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October 16, 2018

Mr. Robert M. Belmore, ICMA-CM  
City Manager  
City of Somersworth, NH  
One Government Way  
Somersworth, NH 03878

RE: **Fire Service Deployment Analysis - Management Letter**

Dear Mr. Belmore:

Municipal Resources, Inc. (MRI) was engaged by the City of Somersworth, New Hampshire, to conduct a deployment analysis of the Somersworth Fire Department. The City plans to use this information to assist in determining the most advantageous location for the construction of a new fire headquarters facility. The study also assessed the current adequacy of the existing Somersworth Fire Station.

MRI is a firm dedicated to providing professional, technical, and management support services to municipal governments, fire departments, police departments, public works departments, libraries, schools, and other government agencies throughout New England. Among the areas of expertise available are department assessments, organizational studies, personnel recruitment, personnel administration, collective bargaining, community and economic development, budget/finance, and general management. MRI has a particularly strong public safety group with nationally recognized expertise in police, fire, and emergency services.

We are a New Hampshire corporation operating from a primary office in Meredith, New Hampshire and are registered to do business in Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island New Jersey, New York, and Pennsylvania. However, our market focus and expertise is New England based. We are intimately familiar with New England local government forms, culture, and issues, and we pride ourselves on our ability to place our recommendations for change in a context appropriate to New England local government.

Our philosophy is to help our clients solve problems and provide realistic solutions for future success. We do not put forth idealistic, unachievable, or narrowly focused solutions.

Our objectives are always:

- To help agencies obtain maximum value for their limited tax dollars.
- To identify and help communities manage the risks associated with public safety functions.
- To raise public awareness of the value and professionalism of their public resources.
- To help local leaders develop and execute plans that best meet their community's unique needs, given the resources available.

## **I. SCOPE & METHODOLOGY**

The locations of fire stations in every community are typically based on a historical need at the time the station was built, as well as the community's infrastructure at that time. Today, communities are taking into consideration their master planning documents, regional economic growth patterns, and potential demographic changes when determining fire station locations. Changes in a community often require a station to be replaced and/or relocated, or additional stations constructed.

In order to provide effective fire suppression service, a community must deploy its fire apparatus in such a manner that a sufficient number of apparatus, staffed with sufficient resources (firefighters), respond and arrive at reported fires within an acceptable period of time. The MRI study team reviewed the 2016 Somersworth Fire Station Study (Appendix A) and evaluated two options relative to the location of a new fire headquarters facility. We reviewed fire department incident patterns, including the mapping of location of all incidents, actual fire incidents, and fire and EMS incident "hotspots" based on response information provided by Fire Chief Keith Hoyle. Hotspots indicate frequent calls for service. The team also analyzed response times and incident location trends through information provided by the Chief. This information was especially helpful in projecting where future incidents would likely occur.

The scope of this project included:

- Review all pertinent documentation already generated by the City regarding operational needs.

- Provide preliminary forecasting for staffing and apparatus in order to project future facility-related needs. Based on these projects, identify any potential limiting factors or significant challenges with rehabbing the fire station on its present site.
- If rehabbing of the current site remains a viable option, look at the challenges related to continuity of operations that may significantly impact the Department during construction.
- Review a potential alternative site for siting/location issues.

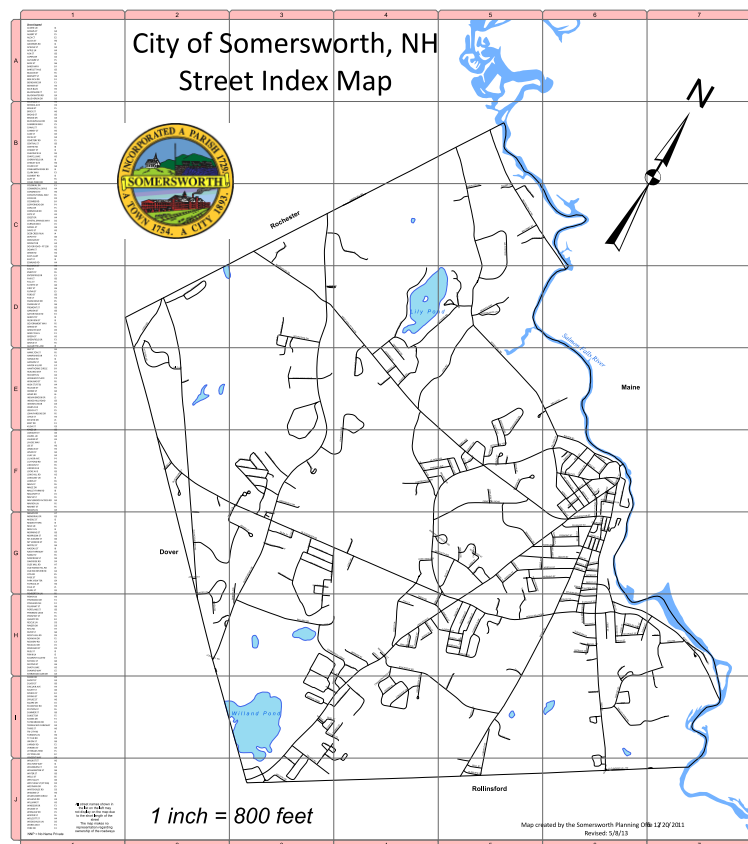
To that end, this service deployment study of the Somersworth Fire Department included the following sixteen methodologies:

1. A review of the 2016 Somersworth Fire Station Study;
2. A review of current response data and incident trends;
3. A review of the current Insurance Service Office Rating issued to the City of Somersworth;
4. A review of the services offered by the Somersworth Fire Department;
5. A review of Somersworth Fire Department staffing and operational capability;
6. A tour of the community and review of target hazards;
7. A meeting with the City Manager and Fire Chief;
8. A review of response and mutual aid practices with Chief Hoyle;
9. A meeting with City senior staff;
10. A review of the current fire facility;
11. A meeting with on duty fire personnel;
12. A meeting with the Somersworth Public Safety Committee;
13. A review of current and proposed fire apparatus;

14. A review of the demographics and growth potential of the City of Somersworth;
15. Response time trials that considered multiple incident and response locations.
16. Coordination with the DPW Director and City Engineer relative to the projected cost of improvements associated with the development of a new fire facility.

## II. COMMUNITY PROFILE: BACKGROUND AND LOCAL INFORMATION

### City of Somersworth



**Figure 1 - Map of the City of Somersworth, NH**

The City of Somersworth is located in eastern Strafford County. The City has a total area of 10.0 square miles, of which 9.8 square miles consists of land and 0.2 square miles of water. Somersworth is bordered to the northeast by the Salmon River Falls which is also the state

boundary with the State of Maine. As of the census of 2010, there were 11,766 people, 4,862 households, and 3,044 families residing in the city. There are a total of 5,199 housing units.

Somersworth retains a quantity of Victorian Architecture from its historical roots. Some antique residences, most notably within the historic district known as "The Hill", have been restored. Today, the City is primarily residential in character with businesses and small commercial areas interspersed throughout. There are also some moderate industries within the City's borders. Somersworth is bordered on the north by the City of Rochester to the east by the City of Berwick Maine; to the south by the City of Dover; and to the west by the Town of Rollinsford. The upper end of High Street has, and continues to, develop as a retail center, with several ongoing development projects and big-box retail stores.

### **The Somersworth Fire Department**

The Somersworth Fire Department provides fire, rescue, and first response emergency medical services (C, D, E Level), at the basic life support (BLS) level with 17 sworn full time personnel operating from a single centrally located station located at 195 Maple Street. These personnel operate three engines, one ladder, one air supply unit, one utility vehicle, and one brush unit. The staffing patterns include a minimum of three personnel on shift during the day and four at night. These on-shift personnel are complemented by the response of both off duty career and on-call personnel.

### **Insurance Service Office Rating**

The Insurance Services Office's (ISO) Public Protection Classification (PPC) program evaluates communities according to a uniform set of criteria defined in the Fire Suppression Rating Schedule (FSRS). This criterion incorporates nationally recognized standards developed by the National Fire Protection Association (NFPA) and the American Water Works Association (AWWA).

Using the FSRS, ISO evaluates the fire suppression capabilities of a community and assigns a PPC classification; a number rating from 1 to 10. Class 1 represents exemplary fire protection (by ISO's standards), and Class 10 indicates that the area or community's fire suppression program does not meet minimum recognized criteria or standards. In most cases, this means there is no recognized fire department or formal fire protection. Any building more than five road miles from a fire station or outside the boundary of a fire protection area is rated 10. Generally, areas of a community that are more than 1,000 feet from a fire hydrant, but within five road miles from a fire station, are rated Class 9.

The FSRS allocates credit for fire protection by evaluating these four major categories (Figure 2):

1. Fire Alarm and Communication System: This aspect of the evaluation examines a community's facilities and support for handling and dispatching fire alarms. This includes telephone lines and systems, staffing, and dispatching systems and equipment. This component equates to 10% (10 points) of the evaluation.
2. Fire Department: This component of the evaluation, which accounts for 50% of the total classification (50 points) focuses on the fire department and its operations. Areas that are examined include the number of engine and ladder/service companies, distribution of fire stations and fire companies, equipment carried on the apparatus, pumping capacity, testing of hose, pumps and ladders, reserve apparatus, department and on-duty staffing, and training.
3. Water Supply System: The third component of the evaluation is an analysis of the community's water supply system for fire protection. Chief among the areas that are examined include fire hydrant size, type, flow, and installation. In addition, the condition and frequency of inspection of the hydrants are evaluated. Finally, the overall capabilities of the water supply system are assessed in comparison to the needed fire flow for target hazards in the community. 40% of the final rating (40 points) is based on the water supply system.
4. A relatively new addition to the FSRS, the Community Risk Reduction section, offers a maximum of 5.5 points, resulting in 105.5 total points now available in the FSRS. The inclusion of this section for "extra points" allows recognition for those communities that employ effective fire prevention practices, without unduly affecting those who have not yet adopted such measures.

The addition of the Community Risk Reduction section gives incentives to those communities who strive proactively to reduce fire severity through a structured program of fire prevention activities. The areas of community risk reduction evaluated in this section include:

- Fire prevention
- Fire safety education
- Fire investigation



**Figure 2: Four Key Parts of the ISO PPC Evaluation Process**

Source: ISO

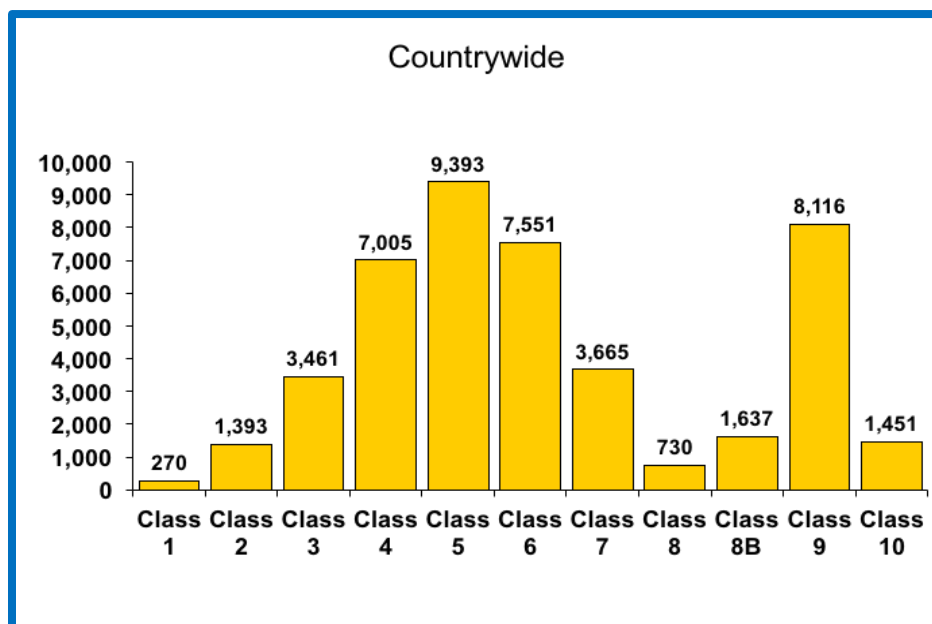
Every city, town, or area that provides fire protection services is subject to being graded to establish a PPC. Individual buildings, both residential and commercial, are subject to the community's PPC. When calculating property insurance premiums, insurance companies using the PPC apply a factor that reflects a particular community's PPC. Some individual facilities within a community may also be individually assessed and assigned a specific rating. Although there may be validity to the argument that this rating is no longer utilized by all insurance companies that issue policies, ISO is still recognized as a comparative benchmark of public fire protection. Moreover, within the past several years, ISO has significantly revised its FSRs, and as a result, the PPC to reflect new innovations and technology and the evolving standards and industry best practices within the fire service. Among these changes are:

1. Greater reference to nationally accepted consensus standards; NFPA and AWWA.
2. Increased recognition of the value of residential automatic fire sprinkler systems.
3. Greater reliance on technology-based solutions (e.g., GIS, thermal imaging cameras, etc.).
4. Increased emphasis on fire training activities.
5. A new reference to national standard safety requirements.

6. A new reference to accreditation; Focus on master/strategic planning.

According to ISO, the PPC helps measure the effectiveness of fire protection and provides an important advisory evaluation to both insurers and communities. It is applied nationwide, and more than ever incorporates accepted national consensus standards. The PPC used in marketing, underwriting, and pricing of both homeowners and commercial lines of fire/property insurance. Broadly speaking, the cost of insurance premiums are generally lower with better protection which translates into lower losses; the cost is higher in areas that have lower levels of protection which often translates into higher losses. Many insurers still rely on this information, at least partially, to set their fire insurance rates.

- Based on the most recent ISO evaluation, the Somersworth Fire Department received a Class 04 rating, which places the organization in the top 20% of fire departments across the country. Figure 3 provides a graphical representation of the rating distribution across the United States.



**Figure 3: Insurance Service Office Rating Distribution Chart**

**Source: ISO**

According to ISO, many communities receive split classifications, which were revised in 2013 to reflect the risk of loss more precisely. An example of the split classification is 03/3X or 03/3Y. The first number refers to the classification of properties within 5 road miles of a fire station and within 1,000 feet of a credible water supply. The second number, with either the X or Y

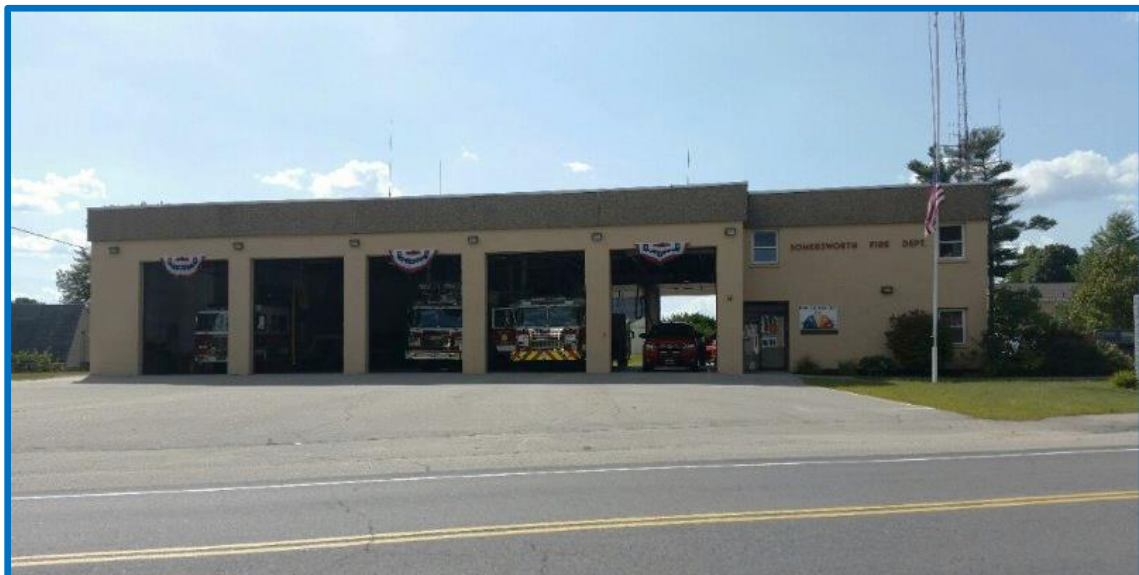


designation, applies to properties within 5 road miles of a fire station, but beyond 1,000 feet of a credible water supply. ISO generally assigns Class 10 to properties beyond 5 road miles. The X and Y classifications replace the former 9 and 8B portions of a split classification, respectively. For example, a community formerly graded as a split 6/9 will change to a split 6/6X. Similarly, a community formerly graded as a split 6/8B classification will change to a split 6/6Y classification. Those designations reflect a reduction in fire severity and loss and have the potential to reduce property insurance premiums.

Although the ISO PPC rating provides a perspective on fire service capability in the City of Somersworth, the true measure of effectiveness is how well the Department meets the community's expectations. The service level expectation in the City of Somersworth is that the fire department provide at least a single unit rapid response on a 24/7 basis. The Department meets this expectation through on duty staff who are supported by on call and off duty personnel. The typical response time for the first due unit is 4 to 6 minutes which is within industry parameters. Based on a review of the ISO rating and response times of the first due unit, we conclude that the Somersworth Fire Department follows industry best practices and exceeds the minimum service expectations set by the community.

### **III. EVALUATION OF THE EXISTING SOMERSWORTH FIRE STATION**

The Somersworth Fire Department currently operates from a single station located adjacent to the downtown area at 195 Maple Street. This facility was constructed in 1977 and the interior was completed by vocational high school students.



**Figure 4 - Somersworth Front Station - Front View, Side A**



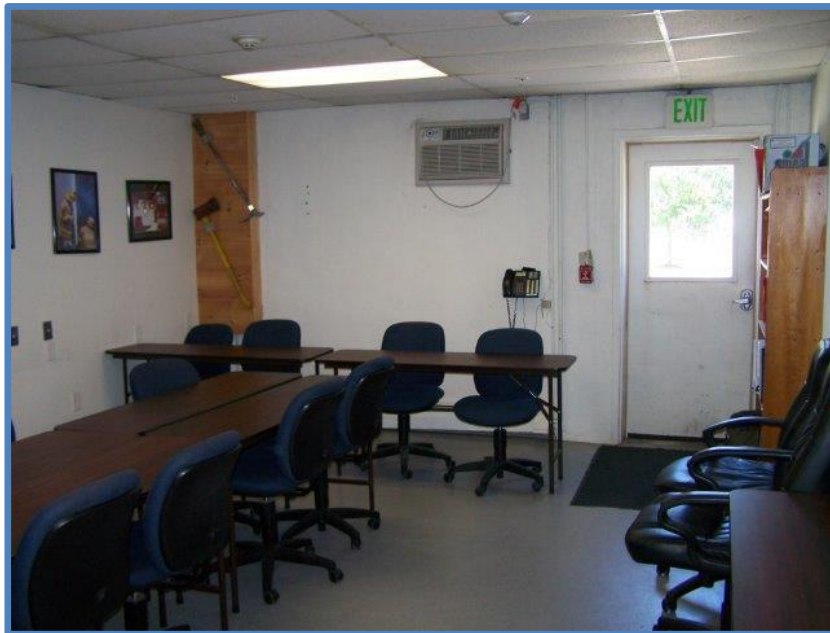
**Figures 5-7 - Somersworth Fire Station – Side View - Sides B-D**

While we could conduct an in-depth analysis of the facility, the 2016 Somersworth Fire Station Study which is attached as Appendix A, captures the essence of the functional issue facing the City of Somersworth. Our review of the current station concurs with the study referenced above. We found that the station was inadequate to support the mission and function of a modern-day fire service organization and has reached the end of its useful life. Reflecting on industry best practice, our team of fire service practitioners found the following:

- The station lacks adequate training and public meeting space and has a less than optimal audio-visual component;
- The station lacks adequate office space as the dispatch area serves as a large and dysfunctional shared office;
- Several areas lack a secondary egress;
- The station lacks appropriate security systems;
- The EMS supply storage area is inadequate;
- The current fitness area sits above the apparatus floor is open to collect contaminants;
- Cooking equipment lacks emergency shut off response controls;
- There is no tone/announcement or alerting systems or lighting controls in the station;
- The station fire alarm system was showing a trouble alarm indicating a problem in the system;

- The carbon monoxide detector on apparatus floor is shut off as it alarms frequently.
- Dorm space is open and there is no capability to separate dorm space for male/female habitation;
- Bathrooms are shared and not separated to facilitate male/female occupancy;
- There is no designated and protected turnout gear storage room. Currently gear is open to absorb particulates on the apparatus floor;
- There is no decontamination area;
- There is no seismic protection leaving the structure vulnerable to earthquakes.

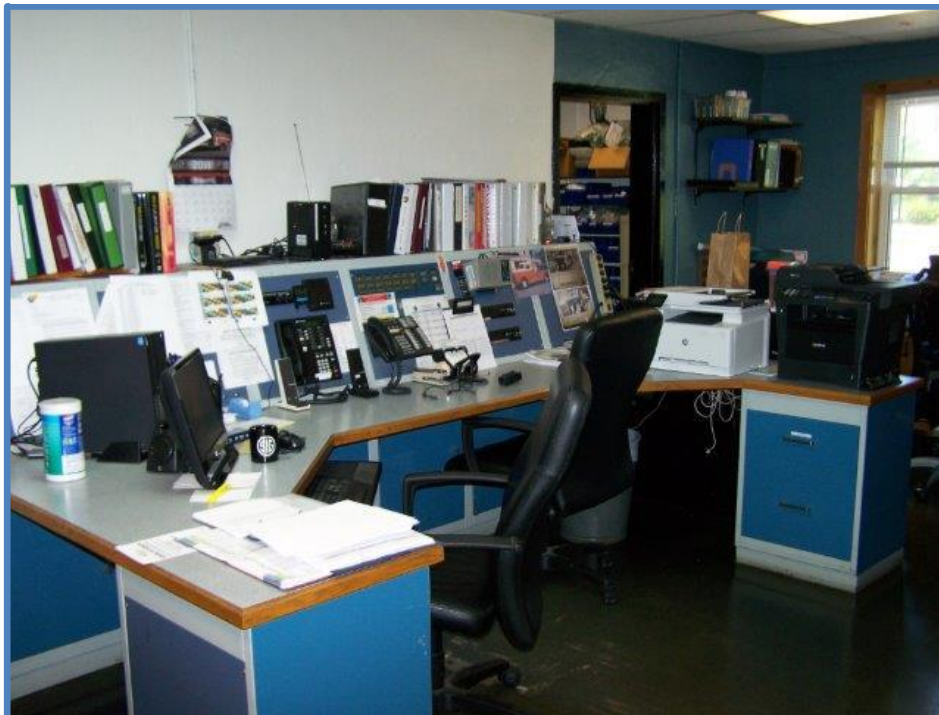
Some of the inherent issues with the station are documented in the next several images:



**Figure 8 - Inadequate training and meeting space.**



**Figure 9 – Common Dorm Area – This area does not meet the industry standard and prevents male/female separation. Roof leaks are evident in this photo.**



**Figure 10 - The dispatch area doubles as office space for all personnel other than the Fire Chief.**





**Figure 12 - Kitchen space is inadequate for the on-duty shift and lacks sufficient space for a staffed fire service facility.**

The station consists of five apparatus bays. Two of these bays can be accessed from the rear of the structure.

Specific concerns of the MRI study team regarding this station are:

- The facility is not in full compliance with the requirements and recommendations of **NFPA 1500: Standard on Fire Department Occupational Safety and Health Program** (National Fire Protection Association; Quincy, MA; 2013 edition) which provides requirements for facility safety, maintenance, and inspections.
- The facility is not in compliance with the requirements and recommendations of **NFPA 1581: Standard on Fire Department Infection Control Program** (National Fire Protection Association; Quincy, MA) which has requirements to provide minimum criteria for infection control in the fire station, in the fire apparatus, during procedures at an incident scene, and at any other location where fire department members are involved in routine or emergency operations.

- The facility is not in compliance with the requirements and recommendations of **NFPA 1851: Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting** (National Fire Protection Association; Quincy, MA). This standard provides safety requirements for storage and cleaning of personal protective equipment.
- The apparatus bays insufficient to house all of the current Somersworth fire apparatus.
- Crew quarters, including the sleeping area, are located on the second floor. The crew quarters are marginally adequate, at best. In particular, the bunk room is in poor condition. Most of the furnishings appeared to be used furniture that was donated to the station.
- There is no fire protection system or emergency response shut off capability in the kitchen.

The MRI study team recognizes that the implementation of recommendations concerning facilities is a costly proposition. However, the City needs to maintain a safe and healthy work environment, as well as ensure that the fire department can operate as effectively and efficiently as possible. This includes being able to deploy various types of apparatus to provide maximum benefit to the community within recommended response times and travel distance.

Our evaluation of this facility finds that it has served beyond its useful life and that it would not be feasible to rehab the existing structure. Therefore, we concur with the 2016 Somersworth Fire Station Study that the facility should be replaced. Much of the remainder of this report will focus on the optimal location of a new fire station.

## **RECOMMENDATIONS**

***Recommendation III-1 The City of Somersworth should develop a three-year strategy to replace the existing fire station. The goal of this project should be to occupy the new station in the Fall of 2021.***

***Recommendation III-2 The City of Somersworth should form a Building Committee and authorize the appropriate steps necessary to fast track the development of a new fire station.***

#### **IV. RESOURCE DEPLOYMENT AND INCIDENT RESPONSE OVERVIEW**

The mission performed by the fire department is one of the fundamental functions of government: to ensure the safety and protection of its residents and visitors. The expectations for the quality and quantity of fire and emergency medical services must come from a community's residents and other taxpayers. There is no "right" amount of fire protection and EMS delivery. It is a constantly changing level based on the expressed needs of the community. It is the responsibility of elected officials to translate community needs into reality through direction, oversight, and the budgetary process. It is their unenviable task to maximize fire, EMS, and other services within the reality of the community's ability and willingness to pay, particularly in today's economic environment.

From an operational perspective, the appropriate deployment of resources is critical to the ability of any fire department to effectively, efficiently, and safely fulfill its core public safety, emergency medical response, and fire protection missions. In determining an acceptable level of risk, elected officials in every community must ask questions about the fire and EMS resources, such as:

1. How much do we need;
2. How much can we afford; and
3. How should those resources be positioned and deployed to provide maximum benefit to the community?

From the perspective of stations and apparatus, there are three main factors that are used to help determine the deployment of resources:

1. Response time;
2. Travel distance;
3. Call volume.

A traditional, and long used, method of determining the appropriate deployment of resources is the fire company travel distance model employed by the Insurance Services Office (ISO) to assist them with determining the Public Protection Classification (PPC) rating that is utilized for determining fire insurance rates by participating insurance companies. Under the ISO deployment and coverage model, in order to obtain maximum point value for this component of an evaluation, the first due engine company should be within 1.5 miles travel distance of every location within their first due response area. The first due ladder company should have a travel distance of no more than 2.5 miles. Travel distance is one of several factors that can have an impact on response time and is usually the most significant.

**Today, for most evaluations, response time is the most critical factor for both fires and emergency medical incidents. It is not just a cliché that during critical life-threatening situations, minutes and even seconds truly do count. Even ISO, which traditionally used a travel distance model, relies more heavily on response time statistics rather than strictly a distance-based evaluation.**

NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operations to the Public by Career Fire Departments*<sup>1</sup>, 2016 edition (National Fire Protection Association; Quincy, MA) addresses the organization and deployment of fire suppression operations, emergency medical operations, and special operations to the public by career fire departments. It is the benchmark standard that the United States Department of Homeland Security utilizes when evaluating applications for staffing grants under the Staffing for Adequate Fire and Emergency Response (SAFER) grant program.

Paragraph 4.1.2.1 of NFPA 1710 states that the first arriving engine company shall arrive at the scene of a fire suppression incident within four minutes (240 seconds) or less, and/or the entire full first alarm response should arrive on scene within eight minutes (480 seconds). For EMS incidents, a unit with first responder or higher-level trained personnel should arrive within four minutes (240 seconds), and an Advanced Life Support (ALS) unit should arrive on scene within eight minutes (480 seconds). Paragraph 4.1.2.2 requires the establishment of a 90% performance objective for these response times.

The four-minute response time is from when the units are physically moving to the incident. One minute can be added for call processing and dispatch, and one minute can be added for turnout time, that is from when firefighters in the station are notified, until they are actually responding, providing six total minutes (360 seconds) from the time the 9-1-1 call is answered, until the first unit arrives on location. It is our observation based on an interview with Chief Hoyle that the City of Somersworth meets the six-minute response criteria based on the following factors:

- Location of the fire station
- Location of incident clusters
- Location of target hazards
- Rapid access to bisecting roadways

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<sup>1</sup> NFPA 1710 is a nationally recognized standard, but it has not been adopted as a mandatory regulation by the federal government or the State of New Hampshire. It is a valuable resource for establishing and measuring performance objectives in the Somersworth Fire Department but should not be the only determining factor when making local decisions about the City's fire and EMS operations.



The EMS component of the emergency services delivery system is more heavily regulated than the fire side. In addition to NFPA 1710, NFPA 450 *Guidelines for Emergency Medical Services (EMS) and Systems*, 2009 edition (National Fire Protection Association; Quincy, MA) provides a template for local stakeholders to evaluate an EMS system and to make improvements based on that evaluation. The Commission on Accreditation of Ambulance Services (CAAS)<sup>2</sup> also promulgates standards that are applicable to their accreditation process for ambulance services. CAAS recommends that an ambulance arrives on scene within eight minutes, fifty-nine seconds (8:59) of dispatch.

As a percentage of overall incidents responded to, it could be argued that EMS incidents constitute the greatest number of “true” emergencies, where intervention by trained personnel does truly make a difference, sometimes literally between life and death. Heart attack and stroke victims require rapid intervention and care, and transport to a medical facility. Nationally, the standard of care based on stroke and cardiac arrest protocols is to have an emergency response unit on scene at a medical emergency within six minutes. The longer the time duration without care, the less likely the patient is to fully recover. Numerous studies have shown that irreversible brain damage can occur if the brain is deprived of oxygen for more than four minutes. In addition, the potential for successful resuscitation during cardiac arrest decreases exponentially with each passing minute that cardio-pulmonary resuscitation (CPR) or cardiac defibrillation is delayed.

Structure fires are the incident type that many of the regulations and standards pertaining to firefighters are primarily focused on. They are generally the most hazardous type of incidents for both firefighters and civilians. Structural firefighting has become far more challenging and dangerous in the last thirty years with the introduction of significant quantities of plastic and foam-based products into homes and businesses (*e.g.*, furnishings, mattresses, bedding, plumbing and electrical components, home and business electronics, decorative materials, insulation, and structural components). These materials ignite and burn quickly and produce extreme heat and toxic smoke. If firefighters cannot arrive in a timely manner and attack the fire quickly, a strong possibility exists that a dangerous flashover (simultaneous ignition of the combustible materials in a room) will occur. Flashover can occur within five to seven minutes of fire ignition and is one of the most dangerous events that a firefighter can face. When a flashover occurs, initial firefighting forces are generally overwhelmed and will require significantly more resources to affect fire control and extinguishment.

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<sup>2</sup> The Commission on Accreditation of Ambulance Services (CAAS) is an independent commission that established a comprehensive series of standards for the ambulance service industry.

## **V. CURRENT RESOURCE DEPLOYMENT AND INCIDENT ANALYSIS**

As has previously been mentioned, the Somersworth Fire Department currently operates from a single station located at 195 Maple Street. Although not exactly in the center of the community, this station is a visible platform adjacent to the downtown area and in proximity to several target hazards.

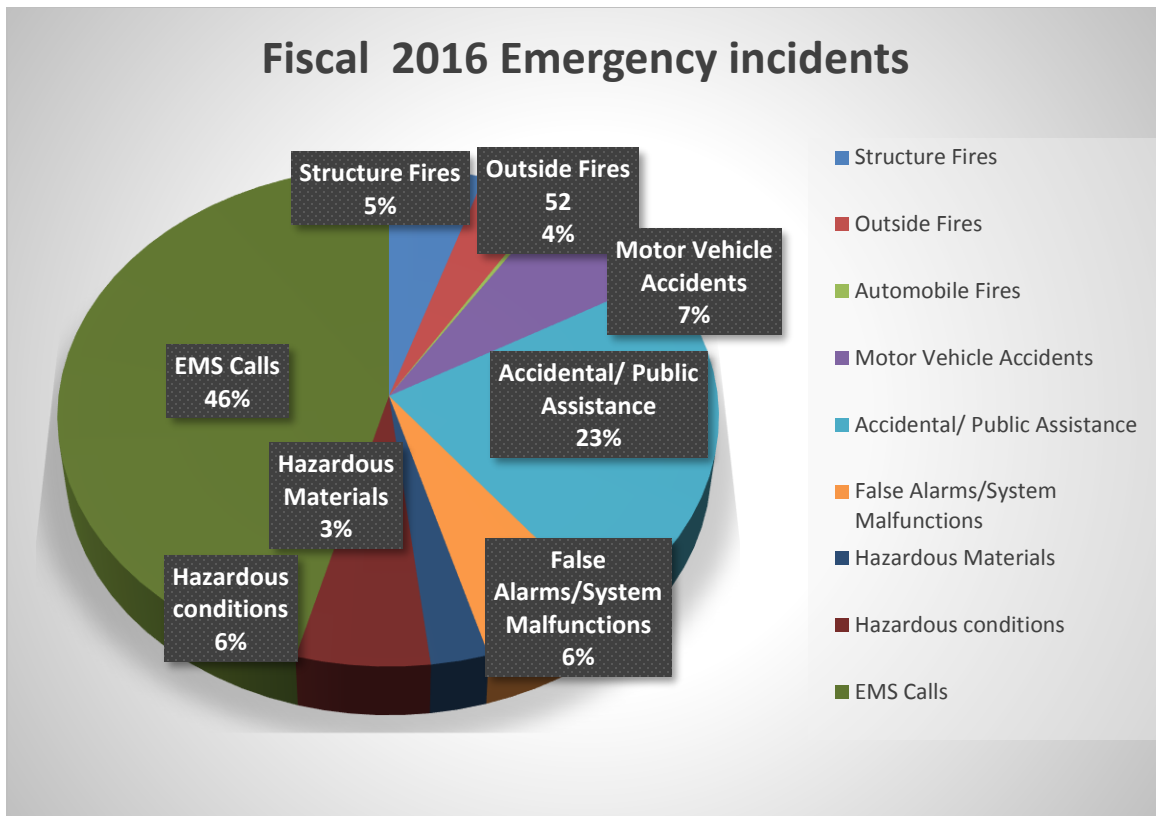
One of the best ways to get a broad overview picture of an emergency services provider is to review and analyze their emergency response/incident statistics. Looking at statistical data that is compiled from incident reports that are generated for each and every emergency response and/or request for assistance will assist with determining the adequacy of current deployments and operations, as well as identify trends in responses (i.e., increasing versus decreasing, changing types of incident requests, increasing response times, frequency of simultaneous incidents, etc.). Utilizing current trends to help predict future ones, while not an exact science, can be helpful to communities and fire departments in predicting, and planning for, future operational needs. However, as with any other type of statistical analysis, the information that is analyzed is only as good and/or reliable as the data that was originally entered and has been provided for evaluation.

The data that was analyzed for this report was provided to the MRI study team by Chief Hoyle through three years of annual reports. These reports detailed the following response statistics:

<b>Fiscal Year</b>	<b>Fire Responses</b>	<b>EMS responses</b>	<b>Total Emergency Response Volume</b>	<b>Change from previous year</b>
<b>2014</b>	651	595	1,246	13% increase
<b>2015</b>	820	654	1,474	18% Increase
<b>2016</b>	744	629	1,373	7% decrease

**Table 1 - Somersworth Fire Department Emergency Response Volume Analysis**

Note: The major change in incident volume can be attributed to the department's increasing role in Emergency Medical Services.



**Figure 13 - Somersworth Fire Department Response Percentages**

## **VI. PLANNING FOR A NEW FIRE STATION**

Fire stations are a critical community asset. The fire station facilities of a modern fire department are designed to do much more than simply provide a garage for apparatus and a place for firefighters to wait for a call. Well-designed fire and EMS facilities enable staff to perform their duties effectively, efficiently, and safely. A fire station should, at a minimum, provide adequate, efficiently designed space for the following functions:

- Housing of fire apparatus, with adequate space for apparatus length and height (and the housing of all equipment, including staff, and service and support vehicles, including trailers);
- On-duty crew quarters, with sufficient toilet/shower/locker room space for both sexes;
- Adequate sized dorm facilities (to include staffing for storm coverage);

- Kitchen and eating area;
- Training and meeting space;
- Physical fitness space;
- Administrative offices;
- Vehicle maintenance (as necessary);
- Hose drying and storage (as necessary);
- A turnout gear storage room;
- Backup communications space;
- A decontamination area;
- Supply and equipment storage; and
- Public entrance/reception area.

Fire stations are unique facilities in that they must accommodate extremely diverse functions, including living quarters, recreation, administration, training, community education, equipment and vehicle storage, equipment and vehicle maintenance, and hazardous materials storage. While it is usually only occupied by fire department personnel, the facility may also need to accommodate the members of the public who visit for station tours, public education presentations, and to discuss building projects or apply for permits. Many communities find that a fire station is an ideal place to locate the community's emergency operations center (a large room, such as a training classroom, can be designed to serve as the EOC when needed). Meeting rooms are also frequently made available to community organizations, thus increasing their versatility. However, in today's environment, serious consideration must be given to station security and whether allowing members of the public who are not members of the department to utilize these facilities, particularly if there is open, or easy, access to the operational areas of the facility.

Fire department capital facilities are exposed to some of the most intense and demanding uses of any public local government facility. Many fire stations are occupied twenty-four hours a day, seven days a week, by on-duty personnel standing by to respond to emergency incidents. The

very nature of the fire department's operations necessitates that all stations be functional, adequate to fulfill the department's core missions, and be well maintained.

The adequacy, quality, and appearance of fire station facilities have a significant impact on the performance of the department as a whole. Fire stations support the needs of the fire department and the community in which they are located. Fire stations that meet those needs now, and in the future, are built and maintained with quality products and systems.

An attractive, well-maintained, functional, clean, and well-designed fire station can contribute to the morale, productivity, and operational effectiveness of the fire department. Most citizens have little contact with the fire service and often make judgments that are, at least partially, based upon their impression of fire station facilities. It follows then, that a good image of the department must be maintained not only by proper deportment of the individual officers and firefighters, but also by the appearance of their physical surroundings.

It is important that the existing fire station is properly maintained, and any future station be designed and constructed in such a manner that employees can perform their duties efficiently and effectively. Typically, Fire stations have an anticipated useful life of 50 to 75 years, depending upon growth and development with a community. As a facility ages, it may no longer meet the needs of an evolving department and/or community, thus negatively affecting efficiency, safety, security, technology, and overall efforts to provide quality fire, rescue, and emergency medical services. It may also hamper the ability of the department to keep pace with increasing and/or expanded requests for, and/or levels of, service. Older and/or obsolete facilities are also expensive to maintain due to inefficient energy systems. When these conditions occur, typical remedies include expanding, renovating, and/or replacing the existing facilities.

There is no specific template for fire station design and construction. Each station must be designed to meet the unique needs of the community, or area of the community, it will serve. National best practices, such as guidance provided by the National Fire Protection Association (NFPA) and the Federal Emergency Management Agency (FEMA), recommend that the following features be included in fire station capabilities:

- Seismic-resistant construction (based on local risk assessment)
- Flood hazard protection (based on local risk assessment)
- Automatic fire sprinkler system and smoke detection system
- Carbon monoxide detectors

- Vehicle exhaust extraction system
- Capability to decontaminate, launder, and dry personal protective equipment and station uniforms
- Facility security
- Emergency power supply
- Exercise and training area(s)
- Compliance with the Americans with Disabilities Act (ADA)
- Compliance with current fire and building codes
- Adequate storage for supplies and equipment, including emergency medical and disaster supplies
- Adequate parking for on-duty personnel, administrative staff, and visitors
- Capability for future expansion

Fire station facilities should be an important component of a municipal capital improvement plan (CIP). A long-term plan should be in place that takes into consideration the life expectancy of a facility, space needs, technology needs, and location requirements, based on response times, travel distance, changes in community development patterns, and regional fire protection capabilities. The construction or renovation of fire stations is a costly proposition that should be planned well in advance in order to balance other community needs for capital projects.

### **Anticipating Future Needs**

#### **Current and Future Apparatus Set**

The Somersworth Fire Department current apparatus set includes the following vehicles: Three engines, one ladder, one air supply unit, one utility vehicle, and one brush unit. Equipment was found to be in good or excellent condition. It should be noted that the air supply unit is a regional asset. Chief Hoyle has obtained a grant for a new unit that will have a 20-year life span. In talking to the Chief, he believes that housing this unit benefits the entire region and is Somersworth's contribution to the mutual aid effort. The study team believes that providing

space for this regional asset should be considered as the new station is developed. The current apparatus configuration matches the community's needs; however consideration should be given to the projected apparatus set and the new station should be designed with that apparatus set in mind.

Type of Unit	Current Apparatus Set	Ideal Apparatus Set	Future Projected Apparatus Set – 20 years
Engines	3	3	3
Ladder	1	1	1
Utility Unit	1	1	1
Air Supply	1	1	1
Brush Unit	1	1	1
Command Unit	1	1	2
First Response Squad	0	0	1
Rescue Boat	1	1	1

**Table 2 - Somersworth Apparatus Set Review and Projection**

#### Engines:



**Figure 14 - Somersworth Engine 2**



**Figure 15 - Somersworth Engine 3**





Figure 16 - Somersworth Engine 4

**Aerial Ladder:**



Figure 17 - Somersworth Ladder 1



**Forestry Unit:**



**Figure 18 - Somersworth Forestry Unit**

**Support Units:**



**Figure 19 - Regional Mutual Aid Air Supply Unit**



**Figure 20 - Somersworth Utility Vehicle**



**Figure 21 - Somersworth Command Unit**



**Figure 22 - Somersworth Rescue Boat**

**Recommendation VI-1** *The new station should be designed to accommodate the projected apparatus set including two ambulances or an ambulance and a squad. This will require five double depth bays.*

### **Current and Future Fire Service Staffing**

The current Somersworth Fire Department staffing pattern provides a minimum of three personnel on shift during the day and four at night. The OSHA two in two out standard requires that four personnel be on the incident scene before offensive fire attack operations are initiated unless a person requiring rescue is visible.



**Figure 23 - OSHA Two in Two Out Illustration**

Based on the projected incident volume and the growing involvement of the Somersworth Fire Department with EMS, staffing needs should be expected to grow at a moderate pace. The addition of a 4th person during the daytime should be anticipated to provide for firefighter safety and meet the expanding EMS volume over the next five years. Patient transport EMS service is currently provided by American Ambulance and there seems to be little question that

they are serving the City well. However, as health care evolves, and service demand increases we envision the department continuing to play an increasing EMS role.

Depending on health care configuration, patient transportation reimbursement and demographic changes, we believe that in the future the department may be required to staff a dedicated non-transport first response squad. The addition of a first response squad has been considered when developing the projected apparatus set for the City of Somersworth. This potential unit should be anticipated in the planning for the construction of a new fire station.

## **VII. FIRE FACILITY FUNCTIONAL LAYOUT**

The facilities of a modern fire and EMS department are designed to do much more than simply provide a garage for apparatus and a place for firefighters and EMS personnel to wait for a call. Well-designed fire and EMS facilities enable staff to perform their duties effectively, efficiently, and safely. As noted previously, a fire station is a platform that supports the needs of the fire department and the community in which it is located. It must accommodate extremely diverse functions, including housing, recreation, administration, training, community education, equipment and vehicle storage, equipment and vehicle maintenance, and hazardous materials storage. While it is usually only occupied by trained personnel, the facility may also need to accommodate the general public for meetings, and community education or outreach programs.

Fire stations will vary in design depending on the specific mission, i.e., the types of emergencies that will be responded to or the types of fires that will be fought. Usually, the facility differences relate to the size of the firefighting apparatus and facility location. The location of the facility is driven by the need to minimize response time. For example, aircraft rescue firefighting (ARFF) stations provide fire protection to flight lines and aircraft and are located adjacent to the runways on airport property. Similarly, stations with hazardous waste response teams are located near likely spill sites.

Major fire station functional areas include the following:

- **Apparatus bay(s):** This is where the firefighting and emergency response vehicles are stored.
- **Apparatus bay support and vehicle maintenance:** These industrial spaces are where the vehicles and other firefighting equipment are cleaned, maintained, and stored.
- **Administrative and training areas:** These include offices, dispatch facilities, and training and conference rooms.
- **Residential areas:** These include the dorm rooms, day room/kitchen, and residential support areas such as bathrooms and fitness spaces.

The two primary drivers for facility layout and functional space adjacencies in a fire station are the following:

1. Ensure that internal response times can be met (time for a firefighter to reach the apparatus and be ready to depart).
2. Separate the diverse and sometimes conflicting functions such as industrial maintenance spaces and residential spaces.

The diagram below provides an example layout of a modern fire service facility.

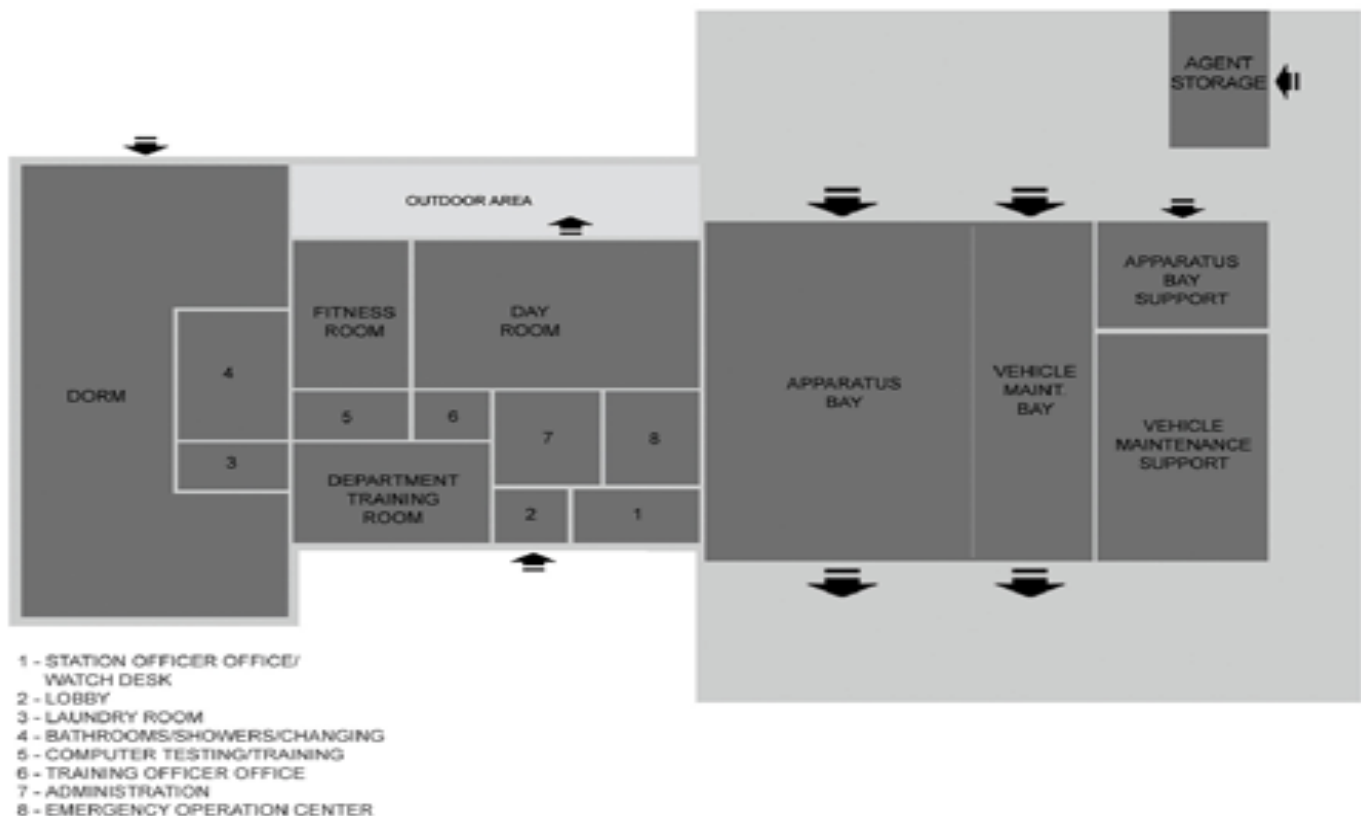


Figure 24 - Example layout of a modern fire service facility

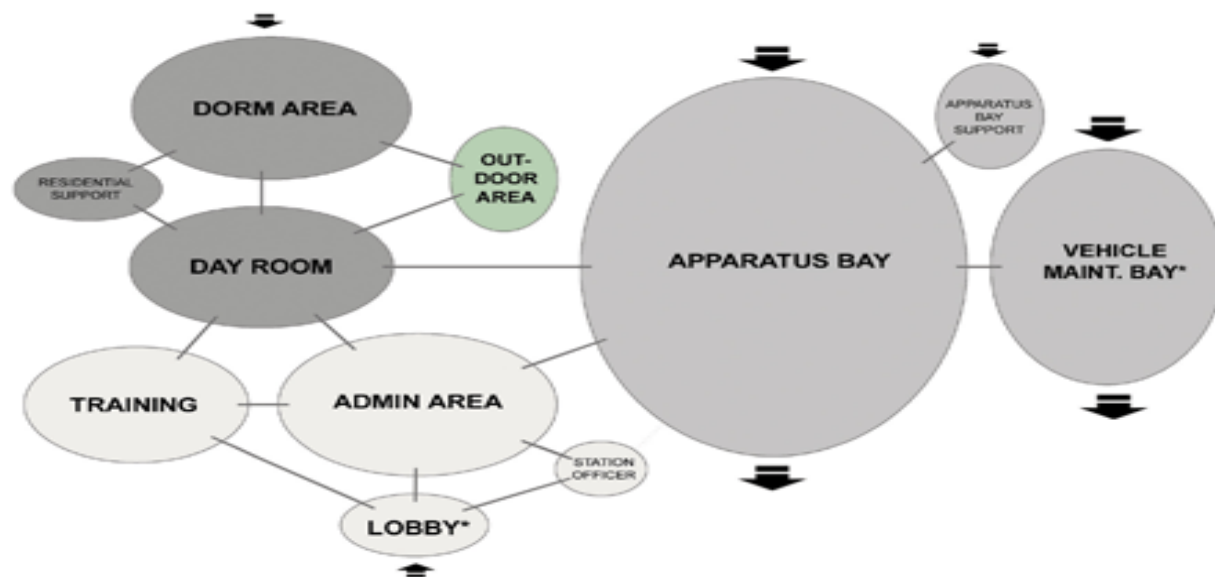
### Apparatus Bays

By placing the apparatus bay between the maintenance and support functions and the residential and administrative functions, both primary layout goals can be accomplished. Some of the adjacencies shown above may be accommodated through a hallway rather than a direct entrance/exit from one space to another. This is particularly true with the apparatus bay and the day room as many facility spaces require an adjacency with these two spaces. This



approach to the layout can also accommodate expansion of the apparatus bay on the other side of the support and maintenance areas, although care must be taken to ensure that internal response times can be met after any expansion.

Sizing the apparatus bay is critical, and it should be designed to accommodate variable vehicle sizes. Typically, the entire room is sized based on the bay size for the largest vehicle in the fleet or the largest anticipated vehicle. Bays also include vehicle exhaust removal systems, compressed air, and power drop lines, and hot and cold water connections. Bay doors must also accommodate the largest vehicle and include a manual means to open in case of power failure. Ideally, the site will accommodate drive-through bays.



**Figure 25 - Example functional layout of a modern fire service facility**

***Recommendation VII-1 The City of Somersworth should consider both response ergonomics and the function or relative hazard of adjacent spaces in the design of the new fire station.***

#### **Apparatus Bay Support and Vehicle Maintenance**

Apparatus bay support functions include cleaning and maintenance areas for the firefighter's self-contained breathing apparatus (SCBA), protective clothing, fire extinguishers, and other equipment. It also includes storage areas for firefighting gear and equipment and secure storage for medical supplies. Some of these areas are specialized spaces for disinfecting protective equipment and for maintaining and recharging the SCBA in a clean environment.

## **VIII. STATION LOCATION OPTIONS AND FISCAL ANALYSIS**

As we approached this project it was rapidly determined that the potential renovation of the existing station is not a realistic or prudent option. The reasons that renovation is not viable include:

- The current position of the station on the lot would not allow for appropriate expansion and development.
- The construction of the existing structure would necessitate that the vast majority of the building would need to be removed.
- Updating the existing building to meet current code would require extensive work that would produce a cost that may exceed the cost of new construction.

Three location options and operational approaches for the siting of a new station were discussed. These include:

**Option One:** Construct a new station on an empty lot located at 17 Lilac Lane.

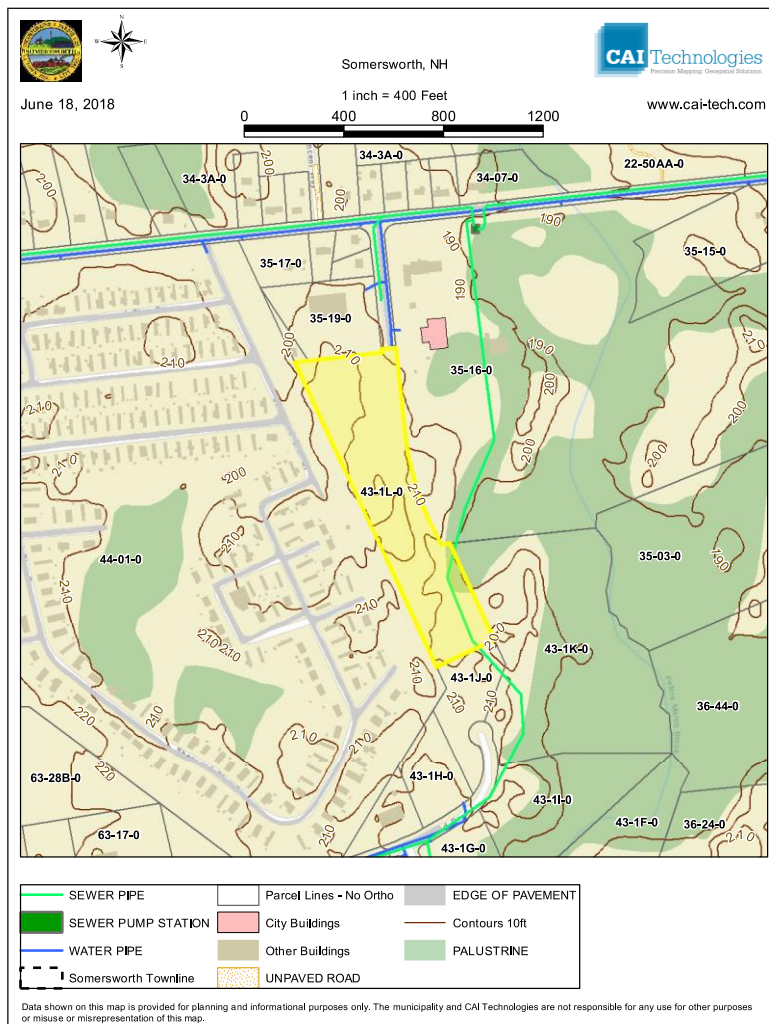
**Option Two:** Construct a new station at the existing location of fire headquarters (195 Maple Street) and pursue a phased demolition and construction approach to accommodate the operational needs of the fire department as it would continue to function from this location during both demolition and construction.

**Option Three:** Construct a new station at the existing location of fire headquarters (195 Maple Street) and shift fire operations to be collocated at the DPW and in trailers near the DPW.

### **Evaluation of Options**

**Option Three:** After further discussion relative to the operational impact to both the fire department and the DPW, the operational obstacles for both departments were significant and outweighed the potential benefit. This option would require placing fire apparatus in the DPW bays during the winter months. If fire apparatus occupied multiple DPW bays it would effectively frustrate the DPW from using those bays for operations as fire apparatus with a water tank and pump needs to be either running while outside or stored in a heated environment. Although apparatus can be drained, and pumps winterized, those units would not be immediately available for emergency operations. Therefore, Option Three was not formally evaluated.

**Option One:** Construct a new station at 17 Lilac Lane in proximity to both the DPW and the Police Department. This would provide the indirect benefit of creating a municipal campus and provide an environment that could potentially enhance collaboration. Pursuing this option would generate a direct benefit of not disrupting fire department operations for the period of demolition and construction.



**Figure 26 - Potential Fire Station Location Site - 17 Lilac Lane**

The current property is a heavily wooded 8.45 acre lot which is not currently owned by the City of Somersworth. No soil testing has occurred on this site to identify wetlands, determine soil types or ledge. Lilac Lane would need to be extended to accommodate this facility and core utilities including water, sewer and electricity would need to be brought onto the site. In

addition, Chief Hoyle is adamant that if this site is selected, the intersection of Lilac Lane and Blackwater Road would need to be fully signalized including the installation of emergency response preempt system. This may also include the need to outfit each piece of fire apparatus with emergency preempt emitters. The potential cost of the purchase and installation of these emitters has not been included in this analysis.

Financial analysis not including the cost of construction of a new fire station which is assumed to remain constant for either of the two location options:

Cost Category	Projected Cost
Land Purchase	\$150,000
Land Clearing	\$20,000
Utility Extension	\$422,600
Contingency Fee	\$105,650
Lilac and Blackwater Signalization	\$150,000
<b>Total</b>	<b>\$848,250</b>

**Table 3 - Lilac Lane Site Development Cost**

It was further noted that as an option to reduce response times, Lilac Lane could become a connector road and be extended to Willand Drive. The estimated cost for this extension would be an additional \$1,760,000. The cost of the connector roadway along with the projected cost of site work on Lilac Lane would produce a total fiscal impact of \$2.6 million dollars. Although this connection would aid response to a portion of Somersworth's target hazards, the station could be constructed on this site without incurring these additional costs. Therefore, for the purpose of analysis, the costs to create a connector roadway have been excluded.

**Option Two:** Demolish the existing station in two stages and reconstruct a new headquarters building on the same lot. This option would be an operational challenge to the fire department in that personnel would need to be shifted into temporary trailers and some vehicles would need to be stored outside or in temporary fabric garages. If this option is pursued it is essential that it be timed to a spring start and involve phased demolition and construction. This would most likely elongate the timeline and a full twenty-four-month demolition and construction period should be considered.

Financial analysis not including the cost of construction of a new fire station which is assumed to remain constant for either of the two location options:



Cost Category	Projected Cost
Demolition Phase One	\$18,000
Demolition Phase Two	\$24,000
Trailer Fabrication	\$22,500
Utility connection	\$12,500
Mod Space Trailer Rental (24 months)	\$60,000
Contingency (10%)	\$13,700
<b>Total</b>	<b>\$150,700</b>

**Table 4 – Maple Street Demolition and Accommodation Costs**

### **Comparing the Options from a Fiscal Perspective**

Comparing the two options, the cost to develop the Lilac lane site would be \$697,550 higher than the cost of reconstructing a headquarters facility at the existing Maple Street location. In addition, to optimize response times from the Lilac Lane site, the City would need to invest an additional \$1.76 million to construct a connector road. It should be noted that the construction of a station on Lilac lane would produce the least operational disruption for the fire department.

Remaining on the Maple Street site would produce a cost of \$150,700. In addition to this cost, the City should also consider the operational impact of having the fire department operate from a demolition and construction site that has a small footprint. We would be remiss in failing to mention that the operational obstacles of this approach while not insurmountable, will be significant. However, when we evaluate the costs and benefits we do not believe that the lower operational disruption offsets the increased cost.

### **IX. RESPONSE TIME ANALYSIS**

Overall, the Somersworth Fire Department’s current response times are close to what is recommended by NFPA and other emergency services recommendations and best practices. The expectations for the quality and quantity of fire and emergency medical services must come from its residents and other taxpayers. As stated previously, there is no “right” amount of fire protection and EMS delivery. It is a constantly changing level based on the expressed needs of the community. The standards provide recommended benchmarks, not mandated requirements. It is the responsibility of elected officials to translate community needs into reality. Decisions regarding deployment of resources or positioning of stations are never easy

decisions, especially when one considers the fact that virtually any decisions on emergency service deployment that involve moving and/or relocating a resource, even for the considerable benefit of the community as a whole, may have a negative effect on at least a small percentage of the population.

When looking at the current situation in Somersworth, one of the important benchmarks regarding overall response time is travel, or drive, time. This is the time from when a unit starts actually responding until it arrives on location. Drive time is the factor where things such as the number and location of stations play a critical role. The estimated drive times utilized in this report were calculated using an expected average response speed of approximately 35 miles per hour. As previously identified, the average drive time for the first arriving fire unit in Somersworth is currently projected at 4-6 minutes.

The Somersworth Fire Department maintains two maps that outline the relative location of incident clusters in the community. Using those maps, we developed a series of response time trials. This involved a staffed engine company proceeding at would be a normal response speed to various locations within the community. These locations were determined by the two site selection options and the location of target hazards, as well as incident clusters within the community. The results of these response time trials are detailed below:

Starting Location	Ending Location	Distance Traversed	Elapsed Time
<b>Current Fire Station (Maple Street)</b>	Blackwater Road and Maple Street Intersection	.1 miles	35 seconds
<b>Lilac Lane</b>	Blackwater Road and Maple Street Intersection	.8 miles	1:47
<b>Willand Drive</b>	12 Commercial Drive	1.25 miles	1:58
<b>Current Fire Station (Maple Street)</b>	12 Commercial Drive	1.4 miles	3:58

**Table 5 - Response Time Analysis**

Based on the location of target hazards and considering the current incident response clusters identified by the mapping maintained by the Somersworth Fire Department, the majority of responses would require emergency apparatus to traverse Lilac Lane, navigate through a signalized intersection and then proceed down Blackwater Road to the intersection with Maple Street. Although some response reduction to the Commercial Drive and adjacent distal areas would be realized if the Lilac Lane connector road was constructed, this would not produce a response time reduction to the majority of emergency incidents. Considering the current

location of both target hazards and emergency incidents, our team concluded that constructing the new fire station on Lilac Lane rather than reconstructing the station at its current location would add an average of 1:12 to the majority of responses.

During this study, a representative from our team met with the Somersworth Public Safety Committee. The Committee indicated that there were clear advantages and disadvantages to each site. However, the Committee focused on the risk associated with elongating response time and asked that our team consider response times as the primary factor in deciding where to place a station. Based on this risk management philosophy it is clear that the current Maple Street location provides the best overall response times to the community.

**Recommendation IX-1 Considering both cost and response time, the City of Somersworth should construct the new fire station at the 195 Maple Street site.**

### **Timeline Phased Construction**

As noted previously in this document, locating a new fire station on the site of the existing station will produce operational obstacles for the Somersworth Fire Department. We believe that these obstacles, while significant, can be overcome by planning, sequencing, coordination with contractors and most importantly with the cooperation of the members of the Somersworth Fire Department. The following table outlines key aspects of a 24-month construction period.

<b>Date</b>	<b>Activity</b>
<b>January 2019</b>	Establish a Building Committee
<b>February 2019</b>	Authorize a feasibility and design
<b>March – May 2018</b>	Feasibility study completed, authorize project funding
<b>June 2019</b>	Design completed
<b>August 2019</b>	Hire an Owners Project Manager
<b>September 2019</b>	Obtain bids for a spring 2020 project start
<b>March 2020</b>	Vehicles relocated. Demolition of three apparatus bays
<b>April 2020</b>	Contractor initiates construction of new apparatus bays
<b>September 2020</b>	Trailers for crews and fire administration positioned on the site
<b>October 2020</b>	Fire operations moved into temporary trailers. Remainder of old station demolished

<b>October 2020</b>	Construction of new administrative and residential components initiated
<b>November 2020</b>	Apparatus moved into five new bays
<b>September 2021</b>	Expected occupancy of the completed station
<b>October 2021</b>	Trailers removed, final paving of parking lots
<b>November 2021</b>	Punchlist and project closure

**Table 6 - Potential Somersworth Fire Station Project Schedule**

## **SUMMARY OF RECOMMENDATIONS**

The following five recommendation were developed based on the analysis of data presented during the course of this study:

***Recommendation III-1 The City of Somersworth should develop a three-year strategy to replace the existing fire station. The goal of this project should be to occupy the new station in the Fall of 2021.***

***Recommendation III-2 The City of Somersworth should form a Building Committee and authorize the appropriate steps necessary to fast track the development of a new fire station.***

***Recommendation VI-1 The new station should be designed to accommodate the projected apparatus set including two ambulances or an ambulance and a squad. This will require five double depth bays.***

***Recommendation VII-1 The City of Somersworth should consider both response ergonomics and the function or relative hazard of adjacent spaces in the design of the new fire station.***

***Recommendation IX-1 Considering both cost and response time, the City of Somersworth should construct the new fire station at the 195 Maple Street site.***

## **X. CONCLUSION**

The existing fire station has exceeded its useful life and is no longer a viable operational platform for the Somersworth Fire Department. Our project team found that a potential renovation of the existing facility was both impractical and imprudent. This station should be replaced, and a new facility should be authorized as soon as possible.

Considering cost and risk, it is apparent that constructing a fire station on Lilac Lane would cost the City more and produce a long-term operational deficit by decreasing average responses times by 1:12 to the majority of incidents in the City. Therefore, the new Somersworth fire station should be constructed on the existing Maple Street site. Given the operational obstacles that will be created by the selection of this site, it is essential that a phased demolition and construction methodology be employed. We believe that the obstacles that will develop can be easily overcome through stakeholder communication and cooperation.

Please contact me with any questions relating to this management letter.

Sincerely,

*Brian P. Duggan*

Brian P. Duggan  
Director of Fire/EMS and Emergency Management Services

## **Appendix A**

### **2016 Somersworth Fire Station Study**

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# *Somersworth Fire Station Study*

*June 3, 2016*

Prepared by the Fire Station Advisory Committee

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# Somersworth Fire Department Feasibility Study

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## EXECUTIVE SUMMARY

Based on our evaluation, the current Somersworth Fire Station is in fair condition and very well maintained. However, due to its original design and orientation on the site the facility has a very limited expansion capability. The facility as it relates to the department's current needs is insufficiently sized in all three aspects of a fire station, administrative spaces, apparatus bays and firefighters living quarters.

This depletion of spaces is not conducive to a standalone fire station and consequently it is impacting the fire department's operations and administrative functions. The current fire station was not constructed with the growth in mind that the department has experienced over the past three decades.

When we factor in the anticipated station's growth over the long term, along with the programmatic needs of the station, the facility becomes excessively undersized. Our evaluation also revealed that if the station is to be expanded, then most of the building systems would also need to be upgraded due to the age and lifecycle of these systems.

To date, this facility has adequately served the community. That said, technological advances in firefighting equipment, the expansion of the departments' services and the need to look toward additional staff in the future, the existing buildings limitations are currently, and will continue to limit the department's ability to carry out its mission. All are in conflict with the constraints of the facility.

Based on the building evaluation and the programmatic needs of the department, the station needs to be expanded or replaced. The spaces requiring the most expansion are the firefighter living quarters, and the administrative offices. Due to their organization within the facility and on the site, the options for expanding the existing facility are very limited. Therefore the committee recommends a new facility be constructed.

The options available to the fire department are as follows:

### **Option A    New Facility on Existing Site**

The existing fire station site is too narrow to accommodate any possible expansion on the existing building without purchasing adjacent property. The site could, however, accommodate the construction of a new building with the removal of the existing. There would be a need to clarify the right of way established by the City between the National Guard property and the current site. If that land could be included in the buildable area of a new fire station the existing site could be utilized.

### **Option B    New Facility on New Site**

In this option, a new facility would be constructed on a new site. Once the new facility is constructed, the station's operations can be shifted from the existing to the new with little disturbances. The existing station can then be sold, or re-utilized by the Town.

We have included a Preliminary Cost Estimate in Section IV of this report. Keep in mind that estimates at this level of study are very preliminary and should be considered for the purpose of alternative comparison and not for budgeting purposes.

## **INTRODUCTION**

The Fire Station Feasibility Committee was commissioned by the Mayor of Somersworth and the City Council to evaluate the existing Fire Department's Headquarters for the possibility of renovating and expanding the existing facility or the feasibility of constructing a new fire station to accommodate the current and future Fire Department needs.

An on-site visual assessment of the building was performed on November 3, 2014 by representatives of the committee along with members of the fire department. In addition to the building evaluation, the committee interviewed members of the Fire Department, investigating such issues as staffing and equipment levels, personnel flow, public spaces, staff spaces and logistical considerations in responding to an event. The end result is a comprehensive program, where each component was considered as to its security level, equipment requirements and functionality. The complete program is located in Section II of this report.

The building evaluation presented in this report is based on field observations, review of available construction documents, and discussions with personnel from the facility.

Building codes and pertinent guidelines, presently in force locally, were used in evaluating the building and surrounding grounds.

## ASSESSMENT

### General

The intent of the assessment is to review the condition of the existing site and to assess the feasibility of modifying the building from a site perspective.

### Existing Conditions

#### Location

The existing Fire Headquarters is located on a 1 acre lot at 195 Maple Street in Somersworth on the west side of the street. The site is predominantly cleared and covered by pavement, sidewalk or building. The only vegetated area is the grassed south westerly yard and it is flat for approximately 80' up to the property line.

#### Layout

The property has frontage on Maple Street and Park View Terrace on the north. Adjacent to the south property line is a legal right of way, which provides access from Maple Street to the town road to the rear of the site.

Striping for the fire department parking are worn, and there are no designated spaces for handicapped use with both pavement markings and signage. There are 14 spaces for parking and one poorly marked handicapped space. The pavement is in fair condition. No curbing is provided. The front apron was replaced within 5 years, however, is showing signs of wear and sinking once again.

The existing structure is a 11,080 square-foot two-story fire station. Vehicles access the apparatus bays via a bituminous paved driveway on Maple Street. The building does not orient square to the street thus offering an awkward approach for the vehicles backing in.

#### Utilities

Water, sewer, gas and drainage are connected to city services on Park View Terrace and Maple Street. The path of the sewer and water service are from the ground level utility room located on the north side of the building and just below the slab on grade. From the interior of the building it is apparent that there is also a storm water line, however it is not clear where it connects to or if it includes an oil/sand interceptor.

**Proposed Conditions****Layout**

The Space Needs Program for the Fire Station reports that 11 staff parking spaces are required. Parking spaces shall be 9'x18' and shall be 90-degree, parallel and paved. Two handicapped parking spaces will be required on-site, near the entrance to the facility. Parking spaces shall either have wheel stops or be curbed to prevent vehicles from being parked or driven within required setback areas or into landscaped open space areas. The driveway and parking lots will be pavement with an appropriate aggregate base. In addition to the curbs and wheel stops required for parking, curbing will be used to control drainage, where needed.

A snow storage area shall be provided to ensure the availability of all proposed parking spaces year-round. All required parking spaces, maneuvering aisles and driveways shall have an asphalt or concrete surface.

A concrete pavement apron will be provided outside of the apparatus bay door locations. Concrete pads will be provided at points of egress, as required. A concrete dumpster pad shall be located on-site and enclosed by a fence or wall at least six feet in height.

**Utilities**

Utilities, including water and sewer, shall be evaluated and upgraded as necessary for the construction of the facility. Mechanical equipment shall be screened from public view.

ARCHITECTURE

Somersworth Fire Station



The Somersworth Fire Department was constructed in 1976 as a seven bay, single-story building with a two story administrative and living quarters building directly attached to it. The structure of the building has remained unchanged with only minor upgrades in interior finishes and safety systems over the past four decades.

The entire structure has a gross square footage (GSF) of 10,296. The first floor of the facility occupies 8,268 GSF, and 2,028 GSF on the second level. The building construction consists of load bearing masonry walls, with a bowtie steel truss framed flat roof.

Since the construction of the facility in 1976, other than the fire alarm and sprinkler system installations and minor improvements and modifications, the facility has virtually remained unaltered.

Building Square Footage		
Floor	Area	Square Footage
First Floor	Apparatus Bay, and Support areas	6,240
First Floor	Offices, Mechanical Rooms, Stairwell, Toilet Room and Training Room	2,028
Second Floor	Living Quarters, Kitchen and Toilet Room	2,028
Total:		10,296

Currently, the station is staffed by sixteen full time firefighters, the fire chief and a part administrative assistant and an on call force of twenty firefighters. The rest of the department is on call. The primary apparatus bay consists of five single loaded bays exiting onto Maple Street and two bay exiting onto Park View Terrace. Storage for firefighter's equipment and supplies is limited to those intervening spaces off of the apparatus bays.

The administrative portion of the facility, consisting of the Fire Chief's office, communications area is located on the first floor adjacent to the training room. Firefighters living quarters are located on the second floor and consist of only the sleeping quarters, a kitchen, day room and bathroom. Currently there are no locker rooms or separate bathrooms for male and female accommodations.

Overall, for its age, the facility is in fair condition. The following is an architectural evaluation of the station assessed in the following categories:

1. Life safety and code compliance.
2. Accessibility.
3. Waterproofing systems.
4. Integrity of doors, windows, and exterior walls.
5. Interior finishes.
6. Fire department operational issues.
7. Structural.
8. Mechanical.
9. Electrical.
10. Plumbing.



**Life Safety and Code Compliance**

1. The existing facility does not have adequate egress from the apparatus bay area when used as a place of assembly.
2. There is no fire separation between the apparatus bays and the offices. This is true of the walls as well as the doors.
3. Handrails and guardrails on the interior stairs are deficient .
  - a. The spacing of the guardrail is to large.
4. The stairwell to the second floor is non compliant as it needs to provide a rated path of egress to the exterior of the building.
5. The pole in the sleeping quarter is non compliant as it creates an unprotected vertical opening between two floors.
6. There are numerous penetrations through rated walls, ceilings and floor assemblies that do not have the required fire stopping.

**Accessibility**

Since construction of the facility, handicapped requirements have slowly been increased. In 1990, Congress passed the "Americans with Disabilities Act" (ADA), which set federal guidelines for the accessibility of buildings by individuals with disabilities. Using ADA, requirements, it has been determined that the Somersworth Fire Station is deficient in providing barrier-free access, both in site access and to spaces within the building. Field investigations identified the following issues that need to be addressed:

1. All doors with closers need the speed and pressure adjusted.
2. The majorities of the doors do not have the proper push and pull clearances.
3. Access into the building is limited and does not comply with accessibility requirements.
4. Door hardware throughout the building does not comply with accessibility requirements.
5. Toilet room sizes, fixtures and accessories are non-compliant with accessibility requirement.
6. There is no access to the second floor to accomodate people with certain disabilities.

**Waterproofing System**

Generally, the waterproofing at the Somersworth Fire Station is in fair to sub-standard condition. Our field investigations revealed the following:

1. The existing flat roof was not evaluated, however from below there were many indications of previous roof leaks. There are indications of old water leak stains on ceilings; however, discussions with personnel revealed that depending on storm conditions leaks can occur at any time. In discussions with the Fire Chief, the existing single-ply roof membrane is approximately 11 years old (2004) and has had some repair work.
2. All sealant and caulking joints should be evaluated. It is expected that they have outlived their life expectancy and need to be replaced.
3. Ventilation in the roof joists spaces needs to be evaluated and corrected. The lack of proper ventilation, if not addressed, could lead to more serious problems such as dry rot, mold, and roofing delamination.
5. The existing facility was constructed during the 70's, when energy conservation was not an issue. In past repairs, supplemental rigid roof insulation has been installed below the roof membrane. However, it is apparent that the existing walls were left untouched. Consequently, the facility is lacking insulation within the exterior walls; additionally there is no continuous vapor barrier or infiltration barrier as required by the New Hampshire Energy Code.

**Integrity of Doors, Windows and Exterior Walls**

Visually, the exterior envelope of the facility appears to be in satisfactory condition. Our field investigations revealed the following:

**Doors**

1. The weatherstripping at the exterior doors is either missing or in poor condition.
2. All door hardware should be evaluated and modified to comply with current codes and guidelines.
3. Overhead doors to the facility are aging and will require a wholesale replacement with openers at some point in the near future.

**Windows**

1. Windows throughout the facility are in fair condition and consist of double-hung vinyl replacement windows.

**Exterior Walls**

The existing masonry construction appears to be in good condition for its age.

1. A cursory review of the block walls revealed that the block has performed fairly well. There are numerous masonry cracks on the exterior of the facility as well as within the facility; however they appear to be stable and attributable to the lack of masonry control and expansion joints. The majorities of the cracks have been in filled with some type of sealant.
2. The block construction was described to us a "Dry Stack" which does not meet today's building standards and Seismic requirements consistent with reliable infrastructure needs of a growing city.
3. The existing exterior concrete panels which make up the decorative trim at the top of the walls are separating and described as "pinned" in place without positive connections.
4. What was originally constructed as the solar panel walls on the south side of the building is dilapidated and in need of replacement.

**Interior Finishes**

The condition of the interior finishes within the facility generally varies with the extent of their use. The majority are in good condition. Overall, the facility has been very well-maintained.

1. Interior walls of the administrative office are an unpermitted interior finish around the chief's office as it is wood paneling not allowed in a place of assembly.
2. The suspended ceilings are in good shape; however there are indications of staining from roof leaks, it is unclear if these leaks are still active or residual staining from past leaks.
3. The flooring within the facility is a mix of painted concrete floor, vct tiles and carpet. all of which is showing its age and requiring constant attention.

4. The flooring construction on the second floor appears to be separating resulting in rips and runs in the existing carpet.

#### **Fire Department Operational Issues**

Currently, there is no accreditation standard for fire stations. The only guidelines available are the National Fire Prevention Association (NFPA) which determines interior response standards and the U.S. Air Force Fire Station Design Guide which is very helpful in verifying space requirements. Typically, each station is designed to suit the specific requirements established by the end users. In discussions with Fire Department personnel and utilizing the U.S. Air Force Fire Station Design Guide, (copy attached or found at <http://www.aviationfirejournal.com/pdf/firestation.pdf>), the following deficiencies were identified:

1. The stations administrative spaces are greatly undersized and limited to the fire chief's office, and a diminutive office off of the apparatus bays serving multiple duties.
2. Currently, there is no separate area for gear storage. Gear is stored in open lockers within the apparatus bay.
3. The only toilet rooms to the facility are off of the training room and second floor sleeping quarters and are also used for storage. Consequently, due to the limited number of toilet rooms, there is no separation of use from toilets in the "dirty" portion of the station to those in the "clean" area.
4. There are no public toilet rooms or in house toilet rooms that offer gender separation.
5. Currently, the facility has been outgrown by the increase in staff numbers over the years and is lacking adequate sleeping quarters, kitchen facilities, dining area, training area and office area.
6. Breathing air tanks and gear are stored and filled on the apparatus floor and not in a separate contained area.
7. The facility does not have a decontamination area. All contaminated equipment is hosed down within the apparatus bay.
8. There is no dedicated area for a washer and dryer. The current arrangement has the washer and dryer separated by more than forty feet.
9. Current storage areas are tight, with storage overflow occupying mezzanines, mechanical room and in use spaces. Storage of building supplies is scattered throughout the facility.
10. The existing kitchen is extremely small and insufficiently sized to accommodate the current staff.

11. The station in its current configuration cannot accommodate the anticipated growth within the community and within the programmatic requirements of the fire station.
12. The male and female toilet/shower rooms are all original construction and are in dire need of an upgrade.
13. There is no janitor's closet.
14. There is no emergency decontamination room with a shower.
15. The existing apparatus approach slab is asphalt in lieu of concrete, consequently is sagging and it needs to be patched or replaced.
16. The interior hose tower has structural issues that has led to falling bricks within the working area of the personnel.

## MECHANICAL

### Existing Conditions

1. The building's fuel source for heating is natural gas.
2. Two boilers supply heat to the building through forced hot water.
3. There is one hot water heater.
4. There is no building airconditioning.



## ELECTRICAL

### Existing Conditions

1. Service/Power Distribution System

400 amp power service provided by Eversource

2. Standby Power Distribution System:

Natural gas standby generator located outside near rear of the building.

3. Interior Lighting:

There is a mix of incandescent and fluorescent lighting throughout the building.

4. Exterior Lighting:

Lighting is located over all the front bay doors and outside of each entry door.

5. Emergency Lighting:

Located throughout most egress paths

6. Fire Alarm System:

There is an addressible fire alarm system that communicates with the Police Department installed throughout the building.

## **PLUMBING**

### **Existing Conditions**

1. The following plumbing systems are present within the existing building:
  - Domestic water enters the building from the north side
  - There are 3 toilets, 3 urinals, 4 sinks and 3 stall showers in the two unisex bathrooms

# ***SPACE NEEDS PROGRAM***

**Somersworth Fire Station**

**SOMERSWORTH FIRE DEPARTMENT  
PROPOSED FIRE STATION SPACE REQUIREMENTS**

APPARATUS BAYS:	6 double deep @ 1630:	9780
ADMINISTRATION:	Office for Chief:	150
	Office for Deputy Chief:	130
	Shared Conference Room for both:	130
	Office for Shift Officer:	130
	Spare Office (expansion):	200
	Dispatch/Admin. Assistant/ Storage Area:	870
	Total:	130
FIRE PREVENTION:	Office for Fire Inspector:	130
	Plans Review Room:	260
	Total:	625
TRAINING:	Classroom/Storage/Kitchenette:	260
PHYSICAL FITNESS:	Room and special flooring:	280
1ST FLOOR BATHRMS:	Men's (130) and Women's (150):	260
STORAGE:	General Supply:	130
	Medical:	50
	Janitor:	150
	Hose storage:	590
	Total:	260
SCBA MAINTENANCE:	Cascade and SCBA bottle and parts storage:	150
TOOL/MAINTENANCE:	Repair and maintenance tools, cabinets, Flam. Liquid Storage:	400
GEAR STORAGE:	Conditioned room for Protective Gear Storage and Cleaning:	250
DISINFECTING AREAS:	Showers, clean area:	420
KITCHEN/DAYROOM:	Kitchen, dayroom for crew:	460
BATHROOM/LOCKERS:	Locker and bathroom area:	660
BEDROOMS:	2 per room (@ 110) except Officer and women: 6 rooms total:	130
LIBRARY:	Private study area:	
<b>GRAND TOTAL:</b>		<b>15395</b>

## **Appendix B**

### **Demolition Estimate**

# Danley Demolition Inc.

P.O. Box 154, Fremont, NH 03044-0154  
lee@danleydemo.com

Tel. (603) 895-4900 Fax (603) 895-4922  
office@danleydemo.com



## ~ PROPOSAL ~

Demolition & Environmental \*\*\* Inspections & Consulting \*\*\* Licensed & Insured \*\*\*

SUBMITTED TO City of Somersworth - Fire Department		PHONE 603-692-9520	FAX
STREET One Government Way		JOB NAME Fire Department	
CITY, STATE, ZIP CODE Somersworth, NH 03878		JOB LOCATION 195 Maple St., Somersworth, NH	
CONTACT NAME Tim Metivier	DESK PHONE 603-692-9522	E-MAIL tmetivier@somersworth.com	JOB NUMBER 1826101
			DATE September 20, 2018

We hereby submit specifications for estimates for the following:

### \*\*BUDGET\*\*

#### Phase 1:

Demolition and removal of 3 bays at the above mentioned job location.....\$18,000

#### Phase 2:

Demolition and removal of 2 bays and office at above mentioned job location.....\$24,000

Remove debris to legal recycling facility.

Pull foundations and slabs. Smooth over with existing fill.

Permits, utilities and all notifications by owner.

All salvage rights to Danley Demolition, Inc. unless otherwise noted.

No fill or hazardous waste removal included in this price.

All work in accordance with Local, State and Federal Regulations.

Rebuild wall on end, by others.

We propose hereby to furnish material and labor in complete accordance with the above specifications, for the sum of:

dollars (\$ \_\_\_\_\_)

Payment to be made as follows:

**1/2 upon acceptance of proposal— balance in full upon completion**

All material is guaranteed to be as specified. All work to be completed in a workmanlike manner according to standard practices. Any alteration or deviation from above specifications involving extra costs will be executed only upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon strike, accidents or delays beyond our control. Owner to carry fire, tornado and other necessary insurance. Our workers are fully covered by Workman's Compensation Insurance. This proposal may be withdrawn by us if not accepted within 90 days.

AUTHORIZED SIGNATURE: \_\_\_\_\_

Date: \_\_\_\_\_

ACCEPTANCE OF PROPOSAL: The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified.

Acceptance Signature(s):

*Lee Danley*

Date:

9/20/18

\*\*\*\*\* Please retain a copy and return a signed copy to indicate acceptance of proposal \*\*\*\*\*



## **Appendix C**

### **Cost Estimation Memo**



## MEMORANDUM from Director Public Works & Utilities

Date: September 21, 2018

To: Bob Belmore, City Manager

From: Michael J. Bobinsky, Director of Public Works and Utilities

Cc: Scott Smith, Director of Finance  
Shanna Saunders, Director of Planning and Development

Re: Responses to Brian Duggan-MRI, Lilac Lane Site Questions

The following responds to Brian Duggan, MRI consultant, request for additional information regarding the Lilac Lane site as potential location for a new Fire Station Complex:

-The property being considered is located adjacent to the City's DPW Facility and immediately next to Airex Corporation, light industrial manufacture, located at 15 Lilac Lane as identified on the attached site map. The site is approximately 8.45 acres and is characterized as heavily wooded. No soils testing has occurred, it is not known what site limits may exist such as wetlands, or ledge or other soil characteristics for building purposes. Lilac Lane would need to be extended to accommodate access to the property along with extending core utilities including water and sewer and electrical power.

-Using the State E-911 address assignment protocol, the recommended assigned property address for this site is 17 Lilac Lane.

-Opinion of estimated costs for site preparation work only includes assessed land value, land clearing, utility extensions, utility connection fees, extending Lilac Lane to the property site, and a new signalized intersection at the intersection of Blackwater Road and Lilac Lane.

-Assessed Land Value	\$150,000
-Land Clearing:	*\$ 20,000 -stump removal and disposal.
-Utility Extensions:	
-Sewer Line	\$133,000
-Water Line	\$ 73,600
-Fire Hydrant	\$ 6,000
-Stormwater	\$ 40,000
-Electrical-	TBD
- <b>Subtotal</b>	<b>\$422,600</b>
-Total Contingency	\$105,650
-Total w/25% contingency	\$528,250; say <b>\$ 530,000</b>
 -New Traffic Signal at Blackwater & Lilac Lane	 <b>\$ 150,000</b>

Total Opinion of site costs **\$680,000**

**Options to extend infrastructure on Lilac Lane:**

-Extend water main only to Willand Drive: **\$ 440,000**

-Extend Lilac Lane to Willand Drive: **\$1,320,000**

(includes drainage/sidewalks):

Total Range of costs **\$680,000-\$2,440,000**

The site presents opportunities to consider extending infrastructure for future development. The options to extend infrastructure and their costs are listed for further discussion.

These are all opinion of costs; additional engineering assessment of the site is required to refine the estimated site costs. Costs do not include costs of the fire station building or running electrical to the property. Land costs are subject to property negotiations; assessed value is all that has been placed in the above costs.

\*Assumes logging contractor removes trees and keeps wood.