

Staff Report

EMERGENCY RESPONSE TIME STUDY

April 24, 2012

BACKGROUND

Since at least 1984, the City of Ames has had a goal for the Fire Department (AFD) to respond to **85% of the community within 5 minutes** of travel time. Since that time, the City Council has consistently referred to this goal when deliberating on land use issues related to annexation and rezoning requests.

What has exacerbated the challenge to meet this response goal is the fact that the City has grown in land area (2,164 acres have been annexed in the last 15 years – a 14% increase in land area) and population (from 50,731 residents in 2000 to 58,965 in 2010 – a 16% increase).

In addition to this growth, the City is now contemplating annexing more land in two directions—residential growth to the north along Grant Avenue and west of George Washington Carver and industrial growth to the east. It is clear from GIS analysis that we will not be able to meet our existing emergency response time goal for the total City, assuming our current three fire station scenario, if the expansion continues in a northern and eastern direction. In anticipation of an annexation request to the north, the City Council asked staff to revisit the question of the appropriate response time goal for the City and to explore how other cities address response time. Since the time this request was made, the City Council began considering annexation to the east as well.

The City has commissioned two reports in the last 30 years related to fire station planning and response times. The *Fire Station Location Study* was delivered in 1984 to address response times to southeast Ames. At the time, a southern spur of railroad tracks crossed Lincoln Way and South 16th Street. Stopped trains could inhibit all routes to southeastern Ames except U.S. Highway 30.¹

In the 1984 study, the City considered either relocating Fire Station #2 to the south (where access to U.S. Highway 30 was improved) or building a third fire station. During the study it was discovered that the south spur of the railroad line was to be abandoned in 1985.² Thereafter, all areas of the City came under an acceptable response time and no stations were built or relocated.

The 1984 study does not explicitly state the adoption of a fire response time goal. However, subsequent documents refer to a goal of reaching 85% of the community within 5 minutes having been established in 1984. Any discussion that might have occurred about this goal was not reflected in the Council minutes. The goal may have derived from an appendix in the study that indicated under the existing configuration of stations, with all railroad crossings open, just under 85% of the community could be reached within 5 minutes.³

¹ City of Ames (1984, December). *Fire Station Location Study*. Ames, IA: City of Ames, Iowa.

² *Ibid.*

³ *Ibid.*

Southeast Ames residents again raised concerns that they were not receiving adequate fire protection in 1999, prompting the City to issue the *Long Range Fire Station Location Plan*.⁴

This study noted, “In 1984, a response time study was conducted which resulted in the City Council adopting a fire suppression travel time goal. **The goal was to cover 85% of the community within 5 minutes travel time from any station.**”⁵ With two stations in 1999, 82% of the City could be reached within 5 minutes, or 79% of the community within 5 minutes when the Duff Avenue railroad crossing was impassible. Scenarios with three and four stations were evaluated to reduce response time.⁶

The study also considered requirements such as sprinklers and alarm systems for new homes constructed outside the 5-minute service limit and additional fire code requirements for new buildings. None of the station locations considered would have improved response to the industrial sites east of I-35. It was anticipated that travel times to these sites could be longer due to the existence of automated detection and suppression systems and employees trained in industrial safety.⁷ A bond referendum was held after this study, culminating in the construction of Fire Station #3 in 2002.

EMERGENCY CALLS IN AMES

In a reflection of national trends, the number of calls for service in Ames is at a historical high. In 2011, the Ames Fire Department responded to 3,884 total incidents: 2,225 EMS/rescue calls, 745 false alarm calls, 646 service calls, 181 fire calls, 81 hazardous materials/conditions calls, and 6 mutual aid calls.

Figure 1: National trend of fire department call types

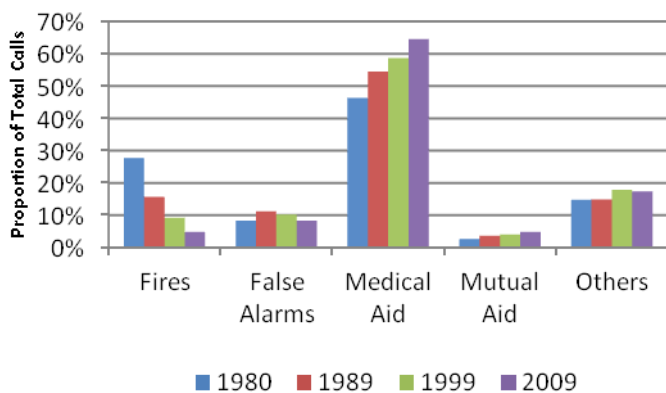
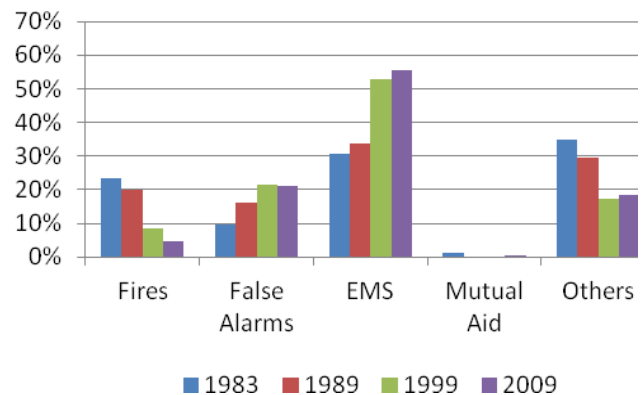


Figure 2: Ames trend of fire department call types



The above sample of Ames Fire Department calls reveals a decrease in the proportion of fire calls and an increase in the proportion of medical calls compared to overall calls, similar to national trends (Fig. 1 and 2). While false alarms held a steady proportion nationally, they have increased as a proportion of total calls in Ames.

⁴ City of Ames (1999, November). Long Range Fire Station Location Plan. Ames, IA: City of Ames, Iowa.

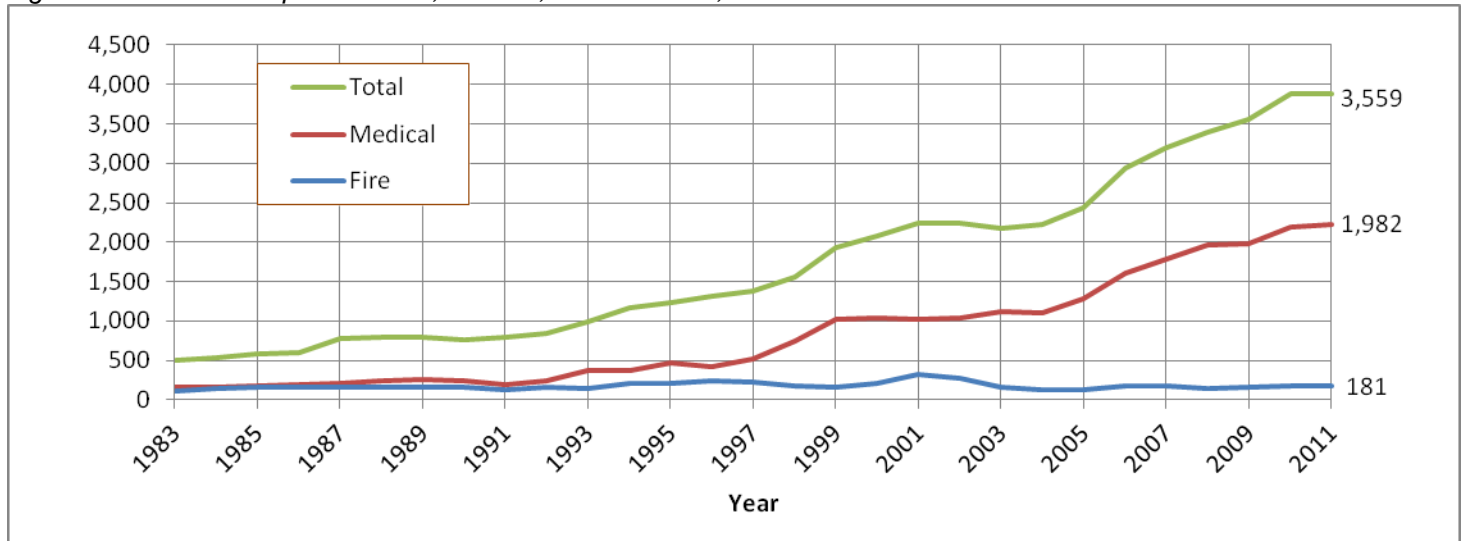
⁵ Ibid.

⁶ Ibid.

⁷ Ibid.

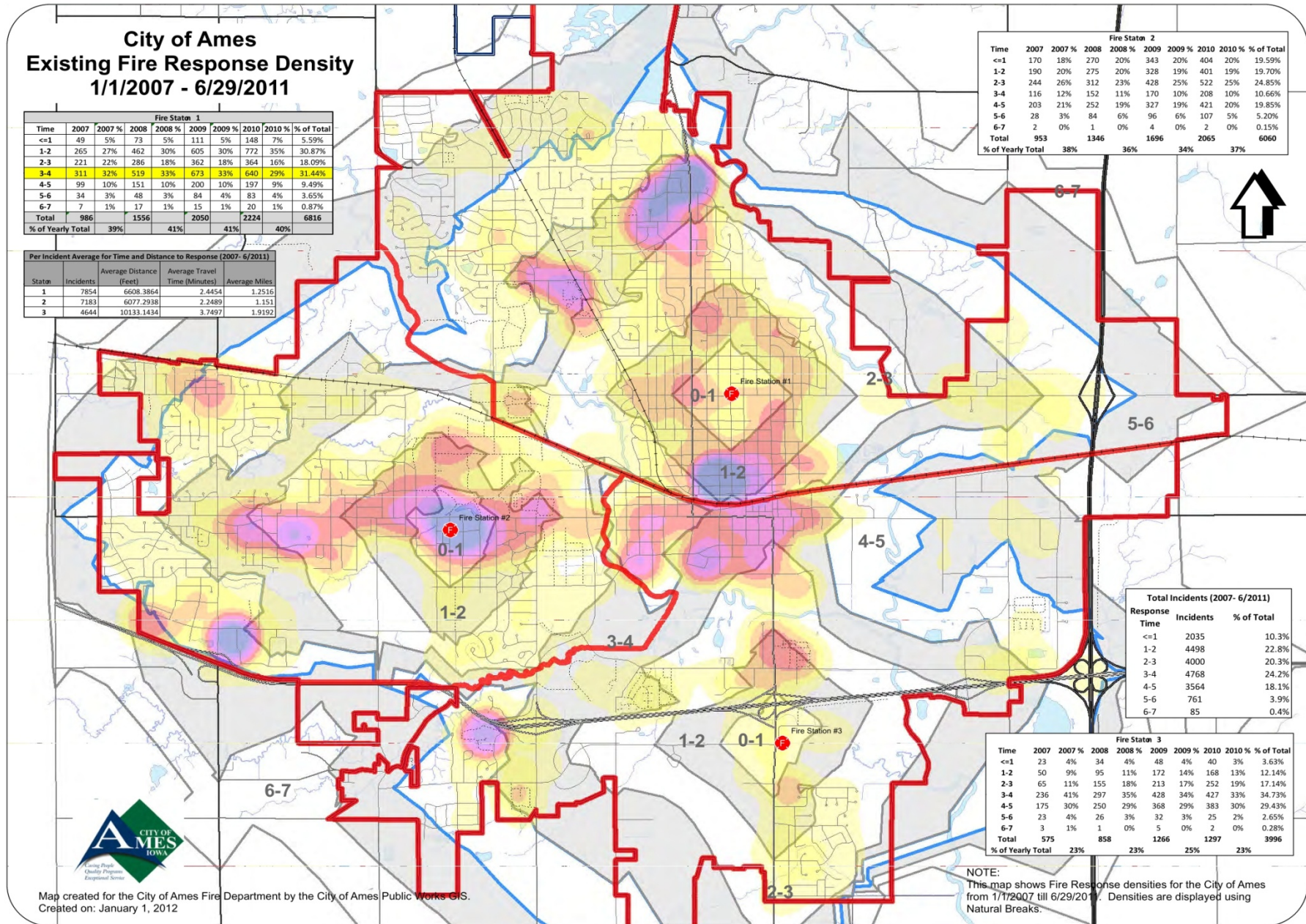
Since 1983, the number of fires in Ames has ranged from 119 to 234, which—compared to the ranges of other types of incidents—is fairly steady (Fig. 3). The call volume in Ames is similar to national trends, with fire growth occurring at a much slower rate than EMS or all other types of emergency response.

Figure 3: Ames Fire Department fire, medical, and total calls, 1983-2010



In addition, it should be noted that call volumes have intensified in certain types of occupancies over time in Ames. Particular types of development tend to have higher Fire Department service needs. These include areas of high-density residential, commercial areas, medical, assisted living and/or nursing home facilities. Figure 4 shows the locations of calls to the Fire Department from January 2007 to June 2011, and the anticipated travel times from the nearest station indicated in concentric rings. The bold red lines indicate the response districts for each station. The blue color represents the highest call volume areas. Each blue area has one or more of the following occupancies: high density residential, commercial, medical, assisted living, or nursing home.

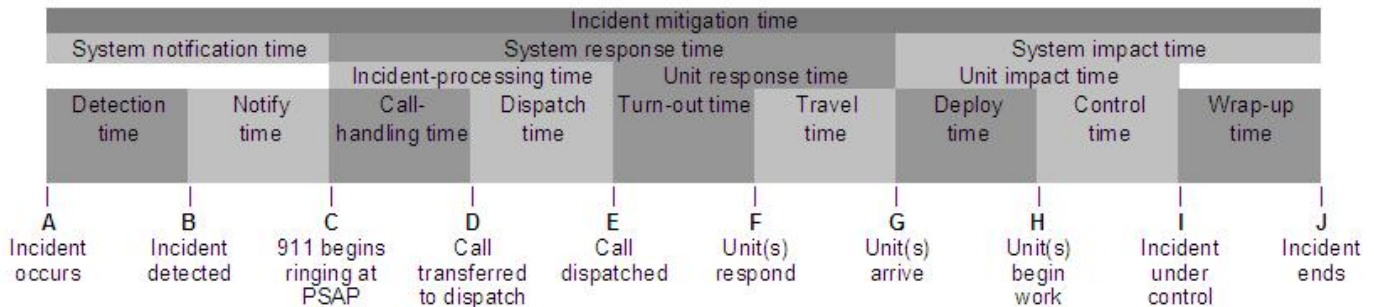
Figure 4: City of Ames existing fire response density



RESPONSE TIME GOAL: WHAT IS IT, HOW IS IT MEASURED, AND WHY IS IT IMPORTANT?

Fire response time goals are typically measured based on travel time. Travel time starts when the apparatus wheels are rolling and stops when the apparatus is curbside to the incident. Additional components of time involved in responding to a call include call handling, dispatch, and turnout (Fig. 5).⁸

Figure 5: Sample emergency incident response timeline and response intervals



Response time goals can be measured using different methods. These include:

1. Using information from actual calls for service.
2. Measuring the amount of land area that can be responded to within a specified amount of time using time/distance formulas (which produces data similar to the line rings of Fig. 4, showing the time needed to respond to certain distances).
3. Assigning nodal points to areas of the map that present a higher demand for service and then modeling run times to those points. Farm fields, for example, would receive fewer nodal points than a cluster of high-rise apartments. This measurement provides a weighted projection of response time performance. (Fig. 4 is similar to this method in its calculation of response times, since it considers both where the calls are and how many calls there are).

Each method has strengths and weaknesses. **Historically, Ames has used information from multiple methods to evaluate response time data.**

Fire response time goals tend to be constructed to encourage the arrival of firefighters prior to *flashover*. Flashover occurs when combustible gases have built up in a burning room, heating until the point at which the room's contents simultaneously ignite. **Flashover is extremely dangerous, as even protected firefighters cannot survive** for more than a few seconds. Once flashover occurs, fire spreads more quickly. Fighting a post-flashover fire requires larger hose lines, more equipment, and more personnel than a fire that is pre-flashover.

⁸ Endicott, D. T. (2002). Performance measures and organizational improvement. D. Compton & J. Granito (Eds.), *Managing Fire and Rescue Services* (pp. 291-333). Washington, D.C.: International City/County Management Association.

The National Fire Protection Association (NFPA)⁹ notes that “an early, aggressive, and offensive primary interior attack on a working fire, where feasible, is usually the most effective strategy to reduce loss of lives and property damage.”¹⁰

Although modern structures are somewhat less likely to ignite than older structures due to improvements in fields such as electrical safety, once a fire begins openly burning, the construction methods and materials and typical layouts of modern structures allow fire to grow and spread much more quickly than a similar fire in a structure constructed three or more decades ago.¹¹

A 2007 National Institute of Standards and Technology (NIST) study found that typical modern furnishings produce more dangerous heat and gases once ignited compared to furniture constructed with natural fibers and materials, as was common in the 1950s and 60s.¹²

There are no legal mandates for a city’s fire response time. Iowa Code requires cities to “provide for the protection of life and property against fire,” but does not specify minimum response time criteria. Iowa municipalities have governmental immunity from liability claims that might allege an injury would not have occurred had there been an additional fire station, more firefighters, or something of a similar nature.

The NFPA-recommended standard is 80 seconds for turnout, 4 minutes travel time for the initial response, and 8 minutes travel time for the full alarm response in 90% of actual calls.¹³

The Insurance Services Office (ISO)¹⁴ establishes community fire protection ratings used by insurance companies to set property insurance rates. Using ISO criteria, the developed area of a city should have an engine company response of no more than 3.2 minutes and a ladder company response of no more than 4.9 minutes.¹⁵

⁹ The NFPA is a trade association comprised primarily of individuals in the fire service, business and industry, architecture and engineering, health care, safety equipment manufacturing, and government.

¹⁰ National Fire Protection Association. (2010). NFPA 1710: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments. Retrieved from www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=1710&cookie%5Ftest=1. Op. cit., National Fire Protection Association.

¹¹ Izydorek, M., Zeeveld, P., Samuels, M., Smyser, J., and Behring, R. (2008). Report on Structural Stability of Engineered Lumber in Fire Conditions. Underwriters Laboratories, Inc.

¹² Bukowski, R., Peacock, R., Averill, J., Cleary, T., Bryner, N., Walton, W., Reneke, P., and Kuligowski, E. (2007). NIST Technical Note 1455 - Performance of Home Smoke Alarms: Analysis of the Response of Several Available Technologies in Residential Fire Settings. National Institute of Standards and Technology. Washington, D.C.: U.S. Government Printing Office.

¹³ Op. cit., National Fire Protection Association.

¹⁴ ISO is a corporation owned by insurance companies that provides databases of information for insurers in making risk calculations.

¹⁵ Insurance Services Office. (2011). Fire Suppression Rating Schedule FSRs Overview. Retrieved from <http://www.isomitigation.com/ppc/2000/ppc2001.html>.

Commission on Fire Accreditation International (CFAI)¹⁶ does not establish a recommended response goal, but notes: “When new areas are being developed that begin to extend travel times, they do not automatically become the source of new alarms. In fact, new construction can have a period of several years before creating fire type service demands not necessarily true from the perspective of emergency medical calls. EMS services are often needed during the construction phase of a project long before any structures are occupied.”¹⁷

Medical response time standards tend to be constructed around the need for defibrillation. Most estimates indicate that survival chances decrease 10 percentage points for each minute delay before defibrillation

Table 3: Comparison of medical response standards (mm:ss)

<u>Org./Standard</u>	<u>1st-Arriving Unit</u>	<u>ALS Unit</u>	<u>% of Time</u>
Ames Fire Dept.	06:00	--	85%
NFPA 1710	05:00	09:00	90%
AHA	--	05:00	--
CAAS 201.05	--	08:59	90%
IDPH	05:59	08:59	80%

is provided for a victim in cardiac arrest or with a cardiac rhythm disturbance. These types of incidents currently represent approximately 1.5% of the ambulance calls in Ames for 2011.

Medical response standards are typically measured from the time the 911 call is answered to the time the ambulance is curbside to the incident. NFPA, American Heart Association (AHA), Commission on Accreditation Ambulance Services (CAAS), and Iowa Department of Public Health (IDPH) all have goals that are relevant to Ames (Table 3).^{18 19 20 21} For some goals, there is an expectation for the first-responding unit (providing defibrillation/CPR) and an expectation for an advanced life support unit (providing drugs, more invasive procedures, and typically transport).

EXISTING FIRE AND MEDICAL RESPONSE RESOURCES AND GOALS

City of Ames

There are presently three fire stations in Ames. Fire Station #1 was opened in 1980, and has a service territory of 9.1 square miles. Fire Station #2 was built in 1966 to serve Iowa State University and western Ames. Its service territory is 6.5 square miles. Fire

¹⁶ CFAI is a branch of the Center for Public Safety Excellence, which is a nonprofit governing body for organizations that offer accreditation and credentialing of fire services. CPSE was originally founded jointly by the International City-County Management Association and the International Association of Fire Chiefs.

¹⁷ Center for Public Safety Excellence, Commission on Fire Accreditation International. (2008). CFAI Standards of Cover, 5th edition. Chantilly, VA: Center for Public Safety Excellence.

¹⁸ Op. cit., National Fire Protection Association.

¹⁹ Commission on Accreditation of Ambulance Services. (1993). Standards for the Accreditation of Ambulance Services, 4th edition. Dallas: Commission on Accreditation of Ambulance Services.

²⁰ American Heart Association (2000). ACLS 2000: Overview of Recommended Changes in ACLS From the Guidelines 2000 Conference Evidence-Based International Resuscitation Guidelines. Part Six: Advanced Cardiovascular Life Support.

²¹ Iowa Department of Public Health, Bureau of EMS. (2010). Iowa EMS system standards. Retrieved from www.idph.state.ia.us/ems/common/pdf/ems_system_standards/ems_system_standards.pdf.

Station #3 was built in 2002 in southeast Ames. The service territory for Fire Station #3 is 8.5 square miles.

The Ames Fire Department has 54 personnel responsible for fire suppression (Table 1). Minimum staffing for a shift is 12. Crews respond to a variety of incidents, which differ in terms of the resources required to resolve them. Fires, while infrequent, require large amounts of resources. Medical assists are more frequent, but require fewer resources. (Appendix A).

Table 1: Ames Fire Department personnel and apparatus

	Station #1	Station #2	Station #3
Personnel	1 Lieutenant 5 Firefighters	1 Lieutenant 4 Firefighters	1 Lieutenant 4 Firefighters
Apparatus	Engine 1 Rescue 1 Command 1 Rescue Boat Reserve Engine 4 3 Admin. Vehicles	Engine 2 Rescue 2 Haz-Mat 1	Ladder 3 Rescue 3 Engine 3

Both the amount of land and the proportion of actual calls that are within the 5 minute travel time goal can be measured. In 2011, **83% of the City's land area was serviceable within 5 minutes travel time. During this same year, 87.5% of actual calls had a 5 minute or shorter response.** Table 2 provides this same analysis of area coverage and actual calls over the past five years.

The current Fire Station Location Plan contemplates relocating Fire Station #2 to the former water tower site on North Dakota Avenue at some point in the future. This move was planned to meet the response time goal for the targeted growth priority areas that were to be developed to the southwest and northwest as envisioned in the LUPP.

Table 2: Actual and projected Ames Fire Department response and coverage metrics

	Actual				Adjusted	With Projected Growth		
	07/08	08/09	09/10	10/11	11/12	North	North/Northwest	North/West/East
Land area within 5 min. response	83%	83%	83%	83%	83%	78%	65%	63%
Actual calls responded to ≤5 min.	87%	83.9%	86.9%	86.5%	87.5%	--	--	--

Mary Greeley Medical Center

Mary Greeley Medical Center (MGMC) provides ambulance services for the City of Ames with a staff of 22.2 FTEs operating 3 ambulances. For calendar year 2011, a total of 2,249 ambulance runs were made in Ames. This included 10 cardiac arrest runs (0.44% of total), 66 respiratory distress runs (2.93% of total), 111 chest pain/heart attack symptoms runs (4.94% of total), and 531 trauma runs (23.61% of total).

The Medical Center does not currently have an adopted response time goal. At the time of this report, MGMC staff was in the process of implementing a computer-aided dispatching system, monitoring run times only for significant variability. MGMC has indicated that more data from computer-aided dispatch is needed before it can consider

adopting a response time goal. MGMC has, however, reported an actual response time of 8 minutes to 90% of its calls, as measured from time of dispatch to arrival on scene.

The Ames Police Department has recently implemented two important changes to enhance the City's medical assist capabilities. One is the initiation of Emergency Medical Dispatch (EMD) in early 2011. EMD allows dispatchers to gather better information about medical emergencies and deliver it to responders en route. This also allows dispatchers to provide instructions to 911 callers to render first aid if they are able and willing to provide it. The second change is the purchase of three automated external defibrillators, which have been placed in the three area cars for use in the north, west, and south patrol areas. The Police Department has budgeted to purchase defibrillators for all 10 patrol cars by July 2012.

COMPARABLE DATA

To compare Ames' response time goal with other cities, a list of 22 comparable cities was developed. The list was based on cities with characteristics similar to Ames (e.g., population, isolation, college town, Midwestern) and several additional cities within Iowa. Fire department officials and city administrators in each community were contacted to provide information about their emergency response and how their response goals are used (Appendix B).

Based on the responses from this survey, the following conclusions can be made:

- **Most cities contacted indicated that the response time goal is an internal Fire Department performance measure, not a policy decision formally approved by their City Council.** (Only two of the cities surveyed have a response time goal that has been approved by the Council)
- **All the cities base their response time goals on the percentage of actual response time data, rather than the percentage of area covered.**
- **All the cities use the same response time goal for both fire and emergency medical response goals.**
- **There is no singular accepted response time goal, as indicated by the wide variation of goals among the cities that were studied. Goals range from Ankeny's goal of 80% within 8 minutes to Marshalltown's goal of 100% in 4 minutes.**
- **While most of the cities have established response time goals, only 6 of the 22 cities surveyed are actually meeting their goals.** (Ames is also currently meeting its goal).

- **None of the cities have adopted policies that would lead the city to deny a request to annex or rezone due to a negative impact on response times.**
- **Over half the cities indicated that when new developments or annexations are considered, their Fire Departments provide feedback to the City Council on the effect this development would have on response times.**
- **At least four cities have placed AEDs in police cars to help provide better first responder medical capability.**

POLICY DIRECTION NEEDED:

❖ **What Response Time Goal Should the City of Ames Have?**

The goal of reaching 85% of calls within 5 minutes travel time is within the range of medical and fire response goals when compared to the other cities surveyed and other national organizations that were studied. However, it should be emphasized that Ames is one of few communities meeting its goal on a regular basis. **Our current goal seems to balance the need to arrive before patient health in medical emergencies significantly deteriorates and before fire conditions become too dangerous to fight, but if left as is would not require more fire stations and personnel to achieve in the near term.**

In 1999, staff reported that a longer response time for industrial properties could be acceptable due to personnel trained in industrial safety, sprinklers, and fire brigades. In the event that the City moves forward with annexing land east of I-35 as industrial reserve, fire response time will not likely be a barrier to doing so. Most industrial land uses tend to have a low frequency of need for fire response. New industrial facilities will have to comply with a modern fire code, and advances in first aid and defibrillation technology improve the likelihood of survival for individual incidents. In the rare event of a large-scale medical or fire emergency, resources would likely need to come long distances to address the situation anyway. **Therefore, a response time goal (performance measure) to the industrial area planned to the east could be longer than for the other parts of the City.**

The City Council should decide whether to modify the goal or leave it as is.

❖ **How Should Response Time Be Measured?**

The typical method for measuring response time goals is based on actual calls for service. Measuring based on total land area with a certain travel time limit no longer appears to be the best approach. For planning purposes, advances in GIS technology now allow the City to map actual calls for service,

and then project the calls for service anticipated upon full build-out in an area of potential annexation. The projections can be based on call densities for similar types of developments. Time-distance formulas are then used to calculate emergency response times based on actual and anticipated calls. This is a more sophisticated method of measurement than the City has been able to use in the past.

Therefore, staff recommends benchmarking response times based on actual calls for service and using GIS projection data for planning decisions.

❖ **Who Should Adopt This Response Time Goal?**

In most of the communities surveyed, emergency response time goals are internal benchmarking measures used by the Fire Department administration—not adopted by the City Council. However, **emergency service literature suggests that the City Council should have the final say on what the goal is and how it is used to help ensure that the overall City picture is kept in mind when decisions are made.**

Since goal carries the connotation that the City is bound to take action if it is not met, it may be more appropriate for the Fire Department to establish “85% of calls within 5 minutes” as a performance measure.

❖ **Should there be Separate Response Time Goals for Fire and Medical Calls?**

Although some emergency standards literature suggests using separate goals for fire and medical response, there is little guidance on what the distinctions should be. In Ames, fire and medical assist response times can be tracked separately, although they tend to occur in similar places—areas of denser population. This, in conjunction with evidence that none of the comparison cities use separate goals, supports the conclusion that having separate response goals for fire and medical calls in Ames is not justified at this time.

Since Mary Greeley Medical Center is the primary provider of ambulance service in the city, the City will look to them to establish the emergency medical response goal for the community.

Staff will continue to analyze medical and fire responses by particular type to determine if in the future different goals should be established within those categories.

❖ **What Council Decisions Can Help the City Better Meet the Response Time Performance Measure?**

If the City continues to grow as anticipated, station relocations and/or additional fire station(s) are not a matter of if, but of when and where. It should be remembered that several factors such as the growth of the City's land area, population growth, density, direction of growth, and the type of development will influence the need for future fire stations.

As new development occurs, response performance as measured by actual calls for service will at some point require that the City begin discussion of station location options. That study will likely take a year or more to develop once it is initiated.

As has been noted elsewhere in this report, the annexation of new land will not cause an immediate failure to meet the response time goal. In the past, dropping below the fire response goal has not been used as an automatic trigger to initiate action to relocate or construct a station. Rather, this trend would signal a future need for an additional fire station if the existing response time goal, as measured by area, is maintained by the City Council.

Land Use/Zoning Decisions

Until it becomes necessary to relocate and/or construct stations, the City Council can help mitigate the increasing demands on the Fire Department through land use choices. High-density residential and assisted living/retirement community land uses have much greater needs for service than do low-density residential and industrial development. (Figure 4)

Staff recommends that the City Council, through its land use and zoning decisions, attempt to place only developments with lower demands for service on the periphery of potential areas of annexation, and place higher-demand developments closer to the existing urban core.

This land use strategy is being suggested for two reasons. A facility distant from a fire station will experience a longer time before rescue personnel can arrive, so facilities with more frequent needs will be served more effectively if they are closer. In addition, when emergency call volumes increase to the extent they have in Ames, the number of simultaneous calls increases. Frequent calls to locations far from fire stations will tend to increase the number of simultaneous calls, causing others in the community to wait longer for service.

Life Safety Initiatives

Several options are available to the Council to mitigate the danger posed by fire by improving fire protection requirements. These could include requirements for sprinklers in residential properties, requiring smoke detectors on every level and in every sleeping room of a structure, and more stringent construction standards.

The Fire Department should continue its partnership with MGMC and develop innovative approaches to mitigate medical risks, the City might offer a program to place AEDs in businesses or provide first aid and CPR training for the public. Effective bystander first aid has the potential to improve patient outcomes in a variety of medical incidents.

APPENDIX A: Examples of Typical Ames Fire Department Emergency Calls

Responding to different types of emergencies requires different types of resources from the Fire Department. The section below describes this based on actual recent calls:

Apartment Structure Fire in Campustown:

This call was dispatched at 15:33:23. Engine 2 arrived at 15:37:23 with three personnel (4:00 minute response time). This first arriving engine company initiated fire attack (two personnel), connected hydrant (one person), assumed command, safety, and accountability officer (one person), set up secondary means of escape (two personnel), began search and rescue (two personnel), and initiated positive pressure ventilation (one person)

(Subtotal 3 personnel on scene)

Engine 1 arrived with three personnel five seconds after the crew of Engine 2 initiated these tasks (4:05 minute response time). This crew began the secondary fire attack, search and rescue, and overhaul (exposing walls and ceilings to search for fire extension).

(Subtotal 6 personnel on scene)

At 7:36 minutes after dispatch, Command 1 arrived with one officer who assumed command, safety, and accountability duties. The first-arriving officer reported back to his crew. Rescue 1 arrived with two personnel who had been on another call. They began to assist Engine 1's crew.

(Subtotal 9 personnel on scene)

At 11:50 minutes after dispatch Command 3 arrived with one officer who acted as safety and accountability officer. This officer coordinated victim support and worked with the press. Ladder Truck 3 arrived with four personnel. This crew checked for fire extension (two personnel), conducted a secondary search for victims (two personnel), conducted salvage and overhaul operations (two personnel), and conducted roof operations for ventilation (two personnel).

(Total 14 personnel on scene)

NFPA Standard 1710 of 14 personnel in under 8 minutes was not met

In total, this fire used resources from all three stations. A total of 6 apparatus and 14 personnel were involved for 2 hours and 39 minutes. During this incident there were no on-duty fire personnel available anywhere else in Ames. In comparison, the medical assist below utilized an ambulance crew and resources from one fire station: four firefighters and two fire apparatus. The firefighters returned to service at 19:13:31, or 1 hour and 37 minutes after dispatch.

Medical Assist Call at Assisted Living Facility:

This call was dispatched at 17:36:17. Rescue 2 arrived at 17:42:45 with two personnel (6:28 response time). Once on scene, the two personnel began assessing the medical situation and initiating patient care. This involved these tasks: initial patient assessment (minimum one person), begin patient care (minimum 2 personnel), assume command (requests additional resources if needed, communicates with on-site staff and other responding personnel -- one person).

Engine 2 was dispatched separately from Rescue 2. As the crew from Rescue 2 assessed the patient, it became known that the patient had a Do Not Resuscitate order. At 7:59 minutes from the initial dispatch, Engine 2 was cancelled by the crew from Rescue 2. Had the crew from Engine 2 arrived, they would have assisted with patient care and if necessary, controlled traffic, assisted with helicopter landing, or coordinated other resources while treatment was underway.

At 11:38 minutes after dispatch, an ambulance crew of two from Mary Greeley arrived and assumed treatment. Efforts to revive the patient were unsuccessful, so crews remained until the coroner arrived.

APPENDIX B: Comparative cities and prioritization

Jurisdiction	Pop.	ISO Number	Isolated?	Career?	Midwest/College Town?	TOTAL POINTS
Fargo, ND	100,453	3 1	Yes	1 Yes	1 Both	6
Bloomington, IN	80,405	3 1	Yes	1 Yes	1 Both	6
Manhattan, KS	52,281	3 1	Yes	1 Yes	1 Both	6
Lawrence, KS	116,393	2 0	Yes	1 Yes	1 Both	5
Columbia, MO	108,500	2 0	Yes	1 Yes	1 Both	5
Asheville, NC	80,000	3 1	Yes	1 Yes	1 College Town	5
Charlottesville, VA	80,000	3 1	Yes	1 Yes	1 College Town	5
*Columbia, MO	75,000	2 0	Yes	1 Yes	1 Both	5
Evanston, IL	74,239	3 1	No	0 Yes	1 Both	5
Iowa City, IA	68,300	3 1	No	0 Yes	1 Both	5
Council Bluffs, IA	62,230	3 1	Yes	1 Yes	1 Midwest	5
Dubuque, IA	57,637	5 0	Yes	1 Yes	1 Both	5
Stillwater, OK	45,688	3 1	Yes	1 Yes	1 College Town	5
Cedar Rapids, IA	126,326	3 1	No	0 Yes	1 Midwest	4
Sioux City, IA	75,000	2 0	Yes	1 Yes	1 Midwest	4
Waterloo, IA	68,406	3 1	No	0 Yes	1 Midwest	4
Cedar Falls, IA	36,145	3 1	No	0 Yes	1 Both	4
Clinton, IA	26,231	3 1	Yes	1 Yes	1 Midwest	4
Davenport, IA	75,000	5 0	No	0 Yes	1 Midwest	3
West Des Moines, IA	56,000	3 1	No	0 No	0 Midwest	3
Ankeny, IA	45,562	4 0	Yes	1 No	0 Midwest	3
Marshalltown, IA	27,552	0 0	Yes	1 Yes	1 Midwest	3
Mason City, IA	28,079	0 0	Yes	1 Yes	1 Midwest	3
Fort Dodge, IA	25,206	0 0	Yes	1 Yes	1 Midwest	3
Ottumwa, IA	24,988	4 0	Yes	1 Yes	1 Midwest	3

*Unable to obtain information from department

APPENDIX C: Comparative City Responses

City	# Stations	# Uniformed Personnel	Annual Incidents	Incident Breakdown (Fire:EMS:Other) (%)	Highest level of medical support	Minimum staffing: engines or trucks	Typical staffing: engines or trucks	Response Time Goal	Response Time Actuals	Response Goals Adopted by Council?	Separate Medical Response Goals?	Emergency Response Considered in New Developments?	Development Restricted if Outside a Certain Response Time?	Unique Considerations
AMES	3	55	3,881	4:55:41	BLS	2	4	85% in 5 minutes travel	86.5% in 5 minutes	Yes	No	Yes	Yes	AEDs in some police cars
Ottumwa	2	32	2,500	2:73:25	First Responder	2-3	3-4	100% in 4 minutes travel	80% in 4 minutes travel		No	Yes	No	
Mason City	1	46	4,750		ALS, Transport					No	No	Yes	Possible, but no Automatic Req'ts.	Would consider conditions if outside response threshold (e.g., sprinklers)
Marshalltown	1	28	2,170	6:78:16	BLS	3	3	100% in 4 minutes travel	80% in 4 minutes travel			No	No	AEDs in police cars
Ankeny	2	73	3,023	20:80:00	ALS, Transport	3-4	3-4	80% in 8 minutes travel	80% in 8 minutes travel	Yes	No	No	No	
West Des Moines	5	92	2,601	7:39:54	ALS	3-4	3-4	90% in 6.5 minutes travel	90% in 6.5 minutes travel	No	No	No	No	AEDs in police cars
Davenport	7	142	14,818	3:72:25	ALS	3	3-4	100% in 6 minutes total	90% in 6 minutes total	Yes	No	No	No	
Cedar Falls	3	48	1,645	6:54:40	BLS	3	3	90% in 4 minutes travel	35% in 4 minutes travel	No	No	Yes	No	
Waterloo	6	109	11,000	32:68:00	ALS, Transport	3-4	2-4	90% in 4 minutes travel	90% in 3.8 minutes	No	No	Yes	No	
Sioux City	7	112	6,806	4:74:22	ALS	3	3-4	90% in 4 minutes travel	83% in 4 minutes travel	No	No	Yes	Possible, but no Automatic Req'ts.	
Cedar Rapids	10	144	9,562	45:55:00	ALS	3	3-4	90% in 5 minutes total	61% in 5 minutes total	No	No	Yes	Possible, but no Automatic Req'ts.	AEDs in police cars
Dubuque	6	89	5,000	04:70:26	ALS, Transport	2	2-5	85-90% in 4 minutes travel	88.9% in 4 minutes travel	No	No	Yes	No	Maintain growth area triggers for a new station; AEDs in all police cars
Council Bluffs	5	99	6,926	00:75:25	ALS, Transport	3	3	90% in 4 minutes travel	87% in 4 minutes travel			Yes	Possible, but no Automatic Req'ts.	Station 5 built after development demonstrated a need.
Iowa City	4	64	4,603	04:55:41	First Responder	3	3-4	90% in 4 minutes travel	90% in 5:46 travel	No	No	Yes	No	Station built on northeast side to reduce travel times.
Stillwater, OK	4	71	5,250	37:63:00	ALS	3	4			No	No	Yes	No	
Evanston, IL	5	107	8,917	38:62:00	ALS, Transport	3	3	No stated goal	Less than 4 minutes travel	No	No	No	No	City is completely built-out, coverage adequate
Lawrence, KS	6	135	9,303	20:80:00	ALS, Transport	4	4	90% in 4 minutes travel		No	No	Yes	No	
Manhattan, KS	5	80	2,700	20:80:00	First Responder	3-4	3-4	90% in 4 minutes travel	83% in 4 minutes	No	No	No	No	Some new areas were required to be sprinklered
Fargo, ND	7	115	4,500	10:50:40	BLS	3	3	90% in 8.2 minutes travel	90% in 8.2 minutes	No	No	No	No	Purchased land in growth areas for future fire station locations. Buy/sell it as needed.
Bloomington, IL	5	98	9,500	20:80:00	ALS, Transport	3	3	90% in 6 minutes travel	98% in 6 minutes		No	No	No	
Columbia, MO	9	136	1,000	35:65:00	ALS	3	3	80% in 4.5 minutes travel			No	No	No	
Asheville, NC	12	235	14,176	04:61:35	First Responder	4	4	90% in 5.2 minutes travel	90% in 4.5 minutes travel		No	Yes	No	
Charlottesville, VA	3	86	5,634	07:49:44	ALS	3	3					Yes	No	Currently relocating a station to accommodate for growth