessary functions at an incident are completed correctly, safely, and effectively. A comprehensive, diverse, and ongoing training program is critical to the fire department's level of success.

An effective fire department training program must cover all the essential elements of that department's core missions and responsibilities. The level of training or education required for a set of tasks varies with the jobs to be performed. The program must include an appropriate combination of technical/didactic training, manipulative or hands-on/practical evolutions, and training assessment to gauge the effectiveness of these efforts. Most of the training, but particularly the practical, standardized, hands-on training evolutions should be developed based upon the department's own operating procedures and operations while remaining cognizant of widely accepted practices and standards that could be used as a benchmark to judge the department's operations for any number of reasons.

Certain Occupational Safety and Health Administration (OSHA) regulations dictate that minimum training must be completed on an annual basis, covering assorted topics that include:

- A review of the respiratory protection standard, self-contained breathing apparatus (SCBA) refresher and user competency training, SCBA fit testing (29 CFR 1910.134).
- Blood Borne Pathogens Training (29 CFR 1910.1030).
- Hazardous Materials Training (29 CFR 1910.120).
- Confined Space Training (29 CFR 1910.146).
- Structural Firefighting Training (29 CFR 1910.156).

In addition, National Fire Protection Association (NFPA) standards contain recommendations for training on diverse topics such as a requirement for a minimum of 24 hours of structural firefighting training annually for each fire department member. Also, the ISO-Fire Suppression

Rating Scale (ISO-FSRS) has certain training requirements for which fire departments receive credit during the ISO-FSRS review.

Because so much depends upon the ability of the emergency responder to effectively deal with an emergency, education and training must have a prominent position within an emergency responder's schedule of activities when on duty. Education and training programs also help to create the character of a fire service organization. Agencies that place a real emphasis on their training tend to be more proficient in performing day-to-day duties. The prioritization of training also fosters an image of professionalism and instills pride in the organization. Overall, the MFD has an excellent, robust, and comprehensive training program and there exists a dedicated effort focused on a wide array of training activities.

The training function in the MFD is currently headed by a Battalion Chief who manages this function as part of a broader portfolio of duties. At the time of this assessment the Battalion Chief was the only person formally assigned to training. It was reported that at one time the MFD had a dedicated training officer before those duties were combined with other duties and responsibilities. The Battalion Chief puts out an annual training calendar and assigns personnel to various classes throughout the year.

It does appear that the training program is headed in the right direction. There seems to be a dedicated effort—and desire by the members of the department—to focus training on a wide array of training activities. The department also earned the maximum points allowable for training in its last ISO evaluation. However, as the department increases in size and its missions grow more complex, attempting to manage the wide-ranging training function along with other duties will eventually overwhelm the Battalion Chief.

As a result, CPSM believes that within the next several years the department's training and safety functions should be refined and expanded. It is recommended that an Administrative Battalion Chief lead the training and Operational Battalion Chiefs lead the safety function. Battalion FITs, if implemented, could serve as the Safety Officers and work in coordination with Operational Battalion Chiefs.

The MFD utilizes a wide range of personnel from both inside and outside of the department (and even the city) to provide training based upon the subject and the expertise needed to teach that particular subject or skill. Many MFD personnel are state-certified as Fire Instructor 1. Shift Battalion Chiefs assign personnel different under their command to present classes for battalion or company level training, in addition, the department has various city employees—such as Finance, Human Resources, Water Dept., Police Dept., etc. —provide training on multiple aspects of the city's operations. Finally, the department will bring in outside instructors from the state, private businesses, and national organizations to provide specialized training.

The MFD does not require newly hired personnel to be certified firefighters prior to hire. New firefighters are hired and put through a six-to-eight-week, in-house training academy. They then go on shift and work towards their Pro-Board Fire Fighter I certification over their first year of employment. They must also obtain their Nationally Registered Emergency Medical Technician certification within 18 months of employment.

The MFD has multiple locations and opportunities for training. All five MFD stations have large open bay areas for training on topics to include search and rescue, hose deployment, ropes, EMS, ladder deployment, hoisting and operating fire tools, and salvage/overhaul. All stations are also equipped with exercise facilities to support firefighters' cardiovascular and muscular endurance.

The department has its own training facility that includes classrooms, a burn building, a high-rise building, ventilation prop, trench rescue prop, forcible entry prop, two fire hydrants, and vehicles for auto extrication. Personnel also have access to city-owned properties that can be used for training. This includes flood damaged homes for fireground evolutions, Roosevelt Park swimming pool for diving and other water operations, Minot city water treatment facility for confined space training, and the airport for ARFF operations. The Minot State University swimming pool is also available for diving and water operations training. North Dakota State fairgrounds are used annually for the state fire school.

The MFD utilizes Trinity Health Riverside facility for EMT courses, continued education, and EMT certification. The Trinity Health First Response building is used for medical training and patient care mutual aid training.

Additional daily opportunities for training can be found during related activities such as daily/weekly apparatus and equipment inspections and fire pre-planning activities. Annual inspection and testing requirements such as for hose, pumps, hydrant flow testing, etc. can also provide additional training credits for personnel who participate. Training can and should also be conducted during evening hours and on weekends.

On the EMS side of operations, training programs and requirements are primarily driven by the mandatory nature of continuing education and recertification requirements for various levels of practitioners. All levels of EMS training require continuing education credits on a multiyear cycle for recertification. If individual personnel, or the agency, were to not keep up with required training and/or certification requirements they could lose their ability to practice or provide the prescribed levels of service.

An MFD Captain assists with coordinating and providing this training. Whenever possible, fire training should be tied into EMS continuing education credits, providing dual discipline benefit for personnel. Since EMS incidents make up a significant percentage of the department's responses, ensuring that these certifications continue to be maintained should remain a meaningful component of the department's training focus.

Professional development for fire department personnel, especially officers, is also an important part of overall training. There are numerous excellent opportunities for firefighters and officers to attend training on a wide range of topics outside of Minot including those offered at various state firefighting academies, at the National Fire Academy (NFA) in Emmitsburg, Maryland, and at national conferences such as the Fire Department Instructor's Conference (FDIC), Fire Rescue International, and the annual Firehouse Expo. The department also sends its personnel to various training opportunities across the country such as the Anniston, Ala., Regional Training Center, Pueblo Colorado training facility, TEEX annual fire training school, IAFF training, and the ND State Fire School.

CPSM was informed that although a few officers have attended the NFA, most have so far declined to take advantage of this excellent opportunity. Beyond the practical benefits to be gained from personnel participating in outside training, encouraging personnel to earn and/or maintain various specialized certifications such as Fire Instructor or Fire Officer increases the positive professional perception of the organization and can help to demonstrate a commitment to continued excellence.

As of the time of this assessment the MFD's personnel development program was a work in progress. The department is to be commended for this effort and given the support to continue to develop this program.

MFD officers typically provide feedback to personnel regarding their performance but there is no formal testing or skills assessments for fire training in the department. Training is a required activity in the fire service and thus it is essential to incorporate a formal testing process as part of the learning effort. EMS skills assessments, both practical and written, are regularly incorporated into EMS training. Traditionally, fire departments are reluctant to incorporate skills testing into their fire training components. However, an increasingly common way to evaluate the department's training program is through annual skills proficiency evaluations where all members of the department are required to successfully perform certain skills or complete standardized evolutions, either individually or as part of a team.

The ability to monitor and record training test scores is beneficial from an overall proficiency standpoint. In addition, training scores should be incorporated into the annual performance appraisal process for both the employee, his/her supervisor, and the training staff. In addition, the concept of adding a testing process to each training evolution adds to the importance and seriousness in which these activities are carried out.

The MFD utilizes a formal task book process to provide training guidance and new rank orientation. A growing number of fire departments are employing task books for personnel who aspire to (or in some cases have already been promoted to) higher rank and is considered a *CPSM Best Practice*. The successful completion of a task book may be considered as a prerequisite for promotion to higher rank or step-up assignment. These efforts can help provide newly promoted personnel with the tools needed to operate both administratively and in field settings. The completion of the task book also qualifies individuals to assume acting Senior Firefighter and Captain assignments in which they receive practical experience and on-the-job training.

Beyond the establishment of requirements to achieve certain levels of certification for promotion, the department should consider the implementation of a formal professional development program for all department personnel. The program should attempt to strike an appropriate balance between technical/practical task books, simulator training, formal certifications, mentor relationship, and outside influences. Where practical, best practices identified by the NFA, NFPA, ISO, IFSTA, IFSAC, North Dakota State Fire School, and the Center for Public Safety Excellence (CPSE) should be incorporated.

Fire Education, Training, and Professional Development Recommendations:

- The MFD should continue to develop and budget for officer training and development programs. To further enhance these programs the department should consider components that are competency-based on National Fire Protection Association (NFPA), International Association of Fire Chiefs (IAFC) and International Fire Service Training Association (IFSTA) standards, and that focus on contemporary fire service issues including community fire protection and emergency services delivery approaches, fire prevention practices, firefighter safety and risk management and labor/staff relations; reviewing, approving, or preparing technical documents and specifications, departmental policies, standard operating procedures and other formal internal communications; improving organizational performance through process improvement and best practices initiatives; and having a working knowledge of information management and technology systems. (Recommendation No. 13.)
- The MFD should consider increasing the requirements for further professional advancement at various levels, such as the following: (Recommendation No. 14.)
  - Senior Firefighter

- Minimum of 30 college credits.
- Advanced engine and truck company operations.
- Tactics and Strategy.
- Fire Instructor I.
- Fire Officer I.
- NFA Command and Control for Company Level Officers.
- IMS Level 300.

- Captain
  - Possession of an associate degree.
  - Fire Instructor II.
  - Fire Officer II.
  - Fire Inspector I.
  - NFA Command and Control of Incident Operations.
  - Command and Control/ Blue Card Cert.
  - Incident Safety officer.
  - 1st. Leadership/Emergency Systems Management course.
- Battalion Chief
  - Bachelor's Degree.
  - Fire Officer III.
  - IMS Level 400.
  - Health and Safety Officer.
  - NFA Command and Control of Fire Department Operations at Target Hazards.
  - 2nd Leadership / Emergency Services Management course.
  - Fire Investigator.

- The MFD should develop should institute written and practical skills testing and proficiency evaluations (non-punitive) as part of the department's comprehensive fire training program. (Recommendation No. 16.)
- The City of Minot in consultation with the MFD should consider providing funding for the MFD to procure additional training props necessary to effectively and safely perform both basic and advanced/complex training evolutions for all personnel. (Recommendation No. 17.)
- The MFD should make a concerted effort to send as many officers as possible to the National Fire Academy (NFA). This should include the Training personnel for various training-related classes, and the Fire Marshal and/or Fire Inspectors for fire prevention and community risk reduction classes. Any officers who meet the admissions criteria should be encouraged to enroll in the Academy's Executive Fire Officer Program. (Recommendation No. 18.)
- The MFD should look for opportunities to provide periodic joint training between the department and various agencies that provide automatic/mutual aid to the city including in the evening and on weekends. Consideration should also be given to hosting large-scale exercises to test and evaluate regional interoperability. (Recommendation No. 19.)

ISO-PPC ANALYSIS

The ISO is a national, not-for-profit organization that collects and evaluates information from communities across the United States regarding their capabilities to combat building fires. ISO conducts field evaluations to rate communities and their relative ability to provide fire protection and mitigate fire risk. This evaluation allows ISO to determine and publish a Public Protection Classification (PPC) rating of Class 1/1X to Class 9 (Class 10 are areas with no fire protection) for the community.

Class 1 (highest classification) represents an exemplary community fire suppression program as outlined below. In contrast, a Class 9 score indicates that the community's fire suppression program does not meet ISO's minimum criteria. It is important to understand the PPC is not just a fire department classification, but a compilation of community services that include the fire department, the emergency communications center, and the community's water supply system operator. A lower numerical rating makes the community more attractive from an insurance risk perspective, so insurance costs are reduced for businesses and homeowners. A community's PPC grade depends on:

Emergency Communications: A maximum of 10 points of a community's overall score is based on how well the fire department receives and dispatches fire alarms. ISO field representatives evaluate:

- The emergency reporting system.
- The communications center, including the number of telecommunicators.
- Computer-aided dispatch (CAD) facilities.
- The dispatch circuits and how the center notifies firefighters about the location of the emergency.

Fire Department: A maximum of 50 points of the overall score is based on the fire department. ISO representatives review the fire companies and check that the fire department tests its pumps regularly and inventories each engine and ladder company's equipment according to NFPA 1901. ISO also reviews the fire company records to determine factors such as:

- Type and extent of training provided to fire company personnel.
- Number of people who participate in training.
- Firefighter response to emergencies
- Maintenance and testing of the fire department's equipment.

Water Supply: A maximum of 40 points of the overall score is based on the community's water supply. This part of the assessment focuses on whether the community has sufficient water supply for fire suppression beyond daily maximum consumption. ISO surveys all components of the water supply system and reviews fire hydrant inspections and frequency of flow testing.

Community Risk Reduction: The Community Risk Reduction section of the FSRS offers a maximum of 5.5 points, resulting in 105.5 total points available in the FSRS. The inclusion of this section for "extra points" allows recognition for those communities that employ effective fire prevention practices, without unduly affecting those who have not yet adopted such measures. The addition of Community Risk Reduction gives incentives to those communities that strive proactively to reduce fire severity through a structured program of fire prevention activities. The areas of community risk reduction evaluated in this section include:

- Fire prevention.
- Fire safety education.
- Fire investigation.

Many communities view achieving a Class 1 as an accolade. Therefore, when it is possible, maintaining a favorable rating or lowering an ISO score is often included in a community's strategic plan.

Overall, the community PPC rating for Minot (2017) yielded 82.75 out of 105.5 earned credits, leading to a Class 2 rating.[18] **This is an excellent score (and class), for which the City of Minot and MFD are to be commended.**

FIGURE 2-10: ISO PPC Ratings in the U.S.

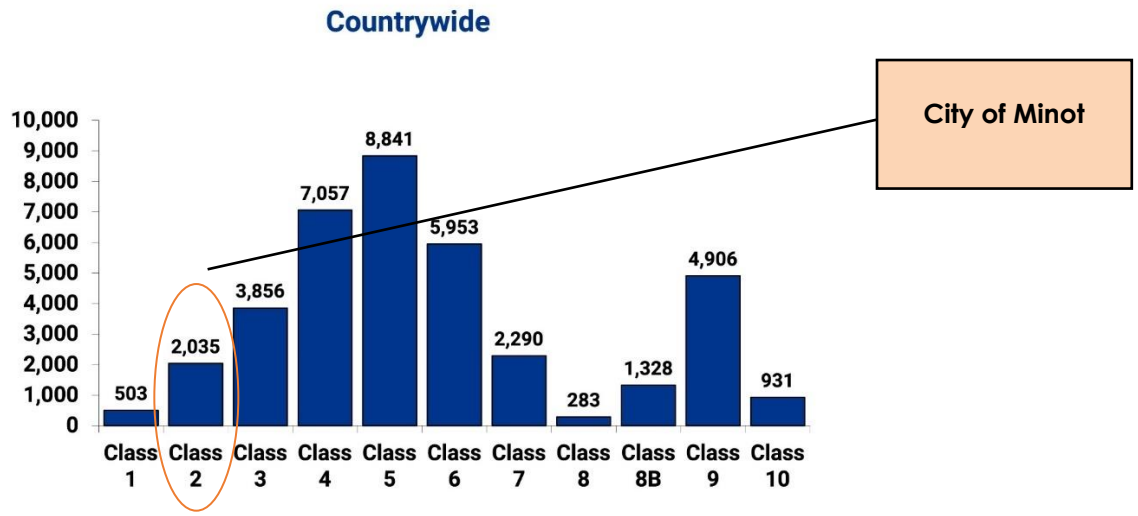
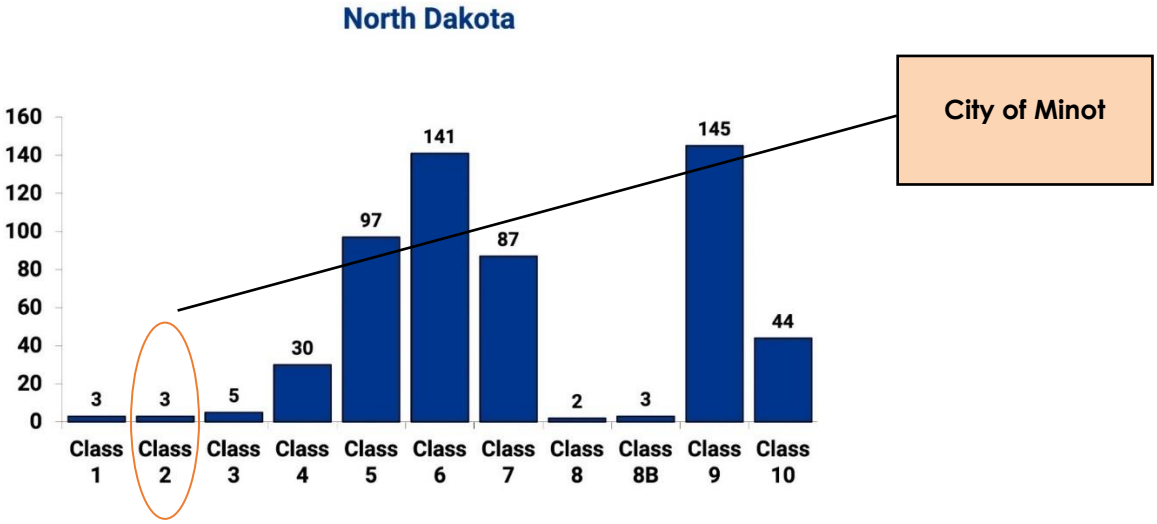


FIGURE 2-11: ISO PPC Ratings in North Dakota



18. ISO 2017 Minot Report (2017)

The following table is a summary of Minot's 2017 ISO rating.

TABLE 2-1: City of Minot ISO Earned Credit Overview

FSRS Component	Credit Available	Earned Credit 2017
414. Credit for Emergency Reporting	3	2.85
422. Credit for Telecommunicators	4	4.00
4.32. Credit for Dispatch Circuits	3	1.57
440. Credit for Emergency Communications	**10**	**8.42**
513. Credit for Engine Companies	6	5.75
523. Credit for Reserve Pumpers	.5	0.50
532. Credit for Pump Capacity	3	3.00
549. Credit for Ladder Service	4	2.03
553. Credit for Reserve Ladder and Service Trucks	.5	0.00
561. Credit for Deployment Analysis	10	5.12
571. Credit for Company Personnel	15	7.67
581. Credit for Training	9	9.00
730. Credit for Operational Considerations	2	2.00
590. Credit for Fire Department	**50**	**35.07**
616. Credit for Supply System	30	29.14
621. Credit for Fire Hydrants	3	3.00
631. Credit for Inspection and Flow Testing	7	8.00
640. Credit for Water Supply	**40**	**40.00**
Divergence	**---**	**-5.97**
1050. Community Risk Reduction	**5.50**	**5.23**
Total	**105.50**	**82.75**

This table shows that the Emergency Communications, Water Supply, and Community Risk Reduction credits are very good. In the Emergency Communications component the only significant point deduction was for the number of dispatch circuits. With dispatch's move into the new City Hall this issue may be resolved. **The city received maximum credit for Water Supply, which is very rare and commendable.**

Under the Fire Department category, **the department received full credit for Training, which again is rare and commendable.**

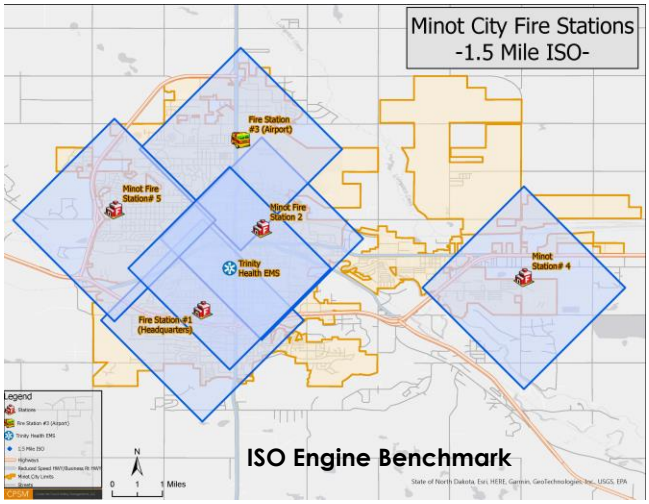
The Fire Department credits have room for improvement, specifically improving credits in Ladder Service, Deployment Analysis, Company Personnel, and Training sections.

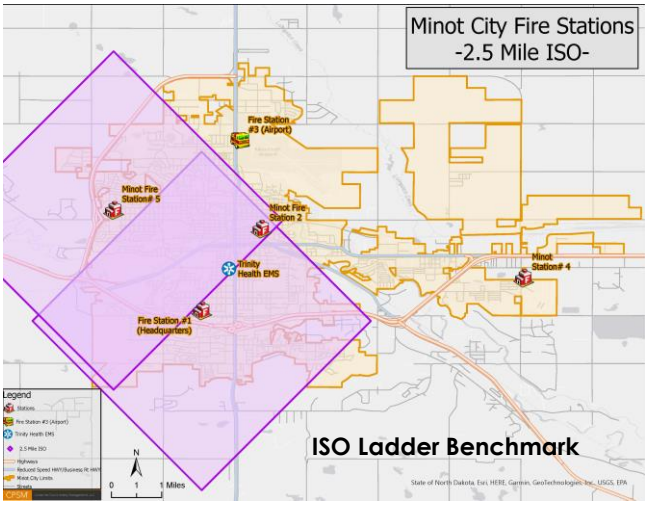
- Credit for Reserve Pumpers – ISO provides credits for the number and adequacy of pumpers (engines) and their equipment within. The number of needed reserve engines and ladder trucks is one for each eight needed in a community, or fraction thereof. There is one reserve pumper in the city, which would be adequate for the City of Minot. However, the credit for engine companies is calculated by ISO based on an agency's capability to provide 3500

GPM from three engine companies. To achieve the 3,500 GPM standard, the reserve pumper was utilized, thus negating the reserve credit.

- ISO provides credit for the number of response areas within the city with five buildings that are three or more stories (or 35 feet or more in height), or with five or more buildings that have a fire flow requirement greater than 3,500 GPM. The height of all buildings in the city, including those protected by automatic sprinklers, is considered when determining the number of needed ladder companies.
  - The MFD lost 1.97 points for Credit for Ladder Service due to several factors, but in its simplest form, the fact that the city utilizes its primary ladder, which is a quint, as both an engine and a ladder (and is primarily an engine/pumper) costs points as ISO will not give full credit for both. In addition, the fact that it is stationed at Station 5, rather than at the downtown location of Station 1 or 2 (not within 2.5 road miles of all buildings three stories or greater or that require 3,500 GPM or more fire flow) also results in a point loss. To receive full credit for the ladder, the MFD would need to:
  - Staff an additional pumper at a station along with the Ladder.
  - Have a ladder truck stationed downtown also, or within 2 ½ road miles of all buildings of three stories or more in height or that require 3,500 GPM or more for fire flow.
- The Credit for Deployment Analysis section measures the number of fire units staffed at ISO or NFPA standards that are available to respond to incidents within the city. ISO provides credits for the percentage of the community within specified response distances, which is 1.5 miles for pumpers and 2.5 miles for a ladder truck. As an alternative, a fire protection area may use the results of a systemic performance evaluation; an evaluation analyzing CAD history to demonstrate that, with its current deployment of companies, the department meets the time constraints for initial arriving engine and initial full-alarm assignment as specified by NFPA 1710.
  - The MFD would need to add staffed and equipped apparatus that can respond immediately to increase its points in this section. These units would also need to meet the response area and time frames specified.

FIGURE 2-12: ISO 1.5-Mile Engine Company and 2.5-Mile Ladder Service Polygons





- The section on Credit for Company Personnel simply looks at the department's staffing practices based upon averages. It also includes automatic aid companies and on-call personnel that fall within a five-road mile status or response times as recommended by NFPA standards.
  - To receive additional points in this area MFD would need to increase staffing. The addition of the engine at Station 5 and 4 minimum personnel on Ladder 5 could most likely help.
  - Fire department staff would also need more time available to conduct pre-fire planning inspections. This is addressed later in Section 4 on Fire Operations.
- MFD's credit for Divergence is -5.97. For the divergence analysis, when a fire department's apparatus and personnel capabilities do meet the capabilities of the water system, the department loses what are called divergence points.
  - To receive those points, the MFD would need to place additional fire suppression apparatus and personnel into service.

There are multiple recommendations made throughout this report that if implemented should improve the MFD's ISO rating.

ISO Rating Recommendation:

- CPSM recommends that the MFD address the deficiencies in the most recent ISO report as reviewed in this analysis. Special emphasis should be placed on section 561, Credit for Deployment Analysis (score 5.12/10) and section 571, Credit for Company Personnel (score 7.67/15). CPSM believes that the potential enhancements to staffing and deployment by the MFD, including the addition of Station 5, and the addition of a staffed, dedicated ladder truck, should make earning a coveted ISO Class 1 rating possible for Minot. (Recommendation No. 20.)

FLEET ANALYSIS

The resources that the fire department uses to perform its core mission and mitigate a wide range of emergency incidents are divided into two major categories: apparatus and tools/equipment.

Apparatus includes the department's motorized vehicle fleet and includes the major emergency response apparatus such as engines (pumpers), aerial apparatus including towers and ladders, rescue vehicles, and ambulances. Specialized apparatus includes emergency units such as lighting vehicles, brush trucks, and other off-road vehicles. It also often includes trailers for specialized applications such as technical rescue, hazardous materials response/equipment, hazardous material decontamination, structural collapse rescue equipment, breathing air/light support units, foam units/supplies, and mass casualty incident supplies. Support vehicles that are critical to fire department operations, both routine and emergency, include command post and emergency communications units, command/staff vehicles, and maintenance trucks.

The geography, infrastructure, hazards, and construction features within the community all play a key role in determining the composition of each department's unique and individualized apparatus fleet and equipment inventory. Minot's characteristics present the fire service with a wide variety of strategic and tactical challenges related to emergency response preparedness and mitigation. This includes fire suppression operations, emergency medical responses, and

complex incidents requiring special operations capabilities such as technical rescue and hazardous materials emergencies.

Large commercial buildings, mid/high-rise structures, and a diverse mixture of target hazards present much different operational hazards and challenges than those required for operations in single-family dwellings. These factors, as well as projected future needs, must be taken into consideration when specifying and purchasing apparatus and equipment. Every effort should be made to make new apparatus as versatile and multifunctional/capable as is possible and practical.

Fire department apparatus is designed and intended to transport firefighters and fire and life safety equipment to the scene of an emergency. The provision of an operationally ready and strategically located fleet of mission-essential fire and rescue vehicles is fundamental to the ability of a fire-rescue department to deliver reliable and efficient public safety within a community. Modern, reliable vehicles are needed to deliver responders and the equipment/materials they deploy to the scene of dispatched emergencies within the city.

The procurement, maintenance, and eventual replacement of response vehicles is one of the largest expenses incurred in sustaining a community's fire-rescue department. Reliable vehicles are needed to deliver responders and the equipment/materials they employ to the scene of dispatched emergencies within the city. A well-planned and documented emergency vehicle replacement plan (capital improvement plan) ensures ongoing preservation of a safe, dependable, and operationally capable response fleet. A plan must also include a schedule for future capital outlay in a manner that is affordable to the community.

NFPA 1901, *Standard for Automotive Fire Apparatus*, serves as a guide to the manufacturers that build fire apparatus and for the fire departments that purchase them. NFPA 1901 is updated every five years using input from the public/stakeholders through a formal review process. The committee membership is made up of representatives from the fire service, manufacturers, consultants, and special interest groups. The committee monitors various issues and problems that occur with fire apparatus and attempts to develop standards that address those issues. A primary interest of the committee over the years has been improving firefighter safety and reducing fire apparatus crashes. A key component of NFPA 1901 states:

> "It is recommended that apparatus greater than 15 years old that have been properly maintained and that are still in serviceable condition be placed in reserve status and upgraded in accordance with NFPA 1912, *Standard for Fire Apparatus Refurbishing* (2016), to incorporate as many features as possible of the current fire apparatus standard. This will ensure that, while the apparatus might not totally comply with the current edition of the automotive fire apparatus standards, many improvements and upgrades required by the recent versions of the standards are available to the firefighters who use the apparatus."

Under the NFPA1912 standard there are two types of refurbishments a fire department can choose. These are Level 1 and Level 2 refurbishments. According to NFPA 1912, a Level 1 refurbishment includes *the assembly of a new fire apparatus by the use of a new chassis frame, driving and crew compartment, front axle, steering and suspension components, and the use of either new components or components from existing apparatus for the remainder of the apparatus.* A Level 2 refurbishment includes *the upgrade of major components or systems of a fire apparatus with components or systems of a fire apparatus that comply with the applicable standards in effect at the time the original apparatus was manufactured.*

A few important points to note regarding the NFPA 1912 standard regarding the refurbishment of heavy fire apparatus. These are:[19]

- **Apparatus that was not manufactured to applicable NFPA fire apparatus standards or that is 25 years old should be replaced.** Some departments will utilize vehicles such as this (frontline but not regularly utilized) for longer than 25 years. CPSM does not recommend this practice; however, we understand the financial burden of replacing heavy fire apparatus. It is up to the department and municipality regarding the management of older fire apparatus and the risks these may pose to firefighters and the public who share the road with them.
- A vehicle that undergoes a Level 1 refurbishing receives a new make and model designation and a new Certificate of Origin for the year of refurbishment. Apparatus receiving a Level 1 refurbishing are intended to meet the current edition of the NFPA automotive fire apparatus standard. *This is the optimal level of refurbishing*.
- A vehicle that undergoes a Level 2 refurbishing retains its original make and model identification as well as its original title and year of manufacture designation. Apparatus receiving Level 2 refurbishing are intended to meet the NFPA automotive fire apparatus standard in effect when the apparatus was manufactured.

It is an accepted fact that fire department apparatus and vehicles, like all types of mechanical devices, have a finite life. A primary impetus for these recommended service life thresholds is continual advances in occupant safety. Despite good stewardship and maintenance of emergency vehicles in sound operating condition, there are many advances in occupant safety, such as fully enclosed cabs, enhanced rollover protection and air bags, three-point restraints, antilock brakes, higher visibility, cab noise abatement/hearing protection, and a host of other improvements as reflected in each revision of NFPA 1901. These improvements provide safer response vehicles for those providing emergency services within the community, as well those "sharing the road" with these responders.

Today's fire departments are obligated to establish and document formal programs and procedures to ensure that equipment is replaced regularly, maintained properly, and deployed in accordance with accepted standards and department procedures. Proper training on the use and maintenance of equipment is essential to effective and safe firefighter performance and minimizes the fire department and city's risk exposure.

The current MFD fire apparatus fleet consists of five pumpers, one Quint, one reserve aerial ladder, one rescue, one ARFF unit, one brush unit, one tech rescue truck, one dive truck, one hazardous material response unit and trailer, and various staff and command vehicles. The age of the major firefighting apparatus currently in service ranges from 24 years old for the brush truck to two years old for Engines 2 and 4.

When considering apparatus usage, hours on the motor and pump hours must be taken into consideration. Fire apparatus typically spend more time idling while at emergency scenes or throttled up when operating the fire pump. A rule of thumb that can be used is that each hour on the motor is the equivalent of 30 to 35 miles of actual road usage.

The MFD emergency vehicle inventory is outlined in the following table.

19. NFPA 1912, *Standard for Fire Apparatus Refurbishing*, 2016 Edition.

TABLE 2-2: MFD Full Fleet Listing and Age

Unit #	Description	Year	Type	Serial Number	Suggested Replacement Date	Estimated Replacement Cost	Replacement Interval
	Engines						
204	E-One Typhoon (E4)	2022	Engine	4EN6AHA8XN2004806	2037		15
206	E-One Typhoon (E2)	2022	Engine	4EN6AHA83P2005380	2037		15
225	F-550 Ford- Brush Truck	2000	Brush/Grass	1FDAF57F9YEE09294	2015	150,000	15
229	Intn'l 4400 SBA 4x2- (Dive Rescue)	2005	Dive Rescue	1HTMKAAL15H157364	2035	100,000	30
234	Freightliner Pumper Toyne (Reserve Engine)	2010	Engine	1FVACYBSXBDAY7614	2025		15
233	CBRNE Truck (HazMat)	2010	HazMat	4S7CU2D98AC072469	2030	500,000	20
238	Spartan Force Fire Pumper Truck (E3)	2012	Engine	4S7YT2B96DC076326	2029		15
241	Ford F550 Rescue Truck (R2)	2013	Non-Transport Rescue	1FDUF5HT4DEB53061	2028		15
243	Ford F550 Tech Rescue/Tow Vehicle	2015	Tech Rescue	1FDEF5HT9FEA99811	2030		15
244	Fire Department Aerial Truck (P1)	2015	Aerial Truck	4ENLABA8XF1008989	2035		20
245	E-One 78' Typhoon Quint (L5)	2016	Engine	4EN6AAA84G1000413	2031		15
246	E-One Typhoon Pumper (E1)	2016	Engine	4EN6AHA82G2000414	2031		15
301	E-One Titan (ARFF) OUT OF SERVICE	1992	ARFF	4ENDAAA85N1009982	2012	672,000	20
302	Oshkosh Striker (ARFF)	2012	ARFF	10TALDLGF8CS749212	2032	672,000	20
	Support Vehicles						
202	Ford F150 pickup	2009	Inspections	1FTPX14V59FA17327			
203	Ford Explorer AWD	2016	Inspections	1FM5K8AR6HGB15745			
205	Ford F150 pickup	1997	Utility	1FTDF18W0VKD29484	2007	30,000	20
226	Ford Excursion XLT	2002	Command	1FMNU41L32EC33530	2017	50,000	15
228	Chevy 2500 4WD	2000	Utility	1GCGK24U3YE178968	2020	37,000	20
232	Chevy Impala	2006	Utility	2G1WS551969322338	2014	22,000	10
235	Chevy Suburban (BC2)	2011	Command	1GNWK5EG7BR111383	2026	60,000	15
239	Ford Explorer AWD	2014	Inspections	1FM5K8AR3EGA09281	2034	20,000	20
242	Chevy Silverado K2500	2009	Utility	1GCHK59K79E122952	2019	30,000	10
247	Chevy 3500 Pickup (Mechanic's Truck)	2009	Utility	1GCHK59K89K09E126536			
248	Toyota Corolla	2016	Utility	2T1BURHEXHC926702			
249	Cheverolet Tahoe (BC1)	2019	Command	1GNSKDEC6KR378181			
	Trailers						
251	United Trailer (Investigations)	2002	Trailer	48B500C1821058726	2032		30
252	Old Car Trailer	2002	Trailer	1P9CSI82721199490	2032		30
254	28" Tech Rescue Trailer	2004	Trailer	1WC200N3551110245	2034		30
	Falcon XC Round Top Cargo Trailer	2012	Trailer	AFX8516TA3	2042	10,000	30
256	2012 American Hauler (Wood Trailer)	2012	Trailer	5N6200G27D1039559	2042		30
257	2014 Diamond Car Hauler	2014	Trailer	46UFU2021E1158853	2034		30
259	2022 Haulmark	2022	Trailer	7K5N000167	2052		30
	Miscellaneous						
237	Zodiac boat MS007 Engine OR483683	2012	Water Rescue	XDCC146FB212	2022	25,000	10
240	2015 Wacker Neuson WL30 Wheel Loader	2015	Utility	3023767	2035		20
258	Bobcat 790		Specialized	5128191177			

One of the biggest factors that can impact the serviceable life of an apparatus is the level of preventive maintenance that it receives. NFPA 1911 provides guidance on this important aspect of fire department support operations. Apparatus manufacturers also identify suggested programs and procedures to be performed at various intervals. As apparatus ages it is reasonable to expect that parts will wear out and need to be replaced. It follows then that maintenance costs and overall operating expenses will increase. As a result, cost history and projected costs for the future must be considered as a factor in determining when to replace, or refurbish, a fire apparatus. In addition, reliability of the apparatus must be considered. Experiencing low downtime and high parts availability are critical factors for emergency equipment maintenance and serviceability. A proactive preventive maintenance program can assist with holding costs to an acceptable level. The Annex Material in NFPA 1911 contains recommendations and worksheets to assist in decision making in vehicle replacement.

The MFD provides routine vehicle repairs and maintenance to the MFD fleet using its own fire mechanic who does an excellent job of maintaining the fleet. In addition, limited preventive

maintenance is completed by some personnel within each of their stations. More complex and/or warranty work on the vehicles is performed by either the MFD mechanic, dealer of the apparatus, or a regional vendor who is contracted to do the work. Regarding maintenance and repair to apparatus, a few key points to remember are:

- Ensuring that preventive maintenance programs are developed and implemented for fire apparatus according to manufacturer's guidelines and national consensus standards.
- Ensuring that preventive maintenance on fire apparatus is performed and/or overseen by qualified personnel who meet the certification requirements outlined in NFPA 1071, *Standard for Emergency Vehicle Technician Professional Qualifications*.
- Develop and utilize policies and procedures that monitor preventive maintenance and other automotive services performed by vendors.

From CPSM's perspective, the apparatus fleet as a whole, even the older units, all appear to be in at least fair condition. The equipment is stowed in an orderly fashion.

CPSM understands that the harsh winter weather conditions in North Dakota can have an impact on apparatus and in all probability shorten its life span. CPSM recommends that MFD evaluate the lifespan of its apparatus in terms of this criteria when considering repairs and replacement and evaluate their service life against the NFPA 1912 standard.

MFD utilizes an outside vendor for their ladder testing with pump testing conducted internally. Test results provide an indicator of apparatus condition and are a valuable tool in budget planning. Often, because of this testing, minor maintenance issues can be resolved which will delay or eliminate the need for major repairs in the future. It is also important to remember that from a safety and performance perspective, this annual testing needs to be completed to ensure the overall rating, capacity, and functionality of the pumps and ladders are reliable during emergency incidents.

The MFD does maintain an Apparatus Replacement Plan that is projected out to the year 2055. In 2022, the city received two new pumpers which were assigned to Engines 2 and 4. Another new pumper is slated to be ordered in 2025, followed by two more in 2031. Two challenges for municipalities and fire departments that are looking to replace apparatus today are cost and lead time. A standard pumper can cost between $800,000 and $1,000,000 while a new ladder can be upwards of $2,000,000. Lead time from order to delivery can be two to three years for a pumper and three years or more for a ladder.

Fleet Recommendations:

- CPSM recommends that the City of Minot and MFD work collaboratively to have a complete and objective evaluation of the current condition of the MFD's apparatus fleet. If this evaluation indicates serious deficiencies in the fleet, then adjustments may need to be made to the apparatus replacement schedule. (Recommendation No. 21.)
- CPSM recommends that the City of Minot and MFD explore options to obtain a quality pumper that can be utilized as a reliable spare. The only spare pumper the city has is in fair to poor condition. If it, or just one other unit, is out of service, the department has no spare available. The MFD would be better served by having two spare pumpers available for when units are out of service and that can be used by off-duty personnel being recalled to work for major incidents. (Recommendation No. 22.)

CITY OF MINOT EMS GROUND TRANSPORT SERVICE DELIVERY

First Response Ground is the EMS ground transport division of the Trinity Health Network. It provides direct support to the Minot Fire and Police Departments, as well as the Ward County Sheriff's Office and additional first responder groups. It responds to approximately 10,000 calls annually, both emergency and non-emergency, inter-facility transfers, and provides ALS intercept services to many of the ambulance services in northwestern North Dakota.

FRG operates from a station in Minot located at 305 11th Ave SW. By state law, EMS is supposed to work to achieve a nine-minute response time in the city, and 12 minutes in the surrounding county area. While EMS was not evaluated as part of this assessment, CPSM was informed anecdotally by multiple stakeholders that MFD units are facing increasing on-scene wait times for ambulances. This is a common challenge that we hear today in communities where the EMS ground transport is handled by a private third-party entity.

BUDGET OVERVIEW

The proposed 2024 City of Minot budget continues the City Council's long-standing effort at providing municipal services as cost effectively as possible. The city levy approved by the City Council in 2023 was 120.08 mills. The final adjusted rate by the County was 119.15. The proposed mill rate for 2024 is 120.71, a slight increase of 0.63 mills.

The 2024 proposed budget is $199,635,478 compared to $182,627,269 in 2023, which is an increase of $17,008,209 or 9.31%.

The MFD operating budget for the current and the FY 2023 fiscal year is outlined in the following table: the figures shown are general fund budget allocations, as the MFD is a General Fund (GF) department. Funding the city's General Fund comes from property taxes, licenses, and permits, intergovernmental, charges for services, fines and forfeitures, and transfers. Personnel services (payroll expenditures to include salary, benefits, and pension costs) made up 88.4 percent of the general fund budget for the MFD. This is not uncommon nationally, since general fund departments and activities are typically service-oriented departments and costs are heavily weighted by staffing and personnel costs (salary, benefits, pension costs).[20] The FY 2024 annual proposed budget for the city's General Fund is $60,609,677 million, with public safety (police and fire operations) making up a significant portion of General Fund expenditures.[21]

TABLE 2-3: MFD Budget 2024

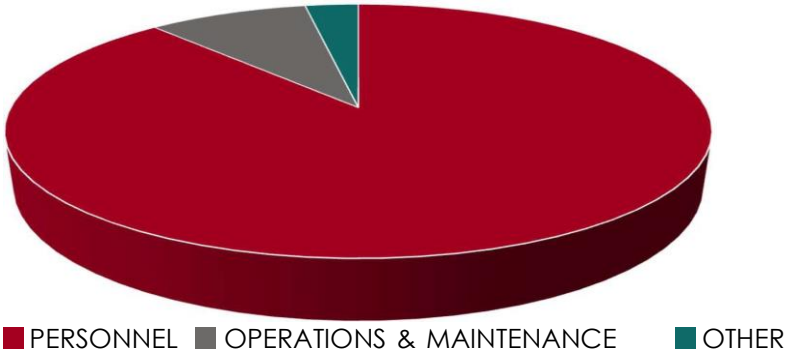
FY 2024 Budget	FY 2023 Budgeted	Dollar Change	Percent Change
$9,657,417	$8,882,834	$774,583	8.72%

Traditionally, and like every other career fire department in the nation, the MFD's budget is primarily consumed in personnel costs. This includes salary, benefits, retirement, overtime, and worker's compensation. The MFD personnel services budget area consistently represents

20. City of Minot Budget Document 2024.
21. Ibid.

approximately 80-plus percent of the total budget. The next largest budget areas are supplies and services, which support the operation and maintenance of facilities and equipment, automotive operational/repair costs and replacement, maintenance and operations of equipment, professional development, and information technology. The next figure illustrates a breakdown of the MFD budget.

FIGURE 2-13: MFD Expense Breakdown[22]



In February 2024, CPSM met with the Fire Chief and staff; the Fire Chief discussed the current overtime the department is experiencing. The FY 23 budgeted overtime for firefighters, engineers, and Captains collectively is $207,859. The 2024 budgeted overtime is $370,303, a 56 percent increase. Overtime is used to maintain minimum staffing of three on each engine and ladder and one on the ARFF apparatus (17 per shift) to meet departmental staffing. Shift staffing is a dynamic process, and vacancies occur daily due to scheduled and unscheduled leave.

Proving guidance of minimum staffing for scheduled and unscheduled leave are governed through Standard Operating Procedure/Guideline #3, Minimum Staffing. The MFD operates a staffing model of four assigned per apparatus with three being the minimum to operationally staff the apparatus. This means there are added personnel assigned to a shift to fill vacancies created by scheduled or unscheduled leave; however, the challenge remains. Vacancies in staffing can be affected by long-term injuries, illnesses, military leave, vacant positions, and Family Medical Leave or FMLA. This model then, consistently requires overtime to maintain minimum staffing levels and thus must be budgeted on an annual basis.

The Fire Chief is developing strategies to assist in covering scheduled and unscheduled leave and reducing overtime through the hiring and filling of vacancies as soon as possible.

It is not unusual for fire departments to staff shifts with additional personnel to cover scheduled and unscheduled leave. In some departments this is done on a large scale, such as one additional firefighter per engine per shift. These personnel are utilized to cover both short- and longer-term vacancies, thus reducing overtime expenses. Again, filling vacancies as soon as possible helps reduce overtime needs as does hiring additional firefighters to outweigh the use of overtime monies.

22. City of Minot Budget Document 2024.

SECTION 3. COMMUNITY RISK PROFILE

A significant part of determining the acceptable levels of service including deployment and staffing levels related to the delivery of fire and emergency services are directly tied to the level of risk found within a community. The level of risk includes a combination of factors including, but not limited to, the number and types of target hazards, life hazard, building construction and the presence of fire sprinklers and fire alarm systems, types and numbers of calls, and social-economic factors within a community. The purpose of this section is to provide an overview of the risk factors found in the City of Minot. Further discussion and related recommendations later in this report are based in significant part on the findings of this risk assessment. Since this section is focused primarily on the assessment itself, there are limited recommendations contained herein.

An all-hazards fire and EMS risk assessment is a compressive, participatory process for assessing hazards, vulnerabilities, and overall risks in a community. The primary purpose of a community risk assessment is to provide data to better inform local decisions on the planning and implementation of risk reduction measures.

A community risk reduction program (CRR) is a process used to identify and prioritize local risks, followed by the integrated and strategic investment of resources to reduce their occurrence and impact.[23] A CRR is a process to help communities find out what their risks are and develop a plan to reduce the risks viewed as high priority. The steps involved in the CRR are conducting a Community Risk Assessment (CRA), developing a CRR plan, implementing the plan, and evaluating the plan.

The CRA is a comprehensive evaluation that identifies, prioritizes, and defines the risks that pertain to the overall community. It is a critical first step in the CRR process and results in a full understanding of the community's unique risks, capabilities, and characteristics. An all-hazards approach is an integrated approach to emergency preparedness planning that focuses on capacities and capabilities that are critical to preparedness for a full spectrum of emergencies or disasters.

POPULATION AND COMMUNITY GROWTH

The City of Minot resides within Ward County in northwest North Dakota. Minot encompasses an area of 27.26 square miles and has a population of 48,377.[24] The population density in the City of Minot is 1,775 per square mile.[25] There has been an 18.3 percent increase in population since the 2010 census and a 32.3 percent increase since 2000. Through annexation, the city's area also increased 56.4 percent since the 2010 census. Minot is expected to continue to experience moderate growth in the near future.

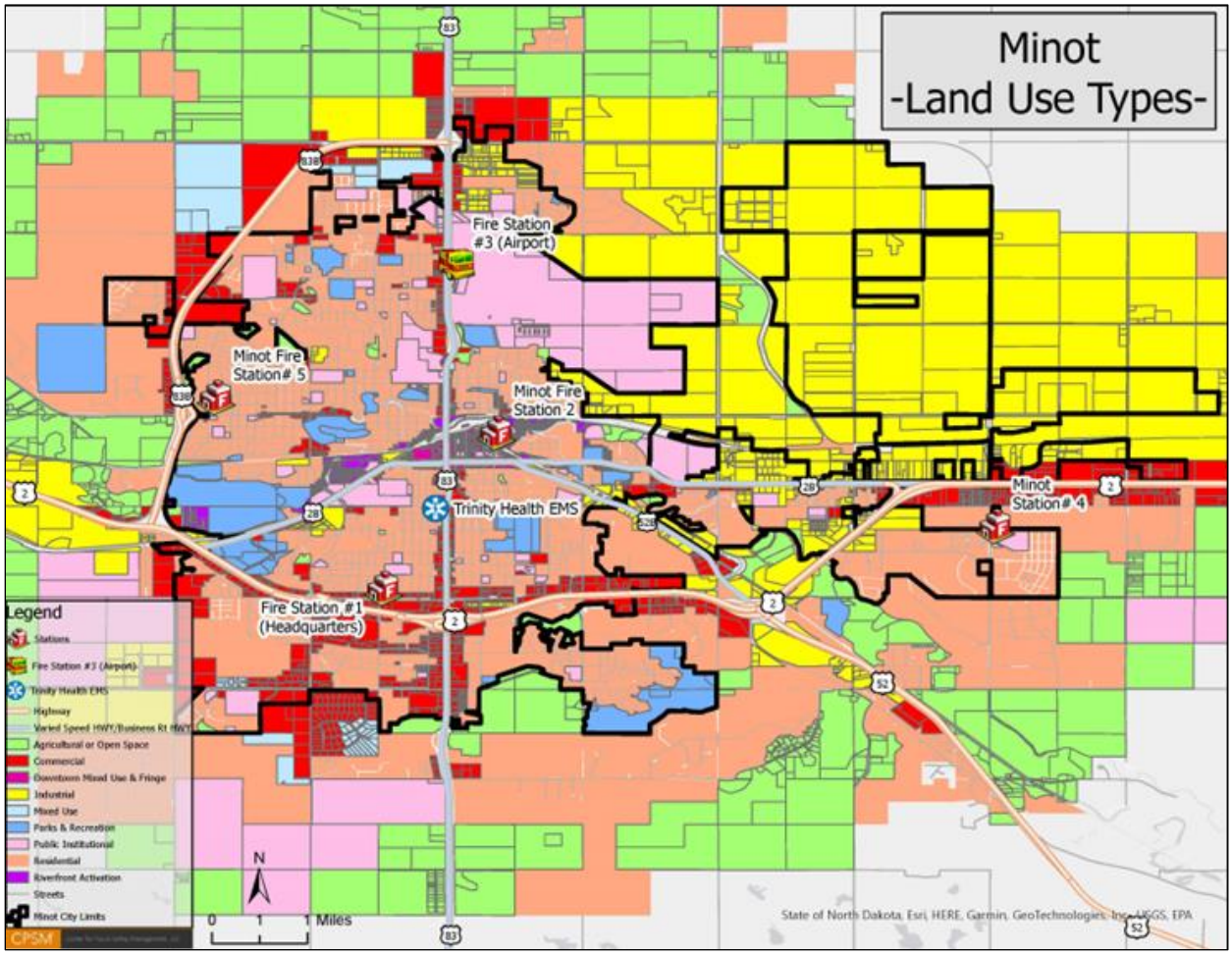
The City of Minot has a mix of industrial, residential, commercial, mixed uses, and parks. The city is the home to several large agricultural product elevators, a college district, a hospital campus, an enclosed mall, several large name-brand big-box retail stores, and mercantile businesses. Minot is a central hub for healthcare, shopping, advanced education, and other activities for a

23. NFPA 1300, *Standards on Community Risk Assessment and Community Risk Reduction Plan Development*.
24. https://www.census.gov/quickfacts/fact/table/minotcitynorthdakota/PST045223
25. ibid

large part of northwestern North Dakota, eastern Montana, southwestern Manitoba, and southeastern Saskatchewan. The city has a historical downtown that has been designated a renaissance district with newer / refreshed mixed-use occupancies.

The following map illustrates Minot's land use districts within the city.

FIGURE 3-1: Minot Land Use Map



In terms of fire and EMS risk, the age and socio-economic profiles of a population can have an impact on the number of requests for fire and EMS services. Evaluation of the number of seniors and children by fire management zones can provide insight into trends in service delivery and quantitate the probability of future service requests. In a 2021 National Fire Protection Association (NFPA) report on residential fires, the following key findings were identified for the period 2015–2019:[26]

- Males were more likely to be killed or injured in home fires than females and accounted for larger percentages of victims (57 percent of deaths and 55 percent of injuries).
- The largest number of deaths (19 percent) in a single age group was among people ages 55 to 65.

26. M. Ahrens, R. Maheshwari, "Home Fire Victims by Age and Gender" (Quincy, MA: NFPA 2021).

- 59 percent of the victims in fatal fires were between the ages of 39 and 74, and three of five (62 percent) of the non-fatal injured were between the ages of 25 and 64.
- Slightly over one-third (36 percent) of the fatalities were aged 65 and older; only 17 percent of the non-fatality injured were in that age group.
- Children under the age of 15 accounted for 11 percent of the home fire fatalities and 10 percent of the injuries.
- Children under the age of 5 accounted for 5 percent of the deaths and 4 percent of the injuries.
- Adults of all ages had a higher rate of non-fatal fire injuries than children.
- Smoking materials were the leading cause of home fire deaths overall (23 percent) with cooking ranking a close second (20 percent).
- The highest percent of fire fatalities occurred while the person was asleep or physically disabled and not in the area of the fire origin, key factors to vulnerable populations.

The following tables outline census and living data for the City of Minot.

TABLE 3-1: Census Data, City of Minot, ND[27]

Census Factor	2020 Census Data
Population	42,547
People per square mile	1,775
Median resident age	32.7 years
< 5 years old	6.3%
<18 years old	21.7%
>65 years old	13.7%
Female / Male	47.8%/52.2%
White Asian Two or more races Black or African American Native American Hispanic Native Hawaiian or Pacific Islander	82.2% 2.2% 7.4% 4.5% 1.7% 7.4% 0.1%
Persons with disability - under age 65	9.5%
Medium household income	$75,545
Per capita income (2018 – 2022)	$41,662
Persons living in poverty	11.3%

Demographics
City of Minot, ND

Living Data Factor	
Housing units	23,746
Occupied units	20,925
Owner occupied	11,883/56.7%
Renter occupied	9,588/43.3%
Building permits issued – New Construction (2017-2021)	407
Persons per household	2.21
Persons without homes (Countywide)	159

https://www.city-data.com/city/Minot-North-Dakota.html

Living in Minot offers residents a dense suburban/urban feel. The public schools in Minot are highly rated and there are lots of things to do from Roosevelt Zoo to the Dakota Aire Museum to the annual North Dakota State Fair and Scandinavian Festival.

27. ibid

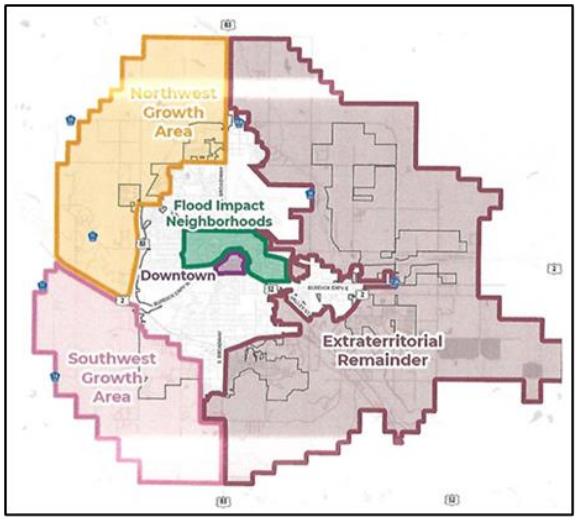
Demographically, Minot's older population—13.7 percent of the total population is over 65 years of age—is lower than the national average of around17 percent. However, Minot's percentage of residents in this age group is expected to increase in accordance with nationally projected trends. Older individuals are at a higher likelihood of having pre-existing medical conditions or limited mobility, which can also diminish their capacity to effectively respond to natural disasters.

There is often a connection between socio-economic status/poverty and elevated fire risk (and use of the EMS systems). Factors associated with poverty and elevated fire risk include family stability, crowdedness, the percentage of owner-occupied homes, older housing, the proportion of vacant houses, and the ability to speak English.[28] Successful programs to reduce fire incident rates have been introduced in high-poverty areas in several areas of the country.

The greatest fire safety concern in Minot is the potential life loss in fires that occur in non-sprinklered, single, and multifamily residential dwellings during sleeping hours, which is consistent with national trends. These fires are fueled by new "lightweight" construction and more flammable home contents. The time to escape a house fire has dwindled from about 17 minutes, 20 years ago, to three to five minutes today (provided there is a working smoke detector). Fires can double in size and intensity every 30 seconds. This poses a severe risk not only to occupants but also to firefighters as they now have less time to do their job and save residents' lives and property.

Looking ahead, following a historic flood in 2011, an oil boom, and a pandemic, new opportunities have emerged in Minot. Development catalysts include the new Trinity Medical Campus in the city's south end, a surge of investment in community flood protection, a new high school, the Minot Air Force Base Sentinel project, and ongoing revitalization within the downtown area. Since 2013, for every house demolished because of flood damage, two new ones have been built.

The City of Minot has a comprehensive Plan that envisions what the city will look like between now and 2040. The plan projects a 2040 population of approximately 66,532, which would be an increase of 18,155 (+37.5%).[29] It also projects this will result in an additional 6,600 households calling the city home.[30]

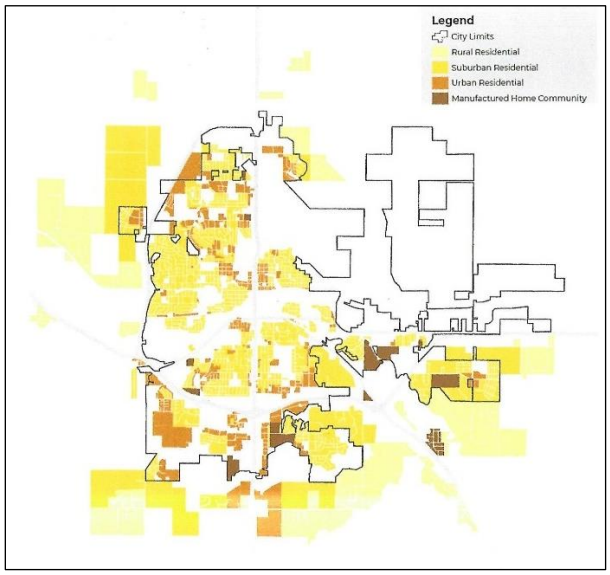


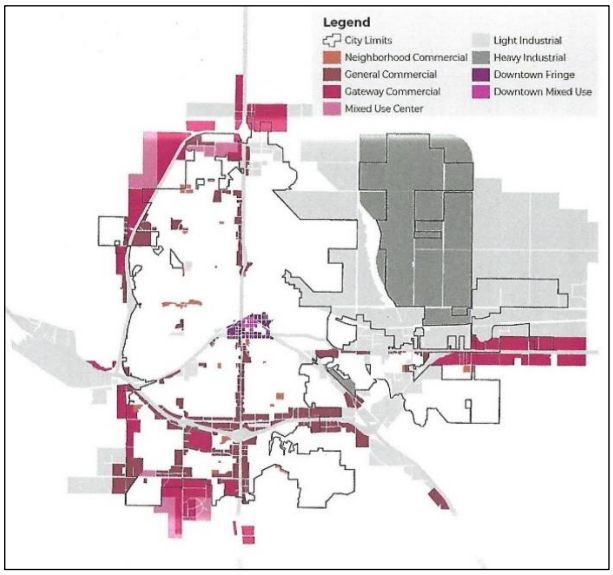
The Comprehensive Plan envisions five general focus areas for the city. These are identified in the adjacent figure. The downtown and flood impact neighborhoods are already experiencing redevelopment and infill development. The northwest and southeast are where the largest amount of growth and development are projected to occur. The extraterritorial area is projected to support a variety of industrial, commercial, and residential projects.

The next figures show the areas that are projected for residential and commercial development.

28. https://www.nfpa.org/~/media/Files/News and Research/Fire statistics and reports/US Fire Problem/poverty.pdf
29. https://www.minotnd.gov/233/Comprehensive-Plan
30. ibid

FIGURE 3-2: Minot Comprehensive Plan 2040 Residential and Commercial Development Areas





More immediately the city has hired a retail recruiter to market the city to potential retailers interested in possibly setting up in the city. The city has also seen multiple new apartment projects with additional projects proposed. One of the catalysts for this development is money from FEMA after the 2010 floods.

Much of the recent interest is centered on southeast Minot near Trinity. One major project in that area would involve more than 1,200 residential lots. The project has been dormant for several years but there are recent indications that the developer may try again. There are also hundreds of large lots for sale in the city's north end. The Highway 83 bypass also presents the potential for a lot of commercial growth.

One of the major projects currently under deveopment is the Tracks project in southeast Minot across from the new Trinity Hospital. This project will eventually include 400 units of mixed residential and commercial in five, seven-story buildings.

The Big M building behind City Hall is undergoing a complete renovation that when complete will feature four floors of retail and four floors of residential. There is also a five-story, 175-unit, mixed-use residential/commercial project propsed over the central parking ramp.

ENVIRONMENTAL FACTORS

The City of Minot is prone to and will continue to be exposed to certain environmental hazards that may impact the community. Identifying and assessing impacts of local hazards in a community is important; agencies can participate in county-wide and state-wide mitigation efforts and prepare local communities for disasters (all-risk).

The natural, human-caused, and technological hazards are currently being evaluated in the 2017 Ward County Hazard Mitigation Plan (WCHMP).[31] In the northwestern region of the state (Ward County/Minot area), wildland fires, severe weather, flooding/ dam failures, earthquakes, drought, haz-mat incidents, disease, landslides, terrorism, violence, civil unrest, and cyberattacks are identified as potential hazards.

The following table places these environmental factors in order of probability.

TABLE 3-2: Potential Environmental Factors for Minot

Environmental Factor	Geographical Area	Potential / Severity	Probability
Wildland Fire	Extensive	Critical	Highly Likely
Severe Weather	Extensive	Limited	Highly Likely
Drought	Extensive	Critical	Likely
Haz-Mat	Limited	Limited	Likely
Flooding/Dam Failures	Significant	Critical	Occasional
Earthquake/Landslides	Significant	Limited	Occasional
Disease	Extensive	Critical	Occasional
Terrorism, Violence, Civil Unrest, Cyber Security	Significant	Critical	Occasional

According to the National Centers for Environmental Information (NCEI) database, at least 323 weather-related hazard events have occurred in Ward County since 1950, including the following number and types of hazard events:

31. Montana Hazard Mitigation Plan (2023).

TABLE 3-3: Occurrences of Weather-Related Hazards Since 1950[32]

Type Event	Number	Type Event	Number
Blizzard	33	Higfh Wind	33
Cold/Extreme Cold	33	Ice Storm	1
Excessive Heat	1	Thunderstorm	72
Flood	8	Tornado	33
Funnel Cloud	2	Wildfire	1
Hail	55	Winter Storm	31
Heavy Snow	16	Winter Weather	4*

*Four winter storms that resulted in a FEMA disater declaration or significant dollar loss.

The potential environmental risks include:

- North Dakota winters are known for being extremely cold with multiple days with overcast skies. Severe winter storms that produce high winds, heavy snow, drifting snow and blizzard-like conditions, ice, extreme low temperatures, as well as power outages and carbon monoxide emergencies are to be expected. The season can last approximately four to six months, usually beginning around November and lasting through April, with the coldest months being December, January, and February.
- Because Minot, like all other upper Midwestern cities, is exposed to eastern-moving fronts, it is prone to strong thunderstorms that produce heavy winds, rain, and lightning. Accompanying these storms is the potential for tornadic activity. The normal North Dakota tornado season spans June and July, although a tornado can occur at any time if the conditions exist to produce these weather events.
- Drought and extreme high temperatures causing dry brush, grass, and other vegetation which leads to outside brush fires. Since the start of 2024, abnormally dry conditions have increased in North Dakota by 57 percent and drought has increased by nine percent.[33] While less of an overall environmental threat, there are hundreds of wildfires reported each year in in North Dakota. While not all these fires are major in size, they pose threat to life, property, and the economy. Wildland fires are often difficult to put out and require a great deal of resources. The peak time of wildfire season in North Dakota is the spring season because it's windier and drier than other times of the year. Anytime between the snowpack being gone and the green up of grasses, fires can occur, particularly on warm, windy, dry days. A dry winter can extend this time, leading to more potential wildfires.Wildland fires are overwhelmingly caused by humans followed by dry-lightning strikes.

The most immediate dangers from wildfires are the destruction of homes and timber, wildlife, and injury or loss of life to persons who live in the affected area or who are using recreational facilities in the area. Long-term effects can be numerous and include scorched and barren land, soil erosion, landslides/mudflows, water sedimentation, and loss of recreational opportunities.

For western and central North Dakota, 2012 had the most red flag warning days of the past 15 years. In more recent memory, 2021, with little snowpack all winter and expansive drought, also had lots of wildfires. While not directly impacting Minot, the National Interagency Fire Center has

32. https://www.co.ward.nd.us/DocumentCenter/View/6728/16---Ward-County-
33. https://www.kfyrtv.com/2024/03/07/potential-more-wildfires-than-normal-this-spring-nd-large-fires-burn-other-parts-us/

also placed the eastern half of North Dakota in the above normal risk category for wildfires in March and April.[34]

FIGURE 3-3: High Wildfire Danger Days

Flooding can occur from heavy rain (urban flooding due to poor drainage), the melting of snow, presence of rivers and creeks, and the failure of dams or levees. Flooding can also cut off access to utilities, emergency services, transportation, and may impact the overall economic well-being of an area.

In Minot, the flooding concern is the Souris (or Mouse) River which originates in the Yellow Grasslands Marshes north of Weyburn, Saskatchewan, Canada, and flows southeast, crossing into North Dakota, passing southeast through Ward County and the City of Minot before then looping back north into Canada to eventually flow into the Assiniboine River near Brandon, Manitoba. The Des Lacs River flows south through Ward County to converge with the Souris River at a point six miles northwest of the City of Minot.[35]

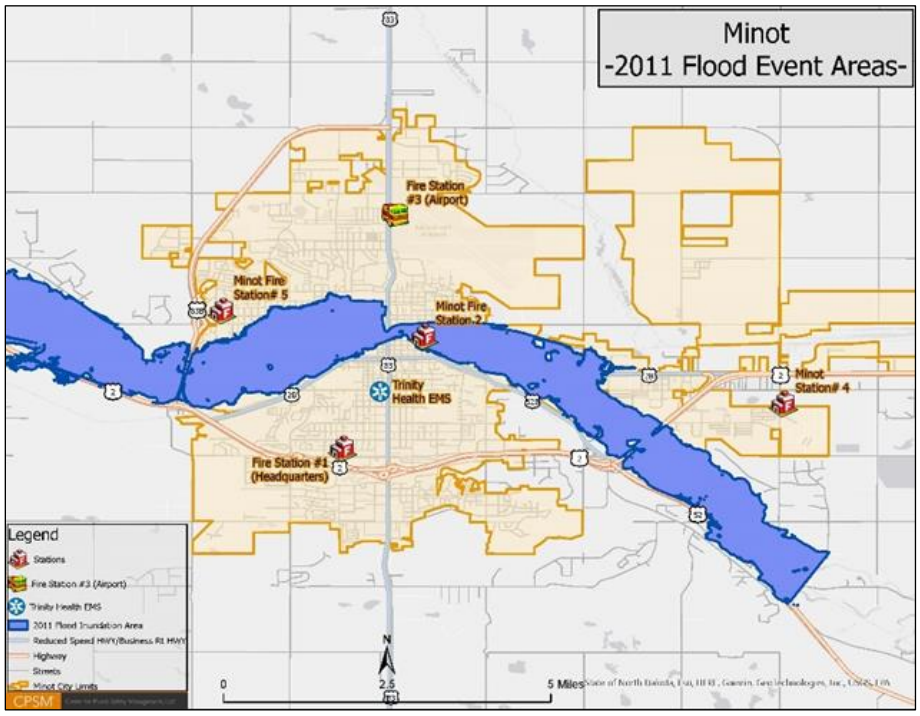
Ward County has a series of naturally occurring coulees that channel water towards the Souris and Des Lacs Rivers. Flows of water through these coulees have measured three feet or more during localized heavy rain (6 to 9 inches in three hours). This type of flooding has washed out roads, breached culverts, and damaged bridges. Adding to these phenomena, as the water flows down through the coulees it picks up a great deal of debris and deposits it into the river, compounding the flood hazard.[36]

In June 2011, after Canada received more than 7" of rain in a short period of time, the City of Minot experienced severe flooding along the Souris (Mouse) River. This resulted in hundreds of millions of dollars in damage throughout the valley including in Minot. While the City of Minot did have some time to prepare for the anticipated floods, there was still extensive damage in the city.

34. https://www.kfyrtv.com/2024/03/07/potential-more-wildfires-than-normal-this-spring-nd-large-fires-burn-other-parts-us/
35. https://www.co.ward.nd.us/DocumentCenter/View/6728/16---Ward-County-
36. ibid

FIGURE 3-4: 2011 Downtown Minot Flood

FIGURE 3-5: 2011 Minot Flood Map

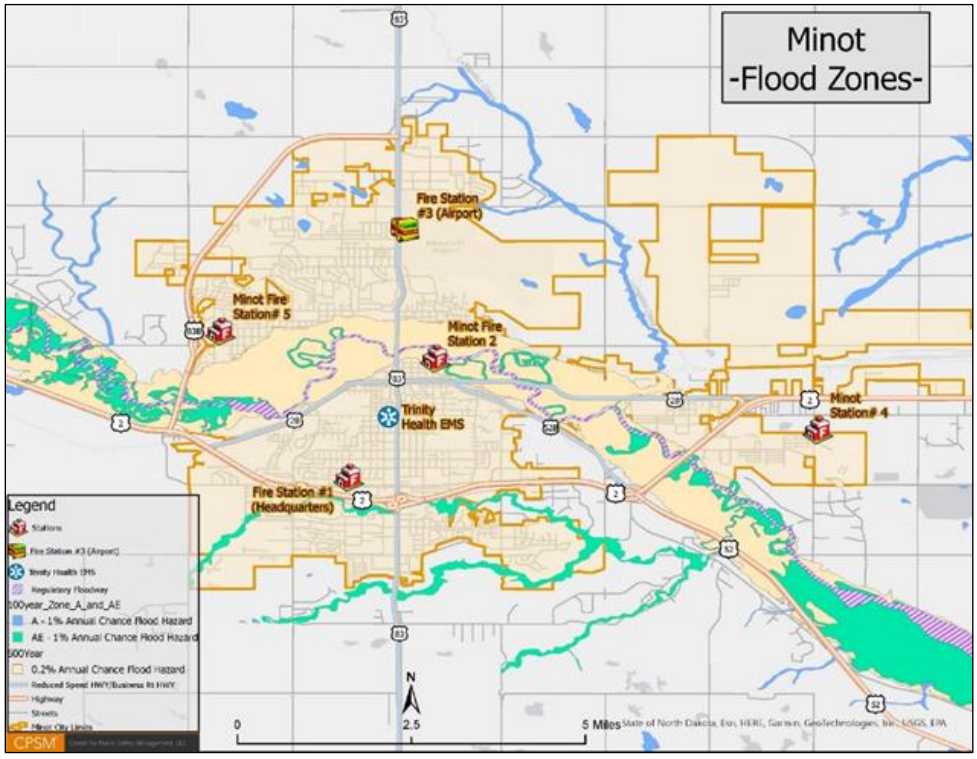


Damage to the city's housing stock included 4,100 homes flooded with 3,100 lost or extensively damaged displacing over 11,000 residents. Estimated damage to residential structures alone was more than $480 million, with losses to commercial, public, and farm structures estimated at more than $210 million. The majority of flooded housing units were not in the FEMA designated 100-year floodplain, therefore many homeowners elected not to carry FEMA flood insurance.[37]

The following figure Illustrates normal flood risk to the City of Minot.

37. https://www.minotnd.gov/DocumentCenter/View/1848/Minot-NB-DT-Chapter-3-Flood-Chronology#:~:text=Damage%20to%20the%20city's%20housing,estimated%20at%20over%20%24210%20million.

FIGURE 3-6: Minot Flood Zone Map



NCEI contains records of another eight flash-flood/flood events that have impacted Ward County since 1950. Of these eight records, seven were flood events and one was a flash flood event.

Although an exceptionally low risk, North Dakota does occasionally experience earthquakes. According to the United States Geological Service there have been five earthquakes in North Dakota since 1909. However, the most recent, which occurred on September 28, 2012, and registered 3.3 on the Richter Scale was centered about 13.7 miles east-southeast of Williston. The largest risk is interruption to natural gas lines and the electric grid from earthquakes distant to the city.

BUILDING AND TARGET HAZARD FACTORS

Building and target hazards are defined as significant hazards that can strain the fire department response capability—*a plausible scenario* in which a fire department could quickly become overwhelmed and for which additional resources would be needed to mitigate the incident. The definition of target hazards varies among jurisdictions but typically covers hospitals, nursing facilities, schools, churches, storage facilities, military sites, high-rise, multifamily dwellings, assemblies, and industrial parks / manufacturing plants.

Target hazards are often segregated by high, medium, or low hazard depending on factors such as the life and building content hazard, and the potential fire flow and staffing required to mitigate an emergency in the specific property. According to the NFPA *Fire Protection Handbook*, these hazards are defined as:

High-hazard occupancies: Schools, hospitals, nursing homes, assisted living, explosives plants, refineries, high-rise buildings, and other high life-hazard (vulnerable population) or large fire-potential occupancies.

Medium-hazard occupancies: Apartments, offices, and mercantile and industrial occupancies not normally requiring extensive rescue by firefighting forces.

Low-hazard occupancies: One-, two-, or three-family dwellings and scattered small business and industrial occupancies.

Identifying high-hazard occupancies or target hazards that would require a higher concentration of fire department resources is an essential part of fire risk assessment. The process of identifying target hazards and pre-incident planning are basic preparedness efforts that have been key functions in the fire service for many years. In this process, critical structures are identified based on the risk they pose. Then, tactical considerations are established for fires or other emergencies in these structures. Consideration is given to the activities that take place (manufacturing, processing, etc.), the number and types of occupants (elderly, youth, handicapped, imprisoned, etc.), and other specific aspects relating to the construction of the facility, or any hazardous materials that are regularly found in the building.

Target hazards are those occupancies or structures that are unusually dangerous when considering the potential for loss of life or the potential for property damage. Typically, these occupancies include hospitals, nursing homes, and high-rise and other large structures.

The construction type for most residential structures in Minot is a mix of wood frame with wood or composite siding, and wood frame with brick veneer built on slab and crawl space with some having basements.

Townhomes, condos, and apartments are also common in Minot. Typical construction includes wood frame with wood or composite siding, wood frame with brick veneer, and ordinary (block/brick) construction. Some are mid/high-rise structures that create vertical density. Some apartment complexes include multistory structures and/or those in a campus footprint.

Other construction types for residential structures are present in Minot as well and may include masonry non-combustible and fire resistive. The city does have an assortment of manufactured homes as well, which are typically made of light metal/wood construction with various exterior coverings. The commercial/industrial structure building inventory is ordinary (block/brick) construction, wood frame with composite siding, and masonry non-combustible.

Minot has the following building types:

- Single-family homes (**10,600**).
- Condos, lofts, townhomes (**2,691**).
- Duplex/Triplex/Quad (**186/64/226**).
- Apartment buildings – 5 or more units (**443 buildings/6,500 +/- units**).
- Commercial/industrial structures (**2,000 +/-/68**).
- Covered/Enclosed malls (**1 w/77 stores**).
- Strip malls (**32: 2 w/25+ stores**).
- Day care centers (**23**).

- Hospitals/medical centers (**2; 1 occupied**).
- Assisted living/long-term care structures (**8**).
- Housing/commercial/professional business structures over 75 feet in height (high rise) (**6: 1 – hotel; 3 - apartment buildings; 2 - hospitals (1 vacated**).
- Public education structures (**21**).
- Public government buildings (**10**).
- Correctional institutions (Ward County Detention Center)(**1**).

In terms of identifying target hazards, consideration must be given to the activities that take place (public assembly, life safety vulnerability, manufacturing, processing, etc.), the number and types of occupants (elderly, youth, handicapped, imprisoned, etc.), and other specific aspects related to the construction of the structure.

Minot has a variety of target hazards that include:

- Multifamily/apartment complexes/buiuldings with a total 6,500 +/- units (life safety/fire spread).
- Hospital/medical center target hazards (Trinity Health complex: 6 stories w/ 148 beds).
- Hotel target hazards (life safety). There are 30 hotels/motels, with 2,946 rooms.
- Correctional instituion target hazard (life safety/access).
- Educational/school/public assembly/day care centers target hazard (life safety).
- Mercantile/Business/Industrial (life safety, hazardous storage and or processes).
- Long-term care target hazard (life safety, vulnerable population).
- Government infrastructure target hazard (hazardous storage/processes and continuity of operations).
- Government business target hazards (life safety, continuity of operations).
- Private business target hazards (life safety).
- High-rise target hazards (life safety) of which there are six of mixed occupancy types and include housing units.
- Grain elevators (life safety/dust explosion hazard).
- College dormitories (life safety)
- Covered shopping mall (life safety).
- Movie theaters (life safety).
- Big box stores (life safety, hazardous storage).
- Warehouses/storage facilities (hazardous storage).

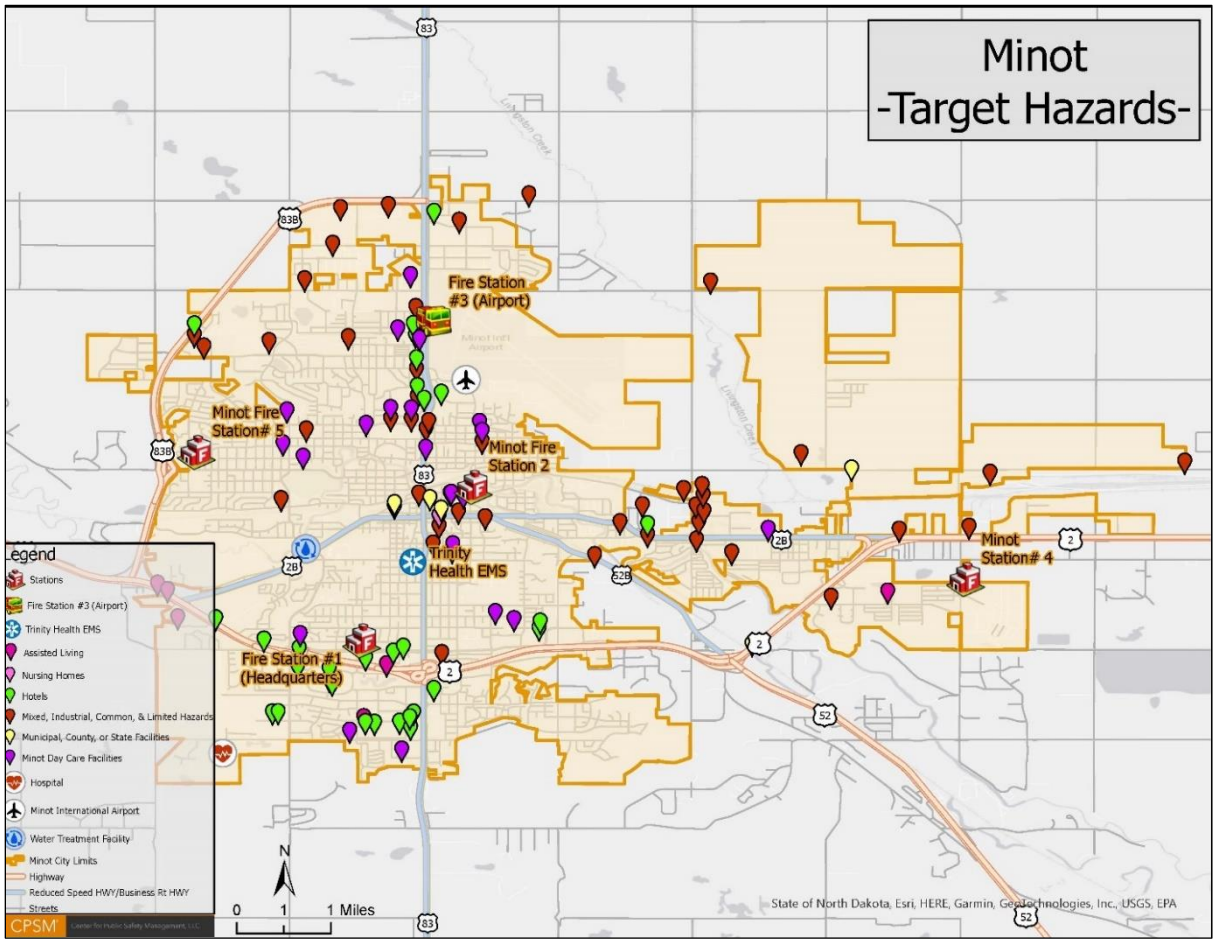
The city has a mix of low- and medium-risk structures that make up the majority of the target hazard risk. High-hazard building risks are noted in this section as well. These include schools, assisted living/long-term care facilities, residential structures housing a vulnerable population, hospital/medical centers, residential high-rise structures, public assembly structures when

occupied, and those that have hazardous materials used in processes or that are stored in large quantities.

An identified high hazard for Minot is the number of high- to mid-occupancy buildings that do not have sprinklers.

The following figure illustrates the location of target hazards in the city.

FIGURE 3-7: Minot Target Hazards (All)



Larger footprint buildings that are projected to be constructed in the city will pose additional building risks to the MFD in terms of a large footprint, mass storage of commodities, and waterflow requirements based on the size and commodities stored and mercantile processes being conducted in the buildings. These buildings are typically built of fire resistive structural members and are sprinklered, but contain internally combustible accessories, storage, processes, and internal structures. While the life-safety hazard normally will not require extensive rescue by firefighting forces (in terms of the number of people on premises at one time to be rescued), the scope and complications of the larger footprint to be covered by initial attack lines and in a search and rescue undertaking may raise these types of structures to a higher hazard.

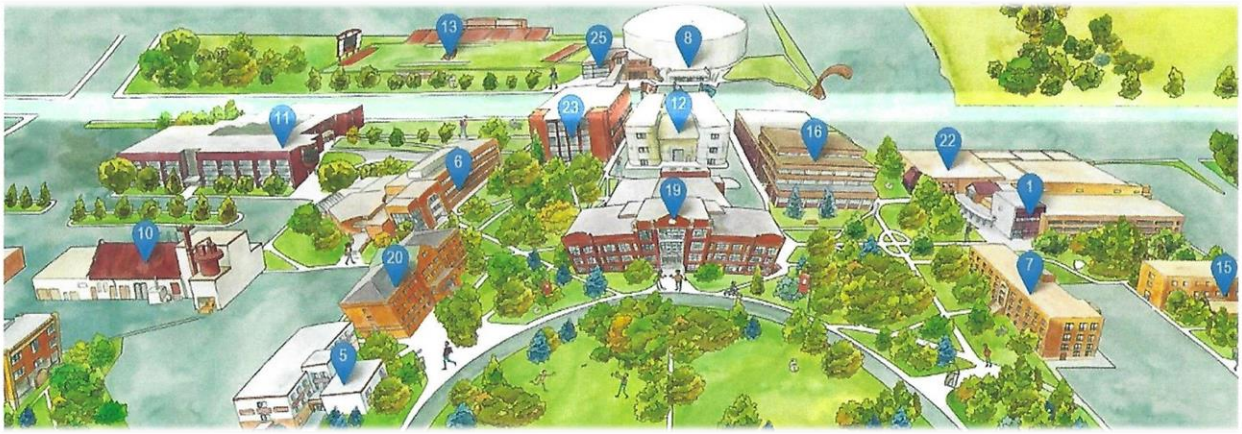
The City of Minot provides a mix of challenges and hazards that must be protected by its fire department. Like many old cities, Minot has an older center core and downtown area with numerous closely spaced, abutting, and even some interconnected buildings (next figure).

FIGURE 3-8: Downtown Minot

These buildings are mostly two to four stories, older unprotected construction, with zero lot lines, and limited area separations. They date to the latter part of the 19th and early years of the 20th centuries. These types of structures and areas can contribute to rapid fire spread from one building to another, requiring an aggressive attack to contain and control. Although some of these buildings have been renovated over the years and equipped with automatic fire suppression systems, a considerable number have not, which increases the potential life hazard and fire spread concerns. As the city continues its downtown renaissance project for revitalizing downtown Minot it should ensure that all buildings that are renovated/rehabilitated are equipped throughout with automatic fire suppression systems.

Minot is also home to Minot State University (MSU), part of the North Dakota state university system. MSU had a total 2023 enrollment of 2,741 students. Of these, 379 reside in on-campus residence halls, while another 74 live in three off-campus apartment complexes. College living facilities present elevated life safety concerns for residents and visitors.

FIGURE 3-9: MSU Campus



To summarize the building and target hazard factors for Minot:

- The greatest building fire risks in the City of Minot are of a low-to-moderate hazard (single-family dwellings, lightweight, wood-frame construction, and mixed use/ historical buildings in the downtown). Of particular concern is Wheatland Village, which is a FEMA temporary housing community that was erected after the 2011 floods. At its peak, this community included over 1,000 temporary residences; today, 13 years later, there are still several hundred that are occupied.

- The city has high-risk/vulnerable population risks (nursing/assisted living facilities, schools, and multifamily residential structures apartments/condominiums).
- The city also has multiple residential projects under construction or approved and planned for near- to mid-term construction.
- The industrial and mercantile building risk, while a lower life-safety risk, is a moderate to higher hazard risk based on processes, storage, and overall occupancy type. All the high-hazard risk locations pose either a difficulty for MFD to conduct evacuations and/or fire attack. The MFD, as with most fire departments, utilizes a quick and aggressive fire attack to contain an incipient fire to the room of origin. However, a significant commercial or a large complex fire and/or a multiple occupancy evacuation will quickly exhaust the resources of both the MFD and its limited mutual aid partners.
- Robust public education and fire inspections / pre-fire planning, specifically in the downtown district and for high- and moderate-risk occupancies, should remain an important endeavor for the MFD.

HUMAN-CAUSED RISK

Human-caused or generated risks include civil unrest, large mass gatherings, cyberattacks, school violence, and threats of violence with the potential of weapons of mass destruction use. As it is somewhat remote and the county seat, there are several federal, state, and local government buildings that could be targeted. Minot is also about 13 miles from the strategically significant Minot Air Force Base and the city is surrounded by multiple ballistic missile silos.

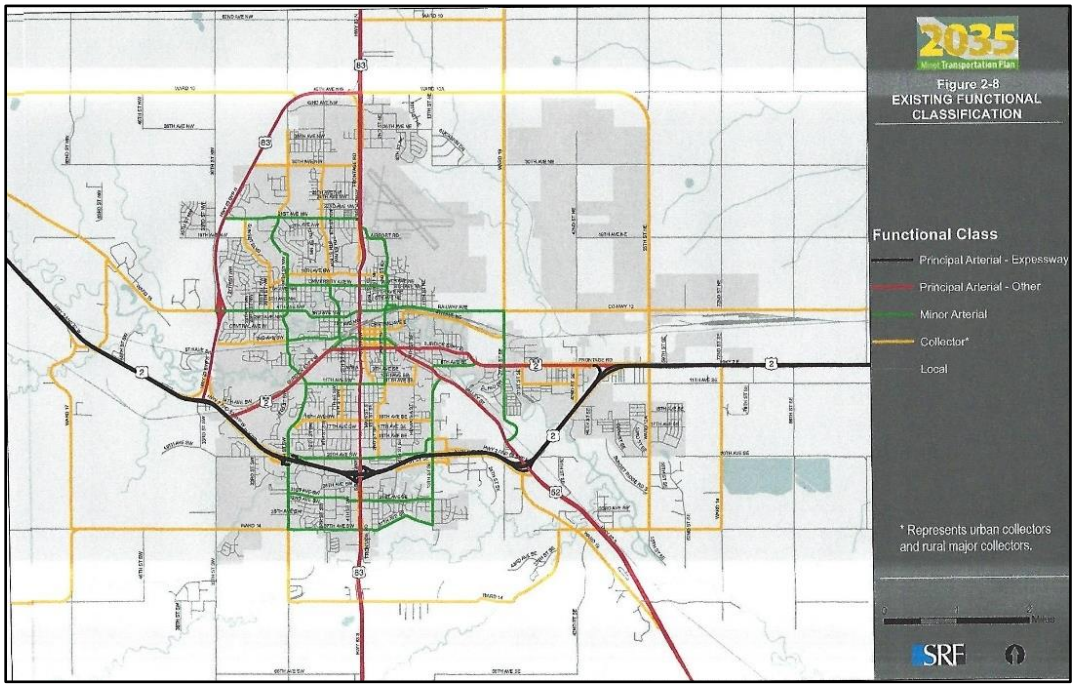
TRANSPORTATION FACTORS

The road network in Minot is typical of cities across the country and includes arterial streets, which carry high volumes of traffic; collector streets, which provide connection to arterial roads and local street networks as well as residential and commercial land uses; and local streets, which provide a direct road network to property and move traffic through neighborhoods and business communities. Minot also has limited access highways that penetrate the city boundaries. U.S. Routes 2 and 52 travel in an east-west direction in the southern part of the city. U.S. Highway 83 bisects the city in a north-south direction. The U. S. Highway 83 Bypass allows drivers to bypass the northwestern portion of the city by connecting Highway 2/52 on the west side of the city with Highway 83 on the extreme north end of the city limits. All these roads include a series of on- and off-ramps. In addition, there are state and county roads that carry high volumes of traffic in and out of the city.

The road network described herein poses risks for a vehicular accident, some at medium to high speeds, as well as vehicular-versus-pedestrian risks. There are additional transportation risks since a heavy volume of tractor-trailer and other commercial vehicles traverse the roadways of Minot to deliver mixed commodities to businesses and residential locations. Loads of industrial chemicals and hazardous materials traverse the city daily. Hazardous military cargo also transits the county because the 91st Missile Wing at Minot Air Force Base services the missile sites situated throughout the county. Fires involving these products can produce smoke and other products of combustion risks that may be hazardous to health.

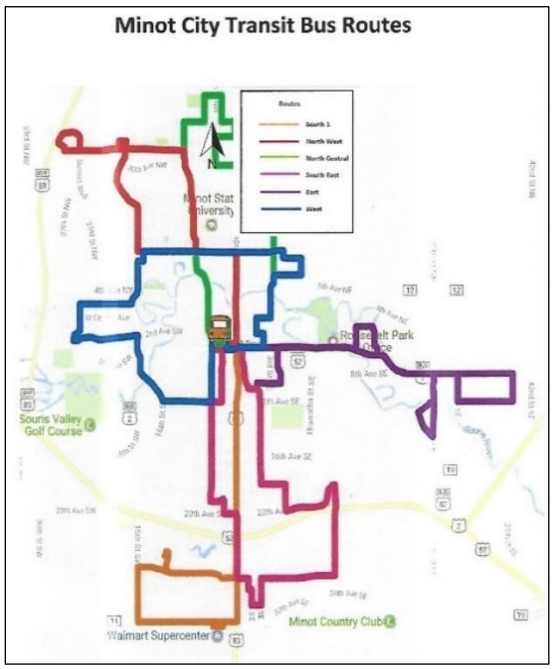
In Minot, response routes are impacted by a limited number of highway, railroad, and river crossings (bridges) available to emergency responders.

FIGURE 3-10: Minot Streets and Highways



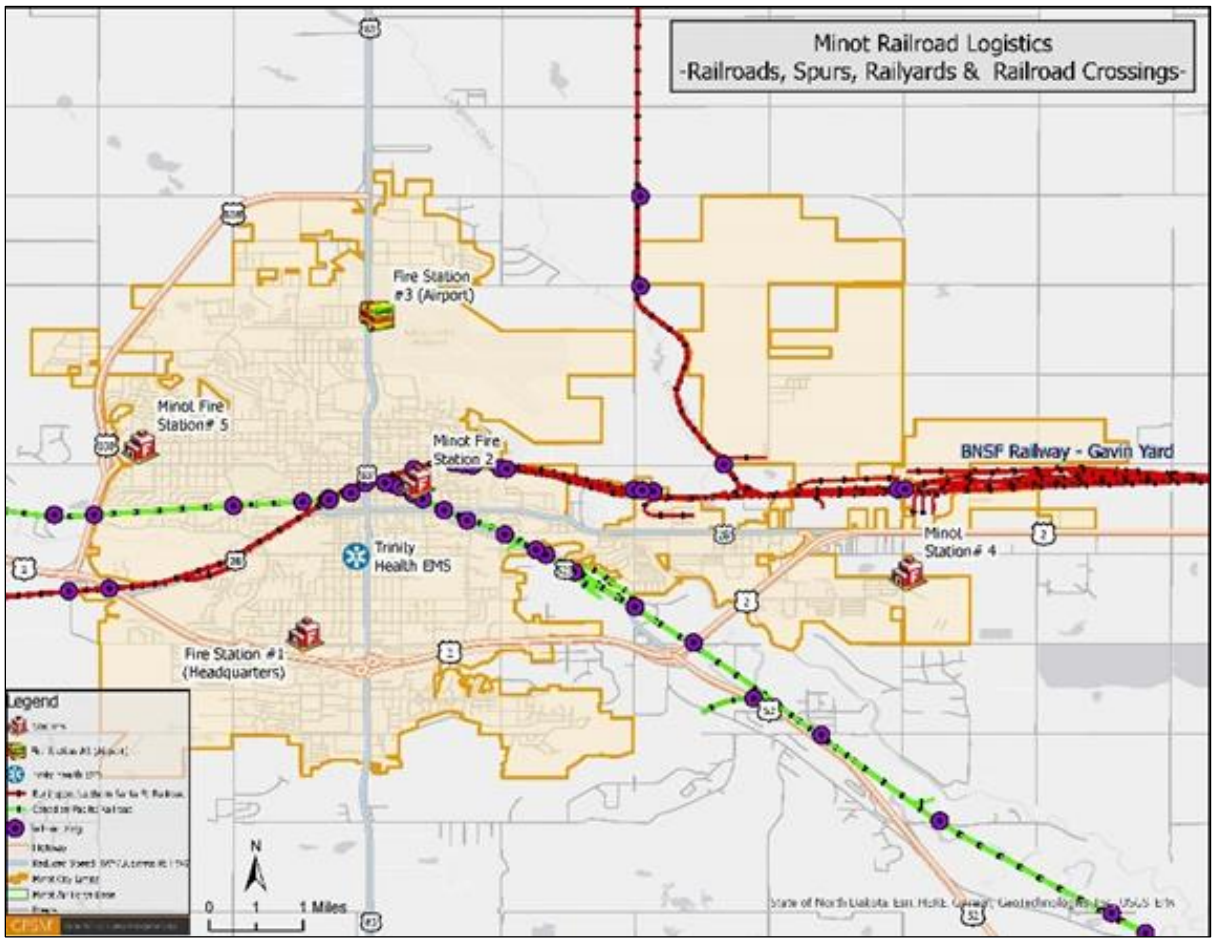
The Minot City Transit service operates fixed bus routes that provide service in the city Monday through Friday from 7:00 a.m. to 7:00 p.m. There is no Saturday or Sunday service. The fixed-route buses provide service to medical facilities, major employment centers, tourist attractions, major retail shopping centers, schools, MSU, professional buildings, the central business district, and all major points of interest. A bus accident when a bus is occupied poses a mass casualty response risk if multiple riders are injured.

FIGURE 3-11: Minot City Transit System Routes



There are several active railroad lines that pass through the city, as well as the presence of active rail freight yards. Rail traffic includes passenger and freight. Active rail lines include Burlington Northern Santa Fe (**33 trains per day**), Canadian Pacific (**15 trains per day**), and Amtrak (**2 trains per day**). Numerous freight trains traverse Minot daily. Hauled freight includes all manner of raw and finished goods as well as tank cars of industrial and agricultural chemicals. While not all of these commodities may be considered hazardous materials, fires involving these commodities can produce smoke and other products of combustion risks that may be hazardous to health. Hazardous materials themselves present risks to health. There are also multiple at-grade crossings on connector and local roads, and these create transportation risks. The Canadian Pacific line in particular traverses multiple grade crossings and bisects downtown Minot. Most arterial streets and highways do not intersect directly with rail traffic, which helps neutralize rail/vehicular traffic accidents.

FIGURE 3-12: Minot Rail Lines



Passenger train service by Amtrak consists of two daily runs: one train goes west in the morning, and another goes east in the evening.

The two rail lines cross just west of Minot's downtown area. Several railroad choke points also exist in Minot: the 6th Street SW overpass in Minot, which serves both freight and passenger rail traffic, and Trestle Valley, which is a particularly heavily used freight train artery on the extreme southwestern side of Minot.

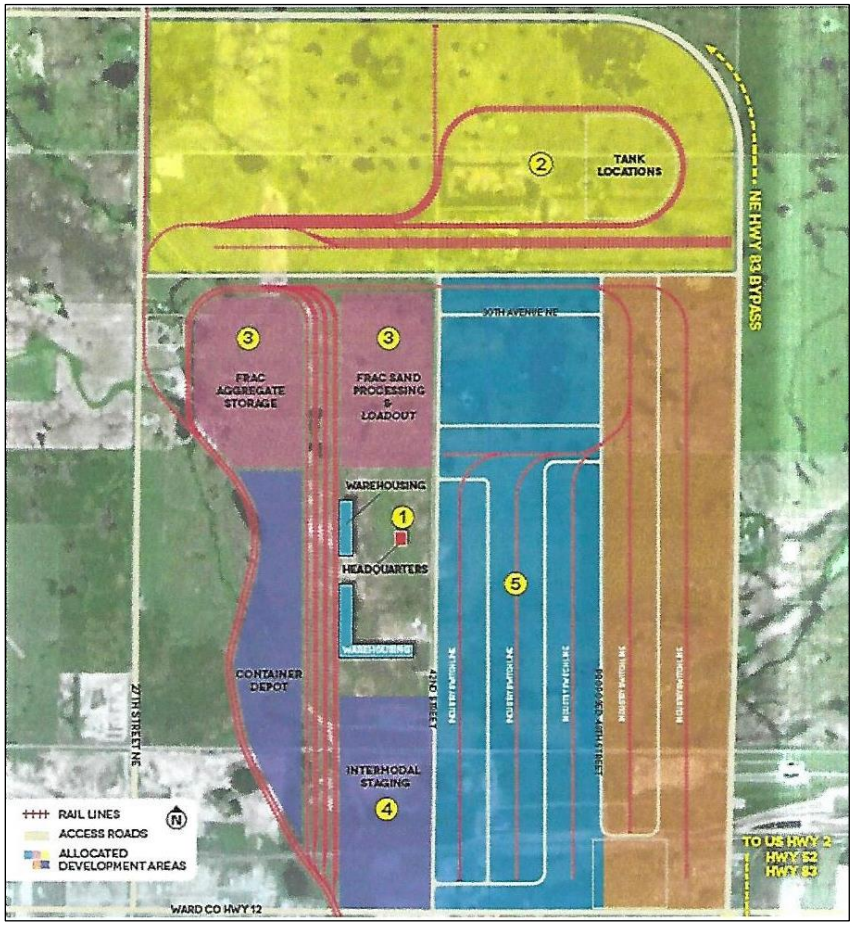
FIGURE 3-13: Minot Rail Line Crossing

There are also three rail yards in Minot:

- Canadian Pacific Railway is located at 1345 Valley St.
- BNSF Railway is located at 6400 4th Ave. NE.
- Northwest Transloading Facility, also known as the North Dakota Expansion Plant, is located at 4900 Railway Ave. The port is a 3,200-acre industrial development in northeast Minot with more than 45 miles of rail spur track, an intermodal facility, and a new 55th Street overpass over the BNSF mainline.

FIGURE 3-14 Minot Rail Yard

FIGURE 3-15: Port of North Dakota Expansion Plan[38]



Minot International Airport is locted witin the city limits, approximately 2 miles north of downtown.

Scheduled passenger service to the airport is currently provided by Delta Air Lines, United Airlines, and Allegiant Air.

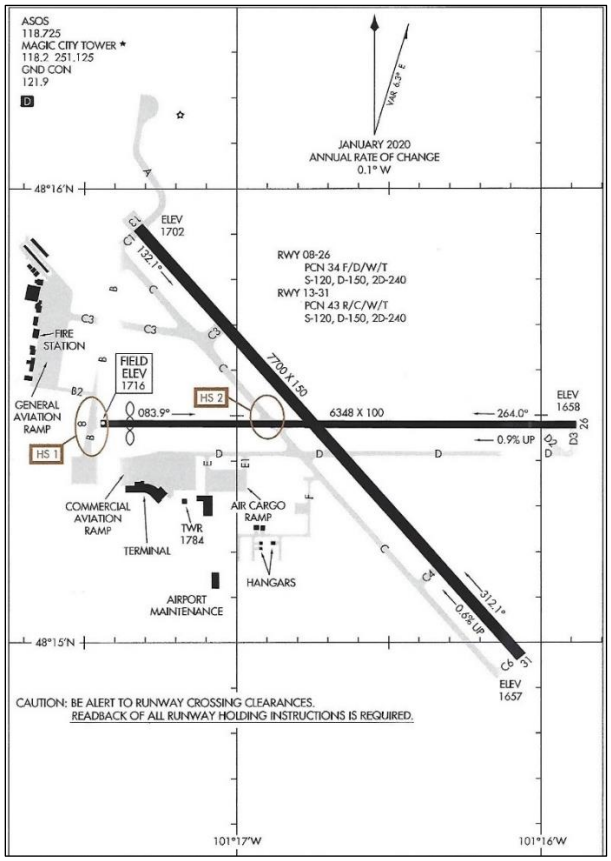
There are six daily flights to and from Minneapolis-St. Paul International Airport (MSP) on Delta, and two daily flights to and from Denver International Airport (DEN) on United. Allegiant Air provides multiple flights throughout the week to Las Vegas (LAS), Orlando(MCO) and Phoenix-Mesa (IWA).

The airport covers 1,563 acres. It has two runways: 13/31 is the primary runway with Instrument Landing Syste (ILS) approach capabilities. It is 7,700 feet by 150 feet and constructed of concrete. Runway 8/26 is a crosswind runway that is 6,348 feet by 100 feet and made of asphalt.[39]

38. Source: Minot Area Development Corporation
39. https://www.gcr1.com/5010ReportRouter/MOT.pdf

In the year ending March 30, 2023, the airport had 33,020 aircraft operations, averaging 90 per day. Of these 73 percent general aviation, 6 percent were commercial airline, 6 percent were military, and 15 percent were air taxi.[40] 128 aircraft are based at this airport: 119 single-engine, 6 multi-engine, 1 jet, and 2 helicopters.[41] According to the FAA, total passengers travelling through the airport in 2023 totalled 301,441.[42]

FIGURE 3-16: Minot International Airport Runway Size and Configuration



The potential for a mass casualty incident exists for any passenger aircraft arriving at or departing from the airport. There is also the possibility of an aircraft with an inflight emergency—including military aircraft—being diverted to Minot.

The FAA calculates the aircraft rescue and firefighting (ARFF) requirements—minimum emergency response capabilities specifically to aircraft incidents—based on five indexes. These indexes are calculated based on the length of aircraft and the average daily departures. The five indexes are labeled A through E, beginning with aircraft less than 90 feet long and ending at those more than 200 feet long.[43] Each index classifies ARFF minimum requirements in terms of type, water, and agent delivery.[44] MOT is currently an Index B airport.[45] The following table outlines ARFF requirements specific to the City of Minot.

40. https://www.gcr1.com/5010ReportRouter/MOT.pdf
41. ibid
42. https://motairport.com/DocumentCenter/View/728/December-2023
43. CFR § 139.315 Aircraft rescue and firefighting
44. CFR § 139.317 Aircraft Rescue and Firefighting Equipment and Agents
45. https://adip.faa.gov/agis/public/#/airportData/BTL

TABLE 3-4: Airport Rescue and Firefighting Requirements (MOT)[46]

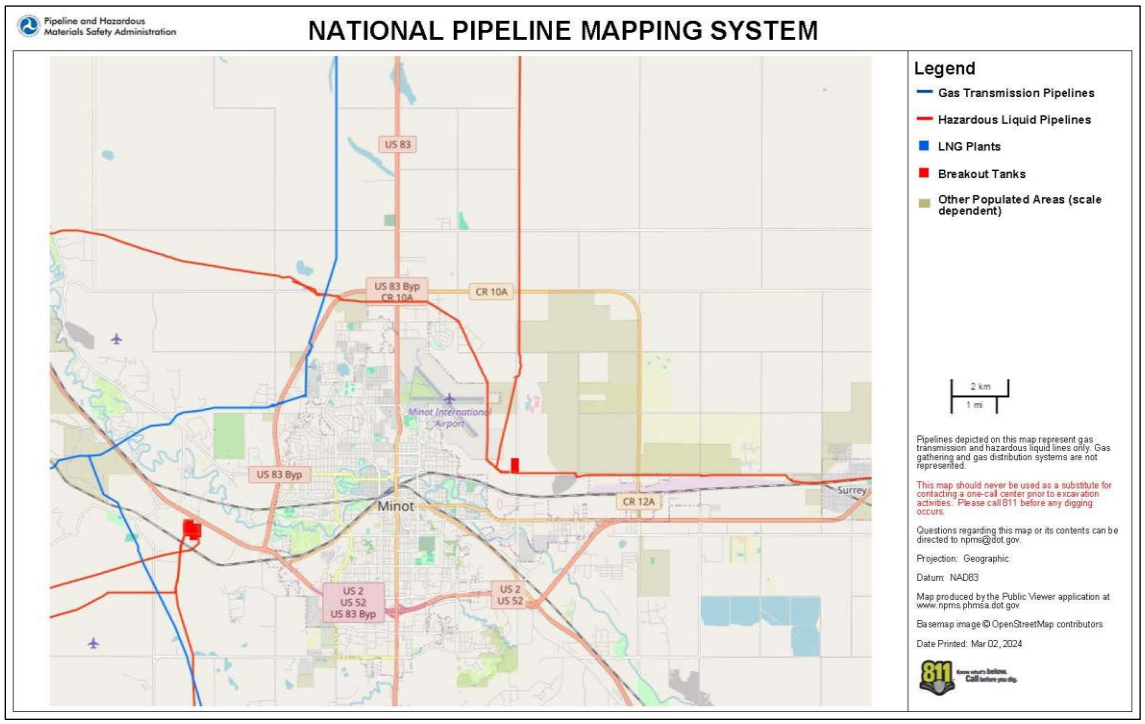
Index	Aircraft Max.	No. of ARFF Vehicles Required	ARFF Min. Standards	Response Time
B	>90 feet <126 feet	1 on site Or 2 vehicles	500 pounds of sodium-based dry chemical, halon 1211, or clean agent and 1,500 gallons of water and the commensurate quantity of AFFF for foam production.[47] One vehicle carrying the following extinguishing agents:[48] ✓ 500 pounds of sodium-based dry chemical, halon 1211, or clean agent; or ✓ 450 pounds of potassium-based dry chemical and water with a commensurate quantity of AFFF to total 100 gallons for simultaneous dry chemical and AFFF application. One vehicle carrying an amount of water and the commensurate quantity of AFFF so the total quantity of water for foam production carried by both vehicles is at least 1,500 gallons.[49]	Within 3 minutes from time of alarm to mid-point of the furthest air carrier runway.

The MFD staffs the airport 24/7 with a crew of four out of Fire Station 3, which is located on airport property. However, only one person is dedicated strictly to the ARFF function. The other personnel cross staff Engine 3 and respond to incidents off property. The one dedicated position on each shift (3 total) are funded by the airport through a pass off fee to the airlines.

46. CFR § 139.319 Aircraft rescue and firefighting: Operational requirements
47. https://www.ecfr.gov/current/title-14/chapter-I/subchapter-G/part-139/subpart-D/section-139.317
48. ibid
49. ibid

Minot is traversed by multiple pipelines, several of which supply fixed storage facilities located just outside of the city limits. A significant pipeline leak can have significant fire, health, and environmental implications. Any incident in the area would likely result in extensive MFD involvement.

FIGURE 3-17: Minot Pipe Lines



TOURISM AND TRANSIENT POPULATION

Minot hosts a significant and growing tourism sector. The city is a gateway to not only the energy drilling sites in the area but also for the multitude of outdoor recreational activities found in northwestern North Dakota. The nearby U.S. Air Force Base also contributes to visitors to the area, as well as the city's status as a regional commerce center. As previously noted, there are 30 hotels/motels with a total of 2,946 rooms located in Minot. While good data was not available, it is estimated the hotels averaged a 60 percent occupancy rate, which equates to 645,174 room stays per year. The demographics of the visitor population are of relevance to emergency services, particularly when it comes to older (over age 65) visitors who are more likely to require EMS services.

Minot is home to the North Dakota State Fair, which is held each year in early July. In 2023, over its nine-day run, the fair set an all-time attendance record with 356,534 visitors. The fairgrounds also host numerous other events throughout the year. Although the fairgrounds themselves are not in an MFD first response area, the department does assist during the fair, and any significant event that occurs will require extensive assistance from the MFD.

FIGURE 3-18: North Dakota State Fairgrounds

FIRE AND FIRE-RELATED RISK

An indication of the community's fire risk is the type and number of fire-related incidents to which the fire department responds. CPSM conducted a data analysis for this project that analyzed MFD incident responses and workload. During the period studied, from October 1, 2022, to September 30, 2023, the MFD responded to 905 fire-related calls for service. The following table details the call types and call type totals for these types of fire-related risks.

TABLE 3-5: Fire Call Types

Call Type	Total Calls	Calls per Day	Call Percentage
False alarm	400	1.1	8.2
Good intent	76	0.2	1.6
Hazard	186	0.5	3.8
Outside fire	47	0.1	1.0
Public service	95	0.3	2.0
Structure fire	83	0.2	1.7
Technical rescue	18	0.0	0.4
Fire Subtotal	**905**	**2.5**	**18.6**

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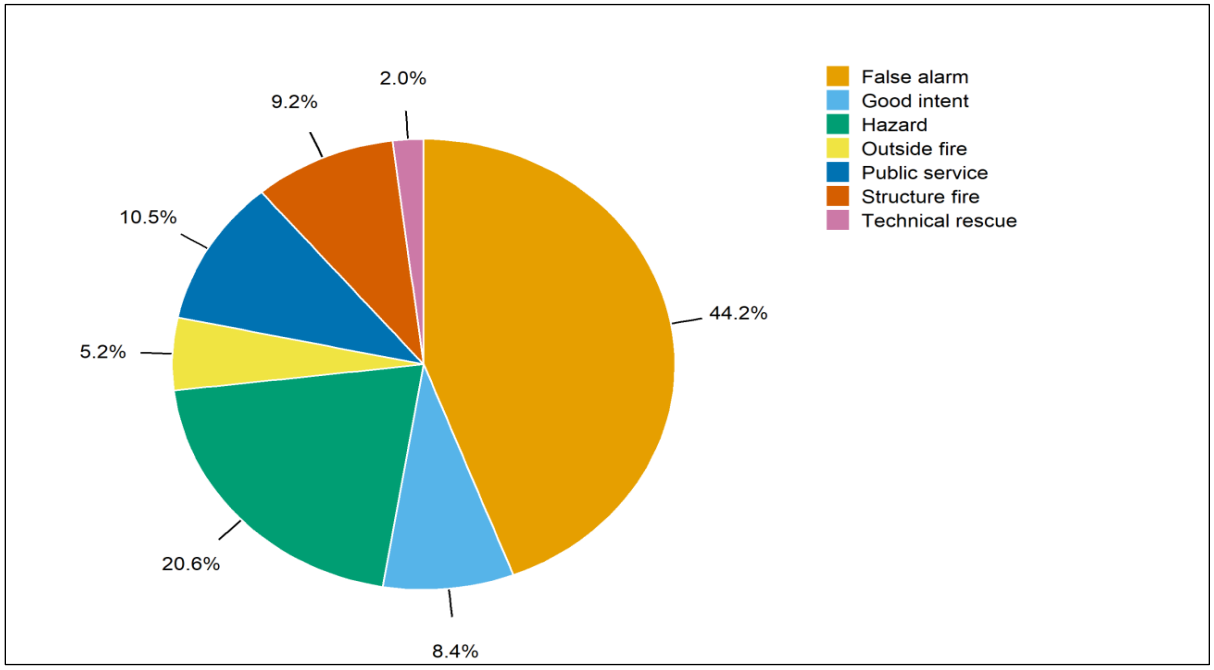
FIGURE 3-19: Fire Calls by Type



Key takeaways from the data in this table and figure are:

- Fire calls for the year totaled 905 (18.6 percent of all calls), an average of 2.5 calls per day. This percentage is slightly lower than CPSM typically sees with fire calls normally accounting for 20 percent to 30 percent of all calls.
- False alarm calls were the largest category of fire calls at 44 percent of fire calls, an average of 1.1 calls per day.
- Structure and outside fire calls combined made up 14 percent of fire calls, an average of 0.4 calls per day, or about one call every three days.

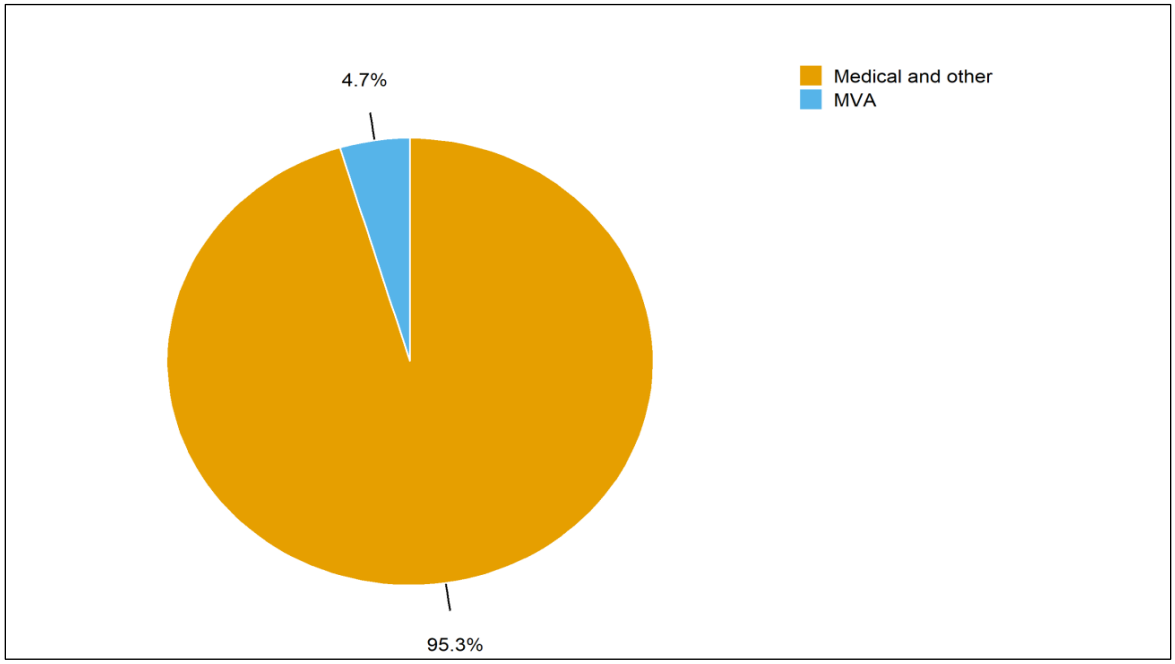
EMS-RELATED RISK

As with fire risks, an indication of the community's pre-hospital emergency medical risk is the type and number of EMS calls to which the fire department responds. During the CPSM data analysis study period the MFD responded to 3,714 EMS-related calls for service. The following table outlines the call types and call type totals for these types of EMS risks.

TABLE 3-6: EMS Call Types

Call Type	Total Calls	Calls per Day	Call Percentage
Medical and other	3,538	9.7	72.9
MVA	176	0.5	3.6
EMS Subtotal	**3,714**	**10.2**	**76.5**

FIGURE 3-20: EMS Calls by Type



Key takeaways from the data in this table and figure are:

- EMS calls for the year totaled 3,714 (76.5 percent of all calls), an average of 10.2 calls per day.
- Medical and other calls were the largest category of EMS calls at 95.3 percent of EMS calls, an average of 9.7 calls per day. It should be noted that this and MVA are the only classification of EMS calls that the MFD utilizes.
- Motor vehicle accidents made up 3.6 percent of EMS calls, an average of 0.5 calls per day.
- Aggregately (Fire, EMS, canceled calls, and mutual aid), the department received an average of 13.3 calls per day, including 0.1 canceled calls (0.5 percent of all calls) and 0.6 mutual aid calls (4.3 percent of all calls).

COMMUNITY LOSS AND SAVE INFORMATION

Fire loss is an estimation of the total loss from a fire to the structure and contents in terms of replacement. Fire loss includes contents damaged by fire, smoke, water, and overhaul. Fire loss does not include indirect loss, such as business interruption. In a 2023 report published by the National Fire Protection Association on trends and patterns of U.S. fire losses, it was determined that home fires still cause most civilian fire deaths, civilian injuries, and property loss due to fire. Key findings from this report include:[50]

- In 2022, local fire departments responded to an estimated 1.5 million fires in the United States. These fires caused 3,790 civilian fire deaths and 13,250 reported civilian fire injuries. The property damage caused by these fires was estimated at $18 billion. From 2021 to 2022, the total number of fires increased 11.1 percent, civilian deaths decreased 0.3 percent, and civilian injuries fell 9.9 percent. The increase in total fires was statistically significant.

50. Fire loss in the United States 2022 (NFPA 2023).

- A home structure fire was reported every 88 seconds, a home fire death occurred every three hours and fourteen minutes, and a home fire injury occurred every 53 minutes.
- The 280,000 one- or two-family home structure fires (19 percent of the total fires that year) caused 2,240 civilian fire deaths (59 percent); 7,190 civilian fire injuries (54 percent); and $8.6 billion in direct property damage (44 percent). From 2021 to 2022, fires in one- or two-family homes rose 9 percent, while deaths fell 8 percent, injuries fell 10 percent, and property damage rose 24 percent.
- The 80,000 apartment or other multifamily housing fires (5 percent of the total fires that year) caused 470 civilian fire deaths (12 percent); 2,750 civilian fire injuries (21 percent); and $1.9 billion in direct property damage (11 percent). From 2021 to 2022, apartment fire deaths rose 14 percent, injuries rose 7 percent, and property damage rose 6 percent.
- In 1980, there were 7.1 deaths per 1,000 reported home fires overall. This was also true for one- or two-family homes and apartments. In 2022, the 7.5 deaths per 1,000 reported one- or two-family home fires was actually 14 percent higher than in 1980. In comparison, the death rate per 1,000 reported apartment fires dropped 17 percent to 5.9.
- Occupants who are alerted by smoke alarms may handle a small fire without fire department assistance, resulting in fewer small fires being reported.
- Many apartment buildings have monitored fire detection systems that can lead to a fire department response even when the system is triggered by a minor fire.

The following table shows overall fire loss in Minot in terms of dollar value for the data study year, and over a five-year period (2018-2022). This information should be reviewed regularly and discussed in accordance with response times to actual fire incidents, company level training, effectiveness on the fireground, and effectiveness of incident command.

TABLE 3-7: Community Loss in Minot, 2018–2022

Year	Number of Incidents	Loss in Dollars as Recorded by the MFD	Average Per Incident
2018	55	$1,262,547	$22,955
2019	25	$947,300	$37,892
2020	13	$603,450	$46,419
2021	47	$917,500	$19,521
2022	22	$1,351,750	$61,443

The next table presents the number of outside and structure fires that occurred during the study period, broken out by levels of fire loss. The subsequent table then shows the amount of property and content loss for outside and structure fires inside Minot from October 1, 2022, to September 30, 2023.

TABLE 3-8: Total Fire Loss Above and Below $25,000

Call Type	No Loss	Under $25,000	$25,000 plus	Total
Outside fire	46	1	0	47
Structure fire	70	9	4	83
Total	**116**	**10**	**4**	**130**

TABLE 3-9: Content and Property Loss, Structure and Outside Fires

Call Type	Property Loss		Content Loss	
	Loss Value	Number of Calls	Loss Value	Number of Calls
Outside fire	$500	1	$0	0
Structure fire	$560,500	12	$117,000	6
Total	**$561,000**	**13**	**$117,000**	**6**

Note: The table includes only fire calls with a recorded loss greater than $0.

Key takeaways from the data in the tables from the study period are:

- 46 outside fires and 70 structure fires had no recorded loss.
- Four structure fires had $25,000 or more in loss.
- Structure fires:
  - The highest total loss for a structure fire was $336,000.
  - The average total loss for all structure fires was $8,163.
  - Six structure fires had content losses with a combined $117,000 in losses.
  - Out of 83 structure fires, 12 had recorded property losses, with a combined $560,500 in losses.
- Outside fires:
  - The highest total loss for an outside fire was $500.
  - The average total loss for all outside fires was $11.
  - Out of 47 outside fires, one had recorded property loss, with a combined $500 in losses.

It is also important to rememberthat in the context of fire loss, one large fire can cause millions of dollars in loss, which can signifacntly skew the overall data.

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FIRE AND EMS DEMAND

The fire and EMS risk in terms of numbers and types of incidents is important when analyzing a community's risk, as outlined above. Analyzing where the fire and EMS incidents occur, and the demand density of fire and EMS incidents, helps to determine adequate fire management zone resource assignment and deployment. The following figures illustrate fire and EMS demand in the MFD fire management zones. For the MFD, the entire city is basically divided into five fire management zones.

The following demand maps (with current fire station locations shown) tell us that:

- Structure/outside fire-related and EMS incident demand is highest in the older, central portion of the city, with some intensity in other scattered areas of the city as illustrated. The highest incident concentration is in Station 1 and 2 first due areas.
- Fire/false alarm demand and other types of fire incidents (hazardous conditions, service calls) are scattered throughout the city as illustrated.

FIGURE 3-21: Fire Incident Demand Density

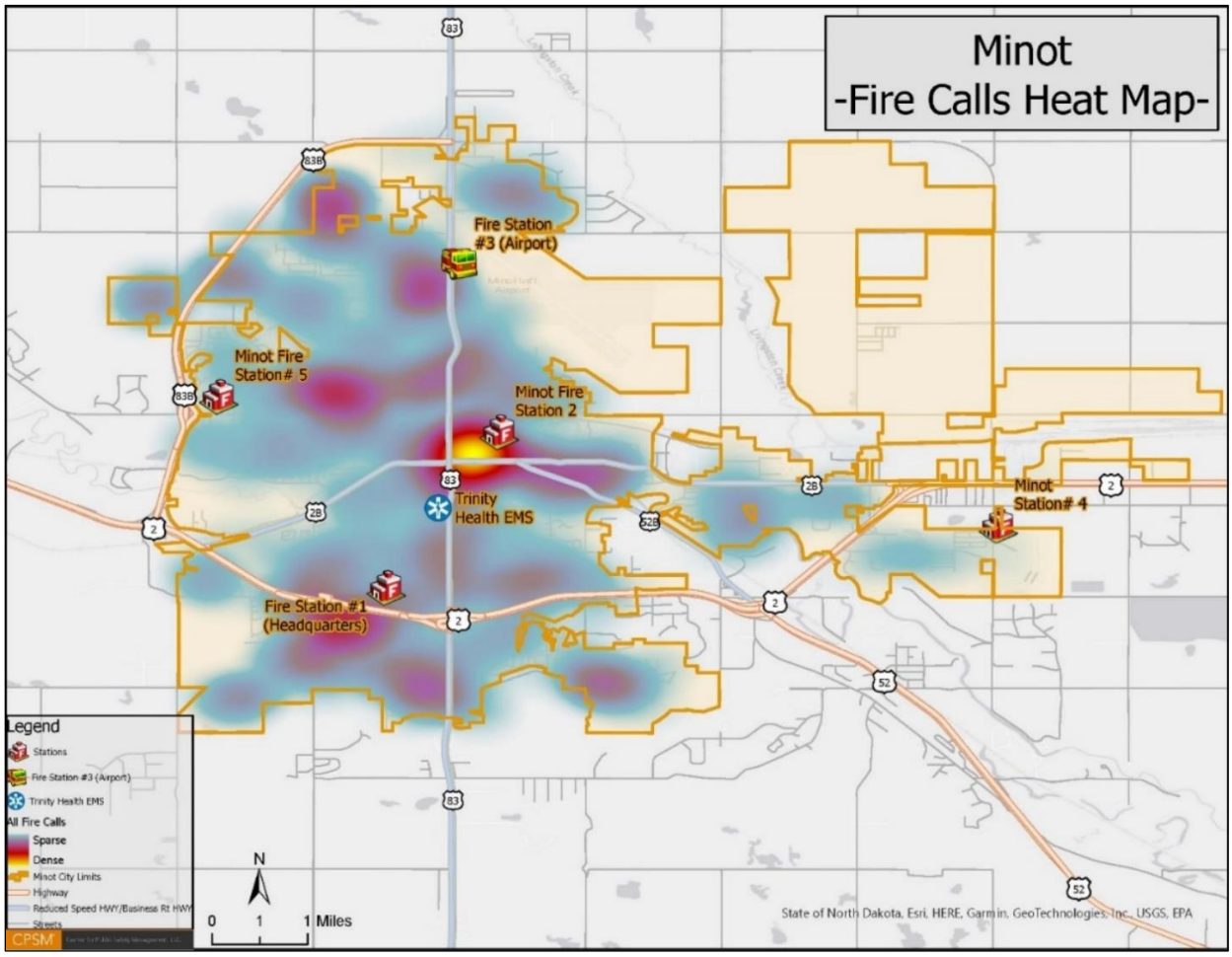


FIGURE 3-22: Structure Fire Incident Locations

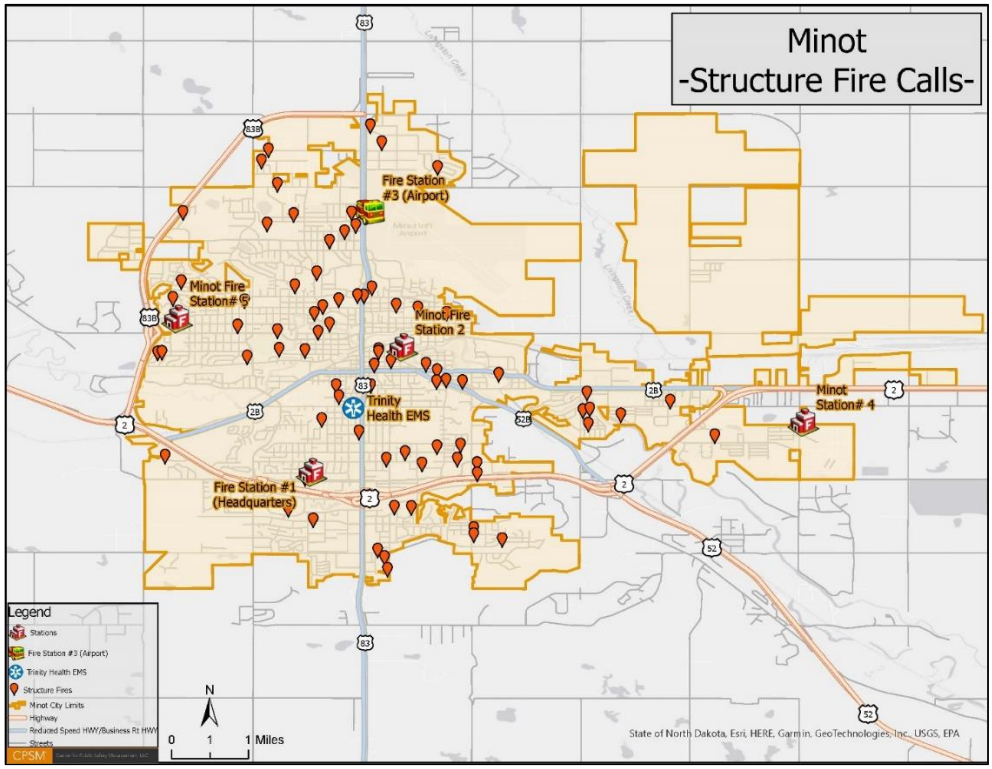


FIGURE 3-23: Outside Fire Incident Locations

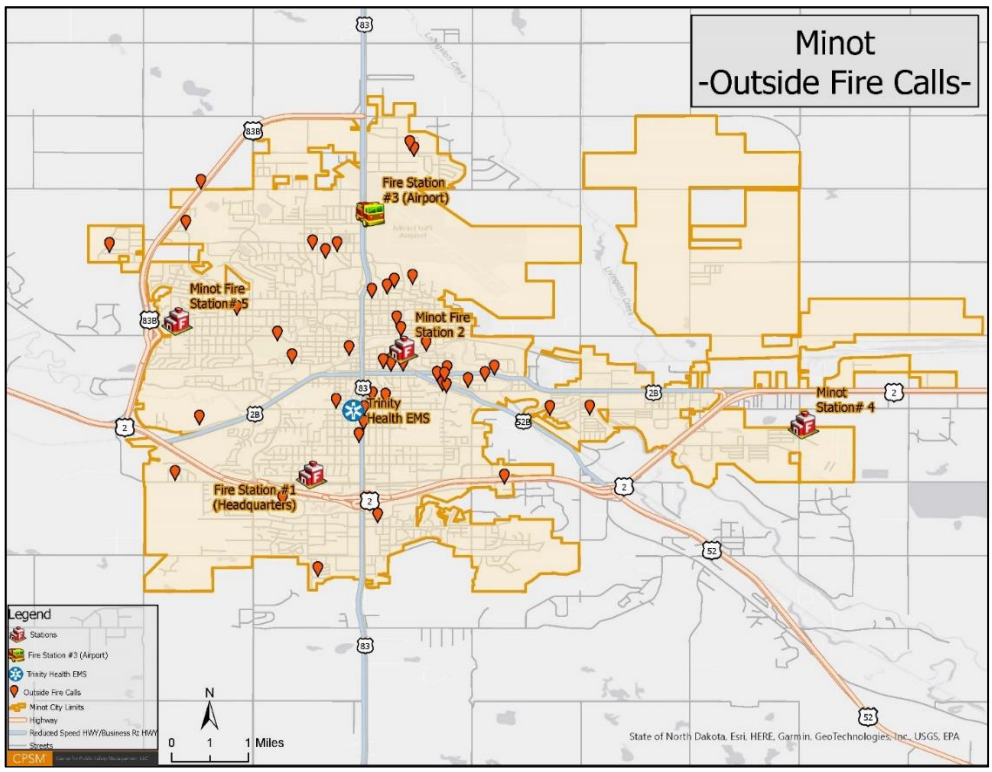


FIGURE 3-24: False Alarm Incident Locations

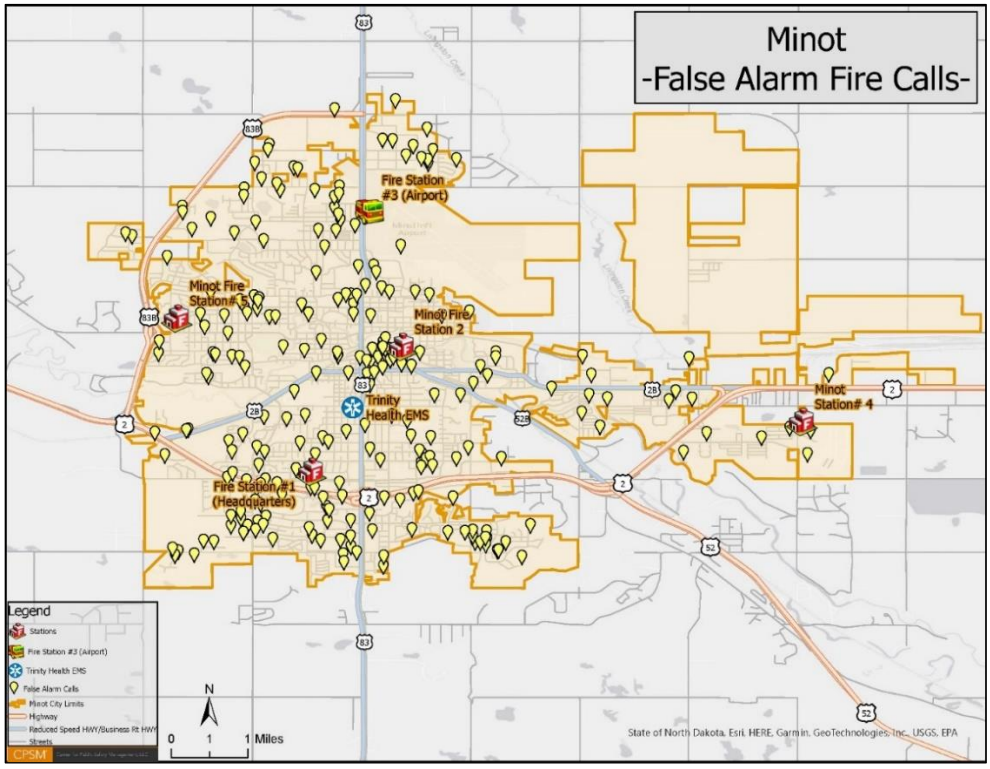


FIGURE 3-25: Hazardous Condition, Public Service, Good Intent Incident Locations

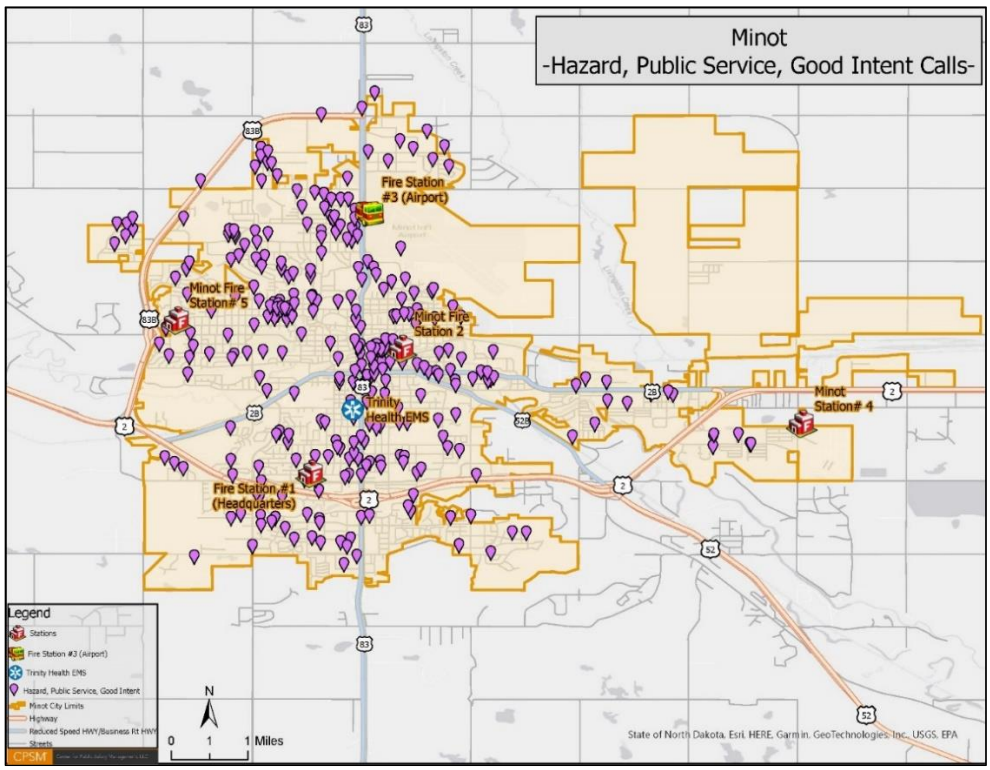


FIGURE 3-26: MVA Incident Locations

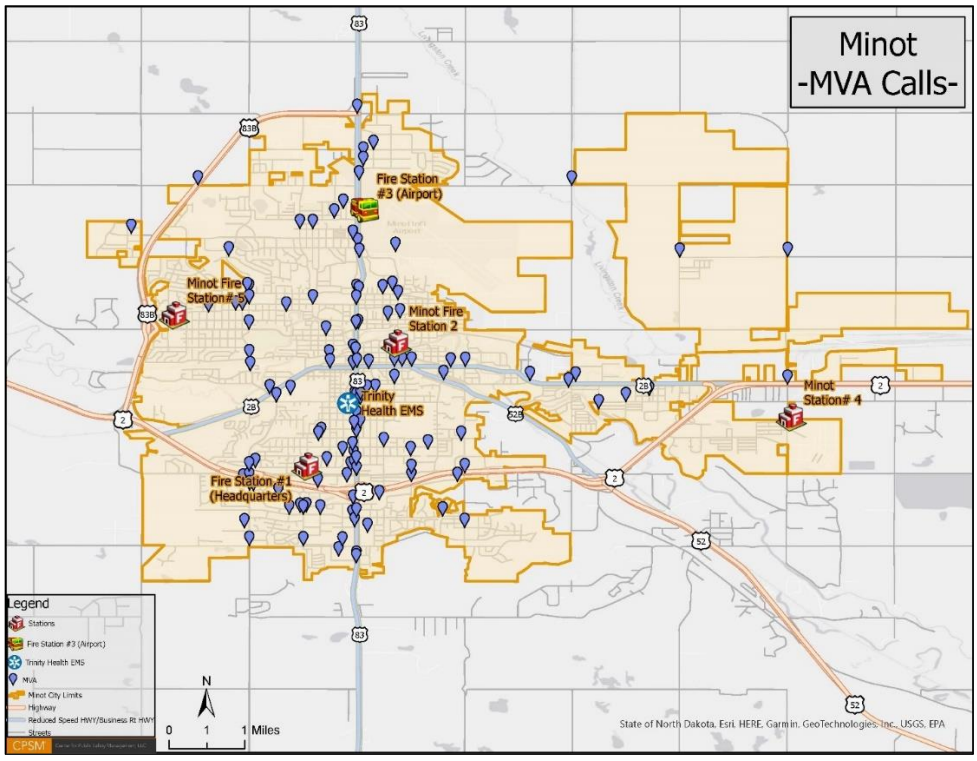


FIGURE 3-27: EMS Incident Locations

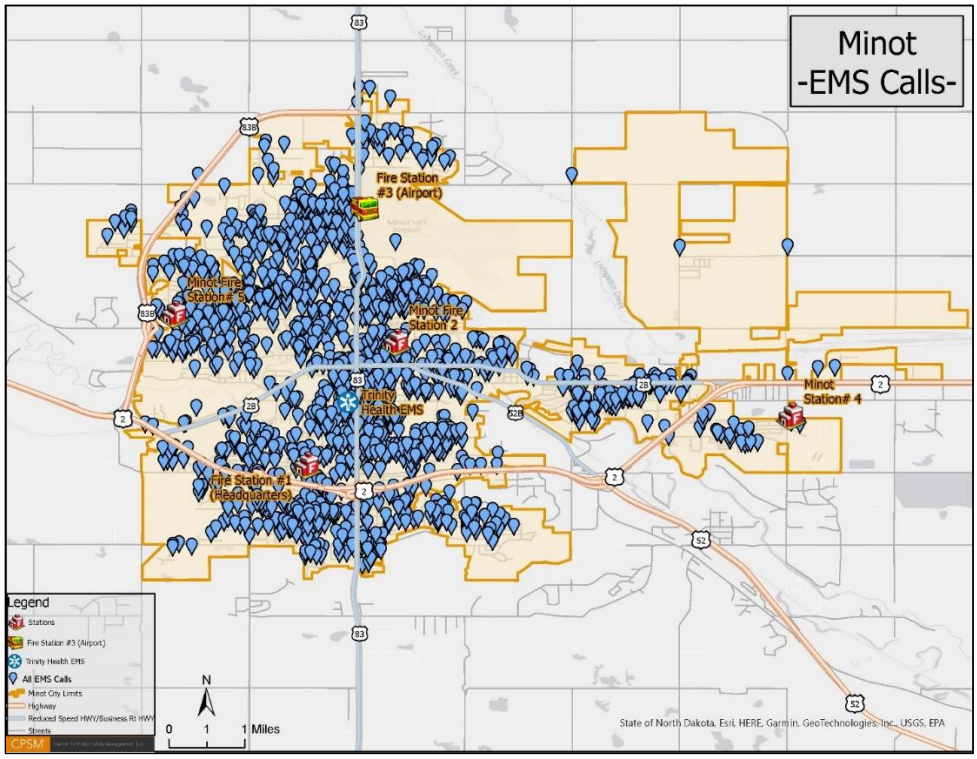
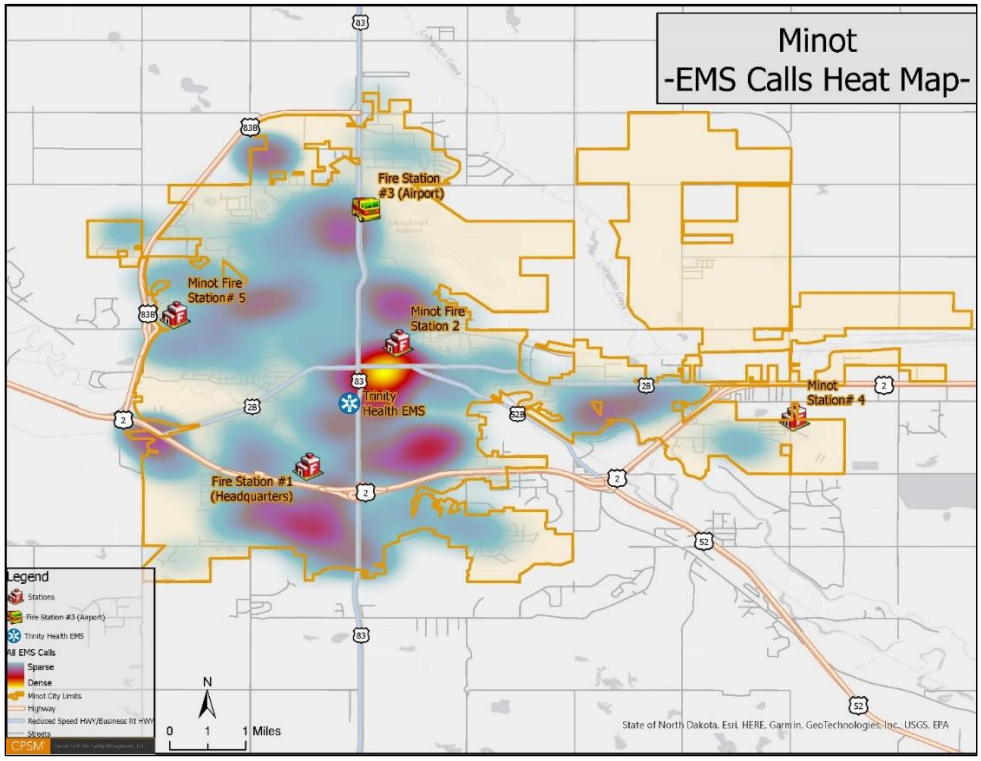


FIGURE 3-28: EMS Incident Demand Density



MFD RESILIENCY

Resiliency as defined by the Center for Public Safety Excellence (CPSE) in the FESSAM 9th edition is: "an organization's ability to quickly recover from an incident or events, or to adjust easily to changing needs or requirements." Greater resiliency can be achieved by constant review and analysis of the response system and focuses on three key components:

- **Resistance:** The ability to deploy only resources necessary to safely and effectively control an incident and bring it to termination, which is achieved through the development and implementation of critical tasking and its application to the establishment of an effective response force for all types of incidents.
- **Absorption:** The ability of the agency to quickly add or duplicate resources necessary to maintain service levels during heavy call volume or incidents of high resource demand.
- **Restoration:** The agency's ability to quickly return to a state of normalcy.

Resistance is controlled by the MFD through staffing and response protocol, with MFD resources dependent on the level of staffing and units available at the time of the alarm.

Absorption is accomplished through initial responding units available to respond by the MFD.

Restoration is managed by MFD unit availability as simultaneous calls occur, recall of personnel to staff fire units during campaign events when warranted, and efficient work on incidents for a quick return to service.

Regarding restoration, the following tables analyze the station availability to respond to calls.

TABLE 3-10: Frequency Distribution of the Number of Calls

Calls in an Hour	Frequency	Percentage
0	5,123	58.5
1	2,654	30.3
2	790	9.0
3	156	1.8
4+	37	0.4
Total	**8,760**	**100.0**

TABLE 3-11: Frequency of Overlapping Calls

Area	Scenario	Number of Calls	Percent of All Calls	Total Hours
MFD1	No overlapped call	1,771	92.9	650.7
	Overlapped with one call	128	6.7	23.0
	Overlapped with two calls	8	0.4	1.2
MFD2	No overlapped call	1,546	93.7	558.1
	Overlapped with one call	97	5.9	20.4
	Overlapped with two calls	6	0.4	1.3
	Overlapped with three calls	1	0.1	0.0
MFD3	No overlapped call	879	96.4	381.5
	Overlapped with one call	32	3.5	8.2
	Overlapped with two calls	1	0.1	0.2
MFD4	No overlapped call	287	99.0	124.2
	Overlapped with one call	3	1.0	0.7
MFD5*	No overlapped call	71	100.0	0.5
Aid Given	No overlapped call	24	96.0	19.9
	Overlapped with one call	1	4.0	0.0

Note: *MFD 5 was a new station in service on 8/20/2023. It was included in the analysis only for 42 days.

The next table focuses on each station's availability to respond to calls within its first due area. At the same time, it focuses on calls where an MFD unit eventually arrived and ignores calls where no unit arrived. Out of 4,830 calls that are not mutual aid, there were 260 calls where an MFD unit responded but no unit arrived. For this reason, the individual rows, and the total in this table's second column, do not match the corresponding values in the table above.

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TABLE 3-12: Station Availability to Respond to Calls

Area	Calls in Area	First Due Responded	Percent Responded	First Due Arrived	Percent Arrived	First Due First	Percent First
MFD1	1,809	1,632	90.2	1,609	88.9	1,582	87.5
MFD2	1,551	1,365	88.0	1,333	85.9	1,289	83.1
MFD3	864	796	92.1	784	90.7	775	89.7
MFD4	276	259	93.8	253	91.7	246	89.1
MFD5	70	62	88.6	61	87.1	60	85.7
Total	**4,570**	**4,114**	**90.0**	**4,040**	**88.4**	**3,952**	**86.5**

For the table above, for each station, CPSM counted the number of calls within its first due area where at least one MFD unit arrived. Next, we focused on units from the first due station to see if any unit responded, arrived, or arrived first; Unit HZMT4 rotates between Station 1 and 4. When LAD5 was out of service in Station 5's area, the reserve Eng 5 would run out of that location.

TABLE 3-13: Workload by Unit

Station	Unit	Type	Minutes per Run	Hours	Percent	Minutes per Day	Runs	Runs per Day
MFD1	BAT1	BC	26.4	211.2	8.7	34.7	480	1.3
	BAT2	BC	52.2	20.9	0.9	3.4	24	0.1
	ENG1	Engine	20.8	665.4	27.5	109.4	1,916	5.2
	ENG5	Res. Engine	23.4	34.6	1.4	5.7	89	0.2
	HZMT1	Hazmat	4.2	0.1	0.0	0.0	1	0.0
	LAD1*	Ladder	1.0	0.0	0.0	0.0	1	0.0
	PLAT1	Platform	20.3	53.2	2.2	8.8	157	0.4
	RES1*	Rescue	20.6	1.7	0.1	0.3	5	0.0
	TEMS1	Rescue	0.1	0.0	0.0	0.0	1	0.0
	Total		**22.2**	**987.2**	**40.7**	**162.3**	**2,674**	**7.3**
MFD2	ENG2	Engine	19.2	143.8	5.9	23.6	449	1.2
	LAD2*	Ladder	19.3	506.7	20.9	83.3	1,572	4.3
	RES2	Rescue	26.3	22.4	0.9	3.7	51	0.1
	SOTV	Rescue	54.6	3.6	0.2	0.6	4	0.0
	Total		**19.6**	**676.5**	**27.9**	**111.2**	**2,076**	**5.7**
MFD3	AIR302	ARFF	15.8	1.1	0.0	0.2	4	0.0
	ENG3	Engine	23.1	458.3	18.9	75.3	1,191	3.3
	Total		**23.1**	**459.4**	**19.0**	**75.5**	**1,195**	**3.3**
MFD4	ENG4	Engine	20.7	243.3	10.0	40.0	705	1.9
	HZMT4**	Hazmat	42.0	39.9	1.6	6.6	57	0.2
	Total		**22.3**	**283.2**	**11.7**	**46.6**	**762**	**2.1**
MFD5	LAD5	Ladder	18.7	16.8	0.7	2.8***	54	0.1***
Total			**21.5**	**2,423.1**	**100.0**	**398.3**	**6,761**	**18.5**

Note: ***No longer at this station; ****Unit rotates between Stations 1 and 4; *****Station 5 started service on 8/20/2023 for a total of 42 days in the study period. However, Ladder 5 was only in service at Station 5 for 21 days. It was out for maintenance for another 19 days, and at Station 2 replacing L2 for two days. All "per day" measurements are divided by 365 days for consistency.

Regarding the MFD's resiliency to respond to calls, analysis of these tables tells us:

- On average the MFD made 18.5 runs per day.
- On average, calls had a duration of 21.5 minutes per run.
- On a station level, Station 1 made the most runs (2,674, or an average of 7.3 runs per day) and had the highest total annual deployed time (987.2 hours, or an average of 2.7 hours per day).
- On a unit level, Engine 1 made the most runs (1,916, or an average of 5.2 runs per day), and had the highest total annual deployed time (665.4 hours, or an average of 109.4 minutes per day).
- 88.5 percent of the time there was no call or a single call (no call overlap).
- 9.0 percent of the time a call overlapped with one other call.
- 1.8 percent of the time there were three or more calls in an hour.
- 0.4 percent of the time there were 4 or more calls in an hour.
- 88.4 percent of the time the first due unit responded to calls in its first due area.
- 86.5 percent of the time the first due unit arrived first in its first due area.

The MFD has moderate resiliency with the current deployment model. Resiliency increases when contemplating the assembling of an Effective Response Force for structural fire responses, which typically means all companies in the city will respond, leaving no resources available to respond to an overlapping call until the incident commander determines resource needs/allocation.

RISK CATEGORIZATION

A comprehensive risk assessment is a critical aspect of creating standards of cover and can assist the MFD in quantifying the risks that it faces. Once those risks are known, the department is better equipped to determine if the current response resources are sufficiently staffed, equipped, trained, and positioned. In this component, the factors that drive the service needs are examined and then link directly to discussions regarding the assembling of an effective response force (EFR) and when contemplating the response capabilities needed to adequately address the existing risks, which encompasses the component of critical tasking.

The risks that the department faces can be natural or human-caused and may be affected by the changing demographics of the community served. With the information available from the CPSM data analysis, the MFD, the city, and public research, CPSM and the MFD can begin an analysis of the city's risks and can begin working towards recommendations and strategies to mitigate and minimize their effects. This section contains an analysis of the various risks considered within the MFD's service area.

Risk is often categorized in three ways: consequence of the event on the community, the probability the event will occur in the community, and the impact on the fire department. The following three tables look at the probability of the event occurring which ranges from unlikely to frequent; consequence to the community, which is categorized as ranging from insignificant to catastrophic; and the impact to the organization, which ranges from insignificant to catastrophic.

TABLE 3-14: Event Probability

Probability	Chance of Occurrence	Description	Risk Score
Unlikely	2%-25%	Event may occur only in exceptional circumstances.	**2**
Possible	26%-50%	Event could occur at some time and/or no recorded incidents. Little opportunity, reason, or means to occur.	**4**
Probable	51%-75%	Event should occur at some time and/or few, infrequent, random recorded incidents, or little anecdotal evidence. Some opportunity, reason, or means to occur; may occur.	**6**
Highly Probable	76%-90%	Event will probably occur and/or regular recorded incidents and strong anecdotal evidence. Considerable opportunity, means, reason to occur.	**8**
Frequent	90%-100%	Event is expected to occur. High level of recorded incidents and/or very strong anecdotal evidence.	**10**

TABLE 3-15: Impact on MFD

Impact	Impact Categories	Description	Risk Score
Insignificant	Personnel and Resources	One apparatus out of service for period not to exceed one hour.	**2**
Minor	Personnel and Resources	More than one but not more than two apparatus out of service for a period not to exceed one hour.	**4**
Moderate	Personnel and Resources	More than 50 percent of available resources committed to incident for over 30 minutes.	**6**
Significant	Personnel and Resources	More than 75 percent of available resources committed to an incident for over 30 minutes.	**8**
Catastrophic	Personnel, Resources, and Facilities	More than 90 percent of available resources committed to an incident for more than two hours or event which limits the ability of resources to respond.	**10**

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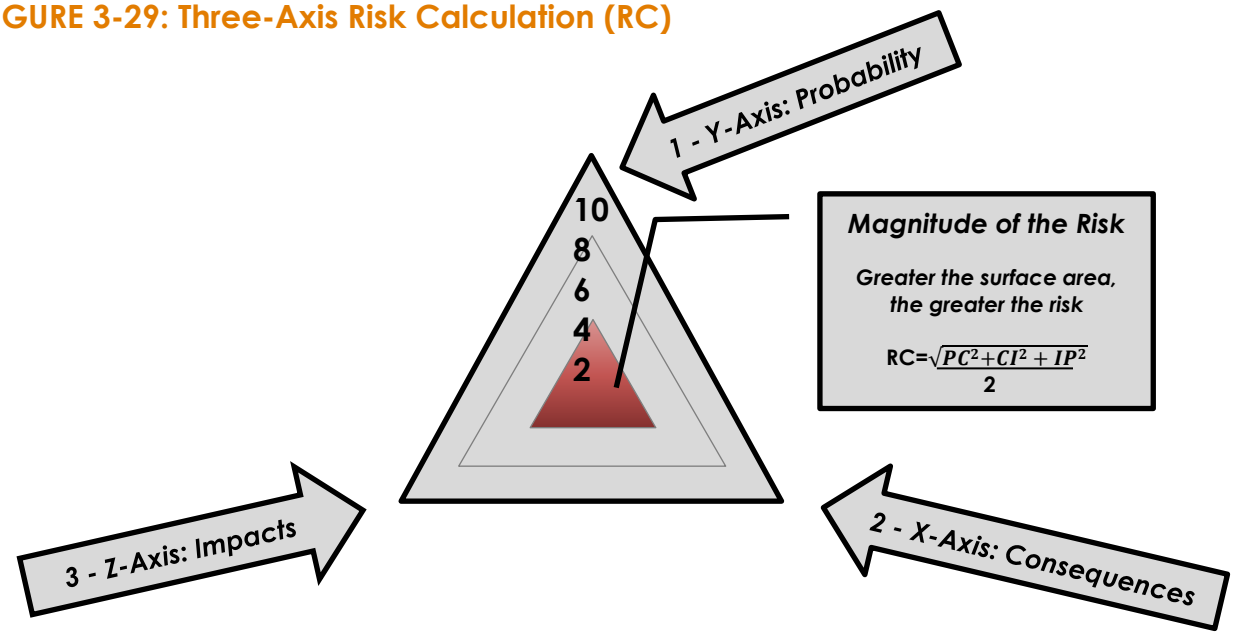
TABLE 3-16: Consequence to Community Matrix

Impact	Impact Categories	Description	Risk Score
Insignificant	Life Safety	1 or 2 people affected, minor injuries, minor property damage, and no environmental impact.	**2**
Minor	Life Safety Economic and Infrastructure Environmental	A small number of people affected, no fatalities, and a small number of minor injuries with first aid treatment. Minor displacement of people for <6 hours and minor personal support required. Minor localized disruption to community services or infrastructure for <6 hours. Minor impact on environment with no lasting effects.	**4**
Moderate	Life Safety Economic and Infrastructure Environmental	Limited number of people affected (11 to 25), no fatalities, but some hospitalization and medical treatment required. Localized displacement of small number of people for 6 to 24 hours. Personal support satisfied through local arrangements. Localized damage is rectified by routine arrangements. Normal community functioning with some inconvenience. Some impact on environment with short-term effects or small impact on environment with long-term effects.	**6**
Significant	Life Safety Economic and Infrastructure Environmental	Significant number of people (>25) in affected area impacted with multiple fatalities, multiple serious or extensive injuries, and significant hospitalization. A large number of people displaced for 6 to 24 hours or possibly beyond. External resources required for personal support. Significant damage that requires external resources. Community only partially functioning, some services unavailable. Significant impact on environment with medium- to long-term effects.	**8**
Catastrophic	Life Safety Economic and Infrastructure Environmental	A very large number of people in affected area(s) impacted with significant numbers of fatalities, large number of people requiring hospitalization, serious injuries with long-term effects. General and widespread displacement for prolonged duration; extensive personal support required. Extensive damage to properties in affected area requiring major demolition. Serious damage to infrastructure. Significant disruption to, or loss of, key services for a prolonged period. Community unable to function without significant support. Significant long-term impact on environment and/or permanent damage.	**10**

This section also contains an analysis of the various risks considered in the city. In this analysis, information presented and reviewed in this section (All-Hazards Risk Assessment of the Community) have been considered. Risk is categorized as Low, Moderate, High, or Special.

Prior risk analysis has only attempted to evaluate two factors of risk: probability and consequence. Contemporary risk analysis considers the impact of each risk to the organization, thus creating a three-axis approach to evaluating risk as depicted in the following figure. A contemporary risk analysis now includes probability, consequences to the community, and impact on the organization, in this case the MFD.

FIGURE 3-29: Three-Axis Risk Calculation (RC)



The following factors/hazards were identified and considered:

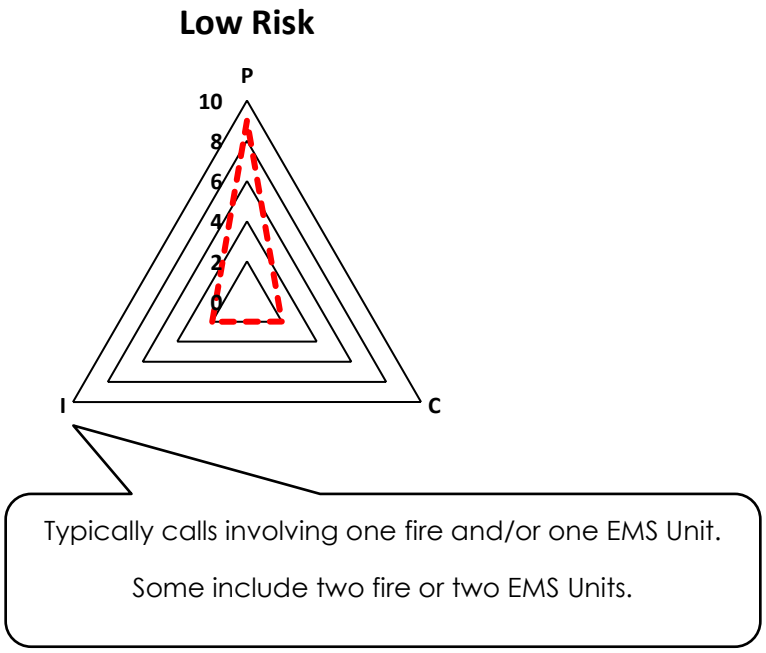
- **Demographic factors** such as age, socio-economic, vulnerability.
- **Natural hazards** such as flooding, snow and ice events, wind events, wild land fires.
- **Manufactured hazards** such as rail lines, roads and intersections, target hazards.
- **Structural/building risks**.
- **Fire and EMS incident numbers and density**.

The assessment of each factor and hazard as listed below took into consideration the likelihood of the event, the impact on the city itself, and the impact on MFD's ability to deliver emergency services, which includes automatic aid capabilities as well. The list is not all inclusive but includes categories most common or that may present to the city and the MFD.

Low Risk

- Automatic fire/false alarms.
- BLS EMS Incidents.
- Low-risk environmental event.
- Motor vehicle accident (MVA).
- Good intent/hazard/public service fire incidents with no life-safety exposure.
- Outside fires such as grass, rubbish, dumpster, vehicle with no structural/life-safety exposure.

FIGURE 3-30: Low Risk



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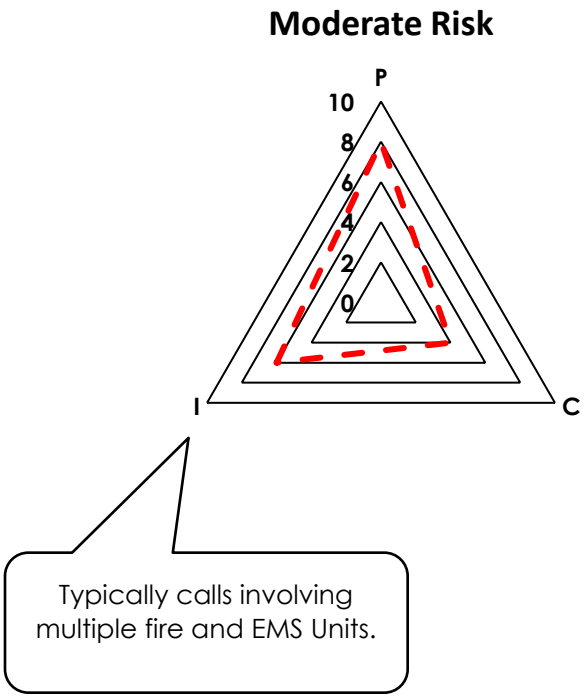
Moderate Risks

- Fire incident in a single-family dwelling where fire and smoke or smoke is visible, indicating a working fire.
- Suspicious substance investigation involving multiple fire companies and law enforcement agencies.
- ALS EMS incident.
- MVA with entrapment of passengers.
- Grass/brush fire with structural endangerment/exposure.
- Low angle rescue involving ropes and rope rescue equipment and resources.
- Surface water rescue.
- Good intent/hazard/public service fire incidents with life-safety exposure.
- Rail event with no release of product or fire, and no threat to life safety.

FIGURE 3-31: Moderate Risk



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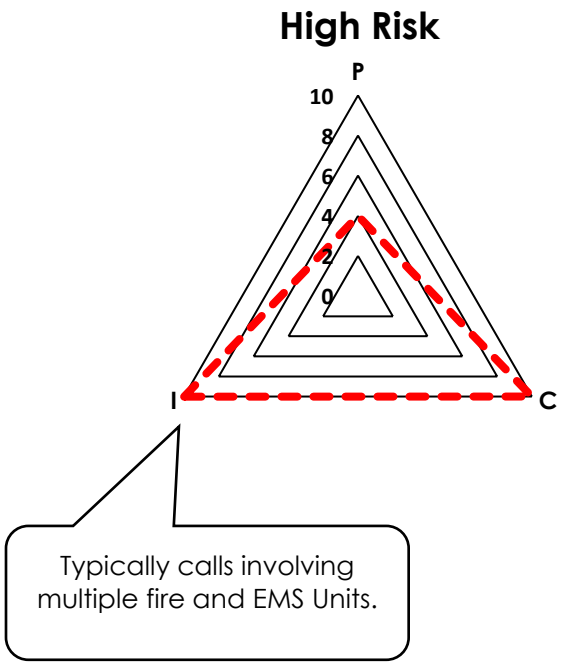
High Risk

- Working fire in a target hazard.
- Cardiac arrest.
- Mass casualty incident of more than 10 patients but fewer than 25 patients.
- Confined space rescue.
- Structural collapse involving life-safety exposure.
- High-angle rescue involving ropes and rope rescue equipment.
- Trench rescue.
- Suspicious substance incident with multiple injuries.
- Industrial leak of hazardous materials that causes exposure to persons or threatens life safety.
- Weather events that create widespread flooding, heavy snow, heavy winds, building damage, and/or life-safety exposure.

FIGURE 3-32: High Risk



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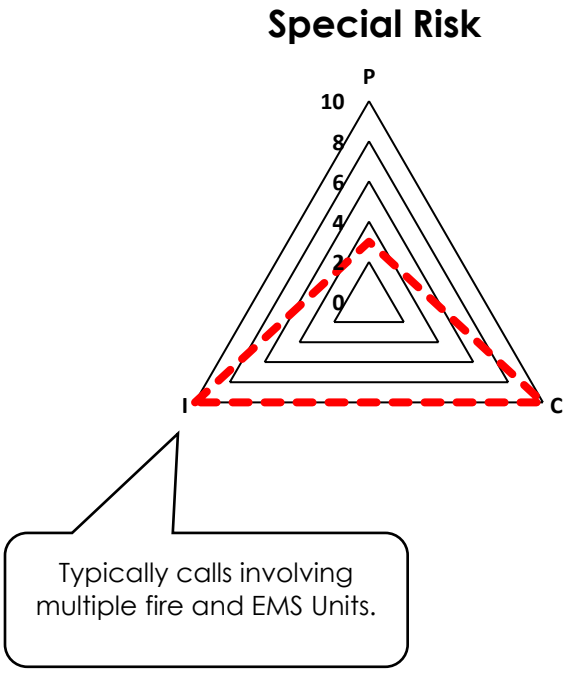
Special Risk

- Working fire in a structure of more than three floors.
- Fire at an industrial building or complex with hazardous materials.
- Fire in an occupied targeted hazard with special life-safety risks such as age, medical condition, or other identified vulnerabilities.
- Mass casualty incident of more than 25 patients.
- Rail or transportation incident that causes life-safety exposure or threatens life safety through the release of hazardous smoke or materials and evacuation of residential and business occupancies.
- Explosion in a building that causes exposure to persons or threatens life safety or outside of a building that creates exposure to occupied buildings or threatens life safety.
- Massive river/estuary flooding, fire in a correctional or medical institution, high-impact environmental event, pandemic.
- Mass gathering with threat of fire and threat to life safety or other civil unrest, weapons of mass destruction release.

FIGURE 3-33: Special Risk



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SECTION 4. ADMINISTRATIVE AND OPERATIONAL ASSESSMENT

ADMINISTRATIVE AND ORGANIZATIONAL ASSESSMENT

MFD is a career fire department that employs 71 full-time personnel consisting of administrative, support, and operational level officers and firefighters. Along with its complement of officers and firefighters, MFD deploys four engine companies and one quint/ladder company out of five fire stations. MFD operates on a rotational shift work schedule with a shift or platoon configuration working 48 hours on and 96 hours off (48/96).

The following positions are part of the Fire Chief's Administrative Staff. It is important to note that these positions while assigned to Fire Administration have a significant role in the operations of the department and are available to assume command and fill support roles at any emergency and non-emergency incident during work, after hours, and weekends if needed.

Fire Chief

The MFD is led by a Fire Chief who has overall responsibility for the management and leadership of the department. The Fire Chief provides leadership and direction for all Fire Department functions in support, operations, and personnel through the supervision of subordinate staff and review of their activities.

The Fire Chief is an inclusive and collaborative leader and exemplifies the vision, standards, and expectations of the city and will work closely with the community to ensure that all members feel safe and included at all times.

The Fire Chief exercises strategic and visionary thinking that will have long-term organization-wide application and impact, including the development and implementation of critical programs, and supervision of multiple assigned functions, divisions, and significant resources.

The Chief works closely with City Department Directors and staff members to achieve the mission of the city and its citizens. The Chief is assisted by Two Battalion Chiefs providing assistance with Operations, Training, and Prevention.

Responsibilities include reviewing the general operation of the department to determine efficiency, ensure operational readiness, providing direction on major projects or problem areas, developing and implementing policies and procedures, administration of the labor relations program; and providing policy guidance. Works in conjunction with the City's Emergency Management Coordinator, EMS Liaison, Fire Prevention Personnel, operational personnel, and civilian support staff. The Fire Chief works Monday-Friday with night and weekend duties and responsibilities for the protection of life and property for the city and is expected to be available 24/7. This position reports to the City Manager or their designee.

Administrative Battalion Chief

Position is responsible for leading, planning, organizing, and controlling all emergency and non-emergency functions of the Operations and Support Services; such duties may include leading and managing fire operations in coordination with the operational Battalion Chiefs, Trinity emergency medical services (EMS), safety, training, fire prevention, administration of disciplinary procedures along with supervision of maintenance operations, supply, and logistics. This position

provides strategic input and assistance in carrying out the day-to-day functions of the department. This is a Monday-Friday assignment with at times night and weekend duties and responsibilities. This position is under the general supervision of the Fire Chief.

Training Battalion Chief

Position is the chief fire official responsible for overseeing all emergency and non-emergency fire training activities, Training is one of the most important factors in any fire department and must be a priority for the MFD. "Train like your life depends on it, because it does" is a mantra that fire departments live by. The Training Chief is responsible for emergency and non-emergency activities and develops schedules, and presents department training programs that are current, and adhere to department medical protocols, The Training Chief is responsible to ensure that all firefighters and staff meet the training needs of all departmental personnel as well as state, Federal, and other nationally recognized criteria, and requirements. The Training Chief will represent the department as a member of applicable fire training associations and groups related to assigned duties and responsibilities. The Training Chief may also respond to emergency and non-emergency incidents as required. This is a Monday-Friday assignment with at times night and weekend duties and responsibilities. This position is under the general supervision of the Fire Chief.

Fire Inspector

Position provides service to the engineering, architectural, construction community, and other citizens and stakeholders through the enforcement, interpretation, and application of fire codes, fire department inspections, and building codes in coordination with the city's Building Official. Conducts inspections of identified buildings and structures, including new and existing construction in the city for fire prevention purposes. Evaluates and enforces existing fire safety conditions, along with federal, state, and local codes applicable to fire safety. This position is currently under the general supervision of the Administrative Battalion Chief.

Executive Assistant to the Fire Chief and Battalion Chief

Position handles complex and confidential administrative support to Fire Chief and Battalion Chiefs including scheduling of calendars; tracking and following up on projects; reviewing mail; coordinating travel; organizing, coordinating, and preparing documents for public and staff meetings; drafting correspondence; and advising executive staff of complex complaints and issues. This position was largely responsible for departmental payroll that has recently been transitioned to the Shift Battalion Chiefs.

The following positions make up the operational staffing, which represents the largest staffing complement in the MFD, which is typical across the country.

Battalion Chiefs: Fire Operations

The position is responsible for all emergency and non-emergency activities along with the daily staffing of all emergency units and for ensuring that their personnel follow departmental policies and SOGs. Position makes rounds to the stations within in their battalion, on a shift basis, to ensure the standardization of procedures, communication of departmental information, and assess the physical and behavioral health and wellness of personnel for operational readiness. Position has ancillary duties in addition to their shift operational and administrative duties, which include community activities, technology, health and safety, support services such as fleet, facilities and equipment, emergency operations, and training of shift personnel. Will assume the position of Incident Commander on all major EMS and fire incidents. This position must hold certification in Paramedicine and/or Emergency Medical Technician (EMT) and other requirements set forth by the city. Position is exposed to a variety of emergency situations at fire

scenes and engages in decision making to determine appropriate procedures for a wide variety of life-threatening situations. This position reports directly to the Fire Chief. Battalion Chiefs work a rotational shift schedule of 48/96. Battalion Chiefs are often recalled if necessary to cover vacancies or emergency incidents. This position is under the general supervision of the Fire Chief.

Shift Captains

The position is responsible for the protection, safety, and welfare of subordinates, peers, and citizens as directed by Fire Department Standard Operating Procedures. The Fire Captain participates in emergency or non-emergency activities as assigned or directed by Fire Department Standard Operating Procedures or a higher-ranking officer. At the direction of, or in the absence of, a higher-ranking officer, the Fire Captain assumes the responsibilities, activities, and duties of a higher rank until relieved . This position must hold certification in Paramedicine and/or Emergency Medical Technician (EMT) and other requirements set forth by the city. Position is exposed to a variety of emergency situations at fire scenes and engages in decision making to determine appropriate procedures for a wide variety of life-threatening situations. The position works a rotational shift schedule and reports directly to the Shift Battalion Chief.

Senior Firefighters

Position is responsible for all operational and non-operational requirements of a firefighter. In addition, this position is responsible for the safe operation of the apparatus and must adhere to all driving and safety standards as described in the department's Standard Operating Procedure (SOP) as well as local, state, and federal laws. Participates in fire prevention and training as needed and maintains the fire station and firefighting equipment in a constant state of readiness. Position is exposed to a variety of emergency situations at fire scenes and engages in decision making to determine appropriate procedures for a wide variety of life-threatening situations. The position works a rotational shift schedule of 48/96 and reports directly to the Shift Captain. Personnel can be assigned as a lead driver position but its rotated among senior firefighters as needed.

Firefighters

Position responds to fire alarms, structural fires, medical emergencies, hazardous materials, urban rescue, and other calls to protect life and property. Participates in fire prevention and training as needed and maintains the fire station and firefighting equipment in a constant state of readiness. This position must hold certifications in Emergency Medical Technician (EMT) and other requirements set forth by the city. Position is exposed to a variety of emergency situations at fire scenes and engages in decision making to determine appropriate procedures for a wide variety of life-threatening situations The position works a rotational shift schedule and reports directly to the Shift Captain.

TIME ALLOCATION PRINCIPLES

To effectively operate in an organization, an employee must understand his or her role and, as importantly, where he/she should allocate his/her time during the workday or shift to be most effective. Understanding this concept is essential in an organization such as MFD, which has a lean organizational chart. Managers and firefighters have a responsibility to understand their organizational roles and responsibilities, and to effectively perform the tasks related to these roles and responsibilities. One would not expect senior-level officers to spend as much time operating the system as a frontline service provider does. Conversely, one would not expect a first-line or midlevel officer to spend as much time as a senior-level officer planning for the future of the

organization. In this way, each level of the organization has a separate set of priorities and employees at each level should allocate their time accordingly.

Three segments of organizational time allocation are central to achieving the goals and objectives of any organization and, more importantly, to enable the organization to fulfill its mission and realize its vision. These segments are (1) operating the system; (2) improving the system; and (3) creating the future.

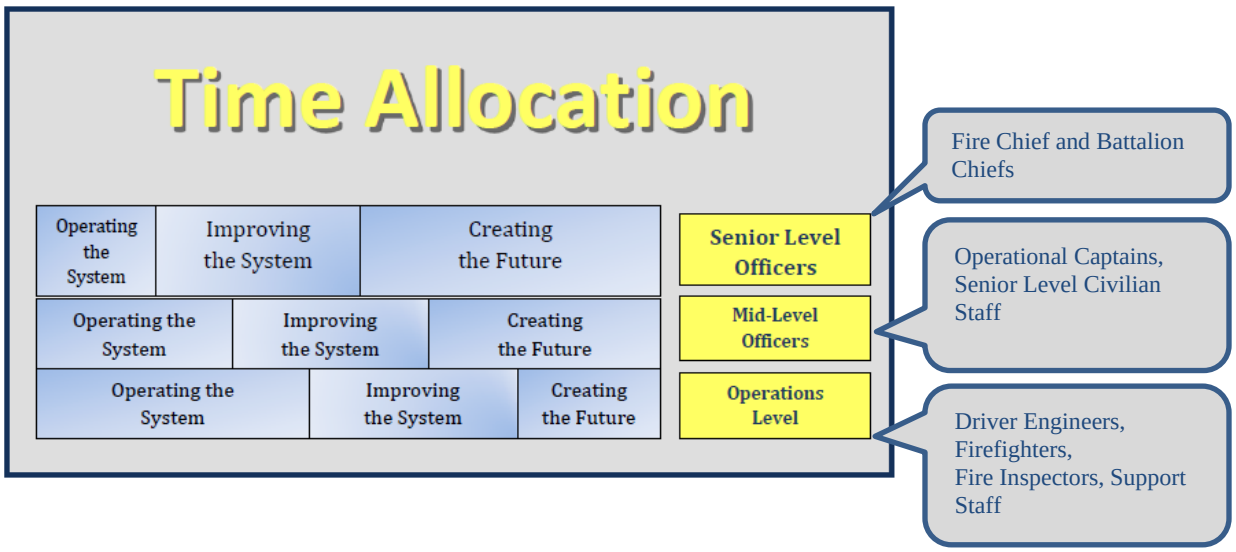
Operating the system is that time during the workday that an organizational member is implementing service deliverables, touching those components of the organization that make it go.

Improving the system is the time during the workday that an organizational member spends seeking ways to make service deliverables and organizational components more efficient, or, more simply put, improved and better.

Creating the future is that critical piece of time allocation when an organizational member develops goals and objectives that link to strategic planning and considers the vision of the organization in a way that focuses on successful, effective outcomes.

In the time allocation model, each level in the organization spends a percentage of their day either *Operating the System*, *Improving the System*, or *Creating the Future*. Where a staff member may allocate their time is directly tied to the position in the organization they fill.

FIGURE 4-1: Time Allocation Model



In the MFD, senior level officers include the Fire Chief and two Administrative Battalion Chiefs. These positions should spend the majority of their time creating the future for the department, the next greatest portion of their time improving the system, and the least amount of time operating the system. When senior management delves into operating the system more than improving the system and creating the future, several things occur, which may include: critical planning goes undone; unclear organizational priorities and goals; a lack of transparency in decision-making; low morale and employee engagement; employees do not reach their expectation level due to their lack of motivation; employees may not feel welcome or respected.

Middle managers in MFD include the shift Battalion Chiefs. These positions should allocate their time evenly across the three categories of creating the future for the department, improving the system, and operating the system. In this scenario these positions plan, organize, lead, and evaluate the shift operations for the career staff. This level in the organization is important in that it creates the conduit of information between those who operate the system and those who improve the system and create the future. This level of the organization should be linked to committees, processes, and continuous improvement of the organization on a regular basis. They should also be included in strategic planning concepts through input and development of goals and objectives. Importantly, this level manages and leads those who operate the system and is responsible for ensuring this level of the organization is continuously prepared to respond and mitigate emergencies. This is often the most difficult in regards to time allocation since time is spent in both planning and operation given the fact that some elements of operating the system cannot be defined and at times are incident driven.

Those who operate the system in MFD include Captains and firefighters. These positions should be allocating their time in reverse of senior leadership. This includes the greatest percentage of the day spent operating the system, the next greatest percent improving the system, and the least amount of time creating the future. While it is natural for this level of the organization to spend most of their time operating the system (preparation and response to emergencies), they are a valuable resource and should not be ignored when systems, processes, equipment, and response require improvement. Equally, when strategic goals and objectives are developed, this level operates the very pieces of the organization for which goals and objectives are being developed. Inclusion of this level empowers and creates trust and buy-in to organizational concepts and strategies.

Ideally, even in a compact organization such as MFD, it is critical that the appropriate time be spent at the appropriate level in the organization to continuously operate the system, make improvements, and create the future. Given this, it is recommended that MFD organize the department to optimize and empower subordinate officers to the Fire Chief to include senior level chief officers and company officers within the leadership and management of all department operations. This includes the concepts of a Functional Organizational Chart, the Time Allocation Model to ensure a more efficient alignment of organizational resources, and the effective use of all members of the organization to achieve the organization's mission and core values.

FUNCTIONAL TABLE OF THE ORGANIZATION

MFD, as a small career department, has a small administrative staffing count and commits most of its total staffing count to fire and EMS operations. Smaller departments deal with the same issues and challenges of much larger departments, just on a smaller scale. Nevertheless, the issues still must be managed, and solutions implemented.

Because there are many of the same functions, programs, and supportive tasks required in MFD as there are in larger fire and EMS departments, it is important for MFD to staff administrative and support roles from a functional standpoint and not necessarily by title or person. This may be accomplished utilizing a functional table of the organization.

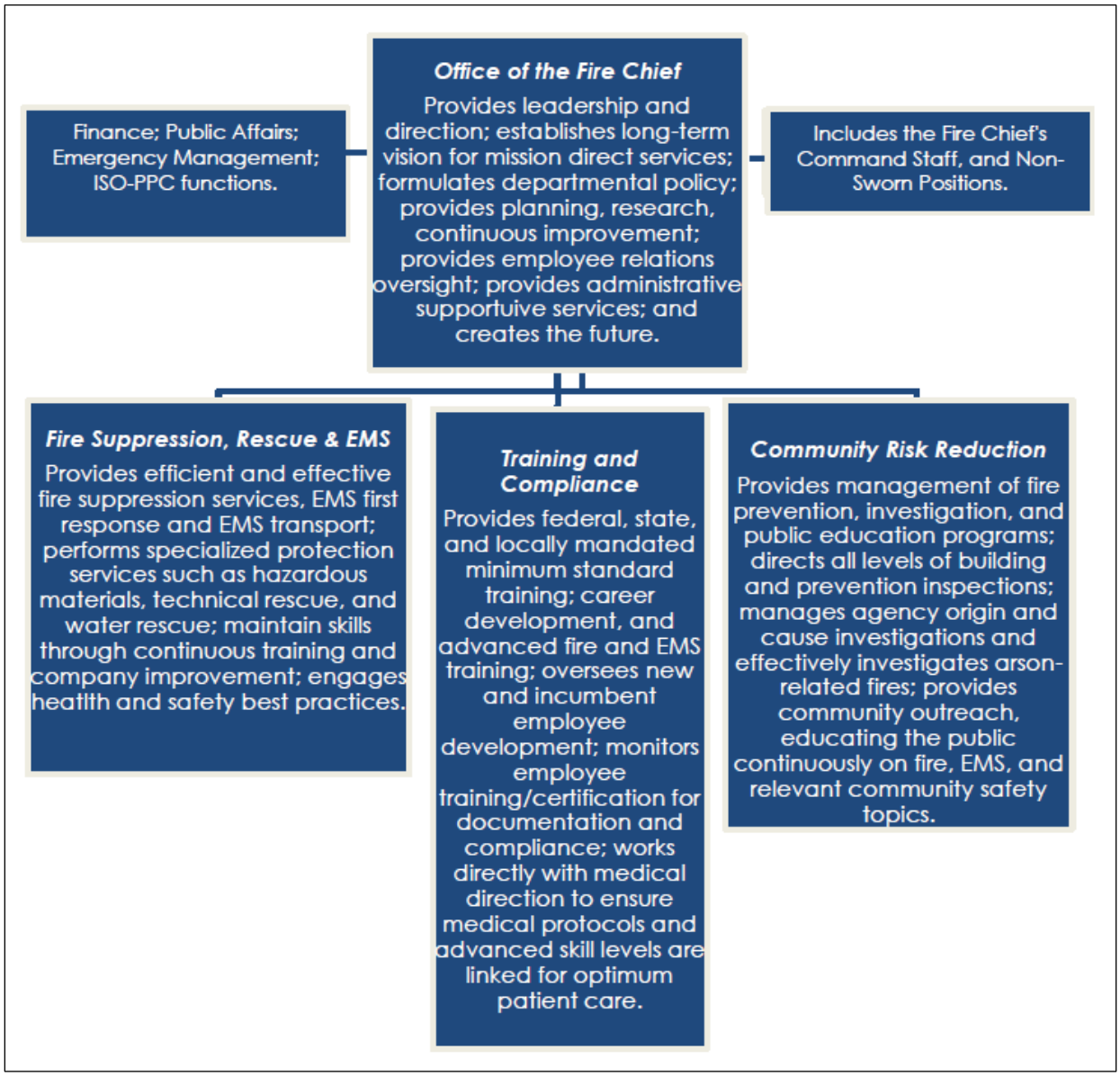
A functional table of the organization will provide a clear picture of the leadership functions at each level, and as well will illustrate the work of leadership to be performed at every level in the organization. Integrating the functional table of the organization with the traditional organizational model (typically a scalar model) directs leadership's attention from that of a

specific focus of an individual to one of leadership viewed from an organizational perspective. This breaks down organizational silos and creates leadership teams within each organizational component, which promotes lateral team building between organizational shifts and divisions.

Additionally, a functional table of the organization illustrates to the community a clear picture of what and where key services of the organization are located within an organization. In this type of chart, each task or functional area becomes a focal point. Specialization is centralized and employees who are doing these specialized jobs or tasks are identified. A functional chart will enable the MFD to better visualize its division of responsibilities and offer a high level of transparency to both internal and external stakeholders.

The next figure outlines a basic fire department functional organizational table with four key elements that include the chief's office, fire suppression and rescue, training and education, and community risk reduction.

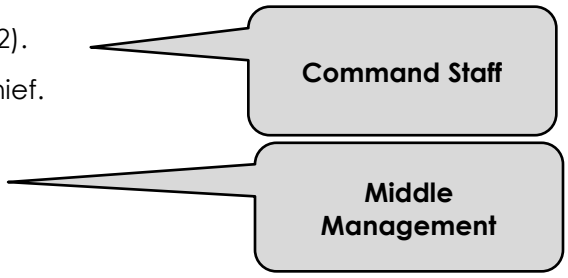
FIGURE 4-2: Sample Functional Table of the Organization



SUCCESSION PLANNING

During our analysis, CPSM was advised of impending retirements of middle and command staff level officers in the near term. While retirement of employees occurs organically in all organizations, because of the small size of MFD the impacts are greater given the short bandwidth of these retirements. The approaching retirements include:

- Fire Chief.
- Admin Battalion Chief (2).
- Operations Battalion Chief.
- Captain A-Shift.
- Captain B-Shift.
- Captain C-Shift.



One important organizational concept for an organization that is experiencing turnover of personnel at management and leadership ranks, is to implement programs that identify the future leaders of the organization; that is, programs that go beyond the technical courses for career advancement preparation. A key to this is to develop and implement a formal succession plan, focused on developing potential successors to ensure organizational leadership stability, and serve as a retention plan. This type of planning is typically designed to identify, develop, and nurture potential future leaders.

There are a few examples of succession planning that work well in fire departments:

- Development-Based Processes: A succession planning model that equips an employee or group of employees for future roles and responsibilities through diverse organizational program exposure and assignments.
- Replacement Planning: A process of identifying replacement staff for key positions and functions and developing these employees over the short term.
- Career Path Training: A program that identifies technical and organizational development courses and/or formal education that must be completed as employees prepare to elevate responsibility or position in the organization. Ideally the officer candidate for any officer level in the department is experienced and has the foundational technical and formal education and training to be successful with each new level promoted to. To ensure this and to ensure the MFD is preparing future officers, a formal program that identifies those foundational technical and organizational courses germane to each level in the organization should be selected and implemented.
- Succession Planning: A more future-focused process of categorizing the knowledge, skills, and abilities needed to perform organizational functions. Linked to this is the development of a plan that has the intent of preparing multiple employees to potentially perform those functions and which creates opportunity for advancement in the organization.

Critical to the success of succession planning is the engagement and commitment of the senior leaders to the program, as well as the commitment of other members of the organization to their own personal and professional development. To be a part of the succession plan, one must commit to one's own professional development to be able to compete for and fill critical organizational leadership roles. CPSM recommends MFD work with the city's Human Resources Director to develop a succession plan that is diverse, includes the entire organization, and has a

focus on preparing current and future members to take on additional roles and responsibilities, and as well as prepares members for advancement and promotion into key roles in the organization.

MFD FIRE OPERATIONS, OPERATIONS STAFFING, AND SERVICE DELIVERY MODEL

When exploring staffing and deployment of fire departments it is prudent to design an operational strategy around the actual circumstances that exist in the community and the fire and risk problems that are identified. The strategic and tactical challenges presented by the widely varied hazards that a department protects against need to be identified and planned for through a community risk analysis planning and management process as completed in this report.

There are budgetary factors that must be considered when deciding on the level of staffing and risk a community must undertake.

Effectively managing a fire department requires an understanding of and an ability to demonstrate how changes to resources will affect community outcomes. It is imperative that fire department leaders, as well as political decision makers, know how fire department resource deployment in their local community affects community outcomes in three critical areas: firefighter injury and death; civilian injury and death; and property loss. If fire department resources (both mobile and personnel) are deployed to match the risk levels inherent to hazards in the community, it has been scientifically demonstrated that the community will be far less vulnerable to negative outcomes in all three areas.[51]

Even with a thorough risk evaluation, staffing fire and EMS companies continues to remain a hotly debated topic among firefighters and governmental leadership since risk assessment models include high-risk/low-frequency situations. Technical rescue and hazmat incidents are examples of these risk profiles. While a situation may be low frequency, they can and do exist and require operational readiness to mitigate.

The federal government is aware of staffing issues for local municipality fire departments as well. In response to concerns over the adequacy of firefighter staffing, the Staffing for Adequate Fire and Emergency Response Act, known as the SAFER Act, was enacted by the 108th Congress as Section 1057 of the FY2004 National Defense Authorization Act (P.L. 108-136). The SAFER Act authorizes grants to career, volunteer, and combination local fire departments for the purpose of increasing the number of firefighters to help communities meet industry-minimum standards and attain 24-hour staffing to provide adequate protection from fire and fire-related hazards. Also authorized are grants to volunteer fire departments for recruitment and retention of volunteers. SAFER is administered by the Federal Emergency Management Agency (FEMA) of the Department of Homeland Security (DHS).[52] The goal of SAFER is to enhance the local fire department's ability to comply with staffing, response, and operational standards established by the NFPA (NFPA 1710 and/or NFPA 1720). For details, review the National Fire Protection Association's codes and standards.[53]

51. Fire Service Deployment, Assessing Community Vulnerability, Metropolitan Chiefs, 2011.
52. Congressional Budget Research Service, informing the legislative debate since 1914. *Staffing for Adequate Fire and Emergency Response:* The SAFER Grant Program, updated April 25, 2019.
53. https://www.fema.gov/grants/preparedness/firefighters/safer

While NFPA 1710 and OSHA provide guidelines as to the level of staffing and response of personnel, the acceptance of these agency documents varies from state to state, and department to department. NFPA 1710 has addressed the recommended staffing in terms of four types of occupancies. The needed staffing to accomplish the critical tasks for each specific occupancy are determined to be the Effective Response Force (ERF). The ERF for each of these occupancies is detailed in NFPA 1710 (2020 edition) section 5.2.4 Deployment.

One of the factors that has helped the fire service in terms of staffing is technology. The fire service continues to experience several technological advances that help firefighters extinguish fires more effectively. More advanced equipment in terms of nozzles, thermal imaging systems, advancements in self-contained breathing apparatus, incident command strategies, and devices used to track personnel air supply are some of the advancements of technologies and techniques that help firefighters extinguish fires faster and manage the fireground more effectively. While some of these technologies do not reduce staffing or workforce required, it can have an impact on workload, property loss, and crew fatigue.

One such technology that can assist in the rapid extinguishment of fires is a foam agent such as Class A or Compressed Air Foam System (CAFS), which have an extinguishing factor that has several advantages over water. Significant advantages of Class A Foam are cooling ability and vapor suppression. The increased surface area of the foam bubbles compared to plain water droplets increases the spray's ability to absorb heat dramatically.

Regarding vapor suppression, the foam blanket effectively covers, and coats burned or partially burned fuels, thereby trapping escaping vapors.[54] Class A foam will increase wetting effectiveness, which allows for greater penetration into Class A fuels such as ordinary combustibles. It also gives water a foaming ability, which allows it to remain and cling to vertical and horizontal surfaces without run-off and allows water to absorb more heat. By adding a small quantity of a Class A foam concentrate into a water stream, the effectiveness of the water can be increased up to five times.[55]

CAFS can also help provide some potential advantages vs. water-only systems. CAFS has been shown to reduce water use, provide for less extinguishment time, and reduce firefighter fatigue.[56]

Even with many advances in technology and equipment, the fireground is an unforgiving and dynamic environment where critical tasks must be completed by firefighters. Providing adequate staffing (Effective Response Force) for these environments depends on many factors. A community fire risk assessment and the expectations of the community are factors that will drive the critical tasks needed to be completed on the fireground.

Staffing and deployment of fire services is not an exact science. While there are many benchmarks that communities and management utilize in justifying certain staffing levels, there are certain considerations that are data driven and reached through national consensus that serve this purpose as well. CPSM has developed metrics it follows and recommends that communities consider when making recommendations regarding staffing and deployment of fire resources.

In addition to metrics, staffing is also linked to station location, what type of apparatus is responding: engine, ladder, ambulance, or specialty piece. These combined factors help to determine what level of fire and EMS service is going to be delivered in terms of workforce,

54. www.chemguard.com
55. ibid
56. Fire Engineering, 2013, Compressed Air Foam and Firefighting Research, Dicus et al.

response time, and resources. Linked to these components of staffing and deployment are 11 critical factors that drive various levels and models from which fire and EMS departments staff and deploy. These factors are:

Fire Risk and Vulnerability of the Community: A fire department collects and organizes risk evaluation information about individual properties and based on the rated factors then derives a "fire risk score" for each property. The community risk and vulnerability assessment are used to evaluate the community. With regard to individual property, the assessment is used to measure all property and the risk associated with that property and then segregate the property as either a high-, medium-, or low-hazard depending on factors such as the life and building content hazard and the potential fire flow and the staffing and apparatus types required to mitigate an emergency in the specific property. Factors such as fire protection systems are considered in each building evaluation. Included in this assessment should be both a structural and nonstructural (weather, wildland-urban interface, transportation routes, etc.) analysis.

Population, Demographics, and Socioeconomics of a Community: Population and population density drives calls for local government service, particularly public safety. The risk from fire is not the same for everyone, with studies telling us age, gender, race, economic factors, and what region in the country one might live in contribute to the risk of death from fire. Studies also tell us these same factors affect demand for EMS, particularly population increase and the more frequent use of hospital emergency departments, since many uninsured or underinsured patients rely on EDs for their primary and emergent care, utilizing pre-hospital EMS transport systems as their entry point.

Call Demand: Demand is made up of the types of calls to which units are responding and the location of the calls. This drives workload and station staffing considerations. Higher population centers with increased demand require greater resources.

Workload of Units: The types of calls to which units are responding and the workload of each unit in the deployment model. This tells us what resources are needed and where; it links to demand and station location, or in a dynamic deployed system, the area(s) in which to post units, and acceptable travel time when measured against national benchmarks.

Travel Times from Fire Stations: Analyzes the ability to cover the fire management zone/response district in a reasonable and acceptable travel time when measured against national benchmarks such as NFPA 1710, 1720, and the ISO-Fire Service Rating Schedule (ISO-FSRS) engine and ladder company grading parameters. This metric links to demand, risk assessment, unit workload, and resiliency.

NFPA Standards, ISO, OSHA requirements (and other national benchmarking).

EMS Demand: Community demand; demand on available units and crews; demand on non-EMS units responding to calls for service (fire/police units); availability of crews in departments that utilize cross-trained EMS staff to perform fire suppression.

Critical Tasking: The ability of a fire and EMS department to comprise an effective response force when confronted with the need to perform required tasks on a fire or EMS incident scene defines its capability to provide adequate resources to mitigate each event. Department-developed and measured against national benchmarks. Links to risk and vulnerability analysis.

Innovations in Staffing and Deployable Apparatus: The fire department's ability and willingness to develop and deploy innovative apparatus (combining two apparatus functions into one to maximize available staffing, as an example). Deploying quick response vehicles (light vehicles

equipped with medical equipment and some light fire suppression capabilities) on those calls (typically the largest percentage) that do not require heavy fire apparatus.

Community Expectations: Measuring, understanding, and meeting community expectations. Stakeholders expect that when they request the fire department to respond to an emergency, the fire department will be available to respond and that the fire department will deliver the services necessary to resolve an emergency situation. They further expect that regardless of the day or time of the response, consistent services will be delivered, and that fire department personnel will be courteous and professional in enacting their responsibilities.[57]

Ability to Fund: The community's ability and willingness to fund all local government services and understanding how the revenues are divided up to meet the community's expectations.

FIGURE 4-3: Ability to Fund: Community Expectations.

While each component presents its own metrics of data, consensus opinion, and/or discussion points, aggregately they form the foundation for informed decision making geared toward the implementation of sustainable, data- and theory-supported, effective fire and EMS staffing and deployment models that fit the community's profile, risk, and expectations.

Minot has a mix of commercial areas, professional office buildings, multifamily, and single-family residential structures (low and moderate density), and healthcare facilities. The service area has a diverse mix of buildings ranging from single family to mixed occupancy types with multiple stories.

MFD responds with fire suppression apparatus with crews from five fire station locations and utilizes Trinity Ambulance EMS ALS/BLS Transport while supporting with fire department-based BLS. At certain times MFD may request mutual aid assistance from Minot Rural or the Minot Air Force Base fire support as well as other departments in the area to assist with working structural fires when MFD resources are strained. More coordination is needed with Minot Rural and this will be discussed later in this report. The department is part of the Northwest Regional Response Team that provides response and equipment for Technical Rescue and Hazardous Materials response throughout North Dakota. ***. It is important to note here that Minot is an island city, meaning the city is not contiguous with jurisdictions providing municipal services. Fire services automatic and mutual aid are not readily available, leaving the MFD to manage multiple calls and large incidents on their own. This should be considered when contemplating staffing and deployment of resources.***

57. Stakeholders Have Explicit Expectations of Fire Departments, Dr. Robert Fleming, Rowan University, 2020

Response Platforms

- Engine Companies, which are primarily designed for firefighting operations, the transport of crew members, hose (fire attack and larger supply), tank water, ground ladders, self-contained breathing apparatus, and storage of an assortment of hand tools used for a broad spectrum of fire operational tasks. As engines are often utilized as first response units on EMS calls, they also carry an assortment of EMS equipment to treat patients and provide life-saving measures prior to the arrival of EMS transport units. Minot Fire Department personnel and apparatus will be trained and equipped for response to all hazards that may affect the community. Engines will be set up for fire suppression as well as emergency medical response and will be staffed with Emergency Medical Technicians (EMTs)who can deliver Basic Life Support (BLS) care from the engine platform.
- Quint/Ladder Company, which is also primarily designed for firefighting operations, differs from engines in that they also have a hydraulically operated aerial device designed to reach above grade floors to transport crew members, effect rescues, and provide an elevated water stream. Ladder trucks also transport crew members, ground ladders, self-contained breathing apparatus, various forcible entry tools, ventilation equipment, and hydraulic rescue tools as well as other equipment to deal with an assortment of fires and technical rescues. Minot's ladder is a quint platform configuration that carries hose (fire attack and supply) and tank water and can operate as an engine when required.
- Traditional Ladder Company personnel primarily perform such functions as firefighting, ventilation, utility control, above-grade firefighting tasks, and elevated master stream applications. These companies will be equipped and trained to engage in direct fire suppression and can respond to all types of EMS incidents. The staffing complement for the ladder is currently three; however, NFPA 1710 recommends a minimum of four firefighters for engine and ladder response.
- Command Vehicles, which are typically SUV-type vehicles with command centers built into the cargo compartment are designed to carry a command level officer to the scene and are equipped with radio and command boards, as well scene personnel tracking equipment and associated equipment. A command vehicle is assigned to the Operations Shift Battalion Chief. These personnel are responsible for responding to fire and EMS incidents and establishing command and control of the incident.

Fire, rescue, and emergency medical system (EMS) incidents, and the fire department's ability to respond to, manage, and mitigate, them effectively, efficiently, and safely, are mission-critical components of the emergency services delivery system. In fact, fire, rescue, and EMS operations provide the primary, and certainly most important, basis for the very existence of the fire department. Having the right vehicles and equipment are essential to the operational readiness of the department.

§§§

MFD Operational Staffing Model

The MFD has three operational shifts, A, B, and C. The following table details the positions for each shift.

TABLE 4-1: MFD Shift Matrix

A Shift (48 on 96 off)	B Shift (48 on 96 off)	C Shift (48 on 96 off)
Station 1 ■ Engine 1: 1 Captain ■ 1 Engineer ■ 2 Firefighters ■ Battalion Chief-Shift Commander ■ ***Hazmat 1*** ■ ***Platform 1***	**Station 1** ■ Engine 1: 1 Captain ■ 1 Engineer ■ 2 Firefighters ■ Battalion Chief-Shift Commander ■ ***Hazmat 1*** ■ ***Platform 1***	**Station 1** ■ Engine 1: 1 Captain ■ 1 Engineer ■ 2 Firefighters ■ Battalion Chief-Shift Commander ■ ***Hazmat 1** ■ ***Platform 1**
Station 2 ■ Engine 2: 1 Captain ■ 1 Engineer ■ 2 Firefighters ■ ***Dive Truck*** ■ ***Rescue 2***	**Station 2** ■ Engine 2: 1 Captain ■ 1 Engineer ■ 2 Firefighters ■ ***Dive Truck*** ■ ***Rescue 2***	**Station 2** ■ Engine 2: 1 Captain ■ 1 Engineer ■ 2 Firefighters ■ ***Dive Truck*** ■ ***Rescue 2***
Station 3 ■ Engine 3: 1 Captain ■ 1 Engineer ■ 2 Firefighters ■ 1 ARFF Vehicle 1 FF Operator	**Station 3** ■ Engine 3: 1 Captain ■ 1 Engineer ■ 2 Firefighters ■ 1 ARFF Vehicle 1 FF Operator	**Station 3** ■ Engine 3: 1 Captain ■ 1 Engineer ■ 2 Firefighters ■ 1 ARFF Vehicle 1 FF Operator
Station 4 ■ Engine 4: 1 Captain ■ 1 Engineer ■ 2 Firefighters ■ ***Technical rescue Truck/Trailer***	**Station 4** ■ Engine 4: 1 Captain ■ 1 Engineer ■ 2 Firefighters ■ ***Technical Rescue Truck/Trailer***	**Station 4** ■ Engine 4: 1 Captain ■ 1 Engineer ■ 2 Firefighters ■ ***Technical Rescue Truck/Trailer***
Station 5 ■ Ladder 5: 1 Captain ■ 1 Engineer ■ 2 Firefighters ■ ***Brush 5***	**Station 5** ■ Ladder 5: 1 Captain ■ 1 Engineer ■ 2 Firefighters ■ ***Brush 5***	**Station 5** ■ Ladder 5: 1 Captain ■ 1 Engineer ■ 2 Firefighter ■ ***Brush 5***

Note: *Cross-staffed units

The table above depicts maximum staffing levels for the department. Engines and Ladders have four assigned personnel to each apparatus and run with a minimum of three. At times, the MFD may struggle to fill in for scheduled and unscheduled leave and thus utilizes overtime to fill in to minimum staffing levels. The MFD, like many fire departments across the country, staffs through the constant-staffing level model, meaning that on each shift there is a minimum number of staffed positions to be filled. In the case of the MFD that number is 17 personnel for each shift. When the department is at minimum staffing and a position is vacated by unscheduled leave, the position is backfilled by overtime staffing.

NFPA 1710

National Fire Protection Association (NFPA) standards are consensus standards and not mandated nor are they the law. Many cites and countries strive to achieve these standards to the extent possible without an adverse fiscal impact to the community. Cities and communities must decide on the level of service they can deliver based on several factors as discussed herein, including budgetary considerations. Questions of legal responsibilities are often discussed in terms of compliance with NFPA standards. Again, these are national consensus standards, representing best practices and applied science and research.

NFPA 1710 outlines organization and deployment of operations by career, and primarily career fire and rescue organizations.[58] It serves as a benchmark to measure staffing and deployment of resources to certain structures and emergencies.

NFPA 1710 was the first organized approach to defining levels of service, deployment capabilities, and staffing levels for career departments. Research work and empirical studies in North America were used by NFPA committees as the basis for developing response times and resource capabilities for those services as identified by the fire department.[59]

According to NFPA 1710, fire departments should base their capabilities on a formal all-hazards community risk assessment, as discussed earlier in this report, and taking into consideration:[60]

- Life hazard to the population protected.
- Provisions for safe and effective firefighting performance conditions for the firefighters.
- Potential property loss.
- Nature, configuration, hazards, and internal protection of the properties involved.
- Types of fireground tactics and evolutions employed as standard procedure, type of apparatus used, and results expected to be obtained at the fire scene.

According to NFPA 1710, if a community follows this standard, engine and ladder companies shall be staffed with a minimum of four on-duty members.[61] Additional staffing parameters in this standard for engine and ladder companies is based on geographical isolation and tactical hazards, and increases each to five or six as a minimum.[62] This staffing configuration is designed to ensure a fire department can complete the critical tasking necessary on building fires and

58. NFPA 1710 is a nationally recognized standard, but it has not been adopted as a mandatory regulation by the federal government or the State of North Dakota. It is a valuable resource for establishing and measuring performance objectives for the City of Minot but should not be the only determining factor when making local decisions about the city's fire services.
59. NFPA, Origin and Development of the NFPA 1710, 1710-1
60. NFPA 1710, 5.2.1.1, 5.2.2.2
61. NFPA 1710, 5.2.3.1.1; 5.2.3.2.1
62. NFPA 1710, 5.2.3.1.2, 5.2.3.1.2.1.,5.2.3.2.2.,5.3.2.3.2.2.1

other emergency incidents simultaneously rather that consecutively, and can efficiently assemble an effective response force for each risk the department may encounter. ***NFPA 1710 permits fire departments to use established automatic aid and mutual aid agreements to comply with the assembling of on-scene personnel to complete critical tasks as outlined in the standard.***

Code of Federal Regulations, NFPA 1500, and Two-In/Two-Out

Another consideration, and one that links to critical tasking and assembling an Effective Response Force, is that of two-in/two-out regulations. Essentially, prior to starting any fire attack in an immediately dangerous to life and health (IDLH) environment [with no confirmed rescue in progress], the initial two-person entry team shall ensure that there are sufficient resources on-scene to establish a two-person initial rapid intervention team (IRIT) located outside of the building.

This critical tasking model has its genesis with the Occupational Safety and Health Administration, specifically 29 CFR 1910.134(g)(4). Currently, North Dakota does not have its own occupational health and safety regulatory program (often called a "state plan"). Instead, federal OSHA laws apply for North Dakota workers, including most private-sector workers.[63]

The MFD responds to structural fires with four engines, a ladder/quint, and a Battalion Chief, equivalent to sixteen-duty fire staff. MFD also dispatches additional personnel to staff companies to backfill their stations on working incidents and who can be sent to the scene if necessary. Under this response model, the MFD provides the minimum number of firefighters on the initial response to comply with CFR 1910.134(g)(4), regarding two-in/two-out rules and an initial rapid intervention team (IRIT).

- CFR 1910.134(g)(4): Procedures for interior structural firefighting. In addition to the requirements as set forth under paragraph (g)(3), interior structural fires, the employer shall ensure that:
  - At least two employees enter the IDLH atmosphere and remain in visual or voice contact with one another at all times;
- CFR 1910.134(g)(4)(ii)
  - At least two employees are located outside the IDLH atmosphere; and
- 1910.134(g)(4)(iii)
  - All employees engaged in interior structural firefighting use SCBAs.
    - **Note 1 to paragraph (g):** One of the two individuals located outside the IDLH atmosphere may be assigned to an additional role, such as incident commander in charge of the emergency or safety officer, so long as this individual is able to perform assistance or rescue activities without jeopardizing the safety or health of any firefighter working at the incident.
    - **Note 2 to paragraph (g):** Nothing in this section is meant to preclude firefighters from performing emergency rescue activities before an entire team has assembled.

According to the standard, one of the two individuals (standby member) shall be permitted to perform other duties outside of the hazard area, such as apparatus operator, incident commander, or technician or aid, provided constant communication is maintained between the standby member and the members of the crew.[64]

63. https://www.360training.com/osha-campus/north-dakota
64. NFPA 1500, 2018, 8.8.2.4

NFPA 1500, *Standard on Fire Department Occupational Health, Safety, and Wellness,* 2018 Edition, has similar language as CFR 1910.134(g)(4) to address the issue of two-in/two-out, stating *the initial stages of the incident where only one crew is operating in the hazardous area of a working structural fire, a minimum of four individuals shall be required consisting of two members working as a crew in the hazardous area and two standby members present outside this hazard area available for assistance or rescue at emergency operations where entry into the danger area is required.*[65]

NFPA 1500 also speaks to the utilization of the two-out personnel in the context of the health and safety of the firefighters working at the incident. *The assignment of any personnel including the incident commander, the safety officer, or operations of fire apparatus, shall not be permitted as standby personnel if by abandoning their critical task(s) to assist, or if necessary, perform rescue, this clearly jeopardizes the safety and health of any firefighter working at the incident.*[66]

In order to meet CFR 1910.134(g)(4), and NFPA 1500, the MFD must utilize two personnel to commit to interior fire attack while two firefighters remain out of the hazardous area or immediately dangerous to life and health (IDLH) area to form the Initial Rapid Intervention Team (IRIT), while attack lines are charged, and a continuous water supply is established.

However, NFPA 1500 allows for fewer than four personnel under specific circumstances. It states, *Initial attack operations shall be organized to ensure that if on arrival at the emergency scene, initial attack personnel find an imminent life-threatening situation where immediate action could prevent the loss of life or serious injury, such action shall be permitted with fewer than four personnel.*[67]

CFR 1910.134(g)(4) also states that nothing in section (g) is meant to preclude firefighters from performing emergency rescue activities before an entire team has assembled.[68]

It is also important to note that the OSHA standard (and NFPA 1710) specifically references "interior firefighting." Firefighting activities that are performed from the exterior of the building are not regulated by this portion of the OSHA standard. However, in the end, the ability to assemble adequate personnel, along with appropriate apparatus, on the scene of a structure fire, is critical to operational success and firefighter safety.

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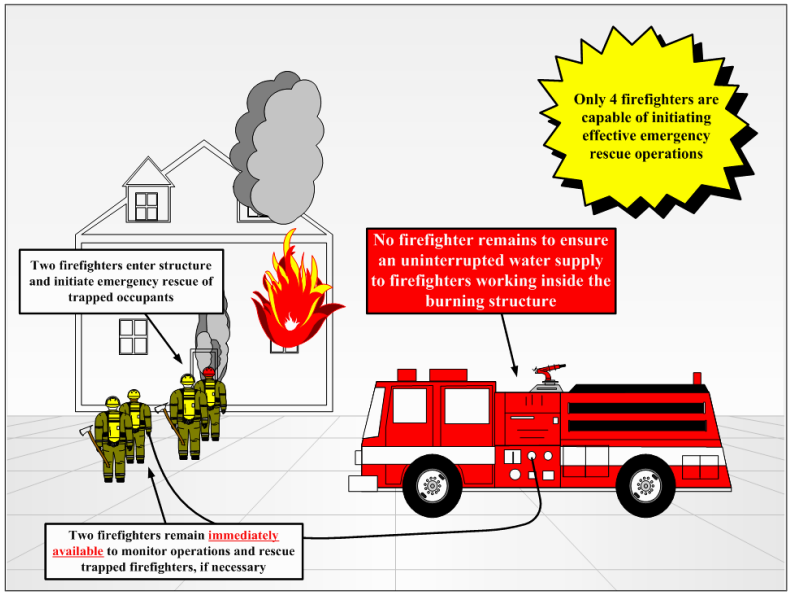
65. NFPA 1500, 2018, 8.8.2.
66. NFPA 1500, 2018, 8.8.2.5.
67. NFPA 1500, 2018 8.8.2.10.
68. CFR 190.134, (g).

FIGURE 4-4: Two-In/Two-Out Interior Firefighting Model*



OSHA and Technical Rescue

Regarding rescue and emergency services: CFR 1926.1211 (b)(1,2,3,4) *requires that (b) an employer whose employees have been designated to provide permit space rescue and/or emergency services must take the following measures and provide all equipment and training at no cost to those employees*:

> (1) Provide each affected employee with the personal protective equipment (PPE) needed to conduct permit space rescues safely and train each affected employee so the employee is proficient in the use of that PPE;
>
> (2) Train each affected employee to perform assigned rescue duties. The employer must ensure that such employees successfully complete the training required and establish proficiency as authorized entrants, as provided by 1926.1207 and 1926.1208 of this standard;
>
> (3) Train each affected employee in basic first aid and cardiopulmonary resuscitation (CPR). The employer must ensure that at least one member of the rescue team or service holding a current certification in basic first aid and CPR is available.
>
> (4) Ensure that affected employees practice making permit space rescues before attempting an actual rescue, and at least once every 12 months, by means of simulated rescue operations in which they remove dummies, manikins, or actual persons from the actual permit spaces or from representative permit spaces, practice rescue is not required where the affected employees properly performed a rescue operation during the last 12 months in the same permit space the authorized entrant will enter, or in a similar permit space. Representative permit spaces must, with respect to opening size, configuration, and accessibility, simulate the types of permit spaces from which rescue is to be performed.[69]

69. https://www.osha.gov/sites/default/files/publications/osha2254.pdf

EFFECTIVE RESPONSE FORCE AND CRITICAL TASKING

NFPA 1710 addresses standards for an Effective Response Force across several types of occupancies.

An effective response force (ERF) is defined as the minimum number of firefighters and equipment that must reach a specific emergency incident location within a maximum prescribed travel [driving] time. The maximum prescribed travel time acts as one indicator of resource deployment efficiency.

NFPA 1710 provides a staffing deployment model and critical tasking guidelines for four specific occupancies. These occupancies are:

- Single-Family Dwelling.
- Open-Air Strip Mall.
- Garden Style Apartment.
- High-Rise.

The Center for Public Safety Excellence (CPSE) has also established benchmarks regarding staffing and deployment. CPSE sets standards for agencies desiring accreditation through the Commission on Fire Accreditation International (CFAI). CFAI uses standards set forth in the *Community Risk Assessment Manual: Standards of Cover*, 10th edition to provide guidance in staffing and deployment to agencies desiring accreditation through Core Competencies.

Critical Tasking as Defined by CPSE and NFPA

Both CPSE and the NFPA have defined Critical Tasking. CPSE defines Critical Tasking as the application of tasks assigned to the human and physical resources that are minimally required to effectively mitigate pain, suffering, and loss of life and/or property. Critical tasking is relevant to risk classifications and risk categories.[70]

There are 93 Core Competencies required for a department to achieve accreditation status as defined by CPSE. Competency 2C.4 is under the heading of Current Deployment and Performance and addresses Critical Tasking under 2C.4.

Criterion 2C: Current Deployment and Performance

The agency identifies and documents the nature and magnitude of the service and deployment demands within its jurisdiction. Based on risk categorization and service impact considerations, the agency's deployment practices are consistent with jurisdictional expectations and with industry research. Efficiency and effectiveness are documented through quality response measurements that consider overall response, consistency, reliability, resiliency, and outcomes throughout all service areas. The agency develops procedures, practices, and programs to appropriately guide its resource deployment.[71]

70. Center for Public Safety Excellence, Quality Improvement for the Fire and Emergency Services, 2020
71. Center for Public Safety Excellence, Quality Improvement for the Fire and Emergency Services, 2020

Core Competency 2C.4

A critical task analysis of each category and risk class has been conducted to determine the first due and effective response force capabilities, and a process is in place to validate and document the results.

Core competency 2C.4 requires that the agency conduct a critical task analysis of each risk category and risk class to determine the first-due and effective response force capabilities, and to have a process in place to validate and document the results. The process considers the number of personnel needed to perform the necessary emergency scene operations. Completion of the process also helps to identify any gaps in the agency's emergency scene practices.

Critical tasks as defined by NFPA 1710 are those activities that must be conducted on time by responders at emergency incidents to control the situation and stop loss. Critical tasking for fire operations is the minimum number of personnel needed to perform the tasks needed to effectively control and mitigate a fire or other emergency. To be effective, critical tasking must assign enough personnel so that all identified functions can be performed simultaneously. However, it is important to note that initial response personnel may manage secondary support functions once they have completed their primary assignment. Thus, while an incident may end up requiring a greater commitment of resources or a specialized response, a properly executed critical tasking assignment will provide adequate resources to immediately begin bringing the incident under control.

The specific number of people required to perform all the critical tasks associated with an identified risk or incident type is referred to as an Effective Response Force (ERF). The goal is to deliver an ERF within a prescribed period. NFPA 1710 provides the benchmarks for effective response forces.

The following discussion and tables will outline how critical tasking and assembling an effective response force is first measured in NFPA 1710, and how the MFD is benchmarked against this standard for the building types existing in Minot. This discussion will cover single-family dwelling buildings, open-air strip mall buildings, and apartment buildings as outlined in the NFPA standard. As mentioned already in this report, the MFD relies on mutual aid to assemble an Effective Response Force.

In all scenarios, the following should be considered:

- Minot Rural Fire Department is a combination agency, and its response time may vary.
- An Auto/Mutual Aid Rapid Intervention Team (RIC) is not part of the initial Attack due to time and distance, and therefore can serve as a Rapid Intervention Crew (RIC), not an IRIT.
- MFD's fourth engine would be considered for an IRIT assignment.

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Single-Family Dwelling: NFPA 1710, 5.2.4.1

The initial full alarm assignment (ERF) to a structural fire in a typical 2,000 square-foot, two-story, single-family dwelling without a basement and with no exposures must provide for a minimum of 16 members (17 if an aerial device is used). The following figure illustrates this, and the subsequent table outlines the critical task matrix.

FIGURE 4-5: Effective Response Force for Single-Family Dwelling Fire

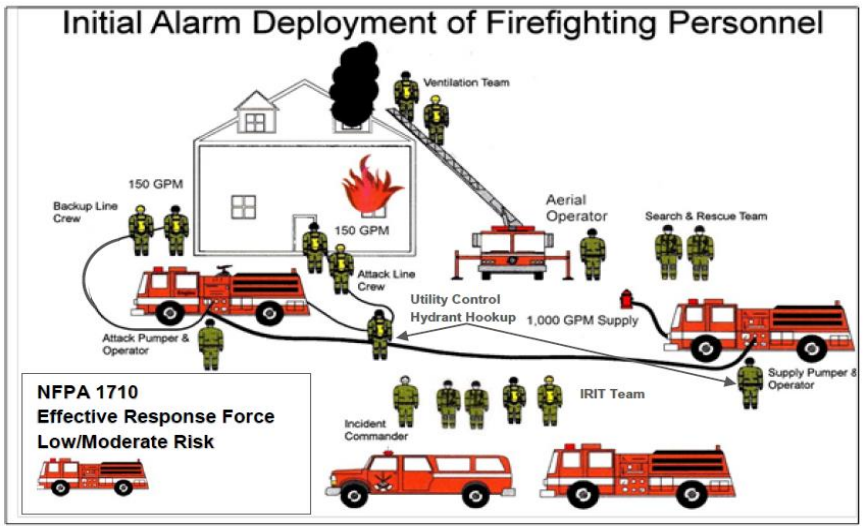

TABLE 4-2: Effective Response Force for Single-Family Dwelling Fire

Critical Tasks	Personnel
Incident Command	1
Continuous Water Supply	1
Fire Attack via Two Handlines	4
Hydrant Hook Up - Forcible Entry - Utilities	2
Primary Search and Rescue	2
Ground Ladders and Ventilation	2
Aerial Operator if Aerial is Used	1
Establishment of IRIC (Initial Rapid Intervention Crew)	4
Total Effective Response Force	**16 (17 If aerial is used)**

The following table outlines how the MFD assembles staffing and deployable resources as measured against NFPA 1710 benchmarking for an effective response force for a single-family dwelling fire. MFD first alarm units are highlighted.

TABLE 4-3: MFD Effective Response Force for Single-Family Dwelling Fire

Apparatus	Personnel
MFD Battalion Chief	1
MFD Engine	3
MFD Engine	3
MFD Engine	3
MFD Engine	3
MFD Ladder/Quint	3
Total MFD ERF	**16**

As a single responding agency, MFD meets the minimum benchmarks of NFPA 1710 for an Effective Response Force for a single-family dwelling fire if the aerial ladder is not utilized. MFD will meet this requirement by the addition of MAFB and MRFD engine/ladder response (depending on their availability) utilizing automatic or mutual aid. NFPA 1710 permits fire departments to use established automatic aid and mutual aid agreements to comply with section 5.2 of this standard.

Open-Air Strip Mall, NFPA 5.4.2

The initial full alarm assignment (ERF) to a structural fire in a typical open-air strip center ranging from 13,000 square feet to 196,000 square feet in size must provide for a minimum of 27 members (28 if an aerial device is used). The following table outlines the critical tasking matrix for this type of fire. This can also be typed as a commercial building fire response.

TABLE 4-4: Effective Response Force for Open-Air Strip Mall Fire

Critical Tasks	Personnel
Incident Command	2
Continuous Water Supply	2
Fire Attack via Two Handlines	6
Hydrant Hook Up - Forcible Entry - Utilities	3
Primary Search and Rescue	4
Ground Ladders and Ventilation	4
Aerial Operator if Aerial is Used	1
Establishment of IRIC (Initial Rapid Intervention Crew)	4
Medical Care Team	2
Total Effective Response Force	**27 (28 If aerial is used)**

The following table outlines how the MFD assembles staffing and deployable resources as measured against NFPA 1710 benchmarking for an effective response force for an open-air strip mall or commercial building fires. MFD first alarm units are highlighted.

TABLE 4-5: MFD Effective Response Force for Open-Air Strip Mall/Commercial Fire

Apparatus	Personnel
MFD Battalion Chief	1
MFD Engine	3
MFD Engine	3
MFD Engine	3
MFD Engine	3
MFD Ladder/Quint	3
Total MFD ERF	**16**

As a single responding agency, MFD **does not meet** the minimum benchmarks of NFPA 1710 for an Effective Response Force for an Open-Air Strip Mall fire but can assemble personnel for the initial attack and limited additional critical tasks. MFD will enhance capabilities by the addition of MAFB and MRFD engine/ladder response (depending on their availability) utilizing automatic or mutual aid. NFPA 1710 permits fire departments to use established automatic aid and mutual aid agreements to comply with section 5.2 of this standard.

Apartment Building, NFPA 1710, 5.2.4.3

The initial full alarm assignment (ERF) to a structural fire in a typical 1,200 square-foot apartment within a three-story, garden-style apartment building must provide for a minimum an Effective Response Force (ERF) of 27 members (28 if an aerial device is used). The following table outlines the critical tasking matrix for this type of building fire.

TABLE 4-6: Effective Response Force for Apartment Building Fire

Critical Tasks	Personnel
Incident Command	2
Continuous Water Supply	2
Fire Attack via Two Handlines	6
Hydrant Hook Up - Forcible Entry - Utilities	3
Primary Search and Rescue	4
Ground Ladders and Ventilation	4
Aerial Operator if Aerial is Used	1
Establishment of IRIC (Initial Rapid Intervention Crew	4
Medical Care Team	2
Total Effective Response Force	**27 (28 If aerial is used)**

The following table outlines how the MFD assembles staffing and deployable resources as measured against NFPA 1710 benchmarking for an effective response force for an apartment building or other multi-unit housing type building fire. MFD first alarm units are highlighted.

TABLE 4-7: MFD Effective Response Force for Apartment Building Fire

Apparatus	Personnel
MFD Battalion Chief	1
MFD Engine	3
MFD Engine	3
MFD Engine	3
MFD Engine	3
MFD Ladder/Quint	3
Total MFD ERF	**16**

As a single responding agency, MFD **does not meet** the minimum benchmarks of NFPA 1710 for an Effective Response Force for an apartment building fire. MFD will enhance capabilities by the addition of MAFB and MRFD engine/ladder response (depending on their availability) utilizing automatic or mutual aid. NFPA 1710 permits fire departments to use established automatic aid and mutual aid agreements to comply with section 5.2 of this standard.

High-Rise, NFPA 5.2.4.4

The initial full alarm assignment to a fire in a building where the highest floor is greater than 75 feet above the lowest level of fire department vehicle access must provide for a minimum of 42 members (43 if the building is equipped with a fire pump). The next table outlines the critical tasking matrix for this type of building fire.

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TABLE 4-8: Effective Response Force for High-Rise Fire

Critical Tasks	Personnel
Incident Command	2
Continuous Water Supply	1/1 1 FF for continuous water. if fire pump exists an additional FF will be required for a total of 2
Fire Attack via Two Handlines	4
One handline above the Fire Floor	2
Establishment of IRIC (Initial Rapid Intervention Crew	4
Primary Search and Rescue Teams	4
Entry Level Officer with Aide near entry point of Fire Floor	2
Entry Level Officer with Aide near the entry point above the Fire Floor	2
Two Evacuation Teams	4
Elevation Operations	1
Safety Officer	1
FF Two floors below Fire to coordinate Staging	1
Rehabilitation Management	2
Officer and FFs to Manage Vertical Ventilation	4
Lobby Operations	1
Transportation of Equipment below Fire Floor	2
Officer to Manage Base Operations	1
Two ALS Medical Care Teams	4
Total Effective Response Force	**42 (43) If building is Equipped with Pump**

The following table outlines how the MFD assembles staffing and deployable resources as measured against NFPA 1710 benchmarking for an effective response force for a High-Rise Building or other multi-unit housing type building fire. MFD first alarm units are highlighted.

TABLE 4-9: MFD Effective Response Force for High Rise Building

Apparatus	Personnel
MFD Battalion Chief	1
MFD Engine	3
MFD Engine	3
MFD Engine	3
MFD Engine	3
MFD Ladder/Quint	3
Total MFD ERF	**16**

As a single responding agency, **MFD does not meet** the minimum benchmarks of NFPA 1710 for an Effective Response Force for a high-rise fire. MFD will enhance capabilities by the addition of

MAFB and MRFD engine/ladder response (depending on their availability) utilizing automatic or mutual aid. NFPA 1710 permits fire departments to use established automatic aid and mutual aid agreements to comply with section 5.2 of this standard.

Operational Response Conclusion

The MFD meets the Effective Response Force (ERF) for fire in Residential Structures but does not meet the benchmark for Open-Air Strip Shopping Centers, Apartment Buildings, and High-Rise Structures as a single response agency; however, it can meet with the assistance of mutual aid companies depending on their availability.

It is important to note that four of the mutual aid companies that would be requested and then relied on to respond to assist with structural fires, or for that matter any incident in Minot includes career resources, a combination department (career/volunteer), and all volunteers. Minot Air Force Base's availability depends on the state of air operations being experienced by the base at the time of the request.

Current automatic aid with Minot Rural Fire Department only applies to All Seasons Arena/State Fairgrounds, Highway 83 Bypass, City Landfill, Minot Milling, and City of Minot wildland fires. The status and distance of some mutual aid agencies creates delays and reliability challenges. NFPA 1710 does allow for mutual aid assistance to satisfy 5.2.1.3, it is clear that response time and distance of the mutual aid companies could impact fire/rescue operations in terms of initiating and completing critical tasking.

This said, CPSM suggests the MFD explore auto-aid agreements with Minot Air Force Base, Minot Rural, Surrey FPD, and Burlington Rural Fire for all structural fires so that additional resources are started, minimizing resource delays for those building fires the MFD lacks resources for.

Note: MFD relies on call-back of personnel and mutual aid companies to back-fill stations in the event of a working structural fire and subsequently can call them to the scene if needed. In addition, the rate of participation varies from incident to incident and currently has provided adequate staffing over the past few years in the effort to staff additional equipment.

A critical component of the incident command system is the establishment of the role of safety officer to monitor conditions at fires and emergency incident scenes to ensure that appropriate safety procedures are being followed. The incident safety officer is an important member of the incident command team. The safety officer works directly under and with the incident commander to help recognize and manage the risks that personnel take at emergencies.

The concept of a command team recognizes that there is a shared responsibility for the proper and safe performance of personnel operating on the emergency scene. The fact is that one of the roles that the safety officer needs to play is that of challenging and confirming the incident commander's actions. The safety officer should be included in the development and monitoring of the incident action plan. In simple terms, the incident commander and the safety officer command team provide a system of checks and balance designed to keep all personnel on the emergency scene safe. Once the incident action plan is established, the safety officer monitors the plan for effectiveness and efficiency. The safety officer provides the following functions:

- Incident recon.
- Assess the risk/benefit of operations.
- Assess and address safety concerns on the incident scene.

- Communicate and report safety issues to command.
- Intervene as necessary to provide safety.

During larger-scale incidents, the safety officer reviews the incident action plan and specific details of the safety plan. As appropriate, the safety officer confirms that a safety plan is in effect, reviews it, and provides recommendations. The incident commander may request that the safety officer develop a proposed safety plan and recommendations for command.

Beyond the specific emphasis on safety, the role of incident commander is a dynamic and highly stressful position that has numerous critical responsibilities that must be handled simultaneously, and, in a time-critical manner.

Multiple fire departments utilize Field Incident Technicians (FIT), or Battalion Safety Officers (BSO), paired with a Battalion Chief as part of a permanent incident management team. These are company level officers; in the case of MFD these would be Captains who would work in tandem with the command-level officer. This is a concept that the MFD should consider adopting to provide for more effective, efficient, and safer incident command operations.

When teamed with a Battalion Chief, in addition to normal safety officer functions, the FIT/BSO also fulfills the following roles and responsibilities:

- Incident Recon.
- Assess the risk/benefit of operations.
- Assist with managing the incident.
- Define, evaluate, and recommend changes to the incident action plan.
- Provide direction relating to tactical priorities and specific critical fireground factors.
- Become the Incident Safety Officer.
- Assess and address safety concerns on the incident scene.
- Communicate and report safety issues to command.
- Intervene as necessary to provide for safety.
- Manage personnel accountability on the incident.
- Evaluate the need for additional resources.
- Assign logistics responsibilities.
- Assist with the tactical worksheet for control and accountability.
- Evaluate the fireground organization and span of control.
- Assist with personnel air management.
- Manage crew work/rest cycles and rehab.
- Other duties as necessary.

In addition, when not operating on the incident scene these personnel can:

- Conduct training on their assigned shift.
- Assist the Battalion Chief with other administrative duties.

MFD EMS CRITICAL TASKING

EMS is a vital component of the comprehensive emergency services delivery system in any community. Together with the delivery of police and fire services, it forms the backbone of the community's overall public safety net.

In terms of overall incidents responded to by the emergency agencies in most communities, it could be argued that EMS incidents constitute the greatest number of "true" emergencies, where intervention by trained personnel makes a difference, sometimes literally between life and death. Heart attack and stroke victims require rapid intervention, care, and transport to a medical facility. The longer the time duration without care, the less likely the patient is to fully recover. Contemporary pre-hospital clinical care deploys many clinical treatments one would also receive in the Emergency Department, truly matching the long-time EMS saying, "we bring the Emergency Room to you."

Critical tasks by specific call type in EMS-only agencies assisted by fire departments are not as well-defined as critical tasks in the fire discipline. Notwithstanding, critical tasking in EMS is typical of that in the fire service in that there are certain critical tasks that need to be completed either in succession or simultaneously. EMS on-scene service delivery is based primarily on a focused scene assessment, patient assessment, and then followed by the appropriate basic and advanced clinical care through established medical protocols. Thus, EMS critical tasking is typically developed (in fire-based EMS Standards of Cover documents) in accord with the U.S. Department of Health and Human Services, Centers for Medicare & Medicaid Services (CMS) as:

- Basic Life Support (BLS), which is an emergency response by a ground transport unit (and crew) and the provision of medically necessary supplies and services.
- Advanced Life Support, Level 1 (ALS1), which is the transportation by ground ambulance vehicle and the provision of medically necessary supplies and services including the provision of an ALS assessment or at least one ALS intervention.
- Advanced Life Support, Level 2 (ALS2), which is the transportation by ground ambulance vehicle and the provision of medically necessary supplies and services including:
  - (1) at least three separate administrations of one or more medications by intravenous push/bolus or by continuous infusion (excluding crystalloid fluids), or
  - (2) ground ambulance transport, medically necessary supplies and services, and the provision of at least one of the ALS2 procedures listed below:
    - a. Manual defibrillation/cardioversion.
    - b. Endotracheal intubation.
    - c. Central venous line.
    - d. Cardiac pacing.
    - e. Chest decompression.
    - f. Surgical airway.
    - g. Intraosseous line.

Currently, MFD is a non-transport Basic Life Support agency. MFD works in concert with Trinity Health First Response Ground Ambulance, which provides ALS care and transport.

MFD has a Captain Paramedic who works with the training division and provides EMS training of skills and protocols, and the maintenance of certifications on the National Registry EMT to all firefighters in MFD.

MFD has two Captains per shift who make up a Steering Committee that meets with Trinity Health and serves as a quality improvement group dedicated to the enhancement and overall quality of service delivery for both departments.

TABLE 4-10: BLS Critical Tasking, MFD

Critical Task	# Responders
One Engine	
Incident Command-Officer	1
Primary Patient Care Firefighter-EMT	1
Secondary Patient Care Firefighter-EMT	1
Effective Response Force	**3**

Resource Deployment:
1 Transport Ambulance (2 Staff)
Trinity Health

TABLE 4-11: BLS Critical Tasking, 1050-I on Bypass In the City Limits

Critical Task	# Responders
Two Engines	
Incident Command	1
Apparatus Officer	1
Primary Patient Care Firefighter-EMT	2
Secondary Patient Care Firefighter EMT	2
Effective Response Force	**6**

Resource Deployment:
1 Transport Ambulance (2 Staff)
Trinity Health

TABLE 4-12: BLS Critical Tasking, Water Emergencies

Critical Task	# Responders
5 Engines and 1 Battalion	
Incident Command	1
Apparatus Officer	5
Primary Patient Care Firefighter-EMT	5
Secondary Patient Care Firefighter-EMT	5
Effective Response Force	**16**

Resource Deployment:
1 Transport Ambulance(2 Staff)
Trinity Health

Administrative and Operational Staffing Recommendations:

Administratively, the MFD lacks some depth in key program management and leadership roles to include the Community Risk Reduction function, and the Fire Chief's office.

Operationally there are several methods a career fire department may consider and implement to ensure safe and effective response, while maintaining an efficient budget and effective service to the end users of the fire department response system. ***Overall, what needs to be achieved for a safe and effective fire unit response in the City of Minot is a daily fire staffing of twenty-two. This includes the current minimum staffing of seventeen, plus three additional firefighters for Engine 5 (new resource-nine total FTEs), one additional firefighter assigned to Ladder 5 (three total FTEs), and 1 Field Incident Technician (three total FTEs). Total new FTEs: Fifteen.***

Based on our assessment and when benchmarking the operational response force against national benchmarking, CPSM recommends the following staffing considerations:

- CPSM recommends the position of Assistant Fire Chief be implemented to assist the Fire Chief with strategic planning and provide supervision to the three Operational and two Administrative Battalion Chiefs. Upon filling this position, the Fire Chef should evaluate the duties and responsibilities of the Administrative and Training Battalion Chiefs in order to reorganize the department as needed (Recommendation No. 23.)
- CPSM recommends the position of Fire Marshall be implemented and assigned to Fire Prevention/Community Risk Reduction. This position should be charged with the responsibility of managing and leading the fire inspection, plans review, fire investigation, and public education programs. This position should also take the lead on program design for Community Risk Reduction programs and performance measures focused on reducing the risk of fire and improving citizen and firefighter safety. Recommendation No. 24.)
- CPSM recommends the addition of three firefighters to be assigned to Ladder 5 to maintain a minimum of four firefighters on this apparatus. This is consistent with NFPA 1710 and as well will support tasks associated with ladder company operations. The department should also establish a strategic and budgetary plan to meet the staffing requirements of NFPA 1710 and an Effective Response Force for the four building types for the department. (Recommendation No. 25.)
- CPSM recommends the establishment of an additional Engine Company to be assigned with the current Ladder Company 5 to form a two-apparatus company. This will allow personnel on Ladder 5 to conduct ladder company operations and not have to function as a primary engine. This will also provide an additional company that will increase resiliency and prevent all stations being vacant on every structure fire response. (Recommendation No. 26.)
- CPSM recommends MFD consider future planning for Field Incident Technicians to enhance and support safety and command-and-control capabilities of the Operational Battalion Chiefs; this would also serve as a key component of a succession plan to prepare members to take on future leadership roles in the department. (Recommendation No. 27.)
- CPSM recommends the addition of an Administrative Assistant position to support the new Assistant Chief and Fire Marshal's Office. This position will assist the with the demands of paperwork on the inspectors, thereby giving them more time in the field. (Recommendation No. 28.)

Discussion on Recommendations:

Assistant Fire Chief (1)

Minot has 71 authorized positions; the department is not large; the Fire Chief is an executive management position. Many departments the size of the MFD have either an Assistant or Deputy Chief who serves as a clearly defined second in command of the department.

The position is needed to assist the Fire Chief in planning for the future and proving a level of strategic thinking to prepare the organization for the future. The position would supervise the five Battalion Chiefs and provide leadership to both administrative and operational functions of the department. This position would allow the Fire Chief to implement a reorganization of duties for the two Administrative Battalion Chiefs to programs including but not limited to: Training, Safety, Special Operations, and/or Accreditation. This position can also be used to fill in for the Fire Chief in their absence, prepare individuals for upcoming leadership positions, and would enable the Fire Chief to spend more time creating the future and improving the system.

Fire Marshal (1)

This position is needed to provide management and direction to three Fire Inspectors. This job is currently being accomplished by the Administrative Battalion Chief who does not have real-time, day-to-day contact with the inspectors. Being a subject matter expert (SME) for the inspectors is necessary as decisions must be made during daily activities that involve interpretation of building and fire prevention codes. This position would also be responsible for work and time allocation that will increase the productivity of the inspection staff.

The MFD has two options for this position. Since the fire prevention/CRR personnel are civilian (non-sworn) personnel, the position of Fire Marshal could also be a civilian hire who possesses the requisite training, certifications, and experience. The other option would be for the MFD to include this position as part of a career development process and designate it as a uniformed position at the rank of Captain.

Firefighters (3)

It is recommended that the department begin staffing Ladder 5 with a four-person minimum. Currently the ladder is staffed with three firefighters, the same as all other MFD units. While Ladder 5 is a Quint and does act in the capacity of an engine, dedicated ladder personnel who are well-versed in ladder company functions is recommended. In the future, an additional engine with personnel can be budgeted to work in concert with the ladder company in a two-unit configuration; some of the first due engine responsibilities could then be transferred away from the ladder. *It is also recommended that the department begin the planning process and establish timelines and strategic goals to comply with NFPA 1710 staffing requirements, especially in terms of the Effective Response Force when and where possible*.

Command Aide Assignments: Captains (3)

In order to provide for more effective, efficient, and safe overall incident management, and to enhance critical incident scene safety for all personnel, MFD should implement the position of Field Incident Technician/Battalion Safety Officer (three total added positions), at the rank of Captain, to function as a part of an integrated command team with each Battalion Chief

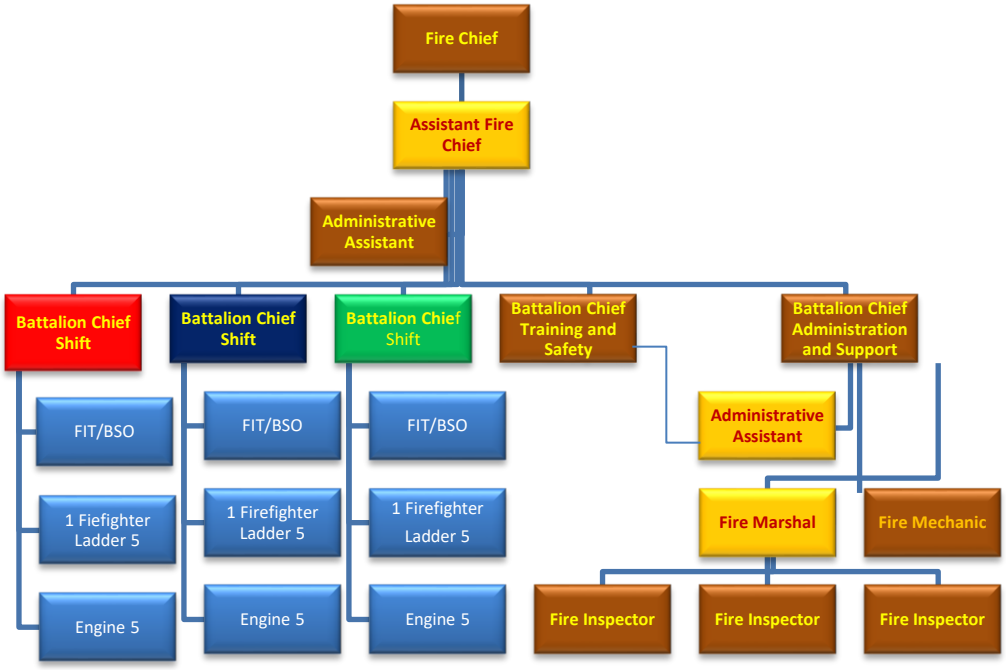
Command aides can be found in many different roles and in many different places. The most ideal situation is when the command aide is assigned to the command officer on a full-time basis. This allows the pair to develop a comfortable routine and a working relationship where each member of the team can anticipate what the other is thinking and take actions

accordingly. The aide can assume the responsibilities of safety, accountability officer, driving and operating the command vehicle, leaving the command officer in a position to closely monitor radio traffic, review preplan information, evaluate the adequacy of responding units, and mentally digest the on-scene report and initial action plan.[72] This is also another step in the succession plan process.

Engine 5: Future budgets and strategic planning should consider adding an additional Engine Company at Station 5 **(9 firefighters total)** to augment Ladder 5 so it can function as a dedicated ladder company and provide the department with an additional company that aids in its resiliency and provides coverage for the city when multiple units are assigned to calls.

As the MFD's administrative and support functions develop and expand, there will be a need to expand the administrative support to these personnel with the addition of an additional Administrative Assistant. If and when this occurs will be dictated by the need generated if the recommended positions contained in this report are created/filled.

FIGURE 4-6: Recommended Administrative & Operations Staffing



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72. https://www.firefighternation.com/firerescue/using-aide-officers-to-enhance-command/#gref 73: Clinton Smoke, *Company Officer*, 2nd ed. (Clifton Park, NY: Delmar, 2005).

MFD FACILITY LOCATIONS AND RESPONSE TIMES

Response times are typically the primary measurement for evaluating fire and EMS services. Response times are used as a benchmark to determine how well a fire department is currently performing, to help identify response trends, and to predict future operational needs. Achieving the quickest and safest response times possible should be a fundamental goal of every fire department.

However, the actual impact of a speedy response time is limited to very few incidents. For example, in a full cardiac arrest, analysis shows that successful outcomes are rarely achieved if basic life support (CPR) is not initiated within four to six minutes of the onset. Moreover, cardiac arrests occur very infrequently; on average they are 1 percent to 1.5 percent of all EMS incidents. There are also other EMS incidents that are truly life-threatening, and the time of response can clearly impact the outcome. These involve certain cardiac and respiratory emergencies, full drownings, high-risk obstetrical emergencies, allergic reactions, electrocutions, and severe trauma (often caused by gunshot wounds, stabbings, and severe motor vehicle accidents, etc.). Again, the frequency of these types of calls is limited.

A crucial factor in the whole response time question is what we term "detection time." This is the time it takes to detect a fire or a medical situation and notify 911 to initiate the response. In many instances, particularly at night or when automatic detection systems (fire sprinklers and smoke detectors) are not present or inoperable, the fire detection process can be extended. The same holds true for EMS incidents. Many medical emergencies are often thought to be something minor by the patient, treated with home remedies, and the true emergency goes undetected until signs and symptoms are more severe. When the fire-EMS department responds, they often find these patients in acute states. Fires that go undetected and are allowed to expand in size become more destructive, are difficult to extinguish, and require more resources for longer periods of time.

For this analysis, response time is a product of three components: dispatch time, turnout time, and travel time.

Dispatch time (alarm processing time) is the difference between the time a call is received and the time a unit is dispatched. Dispatch time includes call processing time, which is the time required to determine the nature of the emergency and types of resources to dispatch. *Turnout time* is when the emergency response units are notified of the incident and ends when travel time begins. *Travel time* is the difference between the time the unit goes en route and its arrival on scene. *Response time* is the total time elapsed between receiving a call to arriving on scene.

For this study, and unless otherwise indicated, response times and travel times measure the first arriving unit only. The primary focus of this section is the dispatch and response time of the first arriving units for calls responded to with lights and sirens.

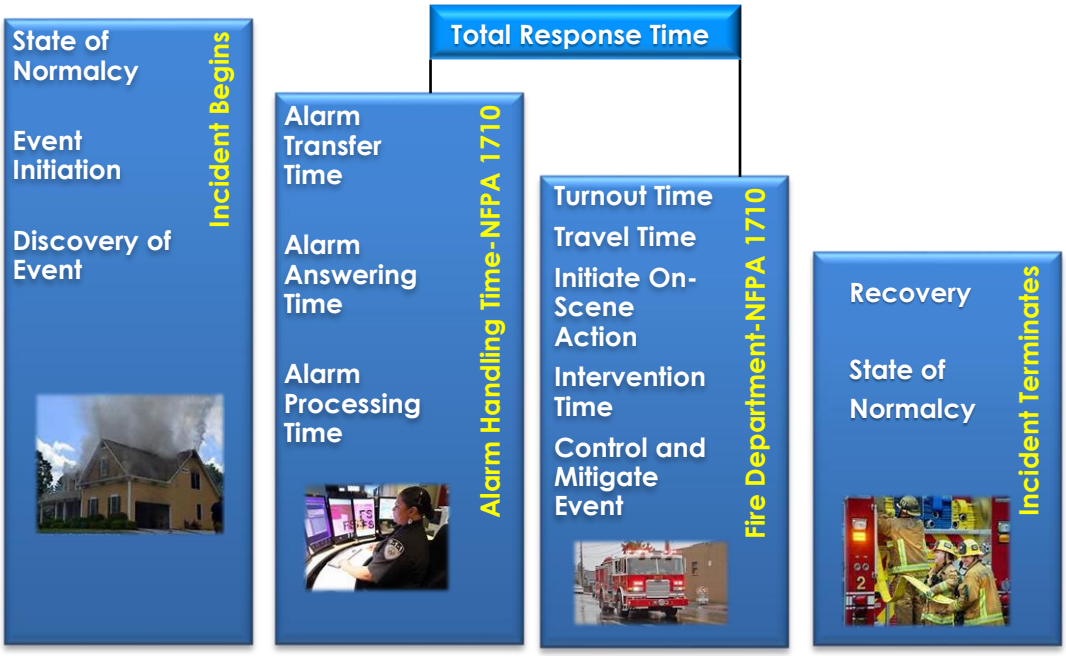
Turnout time, an aspect of response which is controlled by the responding fire department. NFPA 1710 states that turnout time should be less than or equal to 80 seconds (1.33 minutes) for fire and special operations 90 percent of the time and 60 seconds (1.0 minute) for EMS responses. Again, turnout time is the segment of total response time that the fire department has the most ability to control, primarily through employee behavior and station layout (time to travel by foot from day/night areas to apparatus).

NFPA 1710 states that travel time shall be less than or equal to 240 seconds for the first arriving engine company to a fire suppression incident 90 percent of the time and for the second due engine less than or equal to 360 seconds 90 percent of the time.

The standard further states the initial first alarm assignment should be assembled on scene in 480 seconds, 90 percent of the time, for low/medium hazards, and 610 seconds for high-rise or high hazards. For EMS incidents the standard travel time (NFPA 1710) is less than or equal to 240 seconds for the first arriving engine company with automatic external defibrillator (AED) or higher level capability, and 480 seconds or less travel time of an Advanced Life Support (ALS) unit at an EMS incident where the service is provided by the fire department provided a first responder with an AED or basic life support unit arrived in 240 seconds or less travel time.

The following figure provides an overview of the fire department incident cascade of events.

FIGURE 4-7: Incident Cascade of Events



Regarding response times for fire incidents, the criterion is linked to the concept of "flashover." This is the state at which superheated gases from a fire are released rapidly, causing the fire to burn freely, and become so volatile that the fire reaches an explosive state (simultaneous ignition of all the combustible materials in a room). In this situation, usually after an extended period (often eight to twelve minutes after ignition but at times as quickly as five to seven minutes), and a combination of the right conditions (fuel and oxygen), the fire expands rapidly and is much more difficult to contain. When the fire does reach this extremely hazardous state, initial firefighting forces are often overwhelmed, larger and more destructive fire occurs, the fire escapes the room and possibly even the building of origin, and significantly more resources are required to affect fire control and extinguishment.

Flashover occurs more quickly and more frequently today and is caused at least in part by the introduction of significant quantities of plastic- and foam-based products into homes and businesses (e.g., furnishings, mattresses, bedding, plumbing and electrical components, home and business electronics, decorative materials, insulation, and structural components). These materials ignite and burn quickly and produce extreme heat and toxic smoke.

NFPA 1710's travel times are established for two primary reasons: (1) the fire propagation curve, where flashover occurs (threatening property loss and firefighter and public life safety), and

(2) sudden cardiac arrest, where brain damage and permanent brain death occurs in four to six minutes.

According to fire service educator Clinton Smoke, the fire propagation curve establishes that temperature rise and time within in a room on fire corresponds with property destruction and potential loss of life if present.[73] At approximately the eight- to ten-minute mark of fire progression, the fire flashes over (due to superheating of room contents and other combustibles) and extends beyond the room of origin, thus increasing proportionately the destruction to property and potential endangerment of life. The ability to quickly deploy adequate fire staff prior to flashover thus limits the fire's extension beyond the room or area of origin.

Regarding the risk of flashover, the authors of an IAFF report conclude:

An early aggressive and offensive initial interior attack on a working structural fire results in reduced loss of life and property damage. Consequently, given that the progression of a structural fire to the point of "flashover" (the very rapid spreading of the fire due to super-heating of room contents and other combustibles) generally occurs in less than ten minutes, two of the most important elements in limiting fire spread are the quick arrival of sufficient numbers of personnel and equipment to attack and extinguish the fire as close to the point of its origin as possible.[74]

The following figure illustrates the time progression of a fire from inception through flashover and full involvement of the structure if the fire is left unchecked. Flashover occurs at eight to ten minutes (***or less depending on fuel***), allowing the fire to extend beyond the room of origin. Typically, if firefighting crews arrive, set up, and begin fire extinguishment prior to flashover, the fire is contained to the room of origin.

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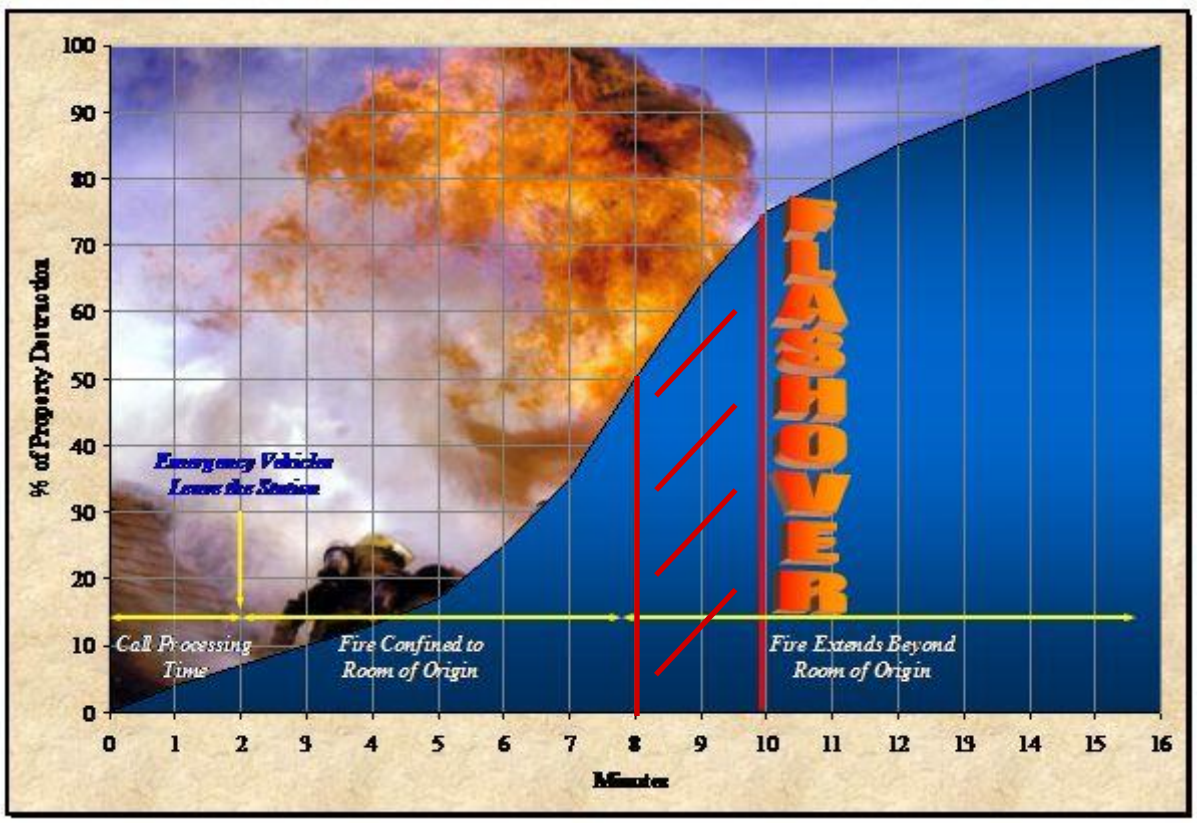
73: Clinton Smoke, *Company Officer*, 2nd ed. (Clifton Park, NY: Delmar, 2005).
74. *Safe Fire Fighter Staffing: Critical Considerations*, 2nd ed. (Washington, DC: International Association of Fire Fighters), 5.

FIGURE 4-8: Fire Growth from Inception to Flashover[75]



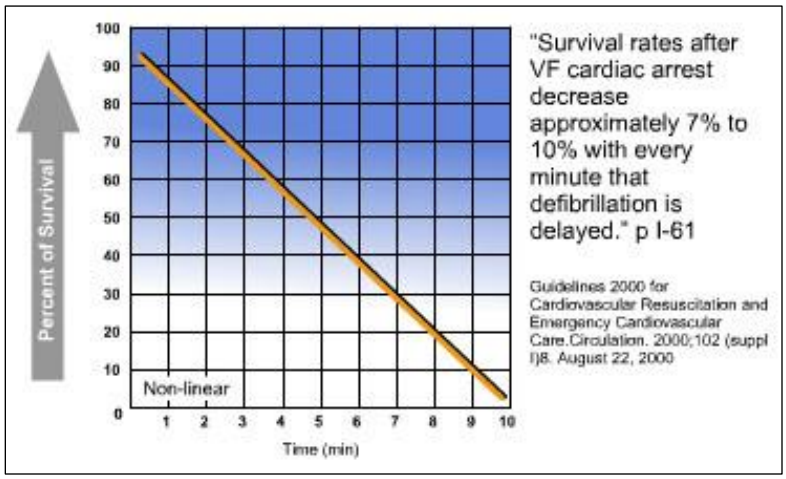
EMS response times are measured differently than fire service response times. Where the fire service uses NFPA 1710 as a response time benchmarking document, the focus for EMS is and should be directed to the evidence-based relationship between clinical outcomes and response times. Much of the current research suggests response times have reduced impact on clinical outcomes outside of a small segment of call types. These include cerebrovascular accidents (stroke); injury or illness compromising the respiratory system; injury or illness compromising the cardiovascular system to include S-T segment elevation emergencies, high acuity medical and pediatric emergencies; cardiac and respiratory arrest; and certain high-risk obstetrical emergencies to name a few. Each requires rapid response times, rapid on-scene treatment and packaging for transport, and rapid transport to the hospital.

Paragraph 4.1.2.1(7) of NFPA 1710 recommends that for EMS incidents a fire unit with first responder or higher-level trained personnel and equipped with an AED should arrive on scene within four minutes of travel time at the 90th percentile. An advanced life support (ALS) unit should arrive on scene within eight minutes travel time at the 90th percentile, provided the fire department responded first with first responder or higher-level trained personnel and equipped with an AED. According the NFPA 1710, "This requirement is based on experience, expert consensus, and science. Many studies note the role of time and the delivery of early defibrillation in patient survival due to heart attacks and cardiac arrest, which are the most time-critical, resource-intensive medical emergency events to which fire departments respond."

75. Source : https://www.slideserve.com/tavon/the-international-society-of-fire-service-instructors

The next figure illustrates the chance of survival from the onset of cardiac arrest, largely due to ventricular fibrillation in terms of minutes without emergency defibrillation delivered by the public or emergency responders. The chance of survival has not changed over time since this graphic was published by the American Heart Association in 2000.

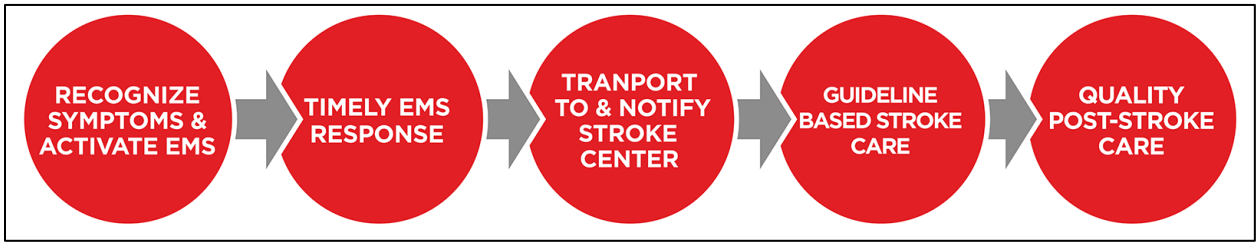
FIGURE 4-9: Cardiac Arrest Survival Probability by Minute



Typically, a low percentage of 911 patients have time-sensitive and advanced life support (ALS) needs. But, for those patients that do, time can be a critical issue. For the remainder of those calling 911 for a medical emergency, though they may not have a medical necessity, they still expect rapid customer service. Response times for patients and their families are often the most important measurement of the EMS department. Regardless of the service delivery model, appropriate response times are more than a clinical issue; they are also a customer service issue and should not be ignored.

In addition, a true emergency is when an illness or injury places a person's health or life in serious jeopardy and treatment cannot be delayed. Examples include severe trauma with cardiovascular system compromise, difficulty breathing, chest pain with S-T segment elevation (STEMI), a head injury, stroke, or ingestion of a toxic substance.[76] The next figure illustrates the out-of-hospital chain of survival for a stroke emergency, which is a series of actions that, when put in motion, reduce the mortality of a stroke emergency.

FIGURE 4-10: Cerebrovascular Emergency (Stroke) Chain of Survival



Source : https://nhcps.com/lesson/acls-acute-stroke-care/

If a person is experiencing severe pain, that is also an indicator of an emergency. Again, the frequencies of these types of calls are infrequent as compared to the routine, low-priority EMS incident responses. In some cases, these dire emergencies often make up a low percent of all

76. Mills-Peninsula Health Blog, Bruce Wapen, MD.

EMS calls.[77] Cardiac arrest is one emergency for which EMS response times were initially built around. Science tells us that the brain begins to die without oxygenated blood flow at the four- to six-minute mark. Without immediate cardiopulmonary resuscitation (CPR) and rapid defibrillation, the chances of survival diminish rapidly at the cessation of breathing and heart pumping activity. Further, only 10 percent of victims who suffer cardiac arrest outside of the hospital survive.[78]

The following figure illustrates the out-of-hospital chain of survival, which is a series of actions that, when put in motion, reduce the mortality of sudden cardiac arrest. Adequate EMS response times coupled with community and public access defibrillator programs potentially can impact the survival rate of sudden cardiac arrest victims by deploying early CPR, early defibrillation, and early advanced life support care provided in the prehospital setting.

FIGURE 4-11: Sudden Cardiac Arrest Chain of Survival

From: "Out of Hospital Chain of Survival," https://cpr.heart.org/en/resources/cpr-facts-and-stats/out-of-hospital-chain-of-survival

ASSESSING THE FIRE MANAGEMENT ZONE

Travel time is key to understanding how fire and EMS station location influences a community's aggregate response time performance. Travel time can be mapped when existing and proposed station locations are known. The location of responding units is one key factor in response time; reducing response times, which is typically a key performance measure in determining the efficiency of department operations, often depends on this factor. The goal of placement of a single fire station or creating a network of responding fire stations in a single community is to optimize coverage with short travel distances, when possible, while giving special attention to natural and manmade barriers, and response routes that can create response-time problems.[79] This goal is generally budget-driven and based on demand intensity of fire and EMS incidents, response times, and identified risks.

As already discussed, MFD responds from five stations and receives automatic and mutual aid from surrounding jurisdictions, most of which are contiguous. This section expands on the earlier discussion on travel times and depicts how travel times of 240, 360, and 480 seconds look when mapped from the current fire station locations. Illustrating response time is important when

77. www.firehouse.com/apparatus/article/10545016/operations-back-to-basics-true-emergency-and-due-regard
78. American Heart Association. *Latest Statistics on Cardiac Arrest Reveal Little Progress*. 2019
79. NFPA 1710, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Departments, 2020 Edition.

considering the location from which assets should be deployed. When historic demand is coupled with risk analysis, a more informed decision can be made.

For our response time analysis, we included all calls to which at least one non-administrative unit arrived. Canceled and mutual aid calls were not included. In addition, calls with a total response time exceeding 30 minutes were excluded. Finally, we focused on units that had complete time stamps, that is, units with all components recorded, so that we could calculate each segment of response time. Calls labeled with "Low" priority were not included in this analysis.

Between October 1, 2022, and September 30, 2023, MFD responded to 4,855 calls, of which 77 percent were EMS calls. The total combined workload (deployed time) for MFD units was 2,423.1 hours. In responding to calls that involved the fire department, the average dispatch time was 2.8 minutes, and the average response time was 7.6 minutes. The 90th percentile dispatch time was 4.3 minutes and the 90th percentile response time was 10.8 minutes.

Based on the methodology above, for 4,855 calls, we excluded 211 canceled, 25 mutual aid calls, 62 low priority calls, 127 calls where no units recorded a valid on-scene time, 51 calls with a total response time exceeding 30 minutes, and 444 calls where one or more segments of the first arriving unit's response time could not be calculated due to missing or faulty data. As a result a total of 3,935 calls are included in the response time analysis.

The next table breaks down the average and 90th percentile dispatch, turnout, travel, and total response times by call type. A 90th percentile means that 90 percent of calls had response times at or below that number. For example, the table shows an overall 90th percentile response time of 10.8 minutes, which means that 90 percent of the time a call had a response time of no more than 10.8 minutes.

TABLE 4-13: Average and 90th Percentile Response Time of First Arriving Unit, by Call Type

Call Type	Average Response Time, Min.				90th Percentile Response Time, Min.			
	Dispatch	Turnout	Travel	Total	Dispatch	Turnout	Travel	Total
Medical and other	3.0	1.0	3.9	7.8	4.4	1.8	6.2	10.8
MVA	2.9	0.8	3.1	6.9	5.6	1.6	5.3	10.5
EMS Subtotal	**3.0**	**0.9**	**3.9**	**7.8**	**4.4**	**1.8**	**6.2**	**10.8**
False alarm	1.9	1.0	3.7	6.7	3.2	1.9	6.5	10.0
Good intent	1.6	0.8	4.1	6.5	3.0	1.6	7.1	9.6
Hazard	2.4	0.9	4.2	7.5	3.6	1.9	8.1	11.9
Outside fire	2.2	0.8	3.4	6.4	3.0	1.4	5.6	8.3
Public service	3.5	0.8	3.6	7.9	7.5	1.9	5.9	12.1
Structure fire	1.8	1.1	3.4	6.2	2.6	1.7	5.6	8.8
Technical rescue	4.4	0.6	3.6	8.6	12.2	1.4	6.1	16.3
Fire subtotal	**2.1**	**1.0**	**3.8**	**6.9**	**3.5**	**1.8**	**6.7**	**10.6**
Total	**2.8**	**0.9**	**3.8**	**7.6**	**4.3**	**1.8**	**6.2**	**10.8**

This table tells us:

- The average dispatch time was 2.8 minutes.
- The average turnout time was 0.9 minutes.

- The average travel time was 3.8 minutes.
- The average total response time was 7.6 minutes.
- The average response time was 7.8 minutes for EMS calls and 6.9 minutes for fire calls.
- The average response time was 6.4 minutes for outside fires and 6.2 minutes for structure fires.
- The 90th percentile dispatch time was 4.3 minutes **(does not meet NFPA 1710 standards)**.
- The 90th percentile turnout time was 1.8 minutes **(does not meet NFPA 1710 standards for EMS or Fire responses)**.
- The 90th percentile travel time for structure fires was 5.6 minutes **(does not meet NFPA 1710 standards)**.
- The 90th percentile total response time was 10.8 minutes.
- The 90th percentile response time was 10.8 minutes for EMS calls and 10.6 minutes for fire calls.

The following figures use GIS mapping to illustrate travel time bleeds of 240 seconds, 360 seconds, and 480 seconds using the existing street network from the current MFD stations.

The GIS data for streets includes speed limits for each street segment and allows for "U-turns" for dead-end streets and intersections, as well as other travel obstacles.

It is, however, important to note that while these maps are GIS-drawn, theoretical travel times do reflect favorably on the adequacy of station facilities and their corresponding locations within the city to support efficient fire and EMS response to the current built-upon areas. Keep in mind, the benefits of favorable travel time findings are only meaningfully realized when apparatus can be predictably staffed for response and have aggressive turnout times.

It is important to understand that measuring and analyzing response times and response time coverage are measurements of performance. When we discussed community risk above, we identified that the MFD, like most other fire departments in the nation, is an all-hazards response agency. While different regions of the country respond to different environmental risks, the remaining hazards that fire departments confront remain the same. Linking response data to community risks lays the foundation for future fire department planning in terms of fire station location, the need for additional fire stations, and staffing levels whether supplied by the fire department or a combination of a city's fire department and automatic aid. Managing fire department response capabilities to the identified community's risk focuses on three components which are:

- Having a full understanding of the total risk in the community and how each risk impacts the fire department in terms of resiliency, what the consequences are to the community and fire department should a specific risk or combination of two or more occur, and preparing for and understanding the probability that the risk may occur.
- Linking risk to the deployment of resources to effectively manage every incident. This includes assembling an Effective Response Force for the response risk in measurable times benchmarked against NFPA standards, deploying the appropriate apparatus (engines, ladders, heavy rescues, ambulances), and having a trained response force trained to combat a specific risk.
- Understanding that each element of response times plays a role in the management of community risk. Low response times of the initial arriving engine and low time to assemble an Effective Response Time on fire and other incidents are associated with positive outcomes.

The following two figures look at the travel time projections at 240 seconds and 360 seconds from MFD stations. From this mapped projection we can see that at 240 seconds, the MFD stations can cover the central and northwest portions of the fire management zone. There are some small deficiencies in the southeast and southwest areas of the city; however, approximately 90 percent of the city is covered within 240 seconds of travel time.

When benchmarked against the 360-second standard, the five stations cover the built areas of the city at almost full coverage.

FIGURE 4-12: 240-Second Travel Time

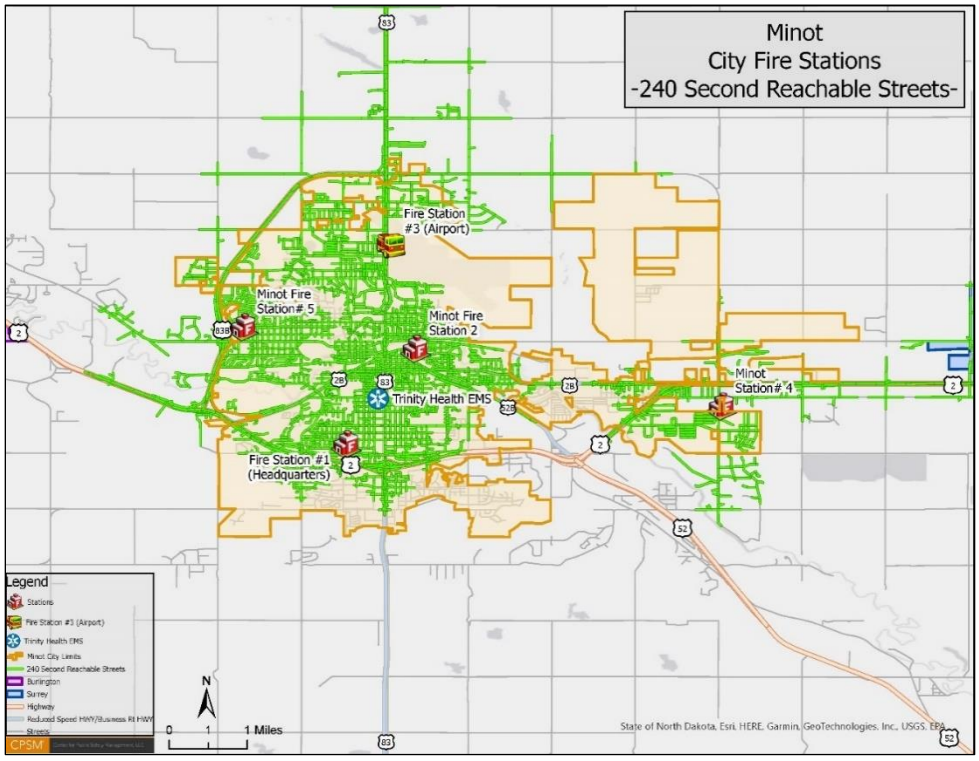


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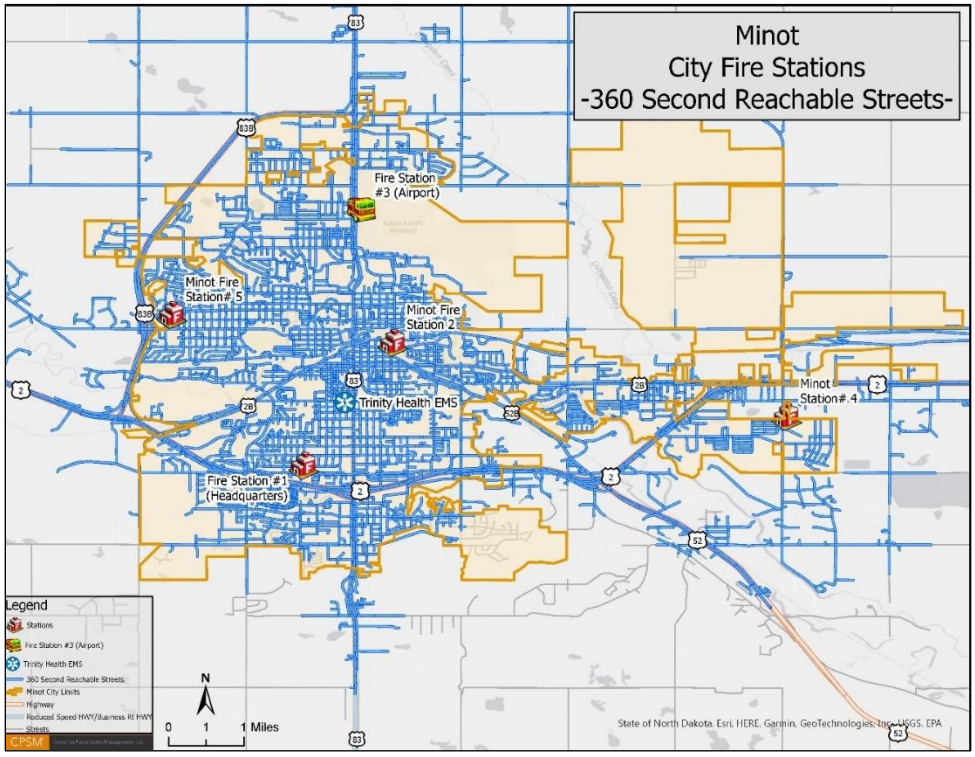
FIGURE 4-13: 360-Second Travel Time



The next map evaluates the 480-second travel time standard, which is the standard for the arrival of first alarm assignment on a structural fire. When benchmarked against the 480-second standard, the five stations cover the built areas of the city at nearly 100 percent.

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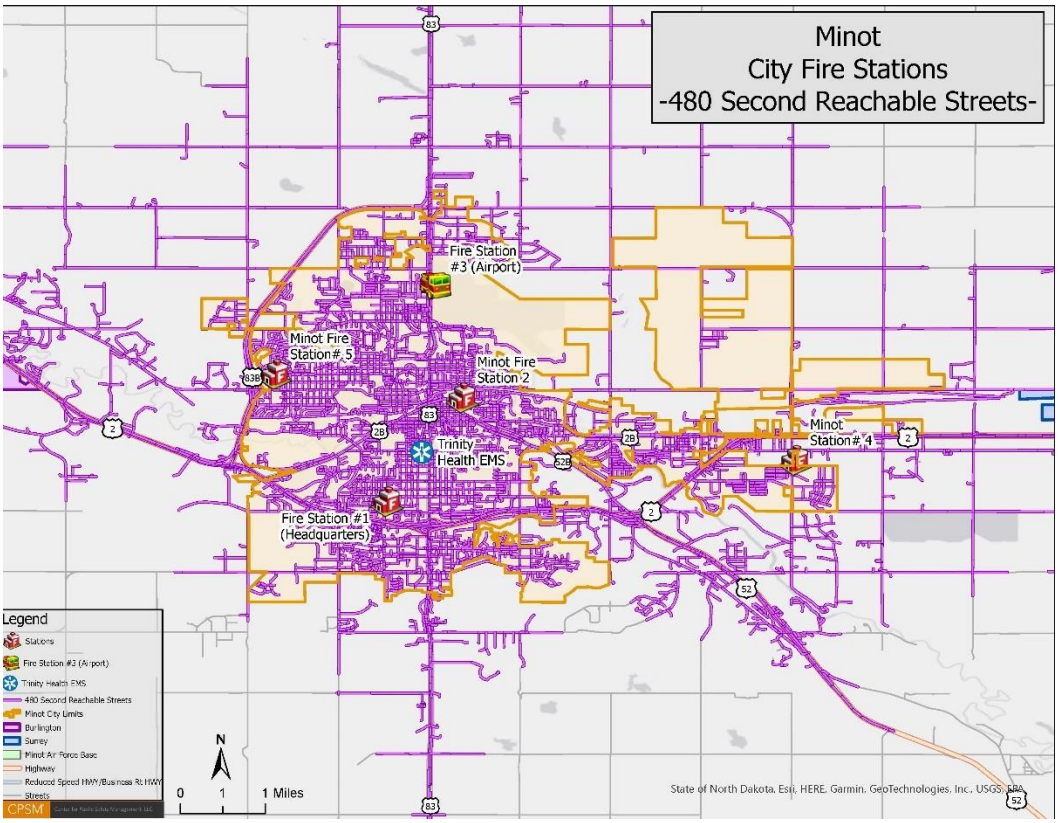
FIGURE 4-14: 480-Second Travel Time



Overall, the MFD has deficiencies in call processing and turnout times when benchmarked against the NFPA 1710 standard. As these are most closely related to human behaviors and efficiency, they should be addressed internally by the Fire Chief and 911 Center Director.

Travel times are dependent on many factors as discussed herein, to include station location, traffic patterns, and the environment. For structural fires and EMS-related calls for service, the MFD may consider adopting a travel time performance objective of six minutes, as it is more realistic based on our analysis.

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AUTO AID AND MUTUAL AID AGREEMENTS

Automatic aid refers to a written agreement under which a municipality agrees to provide an initial response to fires, rescues, and emergencies that may occur in a part of another municipality where a fire department is capable of responding more quickly than the fire department situated in the other municipality; or a municipality agrees to provide a supplemental response to fires, rescues, and emergencies that may occur in a part of another municipality where a fire department in the municipality is capable of providing the quickest supplemental response to fires, rescues, and emergencies occurring in the part of another municipality.[80]

There are several advantages to engaging surrounding jurisdictions/departments in automatic aid agreements. First, such an arrangement can get the closest emergency units to the call for service faster, as auto aid can be based on the closest location to the request for service. There are areas in Minot where Minot Rural Fire units are closer to areas of the City of Minot where the addition of MRFD would in most cases place the MRFD on the scene first, and vice versa for the auto aid departments assisting MRFD.

Automatic aid is also a force multiplier (supplemental response) as neighboring jurisdictions can respond to muti-unit incident responses to home jurisdictions and establish an Effective Response Force (ERF) for the completion of critical fireground tasks as required by NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, and Special Operations to the Public by Career Fire departments.*[81] NFPA 1710 permits fire departments to use established automatic aid and mutual aid agreements to comply with section 5.2 of this standard.[82] These agreements can also add to elements needed for ISO scoring since Auto-aid agencies are part of the initial response assignment.

It is recommended that MFD establish automatic aid written agreements with neighboring jurisdictions of MRFD and Minot Air Force Base; these agreements should cover an all-hazard response. Currently, MFD has an automatic aid agreement with MRFD to cover All Seasons Arena/State Fairgrounds, Highway 83 bypass, city landfill, and City of Minot Wildland Fires.[83]

Mutual aid is similar to auto aid, with the exception of the immediate response. Mutual-aid agreements are based on the assisting agencies being specifically requested by the home agency. Both auto and mutual aid agreements are contingent on the assisting agency's ability to provide assistance as their jurisdiction must maintain priority.

Mutual aid agreements provide response by assisting agencies in areas of muti-alarm fires, technical rescue and specialty responses, and where the home agency is low or out of resources and needs assistance from neighboring jurisdictions to provide direct response to the incident or provide backfills to their fire stations that are vacant to do a working fire or large incident response.

Currently the MFD has mutual aid agreements with the departments listed in the next table.

80. https://www.lawinsider.com/dictionary/automatic-aid
81. NFPA 1710, 2020 edition, 5.2, 5.2.4.1, 5.2.4.2, 5.2.4.3, 5.2.4.4 Standard for the Organization and Deployment of Fire Suppression Operations, and Special Operations to the Public by Career Fire departments
82. NFPA 1710, 2020 edition, 5.2.1.3 Standard for the Organization and Deployment of Fire Suppression Operations, and Special Operations to the Public by Career Fire departments
83. Minot Auto-Aid Agreement, Minot Rural Fire

TABLE 4-14: Mutual Aid Companies

Department	Makeup
Bismarck Fire Department	Full Time
Burlington Fire Department	Volunteer
Grand Forks Fire Department	Full Time
Minot Air Force Base	Full Time
Minot Rural Fire Department	Combination
Mouse River Firefighters Association	Volunteer and Career Department

EMERGENCY MANAGEMENT

The City of Minot utilizes Ward County for emergency management services. MFD provides a liaison/representative Battalion Chief and/or Fire Chief to the county when required.

Ward County Emergency Management coordinates and facilitates the use of resources to minimize the impact of emergencies and disasters on people, property, and the environment

Ward County Emergency Management is responsible for:

- Performing technical work in plan development, including implementation and management of countywide disaster prevention, preparedness, response, recovery, mitigation, and risk reduction.
- Administering the State Homeland Security Program (SHSP) grant funds at the direction of the Ward County Emergency Resource Council Steering Committee, a representative group given legal authority by the Ward County Commission to expend these funds.
- Working with the Ward County Local Emergency Resource Council to develop and maintain the Ward County Hazard Mitigation Plan (HMP) and the Emergency Operations Plan (EOP), which defines agency roles and responsibilities and includes the evacuation, sheltering, warning, and terrorism annex.
- Organizing and operating the Ward County Emergency Operations Center (EOC) and coordinating support from state and federal organizations during an emergency.
- Providing county-wide training and exercises to prepare for local, regional, and state emergencies and disasters to include classroom-based training in the National Incident Management System (NIMS) for all personnel who may be involved in disaster response and recovery activities.
- Providing guidance to municipalities on the development of disaster management plans.
- Acting as the applicant agent for county and townships for state and federal funding when funding is approved after a disaster has occurred.

- Coordinating and facilitating the use of resources in order to minimize the impact of emergencies and disasters on people, property, and the environment from disasters such as tornadoes, flooding, severe weather, etc.

SPECIALIZED FIRE-TECHNICAL RESPONSE CAPABILITIES

Specialized response capabilities include hazardous materials (Haz-Mat), high angle rope rescue, trench collapse, building collapse, complicated heavy auto extrication, elevated rescue with an aerial platform, and confined space rescue. MFD personnel are trained to certain specialized levels and have the response assets and capabilities to mitigate a complex specialized or technical rescue incident. This requires a properly trained and equipped response force. When needed, these assets are obtained through partnerships and agreements with surrounding automatic aid departments and the Northwest Regional Response Team that has additional personnel and resources in place to respond to local emergencies that are beyond their capability.

The Anchor Capability Regional Response Concept was developed in 2005. It began with a study to address the need for improving North Dakota's ability to respond to a CBRNE (Chemical, Biological, Radioactive, Nuclear, Explosive) events across the entire state.

To meet this need, the North Dakota Department of Emergency Services entered into a cooperative agreement beginning in 2008 with Fargo, Grand Forks, Bismarck, and Minot to initiate a statewide comprehensive regional response program. The program places personnel and resources into four geographic regions to provide the mechanism for a coordinated response to a CBRNE incident. The program originally only supported hazardous materials emergency response teams but has grown over the years to include bomb squads, special weapons and tactical teams, ambus teams, and search and rescue teams.

The four regional coordinators provide technical support on planning, training, and exercise activities to the regional teams; city, county, and tribal emergency managers; and all other first responder disciplines. They assist in helping jurisdictions determine their equipment needs and they act as a liaison between local jurisdictions and the state during emergency or disaster events.[84]

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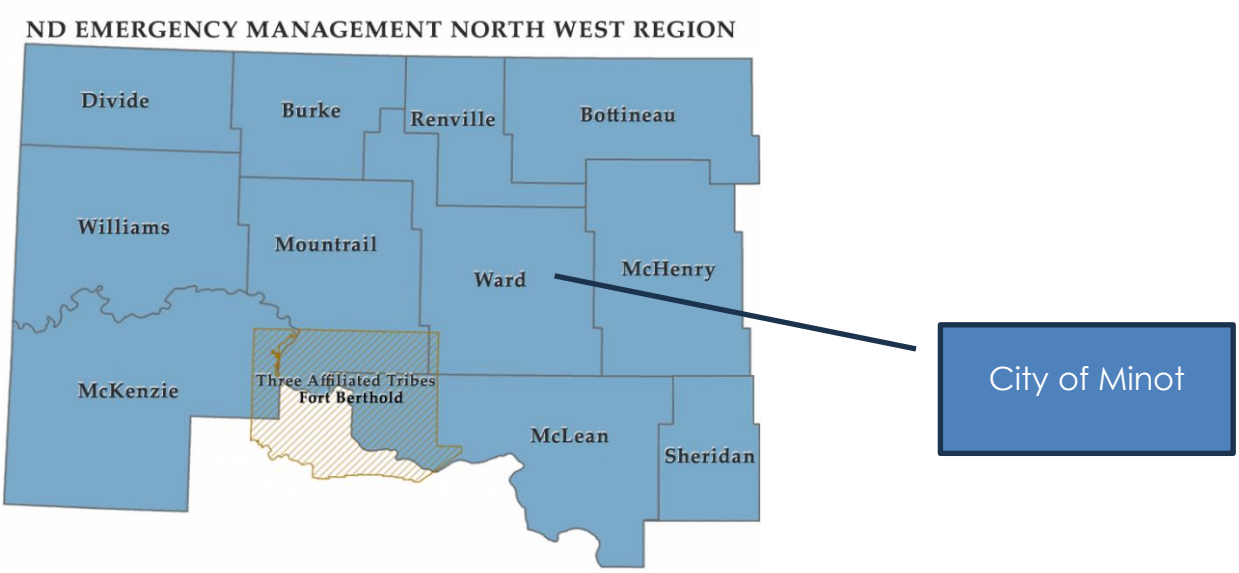
84. https://www.des.nd.gov/preparedness/regional-response

FIGURE 4-15: Emergency Management Northwest Region



The MFD's aim is to have a Northwest Regional Response Team that consists of five members of the HazMat team and five members of the Technical Rescue team from each battalion. It can be 6/4 or 4/6 if needed. The goal is to have 30 total team members.

Minot Northwest Regional Response Team policies for team members includes the following:

- A minimum of a five-year commitment is needed.
- Team members will attend a minimum of two trainings in their discipline and a minimum of one training class in the other discipline. Team members need to attend a minimum of four trainings annually.
- Any outside trainings attended will count as one training per class attended for that discipline.
- Battalion trainings will follow HazMat and Technical Rescue team trainings.
- All members must be a minimum of senior firefighter.
- HazMat leads will set the HazMat skill standards for the technical rescue members, and the Technical Rescue leads will set the Technical Rescue skill standards for the HazMat members.
- Members must have certifications ICS 100, 200, 300, 400, 700, 800.
- Members will be chosen by the Captain, Battalion Chief, and team leads of their discipline.
- Selection consists of an Application and Interview process.
- Members are chosen amongst the three battalions then established if that candidate is able to change battalions to fill an open spot.
- Each member must be Hazardous Materials Technician level certified.
- Regional response team members will receive first choice of outside training opportunities.

The department's goal is to have 10 members from each shift for a total of 30 members. Currently, the team consists of 23 members (19 firefighters and 4 Battalion Chiefs). The department is actively recruiting members to fill out the remainder of the team.

Operational Battalion Chiefs and some firefighters stated that there is at times some ambiguity regarding how the team is staffed depending on the call type, Technical Rescue vs. Hazmat. These decisions are often based on the availability of the members to respond and may not represent those members assigned to only one specialty. CPSM recommends that cross-training in both disciplines can assist in alleviating difficulty staffing the team when response is needed.

The regional response equipment capabilities of the team are in good order and sufficient for response. There is some concern that the rescue apparatus, which was purchased with grant funds, cannot be replaced without securing additional state or federal monies. Continuing to pursue Assistance to Firefighter Grants (AFG) as well as state grant programs for upgrading equipment is essential in the continuity of many of these specialty fire programs.

Operational Planning Considerations and Recommendations

The MFD is entrusted with community emergency response responsibilities and assets, and the city recognizes the intrinsic services the department provides. This is evidenced by the city's forethought to have this analysis completed. On a day-to-day basis the MFD responds to emergency and non-emergency calls for service in and outside of the city as a part of an automatic and mutual aid system in which it participates.

This report is comprised of a comprehensive analysis between October 1, 2022, and September 30, 2023 of the administrative and operational components of the MFD and includes an all-hazards community risk analysis, benchmarking MFD response against the NFPA 1710 standard and ISO-FSRS grading schedule; GIS mapping that illustrates call demand in the city, the extent of response time, and coverage of the city; and a comprehensive data analysis of fire and EMS call types, unit workload, department resiliency, and response times.

CPSM found the MFD to be a well-managed, prepared, dedicated, and capable department that delivers effective services to the residents of Minot. The Fire Chief and her immediate staff and firefighters were highly responsive to our requests for information and assisted in collecting data from outside sources.

Based on our analysis, CPSM did determine areas where improvements and/or enhancements to service can be made and are stated throughout this report.

One last observation/recommendation to consider is the placement of a second multi-functional company (Quint) that can also function as a ladder when needed and which would provide additional 2.5-mile (ISO standard) coverage and provide an additional ladder for high-rise operations. Moving the current Quint from Station 5 to Station 4 may be a current consideration to provide more coverage on the east side of the city and evenly distribute ladder response.

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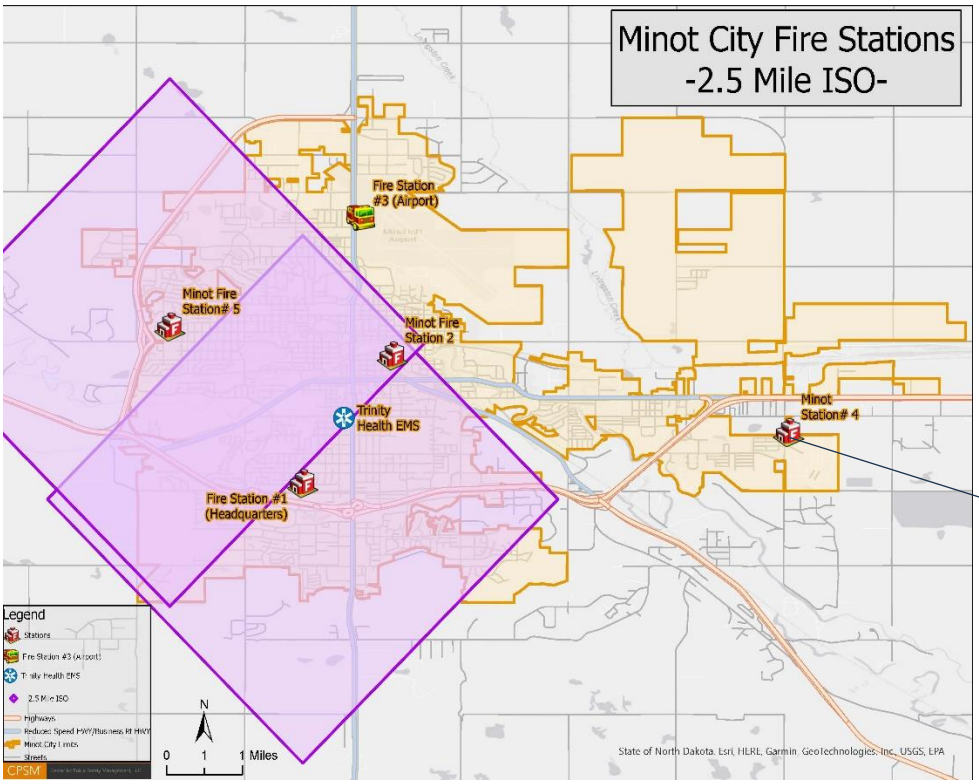
FIGURE 4-16: ISO 2.5-Mile Ladder Coverage



- CPSM recommends that the Fire Chief begin working with city leadership to begin a succession plan, given that several command level retirements will occur in the next four to five years. (Recommendation No. 29.)
- Establish a process to improve turnout times for fire and EMS calls. The turnout time should align with current NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Departments*, 2020 Edition. (Recommendation No. 30.)
- CPSM recommends the Fire Chief work on call processing times with the 911 Center. (Recommendation No. 31.)
- Continue the Steering Committee with Trinity Health with fire department stakeholders; this is viewed by CPSM as a *Best Practice*. (Recommendation No. 32.)
- CPSM recommends engaging Minot Rural Fire Department (MRFD) and Minot Air Force Base to strengthen some of their Automatic Aid and Mutual Aid Responses. MAFB and MRFD (a volunteer company) are the closest assistance for MFD in the event of a large incident. (Recommendation No. 33.)

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SECTION 5. DATA ANALYSIS

This data analysis was prepared as a key component of the study of the fire services provided by the Minot Fire Department (MFD). This analysis examines all calls for service from October 1, 2022, to September 30, 2023, as recorded in the Minot Central Dispatch's Computer-Aided Dispatch (CAD) system and MFD's National Fire Incident Reporting System (NFIRS) records.

This analysis is made up of four parts. The first part focuses on call types and dispatches. The second part explores the time spent and the workload of individual units. The third part presents an analysis of the busiest hours in the year studied. The fourth and final part provides a response time analysis of responding units.

Located in the county seat of Ward County, the Minot City Fire Department serves a population of about 47,800 people in an area of more than 17.5 square miles. MFD is an all-hazards response fire department, providing service and protection for fire and medical emergencies, hazardous material responses, vehicle accidents, and other incidents where life and property are threatened. The MFD operates out of five fire stations with 21 full staff and 17 minimum staff on duty 24/7. The frontline units include two Battalion Chiefs, an aerial truck, four engines, a hazmat truck, two rescue trucks, and a typhoon quint. The MFD also operated a reserve engine that was occasionally in service when the frontline engine was out of service and a reserve ladder as a backup when another ladder truck was out of service.

From October 1, 2022, to September 30, 2023, MFD responded to 4,855 calls, of which 77 percent were EMS calls. The total combined workload (deployed time) for MFD units for the year studied was 2,423.1 hours. In responding to calls that involved the fire department, the average dispatch time was 2.8 minutes, and the average response time was 7.6 minutes. The 90th percentile dispatch time was 4.3 minutes and the 90th percentile response time was 10.8 minutes.

METHODOLOGY

In this report, CPSM analyzes calls and runs. A call is an emergency service request or incident. A run is a dispatch of a unit (i.e., a unit responding to a call). Thus, a call may include multiple runs.

We received CAD data and NFIRS data for the Minot Fire Department. We first matched the NFIRS and CAD data based on the incident numbers provided. Then, we classified the calls in a series of steps. We first used the NFIRS incident type to identify canceled calls and to assign emergency medical service (EMS), motor vehicle accident (MVA), and fire category call types. For calls without matched NFIRS data, we instead used the incident type description in the CAD data to identify the call type. The type of calls that occurred outside MFD's fire district were identified as mutual aid. The method used to categorize incident types is shown in Attachment III.

We received records for a total of 4,964 calls that occurred between from October 1, 2022, to September 30, 2023. We removed seven calls without a dispatched MFD unit and 100 calls to which the dispatched unit did not have at least an en route or an arrival time. In addition, two calls that only involved administrative units were not included in the analysis. However, the work associated with these calls is included in the analysis of additional personnel in Attachment I.

CALL TOTALS AND RUNS

From October 1, 2022, to September 30, 2023, MFD responded to 4,845 calls. Of these, 47 were outside fire calls and 83 were structure fire calls within the City of Minot.

Calls by Type

Table 5-1 shows the number of calls that MFD responded to by call type, average calls per day, and the percentage of calls that fall into each call type category. Figures 5-1 and 5-2 show the percentage of calls that fall into each EMS (Figure 5-1) and fire (Figure 5-2) type category.

TABLE 5-1: Calls by Type

Call Type	Total Calls	Calls per Day	Call Percentage
Medical and other	3,538	9.7	72.9
MVA	176	0.5	3.6
EMS Subtotal	**3,714**	**10.2**	**76.5**
False alarm	400	1.1	8.2
Good intent	76	0.2	1.6
Hazard	186	0.5	3.8
Outside fire	47	0.1	1.0
Public service	95	0.3	2.0
Structure fire	83	0.2	1.7
Technical rescue	18	0.0	0.4
Fire Subtotal	**905**	**2.5**	**18.6**
Canceled	211	0.6	4.3
Mutual aid	25	0.1	0.5
Total	**4,855**	**13.3**	**100.0**

Note: *Calls outside MFD's fire district were labeled as mutual aid. Out of 25 mutual aid calls, one was canceled.

FIGURE 5-1: EMS Calls by Type

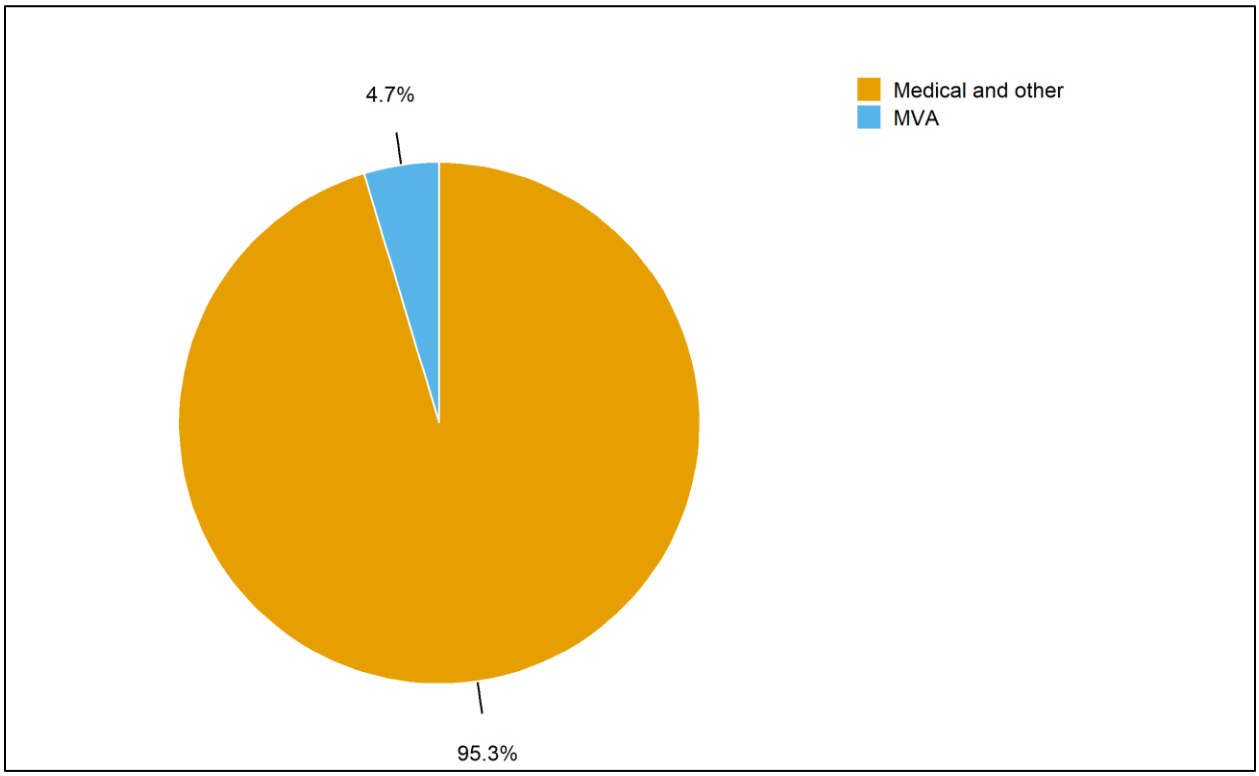
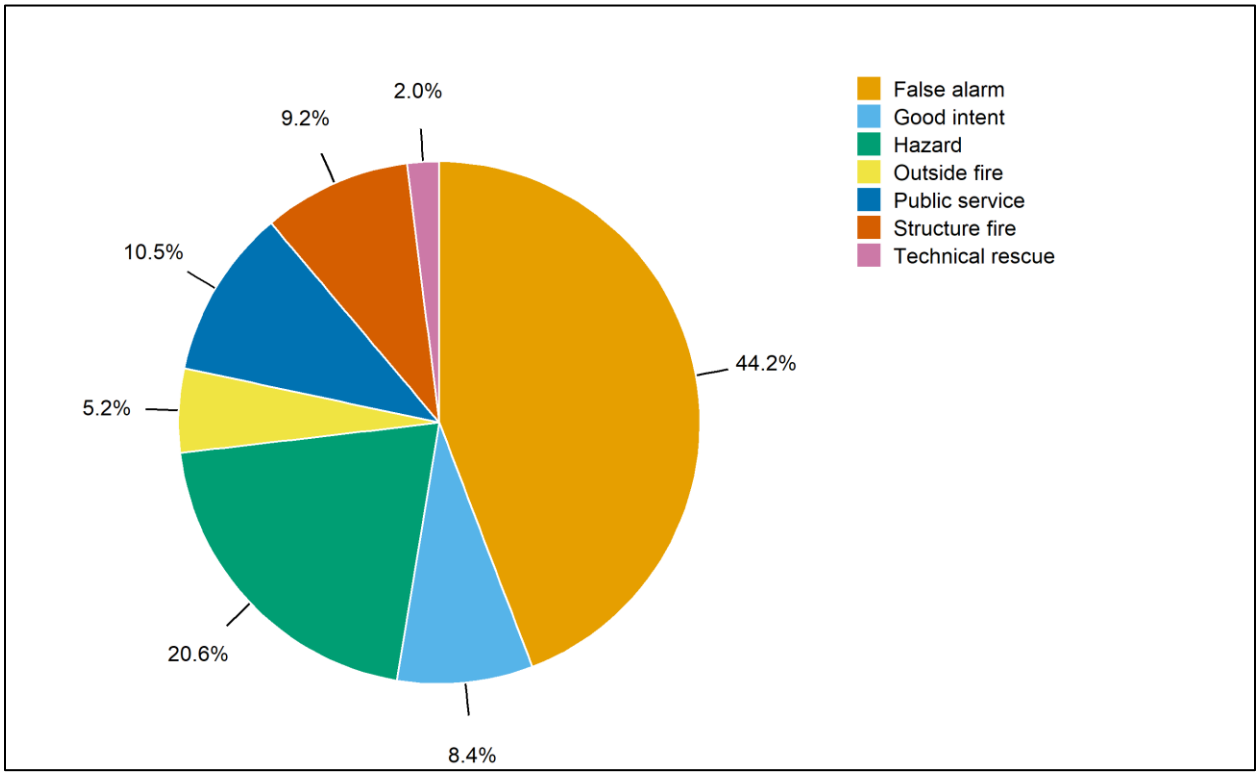


FIGURE 5-2: Fire Calls by Type



Observations:

- MFD responded to an average of 13.3 calls, including 0.6 canceled and 0.1 mutual aid calls, per day.
- EMS calls for the year totaled 3,714 (76 percent of all calls), an average of 10.2 calls per day.
  - Medical and other calls made up 95 percent of EMS calls, an average of 9.7 calls per day.
  - Motor vehicle accidents made up five percent of EMS calls, an average of 0.5 calls per day.
- Fire calls for the year totaled 905 (19 percent of all calls), an average of 2.5 per day.
  - False alarm calls were the largest category of fire calls at 44 percent of fire calls, an average of 1.1 calls per day.
  - Structure and outside fire calls combined made up 14 percent of fire calls, an average of 0.4 calls per day, or one call every three days.

Calls by Type and Duration

The following table shows the duration of calls by type using four duration categories: less than 30 minutes, 30 minutes to one hour, one to two hours, and two or more hours.

TABLE 5-2: Calls by Type and Duration

Call Type	Less than 30 Minutes	30 Minutes to One Hour	One to Two Hours	Two or More Hours	Total
Medical and other	3,144	345	43	6	3,538
MVA	88	59	26	3	176
EMS Subtotal	**3,232**	**404**	**69**	**9**	**3,714**
False alarm	330	56	13	1	400
Good intent	54	18	3	1	76
Hazard	78	64	37	7	186
Outside fire	31	10	6	0	47
Public service	75	13	5	2	95
Structure fire	38	17	15	13	83
Technical rescue	11	6	1	0	18
Fire Subtotal	**617**	**184**	**80**	**24**	**905**
Canceled	207	4	0	0	211
Mutual aid	11	7	4	3	25
Total	**4,067**	**599**	**153**	**36**	**4,855**

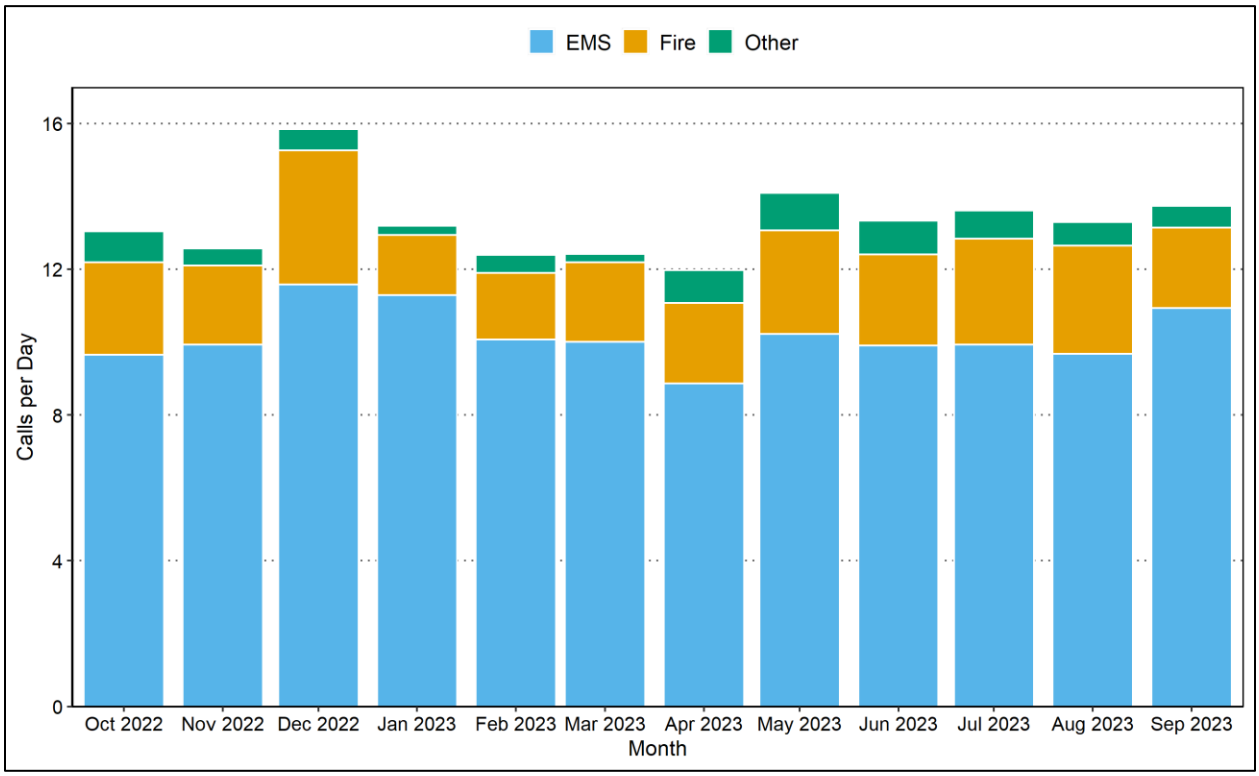
Observations:

- A total of 3,636 EMS calls (98 percent) lasted less than one hour, and 78 EMS calls (two percent) lasted more than one hour.
  - On average, 0.2 EMS calls per day lasted more than one hour.
  - A total of 147 motor vehicle accidents (84 percent) lasted less than one hour, and 29 motor vehicle accidents (16 percent) lasted more than one hour.
- A total of 801 fire calls (89 percent) lasted less than one hour, 80 fire calls (nine percent) lasted one to two hours, and 24 fire calls (three percent) lasted two or more hours.
  - On average, 0.3 fire calls per day lasted more than one hour.
  - A total of 41 outside fire calls (87 percent) lasted less than one hour, and six outside fire calls (13 percent) lasted one to two hours.
  - A total of 55 structure fire calls (66 percent) lasted less than one hour, 15 structure fire calls (18 percent) lasted one to two hours, and 13 structure fire calls (16 percent) lasted two or more hours.

Calls by Month and Hour of Day

Figure 5-3 shows the monthly variation in the average daily number of calls handled by MFD from October 1, 2022, to September 30, 2023. Similarly, Figure 5-4 illustrates the average number of calls received each hour of the day.

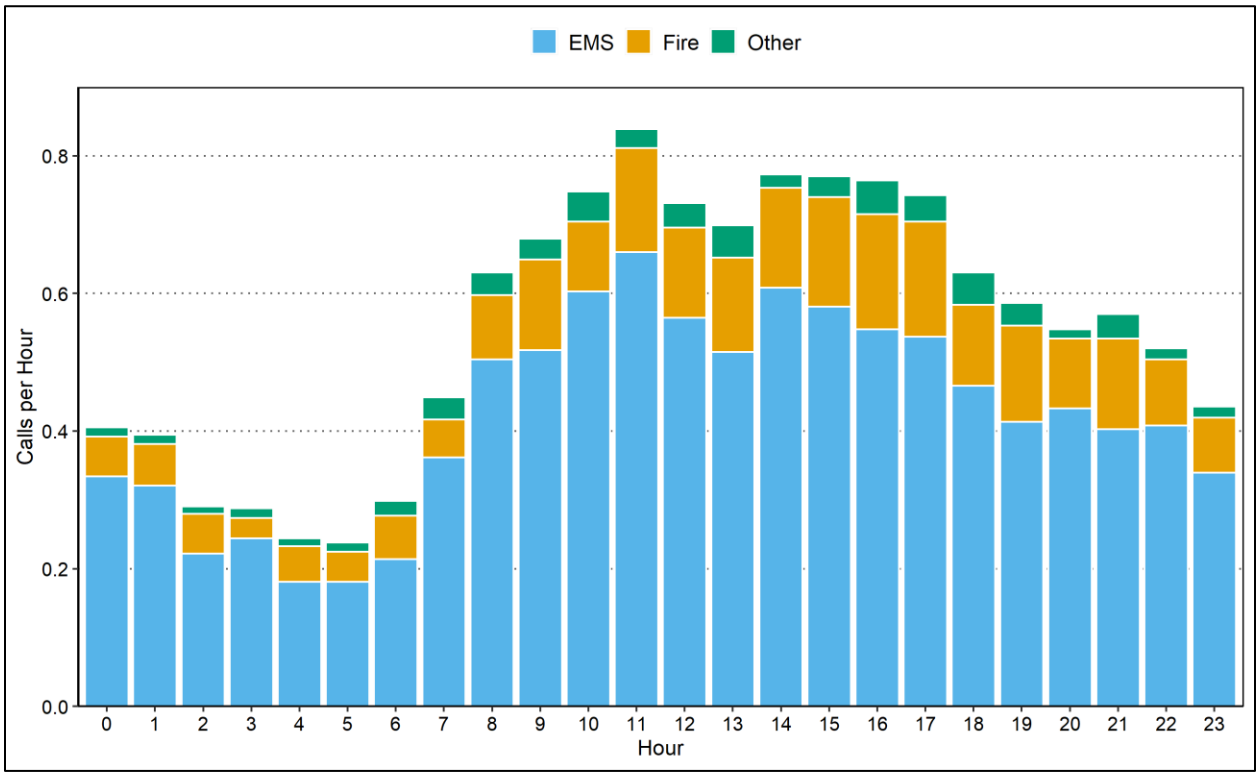
FIGURE 5-3: Calls per Day by Month



Observations:

- Average EMS calls per day ranged from 8.9 in April 2023 to 11.6 in December 2022.
- Average fire calls per day ranged from 1.6 in January 2023 to 3.7 in December 2022.
- Average other calls per day ranged from 0.2 in March 2023 to 1.0 in May 2023.
- Average calls per day overall ranged from 12.0 in April 2023 to 15.8 in December 2022.

FIGURE 5-4: Average Calls by Hour of Day



Observations:

- Average EMS calls per hour ranged from 0.18 between 4:00 a.m. and 5:00 a.m. to 0.66 between 11:00 a.m. and noon.
- Average fire calls per hour ranged from 0.03 between 3:00 a.m. and 4:00 a.m. to 0.17 between 5:00 p.m. and 6:00 p.m.
- Average other calls per hour ranged from 0.01 between 2:00 a.m. and 3:00 a.m. to 0.05 between 4:00 p.m. and 5:00 p.m.
- Average calls per hour overall ranged from 0.24 between 5:00 a.m. and 6:00 a.m. to 0.84 between 11:00 a.m. and noon.

Units Arriving at Calls

In this section, we limit ourselves to calls where a unit from MFD arrives. For this reason, there are 265 fewer calls in Table 5-3 than in Table 5-1. Table 5-3, along with Figures 5-5 and 5-6, detail the number of calls with one, two, and three or more MFD units arriving at a call, broken down by call type.

TABLE 5-3: Calls by Type and Number of Arriving MFD Units

Call Type	Number of Units				Total Calls
	One	Two	Three	Four or More	
Medical and other	3,367	67	2	1	3,437
MVA	93	48	28	5	174
EMS Subtotal	**3,460**	**115**	**30**	**6**	**3,611**
False alarm	213	115	36	22	386
Good intent	44	18	3	11	76
Hazard	121	35	14	11	181
Outside fire	25	11	7	3	46
Public service	66	14	5	5	90
Structure fire	19	15	20	28	82
Technical rescue	12	3	2	0	17
Fire Subtotal	**500**	**211**	**87**	**80**	**878**
Canceled	76	5	0	0	81
Mutual aid	7	6	6	1	20
Total	**4,043**	**337**	**123**	**87**	**4,590**
Total Percentage	**88.1**	**7.3**	**2.7**	**1.9**	**100.0**

Note: Out of 265 calls that did not have an arriving unit, 130 were canceled calls, 103 were EMS calls, 27 were fire calls, and five were mutual aid calls.

FIGURE 5-5: Number of Arriving MFD Units for EMS Calls

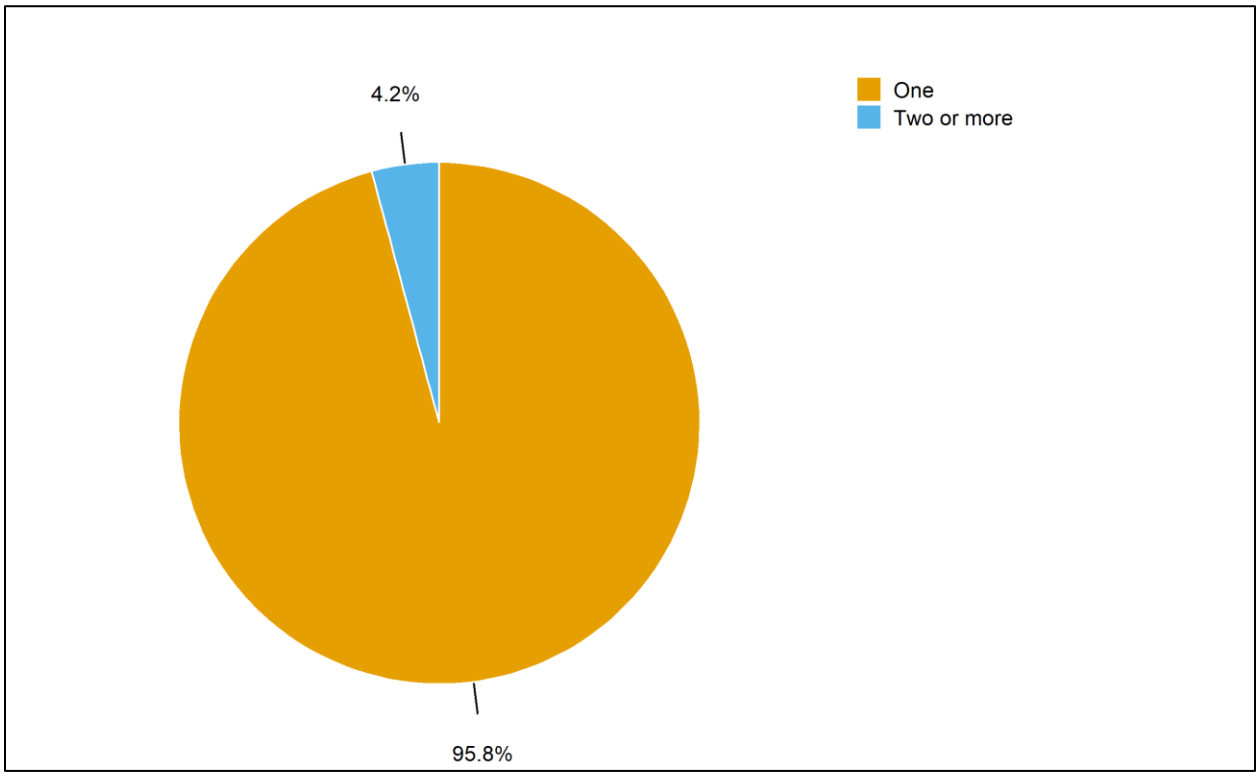
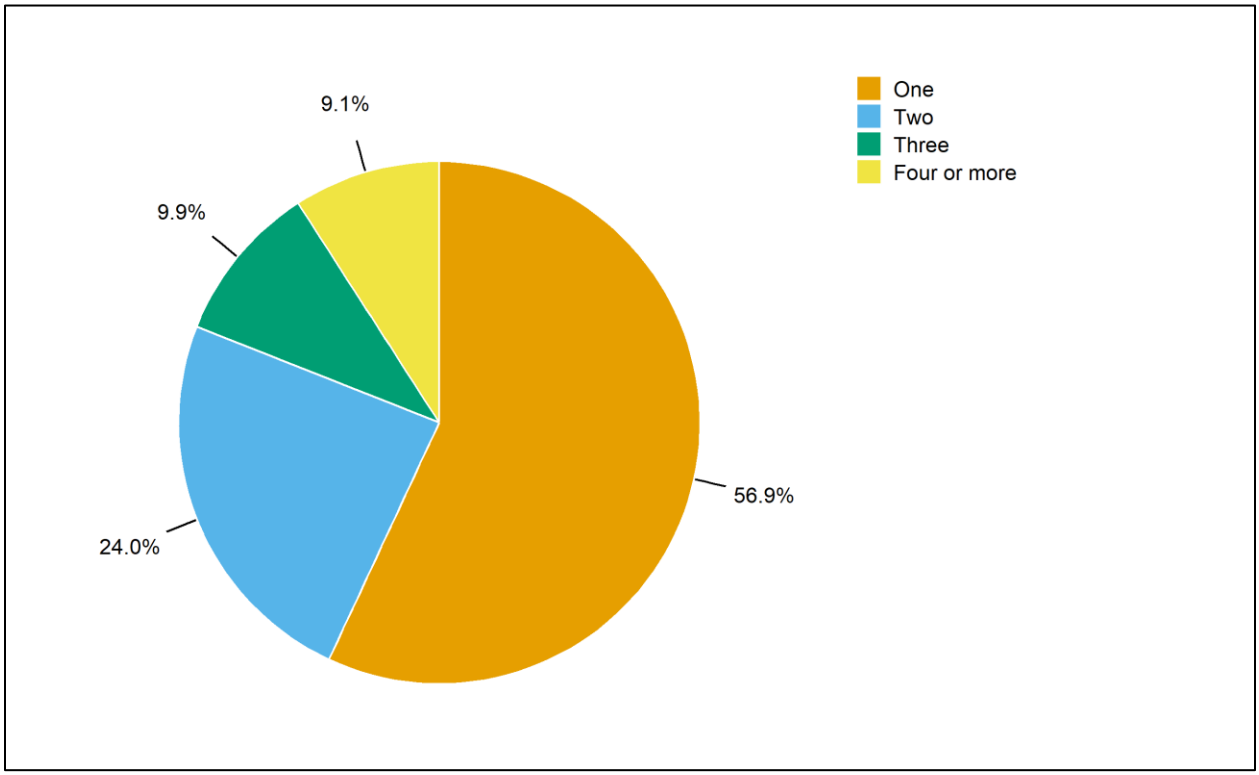


FIGURE 5-6: Number of Arriving MFD Units for Fire Calls



Observations:

Overall

- On average, 1.2 units arrived at all calls; for 88 percent of calls, only one unit arrived.
- Overall, four or more units arrived at two percent of calls.

EMS

- On average, 1.1 units arrived per EMS call.
- For EMS calls, one unit arrived 96 percent of the time, two units arrived 3 percent of the time, and three or more units arrived 1 percent of the time.

Fire

- On average, 1.8 units arrived per fire call.
- For fire calls, one unit arrived 57 percent of the time, two units arrived 24 percent of the time, three units arrived 10 percent of the time, and four or more units arrived 9 percent of the time.
- For outside fire calls, three or more units arrived 22 percent of the time.
- For structure fire calls, three or more units arrived 59 percent of the time.

WORKLOAD: RUNS AND TOTAL TIME SPENT

The workload of MFD's units is measured in two ways: runs and deployed time. The deployed time of a run is measured from the time a unit is dispatched through the time the unit is cleared. Because multiple units respond to some calls, there are more runs (6,761) than calls (4,855) and the average deployed time per run varies from the average duration per call.

Runs and Deployed Time

Deployed time, also referred to as deployed hours, is the total deployment time of MFD units deployed on all runs. Table 5-4 shows the total deployed time, both overall and broken down by type of run, for all non-administrative MFD units. Table 5-5 and Figure 5-7 present the average deployed minutes by hour of day.

TABLE 5-4: Annual Runs and Deployed Time by Type

Run Type	Minutes per Run	Total Hours	Percent of Hours	Minutes per Day	Total Runs	Runs per Day
Medical and other	20.2	1,266.9	52.3	208.3	3,755	10.3
MVA	24.9	174.5	7.2	28.7	421	1.2
EMS Subtotal	**20.7**	**1,441.5**	**59.5**	**237.0**	**4,176**	**11.4**
False alarm	16.6	277.9	11.5	45.7	1,003	2.7
Good intent	21.7	68.9	2.8	11.3	190	0.5
Hazard	33.4	201.6	8.3	33.1	362	1.0
Outside fire	17.7	41.2	1.7	6.8	140	0.4
Public service	23.2	70.4	2.9	11.6	182	0.5
Structure fire	44.0	244.3	10.1	40.2	333	0.9
Technical rescue	20.1	11.4	0.5	1.9	34	0.1
Fire Subtotal	**24.5**	**915.7**	**37.8**	**150.5**	**2,244**	**6.1**
Canceled	5.1	24.5	1.0	4.0	289	0.8
Mutual aid	47.8	41.5	1.7	6.8	52	0.1
Other Subtotal	**11.6**	**65.9**	**2.7**	**10.8**	**341**	**0.9**
Total	**21.5**	**2,423.1**	**100.0**	**398.3**	**6,761**	**18.5**

Observations:

Overall

- The total deployed time for the year was 2,423.1 hours. The daily average was 6.6 hours for all units combined.
- There were 6,761 runs, including 289 runs dispatched for canceled calls and 52 runs dispatched for mutual aid calls. The daily average was 18.5 runs.

EMS

- EMS runs accounted for 59 percent of the total workload.
- The average deployed time for EMS runs was 20.7 minutes. The deployed time for all EMS runs averaged 3.9 hours per day.

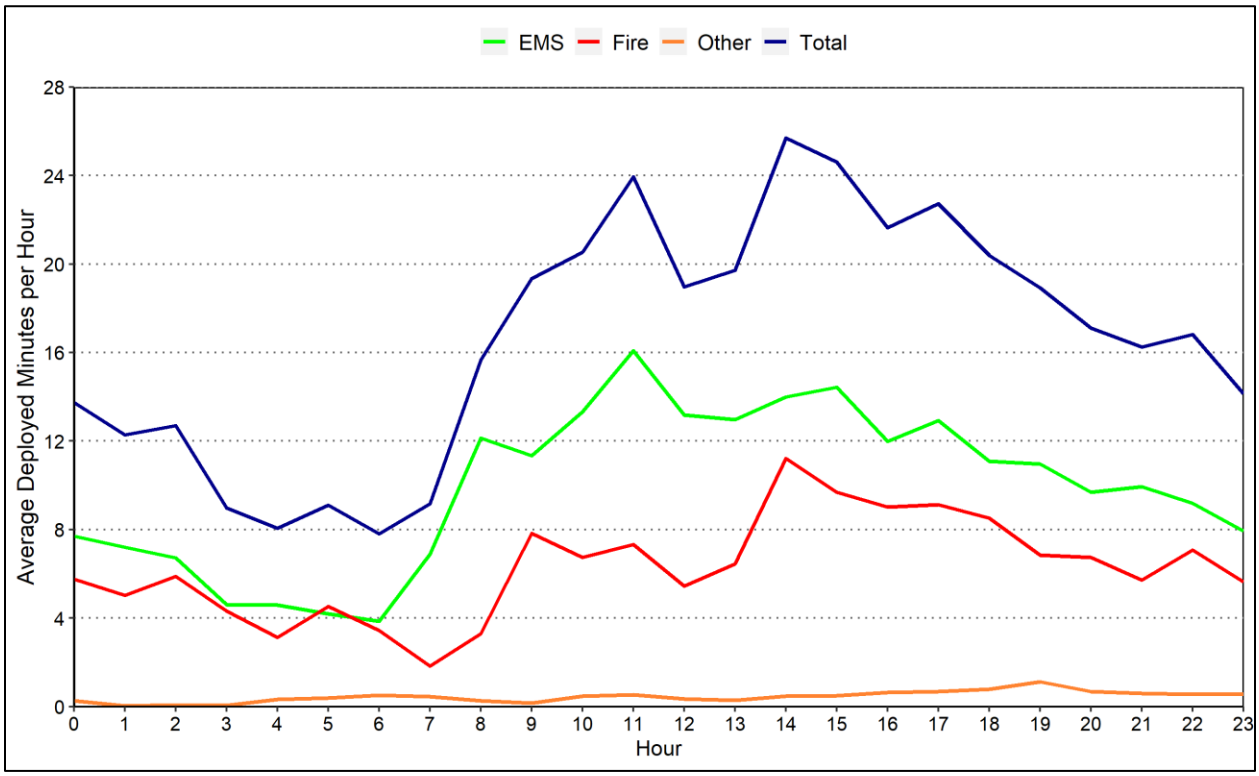
Fire

- Fire runs accounted for 38 percent of the total workload.
- The average deployed time for fire runs was 24.5 minutes. The deployed time for all fire runs averaged 2.5 hours per day.
- There were 473 runs for structure and outside fire calls combined, with a total workload of 285.5 hours. This accounted for 12 percent of the total workload.
- The average deployed time for outside fire runs was 17.7 minutes per run, and the average deployed time for structure fire runs was 44.0 minutes per run.

TABLE 5-5: Deployed Minutes by Hour of Day

Hour	EMS	Fire	Other	Total
0	7.7	5.8	0.3	13.7
1	7.2	5.0	0.0	12.3
2	6.7	5.9	0.1	12.7
3	4.6	4.3	0.1	9.0
4	4.6	3.1	0.3	8.0
5	4.2	4.5	0.4	9.1
6	3.9	3.4	0.5	7.8
7	6.9	1.8	0.5	9.2
8	12.1	3.3	0.3	15.7
9	11.3	7.8	0.2	19.4
10	13.3	6.8	0.5	20.5
11	16.1	7.3	0.5	23.9
12	13.2	5.4	0.4	19.0
13	13.0	6.5	0.3	19.7
14	14.0	11.2	0.5	25.7
15	14.4	9.7	0.5	24.6
16	12.0	9.0	0.6	21.6
17	12.9	9.1	0.7	22.7
18	11.1	8.5	0.8	20.4
19	11.0	6.8	1.1	18.9
20	9.7	6.7	0.7	17.1
21	9.9	5.7	0.6	16.3
22	9.2	7.1	0.6	16.8
23	7.9	5.6	0.6	14.1
Total	**237.0**	**150.5**	**10.8**	**398.3**

FIGURE 5-7: Average Deployed Minutes by Hour of Day



Observations:

- Hourly deployed time was highest during the day from 9:00 a.m. to 7:00 p.m., averaging between 19 minutes and 26 minutes.
- Average deployed time peaked between 2:00 p.m. and 3:00 p.m., averaging 26 minutes.
- Average deployed time was lowest between 6:00 a.m. and 7:00 a.m., averaging eight minutes.

Workload by Unit

Table 5-6 provides a summary of each MFD unit's workload for the period from October 1, 2022, to September 30, 2023. Tables 5-7 and 5-8 provide a more detailed view of the workload, showing each unit's runs broken out by run type (Table 5-7) and its daily average deployed time by run type (Table 5-8).

TABLE 5-6: Workload by Unit

Station	Unit	Type	Minutes per Run	Hours	Percent	Minutes per Day	Runs	Runs per Day
MFD1	BAT1	BC	26.4	211.2	8.7	34.7	480	1.3
	BAT2	BC	52.2	20.9	0.9	3.4	24	0.1
	ENG1	Engine	20.8	665.4	27.5	109.4	1,916	5.2
	ENG5	Res. Engine	23.4	34.6	1.4	5.7	89	0.2
	HZMT1	Hazmat	4.2	0.1	0.0	0.0	1	0.0
	LAD1*	Ladder	1.0	0.0	0.0	0.0	1	0.0
	PLAT1	Platform	20.3	53.2	2.2	8.8	157	0.4
	RES1*	Rescue	20.6	1.7	0.1	0.3	5	0.0
	TEMS1	Rescue	0.1	0.0	0.0	0.0	1	0.0
	Total		**22.2**	**987.2**	**40.7**	**162.3**	**2,674**	**7.3**
MFD2	ENG2	Engine	19.2	143.8	5.9	23.6	449	1.2
	LAD2*	Ladder	19.3	506.7	20.9	83.3	1,572	4.3
	RES2	Rescue	26.3	22.4	0.9	3.7	51	0.1
	SOTV	Rescue	54.6	3.6	0.2	0.6	4	0.0
	Total		**19.6**	**676.5**	**27.9**	**111.2**	**2,076**	**5.7**
MFD3	AIR302	ARFF	15.8	1.1	0.0	0.2	4	0.0
	ENG3	Engine	23.1	458.3	18.9	75.3	1,191	3.3
	Total		**23.1**	**459.4**	**19.0**	**75.5**	**1,195**	**3.3**
MFD4	ENG4	Engine	20.7	243.3	10.0	40.0	705	1.9
	HZMT4**	Hazmat	42.0	39.9	1.6	6.6	57	0.2
	Total		**22.3**	**283.2**	**11.7**	**46.6**	**762**	**2.1**
MFD5	LAD5	Ladder	18.7	16.8	0.7	2.8***	54	0.1***
Total			**21.5**	**2,423.1**	**100.0**	**398.3**	**6,761**	**18.5**

Note: *No longer at this station; **Unit rotates between Stations 1 and 4; ***Station 5 started service on 8/20/2023 for a total of 42 days in the study period. However, Ladder 5 was only in service at Station 5 for 21 days. It was out for maintenance for another 19 days and at Station 2 replacing L2 for two days. All "per day" measurements are divided by 365 days for consistency.

TABLE 5-7: Total Runs by Type and Unit

Station	Unit	Unit Type	EMS	False Alarm	Good Intent	Hazard	Outside Fire	Public Service	Struct Fire	Tech Rescue	Cancel	Mutual Aid	Total
MFD1	BAT1	BC	78	168	31	49	25	26	65	5	20	13	480
	BAT2	BC	4	3	1	1	3	1	9	0	0	2	24
	ENG1	Engine	1,375	214	41	73	23	32	57	8	88	5	1,916
	ENG5	Res. Engine	55	20	1	5	4	2	2	0	0	0	89
	HZMT1	Hazmat	0	0	0	1	0	0	0	0	0	0	1
	LAD1*	Ladder	1	0	0	0	0	0	0	0	0	0	1
	PLAT1	Platform	95	25	2	6	4	4	9	1	10	1	157
	RES1*	Rescue	5	0	0	0	0	0	0	0	0	0	5
	TEMS1	Rescue	1	0	0	0	0	0	0	0	0	0	1
	Total		**1,614**	**430**	**76**	**135**	**59**	**65**	**142**	**14**	**118**	**21**	**2,674**
MFD2	ENG2	Engine	311	44	7	16	10	16	13	3	27	2	449
	LAD2*	Ladder	1,026	234	32	72	28	41	58	8	69	4	1,572
	RES2	Rescue	27	17	0	0	0	5	1	0	1	0	51
	SOTV	Rescue	0	0	0	0	0	0	0	1	1	2	4
	Total		**1,364**	**295**	**39**	**88**	**38**	**62**	**72**	**12**	**98**	**8**	**2,076**
MFD3	AIR302	ARFF	0	0	0	4	0	0	0	0	0	0	4
	ENG3	Engine	765	168	35	68	23	27	60	6	37	2	1,191
	Total		**765**	**168**	**35**	**72**	**23**	**27**	**60**	**6**	**37**	**2**	**1,195**
MFD4	ENG4	Engine	394	103	26	33	19	25	55	1	34	15	705
	HZMT4**	Hazmat	3	2	11	31	0	1	1	0	2	6	57
	Total		**397**	**105**	**37**	**64**	**19**	**26**	**56**	**1**	**36**	**21**	**762**
MFD5	LAD5***	Ladder	36	5	3	3	1	2	3	1	0	0	54
Total			**4,176**	**1,003**	**190**	**362**	**140**	**182**	**333**	**34**	**289**	**52**	**6,761**

Note: *No longer at this station; **Unit rotates between Stations 1 and 4; ***L5 was in service for 23 days during the study period.

TABLE 5-8: Deployed Minutes per Day by Type and Unit

Station	Unit	Unit Type	EMS	False Alarm	Good Intent	Hazard	Outside Fire	Public Service	Struct Fire	Tech Rescue	Cancel	Mutual Aid	Total
MFD1	BAT1	BC	5.9	8.2	2.0	3.8	1.4	1.5	9.4	0.2	0.3	1.9	34.7
	BAT2	BC	0.4	0.1	0.0	0.0	0.1	0.1	2.2	0.0	0.0	0.5	3.4
	ENG1	Engine	77.9	10.9	2.8	7.0	1.1	1.7	5.5	0.3	1.7	0.4	109.4
	ENG5	Res. Engine	3.6	0.9	0.0	0.3	0.4	0.2	0.3	0.0	0.0	0.0	5.7
	HZMT1	Hazmat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	LAD1*	Ladder	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	PLAT1	Platform	5.2	1.3	0.3	0.6	0.2	0.2	0.8	0.1	0.1	0.0	8.8
	RES1*	Rescue	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
	TEMS1	Rescue	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total		**93.2**	**21.4**	**5.1**	**11.7**	**3.1**	**3.8**	**18.2**	**0.7**	**2.1**	**2.9**	**162.3**
MFD2	ENG2	Engine	16.6	1.6	0.3	1.1	0.7	1.1	1.5	0.2	0.3	0.2	23.6
	LAD2*	Ladder	53.7	9.1	1.6	7.1	1.2	2.3	6.7	0.4	0.7	0.5	83.3
	RES2	Rescue	1.5	0.8	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	3.7
	SOTV	Rescue	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.6
	Total		**71.9**	**11.5**	**1.9**	**8.2**	**2.0**	**4.6**	**8.3**	**0.6**	**1.0**	**1.2**	**111.2**
MFD3	AIR302	ARFF	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2
	ENG3	Engine	46.0	8.2	2.1	7.5	1.3	1.8	7.5	0.5	0.3	0.2	75.3
	Total		**46.0**	**8.2**	**2.1**	**7.7**	**1.3**	**1.8**	**7.5**	**0.5**	**0.3**	**0.2**	**75.5**
MFD4	ENG4	Engine	23.9	4.4	0.8	2.2	0.5	1.1	5.4	0.0	0.5	1.2	40.0
	HZMT4**	Hazmat	0.2	0.1	1.2	2.7	0.0	0.2	0.7	0.0	0.1	1.4	6.6
	Total		**24.1**	**4.5**	**2.1**	**4.9**	**0.5**	**1.3**	**6.1**	**0.0**	**0.5**	**2.5**	**46.6**
MFD5	LAD5***	Ladder	1.7	0.2	0.1	0.6	0.0	0.1	0.1	0.0	0.0	0.0	2.8
Total			**237.0**	**45.7**	**11.3**	**33.1**	**6.8**	**11.6**	**40.2**	**1.9**	**4.0**	**6.8**	**398.3**

Note: *No longer at this station; **Unit rotates between Station 1 and 4; *** LAD5 was in Station 5 for 23 days during the study period.

Observations:

- Station 1 made the most runs (2,674 or an average of 7.3 runs per day) and had the highest total annual deployed time (987.2 hours or an average of 2.7 hours per day).
  - EMS calls accounted for 60 percent of runs and 57 percent of the total deployed time.
  - Structure and outside fire calls accounted for eight percent of runs and 13 percent of the total deployed time.
- Station 2 made the second most runs (2,076 or an average of 5.7 runs per day) and had the second-highest total annual deployed time (676.5 hours or an average of 1.9 hours per day).
  - EMS calls accounted for 66 percent of runs and 65 percent of the total deployed time.
  - Structure and outside fire calls accounted for five percent of runs and nine percent of the total deployed time.
- ENG1 made the most runs (1,916 or an average of 5.2 runs per day) and had the highest total annual deployed time (665.4 hours or an average of 109.4 minutes per day).
  - EMS calls accounted for 72 percent of runs and 71 percent of the total deployed time.
  - Structure and outside fire calls accounted for four percent of runs and six percent of the total deployed time.
- LAD2 made the second most runs (1,572 or an average of 4.3 runs per day) and had the second-highest total annual deployed time (506.7 hours or an average of 83.3 minutes per day).
  - EMS calls accounted for 65 percent of runs and 65 percent of the total deployed time.
  - Structure and outside fire calls accounted for five percent of runs and 10 percent of the total deployed time.

Workload by Station Area

Table 5-9 breaks down the workload of MFD by areas within its fire district where the calls occurred. Table 5-10 provides further detail on the workload associated with structure and outside fire calls, also broken down by area. Each area is associated with a first due station.

TABLE 5-9: Annual Workload by Area

Area	Calls	Percent Calls	Runs	Runs Per Day	Minutes Per Run	Work Hours	Percent Work	Minutes Per Day
MFD1	1,907	39.3	2,672	7.3	20.4	906.4	37.4	149.0
MFD2	1,650	34.0	2,295	6.3	20.2	774.3	32.0	127.3
MFD3	912	18.8	1,271	3.5	23.6	501.0	20.7	82.4
MFD4	290	6.0	379	1.0	26.3	165.8	6.8	27.3
MFD5*	71	1.5	92	0.3	22.2	34.1	1.4	5.6
MFD Subtotal	**4,830**	**99.5**	**6,709**	**18.4**	**21.3**	**2,381.6**	**98.3**	**391.5**
MRFD	19	0.4	40	0.1	37.8	25.2	1.0	4.1
Burlington	3	0.1	5	0.0	76.5	6.4	0.3	1.0
Sawyer	1	0.0	1	0.0	0.4	0.0	0.0	0.0
Surrey	1	0.0	3	0.0	33.1	1.7	0.1	0.3
Velva	1	0.0	3	0.0	164.0	8.2	0.3	1.3
Aid Given Subtotal	**25**	**0.5**	**52**	**0.1**	**47.8**	**41.5**	**1.7**	**6.8**
Total	**4,855**	**100.0**	**6,761**	**18.5**	**21.5**	**2,423.1**	**100.0**	**398.3**

Note: *MFD 5 was a new station in service on 8/20/2023. It was only considered a separate location for 42 days; MRFD=Minot Rural Fire Department

TABLE 5-10: Runs for Structure and Outside Fires by Area

Area	Structure Fires		Outside Fires		Total Deployed Hours	Percent Work
	Runs	Minutes per Run	Runs	Minutes per Run		
MFD1	83	32.0	30	13.0	50.8	17.5
MFD2	149	45.3	72	17.4	133.3	46.0
MFD3	67	42.0	32	21.3	58.3	20.1
MFD4	33	73.4	4	10.2	41.1	14.2
MFD5*	1	20.6	2	53.0	2.1	0.7
MFD Subtotal	**333**	**44.0**	**140**	**17.7**	**285.5**	**98.4**
MRFD	3	36.0	6	27.2	4.5	1.6
Total	**336**	**43.9**	**146**	**18.0**	**290.0**	**100.0**

Note: *MFD 5 was a new station in service on 8/20/2023. It was only considered a separate location for 42 days; MRFD=Minot Rural Fire Department.

Observations:

MFD Service Area

- There were 4,830 calls or 99 percent of the total calls.
- There were 6,709 runs, including 289 runs dispatched for canceled calls. The daily average was 18.4 runs.
- The total deployed time for the year was 2,381.6 hours. The daily average was 6.5 hours for all units combined.

Aid Given

- There were 25 calls or one percent of the total calls.
- There were 52 runs, including one run dispatched for canceled calls. The daily average was 0.1 runs.
- The total deployed time for the year was 41.5 hours. The daily average was 7.2 minutes for all units combined.

ANALYSIS OF BUSIEST HOURS

In this analysis, we included all 4,855 calls given in Table 5-1. For these calls, there is significant variability in the number of calls from hour to hour. One special concern relates to the resources available for hours with the heaviest workload. We tabulated the data for each of the 8,760 hours from October 1, 2022, to September 30, 2023. Table 5-11 shows the number of hours in which there were zero to four or more calls during the hour. Table 5-12 shows the ten one-hour intervals that had the most calls during the studied period. Table 5-13 examines the number of times a call overlapped with another call.

TABLE 5-11: Frequency Distribution of the Number of Calls

Calls in an Hour	Frequency	Percentage
0	5,123	58.5
1	2,654	30.3
2	790	9.0
3	156	1.8
4+	37	0.4
Total	**8,760**	**100.0**

TABLE 5-12: Top Ten Hours with the Most Calls Received

Hour	Number of Calls	Number of Runs	Total Deployed Hours
7/10/2023, 11:00 p.m. to midnight	5	8	2.0
11/13/2022, noon to 1:00 p.m.	5	7	1.8
1/8/2023, 2:00 p.m. to 3:00 p.m.	5	6	1.9
2/22/2023, 2:00 p.m. to 3:00 p.m.	5	6	1.5
1/9/2023, 2:00 p.m. to 3:00 p.m.	5	5	1.9
5/30/2023, 5:00 p.m. to 6:00 p.m.	4	11	4.3
3/10/2023, 1:00 p.m. to 2:00 p.m.	4	10	2.4
11/7/2022, 2:00 p.m. to 3:00 p.m.	4	9	4.9
12/27/2022, 2:00 p.m. to 3:00 p.m.	4	9	4.1
7/6/2023, noon to 1:00 p.m.	4	9	1.6

Note: Total deployed hours is a measure of the total time spent responding to calls received in the hour. The deployed time from these calls may extend into the next hour or hours.

Observations:

- During 37 hours (0.4 percent of all hours), four or more calls occurred; in other words, the department responded to four or more calls in an hour roughly once every 10 days.
  - The highest number of calls to occur in an hour was five, which happened five times.
- The hour with the most calls and runs was 11:00 p.m. to midnight on July 10, 2023.
  - The hour's five calls involved eight dispatches resulting in 2.0 hours of deployed time.
  - These five calls included three medical and other calls, one false alarm call, and one good intent call.

TABLE 5-13: Frequency of Overlapping Calls

Area	Scenario	Number of Calls	Percent of All Calls	Total Hours
MFD1	No overlapped call	1,771	92.9	650.7
	Overlapped with one call	128	6.7	23.0
	Overlapped with two calls	8	0.4	1.2
MFD2	No overlapped call	1,546	93.7	558.1
	Overlapped with one call	97	5.9	20.4
	Overlapped with two calls	6	0.4	1.3
	Overlapped with three calls	1	0.1	0.0
MFD3	No overlapped call	879	96.4	381.5
	Overlapped with one call	32	3.5	8.2
	Overlapped with two calls	1	0.1	0.2
MFD4	No overlapped call	287	99.0	124.2
	Overlapped with one call	3	1.0	0.7
MFD5*	No overlapped call	71	100.0	0.5
Aid Given	No overlapped call	24	96.0	19.9
	Overlapped with one call	1	4.0	0.0

Note: *MFD 5 was a new station in service on 8/20/2023. It was included in the analysis only for 42 days.

Table 5-14 focuses on each station's availability to respond to calls within its first due area. At the same time, it focuses on calls where an MFD unit eventually arrived and ignores calls where no unit arrived. Out of 4,830 calls that are not mutual aid, there were 260 calls where an MFD unit went en route but no unit arrived. For this reason, the individual rows and the total in Table 5-14's second column do not match the corresponding values for Table 5-13.

TABLE 5-14: Station Availability to Respond to Calls

Area	Calls in Area	First Due Responded	Percent Responded	First Due Arrived	Percent Arrived	First Due First	Percent First
MFD1	1,809	1,632	90.2	1,609	88.9	1,582	87.5
MFD2	1,551	1,365	88.0	1,333	85.9	1,289	83.1
MFD3	864	796	92.1	784	90.7	775	89.7
MFD4	276	259	93.8	253	91.7	246	89.1
MFD5*	70	62	88.6	61	87.1	60	85.7
Total	**4,570**	**4,114**	**90.0**	**4,040**	**88.4**	**3,952**	**86.5**

Note: For each station, we count the number of calls within its first due area where at least one MFD unit arrived. Next, we focus on units from the first due station to see if any unit responded, arrived, or arrived first; Unit HZMT4 rotates between Station 1 and 4. *When LAD5 was out of service in Station 5's area, the reserve Eng5 would run out of that location. In addition, unit HZMT4 rotated between Stations 1 and 4.

RESPONSE TIME

In this part of the analysis, we present response time statistics for different call types. We separate response time into its identifiable components. *Dispatch time* is the difference between the time a call is received and the time a unit is dispatched. Dispatch time includes call processing time, which is the time required to determine the nature of the emergency and the types of resources to dispatch. *Turnout time* is the difference between dispatch time and the time a unit is en route to a call's location. *Travel time* is the difference between the time en route and arrival on scene. *Response time* is the total time elapsed between receiving a call to arriving on scene.

In this analysis, we included all calls to which at least one non-administrative unit arrived. Canceled and mutual aid calls were not included. In addition, calls with a total response time exceeding 30 minutes were excluded. Finally, we focused on units that had complete time stamps, that is, units with all components recorded, so that we could calculate each segment of response time. Calls labeled with "Low" priority were not included in this analysis.

Based on the methodology above, for 4,855 calls (Table 5-1), we excluded 211 canceled, 25 mutual aid calls, 62 low priority calls, 127 calls where no units recorded a valid on-scene time, 51 calls with a total response time exceeding 30 minutes, and 444 calls where one or more segments of the first arriving unit's response time could not be calculated due to missing or faulty data. As a result, in this section, a total of 3,935 calls are included in the analysis.

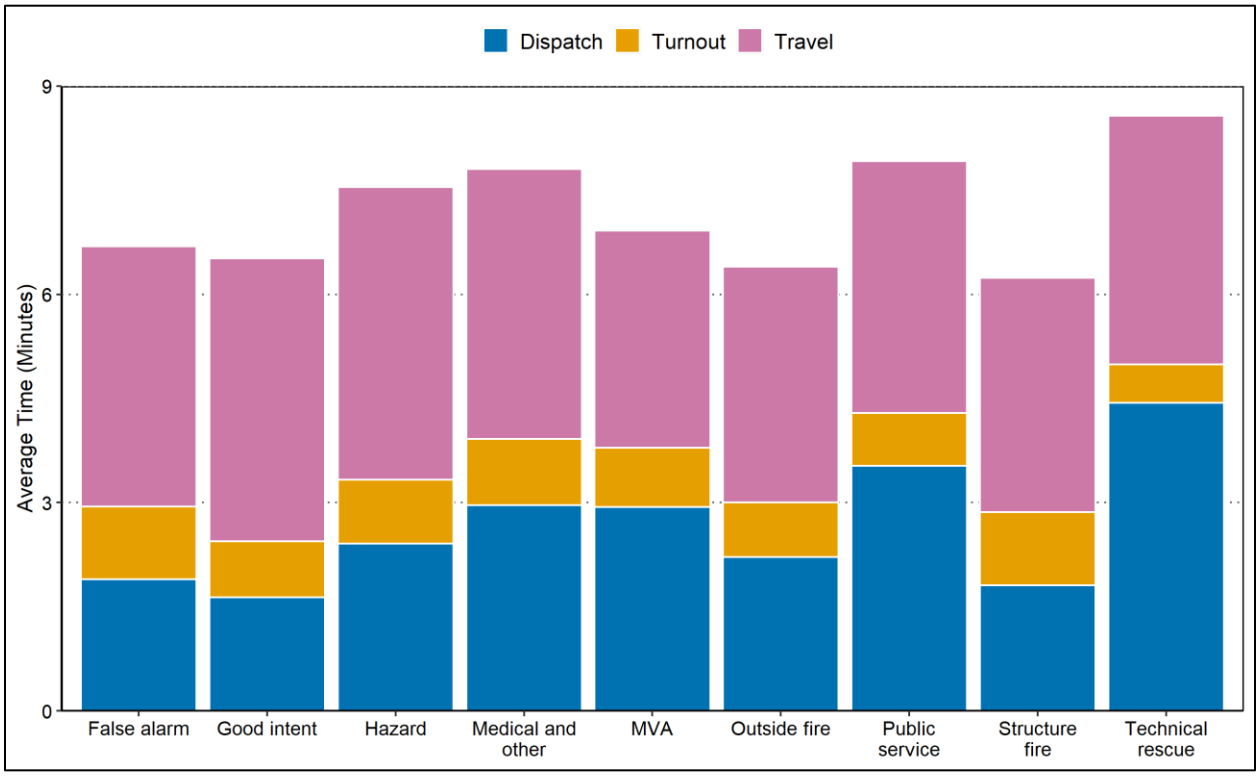
Response Time by Type of Call

Table 5-15 breaks down the average and 90th percentile dispatch, turnout, travel, and total response times by call type. A 90th percentile means that 90 percent of calls had response times at or below that number. For example, Table 5-15 shows an overall 90th percentile response time of 10.8 minutes, which means that 90 percent of the time, a call had a response time of no more than 10.8 minutes. Figure 5-8 illustrates the average response time by call type.

TABLE 5-15: Average and 90th Percentile Response Time of First Arriving Unit, by Call Type

Call Type	Average Response Time, Min.				90th Percentile Response Time, Min.				Call Count
	Dispatch	Turnout	Travel	Total	Dispatch	Turnout	Travel	Total	
Medical and other	3.0	1.0	3.9	7.8	4.4	1.8	6.2	10.8	3,132
MVA	2.9	0.8	3.1	6.9	5.6	1.6	5.3	10.5	129
EMS Subtotal	**3.0**	**0.9**	**3.9**	**7.8**	**4.4**	**1.8**	**6.2**	**10.8**	**3,261**
False alarm	1.9	1.0	3.7	6.7	3.2	1.9	6.5	10.0	308
Good intent	1.6	0.8	4.1	6.5	3.0	1.6	7.1	9.6	63
Hazard	2.4	0.9	4.2	7.5	3.6	1.9	8.1	11.9	133
Outside fire	2.2	0.8	3.4	6.4	3.0	1.4	5.6	8.3	36
Public service	3.5	0.8	3.6	7.9	7.5	1.9	5.9	12.1	57
Structure fire	1.8	1.1	3.4	6.2	2.6	1.7	5.6	8.8	72
Technical rescue	4.4	0.6	3.6	8.6	12.2	1.4	6.1	16.3	5
Fire Subtotal	**2.1**	**1.0**	**3.8**	**6.9**	**3.5**	**1.8**	**6.7**	**10.6**	**674**
Total	**2.8**	**0.9**	**3.8**	**7.6**	**4.3**	**1.8**	**6.2**	**10.8**	**3,935**

FIGURE 5-8: Average Response Time of First Arriving Unit, by Call Type



Observations:

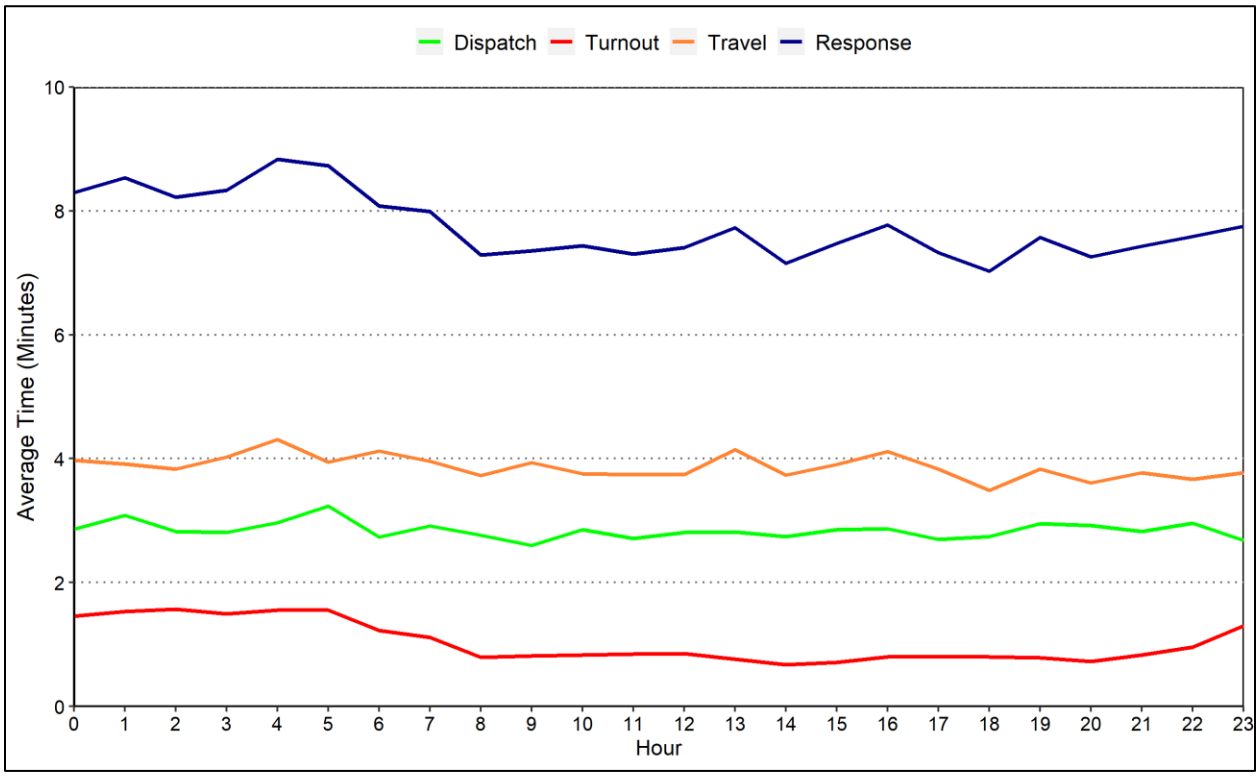
- The average dispatch time was 2.8 minutes.
- The average turnout time was 0.9 minutes.
- The average travel time was 3.8 minutes.
- The average total response time was 7.6 minutes.
- The average response time was 7.8 minutes for EMS calls and 6.9 minutes for fire calls.
- The average response time was 6.4 minutes for outside fires and 6.2 minutes for structure fires.
- The 90th percentile dispatch time was 4.3 minutes.
- The 90th percentile turnout time was 1.8 minutes.
- The 90th percentile travel time was 6.2 minutes.
- The 90th percentile total response time was 10.8 minutes.
- The 90th percentile response time was 10.8 minutes for EMS calls and 10.6 minutes for fire calls.
- The 90th percentile response time was 8.3 minutes for outside fires and 8.8 minutes for structure fires.

Table 5-16 shows the average response time by the time of day. The table also shows the 90th percentile response times. Figure 5-9 shows the average response time by the time of day.

TABLE 5-16: Average and 90th Percentile Response Times of First Arriving Unit, by Hour of Day

Hour	Minutes					Number of Calls
	Dispatch	Turnout	Travel	Response Time	90th Percentile Response Time	
0	2.9	1.5	4.0	8.3	11.3	133
1	3.1	1.5	3.9	8.5	11.4	129
2	2.8	1.6	3.8	8.2	13.3	88
3	2.8	1.5	4.0	8.3	11.1	92
4	3.0	1.6	4.3	8.8	11.3	80
5	3.2	1.6	3.9	8.7	11.9	78
6	2.7	1.2	4.1	8.1	11.1	94
7	2.9	1.1	4.0	8.0	11.3	141
8	2.8	0.8	3.7	7.3	9.9	183
9	2.6	0.8	3.9	7.4	10.9	202
10	2.9	0.8	3.8	7.4	10.4	204
11	2.7	0.8	3.7	7.3	9.8	262
12	2.8	0.9	3.7	7.4	10.8	213
13	2.8	0.8	4.1	7.7	11.5	188
14	2.7	0.7	3.7	7.2	9.8	218
15	2.9	0.7	3.9	7.5	11.1	206
16	2.9	0.8	4.1	7.8	11.0	211
17	2.7	0.8	3.8	7.3	10.2	216
18	2.7	0.8	3.5	7.0	10.1	178
19	2.9	0.8	3.8	7.5	11.0	180
20	2.9	0.7	3.6	7.2	10.5	164
21	2.8	0.8	3.7	7.4	10.0	179
22	3.0	1.0	3.6	7.6	10.4	159
23	2.7	1.3	3.8	7.8	10.4	137
Total	**2.8**	**0.9**	**3.8**	**7.6**	**10.8**	**3,935**

FIGURE 5-9: Average Response Time of First Arriving Unit, by Hour of Day



Observations:

- Average dispatch time was between 2.6 minutes (9:00 a.m. to 10:00 a.m.) and 3.2 minutes (5:00 a.m. to 6:00 a.m.).
- Average turnout time was between 0.7 minutes (2:00 p.m. to 3:00 p.m.) and 1.6 minutes (2:00 a.m. to 3:00 a.m.).
- Average travel time was between 3.5 minutes (6:00 p.m. to 7:00 p.m.) and 4.3 minutes (4:00 a.m. to 5:00 a.m.).
- Average response time was between 7.0 minutes (6:00 p.m. to 7:00 p.m.) and 8.8 minutes (4:00 a.m. to 5:00 a.m.).
- The 90th percentile response time was between 9.8 minutes (2:00 p.m. to 3:00 p.m.) and 13.3 minutes (2:00 a.m. to 3:00 a.m.).

Response Time by First Due Station Area

Here, we detail the average and 90th percentile response times to calls that occurred in different first due station areas.

TABLE 5-17: Average and 90th Percentile Response Time of First Arriving Unit, by Station Area

Area	Average Response Time, Min.				90th Percentile Response Time, Min.				Call Count
	Dispatch	Turnout	Travel	Total	Dispatch	Turnout	Travel	Total	
MFD1	2.8	1.0	4.0	7.9	4.4	1.9	6.1	10.7	1,533
MFD2	2.8	0.9	3.4	7.0	4.2	1.7	6.1	10.5	1,309
MFD3	2.8	1.0	3.9	7.7	4.3	1.8	6.6	10.8	782
MFD4	2.9	1.1	4.9	8.8	4.2	2.1	7.2	11.9	253
MFD5	3.0	0.6	3.5	7.2	4.5	1.5	5.6	9.3	58
Total	**2.8**	**0.9**	**3.8**	**7.6**	**4.3**	**1.8**	**6.2**	**10.8**	**3,935**

Note: *MFD 5 was a new station in service on 8/20/2023. It was included in the analysis only for 42 days.

Response Time by Month

Table 5-18 presents the average and 90th percentile response times for each month between October 1, 2022, and September 30, 2023. MFD added Station 5 on 8/20/2023. This analysis examines the impact of the new station on MFD's response time.

TABLE 5-18: Average and 90th Percentile Response Time of First Arriving Unit, by Year and Month

Year	Month	Average Response Time, Min.				90th Percentile Response Time, Min.				Call Count
		Dispatch	Turnout	Travel	Total	Dispatch	Turnout	Travel	Total	
2022	10	3.0	0.8	3.8	7.6	4.3	1.6	6.7	10.7	325
2022	11	2.7	1.0	3.8	7.5	4.3	1.8	6.2	10.7	329
2022	12	3.0	1.0	4.0	8.0	4.8	1.8	6.7	11.3	413
2023	1	3.0	1.0	4.0	8.0	4.4	2.0	6.1	11.1	355
2023	2	2.8	1.0	4.0	7.8	4.3	1.8	6.5	11.0	294
2023	3	2.8	0.9	3.9	7.6	4.3	1.9	6.2	10.6	322
2023	4	2.4	1.0	3.8	7.2	3.6	1.9	6.1	9.9	287
2023	5	2.8	0.9	3.7	7.4	4.2	1.8	6.0	10.9	340
2023	6	3.2	0.9	4.0	8.0	4.8	1.9	6.0	11.3	300
2023	7	2.7	1.0	4.2	7.8	4.1	1.9	6.9	11.1	338
10 Month Subtotal		**2.8**	**1.0**	**3.9**	**7.7**	**4.3**	**1.8**	**6.4**	**10.9**	**3,303**
2023	8	2.6	1.0	3.6	7.1	4.1	1.9	6.0	9.9	321
2023	9	2.9	0.8	3.4	7.1	4.4	1.6	5.5	9.7	311
Total		**2.8**	**0.9**	**3.8**	**7.6**	**4.3**	**1.8**	**6.2**	**10.8**	**3,935**

Observations:

- Between October 2022 and July 2023, before Station 5 was in service, the average and 90th percentile response times were 7.7 and 10.9 minutes, respectively.
- After Station 5 was in service, in September 2023, the average response time decreased eight percent from 7.7 to 7.1 minutes, and the 90th percentile response time decreased 11 percent from 10.9 to 9.7 minutes.

Response Time Distribution

Here, we present a more detailed look at how response times to calls are distributed. The cumulative distribution of total response time for the first arriving unit to EMS calls is shown in Figure 5-10 and Table 5-19. Figure 5-10 shows response times for the first arriving unit to EMS calls as a frequency distribution in whole-minute increments, and Figure 5-11 shows the same for the first arriving unit to outside and structure fire calls.

The cumulative percentages here are read in the same way as a percentile. In Figure 5-10, the 90th percentile of 10.8 minutes means that 90 percent of EMS calls had a response time of 10.8 minutes or less. In Table 5-19, the cumulative percentages of 61.3 and 82.4, for example, means that 61.3 percent of EMS calls and 82.4 percent of outside and structure fire calls had a response time under 8 minutes, respectively.

FIGURE 5-10: Cumulative Distribution of Response Time, First Arriving Unit, EMS

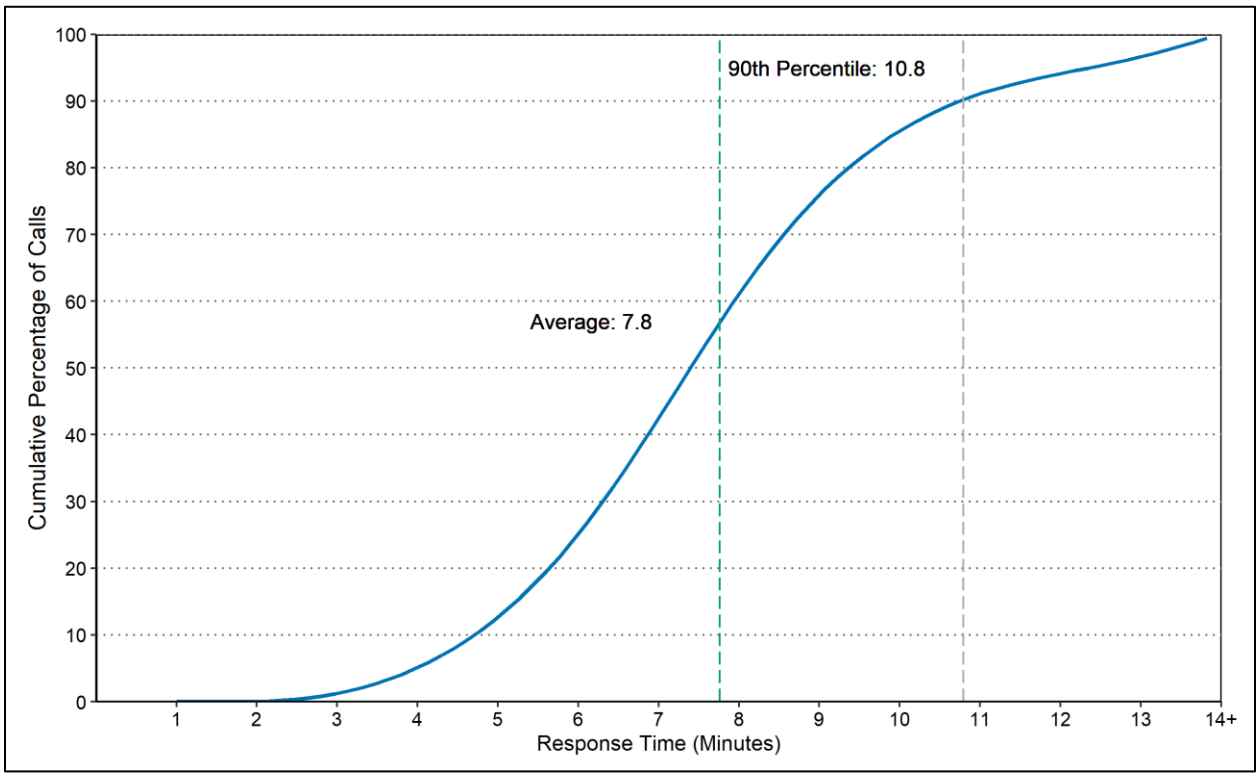


FIGURE 5-11: Cumulative Distribution of Response Time, First Arriving Unit, Outside and Structure Fires

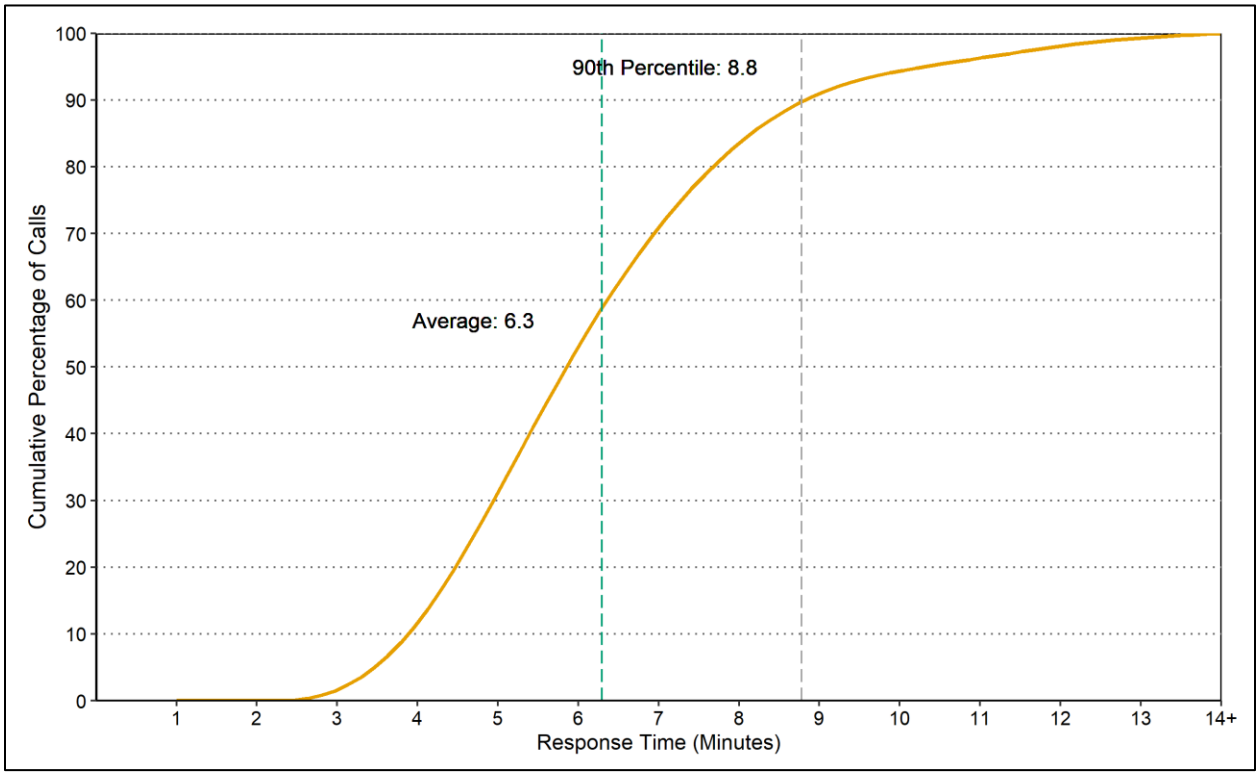


TABLE 5-19: Cumulative Distribution of Response Time, First Arriving Unit

Response Time (minute)	EMS		Structure and Outside Fires	
	Frequency	Cumulative Percentage	Frequency	Cumulative Percentage
1	0	0.0	0	0.0
2	2	0.1	0	0.0
3	32	1.0	2	1.9
4	140	5.3	8	9.3
5	237	12.6	25	32.4
6	394	24.7	22	52.8
7	584	42.6	21	72.2
8	610	61.3	11	82.4
9	478	76.0	10	91.7
10	318	85.7	3	94.4
11	170	90.9	1	95.4
12	112	94.4	3	98.1
13	59	96.2	0	98.1
14+	125	100.0	2	100.0

TABLE 5-20: Workload of Administrative Units

Unit ID	Unit Type	Annual Hours	Annual Runs
CHF	Fire Chief	0.1	3

ATTACHMENT II: FIRE LOSS

Table 5-21 presents the number of outside and structure fires, broken out by levels of fire loss. Table 5-22 shows the amount of property and content loss for outside and structure fires inside Minot from October 1, 2022, to September 30, 2023.

TABLE 5-21: Total Fire Loss Above and Below $25,000

Call Type	No Loss	Under $25,000	$25,000 plus	Total
Outside fire	46	1	0	47
Structure fire	70	9	4	83
Total	**116**	**10**	**4**	**130**

TABLE 5-22: Content and Property Loss, Structure and Outside Fires

Call Type	Property Loss		Content Loss	
	Loss Value	Number of Calls	Loss Value	Number of Calls
Outside fire	$500	1	$0	0
Structure fire	$560,500	12	$117,000	6
Total	**$561,000**	**13**	**$117,000**	**6**

Note: The table includes only fire calls with a recorded loss greater than $0.

Observations:

- 46 outside fires and 70 structure fires had no recorded loss.
- Four structure fires had $25,000 or more in loss.
- Structure fires:
  - The highest total loss for a structure fire was $336,000.
  - The average total loss for all structure fires was $8,163.
  - Six structure fires had content losses with a combined $117,000 in losses.
  - Out of 83 structure fires, 12 had recorded property losses, with a combined $560,500 in losses.
- Outside fires:
  - The highest total loss for an outside fire was $500.
  - The average total loss for all outside fires was $11.
  - Out of 47 outside fires, one had recorded property loss, with a combined $500 in losses.

ATTACHMENT III: CALL TYPE IDENTIFICATION

When available, NFIRS data serves as our primary source for assigning call categories. For 4,785 non-mutual aid calls, NFIRS incident type codes were used to assign call types for canceled, EMS, fire, and motor vehicle accident (MVA) calls. Table 5-23 summarizes the method used to identify call types. For 45 additional calls without NFIRS incident types, the CAD data's nature description was used as described in Table 5-24. In both tables, the 25 mutual aid calls were not included.

TABLE 5-23: Call Types by NFIRS Incident Type Code and Description

Call Type	Code	Description	Count
Canceled	611	Dispatched and canceled en route	193
	622	No incident found on arrival	18
False Alarm	700	False alarm or false call, other	6
	711	Municipal alarm system, malicious false alarm	3
	713	Telephone, malicious false alarm	3
	714	Central station, malicious false alarm	2
	715	Local alarm system, malicious false alarm	8
	721	Bomb scare	1
	730	System or detector malfunction, other	4
	731	Sprinkler activated due to the failure or malfunction	9
	733	Smoke detector activation due to malfunction	53
	734	Heat detector activation due to malfunction	5
	735	Alarm system activation due to malfunction	32
	736	Carbon monoxide detector activation due to malfunction	18
	740	Unintentional transmission of alarm, other	4
	741	Sprinkler activation (no fire), unintentional	15
	742	Extinguishing system activation	1
	743	Smoke detector activation (no fire), unintentional	89
	744	Detector activation (no fire), unintentional	25
	745	Alarm system activation (no fire), unintentional	101
	746	Carbon monoxide detector activation	14
Good Intent	600	Good intent call, other	3
	651	Smoke scare, odor of smoke, not steam (652)	23
	652	Steam, vapor, fog, or dust thought to be smoke	9
	653	Smoke from barbecue or tar kettle	2
	671	Hazardous material release investigation	39
Hazard	213	Overpressure rupture of pressure or process vessel	1
	221	Overpressure rupture of air or gas pipe or pipeline	1
	223	Overpressure rupture of pressure or process vessel	1
	243	Fireworks explosion	2
	251	Excessive heat, overheat scorch burns with no ignition	6
	400	Hazardous condition (no fire), other	1
	410	Combustible and flammable gas or liquid spills or leaks	1
	411	Gasoline or other flammable liquid spill	4

Call Type	Code	Description	Count
	412	Gas leak	48
	413	Oil or other combustible liquid spill	5
	420	Toxic chemical condition, other	1
	421	Chemical hazard	1
	422	Chemical spill or leak	4
	423	Refrigeration leak	2
	424	Carbon monoxide incident	35
	440	Electrical wiring/equipment problem, other	3
	441	Heat from short circuit	7
	442	Overheated motor or wiring	10
	443	Breakdown of light ballast	3
	444	Power line down	12
	445	Arcing, shorted electrical equipment	7
	461	Building or structure weakened or collapsed	2
	462	Aircraft standby	4
	463	Vehicle accident, general cleanup	20
Medical & Other	311	Medical assist	3,519
Motor Vehicle Accident	322	Motor vehicle accident with injuries	64
	323	Motor vehicle/pedestrian accident	3
	324	Motor vehicle accident with no injuries	104
Outside Fire	130	Mobile property (vehicle) fire, other	1
	131	Passenger vehicle fire	6
	137	Camper or recreational vehicle (RV) fire	1
	140	Natural vegetation fire, other	1
	142	Brush or brush-and-grass mixture fire	2
	143	Grass fire	2
	150	Outside rubbish fire, other	1
	151	Outside rubbish, trash, or waste fire	16
	154	Dumpster or other outside trash receptacle fire	12
	155	Outside stationary compactor or compacted trash fire	1
	160	Special outside fire, other.	1
	162	Outside equipment fire	2
Public Service	510	Person in distress, other	2
	511	Lock-out	3
	512	Ring or jewelry removal, without transport to hospital	1
	521	Water (not people) evacuation	2
	522	Water or steam leak	3
	531	Smoke or odor removal	31
	542	Animal rescue	2
	551	Assist police or other governmental agency	9
	552	Police matter	2
	553	Public service	22

Call Type	Code	Description	Count
	554	Assist invalid	1
	555	Defective elevator, no occupants	2
	561	Unauthorized burning	2
	571	Cover assignment	2
	911	Citizen's complaint	3
Structure Fire	111	Building fire	30
	113	Cooking fire	31
	115	Incinerator overload or malfunction	1
	116	Fuel burner/boiler, delayed ignition or malfunction,	1
	118	Trash or rubbish fire in a structure	16
	121	Fire in mobile home used as a fixed residence	4
Technical Rescue	331	Lock-in	2
	341	Extrication of victim(s) from building or structure,	2
	352	Extrication of victim(s) from vehicle	3
	353	Removal of victim(s) from stalled elevator	6
	355	Confined space rescue	1
	356	High-angle rescue	1
	361	Swimming/Recreational water areas rescue	1
	381	Rescue or EMS standby for hazardous conditions	2
Total			**4,785**

TABLE 5-24: Call Type by CAD Nature

Call Type	Call Description	Calls
False alarm	Fire - Alarm	5
	Fire - Alarm Waterflow	2
Hazard	Fire - Public Works	2
	Fire - Smoke/Odor/Chemical	3
Medical and Other	Ambulance Request	16
	Gunshots	1
	Welfare Check	2
Motor Vehicle Accident	Accident – No Injuries	3
	Accident – W/Injuries	2
Outside Fire	Fire - Grass/Brush	1
Public Service	Animal Call	1
	Assist Public	2
	Domestic	1
	Public Works	1
	Stalled Vehicle	1
	Terrorizing	1
	Warrant Service	1
Total		**45**

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