

Operational and Administrative Analysis

Northville City Fire Department

Northville, MI
Plymouth, MI

February 2024



CPSM[®]

CENTER FOR PUBLIC SAFETY MANAGEMENT, LLC
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Exclusive Provider of Public Safety Technical Services for
International City/County Management Association

THE ASSOCIATION & THE COMPANY

The International City/County Management Association is a 110-year old, nonprofit 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 its 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. 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.

ICMA 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) was spun out as a separate company. It 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, and others.

The Center for Public Safety Management, LLC, maintains the same team of individuals performing the same level of service as when it was a component of 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 align department operations with industry best practices. We have conducted 341 such studies in 42 states and provinces and 246 communities ranging in population from 8,000 (Boone, Iowa) to 800,000 (Indianapolis, Ind.).

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SECTION 1. INTRODUCTION

The Cities of Northville and Plymouth, MI contracted with the Center for Public Safety Management LLC (CPSM) to complete an analysis of the Northville City Fire Department (NCFD).

The NCFD provides service to the City of Northville as the city's fire department, and the City of Plymouth through contractual agreement.

The service demands and challenges generated by the community are numerous for the fire department and include fire protection; EMS first response and transport (secondary); technical rescue; severe winter weather; urban response district; special events, transportation emergencies to include vehicle traffic and freight rail, and other non-emergency responses typical of urban fire departments.

A significant component of this report is the completion of an organizational assessment that includes the organizational structure; training and education; strategic and succession planning; organizational communication; organizational strengths, weaknesses, issues, and challenges; health safety and wellness of staff; and operational staffing. The organizational assessment and recommendations are focused on organizational improvement and sustainability of personnel.

Included also is a risk profile of each community, which contemplates many factors that cause, create, facilitate, extend, and enhance risk in and to a community. The risk profile is important in that it links directly to deployment of fire and EMS assets.

The response time and staffing components discussion of this report are designed to examine the current level of service provided by the NCFD compared to national best practices. As well, these components provide incident data and relevant information to be utilized for future planning and self-review of service levels for continued improvement. This analysis is intended to help the department meet community expectations and mitigate emergencies effectively and efficiently. CPSM has provided several operational staffing alternatives and recommendations.

Other significant components of this report are an analysis of the current deployment of resources and the performance of these resources in terms of response times in the NCFD fire management zones, which include the cities of Northville and Plymouth; a comprehensive review of the current ISO Public Protection Classification report; current staffing levels and patterns; critical tasking elements for specific incident responses and assembling an effective response force; and community risk reduction.

Throughout our analysis, and more specifically when analyzing the response travel time and operational deployment of resources, CPSM utilized two national benchmarks: the *Insurance Services Office - Public Protection Classification (ISO-PPC)* rating system, and *NFPA 1720, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operations to the Public by Volunteer Fire Departments*, 2020 edition. Both are important national benchmarks. Although both are primarily focused on fire protection, it is important to understand they are independent of one another.

The Insurance Services Office (ISO), a subsidiary of Verisk Analytics 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. The Verisk hazard mitigation team collects and evaluates information from communities across the United States regarding their capabilities to provide municipal fire protection. This information is analyzed utilizing the Fire Suppression Rating System from which individual section credits and points are tabulated and a Public

Protection Classification for the community is assigned. Classifications range from 1 through 10, with one being the highest rating a community can achieve.¹ **Benchmarks include coverage of built-upon land by engine companies and ladder companies, which CPSM utilizes when evaluating response resources.**

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 systems, and the water supply system.

A review of the Northville Fire Protection Service Area (FPSA) ISO Report shows the FPSA (Northville and Plymouth) are rated as Class 4 communities. Improvement in areas such as aerial ladder or service company coverage, fire hydrant inspection and flow testing, and NCFD training and available staffing will improve the FPSA's score and potentially may elevate the cities to a Public Protection Class (PPC) Class 3. The current FPSA ranking of an ISO-PPC 4 community corresponds to 7,071 communities in the country and 247 in the state of Michigan.

NFPA 1720 outlines the organization and deployment of operations for volunteer fire departments (paid on call is included in this standard).² This standard serves as a benchmark to measure staffing and deployment of resources to certain building types and emergencies. **Benchmarks include response travel times, which CPSM utilizes when evaluating station placement.**

Based upon CPSM's detailed assessment of the NCFD, it is our conclusion that the department, overall, provides quality fire, EMS, and rescue services. The NCFD staff are professional and dedicated to the mission of the department. This was apparent during our discussions as staff were quite focused on elaborating on both the positives of the organization and the issues and challenges and creating a positive future for the agency.

Organizationally, the NCFD has many issues and challenges, however, that will take significant planning, communication, leadership, and management of core programs to overcome. CPSM has provided recommendations for initial and continuous improvement.

This report also contains a series of observations and planning objectives and recommendations. These are intended to help the NCFD deliver services more efficiently and effectively.

Recommendations and considerations for continuous improvement of the organization and services are included in Section 5: Conclusion, Recommendations & Considerations.

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1. Verisk's Community Hazard Mitigation Services (isomitigation.com)

2. NFPA 1720 is a nationally recognized standard, but it has not been adopted as a mandatory regulation by the federal government or the State of Michigan. It is a valuable resource for establishing and measuring performance objectives for the NCFD but should not be the only determining factor when making local decisions about the city's fire and EMS services.

Analysis Methodology

Data Analysis

The CPSM Fire and EMS Team used numerous sources of data to support our conclusions and recommendations for the NCFD. Information was obtained from the NCFD, the two cities and department members along with information garnered from a CPSM document/information request. Internal sources included data from the computer-aided dispatch (CAD) system for response time and workload information, and the department's National Fire Incident Reporting System (NFIRS) records management system for calls for service. Additional response data was collected from the two EMS ground transport providers: Huron Valley Ambulance (City of Plymouth) and Superior Ambulance (City of Northville).

Stakeholder Interviews

This study relied extensively on stakeholder interviews and interaction with department members and each city. On-site and in-person interviews and virtual meetings were conducted with the Fire Chief, NCFD members, and the two City Managers.

Document Review

CPSM Fire Team consultants were furnished with reports and summary documents by the NCFD. Information on department staffing and deployment of resources; mutual aid; policies and procedures; community risk, community risk reduction; fleet and facilities; training; and additional performance information were reviewed by fire project team staff. Follow-up phone calls, emails and virtual meetings were used to clarify information as needed.

Operational/Administrative Analysis

Over the course of the analysis, numerous analyses were conducted. These included analysis of the organization and organizational culture as a whole; emergency operations; department leadership; community risk reduction; administrative functions; deployment of apparatus from a coverage perspective as benchmarked against national standards; and operational staffing benchmarked against national standards as it relates to assembling an effective response force. The CPSM Fire Team engaged all facets of department operations from a ground floor perspective and as well from a leadership and management perspective.

Staffing Analysis

In virtually all CPSM fire studies, we are asked to identify appropriate staffing and resource deployment levels. This is the case in this analysis as well. In this report we discuss operational workload; critical tasking; assembling an effective response force; operational deployment, the feasibility of additional staffing assets to improve response coverage; and other factors to be considered in establishing appropriate staffing levels. Staffing alternatives are based upon our comprehensive evaluation of all relevant factors and are benchmarked against national standards such as the National Fire Protection Association (NFPA) 1720 Standard, ISO Public Protection Classification rating system, and the Center for Public Safety Excellence, Standards of Cover.

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SECTION 2. AGENCY CHARACTERISTICS

Northville City Fire Department

The Northville City Fire Department (NCFD) is a combination fire department that employs a full-time Fire Chief and paid-on-call (POC) officer and Fire & EMS operational response staff. POC refers to members who are compensated only when responding to calls for service, training, on premise station staffing, details, and assigned administrative duties.

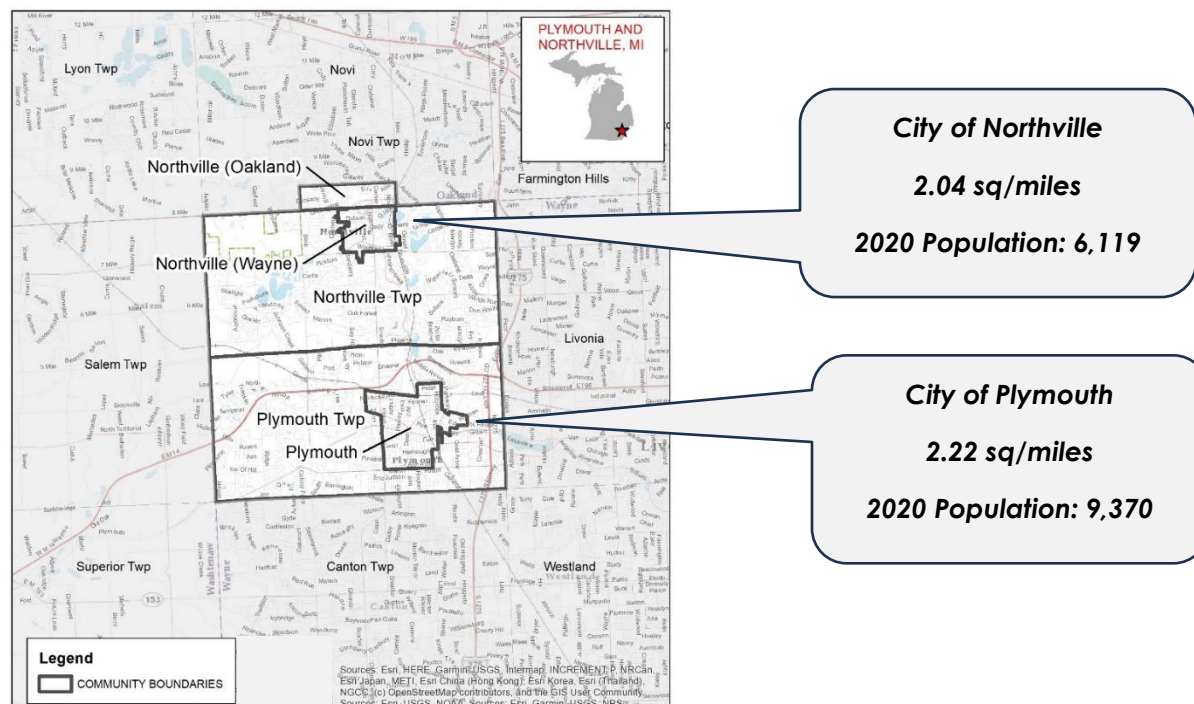
Historically, the City of Northville has provided municipal fire services through the NCFD to its citizens and businesses. Service has grown from volunteer membership to the current POC staff and a fulltime Fire Chief.

The city of Plymouth, after reviewing contractual services with Plymouth Township in 2010 and 2011, opted to contract fire services with the City of Northville. The NCFD began providing contract fire services to the City of Plymouth on January 1, 2012.

Today, the City of Northville has one primary station where fire suppression and EMS apparatus respond from. The City of Plymouth has one primary station where fire suppression and EMS apparatus respond from as well as one auxiliary station where a ladder apparatus and engine apparatus are housed for primary response.

As outlined above, geographically, the NCFD serves two municipalities that are not contiguous- the City of Northville, located in Wayne and Oakland Counties, and the City of Plymouth, located in Wayne County. Aggregately, the NCFD serves a geographical area of 4.26 miles and a population of 15,489 (2020 census).

Figure 1: Cities of Northville and Plymouth



As indicated above, the NCFD is led by a Fire Chief who has overall responsibility for the management and leadership of the combined department. The Fire Chief is assisted by a Fire Marshal (part-time) who participates in and oversees the community risk reduction function fire prevention, and public life safety education.

The Fire Chief is also assisted by two Captain positions. These positions are assigned as follows: 1 Captain at the Northville Station; 1 Captain at the Plymouth Station. The Captain positions are designed to serve as Station Captains or Station Commanders. Responsibilities include overall station command and organization; staff preparedness; apparatus preparedness; incident command on emergency responses; employee relations from a leadership and management perspective; community engagement at events; safety compliance; liaison with public safety leaders from mutual aid and EMS agencies; and ensuring effective communication and liaison with the Fire Chief, the City Managers, and regional public safety officials to name a few of the more important responsibilities. ***It was communicated to CPSM that not all of these responsibilities are spelled out and/or are the positions held accountable to carry out in support of the NCFD and the Fire Chief.***

At the time of this study, the two Captain positions were vacant.

Assisting the two Captains carry out the emergency and non-emergency functions of a fire department are Lieutenant positions. In total there are six Lieutenants with three assigned to the Northville station and three assigned to the Plymouth primary station. Lieutenants are designed to be program managers and first-line supervisors. Responsibilities include city and/or program assignments of training; fire prevention and investigation; public life safety education; incident command on emergency responses; apparatus checkoff and maintenance; staffing assignments; logistics; safety compliance; completion of run reports; liaison with public safety personnel and officers responding into each's jurisdiction; employee relations from a first line supervisor perspective; and ensuring effective communication and liaison with the Fire Chief to name a few of the more important responsibilities. This level in the organization will also assist with fire prevention code inspections if certified to do so. ***It was communicated to CPSM that not all of these responsibilities are spelled out and/or are the positions held accountable to carry out in support of the NCFD and the Station Captains.***

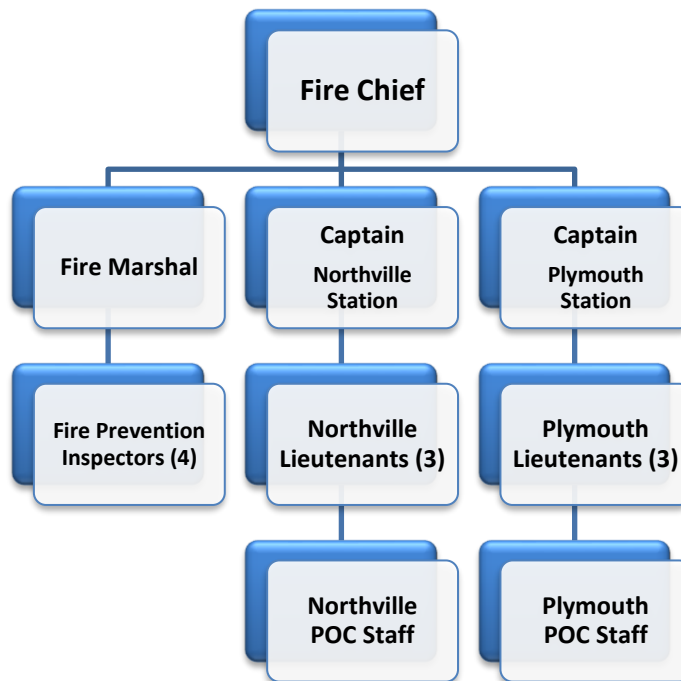
At the time of this study, two Lieutenant positions at the Northville station were vacant, and one Lieutenant position in Plymouth was vacant.

Rounding out the staffing for the NCFD is the line staff. Line staff includes POC personnel that are trained in the firefighter discipline; the EMS discipline; and the those that are dual trained in the firefighter and EMS disciplines. Currently (as of January 2024) there are twenty POC line staff members assigned to the Northville station and twenty-two line staff members at the Plymouth station. This level in the organization will also assist with fire prevention code inspections if certified to do so. Agregately there are 42 POC members. The NCFD can have as many as 60.

Hourly pay rates (effective January 2023) are as follows (does not include cadet members):

Call Response.	\$25.58/hour
Training, details, on-premises staffing; fire prevention work; all other work assigned.	\$16.26/hour
Stipend for Fire Marshal and Captain positions.	\$2,889.58 (paid quarterly).
Stipend for Lieutenant positions.	\$1,938.84 (paid quarterly)

Figure 2: NCFD Organizational Chart



The key elements of the NCFD include:

- Fire protective services.
- Fire prevention Inspections.
- Community outreach and life safety education.
- Fire cause and origin (initial investigation).
- Fleet, facility, and logistical support and management.
- EMS first-tier response (ALS level).
- EMS ground transport as needed.
- Hazardous materials and technical rescue response and mitigation.
- Employee training and education.
- Special event support.

Interlocal Agreement³

The City of Plymouth engages the City of Northville for fire services through an interlocal agreement. Through this agreement the City of Northville, and more directly, the Northville City Fire Department provide oversight and staffing for specific fire services as outlined in the agreement. Key operational and budgetary items in the agreement include:

- Apart from mutual aid agreements, neither party will enter into any other agreements for fire service with any other municipality, community, or entity with consent from the other party.
- NCFD level of service includes fire suppression, fire safety inspections, and fire prevention education. The level of service for each city will be the same.

3. Interlocal Fire Service Agreement between The City of Northville and The City of Plymouth.

- Aggregate staffing for both stations shall consist of 60 part-time, paid on-call firefighters, all of whom are considered employees of Northville and fall under Northville's personnel regulations.
- EMS response will be requested from private providers and/or mutual aid.
- The NCFD is administered by Northville to include the annual budget. Plymouth has an opportunity to provide comments during NCFD budget preparation. Administrative and financial documents are furnished to the Plymouth City Manager on request.
- The agreement outlines an intent for the NCFD to operate under a single set of ordinances in both cities and describes how each city will collaborate to accomplish this and includes response to calls, use of equipment and apparatus and establishment and enforcement of building and safety codes.
- Cost sharing includes:
 - The percentage of Plymouth's budget portion is based on runs attributable to Plymouth from the previous year.
 - Apparatus except the aerial apparatus used by the NCFD will be paid for and titled by the city in which the apparatus is initially stationed. Cost in excess of \$70,000 to be reviewed by the Fire Advisory Board. All apparatus requires Northville approval and is the responsibility of the NCFD.
 - Any aerial apparatus purchased after July 1, 2015, will be procured on a cost share basis. Cost share formula same as budget share formula-based on runs attributable to Plymouth from the previous year.
- Plymouth shall own and have equity in all apparatus pursuant to the agreement, and any equipment as part of initial start-up costs and any improvements to the Plymouth stations. All other ownership and equity in any other equipment, apparatus, or other property shall solely be that of Northville.
- Termination of Agreement (Section 10c)

Upon the termination of the Agreement by the expiration of its term, or by mutual consent of the parties to this Agreement, each party will keep whatever item and/or asset that that party is in possession of at the time of termination of this Agreement. If the parties mutually share an item and/or asset at the time of the termination of the Agreement, the party who keeps the item and/or asset shall pay to the other party fifty percent (50%) of the current value of the item and/or asset at the time of termination of the Agreement. Provided, however, that the ownership and use of the aerial apparatus referenced in section 6(f) shall be as provided for in that section.

Fire Advisory Board⁴

A Fire Advisory Board consisting of elected and appointed officials from each city reviews operations and the financial affairs of the department and makes recommendations regarding the provision of services in accordance with the Interlocal Fire Service Agreement established between the two cities. Key items regarding the Fire Advisory Board include:

- Each of the cities shall participate as such: each city shall appoint one elected official for a two-year term; each city's City Manager shall be a member; the two elected officials and the

4. *ibid*

two City Managers will select a fifth member who has fire service experience-this member shall serve a two-year term.

- Review the NCFD budget prior to budget submission to the Northville City Council. The purpose of the review is to make suggestions or recommendations as deemed appropriate.
- Review requests for capital expenditures in excess of \$70,000 and request approval by the city the expenditure is linked to.
- Review and make recommendations on any new full-time NCFD positions.
- Conflict resolution between the parties of the interlocal agreement.
- Recommendations or decisions made by the board are not binding and are reserved to the governing body of each jurisdiction.

Provision of EMS Ground Transportation

City of Plymouth



The City of Plymouth contracts with and has had a relationship with Huron Valley Ambulance (HVA) to provide EMS response and ground transport services since 1989. In addition to regular EMS services, HVA provides community programs and supports special events in the City as requested. HVA was founded in

1981 and serves all of Washtenaw County and portions of Oakland and Wayne Counties with ALS and BLS response and transport services. Additionally, HVA is a CAAS (Commission on Accreditation of Ambulance Services) accredited agency (one of fifteen in the state). HVA is a member of Emergent Health Partners, the parent company who owns and operates five additional ambulance services in southern Michigan, which the Plymouth site can call upon when needed.⁵

City of Northville



The City of Northville contracts with Superior Ambulance Service-Michigan to provide EMS response and ground transport services. Superior Air-Ground Ambulance Service has over sixty years of experience providing EMS services. Currently Superior operates in Michigan, Illinois, Indiana, Ohio, and Wisconsin. In

Michigan, operation sites include Northville, Allen Park, Detroit, Lincoln Park, Novi, Southfield, Taylor, Troy, and Warren, which the Northville site can call upon when needed. Additionally, Superior assists the city with special events as requested. As with HVA, Superior is a CAAS accredited agency and is one of the fifteen in the state to achieve this status.

As a note, beginning 2/1/2024, Northville began utilizing Huron Valley Ambulance as their primary EMS ground transport provider. This arrangement will remain in place during a near term period as the Northville City Council considers a current Superior Ambulance financial proposal.

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5. About - Huron Valley Ambulance - Emergent Health Partners

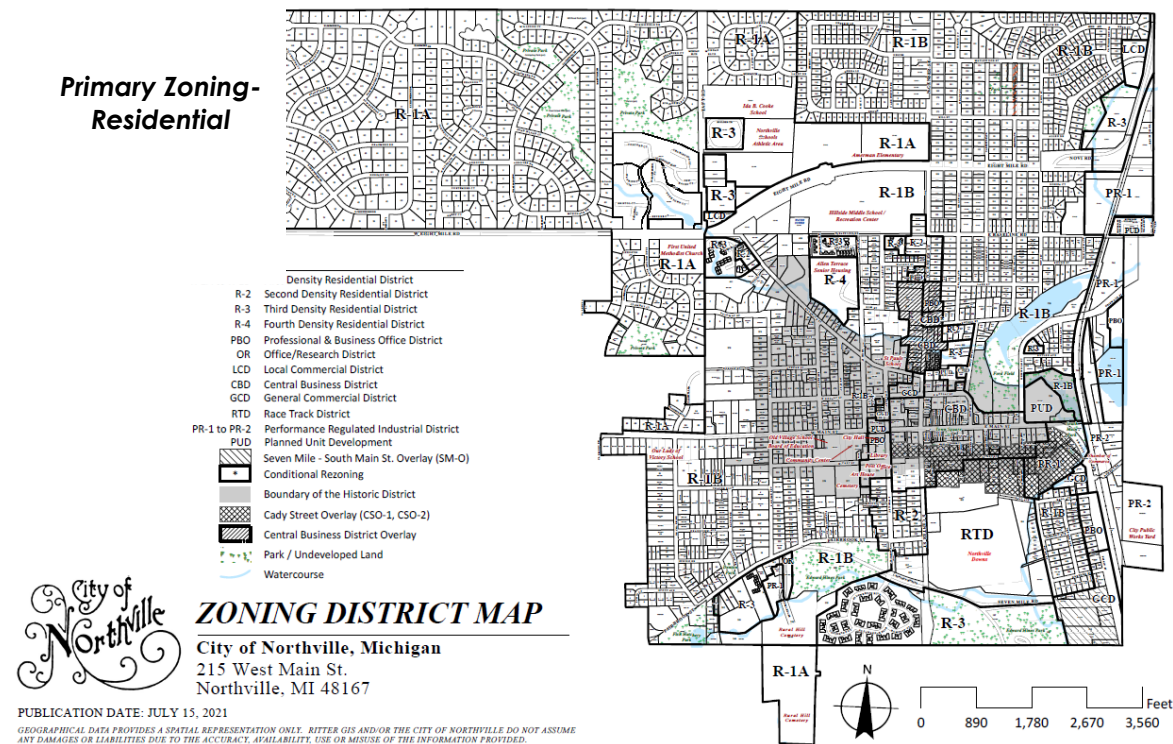
NCFD-Northville Overview

The NCFD-Northville service area consists of 2.04 square miles of urban area. This was a 2.29 percent increase from the 2010 population of 5,970. The 2020 population was 6,119 (U.S. Census). There are 3,001 people per square mile and 2.30 persons/household (2018-2022 average).

The largest percentage of building risk in Northville is single family dwellings (low risk as classified by the National Fire Protection Association-Fire Protection Handbook, 20th edition). These buildings are primarily wood frame construction, and many have basements.

Northville does have medium and high risk occupancies to include schools (4), skilled nursing facility (1), places of public assembly, multi-family residential to include buildings of more than two floors (one is 4 floors), strip malls (10), and mercantile buildings that use or may store hazardous materials. The predominant construction type of apartment buildings (15 buildings) is wood frame. Future sub-area planning identifies residential multi-family and mixed use buildings up to three stories. There are no high rise buildings in Northville.

Figure 3: Northville Zoning District Map



Northville is also prone to certain environmental risks to include severe winter snowstorms; ice storms (at least ½ inch or more); flooding; sever wind/tornado; washouts; and extreme temperatures. Other risks include active shooter; cyber-attack; pandemic; haz-mat release (static or in transportation); major transportation accident; critical infrastructure failure; sustained power outage; animal disease/foreign animal disease; major fires (non-wildfire).⁶

6. Wayne County Comprehensive Emergency Management Plan, 2019.

Northville does not have any major arterials that pass through the city such as freeways or highways. The current road network consists of:⁷

- Primary arterial roads: run long distances and service travel movements to important traffic generators.
- Minor arterial roads: similar to major arterial but with trips that are shorter distances and to lesser traffic generators.
- Major collector roads: funnel traffic from residential areas to arterial roads.
- Local roads: neighborhood streets that provide access to residences.

The road and transportation network described herein for the City of Northville poses risks for a vehicular accident, some at medium to greater than medium speeds, as well as vehicular-versus-pedestrian risks. There are additional transportation risks since tractor-trailers and other commercial vehicles traverse the roadways of Northville to deliver mixed commodities to business locations. Fires involving these products can produce smoke and other products of combustion that may be hazardous to health.

The city also has a rail line that runs north-south along the eastern municipal boundary. Lake State Railway Company primarily uses this rail line. Typical commodities include grain, fertilizer, coal, chemicals, cement, steel, forest products, machinery, petroleum products, plastics, and scrap metal. The rail line in Northville is a pass through line from interchange locations in Plymouth (with CSX Transportation), Flint and Port Huron (Canadian National), and Bay City and Saginaw (Huron and Eastern Railway and Mid-Michigan Railway).

Fires involving the potential freight commodities passing through the city can produce smoke and other products of combustion risks that may be hazardous to health. Hazardous materials (existing or waste) themselves present hazards to health risks if being transported and involved in a rail accident. Additionally, there are at-grade vehicle/rail crossings in the city presenting rail-vehicle and rail-pedestrian risks.

Estimated fire loss for the Northville service area for the years 2019-2022 is:

- 2019: \$11,000
- 2020: \$417,000
- 2021: \$0.00
- 2022: \$38,000

As discussed earlier, operational staffing for NCFD-Northville includes:

- Station Captain: 1
- Lieutenants: 3
- POC line staff: 20 as of January 2024

NCFD-Northville has a fleet compliment that includes:

- Engine Apparatus: 2

7. City of Northville Master plan-July 2018.

- Quick Response Vehicle: 1 (Includes a fire pump and 300 gallon tank)
- Ambulance-BLS Transport: 1

The NCFD-Northville fire facility is located at 215 Main Street and is connected to the City Hall facility. The facility consists of five vehicle bays (single vehicle) and are non-drive through. A CO capture system is in place (best practice). Generally, members congregate in the rear of the apparatus bays where the majority of the living space is. During the CPSM site visit, station renovation was taking place in an area between the fire facility and the City Hall facility. This renovation is for living and office space for company personnel. There is a bunking area for overnight staffing, however during the site visit CPSM did not note gender separation for bunking or bathroom/locker room facilities.

NCFD-Plymouth Overview

NCFD-Plymouth consists of 2.22 square miles of urban area. The 2020 population was 9,370 (U.S. Census). This was a 2.60 percent increase from the 2010 population of 9,132. There are 4,236 people per square mile and 2.20 persons/household (2018-2022 average).

Like Northville, the largest percentage of building risk in Plymouth is single family dwellings (low risk as classified by the National Fire Protection Association-Fire Protection Handbook, 20th edition). These buildings are primarily wood frame construction, and many have basements.

Plymouth does have medium and high risk occupancies to include schools, skilled nursing facility, places of public assembly, multi-family residential and mixed use to include buildings of more than two floors and residential over commercial, strip malls, and mercantile buildings that use or may store hazardous materials. Included in the building risks is an auto glass manufacturer that occupies a large manufacturing building.

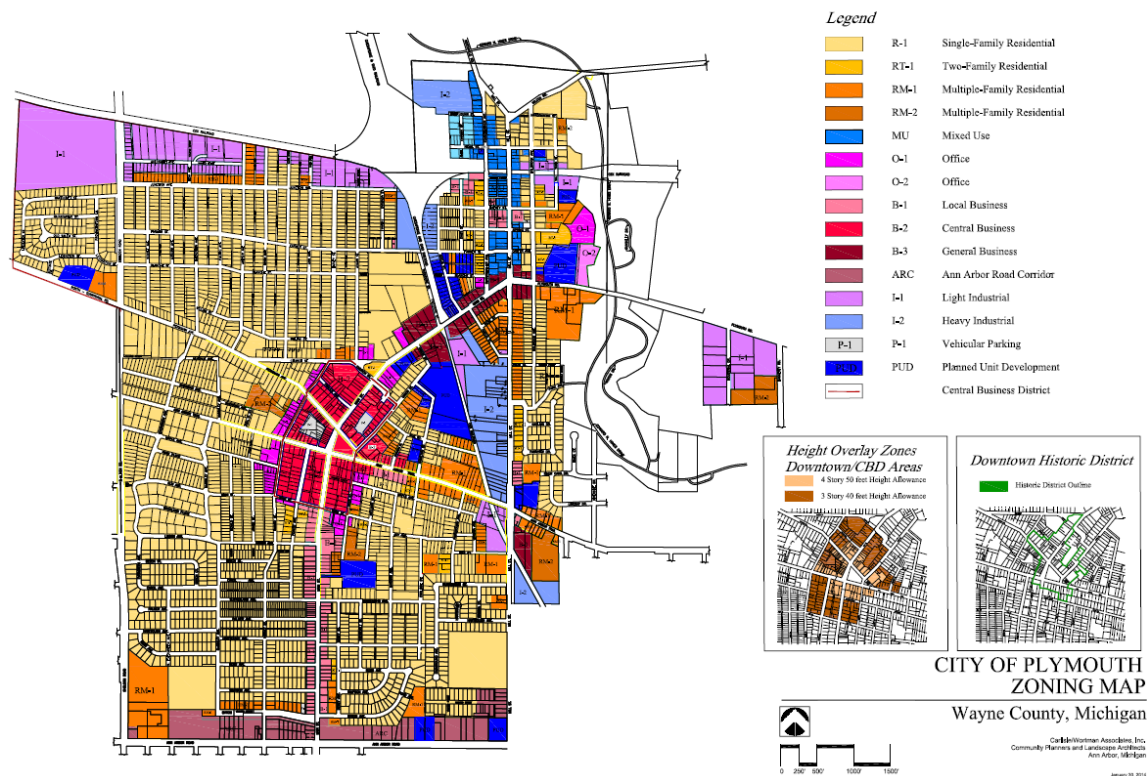
There are no high rise buildings in Plymouth (defined as buildings 75' or more above the lowest level of fire department vehicle access). Plymouth does have buildings that are at least 4 stories high.

Specifically, Plymouth has the following building risks:

- Single Family Dwellings: 3,578
- Apartment Units: 1,066
- Commercial and Industrial Buildings: 493
- Strip Malls: 21
- Nursing Homes: 3
- Senior Living Buildings: 2
- Schools: 3

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Figure 4: Plymouth Zoning Map



Plymouth is prone to the same environmental risks as Northville and include severe winter snowstorms; ice storms (at least ½ inch or more); flooding; sever wind/tornado; washouts; and extreme temperatures. Other risks include active shooter; cyber-attack; pandemic; haz-mat release (static or in transportation); major transportation accident; critical infrastructure failure; sustained power outage; animal disease/foreign animal disease; major fires (non-wildfire).⁸ Additionally, there is a Buckeye Partners petroleum pipeline on the eastern edge of the city that transports petroleum products.

Plymouth does not have any major arterials that pass through the city such as freeways or highways. The current road network consists of:⁹

- Principal arterial roads: run relatively long distances and service travel movements to important traffic generators.
- Major collector roads: funnel traffic from residential areas to arterial roads with some providing direct access to residences.
- Minor collector roads: serve more through-traffic than a local road but are not as heavily traveled as a major collector.
- Local roads: neighborhood streets that provide access to residences.

The road and transportation network described herein for the City of Plymouth poses risks for a vehicular accident, some at medium to greater than medium speeds, as well as vehicular-

8. Wayne County Comprehensive Emergency Management Plan, 2019.

9. City of Plymouth Master Plan-September 2018.

versus-pedestrian risks. There are additional transportation risks since tractor-trailers and other commercial vehicles traverse the roadways of Plymouth to deliver mixed commodities to business locations. Fires involving these products can produce smoke and other products of combustion that may be hazardous to health.

The city also has rail lines that run north-south (eastern half of the city) and east-west (northern area of the city). This rail line is primarily used by CSX Transportation. In the northern area of the city CSX has a junction where trains can run north-south or east-west. Additionally, CSX operates a small classification yard at this junction. Classification yards are utilized to separate rail freight cars that enter the yard, onto one or more tracks. The rail cars are then sorted by destination, joined together to form a freight haul to the specified destination(s). Typical commodities include grain, fertilizer, coal, chemicals, cement, steel, forest products, machinery, petroleum products, plastics, and scrap metal.

Fires involving the potential freight commodities passing through the city can produce smoke and other products of combustion risks that may be hazardous to health. Hazardous materials (existing or waste) themselves present hazards to health risks if being transported and involved in a rail accident. Additionally, there are at-grade vehicle/rail crossings in the city presenting rail-vehicle and rail-pedestrian risks.

Estimated fire loss for the Plymouth service area for the years 2019-2022 is:

- 2019: \$220,000
- 2020: \$8,000
- 2021: \$130,500
- 2022: \$226,040

As discussed earlier, operational staffing for NCFD-Plymouth includes:

- Station Captain: 1
- Lieutenants: 3
- POC line staff: 22 as of January 2024

NCFD-Plymouth has a fleet compliment that includes:

- Engine Apparatus: 2
- Quick Response Vehicle: 1 (Includes 1,250 gpm fire pump and 250 gallon tank)
- Ladder Apparatus: 1 (101' Aerial Tower)
- Ambulance-BLS Transport: 2 (1 owned by City; 1 owned by Huron Valley Ambulance)

The NCFD-Plymouth primary fire facility is located at 201 S. Main Street and is connected to the City Hall facility. The facility consists of three vehicle bays with one as a drive through. A CO capture system is in place (best practice). This facility has an office, kitchen/day room, training room (shared with Plymouth Police), and unisex locker room. Renovation to create a bunkroom for overnight on-premises staffing is occurring. This facility houses one engine, one quick response vehicle, and two ambulances.

A second station in Plymouth is located at 186 E. Spring Street. This facility consists of two apparatus bays (non-drive thru). Additional space consists of an office, turnout gear storage

and turnout gear extractor and dryer. This facility has an additional storage area for supplies and a bunkroom that can be utilized as needed. This facility houses the NCFD aerial apparatus and an additional engine.

Northville and Plymouth Call Demand

The service demands on the department generated from the service area are numerous and include EMS first response; fire suppression; technical rescue; hazardous materials; transportation emergencies, service calls, and other non-emergency responses typical of urban fire departments.

CPSM analyzed NCFD, HVA, and Superior Ambulance workload for a one year period (July 1, 2021-June 30, 2022). In all the NCFD responded to 2037 incidents; Superior Ambulance responded to 412 incidents in Northville; HVA responded to 737 incidents in Plymouth.

Table 1: NCFD Fire Incident Workload by Call Type (Both Cities)

Call Type	Total Calls	Calls per Day
False alarm	161	0.4
Good intent	25	0.1
Hazard	288	0.8
Outside fire	12	0.0
Public service	123	0.3
Structure fire	21	0.1
Technical rescue	11	0.0
Fire Subtotal	641	1.8

Key Points

- 33% of all calls in the NCFD service area are fire related calls.
- 70% of fire calls were classified as Hazard or False Alarm and represent the largest fire call types aggregately.
- 5% of fire calls were Outside or Structure fire calls.

Table 2: NCFD EMS Workload by Call Type

Call Type	Total Calls	Calls per Day
Breathing difficulty	123	0.3
Cardiac and stroke	117	0.3
Fall and injury	285	0.8
Illness and other	427	1.2
MVA	48	0.1
Overdose and psychiatric	127	0.3
Seizure and unconsciousness	187	0.5
EMS Subtotal	1,314	3.6

Key Points

- 67% of all calls in the NCFD service area are EMS related.
- 54% of EMS calls were classified as Illness or Other and Fall & Injury and represent the largest EMS call types aggregately.
- 4% of EMS calls were Motor Vehicle Accident calls.

Included in the overall workload are cancelled calls, which are calls the NCFD was dispatched to, and were cancelled enroute or prior to responding (issue resolved and NCFD not needed). There were 23 canceled calls during the study period (1% of all calls). Additionally, the NCFD provided 82 automatic/mutual aid responses to neighboring jurisdictions (4% of all calls).

In the next tables we analyze 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.

The next table analyzes all work by the NCFD.

Table 3: NCFD Workload by Response City and Mutual Aid

Location	Calls	Percent Calls	Runs	Runs Per Day
Northville	813	39.5	1,493	4.1
Plymouth	1,165	56.6	1,928	5.3
NCFD District Subtotal	1,978	96.0	3,421	9.4
Plymouth Twp	37	1.8	65	0.2
Northville Twp	19	0.9	33	0.1
Novi	20	1.0	29	0.1
Romulus	2	0.1	2	0.0
Salem Twp	4	0.2	5	0.0
Aid Given Subtotal	82	4.0	134	0.4
Total	2,060	100.0	3,555	9.7

Key Points

- Includes 23 canceled calls.
- 59% of NCFD service area calls occurred in Plymouth.
- 41% of NCFD service area calls occurred in Northville.
- 4% of all calls were mutual/automatic aid.

The next table analyzes HVA workload in Plymouth.

Table 4: HVA EMS Workload by Call Type in Plymouth

Run Type	Total Runs	Runs per Day
Breathing difficulty	59	0.2
Cardiac and stroke	95	0.3
Fall and injury	193	0.5
Illness and other	236	0.6
MVA	40	0.1
Overdose and psychiatric	58	0.2
Seizure and unconsciousness	56	0.2
Total	737	2.6

Key Points

- 58% of EMS calls were classified as Illness or Other and Fall & Injury and represent the largest EMS call types aggregately.
- Overall, HVA averaged 2.6 9-1-1 calls/day in Plymouth.

The next table analyzes Superior Ambulance workload in Northville.

Table 5: Superior Ambulance EMS Workload by Call Type in Northville

Run Type	Response			Arrival		
	Runs	Runs per Day	Percentage	Runs	Runs Per Day	Percentage
Breathing difficulty	46	0.1	11.2	39	0.1	13.3
Cardiac and stroke	50	0.1	12.1	41	0.1	13.9
Fall and injury	103	0.3	25.0	71	0.2	24.1
Illness and other	100	0.3	24.3	65	0.2	22.1
MVA	27	0.1	6.6	17	0.0	5.8
Overdose and psychiatric	40	0.1	9.7	25	0.1	8.5
Seizure and unconsciousness	46	0.1	11.2	36	0.1	12.2
Total	412	1.1	100.0	294	0.8	100.0

Key points of the table above include:

- Superior Ambulance made 412 responses to Northville and arrived 294 times (as a note, this table is slightly different than the HVA workload table as this is how the data was reported to CPSM).
- 49 percent of all Superior Ambulance calls in Northville were Illness and Other and Fall & Injury and represent the largest EMS call types aggregately.
- Overall Superior Ambulance was dispatched to 1.1 calls/day into Northville.

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 all Fire and EMS demand in the NCFD service areas which the NCFD responded to. Additional maps provide demand analysis of HVA and Superior Ambulance.

In analysis of the demand maps:

NCFD Fire demand in Northville is concentrated in the central area of the city (in proximity to the fire station), and the southwest and northeast areas as well.

NCFD EMS demand in Northville is concentrated in the central area of the city (in proximity to the fire station and in the northern and northeast areas as well.

NCFD Fire demand in Plymouth is concentrated in the central south area of the city as well as the northwest quadrant.

NCFD EMS demand in Plymouth is concentrated in the central, central south, and southern areas of the city. There is also heavier demand in the northeast quadrant as well.

HVA EMS demand in Plymouth is concentrated in the same areas of NCFD-Plymouth. **As a note, CPSM did not receive addresses for all HVA calls in Plymouth.**

Superior Ambulance demand in Northville is concentrated in the central area of the city, with moderate demand in the north and northeast areas as well. As with the HVA data CPSM

received, not all addresses for Superior Ambulance incidents in Northville were included in the data we received.

Figure 5: NCFD Fire & EMS Demand in Northville

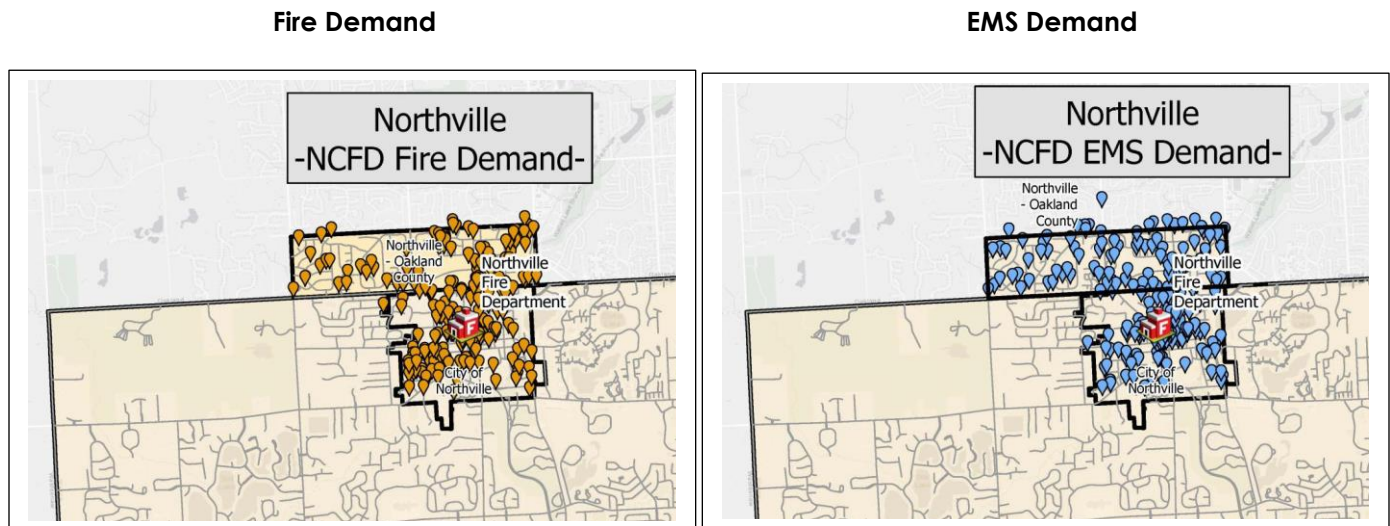
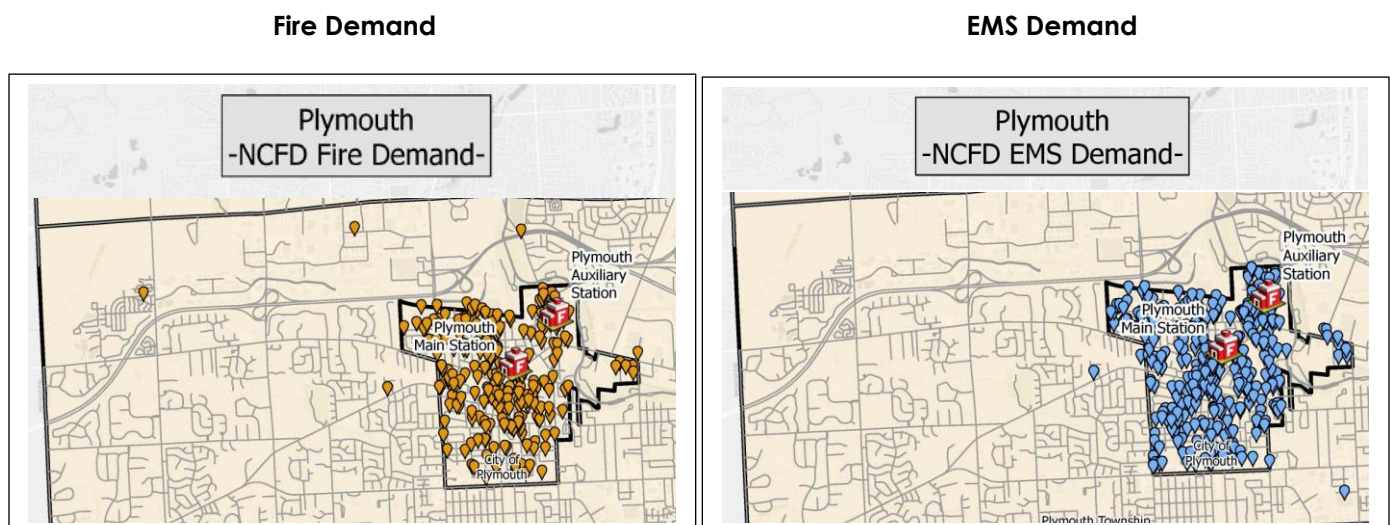
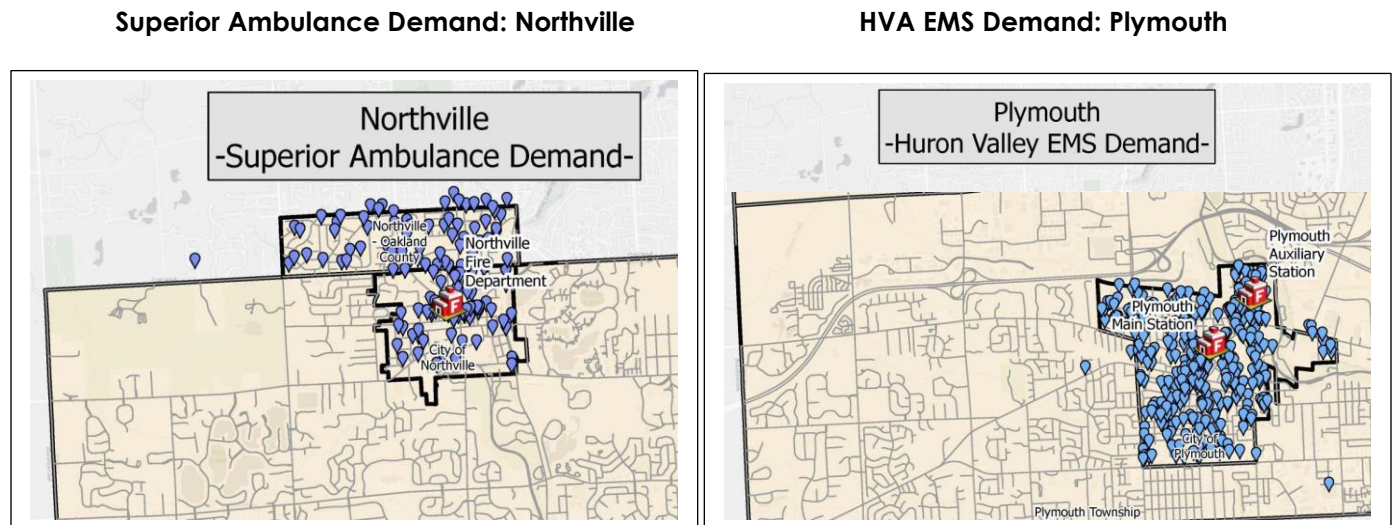


Figure 6: NCFD Fire & EMS Demand in Plymouth



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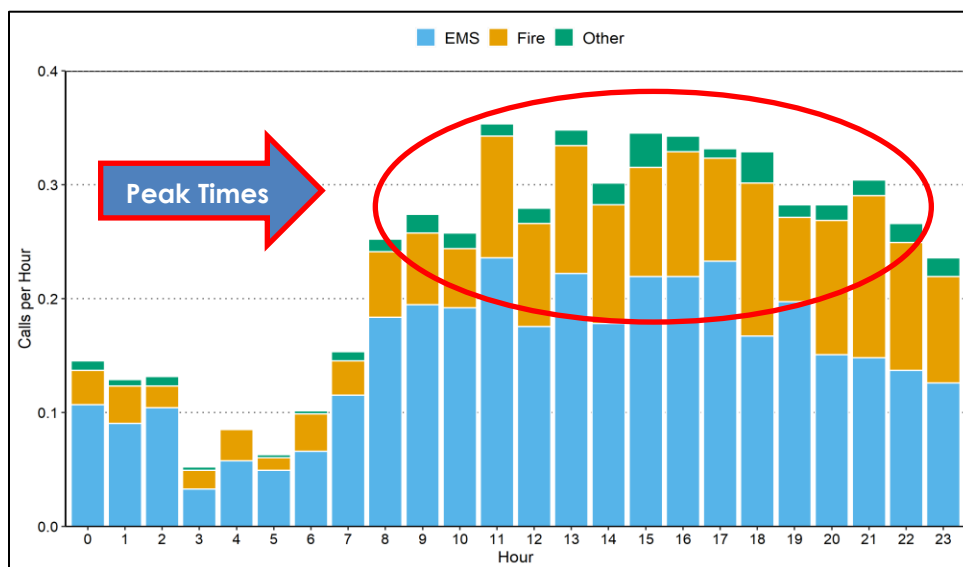
Figure 7: HVA and Superior Ambulance EMS Demand



It is important as well to look at Fire and EMS response activity over time, such as calls by month, calls by hour of the day, and calls by day of the week. ***This analysis is important when contemplating on-premises staffing in a volunteer or paid on-call department.***

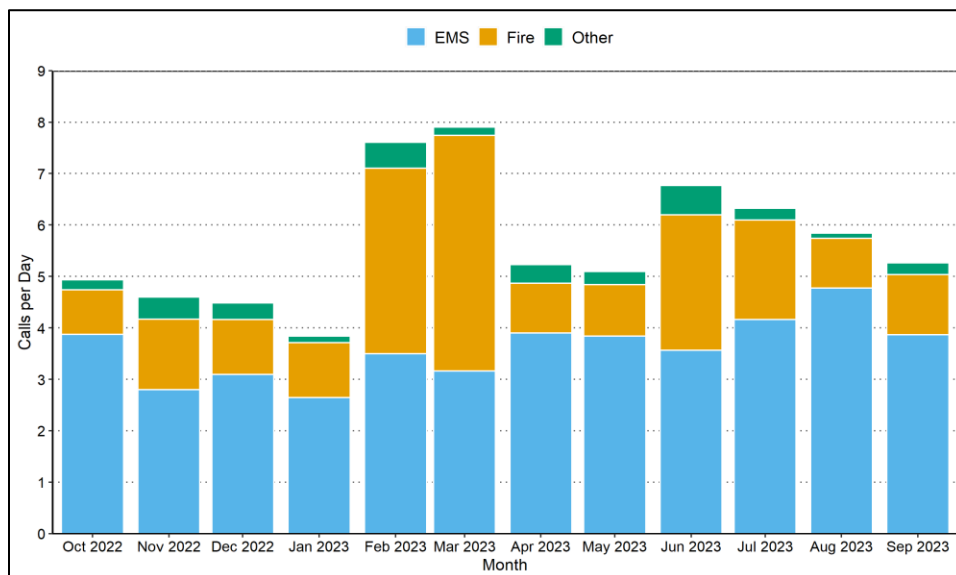
The next figures illustrate this. First, we look at NCFD responses by time of day (calls per hour). As the analysis shows, the NCFD has a higher demand for service between the hours of 9:00 am and 10:00 pm with peaks at 11:00 am, 1:00 pm and 3:00 pm to 6:00 pm.

Figure 8: Calls by Hour of Day



Next, we analyzed the fire and EMS demand by month of the year (calls per day). Demand is consistent during the months of February, March, and again in April and May although demand is lower in these months. Demand peaks again in June, July, August, and September. The lower demand levels are in October, November, and December, with the lowest demand in January.

Figure 9: Calls by Month



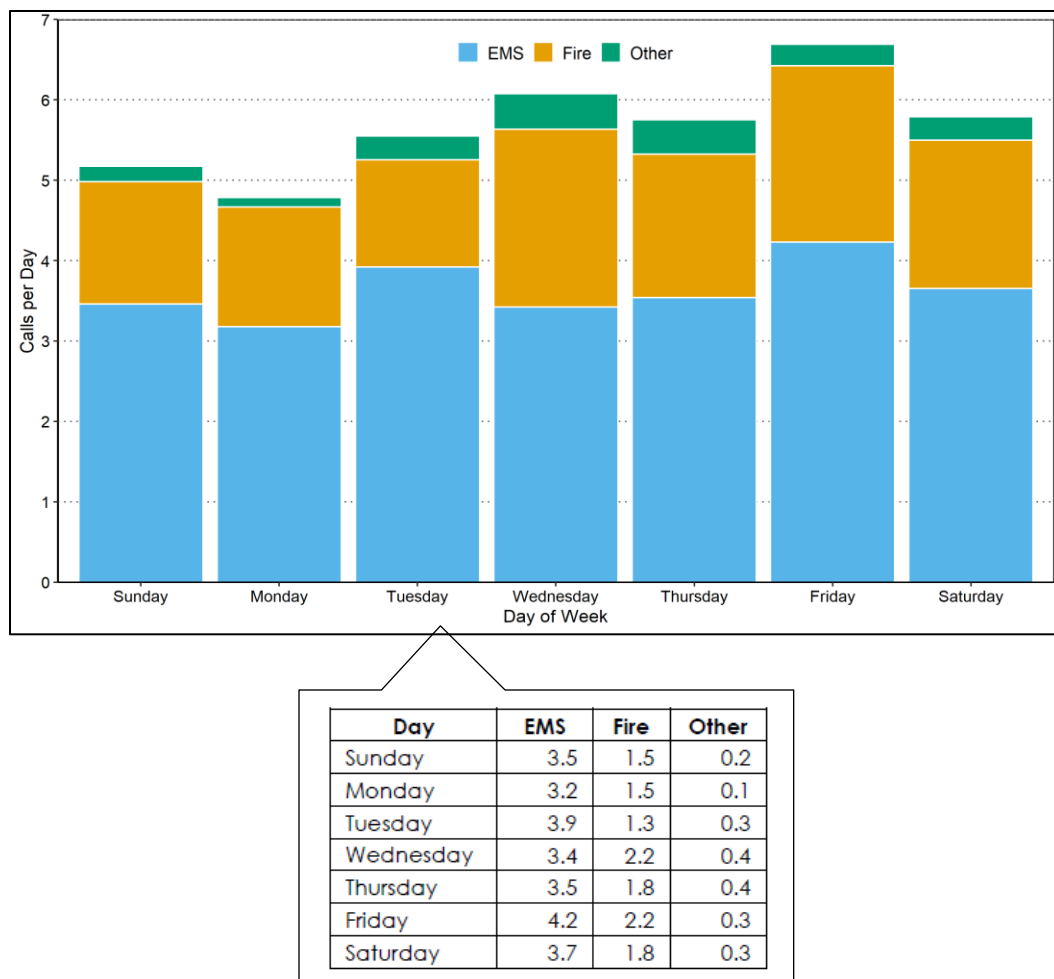
Additionally, the number of units responding to an incident indicates response management of resources (resistance and efficiency), types of calls received (the Fire and EMS risk of the community), and to some degree the availability of human resources. Overall, the NCFD responds primarily with one resource (51.3%), followed by two resources (37.6%) and then rarely three resources (9%) and four or more (2.1%). The next table outlines this data—overall the NCFD has an efficient response pattern.

Table 6: Calls by Call Type and Number of Arriving Units

Call Type	Number of Units				Total
	One	Two	Three	Four or More	
Breathing difficulty	61	51	6	3	121
Cardiac and stroke	65	40	10	0	115
Fall and injury	131	125	21	1	278
Illness and other	220	161	23	2	406
MVA	7	21	14	6	48
Overdose and psychiatric	64	50	11	0	125
Seizure and unconsciousness	83	83	18	1	185
EMS Subtotal	631	531	103	13	1,278
False alarm	80	48	22	7	157
Good intent	10	11	4	0	25
Hazard	167	82	25	8	282
Outside fire	3	6	1	2	12
Public service	72	30	16	4	122
Structure fire	8	7	1	5	21
Technical rescue	6	2	2	1	11
Fire Subtotal	346	186	71	27	630
Canceled	6	3	0	0	9
Mutual aid	37	28	4	1	70
Total	1,020	748	178	41	1,987
Percentage	51.3	37.6	9.0	2.1	100.0

Additionally, CPSM looks at responses by day of the week. The next figure tells us that calls Tuesday through Saturday, with an additional peak on Wednesday and Friday.

Figure 10: Calls by Day of the Week



ISO-PPC Community Rating

In August 2020, the Northville Fire Protection Service Area (Northville FPSA) received an updated Insurance Services Office-Public Protection Classification (PPC) summary report outlining the FPSA's ability to prepare for and combat building fires. The Northville FPSA summary report includes the cities of Northville and Plymouth.

The ISO-PPC hazard mitigation team collects and evaluates information from communities across the United States regarding their capabilities to provide municipal fire protection. This information is analyzed utilizing the Fire Suppression Rating System from which individual section credits and points are tabulated and a Public Protection Classification for the community is assigned. Classifications range from 1 through 10, with one being the highest rating a community can achieve.¹⁰ **The Northville FPSA received a rating of Class 04.** As a note, the City

10. Verisk's Community Hazard Mitigation Services (isomitigation.com)

of Plymouth when evaluated separately in 2014 by the ISO-PPC team received a rating of Class 04 as well.

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 systems, the water supply system that includes an evaluation of available water matched to the amount needed to suppress fires (referred to as fire flow), and community efforts to reduce the risk of fire, including fire prevention codes and enforcement, public fire safety education, and fire investigation programs.¹¹ That said, the ISO-PPC is a measure of the community's ability to prepare for and respond to building fires.

A lower PPC does not always guarantee a lower property insurance rating as many factors feed into the formulas insurance companies utilize to determine property risk rates. However, a PPC rating of 1, 2, or 3 alerts the property insurance underwriter that the service area of the fire department is well-equipped, positioned, and staffed to extinguish, mitigate, and prevent fires. Additionally, although insurance companies may use the Verisk-ISO-PPC information when deciding property insurance premiums, Verisk-ISO has nothing to do with insurance premium pricing.

A community's PPC grade depends on:

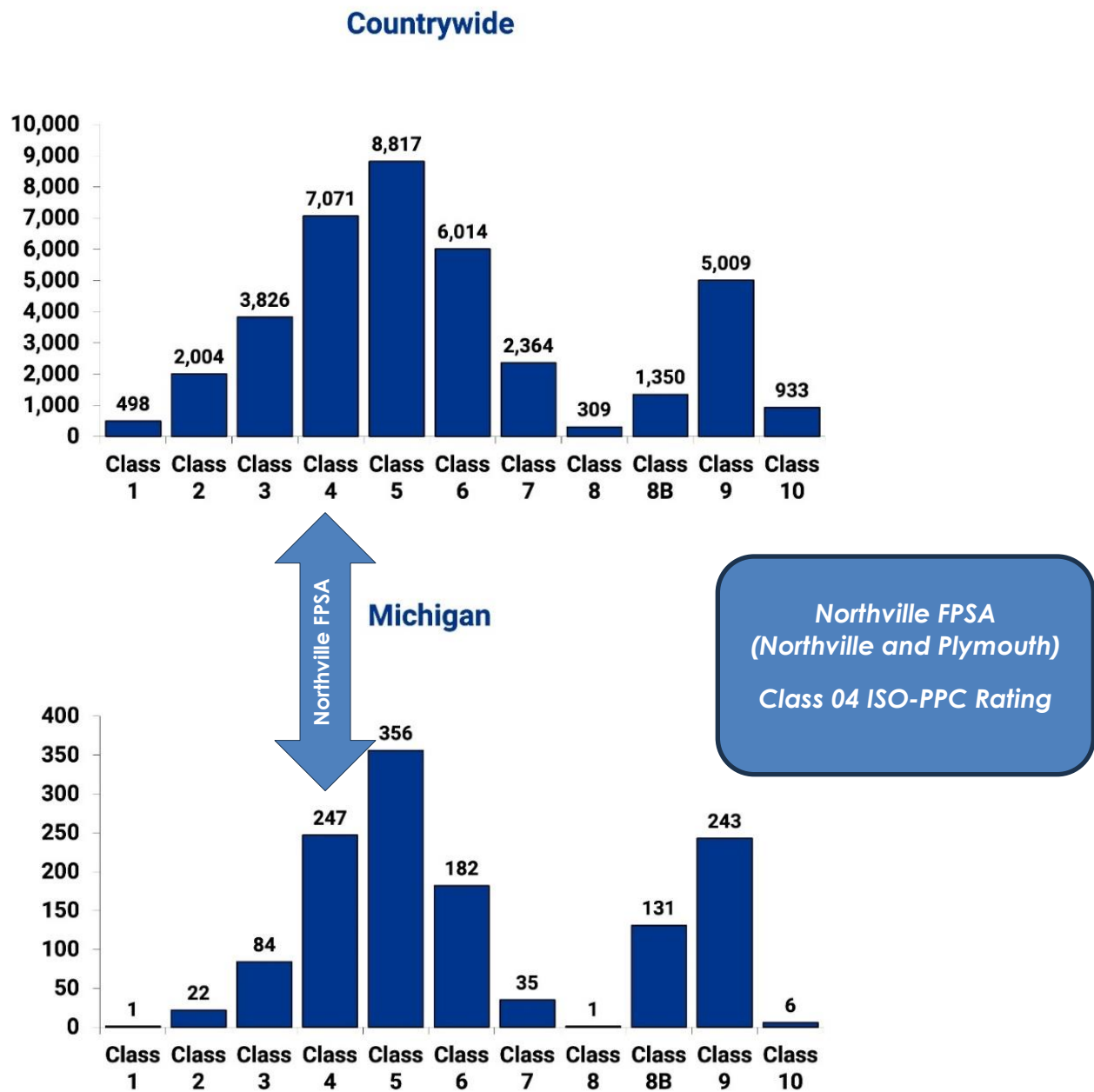
- **Needed Fire Flows** (building locations used to determine the theoretical amount of water necessary for fire suppression purposes).
 - The basic fire flow for Northville FPSA was determined to be 3500 gallons per minute (GPM).
- **Emergency Communications** (10 percent of the evaluation).
 - Northville FPSA: 7.02/10.00 credits earned.
- **Fire Department** (50 percent of the evaluation).
 - Northville FPSA: 28.30/50 credits earned.
- **Water Supply** (40 percent of the evaluation).
 - Northville FPSA: 32.01/40 credits earned.
- **Community Risk Reduction** (Additional credits received for Fire Prevention/Inspection, Public Education, and Fire Investigation activities)
 - 4.13/5.50 credits earned.

Overall, the community PPC rating yielded 66.78 earned credit points/105.50 credit points available. There was a 4.68 point diversion reduction assessed as well, which is automatically calculated based on the relative difference between the fire department and water supply scores. **60.00 points or more qualify a community for a rating of 4.**

The following Figures illustrate the current PPC ratings across the United States and in Michigan.

11. ibid

Figure 11: PPC Ratings in the United States and Michigan¹²



The next Table outlines credits earned by the Northville FPSA.

12. <https://www.isomitigation.com/ppc/program-works/facts-and-figures-about-ppc-codes-around-the-country/>

Table 7: Northville FPSA Earned Credit Overview

FSRS Component	Earned Credit	Credit Available
414. Credit for Emergency Reporting	3.00	3
422. Credit for Telecommunicators	1.99	4
4.32. Credit for Dispatch Circuits	2.03	3
440. Credit for Emergency Communications	7.02	10
513. Credit for Engine Companies	5.71	6
523. Credit for Reserve Pumpers	0.26	0.50
532. Credit for Pump Capacity	3.00	3
549. Credit for Ladder Service	2.52	4
553. Credit for Reserve Ladder and Service Trucks	0.05	0.50
561. Credit for Deployment Analysis	8.00	10
571. Credit for Company Personnel	2.59	15
581. Credit for Training	4.17	9
730. Credit for Operational Considerations	2.00	2
590. Credit for Fire Department	28.30	50
616. Credit for Supply System	24.54	30
621. Credit for Fire Hydrants	2.99	3
631. Credit for Inspection and Flow Testing	4.48	7
640. Credit for Water Supply	32.01	40
Divergence	-4.68	-
1050. Community Risk Reduction	4.13	5.50
Total Credit	66.78	105.50

Areas of scoring that the Northville FPSA and the two cities have control over, and that should be reviewed further internally for improvement and to sustain/improve the current rating include:

- Credit for Company Personnel: #571 (2.59/15.00 credits).

This category reviews the average number of existing firefighters and company officers available to respond to first alarm structure fires. Because the NCFD is paid on-call, and personnel are not always at the station (have restricted availability), the ISO-FSRS grading schedule credits company personnel as follows: *For personnel not normally at the fire station, the number of responding firefighters and company officers is divided by 3 to reflect the time needed to assemble at the fire and the reduced ability to act as a team due to the various arrival times at the fire location when compared to personnel on-duty at the fire station during the receipt of the alarm.* The NCFD received credit for 1.19 personnel on duty and 17.00 on-call personnel responding to first alarm structure fires.

- Training: #581 (A) Facilities and Use (0.00/35 credits).
 - For maximum credit each firefighter should receive 18 hours per year in structure fire-related subjects as outlined in the NFPA 1001 standard at a training facility where props and fire simulation buildings can be used. **The NCFD is not meeting this section, or is, and does not record this training activity.**

- Training: #581 (B) Company Training (11.72/25 credits).
 - For maximum credit, each firefighter should receive 16 hours per month in structure fire-related subjects as outlined in the NFPA 1001 standard. **The NCFD is not meeting this section to their fullest potential or is, and does not record this training activity.**
- Water Supply: #631 (4.48/7)
 - This item reviews the fire hydrant inspection frequency, and the completeness of the inspections in accordance with the AWWA M-17 standard. **The credits received (3.20) means fire hydrants have not been inspected in ten years or more.**
 - This item also reviews the frequency of flow testing of hydrants. **The credits received (3.20) means the hydrants have not been flow tested for ten or more years.**

As a note-water supply is a combined analysis of the FPSA (Northville and Plymouth). Per Plymouth, all hydrants in the city are inspected and checked for operations annually (documented).

Recommendation:

- CPSM recommends deficiencies in the 2020 ISO-PPC report should be included in any planning the NCFD and cities conduct in the near and mid-terms. This should include planning to increase on-premises staffing, improve training deficits that focuses on live fire and live fire related training at a training facility, a focus on company training that includes structural firefighting topics that align with NFPA 1001, and fire hydrant inspection and flow testing that follows a schedule of increased frequency in accordance with the AWWA M-17 standard.

The next figures illustrate the NCFD's coverage of built-upon areas with existing engine and ladder apparatus.

Under this ISO-PPC grading system, a jurisdiction is graded on the distribution of engine and ladder companies within built-upon areas (deployment analysis). For higher or full credit in the Fire Suppression Rating Schedule (FSRS), a jurisdiction's fire protection area with residential and commercial properties should have a first-due engine company within 1.5 road miles and a ladder service company within 2.5 road miles where benchmarked against this standard as outlined above.¹³ As engine and ladder companies both respond from fire facilities, and because engine companies are the more prevalent fire suppression company, fire facilities are predictably sited based on the response needs of engine companies.

Analysis of these maps tell us:

- 100 percent of built upon land in each city is covered by current deployment of engine companies when compared against the ISO-PPC 1.5 mile engine company coverage benchmark.
- Only Plymouth is covered by the current deployment of the single ladder company when compared against the ISO-PPC 2.5 mile ladder company coverage benchmark.
 - Regardless of which city the NCFD aerial ladder truck is located in, the other city will not be covered due to distance between the two. Therefore, automatic aid aerial ladder

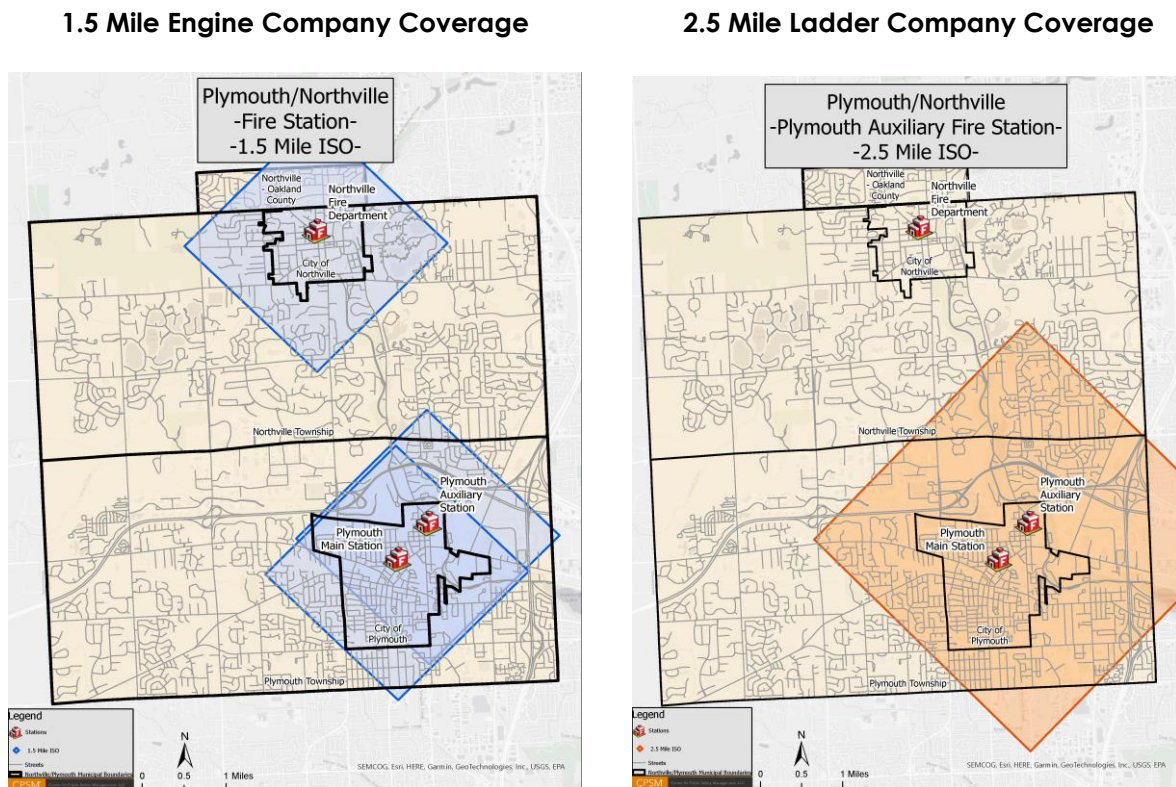
¹³. Insurance Services Office, ISO Mitigation, Deployment Analysis.

trucks could be added to an automatic aid agreement and considered where and when practical on the initial response to ensure aerial ladder truck coverage.

- Generally, aerial ladder company automatic aid ISO credit would be considered as follows:
 - Must offset a need.
 - It is preferred if the automatic aid agreement is in writing.
 - The automatic aid department must be notified on the first alarm according to a defined response plan.
 - Aid must be provided 24/7/365.
 - The communities should have common dispatch and tactical radio frequency capabilities and standard operating procedures.

Generally, water supply is the sole component recognized for ISO credit under Mutual Aid agreements.

Figure 12: ISO-FSRS 1.5 Mile and 2.5 Mile NCFD Engine & Ladder Coverage



Automatic and Mutual Aid

Automatic aid is a system whereby fire, rescue, and EMS units respond automatically to another community through agreement based on proximity to the incident. **Mutual aid** is a system whereby surrounding communities provide fire, rescue, and EMS resources to another community through agreement and specific request from the jurisdiction in need of resources

(not automatically and case by case). In an automatic aid scenario, resources from neighboring jurisdictions are built into run cards in the home jurisdiction for again, an automatic response; this aid is designed to supplement and bolster the Effective Response Force of the home jurisdiction.

The NCFD currently participates in the Western Wayne County Fire Department Mutual Aid Association. Through this agreement participating agencies provide response services to each request for emergency assistance organization within the bounds of the licensed service areas of the member communities. Documents that provide the backbone to the agreement include:

- Amended and Restated Interlocal Agreement (2014) of the Western Wayne County Fire Department Mutual Aid Association By-Laws (2022).
- Amended Michigan Mutual Aid Box Alarm Association Agreement (2016).

Member communities include:

- | | |
|----------------------------------|----------------------------|
| ■ City of Belleville | ■ City of Northville |
| ■ City of Dearborn | ■ City of Dearborn Heights |
| ■ City of Farmington Hills | ■ City of Garden City |
| ■ City of Inkster | ■ City of Livonia |
| ■ City of Melvindale | ■ City of Novi |
| ■ Plymouth Township | ■ City of Romulus |
| ■ Canton Township | ■ City of Taylor |
| ■ City of Wayne | ■ City of Westland |
| ■ Wayne County Airport Authority | ■ Northville Township |
| ■ Redford Township | ■ Van Buren Township |
| ■ City of Wayne | ■ City of Plymouth |

NCFD reciprocates mutual aid with these departments and jurisdictions as well.

Recommendation:

- CPSM recommends the NCFD continue with reciprocal mutual aid agreements as they provide a valuable boost to assembling an Effective Response Force for structural fires and multi-unit responses, and as well improve the overall resiliency of the NCFD. CPSM further recommends the NCFD Fire Chief work collaboratively with mutual aid partners regarding multi-company and multi-department practical training sessions to ensure familiarity between jurisdictions, and to increase fireground efficiency and effectiveness when working together.
- As the City of Northville is without aerial ladder coverage, as the aerial from Plymouth does not provide a timely response, and as this is a deficiency in the current Northville FPSA ISO-PPC analysis, CPSM recommends the NCFD work with a contiguous city that has an aerial ladder apparatus and establish an automatic aid agreement for this apparatus to respond into Northville on structural fires.

Training and Education

Training is, without question, one of the most essential functions that a fire and EMS department should be performing 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 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 and EMS department training program must cover all the essential elements of that department's core missions and responsibilities. The level of training or education required, given 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.

Overall NCFD training is governed by SOG#6.1, *Monthly Department Training*. SOG#6.1 outlines department training meeting days and times, what training is considered mandatory, web-based training procedures, and the annual training program/calendar. SOG#6.1 outlines training expectations for shift and POC staff.

Training and education in the NCFD are managed by the Fire Chief who may appoint a Training Officer. Training overall is supported by NCFD instructors when implementing or instructing training programs. Together this group coordinates and implements the various Fire and EMS training for the department.

Certain Occupational Safety and Health Administration (OSHA) regulations dictate that minimum training must be completed on an annual basis. The state of Michigan operates under an approved state OSHA program for public employees at the state or local government level.

OSHA Regulations and Standards regulated employers located in the state of Michigan are governed by the Michigan State Plan. Federal OSHA covers issues not covered in the state plan. This includes Federal OSHA health and safety standards found in the 29 Code of Federal Regulations (CFR). As such, the NCFD should ensure the following are included in the training matrix and program requirements for all uniform personnel:

- Annual review of the respiratory protection standard, self-contained breathing apparatus (SCBA) refresher and user competency training, SCBA fit testing (29 CFR 1910.134).
- Annual Blood Borne Pathogens Training (29 CFR 1910.1030).

Other training requirements the NCFD must manage include:

- The ISO-PPC has certain training requirements for which fire departments receive credit during the ISO-PPC review (as reviewed above).
- In addition to the above, NCFD training requirements include:
Combat ready:

- State Certified Firefighter I/II
- FEMA ICS 100, 200, 700, 800

Fire Officer Requirements by Rank;

- Captain
 - FF I/II
 - EMT
 - Fire Officer I/II/III
 - FEMA ICS 300 and 400
- Lieutenant
 - FF I/II
 - EMT (Requirement started in 2019)
 - Fire I/II (Requirement started in 2019)

Fire training requirements are governed by the Michigan Department of Licensing and Regulatory Affairs, Firefighters Training Council through Michigan Administrative Code for initial and maintenance of required position certifications.

- Fire certifications include but are not limited to Firefighter I/II; Fire Chief; Fire Inspector; Fire Instructor; Fire Investigator; Fire Officer; Public Safety Director; Plans Examiner; Hazardous Materials Responder; Technical Rescue Responder; Airport Rescue Firefighter.
- EMS training certification/licensure is governed by the Michigan Department of Health and Human Services, Division of EMS. EMS certifications and licensing includes:
 - Medical First Responder (MFR); EMT; Advanced EMT (AEMT); and Paramedic.

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.

While the NCFD has a planned training program and there exists an on a wide array of training activities, the 2020 ISO-PPC report does expose deficiencies. These include live firefighting training at a training facility (18-hours/year for every firefighter) and company training (16-hours/month in structural firefighting). Both of these training components represent core subject matter (instructional and hands-on training) for fire departments.

CPSM was informed there is an issue scheduling a training facility for live burn and structured practical training. The training facility is located at Oakland County Community College. Additionally, there is a fee for instructors at this location. Additional live training facilities exist at Schoolcraft College located in Livonia through this institution's Fire technology program (4-story burn tower). Fees may be associated with this training facility as well. Regardless of the impediments, this is required training and should be planned and budgeted for, and all staff should rotate through on an annual basis.

The Annual Training Program subjects for CY 2023 are discussed next. An outline of weekly NCFD training includes:

- Training is scheduled every Thursday from 7:00 pm to 9:00 pm.
- There are also occasional Saturday classes conducted as well.
- Training is assigned to all personnel, meaning this training is conducted at Station 1 in Northville and has assigned instructors.
- Training is assigned as Station 1 and Station 2 on training night, meaning this training is scheduled at both stations and has assigned groups or individual instructors .
- Training is assigned to individual stations on the same training night meaning members report to their station and there is an assigned instructor for the topic(s).
- The training topics for the year are broad and include administrative tasks, driving and operating apparatus, EMS, fire behavior, fire practical skills, live training scenarios, workplace behavior, annual fire and EMS skill competency, specific fire tactics, water rescue, and target hazards to name the most common training topics.

Additionally, CPSM was advised that the NCFD has also conducted in-house FFI and FFII training certification classes, which is an intensive undertaking and for which the department is commended.

What is missing from the training schedule however is the ISO training as noted above and includes:

- 18 hours per year in structure fire-related subjects as outlined in the NFPA 1001 standard at a training facility where props and fire simulation buildings can be used.
- 16 hours per month in structure fire-related subjects as outlined in the NFPA 1001 standard.

Every effort should be made to make completion of required and periodic training an NCFD priority.

Recommendations:

- The NCFD should make it a priority to ensure weekly training and any daily in-station training occurs as scheduled, and members are held accountable to attend scheduled training, and a concerted effort is made to achieve a greater number of ISO-PPC stated training is completed monthly, and annually by all members this training applies to.
- The NCFD should continue to develop and budget for its fire officer training and development program. To further enhance the program 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 strategy & tactics and incident command concepts, community fire protection and emergency services delivery approaches; fire prevention practices; firefighter safety and risk management; employee relations; reviewing, approving, or preparing technical documents and specifications; departmental policies; standard operating procedures; formal internal communications; improving organizational performance through process improvement and best practices initiatives; and having a working knowledge of information management and technology systems.

- The NCFD should develop a plan to provide all personnel with mandatory high-intensity training on subjects such as periodic live fire training on at least a semi-annual basis; live fire facility training to include fireground basics such as hose and ladder evolutions, forcible entry, ventilation, search and rescue, and vehicle extrication. This should include practical skills and proficiency evaluations (non-punitive) as part of the department's comprehensive fire training program. Available buildings scheduled for demolition work well for this and should be acquired often to ensure all members are included in this important training.

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 suppression and response, although necessary to protect property, have negligible impact on preventing fire. 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.

The Fire Marshal (part-time position) staffs the community risk reduction function. The NCFD community risk reduction function includes fire prevention inspections for those occupancies identified in the adopted fire code for the cities, and includes building occupancy uses such as businesses, mercantile and commercial, places of public assembly, institutional occupancies, storage facilities, high hazards, and other miscellaneous building uses that require a fire inspection. The Fire Marshal may also participate with and assist the State Fire Marshal's office with fire prevention inspections to properties the State Fire Marshal's Office is responsible for in each city if requested.

At the time of this analysis the NCFD Fire Marshal's Office was utilizing the following Building and Fire Codes:

- International Fire Code as adopted by each city.
- Michigan Building Code as adopted by each city.
- City Ordinances applicable to fire prevention and enforcement:
 - Chapter 38: Code of Ordinances City of Plymouth, Michigan.
 - Chapter 38: Code of Ordinances City of Northville, Michigan.

Overall, Northville reports 285 registered businesses in the City, which would require a fire prevention inspection and Plymouth reports just over 400 inspectable properties.

It was communicated to CPSM that there is no coordination of fire prevention activities from the Fire Marshal (currently the Fire Chief) and between the two cities. There is also no consistent annualized fire inspection plan that delineates the required and/or priority inspections for the year, and or any additional inspection requirements. Because there is no department wide fire inspection plan, and because there is no coordination of fire inspections between the cities, and specifically fire inspections that are completed (CPSM requested but was not provided historical

fire prevention inspection data), CPSM cannot determine the efficacy of the fire prevention - community risk reduction program.

It is important for a community risk reduction program to have a fire inspection plan that is consistent from year to year, coordinated, and managed. Having a comprehensive fire inspection plan is critical for the safety, well-being, and resilience of a community. There are several reasons why it is important for a fire department to have a fire inspection plan and include:

- Identification and Mitigation of Fire Hazards
- Ensures Compliance with Codes and Standards
- Prevention of Fire Incidents
- Protection of Life and Property
- Potential for Risk Reduction for Businesses
- Provides Community Education and Outreach

The NFPA has guidance for community risk reduction through the NFPA 1730 standard -*Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations, 2019 Edition*. This standard provides guidelines for fire prevention activities in a community. One of the key aspects addressed in NFPA 1730 is the minimum inspection frequency for various types of occupancies. NFPA 1730 outlines fire inspection frequency as such:

- High Hazards: Annually
- Moderate Hazards: Biennially
- Low Hazards: Triennially
- Critical Infrastructure: As assigned by the Authority Having Jurisdiction (AHJ)

NFPA 1730 defines these hazards as:

- High-Risk Occupancy. An occupancy that has a history of high frequency of fires, high potential for loss of life or economic loss, or that has a low or moderate history of fires or loss of life, but the occupants have a high dependency on the built-in fire protection features or staff to assist in evacuation during a fire or other emergency.
 - High-Risk Occupancy. Examples of high-risk occupancies could include multiple-family dwellings, high-rise buildings, hotels, dormitories, lodging and rooming, assembly, childcare, detention, educational, health care, and industrial.
- Moderate-Risk Occupancy. An occupancy that has a history of moderate frequency of fires or a moderate potential for loss of life or economic loss.
 - Moderate-Risk Occupancy. Examples of moderate-risk occupancies could include ambulatory health care and industrial occupancies that do not maintain, store, use, or handle hazardous materials in excess of exempt amounts.
- Low-Risk Occupancy. An occupancy that has a history of low frequency of fires and minimal potential for loss of life or economic loss.
 - Low-Risk Occupancy. Examples of low-risk occupancies could include storage, mercantile, and business.

- Critical Infrastructure. The assets, systems, and networks, whether physical or virtual, that are so vital to the community that their damage or destruction would have a debilitating effect.
 - Critical Infrastructure. Examples of critical infrastructures could include water treatment plant, special structures, public safety buildings, and power plants.

In summary, a well-developed fire inspection plan is essential for proactively managing fire safety within a community. It contributes to risk reduction, emergency preparedness, and the overall safety and resilience of the community. Additionally, incorporating the essential components of NFPA 1730 and its recommended minimum inspection frequencies will be important when creating a comprehensive and effective fire prevention program for the cities of Northville and Plymouth. A focus of life safety, property conservation, and the overall well-being of the community are the primary drivers of such a program.

Recommendations:

- CPSM recommends the NCFD develop a comprehensive fire prevention code enforcement inspection plan that aligns with NFPA 1730 *Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations, 2019 Edition*, and ensures for both cities: city ordinances are followed that relate to fire prevention and fire code enforcement; and a fire inspection plan is developed that identifies the occupancies/use groups that require annualized fire inspections and the identification occupancies/use groups that do not require annualized inspections but should be inspected on at least a biennial or triennial basis.

The comprehensive fire prevention code enforcement plan should also include a methodology for quality assurance of fire prevention inspections, and a data entry platform for consistent record keeping of each inspection completed that can also serve as a compliance tool to ensure outlined annual fire prevention inspections are completed.

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SECTION 3. ORGANIZATIONAL ASSESSMENT

Stakeholder Meetings

CPSM was on-site in June 2023 for the purpose of evaluating in person the NCFD and conducting in-person stakeholder meetings with members of the NCFD. These in-person stakeholder meetings included members from NCFD-Northville station and Plymouth station. CPSM did not have a list of participants prior to the in-person stakeholder meetings, nor did we receive one after the meetings. This maintained our neutral-bias approach to these stakeholder input sessions.

In addition to NCFD member meetings, CPSM held a virtual meeting with the NCFD Fire Chief as he was on leave during our site visit.

Lastly, during the station visits, CPSM visited with members who were present at the time and engaged in organizational discussion.

The in-person stakeholder meetings were held at the Northville and Plymouth fire stations in the evening, to ensure maximum member participation. Discussion points facilitated by CPSM included:

- Organizational Strengths
- Organizational Weaknesses
- Current Challenges and Issues
- Operational Response and Staffing
- Consistencies and Inconsistencies
- Recruitment and Retention of Members

It is noted that some stakeholder input conferred here may be perception or assumptions offered by stakeholders, who may not have all of the information germane to their statement. However, and to ensure inclusiveness, CPSM has included all information received from stakeholder sessions.

Discussion highlights from the member stakeholder meetings, in no particular member order, include:

Strengths	Positives
Excellent Fireground accountability.	Use of acquired structures for training.
Ability to do live training.	All riding positions have portable radios.
Have members who desire to be EMS only.	HVA and Superior respond to all EMS calls.
NCFD is EMS transport capable (BLS).	Replace turnout gear every six years.
Crews work together.	Heading in the right direction.
Members want to make it better.	Plymouth and Northville station renovations.
Working with neighboring jurisdictions.	New ladder truck.
The people.	Overnight crews.

<p>Knowledge of members.</p> <p>Compassionate people.</p> <p>When members are responding or at the station, they are all in.</p> <p>Able to put people in seats.</p> <p>Great equipment and apparatus.</p> <p>Well supported by the community.</p> <p>Good presence in community.</p> <p>Staffing has improved with new schedule.</p> <p>Efficiency of paid-call department.</p> <p>Council supportive.</p> <p>Advisory Board.</p>	<p>Dual certified members (Fire and MFR).</p> <p>Appreciated by the community.</p> <p>Both cities are supportive of the department regarding apparatus, gear, equipment.</p> <p>Public outreach.</p> <p>People in department.</p> <p>Mask fit testing completed.</p> <p>New staffing plan-nights and weekends.</p>
<p>Weaknesses, Issues and Challenges</p> <p>Recruitment-little community interest.</p> <p>SCBA tracking system not turned on.</p> <p>On-premises staffing is needed more than nights and weekends.</p> <p>The same 10 people prop up the department.</p> <p>Staffing with 1 Fire trained and 1 EMS trained impacts response to fires.</p> <p>Two different fire departments (Plymouth and Northville).</p> <p>Staffing requirement not consistent or required.</p> <p>Retention of members.</p> <p>No recruitment plan.</p> <p>Annualized medical physicals not required.</p> <p>No Length of Service Award Program (LOSAP retirement plan (retention)).</p> <p>Two fire departments (Northville and Plymouth). Not a strong relationship.</p> <p>Vacant Captains and Lieutenants.</p>	<p>Weaknesses, Issues and Challenges</p> <p>Scheduling live burns and associated fees.</p> <p>Software program to record training.</p> <p>Lose NCFD POC members to full time jobs.</p> <p>Hourly pay needs to be increased.</p> <p>Promoting better what the NCFD does.</p> <p>Members have to buy their uniforms (% based).</p> <p>Funding for out of town training.</p> <p>Need to make promotions.</p> <p>No Fire Marshal—Chief does both.</p> <p>Struggle filling shifts.</p> <p>Need to increase training for firefighters, officers, drivers, EMS only members.</p> <p>No retention strategies.</p> <p>Need to get back to the basics with training.</p> <p>Communication between stations-very little.</p> <p>Need a marketing plan for recruitment.</p>

Weaknesses, Issues and Challenges	Weaknesses, Issues and Challenges
<p>No communication from Chief-inconsistencies.</p> <p>Lack of command structure.</p> <p>The span of control is too large.</p> <p>No succession plan (current officer vacancies).</p> <p>Lack of ancillary position duties.</p> <p>911 Center-how they dispatch calls.</p> <p>No rules.</p> <p>Need to limit freelancing.</p> <p>Cannot get to Fire Chief with an issue.</p> <p>The Chief is busy running calls.</p> <p>No daytime staffing.</p> <p>EMS only person can go to fire call-drive and operate engine-but cannot fight fire.</p> <p>Lean at administrative level.</p> <p>Chief does everything-admin., responds to calls, supervises.</p> <p>Collaboration between cities does not occur consistently.</p> <p>Lack of respect for senior people.</p> <p>Fire Chief sides with complainers.</p> <p>Officers have no authority to act.</p> <p>Fire Chief does not support officers.</p> <p>Nothing happens when issues are raised.</p> <p>No accountability.</p> <p>Issues date back to the previous Fire Chief.</p> <p>Members want to be valued.</p> <p>Not sure where I/we fit in the department.</p>	<p>No command staff staffing-who do we call for issues.</p> <p>Little if any assistance with out of town training.</p> <p>More presence of Chief in Plymouth.</p> <p>Dual certified receives the same hourly pay as single certified.</p> <p>NCFD is run like a club.</p> <p>Two sets of rules.</p> <p>Needs to be a professional workplace.</p> <p>Chief's admin support shared with building official.</p> <p>No administrative controls in place.</p> <p>Need to use ESO (Records Management System) to full capacity.</p> <p>Grapevine communication.</p> <p>No expectations of members.</p> <p>No succession planning.</p> <p>No bench strength when leadership vacancies occur.</p> <p>No rules or playbook.</p> <p>Lack of formal plans and planning.</p> <p>Lack of collaboration between Fire Chief and officers.</p> <p>No expectations for on-premises staffing.</p> <p>Inconsistent use of <i>I Am Responding</i> software.</p> <p>Lack of Fire Prevention direction or plan.</p> <p>Need to resolve issues early.</p> <p>Use of chain of command is inconsistent.</p> <p>Staffing with qualified staff.</p>
End	End

At the root of the weaknesses, issues, and challenges within the NCFD are:

Lack of Inclusiveness and Ineffective Organizational Communication

Effective communication is the key to overcoming conflict. Sharing organizational information, seeking continuous input and improvement from all staff, and establishing open and continuous dialogue with all staff will help to increase morale and create strong organizational foundations. It is important to bring all staff together to seek constructive input so as organizational leaders, one can see situations from diverse perspectives, which creates a strong, transparent, and trusted organization.

Trust, Transparency, and Emotional Intelligence

Trust is built through open communication, disclosure, and sharing of information. Being truthful and recognizing others who show the same level of transparency develops an open organizational culture. Leaders play a key role in this and should actively reach out to stakeholders to set a positive example. Different people share information and are convinced in different manners, making it vital across the organization for staff to understand and embrace emotional intelligence.

Lack of Strategic, Operational, and Succession Planning, and Department Vision

Leadership must clearly and regularly communicate the organizational purpose and the role every member has in the organization. Every organizational member must know where they fit and how they should be spending their time. To be successful, leadership should not always be focused on the short term, it is equally important to see and develop the organization's ability to think and plan for the longer term. It is vital that every staff member understands the role they will play in developing the long-term plan. It is the leader's responsibility to create and share the vision and the future of the organization and create the nexus between his/her vision with the organization.

The following represent organizational tools and planning concepts that the NCFD should consider and undertake, to close organizational weaknesses and gaps; create a cohesive, consistent, and inclusive environment; implement trusted, professional, and contemporary fire service leadership; and provide a competent, well-equipped, and well-trained services.

Strategic Planning

Organizing and managing a contemporary fire department requires results-oriented and well-thought-out and achievable goals and objectives. This is realized through the development of a Strategic Plan. A Strategic Plan is a comprehensive and forward-looking document that outlines an organization's goals, objectives, and action plans for achieving success over a specific period. It serves as a roadmap, providing guidance on how the organization will allocate its resources, make decisions, and respond to challenges in order to fulfill its mission and achieve its vision.

As the NCFD has a relatively new Fire Chief (July 2021), this is an opportune time to develop a Strategic Plan for the fire department for several reasons as outlined below:

- **Fresh Perspective:** A new fire chief brings a fresh perspective and may have different insights and experiences. This can lead to a more innovative and forward-thinking strategic plan that incorporates new ideas and approaches.

- **Assessment of Current State:** The new fire chief can assess the current state of the fire department, including its strengths, weaknesses, opportunities, and threats. This assessment is crucial for developing a strategic plan that addresses the specific needs and challenges of the department.
- **Alignment of Goals:** The strategic planning process allows the fire chief to align the goals and priorities of the fire department with broader organizational and community objectives. This ensures that the department's efforts are coordinated with the overall vision and mission.
- **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.
- **Resource Allocation:** A strategic plan helps in identifying and prioritizing resource needs. The new fire chief can analyze existing resources, identify gaps, and allocate resources efficiently to meet the department's strategic goals.
- **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.
- **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.

In summary, the appointment of a new fire chief presents a unique window of opportunity to assess, plan, and align the fire department's direction with the needs of the community. This strategic planning process can set the stage for effective leadership, improved organizational performance, and enhanced community safety.

Recommendation:

- CPSM recommends the NCFD, along with internal and external stakeholder input develop a five year strategic plan that outlines the mission, vision, and values of the department, and that includes near, mid, and longer term organizational goals. Ideally, this plan would be developed in the context of a clear vision of what the department will look like in the future.

Succession Planning

Succession planning is a strategic process that involves identifying and developing individuals within an organization to ensure a smooth transition of key leadership positions when incumbents retire, resign, or otherwise leave their roles. The goal of succession planning is to proactively address the potential leadership gaps that may arise due to changes in personnel, thereby safeguarding the continuity and effectiveness of the organization. Succession planning is not limited to top executive roles and should extend to critical positions at various levels within the organization.

Key components of succession planning include:

- **Identification of Key Positions:** Organizations need to identify the critical roles and positions that are essential for the continued success and operation of the business. These positions often include top leadership roles and also encompass key technical or specialized roles. In the NCFD this is Fire Chief, Fire Marshal, Captain, and Lieutenant positions.

- **Talent Assessment:** The organization assesses its current talent pool to identify individuals with the potential to assume key positions in the future. This involves evaluating employees based on their skills, competencies, leadership qualities, and potential for growth.
- **Leadership Development:** Once potential successors are identified, organizations invest in their development through training, mentorship programs, leadership development initiatives, and exposure to diverse experiences. The goal is to groom individuals to be ready for higher-level responsibilities.
- **Feedback Management:** Succession planning is closely linked to feedback management. Regular feedback will help organizations gauge the progress of potential successors and address any performance gaps.
- **Career Planning:** Organizations work with employees to create personalized career development plans that align with the individual's aspirations and the organization's succession needs. This may involve providing opportunities for skill development and advancement.
- **Monitoring and Evaluation:** Succession plans are dynamic and should be regularly reviewed and updated based on changes in organizational goals, leadership needs, and the development of potential successors. Regular evaluations ensure the plan remains effective and responsive to evolving circumstances.
- **Knowledge Transfer:** For key positions, particularly those with specialized knowledge, succession planning may involve strategies for transferring critical institutional knowledge from the outgoing leader to the successor.
- **Inclusivity and Diversity:** A robust succession plan considers diversity and inclusivity, ensuring that individuals from different backgrounds and experiences have equal opportunities for advancement.

In summary, succession planning is a proactive and systematic approach to developing and retaining talent within an organization, with the aim of ensuring a smooth transition of leadership and maintaining organizational stability and continuity.

Currently, and as discussed herein, the NCFD has leadership positions vacant as follows:

- 1 Station Captain-Northville
- 1 Station Captain-Plymouth
- 2 Lieutenants-Northville
- 1 Lieutenant-Plymouth

When leadership positions are vacant within an organization, it can have various effects depending on the level of leadership. Common consequences of leadership gap(s) include:

- Lack of Direction
- Decreased Morale
- Decreased Productivity
- Communication Breakdowns
- Difficulty Implementing Change
- Increased Workload on Remaining Staff

■ Impact on Organizational Culture

During project internal discussions and stakeholder meetings, many if not all of the consequences listed above are or have occurred in the NCFD over the course of the listed vacancies, and some prior to the vacancies.

Recommendation:

- CPSM recommends the NCFD Fire Chief work with the two City Managers (Northville and Plymouth) and develop a succession plan model for the fire department. CPSM further recommends while the plan is being developed, the Fire Chief assesses the current talent, identifies potential organizational leaders, and begins a leadership development program focused on filling current and future leadership positions.
- CPSM further recommends once potential leadership candidates are identified and vetted, that the vacant Captain and Lieutenant positions be filled so that organizational leadership gaps that currently exist can be closed.
- CPSM also recommends the NCFD wrap recruitment into a succession plan and develop a recruitment plan that focuses on new fire and EMS members placement in the organization.

Health, Safety, and Wellness

The prevention and reduction of accidents, injuries and occupational illnesses should be established goals of any fire-rescue department and should be primary considerations at all times (emergency and non-emergency activities). This concern for safety and health must apply to all members of the fire-rescue department and should include others who may be involved in fire department activities.

NCFD should strive to make every reasonable effort to provide a safe and healthy work environment, recognizing the dangers involved in the types of service fire-rescue departments deliver. Included in this effort should be appropriate and continuous training, supervision, procedures, program support and review to achieve department health and safety objectives in all department functions and activities.

Firefighting and to some degree EMS service delivery are inherently dangerous activities occurring in environments over which the participants have no engineering control. NFPA 1500, *Standard on Fire Department Occupational Safety and Wellness Programs* was developed to provide a "consensus standard for an occupational safety and health program for the fire service." NFPA 1500 is intended to be an umbrella document, establishing the basic framework for a comprehensive safety and health program, and providing for its implementation and management.

The Health and Safety function in NCFD is handled primarily by the Fire Chief, the Station Captains, and Lieutenants. Health and safety are intrinsically built into all operational policies and procedures. The following NCFD policies and or procedures specifically address health and safety:

Table 8: NCFD Health and Safety Policies and Procedures

- 2.0: Command
- 7.0: Operation of Apparatus
- 12.7: Personal Protection
- 12.9: Rapid Intervention Teams
- 12.10: Mayday Procedures
- 12.11: Evacuation Procedures
- 15.0: Work Related Restrictions
- 21.0: Fireground accountability
- 24.0: Response to Hazardous Materials Incidents

In 2021, the NFPA produced *The Fifth Needs Assessment of the U.S. Fire Service* and revealed the following:

- 72 percent of departments lack a program to maintain basic firefighting fitness and health.
- 61 percent of departments don't provide medical and physical evaluations for all firefighters that comply with *NFPA 1582: Standard on Comprehensive Occupational Medical Program for Fire Departments*.
- 73 percent of departments lack a behavioral health program (larger departments are much more likely to have such a program).
- 56 percent of fire stations are not equipped for exhaust emissions control; this number rises to 82 percent in the smallest communities.
- Many departments do not engage in cancer prevention best practices.¹⁴

A successful health, safety, and wellness program requires:

- Senior Management buy-in.
- The establishment of a Health & Wellness Committee.
- A department needs assessment.
- The establishment of obtainable goals and objectives.
- The establishment of a budget for health, safety, and wellness.
- Implementation.
- Evaluation.¹⁵

Primary goals of a comprehensive health, safety, and wellness should include:

- Reducing injury leave and light duty due to on-the-job injuries.
- Potentially lowering workers' compensation and employee health care costs.
- Reduction of injuries.¹⁶

14. Creating a Health & Wellness Program for Your Department, Firehouse Magazine, October 2022.

15. *ibid*

16. *ibid*

Firefighter injuries and deaths are devastating to families, fellow responders, local governments, and the community. The National Institute for Occupational Safety and Health (NIOSH) has studied firefighter fatality root causes, and found five key factors, which are commonly referred to as the NIOSH 5:

- Lack of fireground firefighter accountability.
- Lack of fireground communication methods.
- Lack of standard operating procedures related to response and fireground operations.
- Lack of incident management/command.
- Lack of appropriate risk assessment of the incident as whole, the building, the emergency scene, and basic fireground knowledge to understand the risk.

These five fireground factors should be etched in every firefighter's brain. A fire department training regimen, equipment, guidelines, and culture should center on these five factors. A lack of understanding of these five factors leads to sloppy, ineffective, and unsafe fireground operations. ***They should be taken seriously.***

Managing the health, safety, and wellness components of a fire-rescue department are as important as any other, as the concepts of health, safety, and wellness apply to both emergency and non-emergency activities. For NCFD this will take dedicated staff hours and oversight from a command and station level.

Recommendation:

- CPSM recommends NCFD develop a health, safety, and wellness committee, and further develop a comprehensive health, safety, and wellness initiative program that aligns with NFPA 1500, *Standard on Fire Department Occupational Safety and Wellness Programs*, 2021 edition.

Organizational Communication

Fire and EMS departments operate in a decentralized format meaning, with exception of fire administration staff and other staff assigned the fire administration office, the largest component of the workforce is in facilities external to department leadership.

Further complicating organizational communication in a fire and EMS POC department is senior leadership (Fire Chief) and station officers do not see members on a consistent basis. The POC availability complicates communication in that the largest component of the organization is typically not at a station when a communication is directed out and down from organizational leadership.

The inherent communication challenges and breakdowns in an organization, both vertically and laterally, with a decentralized workforce and one that deploys through a POC system, often result in miscommunication. Usually, the lack of formal communication channels will feed communication through the "grapevine," which is where most members will get their information. These organizational communication challenges feed the fodder for the rumor mill. This is evident in the NCFD.



Figure 13: Grapevine Effect

Despite the tremendous advances in communication and information technology, communication among people in organizations leaves much to be desired. The importance of effective communication, established communication processes, and ongoing follow-up cannot be overstated. The development of a communication model that provides a consistent means for communication within and among various levels of the organization and encourages feedback that can be integrated into continuous improvement and accountability supports a healthy organizational culture. ¹⁷

Developing a basic communication model that, when followed, enhances communication across any organization, particularly those experiencing communication challenges regardless of where the root cause lies. Having a “channel” by which information flows is key to ensuring effective ongoing communication - written and oral. The lateral flow of information between the

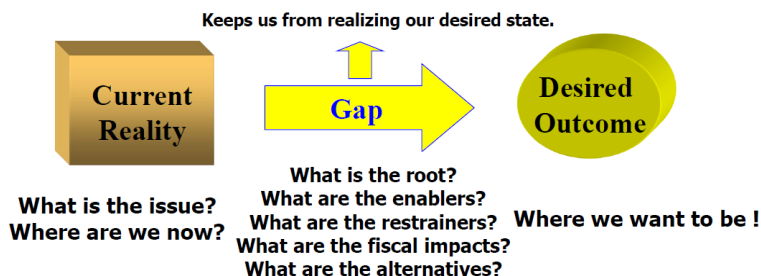


Figure 14: Communication Model

Fire Chief, fire senior staff, and mid-level supervisors affects the vertical flow of information to the frontline staff. A lack of effective communication and direction, or disconnect at the channeling stage, particularly between senior staff and middle managers creates morale issues, promotes inconsistencies, and fuels grapevine communication and informal leadership.

Before the NCFD will be able to improve the efficiency or effectiveness of its organizational communications, it must first improve the delivery of messages from fire administration (Fire Chief, Fire Marshal, Station Captains) to supervisors (Lieutenants), who are the conduit to the front-line personnel (firefighters and EMS staff). Leaders must seek to understand the people they manage, provide, and encourage feedback, **and follow up on the communication that takes place.**

High performing organizations communicate effectively both laterally and vertically with fact and not perception regarding organizational planning; issues and challenges and the resolutions to the issues and challenges; and decision-making. Consideration is given to the current reality of the issue and where the organization is in the present, and where the organization wants to

17. See James L. Gibson, John M. Ivancevich, James H. Donnelly, and Robert Konopaske, *Organizations: Behavior, Structure, Processes*, Eighth Edition (New York: Irwin/McGraw-Hill, 2002).

be. Lastly, communication generally occurs when ideas, thoughts, opinions, knowledge, and data are exchanged (received and understood).

Recommendation:

- As there are documented communication issues and challenges within the NCFD, CPSM recommends the NCFD include in any organizational planning, goals and objectives that are aimed at closing communication gaps in the organization, improving consistent messaging and actions across the organization, improving communication between NCFD stations, programs, and members, and establishing a shared vision for communication all members of the organization can work towards.

CPSM further recommends the NCFD create a communications General Order to ensure the most correct communication medium is utilized when delivering organizational information (i.e. e-mail; in-person; through formal training); messages and information are consistent and include feedback to the originator or sender when requested/necessary/required; gives members the proper voice; includes a communications gap analysis model that the organization will follow; and that has a compliance measures so that effective communication can be measured for organizational effectiveness.

Time Allocation

During in-person stakeholder meetings a discussion with attendees occurred where members stated they were not sure where they fit in the organization, and they see the Fire Chief doing too much hands-on tasks (responding to calls, fire code enforcement, and training), and not enough management and leadership of the organization. Members also stated the Fire Chief is difficult to reach and talk to, and that they see this as creating organizational gaps. CPSM finds these things troubling.

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 assigned work period (on-premises time), when responding to and arriving to a call, and overall, in and for the organization be most effective. Understanding this concept is essential in a small organization such as the NCFD.

Senior leadership, line supervisors, 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 different set of priorities and employees at each level should allocate their time accordingly.

The Time Allocation Model is a framework that helps organizations effectively manage and allocate their resources, particularly time, to achieve strategic goals. 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.

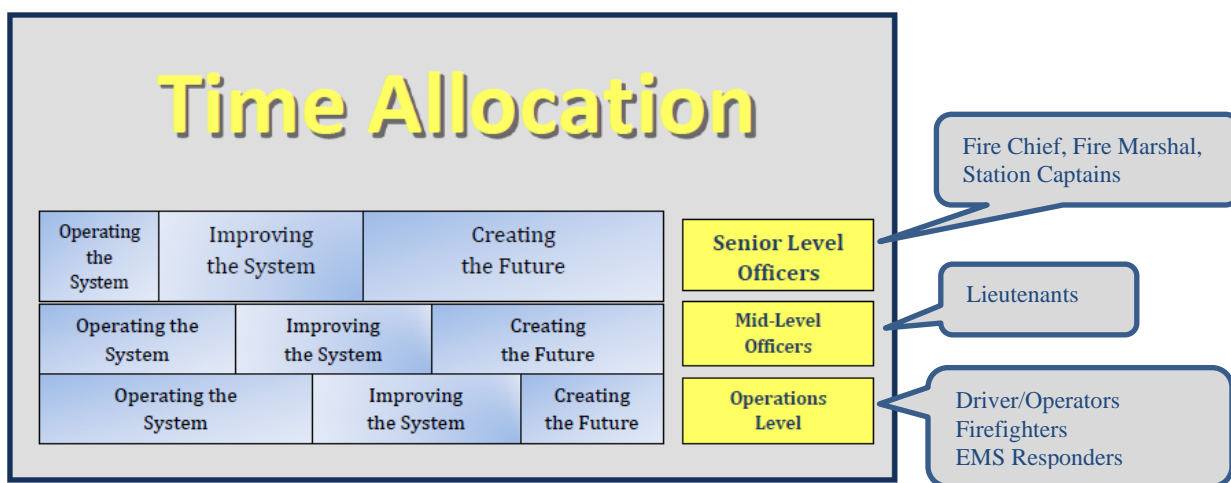


Figure 15: Time Allocation

In the NCFD, senior level officers include the Fire Chief, Fire Marshal, and Station Captains (1 Captain in Northville and 1 Captain in Plymouth). 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 and may include: critical planning goes undone; there are 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 the NCFD include Lieutenants. This position (3 In Northville and 3 in Plymouth) 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 on-premises and response operations. 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.

Those who operate the system in the NCFD include driver/operators, firefighters, and EMS only response personnel. 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 (i.e., 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 components 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 small organization such as the NCFD, 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 the NCFD organize the department so as to optimize and empower subordinate officers to the Fire Chief to include the Fire Marshal, Station Captains, and Lieutenants within the leadership and management of all department operations. This includes the concepts of the **Time Allocation Model** to ensure a more efficient alignment of organizational resources, and the effective use of all members of the organization in order to achieve the organization's mission and core values.

Recommendation:

- CPSM recommends the NCFD adopt the concepts of the Time Allocation Model and allow the model concepts to further contribute and enhance organizational effectiveness, goal achievement, and a more streamlined and purposeful use of resources.
- CPSM further recommends the Fire Chief optimize and include the Fire Marshal, Station Captains, and Lieutenants within the leadership and management of all department operations, thus, creating an additional avenue for organizational succession, so that these levels will be more readily prepared as the future leadership of the organization.

Policy and Procedure Review

The NCFD operates under General Orders (GOs) and Standard Operating Guidelines (SOGs) that are specific to its internal operations. Fire departments typically manage and direct operational and administrative matters in the same manner as described here. The GOs and SOGs CPSM was provided have implementation dates of October 2020.

These GOs and SOGs are necessary and establish the basis for all department operations in the station, on the emergency scene, when responding to incidents and for certifications, administrative tasks, and duties.

The NCFD, like other fire departments segregate the fundamental rules that outline the basic duties, responsibilities, and conduct expected of NCFD members as GOs. **NCFD SOGs outline specific instructions or protocols that detail the step-by-step processes and procedures for carrying out specific tasks or operations. While there are some mix (GOs that may work better as SOGs), the content of each provides guidance and direction as needed and are in-line with similar agencies CPSM has evaluated.**

NCFD General Orders include the following subject matter and content:

- 1.0: Implementation and Repeal
- 2.0: Command (ICS System)
- 3.0: Standards of Conduct
- 4.0: Response to Alarms
- 5.0: Operation of Personal Vehicles
- 6.0: Apparatus Assignments (includes response of apparatus to certain alarms).
- 7.0: Operation of Apparatus
- 8.0: Apparatus Maintenance
- 9.0: Department Property and Equipment
- 10.0 Required Certifications and Licensure
- 11.0: Uniform Standards

NCFD Standard Operating Guidelines include the following subject matter and content:

- 12.1: Structural Fire Incidents
- 12.2: Structural Fire Incidents (Buildings with Standpipes and Sprinklers)
- 12.3: Other Fires (such as auto, dumpster, trash etc.)
- 12.4: Motor Vehicle Accidents
- 12.5: Communications (radio-while responding to incidents)
- 12.6: Assignment of Run Numbers (incident numbers for incident reports)
- 12.7: Personal Protection: (turnout gear; safety vests; working in IDLH atmospheres)
- 12.8: Medical Transport (by NCFD units)
- 12.9: Rapid Intervention Teams
- 12.10: May Day procedures (emergency incidents)
- 12.11: Evacuation Procedures (emergency incidents)
- 13.0: Release of Information (general incident information)
- 14.0 Enforcement Discipline (for violating GOs and/or SOGs)
- 15.0: Work Related Restrictions (member restriction based on medical evaluation)
- 16.0: Absences (member absences from responses)
- 17.0: Compensation (member compensation and procedures for documenting time for compensation)
- 18.0: Reports (completion for incident reports)
- 19.0: Training (attendance and member expectations)
- 20.0: Hiring Process (new member hiring and on-boarding)
- 21.0: Incident Accountability (use of Passports and the Passport system; Personnel Accountability Reports while operating on incidents;
- 22.0 Blood Glucose Monitoring (procedures for use of equipment)
- 23.0: Subsequent Calls When Unit of First Call Unable to Respond (guidelines for concurrent calls)
- 24.0: Response to Hazardous Materials Incidents (includes guidelines for activating regional team)
- 25.0: Personnel Complaints
- 26.0: Trains Blocking Response to Incidents (Stations 2 and 3)

As often as possible GOs and SOGs should reference *National Fire Protection Association* standards, state and local laws and statutes, and other national best practices. This adds validity to the GO and/or SOG. That said, fire and EMS departments should make every effort to maintain up-to-date policies and directives, which are consistent with national best practices, NFPA documents, in particular those that involve fire operations, health, and safety.

CPSM was informed that the NCFD is currently going through a GO, SOG update, which is common in fire departments. In the fire service there are many internal and external forces that have to be considered when delivering services, which begins with administrative and preparatory processes.

One concept the NCFD may align with when making GO and SOG changes and updates in the systems theory. The systems theory suggests the organizational system has four elements: **inputs** from the environment, including information and external resources (external forces such as NFPA, state and local law etc.); **transformations**, which is the managerial or technological processes used to convert inputs to outputs (understanding the external and internal forces); **outputs** in the form of desired products or services (organizational concepts, non-emergency activities, and emergency activities); and **feedback**, the environment's reaction to outputs (the driver to continuously review existing processes). Feedback also serves as an input during future iterations of the process, thus completing the cycle and continuous improvement.

In summary, when developing or renovating current policies and procedures, it is important that the NCFD consider all internal and external forces/relationships prior to implementation.

Recommendation:

- CPSM recommends the NCFD develop a management process that ensures General Orders and Standard Operating Guidelines remain current, represent a contemporary fire department, reflect current best practices, and consider all internal and external forces and relationships prior to implementation.

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SECTION 4. OPERATIONAL ANALYSIS

Deployable Resources

NCFD responds with fire suppression apparatus and crews from three fire stations that serve the cities of Northville and Plymouth. The NCFD relies on paid-on-call (POC) staff and when necessary, auto/mutual aid companies for fire service delivery to collect the appropriate Effective Response Force for building fires.

NCFD emergency response units include:

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 gear to treat patients and provide life-saving measures prior to the arrival of EMS transport units. NCFD currently responds to emergencies with an inventory of four engines (two from the Northville station; one from the Plymouth primary station; and one from the Plymouth auxiliary station).

Ladder Company, which are also primarily designed for firefighting operations but differ 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. Some ladder trucks, such as the one in the NCFD, carry hose (fire attack and larger supply) and tank water. The NCFD responds with one ladder truck from the auxiliary station in Plymouth.

Quick Response Vehicle, which can be designed, as the two are in the NCFD, as fire capable and transports crew members, self-contained breathing apparatus, various hand and forcible entry tools, ventilation equipment, specialty equipment, and EMS equipment. The NCFD currently responds to emergencies with an inventory of two quick response vehicles (one from the Northville station and one from the primary Plymouth station).

Critical Tasking, NFPA 1720, Effective Response Force

Emergency events occur at all hours, on all days, and under all conditions. The fire and EMS service's response to these unpredictable conditions has been to develop a methodology for being prepared to respond and deploy adequate resources in a timely fashion when they occur.

The rapid and effective performance of highly coordinated assigned tasks is the hallmark of a successful emergency response force whether it be Fire or EMS or combined. Time and on-scene performance expectations are the target indicators established for measuring the operational elements (individuals, crews, and work units) that comprise response-ready resources.

Critical tasks are those activities that must be conducted on time and preferably simultaneously by responders at emergency incidents to control the situation and minimize/stop loss (property and life-safety).

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.

Critical tasking for EMS operations is those activities (clinical and operational) that must be conducted, some in succession, and some simultaneously to rapidly assesses the patient, determine the level of intervention needed, if any, and connect the patient with the appropriate level of pre-hospital clinical care.

To be effective, critical tasking must assign enough personnel so that all identified functions can be performed as described above. 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 (Fire, EMS, and Fire/EMS) is referred to as an **Effective Response Force (ERF)**. The goal is to deliver an ERF within a prescribed period of time as outlined in national standards and the ISO-PPC benchmarking.

Fire Critical Tasking

The NCFD as a paid-on-call agency aligns with NFPA 1720, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operations to the Public by Volunteer Fire Departments*, 2020 edition (National Fire Protection Association, Quincy, Mass.). It serves as a benchmark to measure staffing and deployment of resources to certain fire incidents. NFPA 1720 is a nationally recognized standard, but it has not been adopted as a mandatory regulation by the federal government or the State of Michigan. It is a valuable resource for establishing and measuring performance objectives for the NCFD but should not be the only determining factor when making local decisions about the city's fire services.

According to NFPA 1720, fire departments should base their specific role on a formal community risk management plan, as discussed earlier in this analysis, and taking into consideration:¹⁸

- Life hazard to the population protected. The number and type of units assigned to respond to a reported incident shall be determined by risk analysis and/or pre-fire planning.
- Fire suppression operations shall be organized to ensure that the fire department's fire suppression capability includes personnel, equipment, and other resources to deploy fire suppression resources in such a manner that the needs of the organization are met.
- The Authority Having Jurisdiction shall promulgate the fire department's organizational, operational, and deployment procedures by issuing written administrative regulations, standard operating procedures, and departmental orders.
- The number of members that are available to operate on an incident is sufficient and able to meet the needs of the department.
- Provisions for safe and effective firefighting performance conditions for the firefighters.

18. NFPA 1720

- Personnel responding to fires and other emergencies shall be organized into company units or response teams and have the required apparatus and equipment to respond.
- Initial firefighting operations shall be organized to ensure that at least four members are assembled before interior fire suppression operations are initiated in a hazardous area.
- The capability to sustain operations shall include the personnel, equipment, and resources to conduct incident specific operations.

Fire and rescue work are task-oriented and labor intensive, performed by personnel wearing heavy, bulky personal protective equipment (PPE). Many critical fireground tasks require the skillful operation and maneuvering of heavy equipment.

The speed, efficiency, and safety of fireground operations are dependent upon the number of firefighters performing the tasks. If fewer firefighters are available to complete critical fireground tasks, those tasks will require more time to complete. This increased time is associated with elevated risk to both firefighters and civilians.

To ensure civilian and firefighter safety, fireground tasks must be coordinated and performed in rapid sequence. Assembling an Effective Response Force (ERF) is essential to accomplish on-scene goals and objectives safely and efficiently. Without adequate resources to control a building fire, the building and its contents continue to burn. This increases the likelihood of a sudden change in fire conditions, and thus the potential for failure of structural components leading to collapse. An inadequate ERF limits firefighters' ability to successfully perform a search and potential rescue of any occupants.

As a fire grows and leaves the room and then floor of origin, or extends beyond the building of origin, it is most probable that additional personnel and equipment will be needed, as initial response personnel will be taxed beyond their available resources. From this perspective it is critical that the NCFD units respond quickly and initiate extinguishment efforts as rapidly as possible after notification of an incident. It is, however, difficult to determine in every case the effectiveness of the initial response in limiting the fire spread and fire damage. Many variables will impact these outcomes, including:

- The time of detection, notification, and response of fire units.
- The age and type of construction of the structure.
- The presence of any built-in protection (automatic fire sprinklers) or fire detection systems.
- The contents stored in the structure and its flammability.
- The presence of any flammable liquids, explosives, or compressed gas canisters.
- Weather conditions and the availability of water for extinguishment.

Subsequently, in those situations in which there are extended delays in the extinguishment effort, or the fire has progressed sufficiently upon arrival of fire units, there is actually very little that can be done to limit the extent of damage to the entire structure and its contents. In these situations, suppression efforts may need to focus on the protection of nearby or adjacent structures (exterior exposures) with the goal being to limit the spread of the fire beyond the building of origin, and sometimes the exposed building. This is often termed **protecting exposures**. When the scope of damage is extensive, and the building becomes unstable, firefighting tactics typically move to what is called a **defensive attack**, or one in which hose lines and more importantly personnel are on the outside of the structure and their focus is to merely discharge large volumes of water until the fire goes out. In these situations, the ability to enter the building is

extremely limited and if victims are trapped in the structure, there are very few safe options for making entry.

Today's fire service is actively debating the options of interior firefighting vs. exterior firefighting. These terms are self-descriptive in that an **interior fire attack** is one in which firefighters enter a burning building in an attempt to find the seat of the fire and from this interior position extinguish the fire with limited amounts of water. An **exterior fire attack**, also sometimes referred to as a **transitional attack**, is a tactic in which firefighters initially discharge water from the exterior of the building, either through a window or door and knock down the fire before entry in the building is made. The concept is to introduce larger volumes of water initially from the outside of the building, cool the interior temperatures, and reduce the intensity of the fire before firefighters enter the building.

A transitional attack is most applicable in smaller structures, typically single-family, one-story detached units that are smaller than 2,500 square feet in total floor area. For fires in larger structures, the defensive-type, exterior attacks involve the use of master streams, typically from an elevated aerial device, and capable of delivering large volumes of water for an extended period of time.

The exterior attack limits the firefighter from making entry into those super-heated structures that may be susceptible to collapse. From CPSM's perspective, there is the probability, depending on the time of day, an NCFD response crew of a limited number of personnel on the initial response will encounter a significant and rapidly developing fire situation. ***It is prudent, therefore, that the NCFD builds at least a component of its training and operating procedures around the tactical concept of this occurring.***

The variables of how and where personnel and companies are located, and how quickly they can arrive on scene, play major roles in controlling and mitigating emergencies. ***The reality is that NCFD relies on - on-premises POC staffing (nights and weekends at one of the two primary stations) and paid-on-call response from home or work to make up the teams and crews of the Effective Response Force.*** NCFD's POC availability at any time of the day may have an impact on assembling enough personnel and resources on the scene. This factor has to be considered at all times by those responding to the scene, those responding to the station to pick up apparatus, and command officers responding who must manage and coordinate available responding and on-scene resources.

The NCFD utilizes *IamResponding*, a software app that links responding apparatus and responding volunteers together and alerts responding members, apparatus, and command officers who are responding to an incident or the station to respond with apparatus. The features of this software include:

- Members can receive call notifications through the communications system (CAD) to their smartphone that includes dispatch audio and station alerts.
- The *IamResponding* app provides a map display of the incident location, directions to the scene, and the live location of responding members and apparatus (as long as members and apparatus are using the system). Through this system, command officers have initial accountability of responding members and where they are responding to (scene or station).
- When members are responding to the station their live locations are displayed, which alerts command officers and apparatus driver/operators where they are, assisting driver/operators in determining whether to wait on a member prior to rolling apparatus.

CPSM learned this valuable communication medium is not being utilized to its fullest extent by all members of the NCFD. For volunteer and/or paid-on-call departments, utilizing *IamResponding* will contribute to more efficient and effective emergency response operations by improving communication, coordination, and accountability among NCFD first responders. The app streamlines processes, enhances situational awareness for all members, and ultimately helps save valuable time in critical situations. **CPSM strongly recommends the use of this app become mandatory for all members by policy and utilized as a continual update of their non-availability, and when responding to calls when not in the station.**

NFPA 1720 establishes the minimum response staffing for a predominately volunteer department for low-hazard structural firefighting incidents (to include out buildings and up to a 2,000 square-foot, one- to two-story, single-family dwelling without a basement and no exposures) for specific demand zones as shown in the following table.

Each demand zone takes into consideration certain risk elements such as population density, exposed occupied buildings (more predominant in urban and suburban demand zones), water supply, and proximity to responding apparatus and members (incident and fire station).

NFPA 1720 demand zone response criterion is described in the next table.

Table 9: NFPA 1720 Staffing for Effective Response Force, Residential Structure

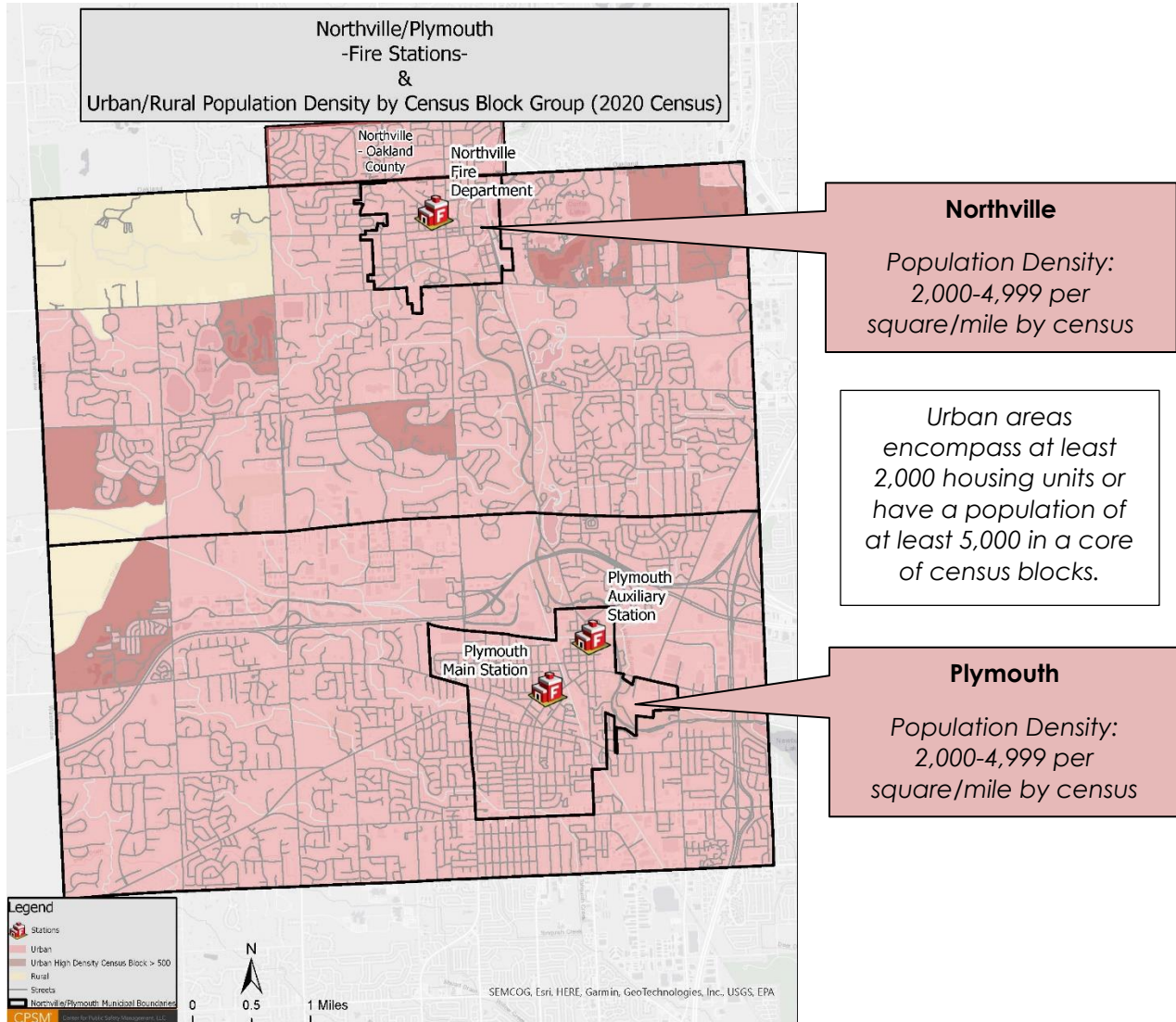
Demand Zone	Demographics	Minimum Staff to Respond to Scene*	Response Time Standard to Collect Minimum Staff
Urban Area	>1000 people/mi ²	15	Within 9 minutes 90 percent of the time
Suburban Area	500-1000 people/mi ²	10	Within 10 minutes 80 percent of the time
Rural Area	<500 people/mi ²	6	Within 14 minutes 80 percent of the time
Remote Area	Travel Distance ≥ 8 miles	4	Directly dependent on travel distance, determined by AHJ, 90 percent of the time

Note: *Minimum staff responding includes automatic and mutual aid. Minimum staff responding to scene by apparatus and personal owned vehicle.

The next figure shows the areas of NCFD response area that are benchmarked against each city's population density. The purpose of this map is to identify where the NFPA 1720 demand zones exist in each city and how this links to the Effective Response Force for each zone the NCFD should strive to meet for building fires. The built-upon land area of the NCFD response area (Northville and Plymouth) meets the NFPA 1720 urban demand zone, which assigns a minimum staff to respond benchmark of 15 personnel for a residential structure.

As a note, the NFPA 1720 study stops at residential buildings in its Effective Response Force outline. The NFPA 1710 standard (primarily career fire departments) goes beyond residential structures and outlines Effective Response Force staffing for commercial, strip mall, and apartment buildings. **The Effective Response Force for these building types is twenty-eight.** The NCFD should be acquainted with this standard as these types of buildings are present in both cities, and to ensure all critical tasks are accomplished safely and effectively.

Figure 16: NCFD NFPA 1720 Demand Zones



The next table provides an example of operational critical tasking utilizing the NFPA 1720 minimum staffing criteria. As discussed above, the urban demand zone stipulates the largest minimum staffing. In the urban demand zone, when the minimum staffing assembles, critical tasks are completed simultaneously. **NCFD has all urban demand zones in its response district.**

TABLE 10: Critical Tasking in an Urban Demand Zone, Single-Family Dwelling

Critical	# of Responders Assigned to Task
Attack Line (2-In)	2
Backup/Second Line	2
Ventilation	2
Search and Rescue	2
Rapid Intervention (2-out)	2
Attack Engine Pump Operator	1
Water Source Engine Pump Operator	1
Outside Crew for: utility control, hose	
Incident Commander	1
Total Minimum Response for Urban Demand Zone	15

NFPA 1720 calls attention to additional staffing/response requirements worth noting here:

- *The fire department shall identify minimum staffing requirements to ensure that the number of members that are available to operate are able to meet the needs of the department.*
 - For the volunteer or POC component this can include scheduled staffing at a predetermined station or pre-determined staff responding to stations to assemble and respond on apparatus.
- *Where staffed stations are provided, when determined by the authority having jurisdiction, they shall have a turnout time of 90 seconds for fire and special operations and 60 seconds for EMS incidents, 90 percent of the time. The NCFD has implemented this staffing concept.*
 - This should be measured at a staffed station.
- *Upon assembling the necessary resources at the emergency scene, the fire department shall have the capability to safely commence an initial attack within 2 minutes 90 percent of the time.*
 - This should be announced by the incident commander over the radio and measured through the computer-aided dispatch (CAD) system after the arrival of the initial arriving members, companies, and response teams.
- *Personnel responding to fires and other emergencies shall be organized into company units or response teams and have the required apparatus and equipment.*
 - This avoids freelancing by personnel before and after the arrival of the fire suppression units; enables the incident commander to size-up available on-scene resources, ensures fireground accountability, and ensures a coordinated assignment of critical tasks.

OSHA “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.

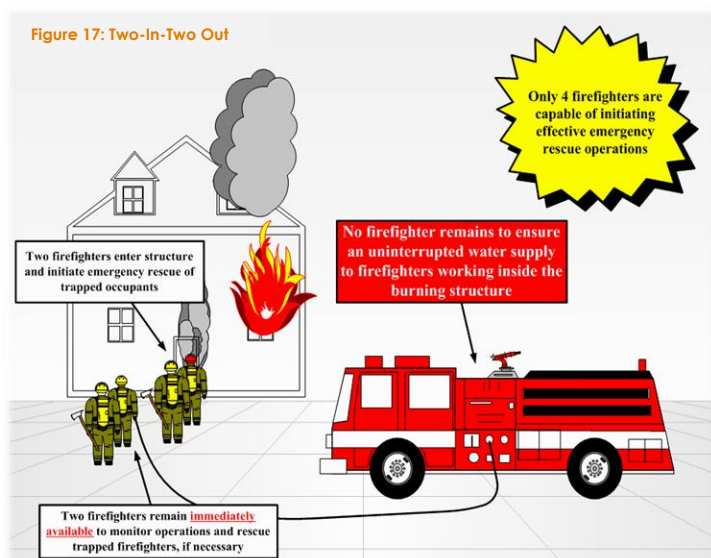
This critical tasking model outlined above has its genesis with the Occupational Safety and Health Administration, specifically 29 CFR 1910.134(g)(4). This standard applies to the NCFD as Federal OSHA covers issues not covered in the state plan.

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:

- 1910.134(g)(4)(i)
 - At least two employees enter the IDLH atmosphere and remain in visual or voice contact with one another at all times;
- 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.



NFPA 1500, Standard on Fire Department Occupational Health, Safety, and Wellness, 2021 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.

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.¹⁹

19. NFPA 1500, 8.8.2.5, 2021 Edition

As is common with many volunteer or paid on call fire departments, NCFD does not respond to structural fires with a pre-determined staffing regimen or a guaranteed command officer on the initial alarm dispatch. Under this response model, NCFD may or may not have the minimum number of firefighters on the initial response in order to comply with CFR 1910.134(g)(4), regarding two-in/two-out rules and initial rapid intervention team (IRIT). Responding members must be mindful of who and what apparatus is on scene and the Two-In/Two-Out concept.

In order to meet CFR 1910.134(g)(4), and NFPA 1500, the NCFD 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.²⁰

The assembling of four members for the initial fire attack can be accomplished in many ways. In their response plan, the fire department should determine the manner in which they plan to assemble members. The four members assembled for initial fire-fighting operations can include an officer, chief officer, or any combination of members arriving at the incident. For career departments, the four members should arrive in tandem if on separate units.

If members are going to initiate actions that would involve entering a structure because of an imminent life-threatening situation where immediate action can prevent the loss of life or serious injury and four members are not yet on the scene, the members should carefully evaluate the level of risk that they would be exposed to by taking such action. If it is determined that the situation warrants such action, incoming companies should be notified so that they will be prepared to provide necessary support and backup upon arrival.

In the end, the ability to assemble adequate personnel, along with appropriate apparatus to the scene of a structure fire, is critical to operational success and firefighter safety. NFPA 1720 addresses this through the staffing matrix for the various demand zones as discussed above.

NCFD Staffing Model

As discussed, the NCFD utilizes paid-on-call response from members who are not on-premises when the alarm sounds, and/or with crews who are on-premises. The NCFD does have on-premises crews assigned to one of the two primary stations at night and on weekends. The on-premises staffing is not mandatory. Members sign up when available. The maximum staffing for this program is two.

The NCFD does have a standardized staffing model for apparatus, meaning an apparatus responds with a minimum of two qualified members. The NCFD has a response matrix with accompanying language directing members to respond to the station, then respond to the call on apparatus. Members can respond directly to the scene on EMS calls if an apparatus has signed on the air responding and to other call types when appropriate apparatus is responding.

Responding to the Scene in Personal Owned Vehicles

Should members elect to or are allowed to respond to the scene and not the station on fire calls for service, there are several factors a NCFD leadership must consider should they allow this to

20. NFPA 1500, A..8.8.2, 2021 Edition

occur. These considerations must ensure the effective use of resources and the safety of the public and firefighters, and are as follows:

- Accountability of responding and on-scene resources, and in the case of firefighters responding in personal vehicles, their ability to arrive safely and function safely prior to the initial arriving fire apparatus.
- Meeting the intent of NFPA 1720 standards, in particular ensuring personnel responding to fires and other emergencies are organized into company units or response teams consisting of a team of at least two.
- The avoidance of freelancing on the fireground, particularly early arriving POC firefighters to an incident in personal vehicles.
- Organizing initial firefighting operations, ensuring that at least four members are assembled before interior fire suppression operations are initiated in a hazardous area.
- It is of the highest importance that firefighters are trained and disciplined not to freelance or enter a hazardous area or building on fire without the proper equipment beyond their issued personal protective clothing if they arrive to an emergency scene prior to responding fire apparatus.
- Ensuring assembled personnel have radio communication with Incident Command at all times so that they may transmit urgent messages, critical task progress, incident updates, and their team's location, accountability of their actions, and receive from Incident Command and/or other teams operating at the scene urgent messages, updates, critical task progress, other team locations, and receive new assignments.

The 2021 edition of NFPA 1500 standard on *Fire Department Occupational Safety, Health, and Wellness Program* is equally clear on the critical emergency scene function of personnel accountability. Additionally, the 2020 edition of NFPA 1561 *Emergency Services Incident Management System and Command Safety* more specifically addresses emergency scene accountability.

Accountability systems include tracking systems where responding apparatus crews or individuals deliver accountability tags to Incident Command for use when command assigns members and companies, and forms crews and groups (interior, roof, hazard control etc.). The Incident Commander places the accountability tags on a board or other tracking instrument that he/she can constantly visualize, move when crews are reassigned, and maintain accountability awareness.

These standards include language as outlined in the following table.

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TABLE 11: Emergency Scene Accountability–NFPA 1500 and NFPA 1561

NFPA 1500	NFPA 1561
8.5.1: The fire department shall establish written standard operating procedures for a personnel accountability system; this is in accordance with NFPA 1561.	4.6.1: The ESO shall develop and routinely use a system to maintain accountability for all resources assigned to the incident with special emphasis on the accountability of personnel.
8.5.3: It shall be the responsibility of all members operating at the emergency incident to actively participate in the personnel accountability system.	4.6.2: The system shall maintain accountability for the location and status condition of each organizational element at the scene of the incident.
8.5.4: The incident commander shall maintain an awareness of the location and function of all companies or crews at the scene of the incident.	4.6.3: The system shall include a specific means to identify and keep track of responders entering and leaving hazardous areas, especially where special protective equipment is required.
8.5.8: Members shall be responsible for following personnel accountability system procedures.	4.6.5: Responder accountability shall be maintained and communicated within the incident management system when responders in any configuration are relocated at an incident.
8.5.9: The personnel accountability system shall be used at all incidents.	4.6.6: Supervisors shall maintain accountability of resources assigned within the supervisor's geographical or functional area of responsibility.
8.5.10: The fire department shall develop, implement, and utilize the system components required to make the personnel accountability system effective.	4.6.10: Responders who arrive at an incident in or on marked apparatus shall be identified by a system that provides an accurate accounting of the responders on each apparatus.
	4.6.11: Responders who arrive at the scene of an incident by other means other than emergency response vehicles shall be identified by a system that accounts for their presence and their assignment at the incident scene.
	4.6.14: The system shall also provide a process for the rapid accounting of all responders at the emergency scene.

Part 74, R 408.17451(b) (Management of Emergency Operations) of the Michigan OSHA Standards (MIOSHA) requires *that a personnel accountability system be implemented at each emergency*. The NCFD is compliant with this as policy (CPSM did not measure implementation) through NCFD Policy #115.

The next figure illustrates the NCFD response matrix to all call types, fire, and EMS.

Figure 18: NCFD Response Matrix

Minimum Staffing	2	1	2	1	1	N/A	Response Mode
Resources	Engine	Rescue	Aerial	Utility	Chief	EMS (ALS)	
Alarms							
Medical Alarm		1				1	Emergent
Res. Fire Alarm	1			1	1		Non-Emergent
Com. Fire Alarm	2	1		1	1		Emergent
Carbon Monoxide w/o Symptoms	1	1					Non-Emergent
Carbon Monoxide w/ Symptoms	1	1			1	1	Emergent
High Hazard Alarm	2	1	1	1	1		Emergent
Structure Fire							
Reported/Confirmed	3	1	1	1	1	1	Emergent
Medical / EMS Runs							
Medical		1				1	Emergent
Lift Assist		1					Non-Emergent
Committals		1				1	Non-Emergent
Hospice Deaths							NO RESPONSE
No Response							
Non-Structural Fire Response / Weather / Rescue / Citizen Assist							
Brush/Grass Fire	2						Emergent
Dumpster/Trash Fire	1	1					Emergent
Smoke Investigation	2	1		1	1		Emergent
Vehicle Fire	2	1		1	1		Emergent
Motor vehicle Accident w/o Injuries	2	1		1			Non-Emergent
Motor Vehicle Accident w/ injuries or unk	2	1		1	1	1	Emergent
Animal Resuce	1						Non-Emergent
Citizen Assist / Police Assist	1						Non-Emergent
Burning Complaints	1						Non-Emergent
Wires Down / Arching	1	1		1			Emergent
Wires Arching/Not down	1						Non-Emergent
Water Rescue	2	1		1	1	1	Emergent
Mutual Aid Request - Fire	1						Emergent
Mutual Aid Request - Medical		1					Emergent

**** Response mode for medicals Depends on the Chief Complaint and threat to life**

**** High Hazard Alarms = Schools in session, Nursing homes, or Hazardous commerical buliding (Ex. AT&T Buidlings)**

**** All responses subject to change when Incident Command requests**

***Members respond to the station, then respond in apparatus to the call. Members are able to respond direct for medicals if an apparatus is on the air.**

When analyzing the NCFD response matrix, CPSM considers two important factors: the NCFD is a paid on call agency and it may take more than one apparatus resource to assemble the staffing needed to mitigate the emergency. That said, CPSM finds the response matrix to be in line with the critical tasking that is needed to be performed on the incidents listed.

Overall, there were twenty-one structure fire calls in the NCFD response areas. Overall, these incidents totaled 56 runs (a call is counted singularly) with multiple units responding (each unit is counted as a run).

Table 12: Runs for Structure and Outside Fires by Call Location

Location	Structure Fires		Outside Fires	
	Runs	Minutes per Run	Runs	Minutes per Run
Northville	14	33.9	14	14.7
Plymouth	42	43.4	16	16.2
NCFD District Subtotal	56	41.0	30	15.5

The next table outlines structural fire responses by number of fire units that responded and personnel count.

Table 13: Structure Fires by Number of Arriving Units and Personnel

NA = no records available.

City	INCI ID	Date	Apparatus				Personnel			
			Fire	EMS	Other	Total	Fire	EMS	Other	Total
Northville	0021582	2022-10-13	1	0	0	1	3	0	0	3
	0021715	2022-12-24	4	0	1	5	8	0	1	9
	0021012	2023-01-08	1	0	0	1	3	0	0	3
	0210045	2023-01-28	1	0	0	0	2	0	0	2
	1000185	2023-04-29	3	1	2	6	7	2	4	13
Plymouth	0000952	2022-10-11	2	0	0	2	5	0	0	5
	0000998	2022-10-28	3	0	0	3	3	0	0	3
	0001016	2022-11-03	2	0	0	2	3	0	0	3
	0001126	2022-12-11	7	0	1	8	2	0	2	4
	0000091	2023-02-05	2	0	0	2	3	0	0	3
	1000216	2023-05-04	6	2	2	10	6	2	1	9
	1000407	2023-06-11	1	0	1	2	2	0	2	4
	1000692	2023-06-28	2	0	0	2	2	0	0	2
	1000729	2023-07-04	3	0	2	5	4	0	1	5
	073934*	2023-07-04	1	0	0	1	NA	NA	NA	NA
	1000829	2023-07-20	2	2	0	4	4	2	0	6
	25719319*	2023-08-05	2	0	1	3	NA	NA	NA	NA
	234759*	2023-08-06	2	0	0	2	NA	NA	NA	NA
	25952017*	2023-09-01	4	2	1	7	NA	NA	NA	NA
	140100*	2023-09-01	1	0	0	1	NA	NA	NA	NA
	23451871*	2022-11-06	1	1	0	2	NA	NA	NA	NA

In analysis of this table:

- There were twenty-one structure fire calls during the one-year data analysis CPSM conducted.
- Fourteen structure fire calls had two or more fire apparatus units responding.
- Four structure fire calls had four or more fire apparatus units responding.
- No structure fire response met the NFPA 1720 personnel response standard for residential structures, which is fifteen personnel.
- One structure fire response had thirteen personnel respond, four of which were EMS.
- Two structure fire responses had nine personnel respond, and in each one was an EMS member.
- When you remove the one call where thirteen members responded, the average number of fire responders to structure fires was 3.4 members/structure fire response.
- **Six responses did not have response personnel information in the data provided to CPSM, so these calls were not included in the table analysis.**

Staffing Considerations

There are several methods a paid on call can consider and implement to ensure safe and effective response, while maintaining an efficient budget and effective service to the end user of the fire department response system. ***Overall, what needs to be achieved for a safe and effective fire unit response to structural fires is a fire apparatus minimum staffing plan of 2 personnel on the heavy fire apparatus (prior to leaving each station-wait if a third is close to the station per lamResponding), and a minimum of staffing of 2 on the Quick Response Vehicles (prior to leaving each station), for a safe and effective operational response to structural fires. Further, the NCFD should develop a goal for structural fire responses that recognizes the minimum response level of personnel as outlined in NFPA 1720 for urban response areas (15 firefighters) and objectives of how to best meet this goal in the NCFD response district. The objectives should link directly to the NCFD response metrics for structure fires, which is outlined above as 3 Engines; 1 Rescue; 1 Aerial Ladder.***

There are several methods a paid on call fire department can consider ensuring safe and effective response, while maintaining efficient service to the citizens. **It is critical in a paid on call response methodology that all members utilize the lamResponding software on their cellular phones and the response boards in the stations to identify member response and availability. This response tool should be mandatory. It is also critical that all calls be acknowledged by an officer or member at the station. Included in this responsibility is monitoring the lamResponding board and app for member response. Logically if no members signal a response through the app, the second station may need to be activated for the response.**

Examples of different paid on call staffing models include:

- Apparatus-only response (minimally staffed apparatus with no personal vehicles to scene response).
 - Initial response of members to station, assemble a crew of at least three-four personnel (Driver/Operator, Officer or designated crew leader, firefighter(s); apparatus responds. Under this model many paid on call departments establish individual companies by the apparatus they deploy (engines and ladders), assign members and officers who then maintain and staff the apparatus, and then train together to increase their effectiveness on the emergency scene. Typical crew assignment commitment times are 6:00 p.m. to 6:00 a.m.
- Hybrid response using off - premises duty crews.
 - For nights and weekends when volunteer members are typically more readily available, assign a crew of three to four to one engine and one other apparatus (ladder or engine) who respond from home to the station to assemble and respond the apparatus. All other members respond to the station accordingly based on the call type. Typical crew assignment commitment times are 6:00 p.m. to 6:00 a.m.
- Hybrid response with on - premises crew and off - premises duty crew.
 - For nights and weekends when paid on call members are able to commit, assign a crew of three to four to one engine to immediately respond the engine apparatus (**current NCFD model**). Also assign a crew of three to four to the opposite station who respond from home to the station to assemble and respond the apparatus accordingly and based on the call type. All other members respond to the station based on the call type and respond additional apparatus. Typical crew assignment commitment times are 6:00 a.m. to 6:00 p.m. and 6:00 p.m. to 6:00 a.m.

- Monday-Friday Daytime Response

- Members should register through **lamResponding** that they are available and will respond to the station and deploy the apparatus when needed. This ensures accountability to the overall system of available responding members and how an Effective Response Force can be assembled during those hours when paid on call members are not as readily available.

NCFD Response Times

Response times are typically a primary measurement for evaluating fire and EMS services. Response times can be 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.

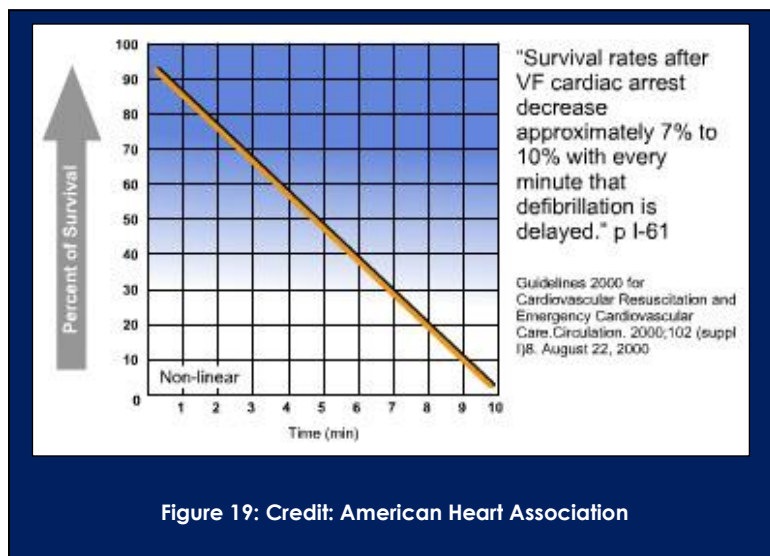
Travel time is a key point to understanding how fire and EMS station location influences a community's aggregate response time performance. Travel time can be mapped when existing and proposed station locations are known. The location of responding units is one key factor in response time; reducing response times, which is typically a key performance measure in determining the efficiency of department operations, often depends on this factor.

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. However, cardiac arrests occur infrequently; on average, these incidents make up a lower percent of all EMS incidents.²¹ There are also other EMS incidents that are truly life-threatening, and the time of response can clearly impact the outcome. These involve cardiac and respiratory emergencies, full drownings, 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 lower on average when looking at the totality of EMS responses.

As a low percentage of 911 patients have time-sensitive and advanced life support (ALS) needs, for those patients that do, time can be a critical issue of morbidity and mortality. 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.

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21 Myers, Slovis, Eckstein, Goodloe et al. (2007). "Evidence-based Performance Measures for Emergency Medical Services System: A Model for Expanded EMS Benchmarking." *Pre-hospital Emergency Care*.



The figure to the left 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 first published by the American Heart Association in 2000.

Response times for fire incidents are based on the concept of

"flashover." A flashover is the near-simultaneous ignition of most of the directly exposed combustible material in an enclosed area. When certain organic materials are heated, they undergo thermal decomposition and release of flammable gases. Flashover occurs when the majority of the exposed surfaces in a space are heated to their auto ignition temperature and emit flammable gases. "Flashover is the transition phase in the development of a contained fire in which surfaces exposed to thermal radiation, from fire gases in excess of 600 degrees Celsius, reach ignition temperature more or less simultaneously and fire spreads rapidly throughout the space."²²

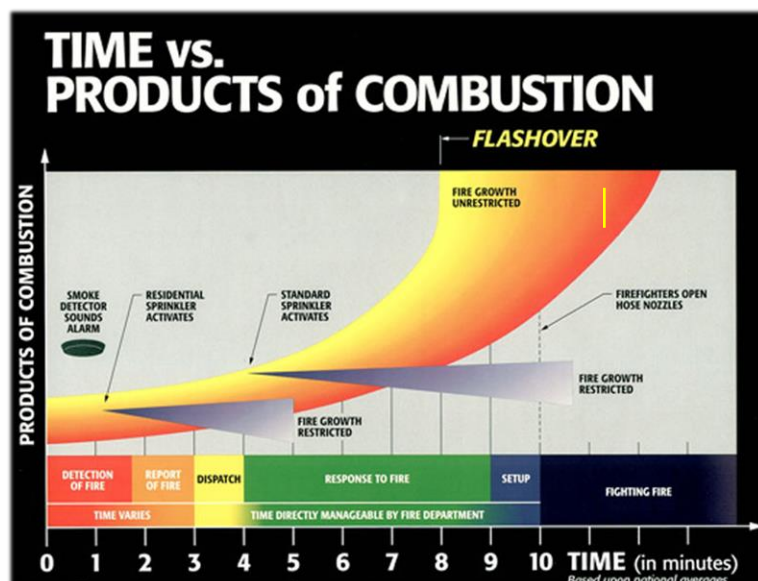
When the fire does reach this extremely hazardous state, initial firefighting forces are often overwhelmed, a larger and more destructive fire occurs, the fire escapes the room and even the building of origin, and significantly more resources are required to affect fire control and extinguishment.

To illustrate how a fire grows over a brief period of time, the next figure shows the time progression of a fire from inception (event initiation) through flashover. The time-versus-products of combustion curve shows activation times and effectiveness of residential sprinklers (approximately one minute), commercial sprinklers (four minutes), flashover (eight to ten minutes), and firefighters applying first water to the fire after notification, dispatch, response, and set-up (ten minutes).

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22. National Institute of Standards and Technology, Definition of Flashover.

Figure 20: Fire Growth²³



The next figure illustrates the overview of response time performance for fire response under NFPA 1720.

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.

23. Fire Protection System Designs, Grant, 2018

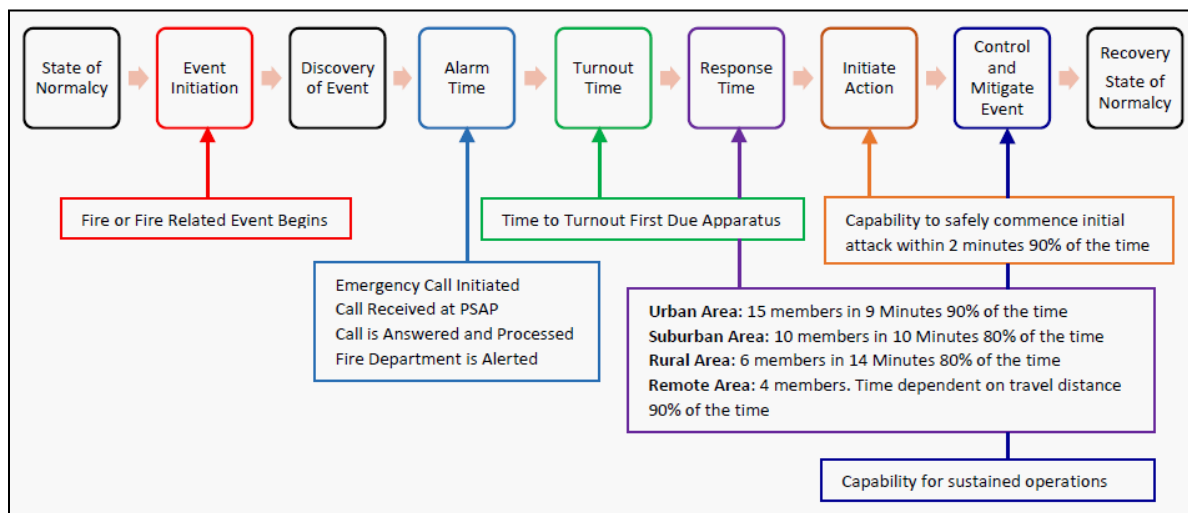
Response time is the total time elapsed between receiving a call to arriving on scene. In the data analysis, we included all calls within the primary service areas of NCFD to which at least one unit responded.

Dispatch time is the difference between the time a call is received and the earliest time an agency 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. The NFPA 1221 standard for this component of response times is the most utilized benchmark. Benchmark times include:

The next component of response time is **turnout time**, an aspect of response which is controlled by the responding Fire and/or EMS agency. Turnout time is the difference between the earliest dispatch time and the earliest time an agency's unit is en route to a call's location.

The last component of response time is **travel time**, an aspect of response time that is affected by factors such as station location, road conditions, weather, and traffic control systems. Travel time is the difference between the earliest en route time and the earliest arrival time.

Figure 21: NFPA 1720 Response Time Performance Measures



As a review, the next table shows the response time of and minimum staffing level for low-hazard structural firefighting incidents (to include out-buildings and up to a 2,000 square-foot, one- to two-story, single-family dwelling without a basement and no exposures) in each demand zone as defined by NFPA 1720. This table reflects the minimum staffing and response time in minutes to assemble the minimum staffing in each demand zone type (urban, suburban, rural, and remote). The minimum staffing represents the response force necessary to combat or begin to combat a structural type of fire as described above.

Urban and suburban demand zones differ as these demand zones have a higher population density, and have a higher percentage of multifamily, townhouse, condominium, and multistory apartment building structures, which require a greater response force to complete the critical tasking necessary to mitigate the fire and life-safety emergency.

Table 14: NFPA 1720 Staffing and Response Times, Low-Hazard Structural Fire

Demand Zone	Demographics	Minimum Staff to Respond	Response Time in Minutes-Assembling Staff	Meets Objective Percentile
Urban Area	>1000 people/mi	15	9	90%
Suburban Area	500-1000 people/mi	10	10	80%
Rural Area	<500 people/mi	6	14	80%
Remote Area	Travel Distance \geq 8 miles	4	Directly dependent on travel distance	90%

Response times for the NCFD are discussed next. In this analysis, we included all calls responded to by NCFD's non-administrative units while excluding canceled and mutual aid calls. We included only calls whose response types were identified as "emergent." In addition, calls with a total response time of more than 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.

Based on the methodology above, for 2,060 calls received for the study period, 23 cancelled calls, 82 mutual aid calls, and 768 non-emergency calls were excluded. As a result, in this section, a total of 1,156 calls are included in the analysis.

The next tables break down the average, 80th, and 90th percentile total response times (in minutes). An 80th or 90th percentile means that 80 or 90 percent of calls had response times at or below that number.

Table 15: Average Response Time of First Arriving Unit, by Call Type (Minutes)

Call Type	Average Response Time				Call Count
	Dispatch	Turnout	Travel	Total	
Breathing difficulty	1.1	3.3	3.4	7.9	111
Cardiac and stroke	1.1	3.3	3.5	8.0	109
Fall and injury	1.0	2.5	3.1	6.6	218
Illness and other	1.2	2.7	3.6	7.5	190
MVA	0.4	2.6	2.4	5.5	41
OD*	0.9	2.7	3.9	7.6	63
Seizure and UNC**	1.2	2.2	3.1	6.5	160
EMS Subtotal	1.1	2.7	3.3	7.1	892
False alarm	0.4	3.1	3.7	7.2	112
Good intent	1.1	3.3	2.5	6.8	14
Hazard	1.7	2.9	2.9	7.5	112
Outside fire	1.0	3.0	2.9	6.9	6
Structure fire	0.7	2.5	3.9	7.2	17
Technical rescue	0.5	2.2	1.4	4.1	3
Fire Subtotal	1.1	2.9	3.3	7.3	264
Total	1.1	2.8	3.3	7.2	1,156

Table 16: 90th Percentile Response Times of First Arriving Unit, by Call Type

Call Type	90th Percentile Response Time				Call Count
	Dispatch	Turnout	Travel	Total	
Breathing difficulty	2.0	8.0	6.9	12.0	111
Cardiac and stroke	2.1	8.4	7.8	13.4	109
Fall and injury	2.0	6.0	7.3	11.7	218
Illness and other	2.0	5.7	7.2	12.3	190
MVA	1.6	7.2	4.4	8.8	41
OD*	2.2	5.2	7.6	12.4	63
Seizure and UNC**	1.7	4.1	7.0	10.8	160
EMS Subtotal	2.0	6.6	7.2	12.0	892
False alarm	1.0	6.2	8.2	13.3	112
Good intent	2.2	6.8	5.8	14.9	14
Hazard	3.5	6.2	5.7	13.9	112
Outside fire	2.6	5.9	4.6	9.0	6
Structure fire	1.6	4.3	7.4	10.8	17
Technical rescue	1.4	3.2	2.2	6.8	3
Fire Subtotal	2.2	6.2	7.4	13.3	264
Total	2.0	6.5	7.2	12.4	1,156

It is important to understand that measuring and analyzing response times and response time coverage are measurements of performance. When we discussed community risk, we identified that the NCFD, 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 majority of 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 jurisdiction's resources plus mutual/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. Lower response times of the initial arriving engine and low time to assemble an Effective Response Force on fire and other incidents are associated with positive outcomes.

As a note, the NFPA 1720 standard measures the assembling of an Effective Response Force in the urban areas at the 90th percentile and not apparatus response times. It is important however to evaluate turnout and travel times as key benchmarks, as you must have at minimum one engine apparatus on scene when assembling an Effective Response Force within the same 90th percentile, so that members have the means to begin fire suppression efforts.

Additionally, and when measuring the collection of an Effective Response Force response time element under NFPA 1720, to effectively benchmark 15 firefighters in 9 minutes for an urban demand zone response, the incident commander must announce to the dispatcher when the response force by head count is collected (utilizing the required personnel accountability board for instance is one way to count firefighters on scene). By doing so, this announcement is recorded in the CAD times and can be evaluated periodically.

In analysis of the NCFD response times:

- The average turnout time was 2.8 minutes.
- The average travel time was 3.3 minutes.
- The average total response time was 7.2 minutes.
- The average response time was 6.9 minutes for outside fires and 7.2 minutes for structure fires.
- **The average response time was 6.9 minutes for outside fires and 7.2 minutes for structure fires.**
- The 90th percentile turnout time was 6.5 minutes.
- The 90th percentile travel time was 7.2 minutes.
- The 90th percentile total response time was 12.4 minutes.
- The 90th percentile response time was 12.0 minutes for EMS calls and 13.3 minutes for fire calls.
- **The 90th percentile response time was 9.0 minutes for outside fires and 10.8 minutes for structure fires.**

As a review from a previous discussion, NFPA 1720 calls attention to additional staffing/response requirements worth noting here:

- *The fire department shall identify minimum staffing requirements to ensure that the number of members that are available to operate are able to meet the needs of the department.*
 - For the volunteer component this can include scheduled staffing at predetermined stations or pre-determined staff responding to stations to assemble and response apparatus.
- **Where staffed stations are provided, when determined by the authority having jurisdiction, they shall have a turnout time of 90 seconds for fire and special operations and 60 seconds for EMS incidents, 90 percent of the time. NCFD nights and weekends on-premises staffing.**
 - **This should be measured at staffed stations.**
- *Upon assembling the necessary resources at the emergency scene, the fire department shall have the capability to safely commence an initial attack within 2 minutes 90 percent of the time.*
 - This should be announced by the incident commander over the radio and measured through the computer-aided dispatch (CAD) system after the arrival of the initial arriving members, companies, and response teams.
- *Personnel responding to fires and other emergencies shall be organized into company units or response teams and have the required apparatus and equipment.*

- This avoids freelancing by personnel before and after the arrival of the fire suppression units; enables the incident commander to size-up available on-scene resources, ensures fireground accountability, and ensures a coordinated assignment of critical tasks.

CPSM also looked at response travel times from a GIS perspective. The next figures illustrate travel time bleeds from NCFD stations utilizing the city road network, speed limits, traffic signal lights, stop signs, U-turns etc. These maps are intended to show the response travel times separately from the Northville and Plymouth stations.

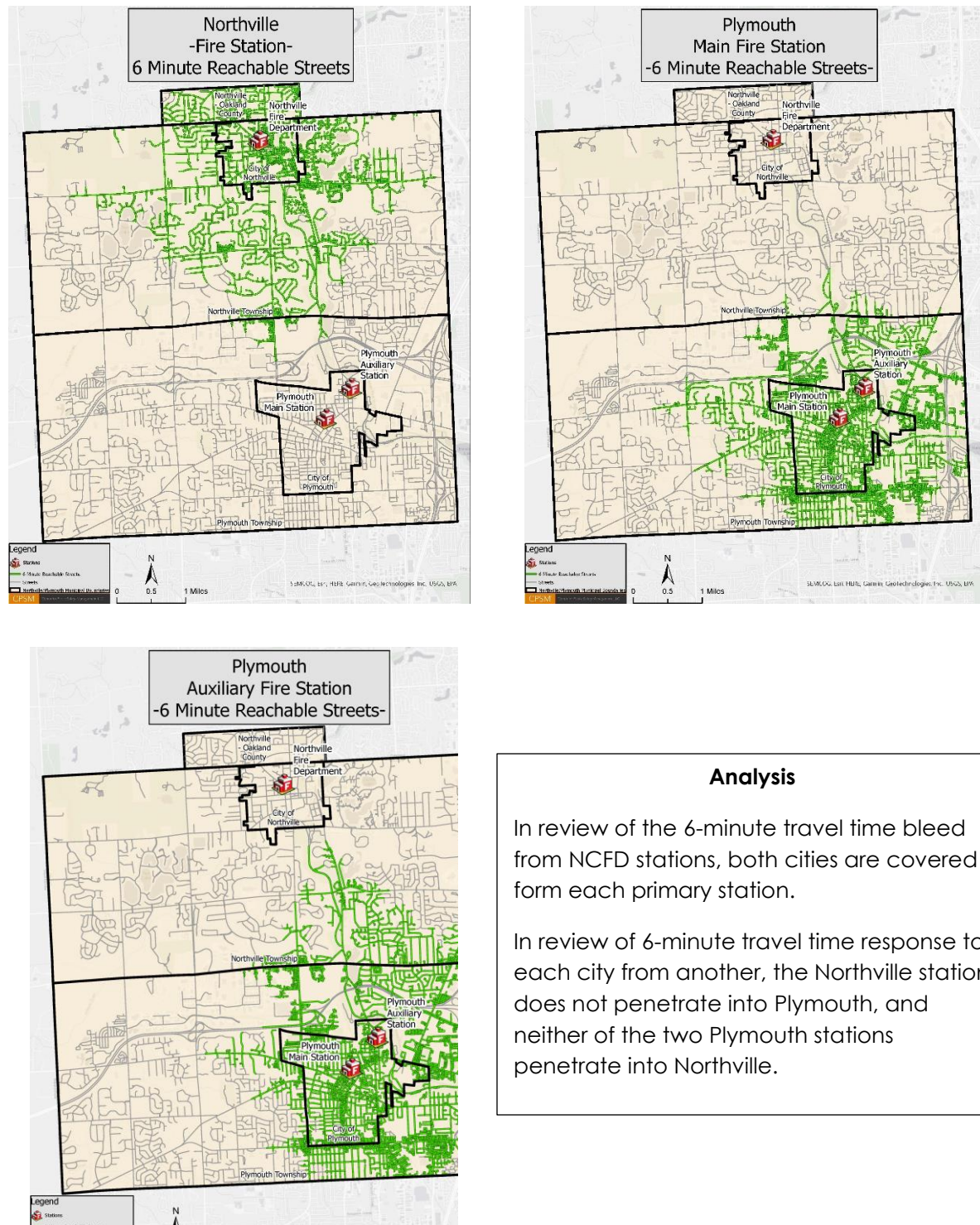
When analyzing these maps, we can determine what the travel time coverage is and where any gaps are in the home city (Northville and Plymouth), and then the travel time from one city to another and visualize any gaps. Traveling from one city is important when one city responds to the other either on an initial call, and when assisting on multi-unit incidents such as structure fires, where the assembling of an Effective Response Force is important.

These maps evaluate 6, 8, 9, and 10 minute travel times.

Again, and related to NFPA 1720, the importance is having a fire suppression engine company on scene as the Effective Response Force is assembling, so that when the appropriate personnel arrive, the initial mitigation/attack can commence.

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Figure 22: 6 Minute Bleed Response Time

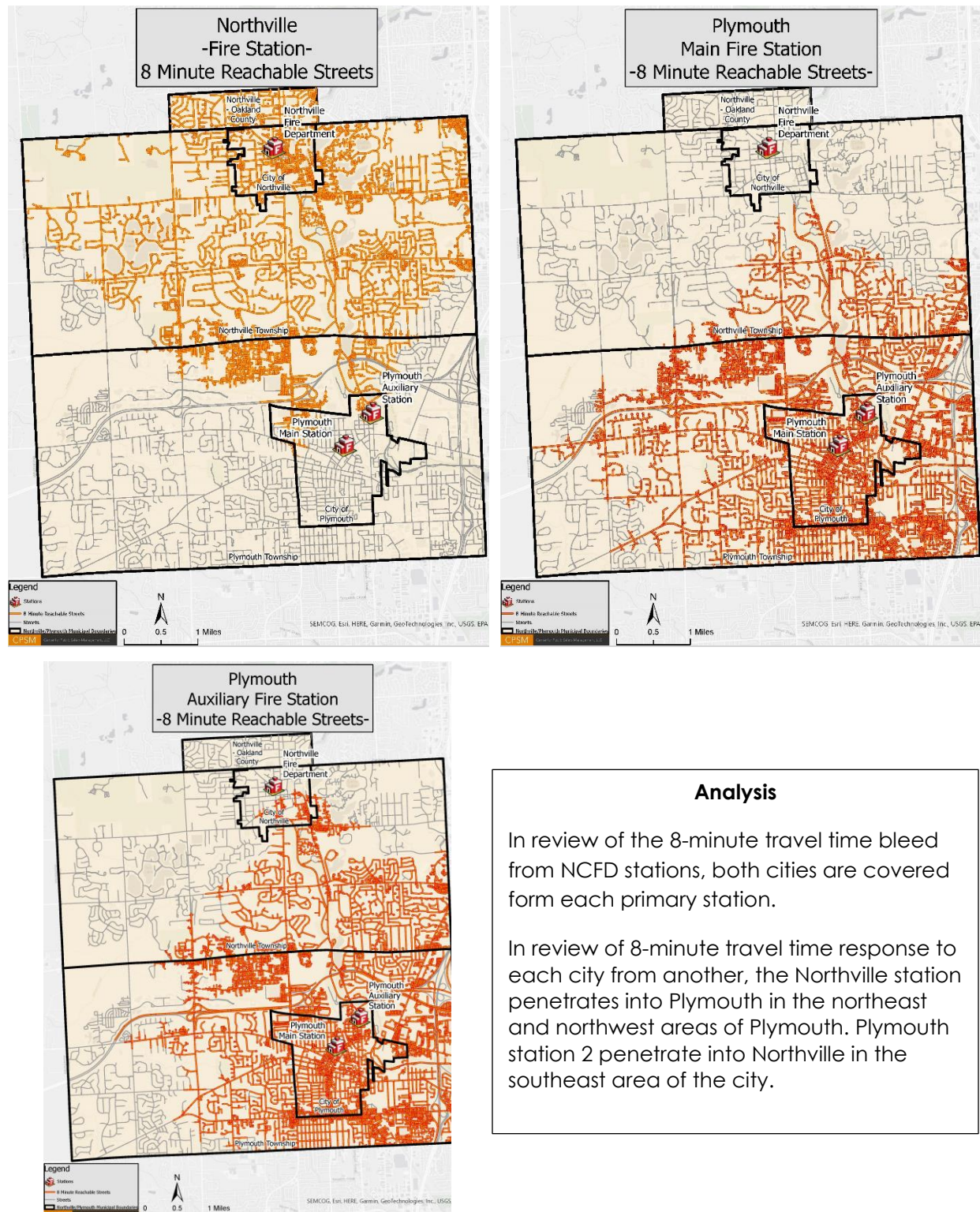


Analysis

In review of the 6-minute travel time bleed from NCFD stations, both cities are covered from each primary station.

In review of 6-minute travel time response to each city from another, the Northville station does not penetrate into Plymouth, and neither of the two Plymouth stations penetrate into Northville.

Figure 23: 8 Minute Bleed Response Time

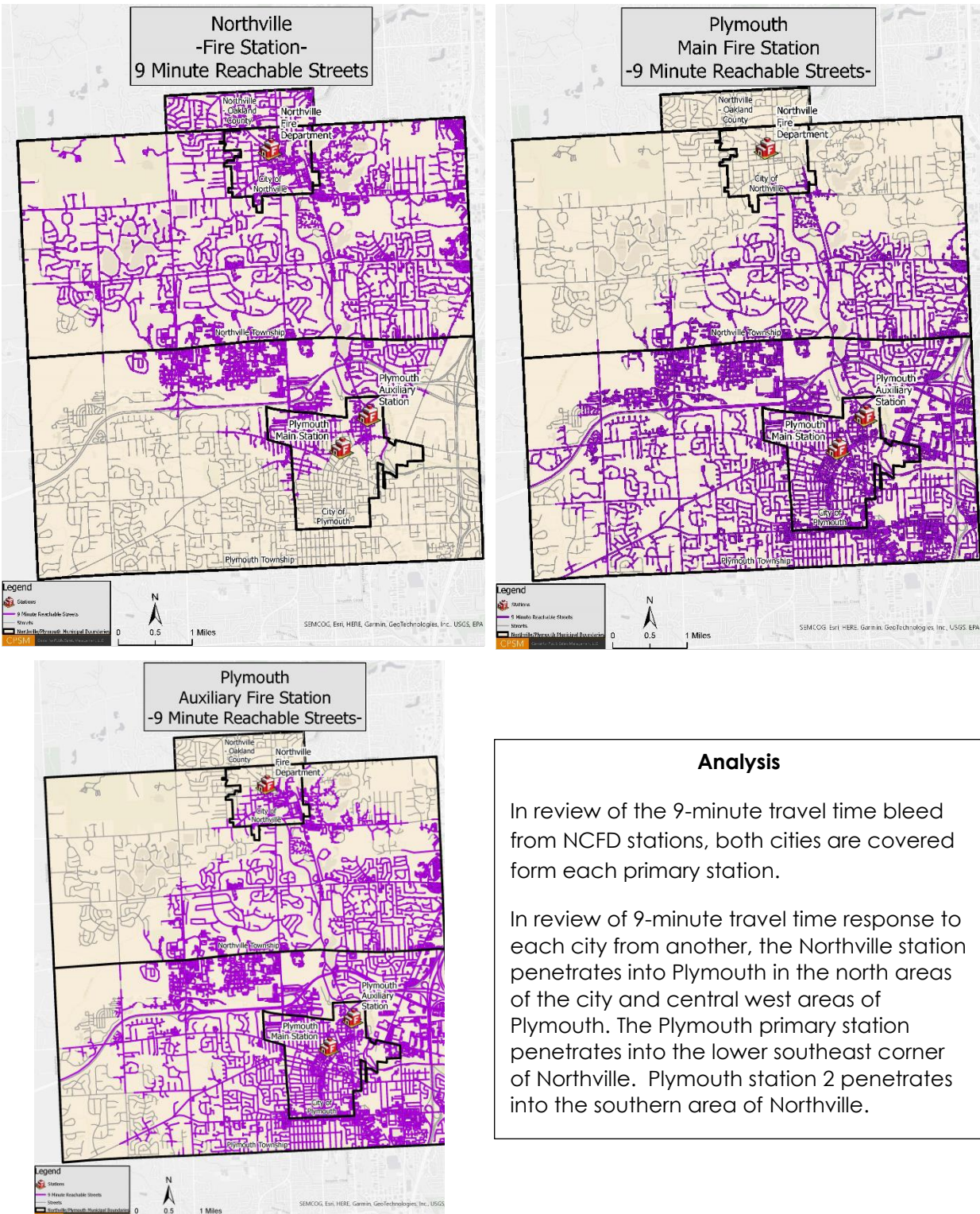


Analysis

In review of the 8-minute travel time bleed from NCFD stations, both cities are covered from each primary station.

In review of 8-minute travel time response to each city from another, the Northville station penetrates into Plymouth in the northeast and northwest areas of Plymouth. Plymouth station 2 penetrate into Northville in the southeast area of the city.

Figure 24: 9 Minute Bleed Response Time

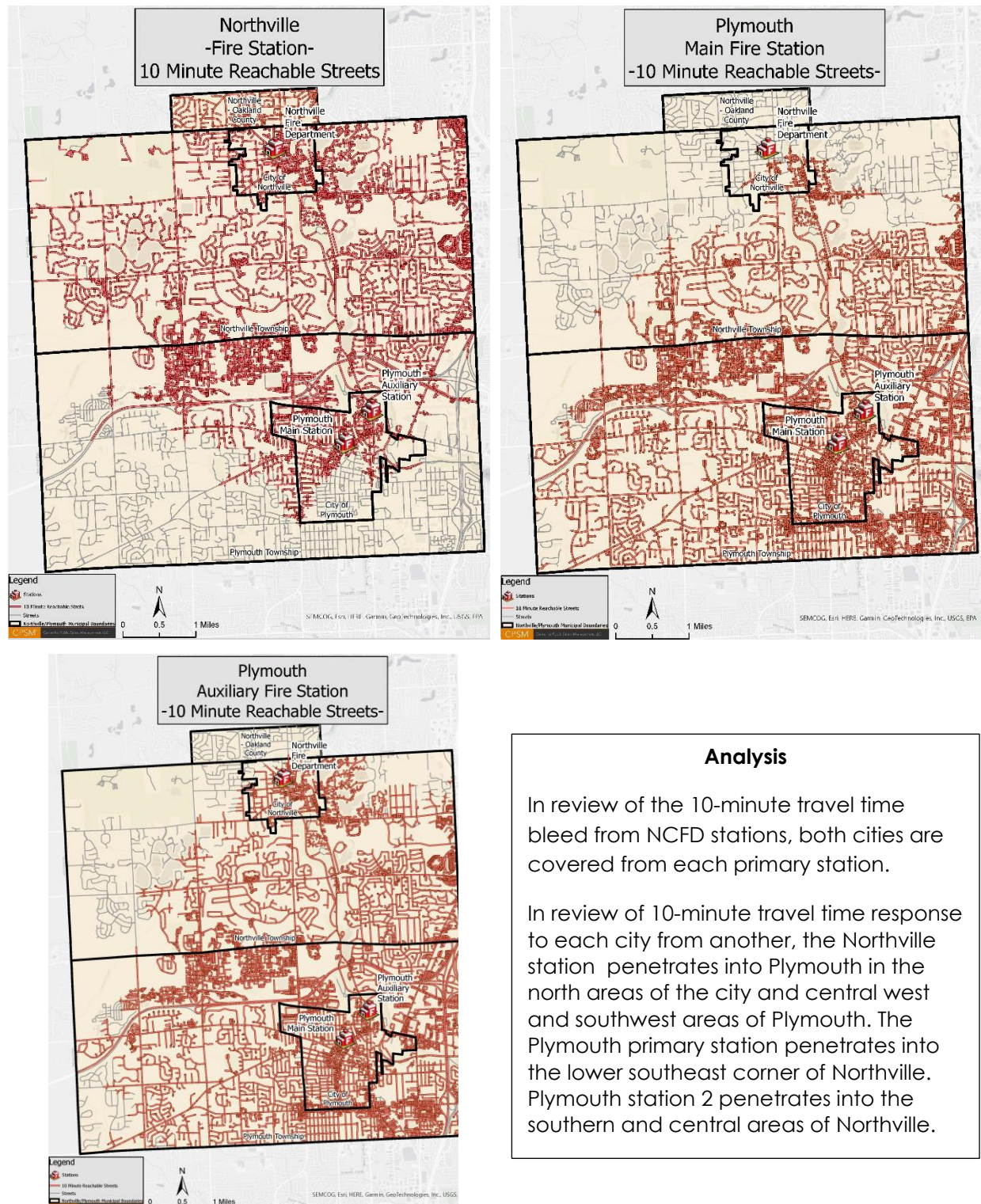


Analysis

In review of the 9-minute travel time bleed from NCFD stations, both cities are covered from each primary station.

In review of 9-minute travel time response to each city from another, the Northville station penetrates into Plymouth in the north areas of the city and central west areas of Plymouth. The Plymouth primary station penetrates into the lower southeast corner of Northville. Plymouth station 2 penetrates into the southern area of Northville.

Figure 25: 10 Minute Bleed Response Time



Analysis

In review of the 10-minute travel time bleed from NCFD stations, both cities are covered from each primary station.

In review of 10-minute travel time response to each city from another, the Northville station penetrates into Plymouth in the north areas of the city and central west and southwest areas of Plymouth. The Plymouth primary station penetrates into the lower southeast corner of Northville. Plymouth station 2 penetrates into the southern and central areas of Northville.

Response time performance recommendations are included in the next section.

SECTION 5. CONCLUSION, RECOMMENDATIONS, & CONSIDERATIONS

This analysis contains illustrative and descriptive material, specific operational and administrative findings, and recommendations regarding the delivery of fire protective and community risk reduction services by the Northville City Fire Department.

The CPSM project team worked from the scope of work prepared for the Cities of Northville and Plymouth in the initial proposal, which was to conduct an operational, organizational, and administrative analysis of the NCFD, which provides fire protective and community risk reduction services to both cities.

After the site visit CPSM recommended a comprehensive data analysis be included as part of this study. Both cities agreed. Subsequently CPSM conducted a comprehensive workload and response time data analysis on the NCFD, analyzing data for a one year period. CPSM also included the two private ambulance services in the data analysis.

The project team conducted the analysis without any preconceived concepts or bias. This analysis contains a number of findings and recommendations that CPSM believes will achieve greater operating efficiencies and effectiveness of overall fire protection and community risk reduction services in the city, and also how the NCFD can better plan, organize, and lead and manage the department and department programs.

Whether volunteer, paid on call, or career, fire protective and community risk reduction services operate under national standards, local government ordinances, and state statutes. It is imperative that department leadership understand and stay abreast of these standards and act accordingly to implement processes, guidelines, organizational plans, training, and education of their members, and implement overall organizational management of contemporary fire services concepts.

As stated in the introduction, based upon CPSM's detailed assessment of the NCFD, it is our conclusion that the department, overall, provides quality fire, EMS, and rescue services. The NCFD staff are professional and dedicated to the mission of the department. This was apparent during our discussions as staff were quite focused on elaborating on both the positives of the organization and the issues and challenges and creating a positive future for the agency.

The principal findings of the study that have the most profound effect on the organization, fire protection, and community risk reduction services, and that include recommendations herein are focused on:

- The need to re-focus department training that better aligns with ISO-PPC firefighter training, contemporary officer training, and proficiency practical skills training and member evaluation.
- The inconsistent manner in which the NCFD performs fire code inspections from year to year and the lack of management of the community risk reduction program.
- Deficiencies in the 2020 ISO–Public Protection Classification report; the ISO report aligns with findings in the CPSM analysis.
- Organizational issues such as inconsistent and inadequate communication, members not understanding where they fit in the organization, vacant officer positions creating inconsistencies across the organization, and a lack of strategic initiatives and a strategic plan.

- How the department assembles an Effective Response Force to perform critical tasks on the fireground as benchmarked against a national standard.
- Response travel times between the two cities and the need to efficiently turnout with fire apparatus using contemporary staffing assignments and technology such as lamResponding.

Recommendations

1. CPSM recommends deficiencies in the 2023 ISO-PPC report should be included in any planning the NCFD and cities conduct in the near and mid-terms. This should include planning to increase on-premises staffing, improve training deficits that focuses on live fire and live fire related training at a training facility, a focus on company training that includes structural firefighting topics that align with NFPA 1001, and fire hydrant inspection and flow testing that follows a schedule of increased frequency in accordance with the AWWA M-17 standard.
2. CPSM recommends the NCFD continue with reciprocal mutual aid agreements as they provide a valuable boost to assembling an Effective Response Force for structural fires and multi-unit responses, and as well improve the overall resiliency of the NCFD. CPSM further recommends the NCFD Fire Chief work collaboratively with mutual aid partners regarding multi-company and multi-department practical training sessions to ensure familiarity between jurisdictions, and to increase fireground efficiency and effectiveness when working together.
3. As the City of Northville is without aerial ladder coverage, and as this is a deficiency in the current ISO-PPC analysis, CPSM recommends the NCFD work with a contiguous city that has an aerial ladder apparatus and establish an automatic aid agreement for this apparatus to respond into Northville on structural fires.
4. The NCFD should make it a priority to ensure weekly training and any daily in-station training occurs as scheduled, and members are held accountable to attend scheduled training, and a concerted effort is made to achieve a greater number of ISO-PPC stated training is completed monthly, and annually by all members this training applies to.
5. The NCFD should continue to develop and budget for its fire officer training and development program. To further enhance the program 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 strategy & tactics and incident command concepts, community fire protection and emergency services delivery approaches; fire prevention practices; firefighter safety and risk management; employee relations; reviewing, approving, or preparing technical documents and specifications; departmental policies; standard operating procedures; formal internal communications; improving organizational performance through process improvement and best practices initiatives; and having a working knowledge of information management and technology systems.
6. The NCFD should develop a plan to provide all personnel with mandatory high-intensity training on subjects such as periodic live fire training on at least a semi-annual basis; live fire facility training to include fireground basics such as hose and ladder evolutions, forcible entry, ventilation, search and rescue, and vehicle extrication. This should include practical skills and proficiency evaluations (non-punitive) as part of the department's comprehensive fire training program. Available buildings scheduled for demolition work well for this and should be acquired often to ensure all members are included in this important training.

7. CPSM recommends the NCFD develop a comprehensive fire prevention code enforcement inspection plan that aligns with NFPA 1730 *Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations, 2019 Edition*, and ensures for both cities: city ordinances are followed that relate to fire prevention and fire code enforcement; and a fire inspection plan is developed that identifies the occupancies/use groups that require annualized fire inspections and the identification occupancies/use groups that do not require annualized inspections but should be inspected on at least a biennial or triennial basis.
 - The comprehensive fire prevention code enforcement plan should also include a methodology for quality assurance of fire prevention inspections, and a data entry platform for consistent record keeping of each inspection completed that can also serve as a compliance tool to ensure outlined annual fire prevention inspections are completed.
8. CPSM recommends the NCFD, along with internal and external stakeholder input develop a five year strategic plan that outlines the mission, vision, and values of the department, and that includes near, mid, and longer term organizational goals. Ideally, this plan would be developed in the context of a clear vision of what the department will look like in the future.
9. CPSM recommends the NCFD Fire Chief work with the two City Managers (Northville and Plymouth) and develop a succession plan model for the fire department. CPSM further recommends while the plan is being developed, the Fire Chief assesses the current talent, identifies potential organizational leaders, and begins a leadership development program focused on filling current and future leadership positions.
10. CPSM further recommends once potential leadership candidates are identified and vetted, that the vacant Captain and Lieutenant positions be filled so that organizational leadership gaps that currently exist can be closed.
 - CPSM also recommends the NCFD wrap recruitment into a succession plan and develop a recruitment plan that focuses on new fire and EMS members placement in the organization.
11. CPSM recommends NCFD develop a health, safety, and wellness committee, and further develop a comprehensive health, safety, and wellness initiative program that aligns with NFPA 1500, *Standard on Fire Department Occupational Safety and Wellness Programs, 2021 edition*.
12. As there are documented communication issues and challenges within the NCFD, CPSM recommends the NCFD include in any organizational planning, goals and objectives that are aimed at closing communication gaps in the organization, improving consistent messaging and actions across the organization, improving communication between NCFD stations, programs, and members, and establishing a shared vision for communication all members of the organization can work towards.

CPSM further recommends the NCFD create a communications General Order to ensure the most correct communication medium is utilized when delivering organizational information (i.e. e-mail; in-person; through formal training); messages and information are consistent and include feedback to the originator or sender when requested/necessary/required; gives members the proper voice; includes a communications gap analysis model that the organization will follow; and that has a compliance measures so that effective communication can be measured for organizational effectiveness.

13. CPSM recommends the NCFD adopt the concepts of the Time Allocation Model and allow the model concepts to further contribute and enhance organizational effectiveness, goal achievement, and a more streamlined and purposeful use of resources.

CPSM further recommends the Fire Chief optimize and include the Fire Marshal, Station Captains and Lieutenants within the leadership and management of all department operations, thus, creating an additional avenue for organizational succession, so that these levels will be more readily prepared as the future leadership of the organization.

14. CPSM recommends the NCFD develop a management process that ensures Standard Operating Procedures and Policies and Procedures remain current, represent a contemporary fire department, reflect current best practices, and consider all internal and external forces and relationships prior to implementation.

Staffing Considerations

Overall, what needs to be achieved for a safe and effective fire unit response to structural fires is a fire apparatus minimum staffing plan of 2 personnel on the heavy fire apparatus (prior to leaving each station-wait if a third is close to the station per IamResponding), and a minimum of staffing of 2 on the Quick Response Vehicles (prior to leaving each station), for a safe and effective operational response to structural fires.

Further, the NCFD should develop a goal for structural fire responses that recognizes the minimum response level of personnel as outlined in NFPA 1720 for urban response areas (15 firefighters) and objectives of how to best meet this goal in the NCFD response district. The objectives should link directly to the NCFD response metrics for structure fires, which is outlined above as 3 Engines; 1 Rescue; 1 Aerial Ladder.

15. CPSM recommends the NCFD consider some, all, or a mix of the following alternatives of paid on call staffing models.
 - Apparatus-only response (minimally staffed apparatus with no personal vehicles to scene response).
 - Initial response of members to station, assemble a crew of at least three-four personnel (Driver/Operator, Officer or designated crew leader, firefighter(s); apparatus responds. Under this model many paid on call departments establish individual companies by the apparatus they deploy (engines and ladders), assign members and officers who then maintain and staff the apparatus, and then train together to increase their effectiveness on the emergency scene. Typical crew assignment commitment times are 6:00 p.m. to 6:00 a.m.
 - Hybrid response using off premises duty crews.
 - For nights and weekends when volunteer members are typically more readily available, assign a crew of three to four to one engine and one other apparatus (ladder or engine) who respond from home to the station to assemble and respond the apparatus. All other members respond to the station accordingly based on the call type. Typical crew assignment commitment times are 6:00 p.m. to 6:00 a.m.
 - Hybrid response with on premises crew and off premises duty crew.
 - For nights and weekends when paid on call members are able to commit, assign a crew of three to four to one engine to immediately respond the engine apparatus (**current NCFD model**). Also assign a crew of three to four to the opposite station who respond from home to the station to assemble and respond the apparatus accordingly and based on the call type. All other members respond to the station based on the call type and respond

additional apparatus. Typical crew assignment commitment times are 6:00 a.m. to 6:00 p.m. and 6:00 p.m. to 6:00 a.m.

■ Monday-Friday Daytime Response

- Members should register through ***lamResponding*** that they are available and will respond to the station and deploy the apparatus when needed. This ensures accountability to the overall system of available responding members and how an Effective Response Force can be assembled during those hours when paid on call members are not as readily available.
16. CPSM strongly recommends that all NCFD members utilize the *lamResponding* software on their cellular phones and the response boards in the stations to identify member response and availability. This response tool should be mandatory.

17. **Response Time Performance Recommendations**

Overall, response performance goals must be shaped to match community expectations, level of community risk, and available funding for contemporary Fire and EMS resources required to achieve the level of service and performance expected by the community.

As such, CPSM recommends the NCFD adopt response time performance goals that include:

Turnout Time Goal:

- Response personnel shall strive to meet NFPA 1720 turnout time of 60 seconds for EMS response and 80 seconds for fire and special call responses when there are scheduled and assigned on-premises staffing.
- When there is no on-premises scheduled and assigned staffing at one or both of the NCFD stations, for fire calls, response personnel shall strive to meet turnout of the first fire suppression apparatus in ≤ 7 minutes 90 percent of the time, and the first response unit for EMS calls in ≤ 7 minutes 90 percent of the time.

Travel Time Goals Fire:

- ≤ 7 minutes for the first arriving engine company to a fire suppression incident 90 percent of the time.
- ≤ 9 minutes to assemble the initial first alarm assignment on scene 90 percent of the time for low/medium hazards. ***The incident commander must announce to the dispatcher when the response force by head count is assembled.***

Travel Time Goals EMS:

- ≤ 7 minutes for the first arriving engine company or other response unit to an EMS incident that is BLS capable and has an AED and other EMS equipment.

Reflex Time:

- Upon assembling the necessary resources at the emergency scene, the fire department shall have the capability to safely commence an initial attack within 2 minutes 90 percent of the time.
- *Personnel responding to fires and other emergencies shall be organized into company units or response teams and have the required apparatus and equipment.*

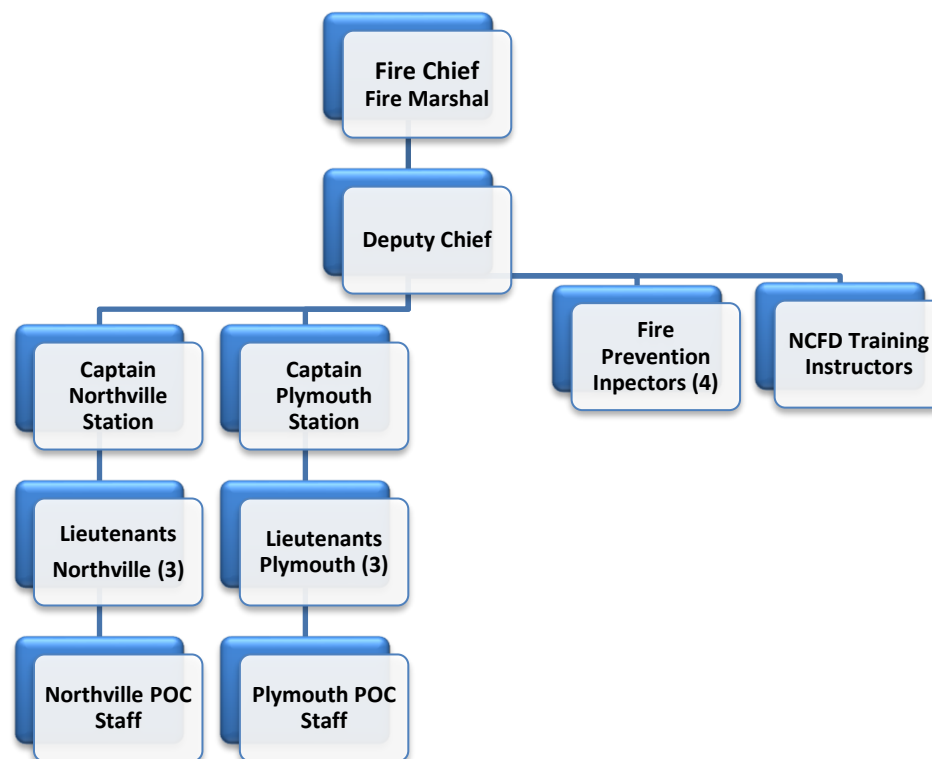
This avoids freelancing by personnel before and on the arrival of the fire suppression units; enables the incident commander to size-up available on-scene resources, ensures fireground accountability, and ensures a coordinated assignment of critical tasks.

18. Creation of a Deputy Chief Position

Based on the key findings discussed herein, which include deficiencies in training, community risk reduction, organizational communication, mis-alignment with how all staff are allocating their work time, and overall planning for the department, and because the Fire Chief is the sole full-time employee who spends a great amount of his day operating the system responding to 911 calls and managing the fire prevention and training functions, CPSM recommends the creation of a full time Deputy Fire Chief position, to be manage the day-to-day operational scheduling and operational functions of the department, and who can assume the role of department training officer, health and safety officer, and operational aspects of the community risk reduction program.

The Fire Chief can then lead and manage the NCFD from a senior leadership position and can allot time in his workday to improve department deficiencies and develop strategic initiatives that are focused on community risk reduction, fire protection, EMS services, the membership, response to emergencies, use of all technology available, and so forth. CPSM further recommends the Fire Chief maintain the title of Fire Marshal with all responsibilities but manage the community risk reduction program from a leadership and planning position, and not from the day-to-day management position, leaving this to the Deputy Chief.

Figure 26: Proposed NCFD Organizational Chart



End of Report