

Concord Fire Department Emergency Medical Service Strategic Plan



December 2013



NORTH BRIDGE

TOWN OF CONCORD FIRE DEPARTMENT

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MESSAGE FROM CHIEF OF DEPARTMENT MARK COTREAU

The decision to embark on this Emergency Medical Service (EMS) Strategic Plan began in the summer of 2011, with a growing perception that our EMS system was becoming 'stretched thin'. As we prepared for our annual Fire Department budget review, including examining the various aspects of our EMS delivery, we noticed a trend. Those of us who have had the good fortune to work for the Concord Fire Department (CFD) over a number of years all realized that we were much busier than ever before.

To add some perspective, we did a quick comparison: in 1956, staffing was increased to 8 per shift and the CFD responded to 240 medical emergencies. Almost 30 years later, in 1983 (the year I was hired), the CFD responded to 742 medical emergencies. Last year, in 2011, the CFD responded to almost 1600 medical emergencies! This number includes ONLY the medical emergencies that we responded to. We also responded to over 1400 other miscellaneous responses, such as medical assist (helping people who fell and could not get up but were unhurt), fire related responses and a great multitude of service calls. The CFD experienced regularly occurring simultaneous emergency responses, and received increasing amounts of medical mutual aid ambulance assistance.

It became obvious that we were receiving much more assistance from other towns than was being requested of us. In addition, the staff time and effort needed for our EMS Coordinators to complete the training, administrative and regulatory requirements necessary to conduct a quality ambulance service was increasing substantially each year. Consequently, at our budget meeting, we announced that the Concord Fire Department would be analyzing all aspects of our EMS delivery system to identify strengths, weaknesses opportunities and threats, and benefits and liabilities in an effort to provide a practical, data-driven, multi-year EMS community driven strategic plan.

This plan would identify goals and objectives, and the strategies to achieve them, to ensure continued excellence in our EMS service to the residents of Concord and those traveling within its boundaries.

We utilized a comprehensive approach to develop this plan. Members from the Concord Fire Department, Concord Finance Department and external consultants collaborated to provide a data driven, objective document that we would be proud of. We have done that. The members of this committee have worked extremely hard and I thank you all.

The committee consisted of:

Mark Cotreau, Fire Chief Concord Fire Department

Edward Conlin, Lieutenant, Concord Fire Department, Chairperson

Thomas Judge, Captain, Concord Fire Department

Brian Whitney, Lieutenant, Concord Fire Department

Anthony Geanisis, Emergency Medical Coordinator, Concord Fire Department

Kevin Fagerquist, Asst. Emergency Medical Coordinator, Concord Fire Department

Mike Wallace, Wallace Training Associates

I would also like to thank:

Bill Mergendahl, ProEMS CEO for his advice and statistical assistance

Arthur St John, FF, Concord Fire Department for his GIS support.

Jon Harris, Budget and Purchasing Administrator, Concord Finance Department, for his careful financial review and input.

Dottie Bernard MPH for her input and professional guidance

All members of the Concord Fire Department for their support of this endeavor

Respectfully,



Mark Cotreau, Fire Chief

EXECUTIVE SUMMARY

This fire department Emergency Medical Service Strategic Plan was developed to identify if the Concord Fire Department is currently capable of sufficiently meeting the Emergency Medical response needs of the community. This strategic plan is designed to provide practical solutions that will correct any identified fire department operational deficiencies. It is a fact based, data driven report that examined all aspects of Emergency Medical Services for the Town of Concord.

The findings indicate that the Concord Fire Department can no longer adequately respond to all of the requests for emergency medical transports in Concord. This is the result of a number of factors including, but not limited to; an increase in the elderly population, an influx of new medical facilities and offices, an expanded infrastructure, visitors to tourist destinations, Route 2 traffic and commuter rail service. As a result of these increases, our reliance on the surrounding communities to assist the fire department in delivering EMS services has become problematic. This year we are on track to have at least 235 ambulance transports handled by neighboring fire department ambulances. This is an increase of at least 39 responses over 2011. This current dependence on mutual aid exceeds nationally recognized acceptable standards. This puts an undue burden on the surrounding communities by stripping their town of ambulance coverage and creates longer on-scene wait times thus reducing our availability for other emergency responses. The result is a potential loss of revenue in excess of \$100,000.

By adding an additional primary ambulance the fire department can reduce reliance on neighboring fire department emergency medical services, improve response times as well as on-scene wait times. In order to capture a majority of the runs the fire department is currently unable to respond to, coverage would need to be 24 hours a day 365 days per year. The fire department can capture approximately 80% of the responses currently being handled by neighboring communities by immediately staffing a primary ambulance for 12 hours daily. Adding personnel incrementally, 2 additional personnel in years 3 and 5 would allow the Concord Fire Department to reach 24 hour staffing in a 5 year incremental period. The projected cost of these positions will be reduced by the amount of revenue returned to the community by capturing most, if not all of, the 235+ out of town ambulance responses. Additionally, a reduction in the overtime necessary to cover the back-up ambulance will be realized.

It is the recommendation of this Emergency Medical Service Strategic Plan that the Concord Fire Department adds sufficient personnel to staff a primary ambulance a minimum of 12 hours per day, 7 days a week. The ultimate goal is to extend the primary ambulance staffing to 24/7 by year 5. The staffing of this additional primary ambulance will allow the Concord Fire Department to serve the Town of Concord in the manner that its citizens are entitled to, deserve and value.

The facts and data supporting the recommendations are contained in the full report.

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Definitions

The following are definitions of terms found throughout this document. These definitions should help the reader understand the context in which they are used.

Service Population; a statistical basis for a population in terms of those accessing services in a given area at a given time. A service population can include residents, institutional populations, workers, and visitors including commuters, tourists and seasonal workers. In short the Service Population of a community consists of all individuals that live, work, visit, or play in the Town of Concord

Infrastructure; is basic physical and organizational structures needed for the operation of a society or enterprise, or the services and facilities necessary for an economy to function. It can be generally defined as the set of interconnected structural elements that provide framework supporting an entire structure of development. It is an important term for judging a country or region's development.

The term typically refers to the technical structures that support a society, such as roads, bridges, water supply, sewers, electrical grids, telecommunications, and so forth, and can be defined as "the physical components of interrelated systems providing commodities and services essential to enable, sustain, or enhance societal living conditions."

Mutual Aid; a written agreement among emergency responders to lend assistance across jurisdictional boundaries. This may occur due to an emergency response that exceeds local resources, such as a disaster or a multiple-alarm fire, or to ensure that there is a timely response to an emergency medical call. The agreement may call for an automatic response or by a request only response when an emergency occurs. Mutual Aid agreements are designed to supplement a community's emergency response, not replace it.

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The members of the Concord Fire Department Emergency Medical Service Strategic Plan Committee:

Mark Cotreau, Fire Chief Concord Fire Department

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I. SCOPE OF PROJECT

OUR PRIMARY QUESTIONS

The committee identified the need to develop an objective data-driven approach to confirm the status of our EMS system and answer the following research questions:

- Does the CFD have adequate resources to provide effective, responsive, high-quality EMS delivery to all residents and customers within the town of Concord?
- What are the benefits and liabilities contained within our current EMS delivery system?
- What is our current response model?
- What should our response model be?
- How many ambulances are needed to effectively service Concord?
- Where should the ambulance, or ambulances, be located?
- What is the current status of our regional ALS system relative to providing top – notch ALS delivery now and in the future?

We used a number of methods to ensure an accurate, data-based approach to develop this strategic plan. We reviewed our CFD patient customer satisfaction survey results. Members of the committee conducted detailed internal CAD data research, literature research, external data research from Pro-Solutions, Inc. (Concord's ambulance billing company), and external data research from ProEMS (regional ALS vendor).

The committee also developed and reviewed various GIS mapping documents. Members of the committee conducted an external survey using the commercial survey tool 'Survey Monkey' to develop appropriate municipal comparisons (see Appendix). A total of 26 communities were surveyed, and 16 comparable communities, in addition to Concord, were selected for our study, based on their run volume, infrastructure, service population, and community demand for services.

WHAT IS AN EMS STRATEGIC PLAN?

It is a fluid and flexible management tool that:

- Provides short-term fire and EMS direction
- Builds a shared community and public vision
- Sets short and long term community and fire department goals and objectives
- Optimizes use of all appropriate resources

Many EMS strategic planning benefits result from using this consistent and cohesively-structured process across all levels of an organization and community.

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This process can also create an appropriate sense of urgency that can energize a fire department's increasingly 'customer-driven' approach to operations.

Successful fire and EMS organizations, like many government agencies and private companies, have recognized that attaining customer focus is essential. Aware of this necessity, public safety agencies must now strategically plan how they will deliver high-quality products and services to the public and their other customers through better, faster, and less expensive programs. Once their strategic goals are established, agency leaders must establish performance measures (for which they are fully accountable) to assess and ensure that their departments and agencies are indeed delivering on the promises made in their strategic plans.

Most importantly, EMS strategic planning can be an opportunity to unify the management, staff, community stakeholders, and residents through a common understanding of where the organization is going, how all those involved can work to that common purpose, and how different levels of progress will measure success.

STEPS IN CREATING A STRATEGIC EMS PLAN

Today's Emergency Medical Services have entered into a very competitive evolutionary cycle. Community and public demands continue to increase while dollars and other resources continue to shrink. These newly documented trends place increased pressure on the modern fire and emergency medical services manager, policymakers, and full-time staff to develop ways to be more cost effective and more efficient. In many cases, the community and public is demanding the accomplishment of specific goals, objectives, and services with fewer resources. Today's fire and emergency medical service leaders must work more efficiently with available resources and organizations must establish their direction based on constructive efforts while eliminating programs that do not serve the community presently or in the future.

To ensure that community needs were incorporated, a 'Community-Driven Strategic Planning' process was used to develop the Concord Fire Department EMS Strategic Plan. Businesses often employ this type of process to identify market trends, allowing the service provider to focus resources while reducing risk and wasted effort.

This process was adapted to meet the Concord Fire Department's specific needs. This document is the result of several strategic planning sessions and includes valuable community input.

WHERE DOES THE COMMUNITY FIT INTO THE STRATEGIC PLANNING PROCESS?

For many successful organizations, the voice of the community drives their operations and charts their course for their future. Fire departments, as well as state and city governments, have begun using the business model of focusing on their community of customers as one of the key motivators in planning for the future.

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A "community-driven organization" is defined as one that *maintains a focus on the needs and expectations, both spoken and unspoken, of customers, both present and future, in the creation and/or improvement of the product or service provided.*

PLANNING STEPS

We followed these steps in our EMS Strategic Planning:

1. Define the services provided to the community.
2. Establish the community's service priorities.
3. Establish the community's expectations of the organization.
4. Identify any concerns the community may have about the organization and its services.
5. Identify those aspects of the organization and its services the community views positively.
6. Develop the Mission Statement, giving careful attention to the services currently provided and which logically can be provided in the future.
7. Establish the Values of the organization's membership.
8. Identify the Strengths of the organization.
9. Identify any Weaknesses of the organization.
10. Identify areas of Opportunity for the organization.
11. Identify potential Threats to the organization.
12. Establish realistic goals and objectives for the future.
13. Identify implementation tasks for each objective.
14. Develop a Vision of the future.
15. Develop organizational and community commitment to the plan.

Implied within every stage of the EMS Strategic planning process is the ability to determine progress made toward the goals or targets set. This assessment ability is a monitoring function that simply tracks activities. It may be as simple as a "To Do List," or as complicated as a plan of action with milestones and performance measures.

Also implied within the planning process is the ability to measure effectiveness of the actions taken in the conduct of the organization's business.

Please see *Appendix C: Planning Approach* for additional information on the planning process.

II. BACKGROUND

CONCORD FIRE DEPARTMENT: MISSION, VISION, AND VALUES

CONCORD FIRE DEPARTMENT MISSION

The mission of the Concord Fire Department is to provide rapid and effective fire, rescue, and emergency medical services to the community, and strive to make Concord a safer place for all to live, work and visit.

CONCORD FIRE DEPARTMENT VISION

The vision of the Concord Fire Department is to meet or exceed the expectations of our community by setting a high standard of excellence: guided by the principles of trust, integrity, honesty, loyalty and respect for all.

CONCORD FIRE DEPARTMENT GUIDING VALUES

As an organization, we value:

Safety

We will strive to protect the lives and well-being of our community and our co-workers.

Professional Excellence

We believe the pursuit of excellence and demonstrating high professional standards are critical to our work. To ensure the best possible service for our community, we will support continuous training and encourage professional development. We will be dedicated, compassionate, trustworthy, and act with honesty and integrity.

Respect

We will respect our community and ourselves, while consistently exhibiting courtesy and compassion for those in need.

Innovation

We will foster an environment that allows new ideas and positive change to better serve our community.

CONCORD: COMMUNITY PROFILE

Concord has nearly 18,000 residents (2010 Federal Census). In addition, Concord also has a substantial service population and infrastructure which must be provided effective EMS delivery including:

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- A major limited access highway (Route 2)
- Two hotels
- A community hospital (174 beds/1600 employees)
- Four medical office buildings
- Adult family care centers (both residential and daycare)
- Various office buildings and office parks
- A commuter rail line (10,000 passengers daily)
- Various tourist attractions including Walden Pond (600,000 annually), Minuteman National Park (excess of 1,000,000 annually), a multitude of historically significant properties
- A substantial river system

A portion of Hanscom Air Force Base is located on the eastern border of town.

In addition Concord contains a number of facilities that account for an additional 1,698 beds, increasing our base population by another 9.61%:

- Four elderly residential care facilities
- Five private schools (three have dormitories)
- Adult Family Care centers (both residential and day)
- A large medium-security prison, a large minimum-security prison and a girl's alternative school

CONCORD FIRE DEPARTMENT PROFILE

The Concord Fire Department is staffed by 38 uniformed members: 36 members are assigned to four groups, each group having 9 members. Currently a minimum of eight members must be on duty to provide fire and EMS protection for the town. All of these 38 uniformed members are certified as Emergency Medical Technicians (EMT's) and certified in CPR, in addition to being fire academy trained firefighters. Members are trained to administer albuterol, aspirin, epinephrine and nitroglycerin when needed. They are trained in the use of Automatic External Defibrillators (AED's) and have the ability to test and monitor a patients glucose levels. All members of the department are required to complete at least 28 hours of continuing education every two years as well as successfully complete a 24 hour refresher class consisting of both a written and practical examination in order to maintain their EMT certifications.

The CFD provides overall incident coordination and basic life support (BLS) service. Advanced Life Support (ALS) care is obtained through a regional ALS system, which provides two-person ALS chase vehicles to fire departments in the Central Middlesex Emergency Response Association (CMERA) communities. These communities have signed agreements with ProEMS and Emerson Hospital. As in most communities, the Town of Concord does charge for ambulance transport to a medical facility and collected revenue is deposited into the town'

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general fund. Annual receipts into the general fund are approximately \$590,000. Town of Concord net revenue per transport (NRPT) is approximately \$465.

The CFD operates from two fire stations: the Headquarters Station, (Station 1) and the West Concord Station (Station 2). The Headquarters Station is located at 209 Walden St. Front-line apparatus responding from this station includes; one engine company, one ladder company and/or one ambulance. The ambulance and ladder company are cross-staffed.

One Captain (who also serves as the Shift Commander) and five firefighters are assigned to this station on each shift. Also located at this facility are the Administrative Offices, Emergency Operation Center (EOC), and a training room.

Strategically located at 1201 Main St. in West Concord is Station 2. Front-line apparatus responding from this station consists of one engine company, which is staffed with one Lieutenant and two firefighters.

The Town is divided into two response districts:

- District 1 encompasses most of Concord located east of Route 2, the Nine Acre Corner Area, Conantum and Sudbury Rd with all of its connecting streets.
- District 2 encompasses most of West Concord, with areas located west of Route 2, Elm St and all the connecting streets from the Acton town line to Park Lane and Barrett's Mill Rd from the Route 2 rotary to Strawberry Hill Rd.

ORGANIZATIONAL HISTORY AND BACKGROUND

The Town of Concord is a community filled with history. Concord was settled in 1635 by a dozen families, most coming from England especially for that purpose. On April 19, 1775 Concord and Lexington fought and won the first battle of the American Revolution.

The Concord Fire Department is also rich in history of its own;

Early History

Organized fire protection in Concord dates as far back as 1794 when a Fire Society was formed and owned one small hand engine with a bucket filled tub. "Each member of the Fire Society was required to keep in readiness for use, two leather buckets, a ladder and a large canvas bag. It was expected that each member at the alarm of a fire, would seize his buckets and bag and go to the scene and help save the property from destruction."

This Fire Society continued until a municipal fire department was established in 1855. During that year, the department was called out three times, all to the Pail Factory, for building fires, and had a total appropriation of \$288.90. In 1874 the beginning of the public water system was introduced into Concord Center, and continued to grow throughout the years.

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In 1899 Town Meeting voted for the installation of a fire alarm system to be installed and maintained by the municipal light plant.

The Department Expands

The Fire Department saw its first permanent member in 1915, a man by the name of Royden A. Bass, was assigned to the Central Station. By 1935 full-time firefighters increased by 5, including the appointment of the first permanent Fire Chief, Harry Tuttle. In these early days, the permanent men were assigned to "...be on duty at all times..." and in addition to an annual vacation, were allowed "one day off (twenty-four hours) in every seven days".

Following a vote at the 1940 Annual Town Meeting, a committee was formed to investigate pensions for Town employees including the permanent men of the Fire Department. Both the committee and the selectmen unanimously recommended the adoption of a contributory pension system. The recommendation was placed before the citizens and a pension system was established thereafter.

On January 1, 1951 the ambulance was transferred from the Police Department to the Fire Department and housed in the West Concord Fire Station. During that year, the department responded to 141 medical calls, including service to many area towns.

In 1954, the department consisted of 19 permanent men, which included the appointment of the first permanent Deputy Chief/Deputy Forest Warden, Harry A. Patterson.

In 1956, three additional men were hired to increase the shift strength to eight, one captain and seven privates. Each was assigned to one of three platoons and worked an average a56-hour workweek.

New Headquarters and Further Expansion

On October 1, 1960, the fire department moved into its new headquarters at 209 Walden Street, where it remains today. The former headquarters station at 16 Walden Street was closed and later became the Walden Station Sandwich Shop.

At the 1968 Annual Town Meeting, approval was given to hire four additional men. This would provide the same shift coverage, while reducing the workweek to 48 hours. It wasn't until 1977 that the Department staffing was increased to 32 permanent members plus the Fire Chief.

In 1982 the department established the position of the Lieutenant to serve as the company officer of the West Concord Engine Company. The first four members to be promoted to Lieutenant were Paul Denaro, Walter Macone, Robert Robinson and Earl Stone.

In 2007, we added 4 firefighters (1 per shift) to the ranks using funds provided by the 'Safer Grant' which pays a decreasing percentage of the firefighter's salary over a four year period. The firefighter's fifth year salary must be fully funded by the Concord Fire Department budget.

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CURRENT ORGANIZATION

Today we operate with four shifts of nine; one captain, one lieutenant and seven firefighters. The lieutenant and 2 firefighters are assigned to the West Concord Engine, the Captain (Shift Commander) and three firefighters are assigned to the Concord engine and two firefighters are assigned to cross-staff the ambulance and the ladder truck. The shift strength of 9 members will drop to 8 when any member is absent.

CONCORD FIRE DEPARTMENT EMS ORGANIZATION

Concord has long benefited from a 'system' approach to Emergency Medical Service (EMS) delivery. Components of the system include:

- Emergency Medical Dispatch, currently operated by the Public Safety Dispatchers
- Rapid BLS response
- Quality ALS response
- Coordination with medical control in the receiving hospitals and the availability of air ambulance transport

The regional Advanced Life Support (ALS) system continues to meld seamlessly into our overall EMS delivery system. The CFD provides overall incident coordination and basic life support (BLS) service. ALS care is obtained through a regional ALS system where fire department responses are supplemented by two person chase vehicles provided through agreement with the CMERA communities, ProEMS and Emerson Hospital.

The Central Middlesex Emergency Response Association (CMERA) is a consortium of eight communities that utilize the regional ALS service model. Concord reaps many additional benefits from this regional system, such as improved coverage (as compared to the previous regional system), clinical sophistication, pilot program participation (example: cerebral cardio resuscitation), transmitted EKGs, accurate data collection, reduced training costs and transport billing for both BLS and ALS. Currently the CMERA communities are: Acton, Boxborough, Concord, Carlisle, Lincoln, Littleton, Maynard and Weston. CMERA is managed by an executive board consisting of three local fire chiefs, three local Town Managers, a representative of the paramedic vendor (currently ProEMS) and a representative of Emerson Hospital. Concord is fortunate in that the Concord Town Manager, as well as the Concord Fire Chief, are both members of the CMERA Executive Board.

EMS COORDINATORS

The Concord Fire Department currently utilizes two on-duty firefighters who, in addition to their firefighter responsibilities, also serve as EMS Coordinators during their regular working shift. There is a noticeable loss of continuity in not having a separate staff person to perform the role of EMS Coordinator, but budgetary constraints have necessitated the current approach.

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Currently, the senior EMS Coordinator is responsible for training, quality control, and representing the CFD at the Regional EMS Coordinators meetings. He spends approximately 6-8 hours per day, while on duty, performing these duties.

The second EMS Coordinator is responsible for purchasing medical supplies and other assorted sundry duties and spends 4-6 hours, per work day, fulfilling these responsibilities. Together these two members dedicate over 1500 hours, including the required overtime, to EMS responsibilities alone. Since the coordinators are required to perform these duties during their regular work hours their ability to participate in daily shift training is compromised. This in turn can have an effect on the cohesiveness of the entire crew when working at an incident. The responsibilities of the EMS Coordinators position are critical and many. Examples include:

- Managing the various regulatory activities required by law. This includes compliance with all Office of Emergency Medical Services (OEMS) regulations
- Review of emergency responses and other quality assurance activities
- Coordinate delivery of training programs such as CPR, EMT Refresher, Glucose, albuterol and stretcher safety programs
- Input to the Data Point Matrix system
- Prepare and coordinate state ambulance inspections
- Purchase process for ambulance replacements including bid preparation etc.
- Monitor of inventory and purchasing of supplies
- Deliver community Heart Safe and AED programs
- Provide training to Town employees on CPR and first aid training
- Maintain EMS equipment and servicing
- Attend EMS regional coordination meetings

HEART SAFE COMMUNITY

The Town of Concord has been a Heart SAFE Community for more than six years. In order to become a Heart SAFE Community, a Town is required to have a specified number of people trained in CPR/AED in relation to the population of the town. The Town of Concord has trained town employees, as well as employees at private and public schools and businesses. Through the Heart SAFE Community program, our community has strengthened what the American Heart Association has called the “Chain of Survival,” which has **four identified** critical steps:

- Step 1.** Early Access to emergency care
- Step 2.** Early CPR
- Step 3.** Early defibrillation
- Step 4.** Early advanced care

The Concord Fire Department has recently increased the number of instructors, and plans to continue training employees and lay people from the community to keep our status of a Heart SAFE Community.

III. OUR METHODOLOGY

COMPARISON COMMUNITIES

The data was collected by surveying seventeen (17) communities, including Concord. We utilized appropriate data collection and identified the current and future service gaps facing the Concord Fire Department. The identified communities were either communities that border Concord Massachusetts, or their fire and EMS departments have similar service and infrastructure requirements. Each department's number of responses was within one call per day, plus or minus, Concord's run total. The seventeen identified communities are as follows:

- Concord
- Acton
- Bedford
- Belmont
- Hudson, New Hampshire
- Lexington
- Lincoln
- Needham
- Reading
- Scituate
- Sudbury
- Walpole
- Wayland
- Westford
- Weston
- Westwood
- Winchester

The first surveyed and identified fact finding process was to determine the current residential population and number of emergency runs of the identified communities. The following is the key information that was identified:

- Residential Population as per 2010 Census
- Annual Fire and EMS runs
- Annual EMS runs
- Are medical assist calls included
- Ambulance total coverage/staffing
- BLS Coverage
- ALS Coverage

In Table 2 the residential population average for all seventeen (17) communities is 19,738 with a high being the community of Lexington with a population 31,394 to a low being the Town of Lincoln with a population of 6,362.

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The Town of Concord is below the average residential population of all the surveyed communities.

The second fact in the research survey was the fact that the Town of Concord had a higher rate of emergency calls than the seventeen (17) community average. In 2011 the Concord Fire Department responded to a total of 3,200 emergencies and the community average was only 2,988. Again, with the high being the community of Reading with a total of 3,792 emergencies and a low of the Town of Lincoln with only 1100 emergencies.

The third surveyed fact that was identified in the data collection was the type of ambulance staffing each community provided. The formula that was used to identify this staffing mechanism was based on the following:

- .25 -ambulance staffed with off duty call back personnel only**
- .50 -ambulance cross staffed with another piece of apparatus** (Concord's current staffing)
- .75 -ambulance fully staffed 24/7 except when running at decreased staffing levels.**
- 1 -ambulance fully staffed 24/7**

The Concord Fire Department currently has a documented rating of 0.5 which means that the primary ambulance is cross staffed with another piece of apparatus. In Station 1 the primary ambulance is cross staffed with the ladder. Personnel staff the appropriate apparatus (ambulance or ladder) depending on the type of emergency call received.

The average numerical rating for this category in the survey is 1.34 with a high from the community of Hudson, New Hampshire with a rating of 3 to a low of the Town of Concord with a 0.5 rating.

Table 1 identifies the current fire department service gap of delivery without a dedicated ambulance for both its residential and service populations. The Town of Concord is below in the average residential population served but in the higher end on emergency calls for service. The critical identified data point is the fact that the Town of Concord is not meeting the average for ambulance staffing and coverage of the other communities surveyed.

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RESIDENTIAL POPULATION AND EMERGENCY RUNS							
CITY	Residential Population 2010 census	Annual Runs Both Fire/EMS	Annual EMS Runs**	Medical Assist included ?	Ambulance Total Coverage/Staffing*	ALS/BLS Breakdown	
						Ambulance BLS Coverage	Ambulance ALS Coverage
Concord	17668	3153	1572	no	0.5	0.5	0
Acton	21924	2760	1592	no	1.5	1.5	0
Bedford	13320	3034	1324	included	0.75	0.75	0
Belmont	24729	3076	1895	included	1	1	0
Hudson NH	24467	2895	1720	included	3	1.5	1.5
Lexington	31394	3783	1853	no	2	0	2
Lincoln	6362	1100	376	no	0.75	0.75	0
Needham	28886	3400	1800	included	1.5	0	1.5
Reading	24747	3792	1978	included	1	0	1
Scituate	18133	2986	1895	included	2	0	2
Sudbury	17659	2332	1212	included	1	1	0
Walpole	24070	3000	2000	included	2	1	1
Wayland	12994	2304	1241	included	0.75	0.25	0.5
Westford	21951	3359	1398	included	1.5	0.5	1
Weston	11261	2400	1200	included	0.75	0.75	0
Westwood	14618	3064	1632	no	1.75	0	1.75
Winchester	21374	3572	1866	included	1	0	1
Group Average	19739	2942	1562		1.34		

* 1 = ambulance fully staffed 24/7
 .75= ambulance fully staffed 24/7 except when running short handed
 .5 = ambulance cross-staffed with another piece of fire apparatus
 .25=ambulance staffed with off-duty callback only

** Run calculations can vary slightly between towns. For example some towns count medical assists in their EMS runs. Concord's calculations are conservative with only emergency responses counted. Concord's 2011 medical assists were 123.

Table 1

Concord Fire Department Emergency Medical Service Strategic Plan

Table 2 identifies the key infrastructure and service population requirements of each identified surveyed community. The key infrastructure that drives emergency calls for assistance in any community can have a taxing effect on all community services. The key infrastructure that was identified in each of the seventeen (17) communities were as follows:

- Highways
- Commuter Rails
- Hospitals
- Nursing Homes
- Independent/Assisted Living Facilities
- Dialysis Clinics
- Medical Office Buildings
- State/County Prisons
- Private Schools
- Private School Dormitories
- Hotels/Motels
- Airport
- Other Tourist Attractions

Concord exceeds the group average for each identified category in the survey. These key infrastructure requirements are now the current service drivers for the Concord Fire Department. New emergency service requirements produced a national change in providing adequate fire and EMS services. Service requirements are now not only based on the old residential population model but on a new response model identified as “Service Population”. This change is the reason that the calls for emergency service continue to grow. The current residential population in the community of Concord has stabilized over the years, but the service population in the community continues to grow and place newer service demands on the Concord Fire Department.

Concord Fire Department Emergency Medical Service Strategic Plan

Infrastructure of Surveyed Towns

CITY	Highway	Commuter Rail	Hospital	Nursing Home	independent/assisted living	Dialysis Clinic	Medical Office Building	State/County Prison	CITY	Private Schools	Private School Dormitory	Hotel	Airport	Tourist attractions	Other notable infrastructure
Concord	1	1	1	3	2	1	5	2	Concord	5	2	2	1	yes	Walden Pond 600,000 annually National Park 1,000,000+
Acton	1	1	0	1	1	0	1	0	Acton	0	0	1		no	
Bedford	1	0	1	1	1	0	2	0	Bedford	0	0	3	1	no	Middlesex Community College
Belmont	1	1	1	1	0	0	3	0	Belmont	2	1	0	0	no	
Hudson NH	1	0	0	1	0	0	2	0	Hudson NH	1	0	0	0	no	2 urgent care clinics
Lexington	2	0	0	4	1	0	4	0	Lexington	3	1	3	1	yes	2 day surgery centers
Lincoln	1	1	0	0	1	0	1	0	Lincoln	1	0	0	1	yes	National Park
Needham	1	1	1	3	3	0	2	0	Needham	4	0	2	0	no	
Reading	2	1	0	2	2	0	2	0	Reading	1	0	0	0	no	
Scituate	0	1	0	2	0	0	3	0	Scituate	1	0	1	0	yes	Scituate harbor 10,000 seasonal
Sudbury	0	0	0	2	1	0	1	0	Sudbury	1	0	1	0	no	
Walpole	2	1	0	0	1	0	3	1	Walpole	2	1	1	0	no	Gillette Stadium
Wayland	0	0	0	1	2	0	0	0	Wayland	0	0	0	0	no	
Westford	2	1	0	1	1	0	2	0	Westford	0	0	3	0	no	
Weston	2	1	0	1	2	0	2	0	Weston	4	1	0	0	no	
Westwood	1	1	1	1	1	1	3	0	Westwood	1	0	2	0	no	
Winchester	1	1	1	2	1	0	5	0	Winchester	1	0	0	0	no	
Group Avg.	1.12	0.71	0.35	1.53	1.18	0.12	2.41	0.18		1.59	0.35	1.12	0.25		

TABLE 2

Concord Fire Department Emergency Medical Service Strategic Plan

Table 3 identifies each fire department organization surveyed. The key documented information that was collected consisted of the following:

- Total number of full time uniformed staffing
- Budget per capita
- FY 13 fire department budget appropriations
- Enterprise revolving account
- Number of stations
- Number of staffed engines
- Number of staff ladders
- Number of staffed Quints (a piece of fire apparatus that has an aerial ladder, usually shorter in length and a water pump).

Concord Fire Department Emergency Medical Service Strategic Plan

CITY	Total# F/T Uniformed Staffing	Budget Per Capita	FY 13 FD Budget Appropriate	Enterprise Revolving Account ?	# of Stations	# staffed Engines	# Staffed Ladders	# staffed Quints *
Concord	38	200.34	3,539,608	no	2	2	0.5	0
Acton	42	172.86	3,000,000	yes-790,000	3	2	0	1
Bedford	30	213.27	2,256,832	yes-584,055	1	1	0	0.5
Belmont	54	212.91	5,265,066	no	2	2	1	0
Hudson NH	42	199.44	4,879,739	no	2	2	1	0
Lexington	58**	173.7	5,453,383	no	2	2	1	0
Lincoln	13	212.19	1,200,000	yes-150,000	1	1	0	0.5
Needham	64	216.36	6,250,000	no	2	2	1	1
Reading	47	157.98	3,909,707	no	2	2	1	0
Scituate	48	226.1	4,100,000	no	3	3	1	0
Sudbury	35	183.7	2,544,091	yes-700,000	3	3	1	0
Walpole	36	135.12	3,252,433	yes	1	2	1	0
Wayland	25	177.6	2,307,800	no	2	2	1	0
Westford	38	185.34	2,926,501	yes-1,142,066	3	3	1	0
Weston	31	278.1	3,131,725	no	2	2	1	0
Westwood	30	211.48	2,747,476	yes-344,000	2	2	1	0
Winchester	46	191.1	4,084,612	no	2	2	1	0
Group Average		196.91	3,797,593	(budget&revolving)				

* a Quint is a fire apparatus that has an aerial ladder, usually shorter in length and a water pump.
 **4 additional fire fighters approved.

Table 3

IV. RESEARCH RESULTS

One reason for conducting this EMS survey was to answer the question; Does the Concord Fire Department provide a better, more efficient EMS delivery system than any of the specifically identified comparison municipalities, or at the very least a system that was equivalent to the others?

What the committee learned was troubling at best. While we provide high quality on scene EMS delivery, resulting in high customer satisfaction, there are substantial critical gaps in our response model. Not only is the Concord Fire Department not out in front on the identified issues, but a department and town that pride themselves in being self-sufficient is anything but that when it comes to providing emergency medical responses. The results of this survey and report reveal that we need to take some immediate corrective actions before we can no longer provide a quality service to the citizens and guests of the town of Concord.

FINDING #1: An Expanding Service Population

Service population is defined and identified as; *a statistical basis for a population in terms of those accessing services in a given area at a given time. A service population can include residents, institutional populations, workers, and visitors including commuters, tourists and seasonal workers.*

Concord's unique infrastructure greatly increases the number and types of our fire and EMS responses. As previously noted in the 'Concord Background' section, Concord's service population includes: two hotels, a community hospital (174 beds/1600 employees), four medical office buildings, adult family care centers (both residential and daycare), various office buildings and office parks, a commuter rail line (10,000 daily), various tourist attractions including Walden Pond (600,000 visitors annually), Minuteman National Park (excess of 1,000,000 visitors annually), four elderly residential care facilities, four private schools (two have dormitories), Adult Family Care centers (both residential and day), a large medium security prison, a large minimum security prison and a girl's alternative school.

Consideration must be given to the future expansion of our infrastructure and service population. The recently completed Concord Mews apartment development could increase the Town's population by nearly 1000 residents, an increase of approximately 5% in the Town's overall population.

Concord Fire Department Emergency Medical Service Strategic Plan

Other future projects, not accounted for in this reports statistics, having considerable impact on Concord’s Fire and EMS services include:

- Concord Mews Housing (350 units)
- possible additional assisted living capacity
- medical infrastructure expansion: Harvard Vanguard project at 300 Baker Avenue which will add nearly 60 additional physicians and ancillary services
- proposed construction of a combination business and 75 unit housing complex at 75 Beharrell Street

(please also see *Finding #3: Increased Mutual Aid* for further discussion on this topic).

FINDING #2: Concord’s Aging Population

Our research clearly identified that Concord has an aging population that is placing a substantial strain on the fire department’s current emergency medical ambulance resources. This is evident when you compare the Town’s population breakdown with that of the other 351 Massachusetts cities and towns. The data revealed that compared to the other 351 Massachusetts municipalities Concord has a very high percentage of residents over 65 years of age (Chart 1).

In fact Concord ranks 318th out of 351 when it comes to the percentage of residents 65 years of age or over. Municipalities were ranked in this study in reverse order so the community with the lowest number of persons over age 65 is ranked number 1. This means that 317 municipalities *have younger populations* than Concord.

Cities and Towns	Population Growth	Median Age		Below 5 Years of Age		Over 65 Years of Age	
	% Change in Pop 2000-2010	Median Age	Rank	Percent of Pop	Rank	Percent of Pop	Rank
Acton	7.8	41.9	137	5.20	198	11.00	49
Bedford	5.8	45.1	240	5.37	222	18.61	300
Belmont	2.2	41.5	116	6.28	312	15.77	224
Concord	4.0	46.9	289	4.23	83	20.07	318
Lexington	3.4	45.6	259	4.58	131	18.64	301
Lincoln	-21.0	43.4	189	5.97	293	16.87	259
Needham	-0.1	43	178	6.47	325	16.27	239
Reading	4.4	41.6	119	6.26	309	14.10	176
Scituate	1.5	45.1	240	5.28	209	17.17	266
Sudbury	4.9	42.5	155	5.66	259	12.20	89
Walpole	5.5	42.1	145	5.54	241	14.83	198
Wayland	-0.8	45.4	250	5.09	184	16.45	244
Westford	5.8	42	140	5.07	181	9.92	30
Weston	-1.8	45.1	240	4.48	117	17.76	282
Westwood	3.5	43.9	208	5.28	210	18.17	290
Winchester	2.7	42.7	166	6.45	323	16.19	238

TABLE 4: Population Demographics

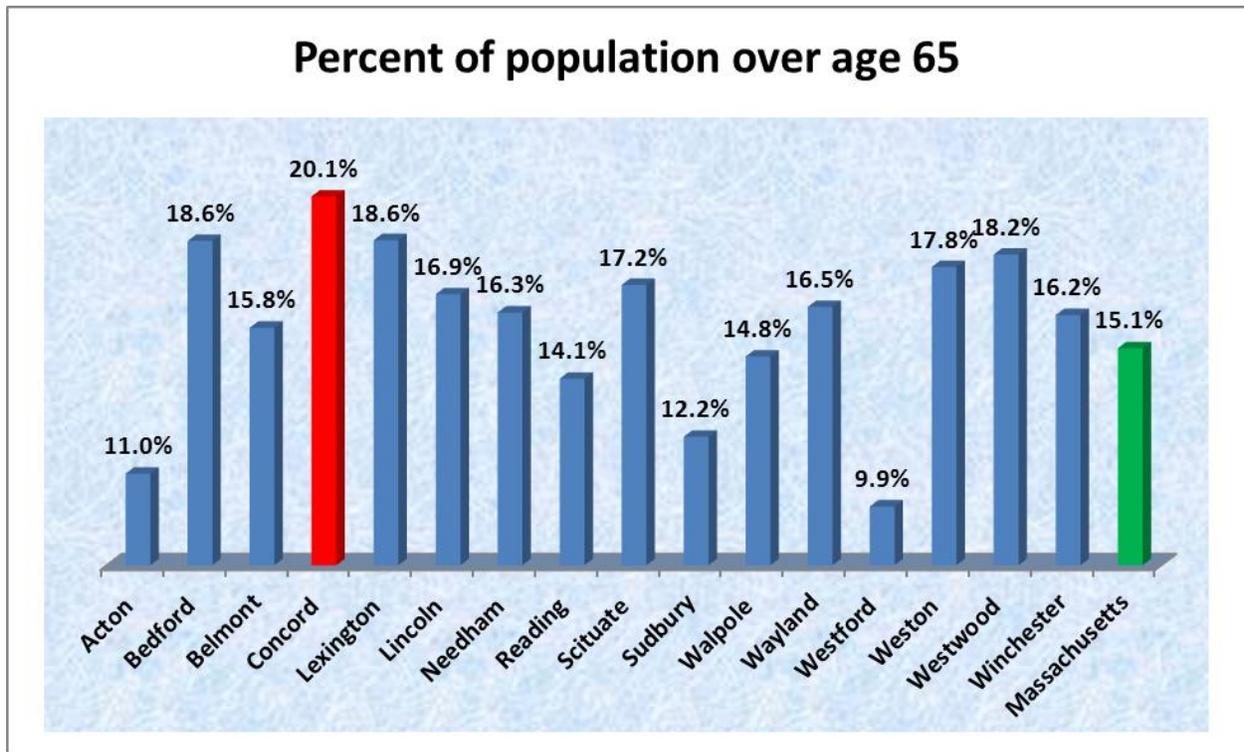


CHART 1: Population over 65

Concord Fire Department Emergency Medical Service Strategic Plan

Conversely when it comes to the percentage of the population under the age of 5, Concord ranks 38th, meaning the majority of Massachusetts municipalities have a larger percentage of their population under 5 years of age. Concord does not have the younger families in place to offset the number of elderly households. The median age in Concord, excluding nursing homes, is 46.9 years of age and the town ranks at number 217 meaning that 216 of the 351 municipalities have a younger population (Chart 2).

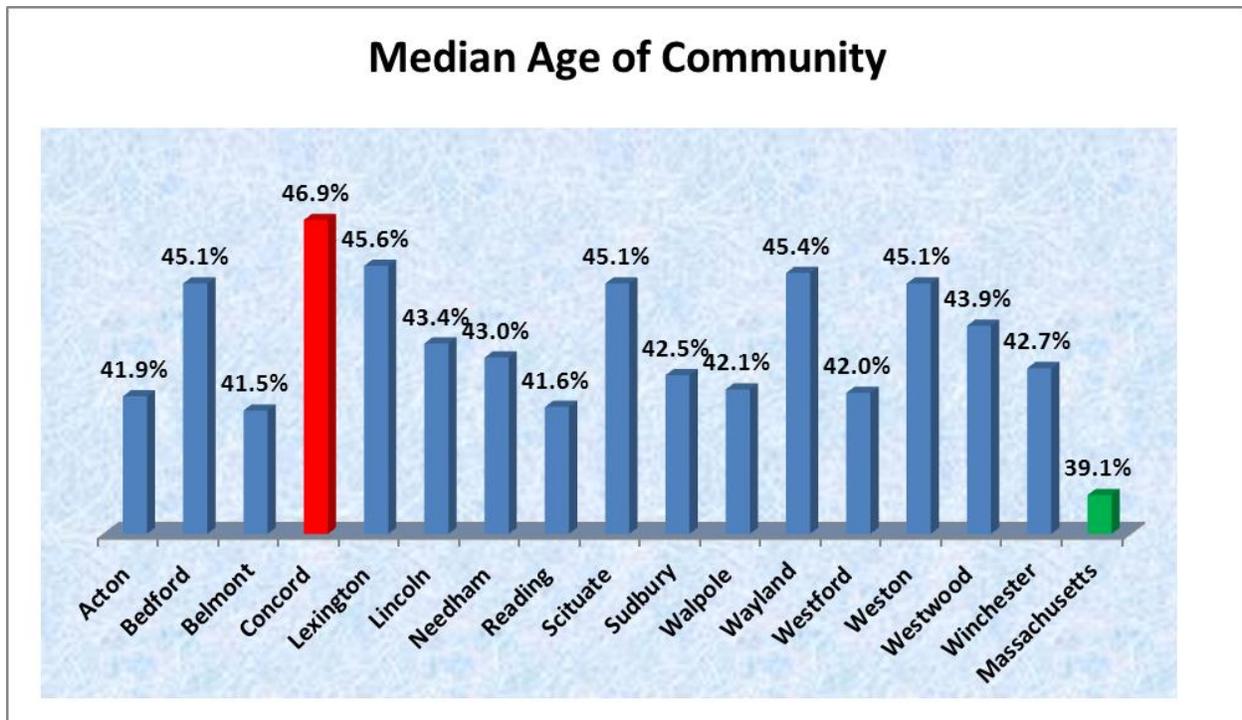


CHART 2: Median Age of Community

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IMPACT ON CONCORD

The results of the survey also identified that although we have a smaller population than many of our comparison towns we have a larger percentage of medical responses per capita and our EMS system is as equally or more heavily taxed than like communities.

This appears to be in part directly related to the aging population that we serve. The elderly housing, skilled nursing and assisted living facilities in town alone account for a substantial amount of our EMS responses.

Examining this impact on our Concord EMS, we found that:

- In 2008, EMS responses to these facilities accounted for **35%** of our responses
- In 2009, EMS responses to these facilities accounted for **40%** of our responses
- In 2010, EMS responses to these facilities accounted for **40%** of our responses
- In 2011, EMS responses to these facilities accounted for **32%** of our responses

When the responses to medical facilities are added, including the Emerson Hospital campus clinics and doctor's offices, the percentage of calls climbs to 46%, 51%, 50% and 43% respectively.

Charts 3 and 4 below illustrate the substantial amount of assistance that these facilities require of fire department EMS services. Concord also responds to numerous calls in the numerous office buildings and office parks, Route 2, Walden Pond State Reservation and the Minuteman National Park.

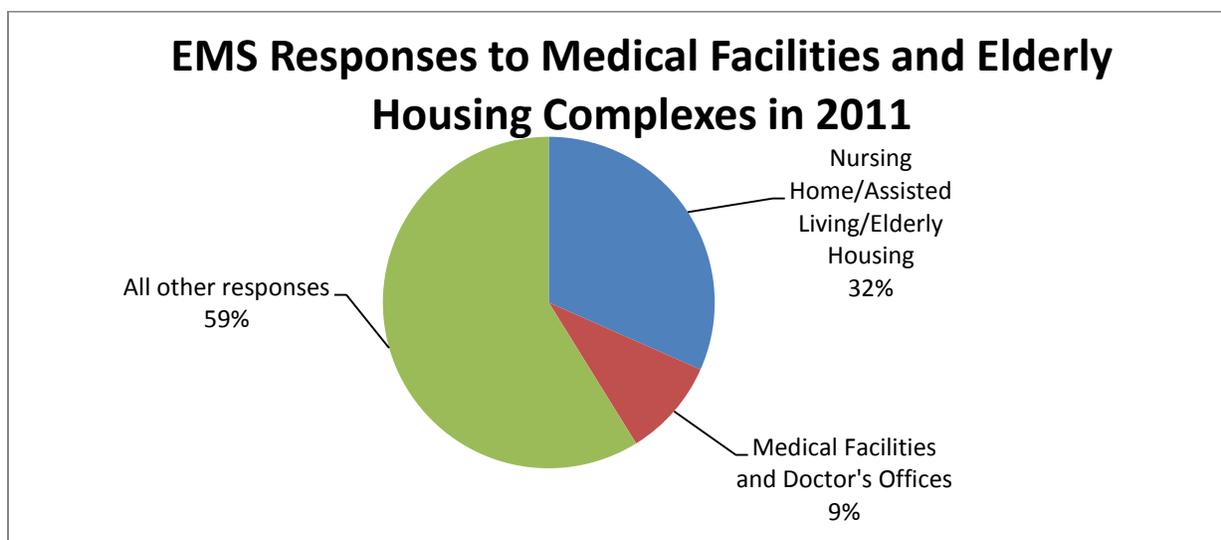


CHART 3

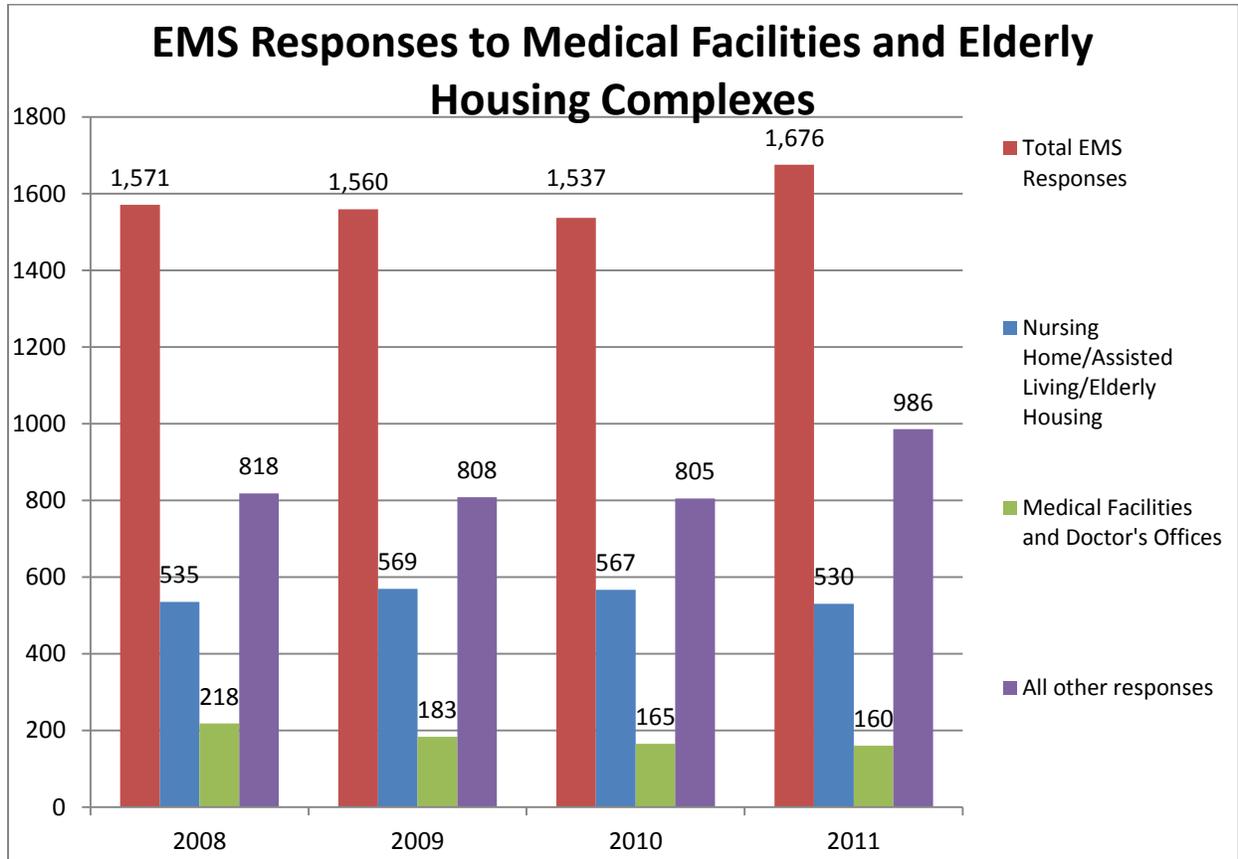


CHART 4

FINDING #3: Increased Mutual Aid Needs

RESPONSE TO EMS CALLS

The Concord Public Safety Dispatch Center is responsible for receiving all of the 911 calls for the Town and for dispatching the proper response. The following information will help you to understand our Emergency Response Model.

When a 911 call is received at the Public Safety Dispatch Center the dispatcher obtains critical information about the caller and the problem that they are reporting. If the call is for a medical emergency the dispatcher references the Emergency Medical Dispatch (EMD) Guide. The caller is asked a number of questions to help determine what type of response is needed for that particular call. The calls are then broken down into priority responses; this is known as Call Coding. The Concord Fire Department uses two priorities for dispatching our medical emergency responses, Basic Life Support (BLS) and Advanced Life Support (ALS). Protocols, or Standing Orders, identify for the dispatchers the units that should be sent to a call. At any

Concord Fire Department Emergency Medical Service Strategic Plan

time during an emergency call the responders have the ability and authority to immediately upgrade or downgrade a call as they deem appropriate.

BLS RESPONSES

Non-life threatening illnesses and injuries, such as a call for a minor bleeding injury, fractured bone or a complaint of a minor illness will usually receive a Basic Life Support (BLS) response consisting of a fire engine and an ambulance. An engine response provides a more rapid initial patient contact (West Concord only), additional resources for a safer patient move to the ambulance, as well as the supervision of a CFD supervisor.

In many localities a change has begun in these types of responses. Instead of dispatching two units to the BLS level calls a number of departments who utilize the EMD call priority coding system now send only an ambulance. They have eliminated the practice of sending a fire engine to these types of calls because there is no life hazard. The call is simply for an on scene evaluation and transport to the hospital and little or no emergency care is required or provided. This newly identified practice of Call Coding reduces the cost of running the fire engine by saving mileage, fuel and wear and tear on the vehicle. This can help to extend the life span of an expensive piece of equipment. A study completed in June 2012 by the Municipal Research Institute for the Lexington Mass Fire Department, one of the comparison towns, recommended that they change their response plan for medical responses and cease sending a fire truck to all medical calls but instead analyze the needs of the patient through EMD and then dispatch accordingly.

The CFD's response protocol does not allow us to currently change to this type of system. Due to our reliance on Mutual Aid, many of the medicals in Concord would have no CFD services responding to the call. However if the recommendations contained in this report are adopted we would revisit this potentially cost savings type of response in the future. At the very least we would be able to modify the department's response to medical assists where the call is only to help someone off the floor or into a chair. In 2011 we responded to 123 calls for this type of service. If we had an ambulance in each station we could send that vehicle to the call instead of a fire truck. An additional benefit to having a staffed ambulance and fire truck in each station would be that for the majority of calls, in either side of Town, there would be both a fire truck and ambulance available to respond. This would reduce both response time and mileage to the calls.

ALS RESPONSES

Life threatening or potential life threatening calls will receive an Advanced Life Support (ALS) response. ALS level calls are those that the very nature of the illness or injury is serious enough that the illness or injury, in and of itself is or, may be life threatening. Calls for breathing or

Concord Fire Department Emergency Medical Service Strategic Plan

cardiac problems, or other serious medical issues, fall into this category as do serious injuries, substantial blood loss or a reported serious motor vehicle accident. When an ALS call for service is received the Public Safety Dispatch Center will identify the closest fire engine to the call and dispatch them along with an ambulance and an ALS unit. Currently the Concord Fire Department provides only BLS level EMS treatment. This type of response helps to ensure that trained emergency personnel can reach the patient in the shortest amount of time and stabilize the patient, prevent further injury and/or begin life-saving treatment. BLS and ALS transports that occur within the Town of Concord have in the past generally been handled by the Concord Fire Department. However for the past few years the Concord Fire Department has found it necessary to rely on our neighboring communities for an ever increasing number of our medical calls. This type of assistance is referred to as Mutual Aid and is defined in the next section. The Mutual Aid system is in place to help to ensure that no individual who needs assistance has to wait an extended period of time to receive help and when used properly works very well for all of the participants.

MUTUAL AID

The Concord Fire Department participates in a Mutual Aid system for both our fire and EMS services. In emergency services, a mutual aid agreement is a written agreement among emergency responders to lend assistance across jurisdictional boundaries. This may occur due to an emergency response that exceeds local resources, such as a disaster or a multiple-alarm fire, or to ensure that there is a timely response to an emergency medical call. The agreement may call for an automatic response or by a request only response when an emergency occurs. It is important to keep in mind that **Mutual Aid agreements are designed to supplement a community's emergency response, not replace it.** While conducting this research process it was identified that the Concord Fire Department is at the point where we are in fact replacing some Concord Fire Department responses with mutual aid responses which is unfair and places a further operational burden on our Mutual Aid communities.

The intended goal of this study is to provide alternatives that will help to stop this progression before we reach the point where a mutual aid ambulance is not available or has an extended response time and a patient is jeopardized.

WHY THE INCREASED NEED FOR MUTUAL AID?

The committee examined the data it compiled in an attempt to determine why Concord's need for Mutual Aid was so high and climbing annually.

Why is a department that has handled the vast majority of its calls quite effectively in the past now finding itself requiring outside assistance at an ever increasing, and rather alarming rate?

Concord Fire Department Emergency Medical Service Strategic Plan

The data identified that the problem was linked to several issues:

- Concord's aging population
- Medical facility service population expansion
- Simultaneous calls for service

Concord's Aging Population

One of the most obvious reasons, and the one that would appear to have the greatest impact on our system, is Concord's aging population. Since its inception the Newbury Court/Newbury Commons campus has grown exponentially. This has allowed a large number of Concord's seniors to take advantage of maintaining their lifelong ties to the community by living in a local retirement community. This campus has not only drawn some of Concord's seniors but has also been populated by seniors from other communities. This campus has increased the number of seniors living or moving into town. The research statistics revealed that as of the 2010 Federal Census 36.7% of Concord's households are 65 years of age or older and 58.8% of those are single occupant households. When you add the number of residents of the Skilled Nursing and Independent/Assisted Living facilities to the above information you find that a large percentage of our medical calls can be attributed to this demographic. When an elderly individual who lives alone has a medical issue they have no other option but to call 911 for assistance. This reliance on the Town's emergency services is responsible for a substantial amount of the increase in requests for service and in turn the need for additional ambulances to transport patients.

Medical Facilities

Another subgroup of service users that has grown recently in Concord is in the area of medical offices and clinics. The number of Health Care Provider offices in town has grown recently. This could be due in part to the proximity to Emerson Hospital. In addition to the individual medical offices, Emerson Hospital has expanded its own outpatient services and now has a number of affiliated medical offices located close to the hospital's main campus. In fact a number of individual physician's offices and labs are located within the main campus of Emerson Hospital in the John Cuming Building. Emerson also has affiliated health service providers across the street from the hospital and in newly acquired medical buildings on Baker Ave Extension.

Each time a doctor in one of these offices determines that a patient has a serious medical issue and cannot self-transport to an Emergency Room they call 911 and the CFD ambulance responds. In fact any time a patient in any office or lab located in the Cuming Building requires transport to the Emergency Room the CFD ambulance is called to transport them. Medical policies do not allow the patient to get to the Emergency Room in any other manner. The types

Concord Fire Department Emergency Medical Service Strategic Plan

of facilities located in the Cuming Building include a Blood Lab, MRI Unit, CAT Scan Unit as well as a Dialysis Unit, all of which utilize the services of the CFD ambulance on a regular basis. In addition to the Emerson campus we have a number of other Primary Care Physicians offices located on Baker Avenue Extension. The Concord Hillside Medical Associates is a practice of Harvard Vanguard Medical Associates. This complex is home to a number of primary care physicians for both adults and children. It offers Urgent Care, Endocrinology, and Behavioral Health Specialty Care. If a patient at one of these offices requires treatment that cannot be provided at the Concord Hillside facility, or requires emergency treatment, they utilize the CFD's ambulance to have them transported to Emerson Hospital. Currently Harvard Vanguard is constructing a new facility at 310 Baker Avenue, across the street from their current location. This is a larger complex which will reportedly house approximately 60 medical professionals. Once completed the new facility, along with the current Concord Hillside facility will house over 90 medical professionals. This will likely increase the number of ambulance responses to the facility because more physicians would lead to more patients which in turn would require more responses. The addition of this facility would most likely at a minimum double the number of responses to those facilities from 31 in 2011 to approximately 60 in 2013. This facility is scheduled to open in the Spring of 2013.

Medical facilities, as a group percentage, account for the second highest percentage of our medical responses.

Next, the committee looked at Simultaneous Responses. 'Simultaneous Responses' are defined as responses that require either a fire or EMS response *to more than one call at a time*. A Simultaneous Response is recorded any time that fire and/or EMS personnel are dispatched to a call before all units are clear from a call that is already in progress.

As Table 5 illustrates, these numbers have remained fairly consistent during this time period.

Year	# Simultaneous Calls/# EMS Calls
2008	520/255
2009	424/218
2010	749/242
2011	515/255

Table 5

On some occasions when simultaneous responses were requested, the Concord Fire Department ambulance was at Emerson Hospital and able to clear in a short enough time period to respond to the second call. However, on many calls they were not able to respond, which resulted in a request for a mutual aid ambulance.

Concord Fire Department Emergency Medical Service Strategic Plan

FINDING #4: Impact on Town Revenue

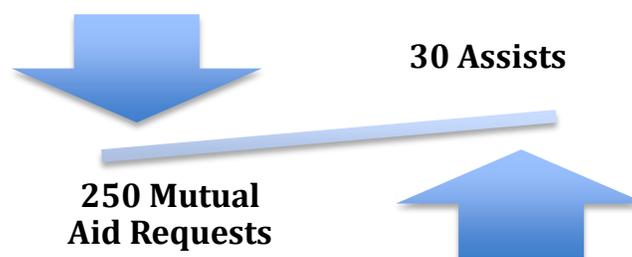
Along with the issue of fairness by overusing our mutual aid partners there is also an identified monetary component attached to this problem. Due to the number of times we require a mutual aid ambulance response, the **Town of Concord currently loses approximately \$465.00 per call.**

When a mutual aid ambulance transports a Concord patient, the mutual aid ambulance bills and receives payment for the service, not the Town of Concord.

Through June 30th, 2012, Concord has required a mutual aid ambulance response **133** times for a dollar loss of approximately \$70,000.00.

In 2011, the Town of Concord required a mutual aid ambulance response for a total of **193** calls for the entire year, which is still well above average and accepted practices. The community of Concord is on course to eclipse that mark in 2012, and in danger of incurring a monetary loss of at least \$135,000.00 for the current calendar year.

Concord's ambulance is available to respond to our neighbors when needed, however through the first 6 months of this year our ambulance has only responded to our mutual aid communities a total of 15 times. If the responses continue at the same rate, which statistics seem to indicate will occur, Concord will finish the year requiring assistance from our neighbors at least **250** times and will be able to provide assistance to them on **30** occasions.



Again this process is called Mutual Aid but a 90/10 split can be called anything but mutual. The identified purpose of our written Mutual Aid agreement is to supplement, not replace, a member town's services. If the trend continues, without any corrective action being taken, Concord's monetary losses will be approximately \$133,000.00 to \$144,000.00. Concord would hopefully recoup \$15,000 for our responses to surrounding towns leaving us still with a substantial deficit. This is of course assuming like responses to the first half of this year. \$140,000.00 is the approximate cost of adding two full time employees, the number necessary to staff an ambulance for 48 hours per week.

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As the report identified earlier the town is getting older, not younger, which means that EMS runs will surely be increasing. An aging population puts a continuous strain on a community's medical resources and Concord currently requires mutual aid for approximately 20% of our EMS calls. Consideration must be given to the future expansion of our infrastructure and service population.

Any future increases in EMS response will also result in a further increase and reliance on our mutual aid communities. As stated in the Findings section of this report additional medical facilities, assisted living and housing developments are some of the likeliest areas for this potential growth.

FINDING #5: EMS Organizational Issues

Organizational Concerns

While the current Concord EMS model performs well, we have identified a number of issues of concern:

- Identified system revenue benchmarks continue to be met, but only by a slim margin.
- Annual receipts into the Town of Concord general fund are approximately \$590,000, with net revenue per transport of approximately \$465. However, general fund receipts below this level would create additional stress on the town's budgetary process.
- The efforts of insurers, such as BC/BS, to promote 'direct pay' to the patients, who would then, in turn, be responsible to pay us as the provider. This model has been tried elsewhere in the nation, and has resulted in patient abuse of the system as well as increased collection costs.
- Our experience with ProEMS as an ALS vendor has been excellent to date. There are few operational issues, and they are always willing to assist us with related activities such as training and software issues. During our initial research and program development, it became readily apparent that there are few, if any, ALS vendors who are capable of duplicating this high-performing system. We do not however have a backup plan in case ProEMS becomes unable to meet their system obligations.
- System revenue is derived from all eight communities that participate in the CMERA regional ALS system. Operational adjustments could be made if a smaller community opted out of the system, however if one of the larger users of the system, such as Acton, decided to opt out of the system, the resulting operational adjustments would become very difficult.

Concord Fire Department Emergency Medical Service Strategic Plan

Additionally, the loss of a larger community would most likely be accompanied by some smaller communities adjacent to that larger community also opting out of the system.

EMS Coordinator Concerns

Examination of internal records reveals that the increasing responsibilities of the EMS Coordinator have translated into an increase in overtime costs. Below is the EMS Coordinators overtime cost trend from FY 09 through FY 12:

- **FY09:** 79 overtime hours
- **FY10:** 125 overtime hours
- **FY11:** 175 overtime hours
- **FY12:** 252 overtime hours

ANSWERS TO OUR QUESTIONS

The committee identified earlier a number of questions that they set out to answer during this process. The following are those identified questions and the answers that our research has provided.

1. Does the Concord Fire Department have adequate resources to provide effective, responsive, high-quality EMS delivery to all persons within the town of Concord?

This question will be addressed in two parts because unfortunately it cannot be clearly answered simply in the affirmative. According to the data that we have collected it is apparent that the Concord Fire Department does not currently have adequate resources to provide effective, responsive and/or high quality EMS service to all of the calls for service received at all times. Although the Concord Fire Department provides effective high quality emergency medical services when we are able to respond to a call, we are finding more and more often that we require a mutual aid ambulance response to an increasing and inordinate number of our medical calls.

The Concord Fire Department is staffed by a Fire Chief and a Deputy Fire Chief who together provide the departments' administrative services, and they are considered staff positions. There are also 36 members assigned to four groups with nine members per group. These positions are referred to as line positions. A minimum of eight members must be on duty to provide fire and EMS protection for the town. The 36 line position members have a combined 597 years of fire and emergency medical service experience for the Town of Concord -- an average of 16.5 per years per member. All of these 36 individuals, as well as the Chief and Deputy Chief, are certified as Emergency Medical Technicians (EMT's) and certified in CPR, in addition to being trained firefighters. All members, excluding the Chief and Deputy Chief, are trained to

Concord Fire Department Emergency Medical Service Strategic Plan

administer albuterol, aspirin, epinephrine and nitroglycerin when needed. They are also trained in the use of Automatic External Defibrillators (AED's) and have the ability to test and monitor a patients glucose levels.

All members of the department are required to be certified as Emergency Medical Technicians. This certification requires initial classroom training of 100 hours and a minimum of ten hours of observation in an Emergency Room. They must then successfully complete both a written and multiple station practical examination. After becoming certified, all EMT's must complete at least 28 hours of continuing education along with a 24 hour refresher class consisting of both a written and practical examination bi-annually. Failure to do so results in the revocation of an individual's authorization to treat patients. The initial training, as well as in-service training, is monitored and approved by the Massachusetts Department of Public Health's Office of Emergency Medical Services.

Monthly in-service medical training classes, administered on-line by ProEMS, are completed by all personnel during their shift. As is shown by the above documentation, the department does provide highly trained personnel, who in turn provide high quality EMS service for the town.

Conversely, we have no control over the training that members of our Mutual Aid response communities require of their employees. Anyone working in the Commonwealth of Massachusetts on an ambulance must be trained and certified to a minimum level of Basic Emergency Medical Technician, and be certified in CPR. Beyond that there are no requirements that EMT's become certified to practice any of the advanced skills that are available. The best way for us to know we are providing the highest level of service available is to ensure that we are sending Concord Fire Department personnel in a Concord Fire Department Ambulance to all, or at the very least, as many calls as possible. We are unable to do that with our current staffing levels.

In 2007, the Town was awarded the Assistance to Firefighter SAFER Grant which provided for a ninth firefighter on each shift. The Staffing for Adequate Fire and Emergency Response Grants (SAFER) was created to provide funding directly to fire departments and volunteer firefighter interest organizations to help them increase the number of trained, "front line" firefighters available in their communities. The goal of SAFER is to enhance the local fire departments' abilities to comply with staffing, response, and operational standards established by the NFPA and OSHA (NFPA 1710 and/or NFPA 1720 and OSHA 1910.134). It is important to note that these additional firefighter positions could not be used to increase staffing of a departments ambulance. The SAFER Grant however did have a positive impact on the department budget and staffing levels. Instead of hiring an overtime slot for each member absent (sick, vacation, personal etc.) we now do not hire for the first member absent leaving us with the original eight (8) member shift staffing 100% of the time and nine (9) members on duty approximately 30% of

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the time. While a very substantial overtime savings has been realized the operational impact of this grant relative to ambulance staffing is insignificant.

RESPONSE TIMES

The effective and responsive issues, which are actually our response times, cannot be completely corrected without either constructing additional fire stations in outlying areas of the town, or by relocating the current two stations to other areas of town. Either of these options would be very costly.

The National Fire Protection Association (NFPA) Standard 1710; “Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments” 2010 Edition, is the standard used by fire departments nationally as the standard for response times. This standard states that fire departments providing BLS service should have their EMS units deployed so that a First Responder with an AED arrives at 90% of their incidents within a 240 second (four minute) travel time.

This standard further states that fire departments providing ALS service should have their EMS units deployed so that an ALS company, (engine or ambulance) arrives at a call within 480 seconds (eight minutes) provided that a BLS unit with an AED arrives at the call within a 240 second (four minute). This standard allows for one minute call processing and one minute turnout time in addition to the travel times listed.

In addition to the NFPA 1710 standard, the American Heart Association (AHA) states that in order to effectively save the life of a cardiac arrest victim basic lifesaving emergency medical treatment must be started within 4-6 minutes of the onset of a cardiac arrest. For both of these events, as well as other serious emergency medical problems, advanced life support measures should ideally be initiated within 8 minutes. We looked at the two criteria to determine if the Concord Fire Department had resources on scene within the recommended time limits. Currently the Concord Fire Department has a Basic Life Support (BLS) unit on scene at emergency medical calls in 6 minutes or less approximately 50% of the time and ALS capabilities, provided by the CMERA regional service, on scene in 8 minutes or less 47% of the time. Overall we were able to meet these BLS time limits on approximately 47% of our medical calls in 2010 and 53% of the calls in 2011 (Chart 5). The gold standard to meet these recommendations is 90% or more. We currently do not come close to meeting the gold standard at the BLS or ALS levels. The fire department provides BLS level service on scene in under eight minutes for approximately 90% of our EMS responses.

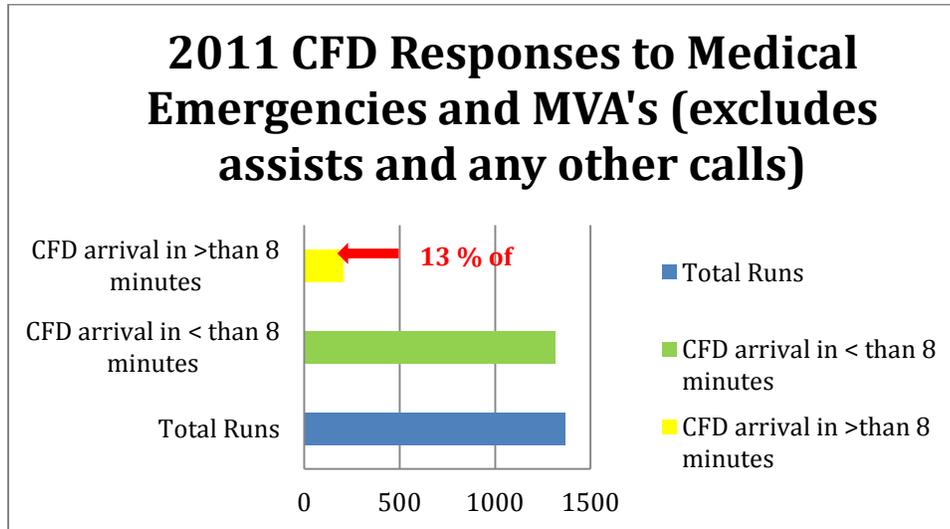


CHART 5

Even though we have very responsive mutual aid communities, and we dispatch a fire engine with trained EMT's to all medical calls, there is a delay in transporting a patient to the hospital via a mutual aid ambulance due to the response time lapse of the responding ambulance. This transport delay problem is the result of awaiting an ambulance from another community to respond to the scene.

Again these issues cannot be fully corrected without either constructing additional fire stations in outlying areas of the town, or by relocating the current two stations to other areas of town in order to change the starting locations for responses. Either of these identified options would be very costly.

2. What are the benefits and liabilities contained within our EMS delivery system?

The benefits of our system include the ability to place highly trained Basic Emergency Medical Technicians (EMT's) as well as Advanced Life Support on the scene of every medical call received and appropriately dispatched in the Town of Concord. Since all members of the Concord Fire Department are trained as firefighters and EMT's the citizens receive top quality basic medical care for every call. Advanced Life Support care is obtained through the Regional ALS system where the fire department responses are supplemented by two person chase vehicles provided through a written agreement with ProEMS.

Concord has now reached a point where, this year to date, we find ourselves relying on mutual aid ambulances for approximately 20%, or 2 out of every 10, of our medical calls. We are rapidly approaching the time where the requests and need for mutual aid responses will overburden our neighboring communities to the point where they may no longer be able to assist

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us. Except for a slight decrease in mutual aid requests in 2010, the number of mutual aid responses needed to effectively serve Concord has been steadily on the increase since 2007.

Our current system has a combined liability that is related to both the Town of Concord and the Mutual Aid communities. One only has to look as far south as Providence, Rhode Island to see the results of a lopsided mutual aid system. Providence uses its neighbors in a fashion somewhat like Concord does. They are also part of a Mutual Aid system and they require a mutual aid ambulance response on more occasions than their neighbors, a lopsided 90/10 split. Their mutual aid communities have advised them that they may no longer be able to provide them the same level of service because by doing so they are creating a situation where their own ambulance will be unavailable to respond to a call in their own town. Unless Providence increases the number of ambulances that it staffs, the Mutual Aid communities will no longer be able to provide services to Providence.

More locally, an example involving comparison communities occurred in 2006 when the town of Lexington reduced the number of ambulances that it staffed down to one ambulance. Immediately Belmont and Bedford realized significant increases in the number of ambulance mutual aid request to Lexington. In fact the strain was systemic: Bedford's primary mutual aid communities (such as Billerica) had to respond to Bedford more often because Bedford was already busy responding to calls in Lexington. This caused Bedford and Belmont to demand that Lexington respond to this inequity.

As is demonstrated in the two instances listed above mutual aid agreements can and have been terminated and/or readjusted as a result of overuse by a community.

3. What is our current Response Model?

The current CFD response model is a Fire/EMS Based Response Model. This type of Response Model calls for a fully staffed fire engine to respond to every call received, including medical calls. This type of response insures that if a fire call were to be received before the fire engine returned to quarters they would be ready to respond. Most of the emphasis with this type of response model is put on ensuring fire protection for the citizens.

The fire truck is staffed by individuals with the same training as the personnel assigned to the ambulance. With the exception of the ability to transport a patient to the hospital, the crew from the fire truck can provide the same treatment and care as the ambulance crew and perform any necessary lifesaving treatment. This type of response helps to ensure that there is rapid access to patients in West Concord. It ensures that there is sufficient help on scene to carry patients and equipment as needed. However there are costs involved in having a fire truck respond to all medical calls. This type of response model places unnecessary wear and tear on the fire engine

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by sending it to non-critical as well as critical emergency calls. This practice contributes to premature mechanical issues, excessive fuel usage and accelerated parts wear and replacement.

Under normal circumstances the dispatching of a fire truck to a medical call should be reserved for the following types of calls; high priority illness or injuries, motor vehicle accidents and complex scenarios where additional resources may be needed to move patients or mitigate hazards. As previously mentioned some communities have switched to the Emergency Medical Dispatch Call Coding Management System which prioritizes all calls and dispatches only the required equipment. Concord utilizes the EMD System however the community does not dispatch at all suggested call coding levels. Unless and until the mutual aid and shortage of a primary and secondary ambulance can be addressed it is not feasible for Concord to change the response model.

4. What should our Response Model be?

The CFD's response model should be adjusted from a Fire/EMS Based Model to an EMS/Fire Based Model. This is a customer driven change that will enhance the long term survivability, treatment and overall delivery care of our patients. An EMS/Fire response model remains an important option because the mission of the fire service is to protect and save lives and property. This can be easily accomplished with cross-trained personnel because there are no other conflicting agendas. The members of the fire department are there to provide emergency service and are not part of a business, or business plan. The CFD is careful to be a good steward of the funds entrusted to us. The bottom line of the fire department is to ensure the best interest of the patient without undue monetary consideration.

The primary goal of this type of response model is to place the best possible trained people on scene in the shortest amount of time which will enhance the survivability of our patients who are predominantly our residents. In order to accomplish this goal the CFD would require a minimum of one fully staffed ambulance located on each side of town.

Our research has indicated that the best means to accomplish this is with an EMS/Fire Based Response Model utilizing cross-trained Fire/EMS personnel. The CFD's response model includes cross-trained/multi-role firefighters. All members of the CFD are trained as such. Firefighters are "All-Hazards" responders who are trained and prepared to handle any situation that may arise at a scene, including patient care and transport. This type of training helps to insure that proper scene safety and management is accomplished along with effective and efficient patient treatment at any call.

There are some important reasons that we recommend the use of cross-trained fire personnel to accomplish this response model. All out-of-hospital emergency care and ambulance transport professionals are taught that scene safety is the primary objective at every emergency scene.

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However, many non-fire service-based EMS professionals do not have the additional resources and often do not have the training to effectively secure a scene. Due to the strict medical orientation in their professional training and practice, adequate preparation to appropriately and safely provide emergency medical care in hazardous or dangerous conditions may be compromised.

Scene safety issues however are the primary focus of every fire department response. As a member of CMERA, Concord utilizes the ProEMS paramedics to provide advanced life support. They are not equipped with the training, or the proper protective clothing, to work in or about hazardous conditions. Properly cross-trained fire service personnel can work in these types of situations possibly improving the chances for a better patient outcome. Incidents such as serious motor vehicle accidents, fire scenes, collapse situations and hazardous materials incidents are examples of the types of calls that require enhanced scene safety.

A second goal of this type of response model would be to have the CFD prepared to supplement and to replace, when and if necessary, the ALS service provider currently used to service the Town. Necessary negotiations were accomplished several years ago and are part of the current Collective Bargaining Agreement. Should the need arise the implementation of this type of care would be able to occur fairly rapidly and seamlessly. As was stated earlier, the regional paramedics are on scene in less than eight minutes approximately 50% of the time and CFD trained personnel on scene approximately 90% of the time.

5. How many ambulances are needed to effectively service Concord?

The data compiled thus far reveal that the one cross-staffed ambulance model that we currently utilize to service the Town of Concord does not provide a sufficient amount of coverage to effectively service the Town. Most of the comparison towns that were surveyed have at least one primary ambulance staffed at all times. Some comparison communities utilize more than one (1) fully staffed ambulance, and many utilize a cross-staffed scenario as their second or back-up ambulance. In order to properly meet the needs of the citizens of Concord the Fire Department will need to staff one primary ambulance and one cross-staffed ambulance 24 hours a day, seven day a week.

All but four of the sixteen other municipalities that the committee surveyed had at least one full time fully staffed ambulance, 24 hours a day, 7 days a week. The remaining four communities staffed an ambulance, unless their staffing levels fell below five (at which time they would run a cross-staffed ambulance and fire engine) meaning either one or the other was available for a call. Thirteen of the comparison communities also staffed at least two engine companies. These identified comparison towns all had approximately the same number of responses that Concord currently does.

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Concord's current response plan and staffing levels do not permit having a fully staffed primary ambulance and at the same time providing the same level of all-hazard and fire protection that the town currently requires. Staffing the current ambulance without interruption would mean the ladder truck would not be available until such time as call back personnel could respond to the station. This type of delay in the response of a ladder truck can be life threatening due to extended response delays. A rapid ladder truck response to a fire essentially leverages the CFD's on scene staffing at one of the most critical times operationally. Response time for call back personnel can range from as little as 10 minutes, to as much as 30 minutes, depending on the time of day and weather conditions.

We have reached a point where year to date we find ourselves relying on mutual aid ambulances for approximately 20% (2 out of every 10) of our medical calls. We are rapidly approaching the time where our requests and need for mutual aid responses will overwhelm our neighboring communities to the point where they will no longer be able to assist us.

Except for a slight decrease in mutual aid requests in 2010, this number has been steadily on the increase since 2007. In fact, within the first 6 months of 2012, we have already needed a mutual aid ambulance at 133 calls. In 2011, we received 193 mutual aid ambulances for the entire year. Already in 2012 we surpassed 2011 total mutual aid ambulances responses and are on track to finish the year with 250 mutual aid ambulances. This would be a 29% increase over 2011 mutual aid ambulance responses. This is an alarming rate of increase and one that cannot be sustained going forward if we expect to be able to provide a quality service.

Concord Fire has always provided the highest level of patient care and customer service to all of our residents in a coordinated fashion. As we have been forced to rely on outside resources on an ever increasing basis, it has become much more difficult to maintain this highest standard. The more we are able to provide EMS with Concord Fire resources, the more we will be able to ensure consistent quality in our EMS system.

Staffing 1.5 ambulances would enhance medical responses as well as provide improved All-Hazard and fire coverage for the Town. It would also eliminate the need for much of the Mutual Aid responses that are now occurring. It would insure that we had at least one ambulance and one fire truck available at nearly all times to respond to an emergency.

There are some costs involved in staffing 1.5 ambulances as opposed to the .5 that is currently staffed. Concord currently has one fully stocked front line ambulance and one fully stocked spare ambulance. When the front line ambulance is out of service due to regular maintenance, mechanical problems, or any other issues, there is a spare ambulance that can be immediately placed into service. If we were to change to a 1.5 ambulance department the purchase of an additional ambulance would be required to maintain our current ability to immediately place a vehicle on the road. The current spare ambulance is scheduled to be replaced in FY15. That

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purchase would need to be accelerated by one year were we to increase our service. When we purchase a new ambulance the vehicle being retired from service has limited to no resale value. The dealer will take the vehicle but we realize minimal trade-in value from it. Rather than trade in the vehicle it would remain in the fleet as the backup for the 1.5 front line ambulances.

Although there would be a cost involved in purchasing a new ambulance it is already scheduled in the FY15 Capital Budget and we would also realize some savings.

Currently we replace our front line ambulance every four years. When a replacement is purchased the front line ambulance that is being replaced is rotated into the role of back up ambulance for four additional years.

We currently place 14,000-15000 miles per year on our front line ambulance annually. If we staffed a minimum of 1.5 ambulances we would cut the number of responses of this ambulance in half. The average run for the ambulance is approximately six miles round trip. That means the ambulance is accumulating approximately 12,800 miles per year for medical runs alone. If the CFD ran with 1.5 ambulances that mileage total would be divided between two ambulances reducing the mileage and increasing the life of the vehicle at the same time. The life expectancy of an ambulance is no more than 125,000. We run our ambulances for four years as front line and four years as back up. This addition of another ambulance would not change our replacement plan. We would however be adding the cost of another ambulance into the calculations.

6. Where should the ambulance, or ambulances, be located?

This question, although statistically easily answered, logistically becomes a bigger problem. In order to properly answer this question, we must first describe how the Concord Fire Department currently staffs our ambulance and why.

Currently the department provides ambulance service to the Town by means of one cross-staffed ambulance. Cross-staffing is accomplished by staffing both the ambulance and the ladder truck with the same two Firefighter/EMT's. Under this staffing scenario, if there is a medical emergency, the ladder truck will not be available to respond to a fire or fire call. Likewise when there is a fire, or fire alarm call, the ambulance is not available to respond to a medical emergency. In order to accomplish this response model the ambulance is garaged in, and responds from, the Headquarters Station on Walden Street. This was an effective means of staffing in the past, but is no longer a viable option due to our increase in responses.

Cross-staffing was only effective in the past between the ladder truck and ambulance because that model still left two fire engines staffed in the event of a fire. A minimum engine response to a fire is two, one to attack the fire and one to establish a water supply, usually at a hydrant.

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Cross-staffing another ambulance with the crew from an engine company is not an option because it would cause the Town's fire protection to fall below what is considered by industry standards to be at safe staffing levels. This practice would put both the firefighters and residents in danger as well as have a ripple effect on the Town's ISO fire rating. Additionally both of the Town's fire engines are busy and much of the time they would not be in the station and thus unable to respond with the ambulance if it was needed. Any decrease in the Town's ISO insurance ratings would cause a slight increase in insurance costs for homeowners but the increase in insurance costs for commercial properties could be substantial due to the decrease in fire protection.

In order to determine the answer to the question of where our ambulance(s) should be stationed we analyzed the run statistics for the past several years and created GIS maps showing where the majority of our responses occurred. The results are illustrated on the maps in **Appendix A**.

The data illustrated that the majority of the medical calls occur in West Concord (District 2).

The data clearly indicates that if the Town has only one staffed ambulance then that ambulance should be stationed in Station 2 in West Concord. This would place the ambulance in the station that is nearest to the majority of medical responses. In 2011 the CFD responded to 1688 EMS runs, which includes lift or medical assists. Of these 1688 responses 1186 of them were for locations in West Concord and 502 for locations in Concord. In 2010 the numbers showed the same type of discrepancy, 1580 total EMS responses, 1085 in West Concord and 495 in Concord (see Chart 6 and 7).

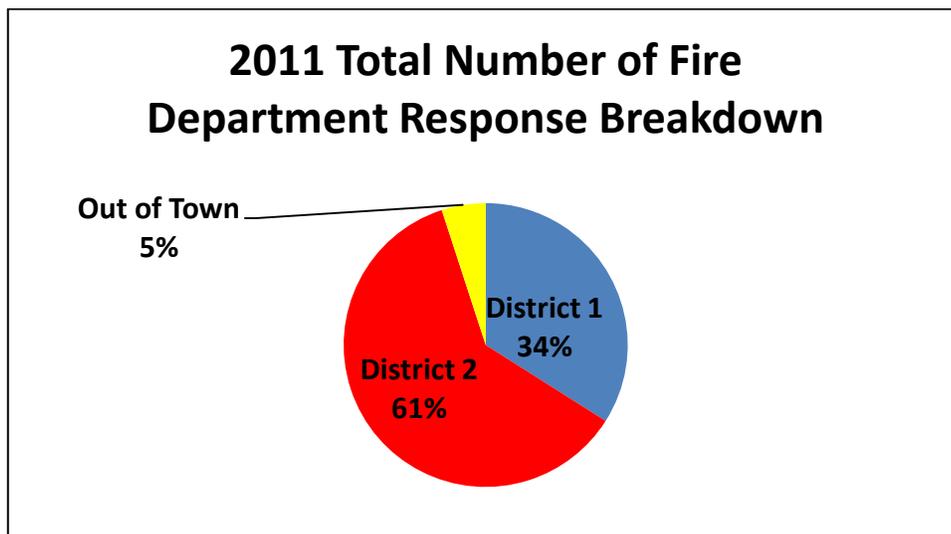


CHART 6

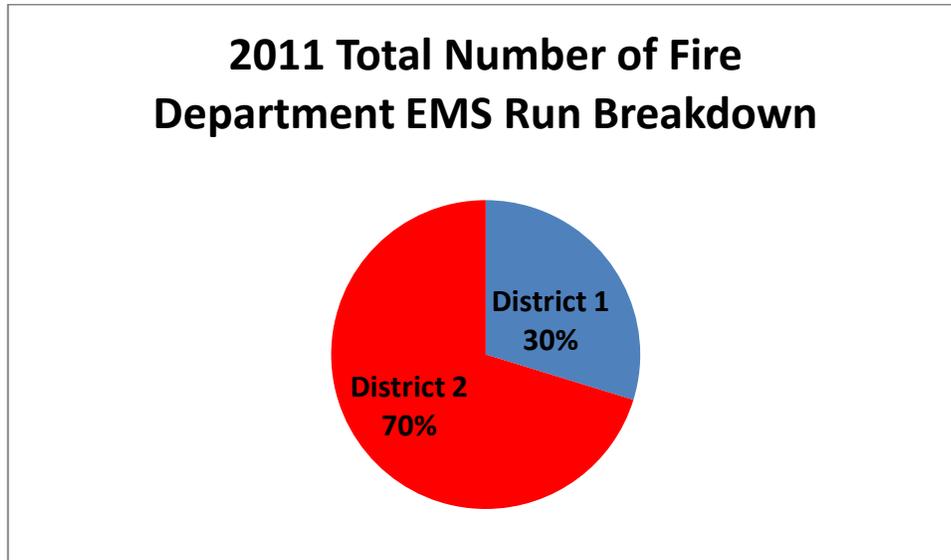


CHART 7

Advantages of placing the ambulance in West Concord would include shorter response times, less wear and tear and fuel use for the vehicle and the elimination of the need to send a fire truck to medical assist calls that only require the ambulance crew of two to complete.

The greatest disadvantage to this recommendation with our present staffing and Response Model is that by placing our only ambulance in West Concord we eliminate the ability of the department to staff the ladder truck. Since our current staffing model calls for our ambulance to be cross-staffed with our ladder truck and the ladder truck is located in the Headquarters Station then garaging the ambulance in the West Concord Station would make it impossible to staff the ladder with on duty personnel. This creates a life safety hazard when a fire occurs, because a piece of equipment necessary to help to save lives cannot respond in a timely fashion, if at all. Waiting for a ladder truck to respond from a neighboring community is not optimal as the critical life-saving functions that the ladder truck brings to bear at an emergency scene is of an extremely time critical nature.

The ladder truck cannot physically fit into the West Concord Fire Station making it impossible to cross-staff an ambulance and ladder from that station.

There would be a cost involved in garaging an ambulance at Station 2. In order to accommodate the additional personnel required for 24/7 staffing, renovations to the living quarters in the building would be required. The minimum renovations necessary to enable the building to accommodate two additional members and the ambulance would cost between \$150,000 and \$170,000.

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This figure is based on commercial construction costs of between \$225 and \$250 per square foot. The area to be renovated is currently 16'x 19'x 2 stories high:

- $(19 \times 16) \times 2 = 608$ square feet of space
- $608 \times \$225 = \$136,800$
- $608 \times \$250 = \$152,000$

Either cost should have a minimum of a 10% contingency cost adding the following to the projected costs:

- \$225 per square foot = $\$13680 + \$136800 = \$150,480$
- \$250 per square foot = $\$15200 + \$152,000 = \$167,200$

The current building cannot physically accommodate two additional personnel around the clock. The renovations would consist of increasing living space that could accommodate the additional personnel. In order to complete the renovations the current single story structure in the rear of the building would need to be removed and rebuilt. The current single story structure is not capable of carrying a second floor weight load.

There is an additional 512 square foot area in the rear of the building adjacent to a previously completed addition. As an option, it may make sense to capture some, or all, of this additional space for living quarters and turnout gear storage. However there would be additional building costs that would add an additional cost of:

- \$115,200 at the \$225 per square foot cost
- \$128,000 at the \$250 per square foot cost

The results of our review has shown that in order to handle the Town of Concord's medical calls, while at the same time reducing the burden placed on our mutual aid providers, the Concord Fire Department must have, at a minimum, one primary staffed ambulance and at least one cross-staffed ambulance. Our recommendations of the options that could allow us to accomplish this are listed in the Recommendations Section of this report.

7. What is the current status of our regional ALS system?

Continuation of ALS services for the Community:

Advanced Life Support (ALS) refers to the medical procedures for sustaining life including the advanced diagnosis and protocol-driven treatment of a patient in the field such as defibrillation, airway management, and administration of medications. Generally, ALS is performed by individuals certified to the Emergency Medical Technician-Paramedic level and other qualified health professionals.

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The Concord Fire Department will continue to provide the appropriate Advanced Life Support services either through the current written agreement with ProEMS or through other methods when deemed appropriate and necessary. The Concord Fire Department has developed an important partnership with Emerson Hospital to provide the highest level of pre-hospital care to the community. This partnership began with the implementation of an ALS non-transporting paramedic unit that responded from Emerson Hospital and continues today through the current CMERA relationship.

The Concord Fire Department would like to continue this positive relationship in the future and also find a means to enhance the ability to deliver the highest level of pre-hospital care available. The Concord Fire Department will achieve this mission and philosophy through the following actions:

1. Through proper location of stations, apparatus and staffing that provide delivery of BLS services in order to meet the gold standard response time standards of four minutes or less 90% of the time
2. Look at future hiring practices to include the possibility of hiring of Paramedics
3. Consider future staffing of fire apparatus with Paramedics

V. CRITICAL ISSUES AND SERVICE GAPS

There are a number of Critical Issues and Service Gaps that must be addressed and corrected so that the Concord Fire Department can continue to provide, as well as improve upon delivering, a professional, quality and effective Emergency Medical Service to the residents of Concord. These issues will be addressed in no particular order.

Critical Issue are defined by the Merriam Webster's Dictionary as; "*Those aspects of a system's capability, operational, technical, or other, that must be questioned before a system's overall suitability can be known. Critical issues are of primary importance to the decision authority in reaching a decision to allow the system to advance into the next phase of development*"

Critical Issue #1: We determined through our research that the Concord Fire Department cannot meet the required needs of the Town when it comes to a Concord Fire Department ambulance responding to all, or nearly all, requests for an ambulance. The data clearly shows that we rely too heavily on local Mutual Aid communities to service the Town. Mutual Aid is in place to supplement, not replace, a municipalities responses. Experts in the EMS field have stated that when an organization requires mutual aid assistance for 14% of its' EMS responses it is operating in crisis mode. When it requires Mutual Aid for 30% or more of it's' calls then the system is in failure. As previously stated the CFD is requiring a Mutual Aid ambulance response

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on approximately 18% of our calls placing us somewhere between Crisis and Failure. Although we are not yet experiencing a failure of our system we are already in a critical situation and the inability, or unwillingness, of any of our Mutual Aid communities to provide us with ambulance coverage could result in our inability to properly service the community. (see charts 8 and 9).

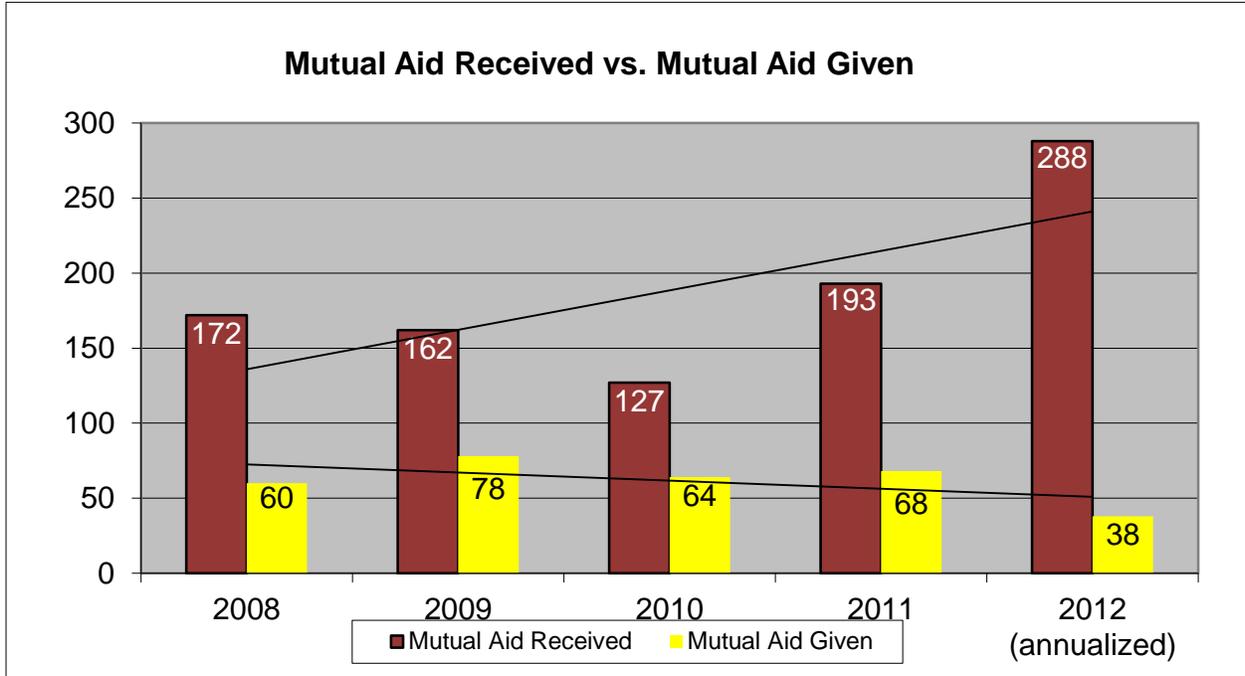


CHART 8

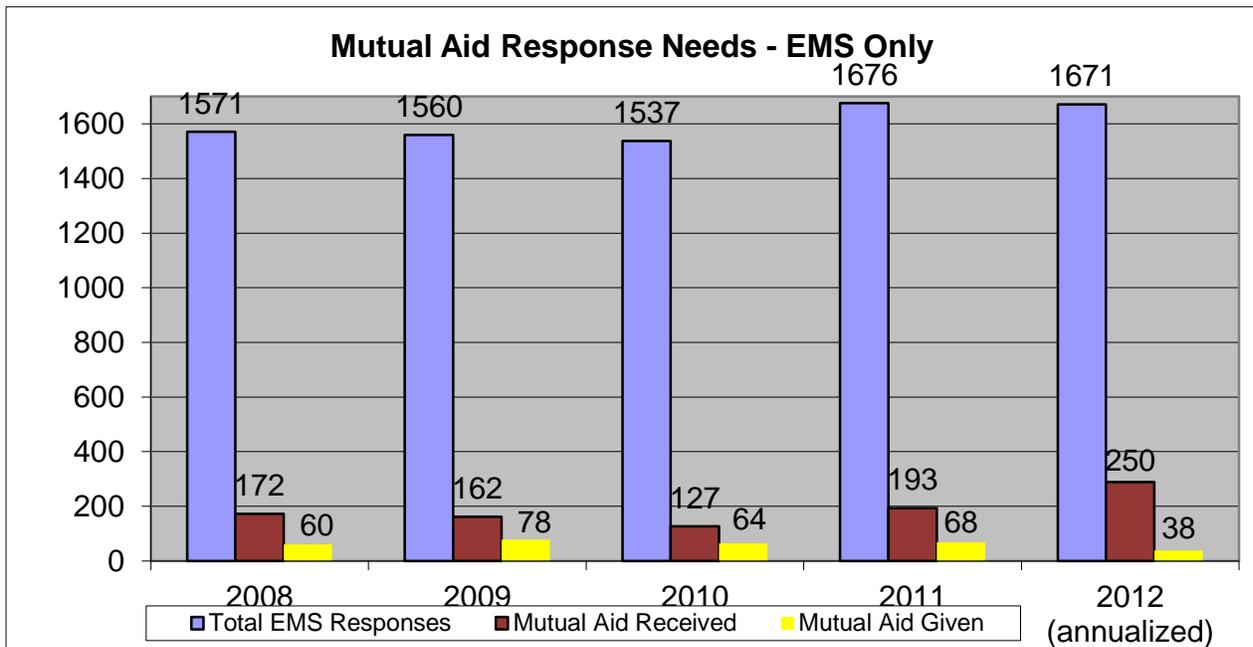


CHART 9

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Critical Issue #2: A second issue which is directly related to the previous Critical Issue is inadequate staffing in place to handle the increasing EMS run volume. We have reached the point where we now have inadequate staffing to handle the present number of EMS calls for service. In addition we have had rising call volumes for the past several years (Chart 10).

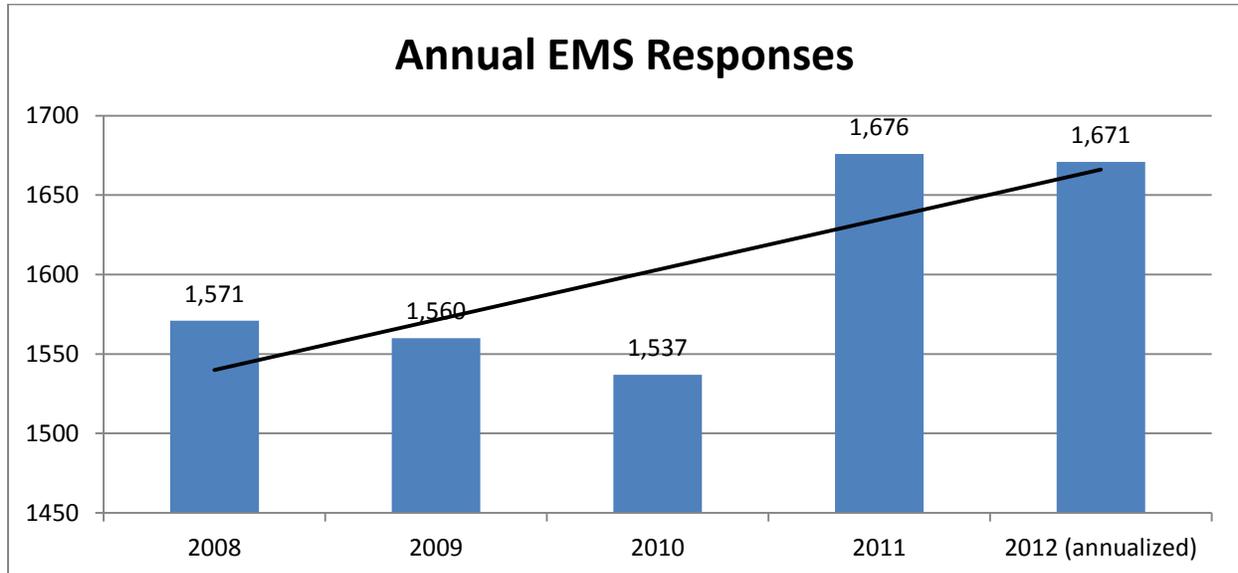


CHART 10

Critical Issue #3: Issue three is the number of simultaneous runs that the Concord Fire Department is experiencing. The definition of a simultaneous run is when two different calls for service are being handled by the Concord Fire Department at the same time. Since 2008 we have experienced two or more simultaneous calls on an average of 17.83% of our calls. (Chart 11)

The data we collected identified that approximately 18% of the time that we are on a call we are experiencing additional calls for service. This condition of simultaneous calls for service is placing a burden on the Town of Concord Fire Department's personnel and resources. Many times this second call for service is handled by an outside agency through the fire department's identified mutual aid contract.

The Concord Fire Department current operational procedure of cross staffing the ladder and ambulance at Station One (1) only allows the fire department to adequately staff the ambulance about 75% of the time. The findings identified that the personnel assigned to ambulance/ladder truck are also responsible for staffing the departments Brush Fire unit when necessary. The absence of a dedicated ambulance crew can cause an increase in simultaneous runs because if the crew is on a run in the ladder truck they are not available to respond in the ambulance. This increase in simultaneous responses to emergencies in the community of Concord can be quantified by the fact that both the median age and the number of older adults living in the community has been on a steady increase for many years.

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A rise in the elderly population of the Town comes with an increase in the need for EMS services. The calls for service can involve a spectrum of problems from: slip, trips and falls, to major medical problems (cardiac, respiratory, and diabetic issues, etc.).

The second factor is the infrastructure and service population. Even though the community has a residential population of approximately 18,000 residents, the Concord Fire Department provides services far beyond the residential population. This service population and infrastructure include major routes that transports vehicles through the community each day, a hospital, medical complexes, assisted living areas, major recreational areas, private schools, prison, etc. These factors also contribute the need for simultaneous calls for services.

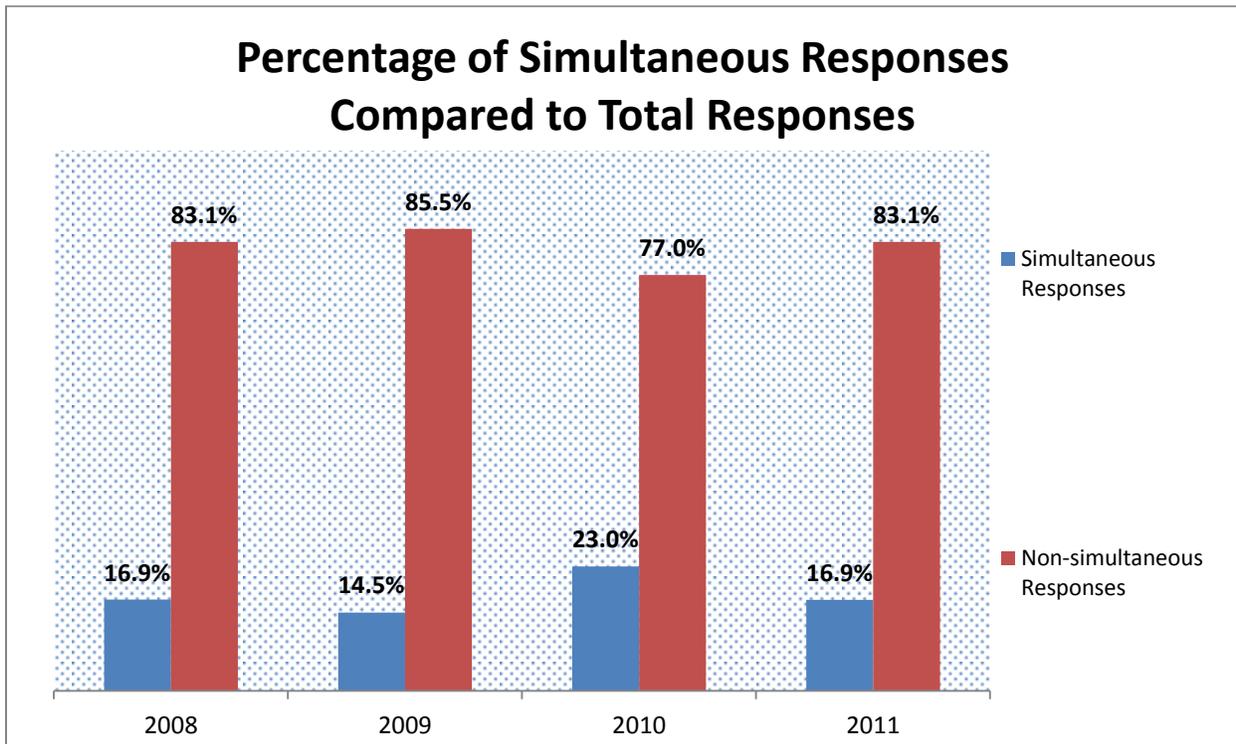


CHART 11

Response reliability is defined as the *'probability that the required amount of staffing and apparatus will be available'* when a fire or emergency call is received. This process requires the department to analyze its response performance data to determine how many simultaneous calls for service are received or are occurring close together. A common term used is “back-to-back calls.”

Another way of looking at historical reliability is if every piece of fire or EMS equipment were available at its desired location, every time a call for service was received, the department’s reliability would be 100%. If, however, a call is received for a particular unit, but that unit is

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already committed to another incident, be it fire or EMS, and the next closest unit must respond from a different station, the substitute company may exceed the maximum prescribed travel time.

As the number of emergency calls per day increases, the probability increases that the primary unit needed for response is already committed, and a backup, or substitute, unit will be required. Another factor that must be considered is the “queuing factor.” Queuing is defined as how many times multiple calls for service occur and whether or not they empty a particular area. When measuring queuing, all calls for service must be considered. EMS calls, due to their volume, will have the primary impact on a fire department’s queuing issues. In the overall evaluation of queuing, it may be that additional units are needed not for fire but instead for EMS service.

Another factor that affects queuing is the physical area covered by a particular station. The larger the response area, the more likely the chance of simultaneous calls for service. If the engine that usually responds to a particular call is already busy on another call, then the next closest units’ response time will exceed the usual first unit’s response time by several minutes. Response reliability is derived from a department’s historical data, and is usually expressed by individual companies and department wide.

Identifying response reliability is a critical component in the successful delivery of EMS services that the Concord Fire Department supplies to both its customers and residents. In determining this important EMS delivery concept, we must, as an organization, analyze the community’s simultaneous responses vs. single incident responses.

In Chart 12 we can identify that the department provides emergency services to its customers and residents approximately 3,000 times a year. Out of the 3,000 responses a year the department provides approximately 2,500 single responses and over 500 simultaneous responses a year. The importance of this graph indicates that the Concord Fire Department does very well handling the first single call that demands the fire department services.

The most compelling statistic is that the Concord Fire Department is not well suited, nor properly staffed, to handle a second simultaneous emergency call received in the same time period as the first call.

The department and community are required to rely heavily on mutual aid to deliver the appropriate emergency services to the second simultaneous call. This reliance on mutual aid can create adverse effects in properly delivering the high quality services that the community is accustomed to. The adverse effects can incorporate longer response times, not having the proper equipment on the scene, and cannot guarantee the same level of personnel training which can have negative effects on lives and property.

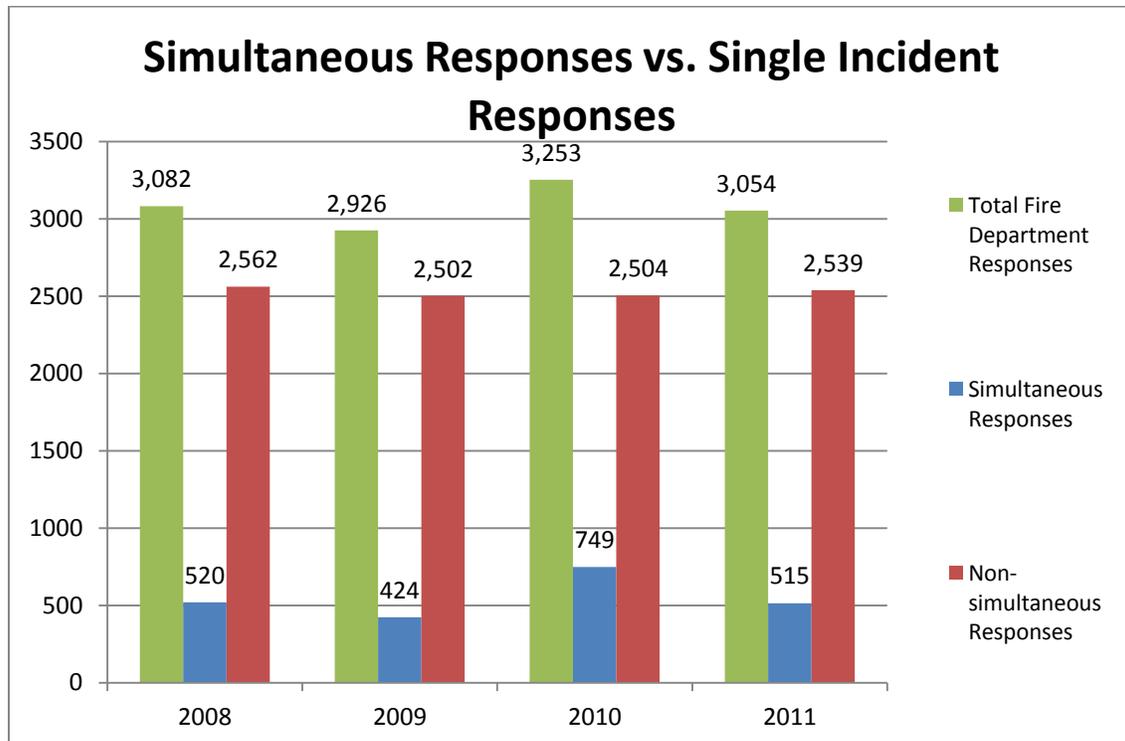


CHART 12

Critical Issue #4: Although not addressed thus far in the report, is the inability of the CFD to provide enhanced medical treatment to the citizens of Concord should the current agreement with ProEMS through CMERA cease to exist. Many of the comparison communities do provide enhanced treatment which not only provides excellent service but also increases the income to the towns. In 2011 alone the Town of Concord collected approximately \$595,000 for Basic Life Support ambulance service while ProEMS collected an additional \$319,706 for ALS service. If you added the money we already collect, plus the ProEMS money, plus the amount recovered if we required little or no Mutual Aid the Town would have collected approximately \$1,020,000 instead of the \$595,000.00 it collected. This would amount to a nearly 73% increase in Net Revenue per transport revenue.

Net Revenue Per Transport (NRPT)

Net Revenue Per Transport is arguably the key metric in measuring the revenue side of an EMS system. This number is the average actual dollars received for every ambulance transport. Total dollars received for the total number of transports in the measured time period.

The current net revenue per transport for Concord based on CY 2011 is \$471.

Concord Fire Department Emergency Medical Service Strategic Plan

Concord Fire EMS Revenue Increases by Moving to ALS Level of Care

The Concord Fire Department can increase revenue from EMS service by moving to the ALS level. Currently, patient transport revenue must be shared to cover the cost of two separate entities (Concord Fire and Pro EMS) handling ALS transports. If Concord Fire were the sole ALS provider the revenue for each ALS transport would go to Concord alone. While this increased revenue would need to be evaluated in context with the cost and level of clinical care, it is clear that revenue can be increased by moving to the ALS level.

Current Concord Fire Revenue and Net Revenue Per Transport for CY 2011

\$614,686 1305 transports \$471 Net Revenue per transport

Current Pro EMS Revenue and Net Revenue Per Transport

\$319,706 704 transports \$454 net revenue per transport

Concord Fire Revenue at ALS Level Based on CY 2011

(Concord Fire Revenue plus Pro EMS Revenue divided by total number of ambulance transports)

It would be ill advised not to have a plan in place should the current agreement end. The municipalities included in CMERA have already experienced the loss of an ALS service provider and now rely again on an outside organization to provide the service. Due to financial issues the Emerson Hospital service that was relied on heavily went out of service in 2010. The CFD had no contingency plan in place at that time. We need to avoid that scenario in the future. Although not imminent this could occur again with the current civilian provider and the CFD needs to be prepared.

Critical Issue #5: Approximately half of the CFD responses fall outside of the accepted time limit for providing both BLS and ALS life-saving emergency medical care. The industry standard and acceptable response time is four (4) minutes for a Basic Life Support (BLS) unit and eight (8) minutes for an Advanced Life Support (ALS) unit to be on scene and treating a patient. Currently we are meeting the BLS response time on 50% of the calls and an ALS unit is only meeting the time for 47% of the calls. Since the foundation is missing there is little to build upon. All of the areas that we are unable to reach within the recommended time period are residential areas. The extended response times are due to the distances from the current fire stations to the calls.

According to data from the American Heart Association, 88% of cardiac arrests occur at home and with every minute that passes the chance of survival is reduced by seven (7) to ten (10) percent. As shown earlier Concord has an aging population and the aging process in turn can increase the chance of experiencing a cardiac event. In fact Concord has one of the highest percentages of residents 65 years of age or older in Massachusetts. Coupled with longer

Concord Fire Department Emergency Medical Service Strategic Plan

response times, there is a clear need to improve on our response times. As was described above, response time is an extremely important factor when it comes to the survivability of incidents of cardiac arrests.

It is clear that the only way to address this issue is to arrive at calls sooner. Unfortunately this cannot be completely accomplished without substantial funding to either remodel existing facilities or build new ones. The ability to correct the response times in West Concord could be more easily accomplished than in Concord. We have identified the areas where a large number of calls fall outside of the 4-6 minute window and a large percentage of them are located in West Concord. Response time to limited areas could be reduced by garaging an ambulance in the West Concord Fire Station. However, garaging an ambulance in the area of Powder Mill Rd, or Old Rd to Nine Acre Corner, would substantially reduce response times to a large area of West Concord. In order to accomplish this, the Town could construct a facility to house an ambulance and two Firefighter/EMT's. This would not only improve much of Concord's longer response times but also would be a much smaller facility than a regular fire station and would be less costly and more aesthetically pleasing.

Critical Issue #6: This issue describes the inability of the CFD to effectively respond to calls when normal response routes are blocked. A number of things can affect the ability of the department to respond to calls. These issues can be short or long duration problems. The Concord, Sudbury and Assabet rivers all flow through portions of Concord. Three times since the 1980's, portions of the Town have been cut off by rising flood waters which has restricted the CFD's ability to respond rapidly to calls. Sudbury Road in the area of Heath's Bridge has created a situation where the fire apparatus and ambulance from the Headquarters station could not respond to the Conantum or Nine Acre Corner neighborhoods without taking detours that caused extensive response delays.

Currently there are two bridges in Town that fire apparatus cannot cross. The South Bridge, located on Main Street between River and Wood Streets and the Pail Factory Bridge located on Commonwealth Avenue near Laws Brook Road in West Concord. For approximately ten (10) years none of the Town's fire apparatus has been able to cross the South Bridge. This creates a situation where the physically closest fire engine to a patient is not dispatched to a call because the need to navigate their response around the bridge causes a two minute delay. Currently the only fire apparatus that can cross the Pail Factory Bridge is the West Concord fire engine and it has been suggested by the State Bridge Engineers that it would be best if that was only crossed for emergency responses. The ambulance can cross these bridges. However since the ambulance is on other calls and not available for a substantial amount of time a fire truck is the only lifesaving equipped vehicle able to respond to calls at times. The effect of the closed bridges is then felt by the responders and the patients.

Concord Fire Department Emergency Medical Service Strategic Plan

Other issues than can cause route restrictions are railroad crossings with gate issues, and winter weather scenarios. Currently whenever a substantial winter storm is expected a second ambulance is staffed with overtime personnel and put into service in the West Concord station.

An ambulance permanently stationed somewhere in West Concord would help to insure that none of the residents of the Town would ever be cut off from an ambulance response.

SERVICE GAPS

The research we conducted on our Mutual Aid responses revealed that the majority of our requests for mutual aid ambulances occurred between the hours of 8:00AM and 8:00PM.

The average number of times we required a mutual aid ambulance between 8:00PM and 8:00AM was 26.75 times per year in the four-year period covering 2008 and 2011.

Our biggest service gap for responses has been identified as the time period between 8:00AM and 8:00PM. See Chart 13 below.

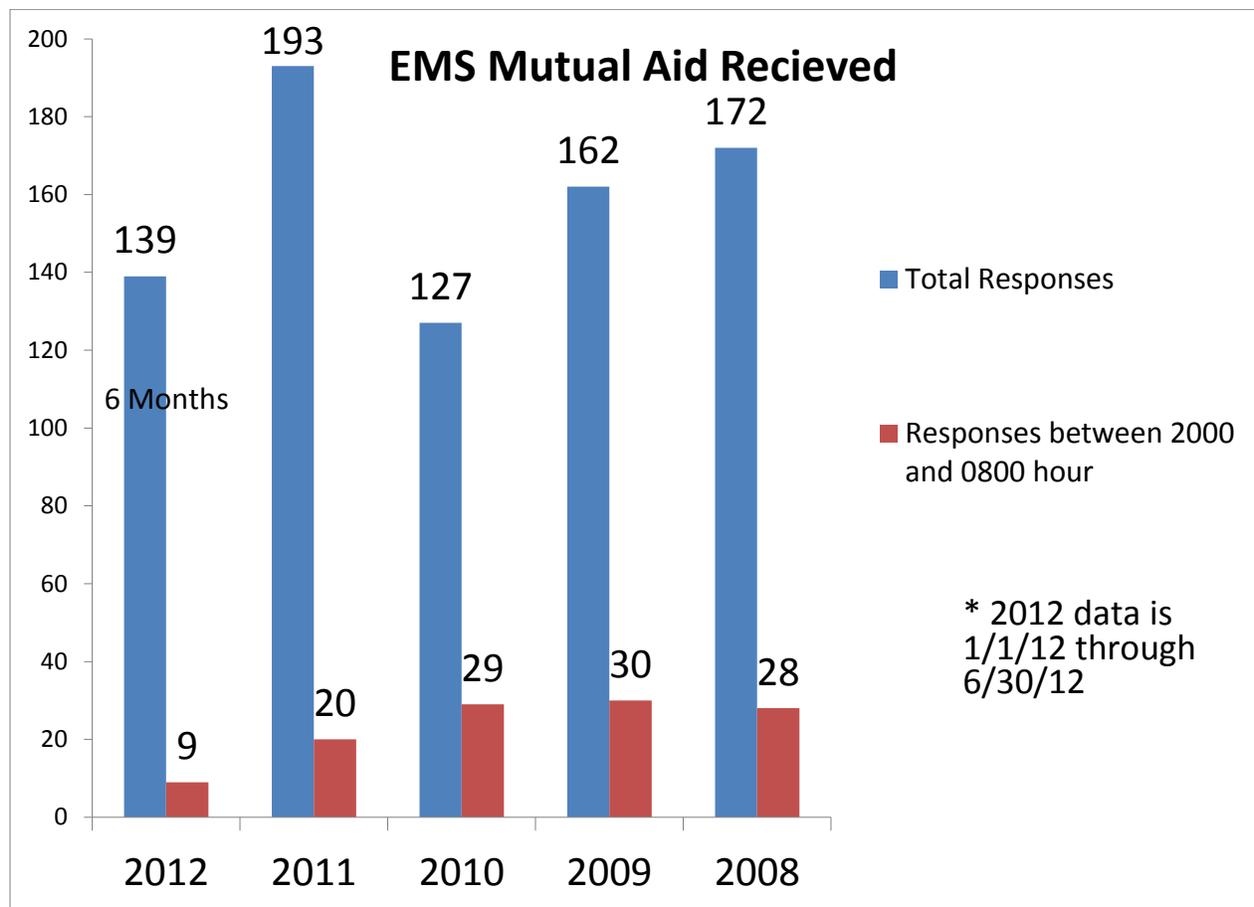


CHART 13

Concord Fire Department Emergency Medical Service Strategic Plan

An additional service gap is in our response times to various areas of Town. In these areas, it is nearly impossible to reach the scene of a call in less than the 4-6 minutes, the response time required to initiate lifesaving procedures in the case of a serious medical emergency. According to Bill Mergendahl, Chief Executive Officer Professional Ambulance, ProEMS supplies the Town of Concord with ALS capabilities in less than 11 minutes 59 seconds for 91% of their responses. However they have a unit with ALS capabilities on scene in eight minutes or less only 47% of the time. The recommendation of NFPA 1710 is to have ALS patient intervention in 8 minutes or less 90% of the time when ALS is provided by fire department personnel. This time line is not presently being met. As stated earlier, the CFD is not meeting the BLS response requirement approximately 50% of the time - - however it does meet the 8 minute ALS time limit, albeit with a BLS unit, on nearly 90% of the calls. The introduction of some type of a fire-based ALS component to the regional system would improve ALS response times.

The ability to identify EMS risks in the community is an important aspect of the CFD's service that is less than effective than it could or should be. Without this ability the CFD cannot institute an effective education program to the residents of the Town. The addition of personnel to staff a primary ambulance would allow the department to look at different target audiences and develop life safety, EMS and Fire Safety programs that would be of benefit to all.

As has been shown above the members of the Concord Fire Department have the training, experience, education, willingness and vested interest in the Community to provide the Town of Concord with the best possible emergency medical system and service. The major piece of the puzzle that is missing is adequate staffing to complete the mission.

VI. STAFFING RECOMMENDATIONS FOR EMS

The final strategic recommendation of this committee is to raise the staffing level of the department to a **minimum of ten members per shift**. In order to eliminate the strain put on our mutual aid communities there must be sufficient personnel on duty to staff the following:

- Staff one primary ambulance with two dedicated members 24 hours a day, 7 days a week at the West Concord Fire Station
- Staff a cross-staffed ambulance and ladder truck 24 hours a day, 7 days a week at the Headquarters Station
- Staff an engine in the West Concord Fire Station with a Lieutenant and two Firefighter/EMT's
- Staff an engine in the Headquarters Station in Concord with a Captain and a minimum of two Firefighter/EMT's

VII. GOALS AND OPTIONS FOR IMPLEMENTATION

The following are several recommended strategic goals and options that will allow the fire department to meet the staffing levels necessary for the Concord Fire Department to provide the service that the citizens of Concord expect and are entitled to. In developing these recommendations we attempted to provide some options that remained consistent with the Town's goals when it accepted the SAFER Grant. Those goals were in part to reduce the overall overtime budget substantially by eliminating the need to hire replacement personnel for the first member absent.

Option #1:

Hire **four new Firefighter/EMT's** and place one on each group raising the staffing level from the current complement of nine members to ten members per group. This would allow the department to staff a primary ambulance exclusively and continue to cross-staff the ladder truck and a second ambulance.

The financial implication to this option is all vacancies must be backfilled with overtime. This recommended method of staffing would allow the community to handle the vast majority of the ambulance calls in Concord with minimal need for mutual aid. The overall costs would be reduced by the amount of funds recouped by the Concord Fire Department Ambulance handling the calls that are currently going to mutual aid community ambulances and the elimination of call-back ambulance coverage when the ambulance responded to another town or to out of the area hospitals.

Option 1 would eliminate the overtime cost savings that were realized with the acceptance of the SAFER Grant that we received in 2007. The cost of this option is shown below in the table titled Option 1.

Concord Fire Department Emergency Medical Service Strategic Plan

<u>Option 1</u>	
4 Firefighters (1 per group)	\$292,092
OT Budget Increase	\$352,458
Eliminate Callback for out of area transports	-\$10,300
Offset from ambulance revenue	-\$131,950
Funding Required	\$502,300

Total Cost on the Town Tax Rate:

Option 1: \$0.0965 (9.65 cents) per thousand dollars (\$1,000) of assessed valuation. This would result in \$65.42 annually based on the median single family residence (\$677,900).

Option #2:

Hire **eight new firefighter EMT's** to increase staffing levels from nine members per shift to eleven. This would allow the department to staff a primary ambulance exclusively and continue to cross-staff the ladder truck and a second ambulance. This method of staffing would allow us to handle the medical calls in Concord with minimal need for mutual aid. The overall costs would be reduced by the amount of funds recouped by the Concord Fire Department Ambulance handling the calls that are currently going to mutual aid community ambulances and the elimination of call back ambulance coverage when the ambulance responded to out of Town calls or hospitals

Option 2 would maintain the overtime cost savings ratios realized through the Safer Grant. There would be an increase in base salaries due to the additional personnel, as well as a slight overtime increase to cover their additional time off.

Concord Fire Department Emergency Medical Service Strategic Plan

The cost of this option is shown below in the table titled Option 2.

<u>Option 2</u>	
8 Firefighters (2 per group)	\$584,185
OT Budget Increase	\$43,513
Eliminate Callback for out of area transports	-\$10,300
Offset from ambulance revenue	-\$131,950
Funding Required	\$485,448

Total Cost on the Town Tax Rate:

Option 2: \$0.0974 (9.74 cents) per thousand dollars (\$1,000) of assessed valuation. This would result in \$66.03 annually based on the median single family residence (\$677,900).

Option #3:

Hire **four new Firefighter/EMT's and assign them to rotating twelve hour shifts**, daily 8:00 AM – 8:00 PM. Two Firefighter/EMT's working four twelve hour days with four days off and two Firefighter/EMT's working four twelve hour days with four days off. This type of schedule would maintain consistency with the 42 hour workweek that all members of the department currently work. This option allows us to provide a primary ambulance during the busiest time periods of the day, as well as maintain the cross-staffed Ambulance/Ladder. Staffing levels would then return to the current model of one cross-staffed Ambulance/Ladder between 8:00 PM and 8:00 AM.

If this option were chosen, the goal would be to reach the full staffing level of all units for 24 hours per day/7 days a week over a five-year time period. This would allow us to add four members immediately and then add two additional members in year 3 and two additional members in year 5.

Concord Fire Department Emergency Medical Service Strategic Plan

The overall costs of this option would be reduced by the amount of funds recouped by the Concord Fire Department Ambulance handling the calls that are currently going to mutual aid community ambulances and the elimination of call back ambulance coverage when the ambulance responded to out of Town calls or hospitals.

Option 3 would maintain the overtime cost savings ratios realized through the Safer Grant. There would be an increase in base salaries due to the additional personnel as well as a slight overtime increase to cover their additional time off.

If this option were chosen, it would require a modification to the Collective Bargaining Agreement.

<u>Option 3: Year 1</u>	
4 Firefighters rotating 12 hr. shifts	\$292,092
Eliminate Callback for out of area transports	-\$10,300
OT Budget Increase	\$21,757
Offset from ambulance revenue	-\$116,250
Funding Required	\$187,299

Concord Fire Department Emergency Medical Service Strategic Plan

<u>Option 3: Years 3 and 5</u>	
Year 3 increase	
2 Firefighters rotating 12 hr. shift	\$146,046
OT Budget Increase	\$10,878
Year 3 total	\$156,924
Year 5 Increase	
2 Firefighters rotating 12 hr. shift	\$146,046
OT Budget Increase	\$10,878
Year 5 total	\$156,924
Total for 3+5	\$313,848

Total Cost on the Town Tax Rate:

Option 3: \$0.0388 (3.88 cents) per thousand dollars (\$1,000) of assessed valuation. This would result in \$26.30 annually based on the median single family residence (\$677,900).

Option #4:

The last option and least favorable would **be to take no action** and continue to rely on our Mutual Aid neighbors to keep the situation at the crisis level knowing that if Mutual Aid responses from other Town’s was reduced or eliminated, we would almost immediately experience a system failure.

VIII. OTHER EMS STRATEGIC ISSUES

Station 2 building alterations would cost between \$140,000 and \$170,000.

Delivery of EMS in the Future:

Today more than 80 percent of fire departments perform some level of emergency medical services (EMS), making professional fire fighters the largest group of providers of pre-hospital emergency care in North America. In 1996, the 30th anniversary of the emergency medical service industry, the National Highway Traffic Safety Administration (NHTSA) looked at the status of EMS nationwide, developed a vision for the future of EMS, and published findings in “EMS Agenda for the Future” (available through the U.S. Government Printing Office). NHTSA predicts that EMS systems of the future will be community-based health management systems that are fully integrated with the overall health care system. NHTSA also states that the future EMS systems will have the capability to identify and reduce illness and injury risks through

Concord Fire Department Emergency Medical Service Strategic Plan

prevention, provide acute illness and injury care and follow-up, assist in the treatment of chronic conditions outside hospitals, and provide community health monitoring. It is projected that EMS will be further integrated with other health care providers, as well as public health and public safety agencies. EMS providers will improve community health and bring about more appropriate use of acute health care resources like the hospital emergency departments.

The Concord Fire Department will play a major role in implementing this national EMS vision and agenda of the future. The fire department EMS based delivery system will be a customer driven EMS system. The Federal EMS Act of 1973 defined an EMS system as “an entity that provides for the arrangement of personnel, facilities, and equipment for the effective and coordinated delivery of health care services under emergency conditions in an appropriate geographic area” (EMS Act 1973, (P.L. 93-154).

The Concord Fire Department service-based EMS system will provide this important pivotal public safety service while also emphasizing responder safety, competent and compassionate workers, and cost-effective operations. How the Concord Fire Department will implement this new customer driven EMS system will be through strategically positioned stations and apparatus to deliver time critical response and effective patient care, while emphasizing responder safety, competent and compassionate employees, and a cost effective driven mission of operations.

To achieve this new national and community driven fire/ems based delivery model, the Concord Fire Department will utilize its mission statement to reflect this new positive change.

“The mission of the Concord Fire Department is to provide rapid and effective fire, rescue, and emergency medical services to the community, and strive to make Concord a safer place for all to live, work and visit”.

The Concord Fire Department will accomplish this with:

1. Proper station and apparatus placement
2. Appropriate cost effective apparatus staffing and budgeting procedures
3. Enhanced delivery of our basic life and advanced life support services
4. Thorough appropriate data collection methods identifying EMS related problems that affect the community
5. Develop appropriate prevention programs to formally address these identified issues

Continuation of ALS services for the Community:

Advanced Life Support (ALS) refers to the medical procedures for sustaining life including the advanced diagnosis and protocol-driven treatment of a patient in the field such as defibrillation,

Concord Fire Department Emergency Medical Service Strategic Plan

airway management, and administration of medications. Generally, ALS is performed by emergency medical technician-paramedics and other qualified health professionals.

The Concord Fire Department will continue to provide the appropriate Advanced Life Support services either through the current written agreement with CMERA, or through other methods when deemed appropriate and necessary.

The Concord Fire Department has developed an important partnership with Emerson Hospital to provide the highest level of pre-hospital care to the community. This partnership began with the implementation of an ALS non-transporting paramedic unit that responded from Emerson Hospital to the same current relationship with ProEMS.

The Concord Fire Department would like to continue this positive relationship in the future and also find means to enhance the ability to deliver the highest level of pre-hospital care available.

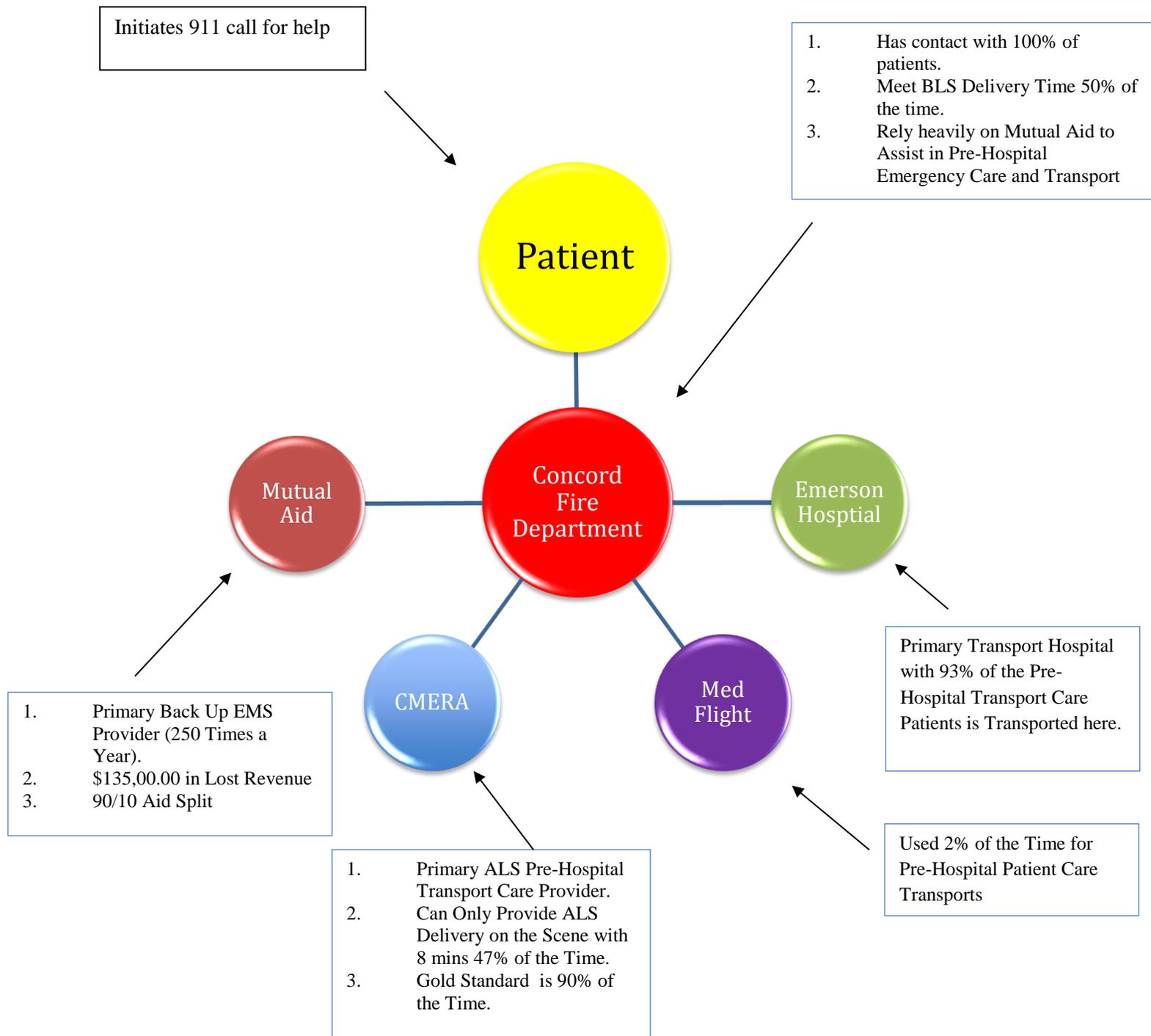
The Concord Fire Department will achieve this mission and philosophy through the following actions:

1. Through proper station, apparatus locations and staffing provide delivery BLS services that meet the gold standard response time averages of four minutes or less 90% of the time
2. Consider future hiring practices to include the possibility of hiring of Paramedics
3. Consider future staffing of apparatus with Paramedics

Concord Fire Department Emergency Medical Service Strategic Plan

Future Patient Pre-Hospital Care Delivery Model

The Concord Fire Department current pre-hospital patient care model has five basic components. The model is identified as the following:



Concord Fire Department Emergency Medical Service Strategic Plan

1. **The Patient.** This is the most important part of the model. The model is customer driven and is what needs to be addressed in the future to ensure the highest pre-hospital care standards are met.
2. **Concord Fire Department.** Concord Fire Department is the major pre-hospital care provider in the community. The issue that needs to be addressed is the fact that the department currently does not meet the BLS response time requirements approximately 50% of the time. The National Standard dictates meeting that time requirement 90% of the time.
3. **CMERA.** CMERA is the sole ALS provider for the community. Based on run volume and other conditions, CMERA cannot meet the NFPA fire based gold standard of having an ALS on scene within 8 minutes in 90% of the time. They currently provide ALS to the scene in 8 minutes 47% of the time.
4. **Mutual Aid Responses.** Due to the present fire department response load, the Concord Fire Department requires a dis-proportional amount of EMS mutual aid responses to deliver pre-hospital care to its citizens. The Concord Fire Department receives mutual aid approximately 288 times a year, a potential revenue loss of \$135,000.00. The other driving factor to mutual aid is that Concord has a “received to provided” ratio of 90% received to 10 % provided. This 90/10 split is well above the national average for giving and receiving mutual aid.
5. **Medflight.** Medflight is a pre-hospital patient care method to transport the critically injured or ill patients to the nearest and most appropriate medical facility by air transport. Medflight is used approximately 2% of the time by Concord Fire Department.

The concept of this EMS Community Driven Strategic Plan is to identify the Concord Fire Department’s Strengths, Weaknesses, Opportunities and Threats. Based on the extensive data collection and the current EMS national benchmarking standards the Concord Fire Department was able to identify the EMS customer service delivery gaps. The basis of this plan is to enhance the future EMS delivery of the Concord Fire Department and enhance the above pre-hospital patient care delivery model. This will be a collaborative effort between the Concord Fire Department Pre-hospital Patient Care Delivery system components, and will ensure that they are meeting and exceed the national EMS benching mark standards.

Concord Fire Department Operational Changes

This Community Driven EMS Strategic Plan will address the issues or problems the department may face today, and in the foreseeable future. If through this dynamic process we can identify the appropriate EMS strategic issues the department will face, the appropriate strategies will be implemented correctly to address the identified operational issues.

Concord Fire Department Emergency Medical Service Strategic Plan

Therefore, the Concord Fire Department Community Driven EMS strategic planning process can be thought of as a process designed to identify those big-picture issues that the department is facing now and in an undefined future.

Dr. John Bryson, author of *Strategic Planning for Public and Nonprofit Organizations*, describes strategic planning as “organized common sense.” Strategic plans provide guidance and direction. Specific plans explaining how to solve a problem or what to do about a particular situation involve creating tactical plans or operational plans. Operational plans should be SMART. SMART is an acronym designed to suggest that operational plans are Specific, Measurable, Achievable, Results-oriented, and Time-limited. For emergency incidents, we usually call them tactical plans. For management or nonemergency purposes, we refer to them as operational plans.

Based on the documented findings discovered in this Community Driven EMS Strategic Planning process the Concord Fire Department must continue the on-going process of self-assessment to identify future operational changes to ensure that it continues to meet and exceed community customer service expectations at a reasonable cost.

These identified **future operation changes** are recommended as follows:

1. Shift from an operational philosophy of a Fire/EMS based response model to a new model that focuses on EMS and then fire.
2. Implement appropriate emergency dispatch and EMS call coding capabilities of the department to ensure the delivery of highest available pre-hospital patient care.
3. Improve fire and EMS response capabilities. The current application only allows for a single response capability. The current customer service requirements now require the Concord Fire Department to be able to handle more than one single call and not to rely on mutual aid to handle the second call for service.
4. Plan future station and apparatus locations to better provide for customer service requirements and meet current and future national benchmarking standards.
5. Add future full-time administrative staff to assist in all the current and future service delivery requirements of the community.
6. Implement an EMS data collection driven decision making process.
7. Continue to enter into EMS collaborative relationships that enhance pre-hospital patient care.

Concord Fire Department Emergency Medical Service Strategic Plan

ADDED BENEFIT – AMBULANCE COST SAVINGS

There will be some financial savings realized by placing an ambulance into service in West Concord. One of the items where we would see a savings would be in fuel costs. The calculations used to determine the fuel costs and their related savings were determined by using the following formula; number of miles divided by 12 miles per gallon times \$3.95 per gallon of fuel. Some of the savings are listed below:

- The mileage from Station 1 to Station 2 is 2.5 or 3.5 depending on the route, Main St or Rt. 2. An ambulance garaged in West Concord would decrease the mileage per call for a call in West Concord by 2.5 to 3.5 miles, an average of 6 miles round trip. We responded to 1186 medical calls, 7116 miles, in West Concord in 2011.
- Elimination of 7116 miles would translate to a cost savings of approximately \$2342.00
- The department currently puts 15000-20000 miles per year on our cross-staffed ambulance. Approximately 10000-11000 of those miles are for emergency responses and another 12-14 miles a day for non-emergency duties.
- The department service's the ambulance every 5000-6000 miles so it saves 1.3 services @ \$200.00 = \$260.00
- The department replaces ambulance tires every 15000-20000. One set of tires per year at \$2000.00. Removing 7116 miles from a vehicle cuts tire replacement in half. Making the cost \$2000.00 per two years, or \$1000.00 per year.
- Front brakes will need to be done every two years instead of every year reducing the cost from \$1500.00 per year to \$750.00 per year.
- Rear brakes will need to be done every four years instead of every two. At \$2500.00 per job the cost is \$625.00 per year instead of \$1250

IX. FUTURE RESPONSIBILITIES OF THE STRATEGIC PLANNING COMMITTEE

Development of a **Five Year EMS Strategic Plan** was the first step for the Strategic Planning Committee. The second step for the committee and the Concord Fire Department is the Strategic Management of the Five Year EMS Strategic Plan.

Along with the Fire Chief, the Committee will have the ultimate responsibility to maintain the Strategic Plan and advance the identified documented strategic goals. Both will have the joint responsibility to put the plan into operation. The Committee will need to ensure that the Strategic Plan continues to advance forward and ensure it remains a significant guiding organizational document for the Concord Fire Department.

The Committee and Department personnel will have a responsibility to keep the Department working towards the accomplishment of its documented EMS strategic goals. Both the

Concord Fire Department Emergency Medical Service Strategic Plan

department personnel and the Committee should cooperate through teamwork in the strategic management of the plan. Department leaders should remain continuously aware of the EMS strategic plan, and be proactive in implementing the strategies for the next five (5) years.

The Committee will have the responsibility to focus on the progress towards desired end results. It will need to continually assess the environment and determine if strategic adjustments are necessary. When warranted, operational plans may need to be revised depending on the climate, budget and unforeseen circumstances that may appear as obstacles.

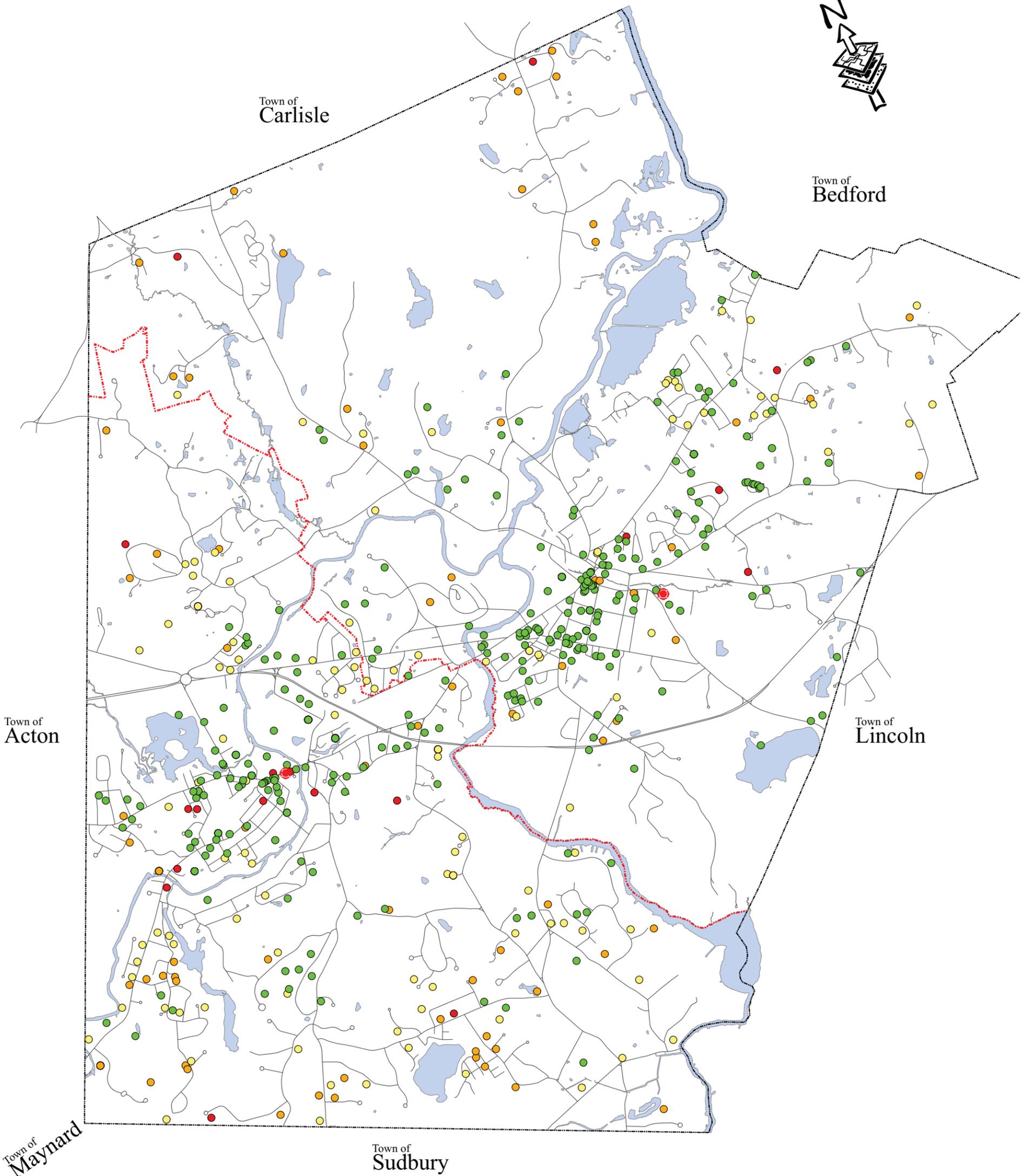
The department personnel and the Committee need to be involved in measuring results and consistently asking the following questions:

- is operational planning and decision making achieving the desired results?
- is the Department adhering to its core values, mission and strategic goals?
- are the objectives of each strategic goal being achieved?

Management of the Five Year EMS Strategic Plan should be a team effort by all the members of the Concord Fire Department. As the Committee moves forward it will need personnel involvement. Members of the Concord Fire Department should be encouraged to interject their innovations and creativity towards achieving quality results.

EMS Calls

Response Time



Town of
Concord
Massachusetts
Fire Department

Elapsed Time

- 0 - 6 Minutes
- 6 - 8 Minutes
- 8 - 12 Minutes
- 12 Minutes Plus
- District Line

About

This maps data source is IMC, calendar year 2011, Code 321, EMS call, excluding vehicle accident with injury.

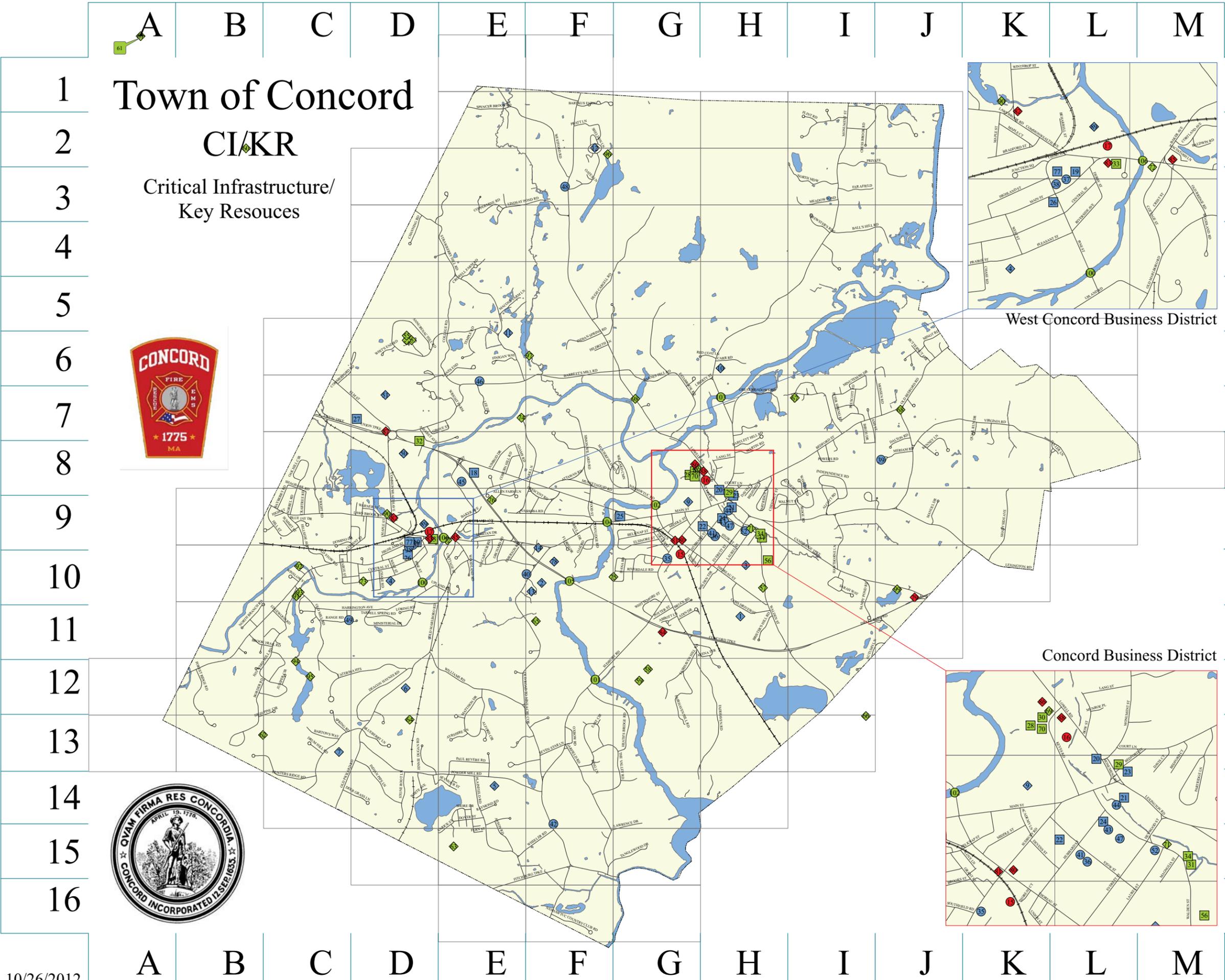
This map shows elapsed response time. Where more than one response to an address was made, the time reflected is the average of the calls.



Town of Concord

CI/KR

Critical Infrastructure/ Key Resources



Index To Sites

ID	GRID	NAME	TYPE
1	H11	CCRHS	School
2	F10	Emerson Hospital	Hospital
3	H9	Akott School	School
4	D10	Thoreau School	School
5	E14	Willard School	School
6	D12	Sanborn School	School
7	C13	Peabody School	School
9	G9	Concord Academy	School
10	H6	Fenn School	School
11	E6	Nashua Brooks School	School
12	F3	Middlesex School	School
13	F10	Rivercrest Deaconess	Nursing Home
14	F10	Walden Rehab	Nursing Home
15	G10	CVS	Pharmacy
16	H8	Rite Aide	Pharmacy
17	D9	West Concord Pharmacy	Pharmacy
18	E8	Congregation Kerem Shalom	Place of Assembly
19	D9	Redeemer Presbyterian Church	Place of Assembly
20	H9	First Church of Christ	Place of Assembly
21	H9	First Parish	Place of Assembly
22	H9	New Life Community Church	Place of Assembly
23	H9	Holy Family Parish	Place of Assembly
24	H9	Trinitarian Congregational Church	Place of Assembly
25	G9	Trinity Episcopal Church	Place of Assembly
26	D10	West Concord Union Church	Place of Assembly
27	D7	CMLP	Place of Assembly
28	G8	Concord Public Works	Public Works
29	H9	Concord Town House	Town House
30	G8	Concord Planning and Land Mgmt.	Municipal
31	H9	Concord Police Dept.	Police
32	D8	MA State Police	Police
33	D9	Concord Fire Dept.	Fire
34	H9	Concord Fire Dept.	Fire
35	G10	A Place To Grow	Daycare
36	H9	Daycare	Daycare
37	D9	Concord Carousel Daycare	Daycare
38	D10	Concord Childrens Center	Daycare
39	J8	Concord Childrens Center	Daycare
40	F10	Concord Childrens Center	Daycare
41	H9	Concord Rec. Afterschool	Daycare
42	F14	Diane Hok-Tuttle	Daycare
43	H9	LEAP School	Daycare
44	H9	Mildam Nursery School	Daycare
45	E8	Manutann ARC	Daycare
46	E7	Phyllis Simpson	Daycare
47	H9	The Barn Coop Nursery School	Daycare
48	F3	Childrens Meeting House	Daycare
49	C11	Catherine Day Unita	Daycare
50	D8	MCI Concord	Prison
51	D7	North East Correctional Ctr.	Prison
52	H9	Walden St School	Residential Board
53	D6	Annarsnac Hill Tower	Communications
54	D6	Annarsnac Hill Repeater	Communications
55	D6	Annarsnac Hill Reservoir	Reservoir
56	H10	Concord District Court	Courthouse
57	H10	High Cargill Pump Station	Water/Sewer
58	G12	Robinson Pump Station	Water/Sewer
59	G12	Robinson Well	Water/Sewer
60	Acton	Rt. 2A Pump Station	Water/Sewer
61	Acton	Nagog Treatment Plant	Water/Sewer
62	B13	Second Division Pump Station	Water/Sewer
63	E15	White Pond Pump Station	Water/Sewer
64	D13	Jemie Dugan Pump Station	Water/Sewer
65	F11	Deaconess Pump Station	Water/Sewer
66	Lincoln	Pine Hill Reservoir	Reservoir
67	I7	Concord Waste Water Treatment	Water/Sewer
68	J7	Bedford St Sewer Station	Water/Sewer
69	G8	Lowell Rd Sewer Station	Water/Sewer
70	G8	Concord Public Works	Municipal
71	H9	Laurel St Sewer Station	Water/Sewer
72	E9	Assabet Sewer Station	Water/Sewer
73	D10	Cousins Park Sewer Station	Water/Sewer
74	E7	Park Ln Sewer Station	Water/Sewer
75	G10	Pilgrim Rd Sewer Station	Water/Sewer
76	E9	Gifford Ln Sewer Station	Water/Sewer
77	D9	Harvey Wheeler Community Ctr	Place of Assembly
78	F10	Concord Health Care	Nursing Home
79	J10	Mobil Gas Station	HazMat
80	G9	Mobil Gas Station	HazMat
81	G9	Cumberland Farm Gas	HazMat
82	D9	Comm. Ave Gulf Station	HazMat
83	D9	Colonial Motors Gas	HazMat
84	G11	Rt. 2 Gas Station	HazMat
85	E9	Main St Mobil Gas	HazMat
86	G8	Concord Oil Co	HazMat
87	D8	Rotary Exxon	HazMat
88	H8	Lowell Rd C/igo Gas	HazMat
89	D9	Concord Park	Assisted Living
90	D9	Warners Pond Dam	Dam
91	C10	Kennedy's Pond Dam	Dam
92	C10	Diamondlake Dam	Dam
93	C10	Harrington Ave Dam	Dam
94	C12	Lower Musketquad Pond Dam	Dam
95	C12	Upper Musketquad Pond Dam	Dam
96	F3	Batemans Pond Dam	Dam
97	F6	Barretts Mill Rd Dam	Dam
98	G7	Dakin Brook Dam	Dam
99	J10	Crosby Brook Dam	Dam
100	D10	Pine Street Bridge	Bridge
101	F12	Heath's Bridge	Bridge
102	G9	Nashuaue Bridge	Bridge
103	H7	Finn Bridge	Bridge
104	F9	Main St Bridge	Bridge
105	F10	Rt. 2 Over Sudbury River	Bridge
106	E9	Main St Bridge	Bridge

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APPENDIX B REFERENCES

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Demographic References

In order to get the most current and accurate information available the committee utilized several databases as well as information compiled by the Massachusetts State Data System. The Massachusetts State Data Center is a program of the UMass Donahue Institute's Economic and Public Policy Research Unit and is housed at the Institute's offices in Hadley, MA. The State Data Center Program was established in 1978 by the U.S. Census Bureau to make statistical information more readily available to the public. The program now includes most states in the U.S., the District of Columbia, Puerto Rico, Guam, and the Virgin Islands. The Census Bureau provides data products, training, technical assistance, and consultation to data centers, which then offer products and assistance to local community leaders, planners, businesses, researchers, and the general public. The information gathered from The Massachusetts State Data Center information we used was culled from the 2010 Federal Census so it is the most current and complete information available.

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APPENDIX C: FURTHER INFORMATION ON THE PLANNING APPROACH

The EMS strategic planning process started with an S.W.O.T. analysis from the perspectives of those in the department, and those outside who receive or expect services. A **S.W.O.T. analysis** is a strategic planning method used to evaluate the **Strengths, Weaknesses, Opportunities, and Threats** involved in a project or in a business venture. It involves specifying the objective of the business venture or project and identifying the internal and external factors that are favorable and unfavorable to achieve that objective.

- **Strengths:** characteristics of the department that give it an advantage over others in the industry. These are assets that can be capitalized or built upon.
- **Weaknesses:** are characteristics that place the department at a disadvantage relative to others. These are components that must be re-evaluated for effectiveness, need, and unanticipated consequences.
- **Opportunities:** *internal & external* chances to increase the capacity of the department. This involves the evaluation of utilizing what currently exists, or what is anticipated to surface that can bring the department closer to accomplishing its strategic challenges.
- **Threats:** *internal & external* challenges that form barriers the department seeks to overcome. Threats can be attitudinal, budgetary, environmental, or contextual; they can be perceived or they can be real.