Executive Summary:

Fire department response time measurements are an integral part of managing and understanding emergency response. However, fire departments often define response time using different measures and report response time to the public in different ways. This Capstone seeks to determine what departments in the Southeastern United States consider as response time parameters, as well as how, or if, the department reports these measures to the public on the municipality’s official Web site. The findings will be useful to residents, public managers and fire department officials, as the Capstone attempts to illuminate a complicated issue.
INTRODUCTION
The response time of a local fire department is an integral but often misunderstood measure of performance in managing emergency response. Normally, a complete fire department emergency response has six parts.

1.) 9-1-1 call rings in the primary Public Safety Answering Point (PSAP)
2.) Call received in secondary PSAP.
3.) Call received by dispatcher.
4.) Emergency crew notified/Dispatch
5.) Vehicle begins moving to an emergency location
6.) First responding fire truck arrives at the emergency location

Many residents consider response time the time period from their 911-phone call until the fire truck arrives at their residence, a belief consistent with the above description. While some fire departments do consider response time the full measure (steps 1 to 6), many only consider response time the period of time it takes from dispatch to arrival (steps 4 to 6). Others define response time as travel time (steps 5 to 6).

The National Fire Protection Association (NFPA), an international nonprofit organization that advocates for fire safety through training and research, defines response time as the full measure from the initial call to the first fire truck’s arrival, and the association’s Standards 1710 and 1221 set time standards for each phase of the response time process. However, membership in the NFPA is voluntary and fire departments are not required to adhere to these standards. (The NFPA’s official response time graph is located in Appendix C)

Similarly, some states require fire departments to report response time information to the National Fire Incident Reporting System (NFIRS). The system asks that departments report a response time measure that begins at the “alarm time,” which is defined as the time the alarm was received by the fire department. However, a 2006 U.S. Department of Homeland Security report that used NFIRS response time data found that alarm time was “vague and subjective” because departments began measuring alarm reception at different points.¹

This Capstone examines what – if anything – fire departments in the Southeastern United States publicly report as response time on their official jurisdiction Web site or in the latest budget and performance measurement documents on the Web site, as well as why fire departments define response time as they do.

The findings of this Capstone illuminate a potentially confusing issue. Many individuals — elected officials, public managers and residents — may misinterpret the meaning of a stated response time. This could create unreasonable expectations from citizens, and hamper public managers’ ability to utilize performance measurements. The study findings are also relevant to citizens, who deserve the best and most accurate information about a service their taxes support. Greater transparency is essential to a well-functioning government. As Suzanne J. Piotrowski and Gregg G. Van Ryzin wrote in Citizen Attitudes Toward Transparency in Local Government: “Without governmental transparency and freedom of information, it is much more difficult to hold elected and appointed officials accountable for their actions. The release of information promotes democratic accountability.”²

Local government managers and other public officials will benefit from awareness of the variety of meanings, and even fire chiefs may benefit from a better understanding of how and why different jurisdictions measure and report response time in the manner they do.
METHODOLOGY
The research focused on all 99 jurisdictions of 25,000 population or more in the following five states: North Carolina, South Carolina, Virginia, Georgia and Tennessee. The research was restricted to Southeastern states in order to gain a picture of one area of the United States, and enabled comparisons between North Carolina and states in the same geographic region.

The first step in the research process was to locate each jurisdiction’s municipal Web site and perform a 5 to 10 minute search for fire department response time statistics provided to the general public. If no performance statistics were found, the search continued in the adopted Fiscal Year 2010-11 budget. The search was restricted to a jurisdiction’s Web site — and if necessary an ancillary Fire Department Web page — to ensure that the findings would illustrate what fire departments publicly report to their citizens.

The information was then tabulated according to how the response time was measured and reported. The categories included: the full 911-call-to-arrival measure; just travel time measure; dispatch-to-arrival time; a measure called “response time,” which the researcher soon discovered could mean total response time or any of several segments; and no measure at all (Appendix B). If no response time measure was found, a follow-up email was sent. If the measure did not specify the response time parameters — for example, “average response time was 6 minutes”— a follow-up email was sent asking for clarification about the time’s beginning and end points.

The response times were further grouped according to whether departments reported the response time as an average figure — “Travel time averages 5 minutes” — or as a fractile measurement — “Dispatch-to-arrival time was under 6 minutes, 90 percent of the time.” Upon completion of the quantitative portion of the study, two fire chiefs from jurisdictions whose response time reporting fell into each one of the above noted categories were interviewed about why their department used the measure it did. The results are included in the findings section.

RESULTS
QUANTITATIVE: The initial results of Web site research as well as the results post-email contact are depicted in the graph below.

In the initial search, a little less than a third of the departments did not have a measure that was easily found on the jurisdiction Web site; a third reported a measure they referred to as only “response time,” “average response time,” or “incident response time”; less than a third specifically reported dispatch-to-arrival; five percent reported travel time; and only a small fraction — 2 percent — reported a measure that specified it represented the full 911-call to arrival measure.
Results after follow-up emails produced several changes. Fifteen of the 32 departments that didn’t report anything on their Web site responded: four said they reported a dispatch-to-arrival measure that was overlooked and 11 confirmed that they did not publish response time information on their Web site. Fifteen of the 33 departments that listed a response time measure that did not specify parameters responded: eight said that measure meant dispatch to arrival, six said it meant the full measure and one said it represented travel time.

Only 8 percent of the jurisdictions report a measure that fully represents all the time that a citizen may consider to be total response time. Almost half report a measure that is less than the total response, and about a third do not have a response time measure that could be easily found on the local government’s Web site.

**Average and Fractile Times**

Of the departments that reported a time on their Web site, 39 departments reported response times using the average measurement and 32 reported response times using the fractile measurement. A fractile measure reports the percentage of responses within a specified time. For example, a fractile measurement would be: “Percentage of responses within 6 minutes from initial call to first arriving unit.”

**II.) INTERVIEWS:**

A total of eight interviews were conducted to gather insight on why different departments chose to report response times in different ways. Two chiefs were interviewed in each category.

**REPORTING NOTHING: 28 percent of jurisdictions**

The two chiefs from departments that did not publicly report a response time both said that they do measure it internally. However, each had his own reasons for not publicly reporting it. Fire Chief 1 said that the department uses response time statistics to reinforce the need for new fire equipment during the budgeting process. But the actual response time process is too complicated to accurately convey to citizens in a budget line item or brief passage. In order to avoid misinterpretations of a certain number or measure, the chief avoids publishing it in the budget or on the Web site.

Chief 2 wrote in an email that the reason they do not publicly report response times is security. The terrorist attacks of September 11, 2001, prompted the department to not publicize any “trade secrets” about how it does business. The chief said that he has heard of several attempts by individuals to sabotage fire departments. His fire department has not been targeted. The chief said that it publicizes information that is relevant to its citizens, but does first consider its own security.

**REPORTING TRAVEL TIME: 6 percent of jurisdictions**

The fire chiefs of departments that reported only travel time gave different answers for their use of that particular measure. Fire Chief 1 said the department uses travel time because it was the measure the department has the most control over. The department uses a fractile measure because in the chief’s opinion it provides a more accurate measure of the true time it takes for the fire department to respond to an emergency incident. An average time is influenced by outliers, which can skew the data.

The second fire chief said that the department measures and reports travel time because of a combination of tradition and technological limitations. The current computer system is only capable of measuring the travel time of an emergency fire call. The dispatch operation is located in a countywide 911 emergency operations center.

**REPORTING DISPATCH-TO-ARRIVAL: 40 percent of jurisdictions**

The two interviewed fire chiefs of departments that only reported dispatch-to-arrival response times both gave similar reasons for their use of the dispatch-to-arrival response time measure. Fire Department Chief
1 said the primary reason for the use of dispatch-to-arrival response time was it was the only part of the response time process the fire department controlled; the dispatch operation is managed by the municipal police department. The chief said the department uses an average response time because residents understand it more easily than a fractile measure.

Fire Chief 2 gave a similar reason for reporting only the dispatch-to-arrival response time measure. The chief said that the fire department did not control the dispatch operation — the police department did — and the department only wanted to measure and report what it could control and improve. However, in this case the department reported the fractile measure because in the view of this chief it provided a more accurate representation of the actual response time. The fractile measurement — in this case 90 percent — disregards outliers that might skew the response time. The chief added that though the fire department does not control dispatch, the department holds regular meetings with the police department to ensure the departments work together as efficiently as possible.

**REPORTING 911-CALL TO ARRIVAL: 8 percent of jurisdictions**

Both fire chiefs interviewed about the 911-call-to-arrival response time measure gave similar answers about why their department used the full measure. Neither department controls the dispatch operation, but both said that the departments reported the full measure because the fire departments have a responsibility for public safety, and a full response time measure is part of that responsibility, even if the department does not control it.

Fire Chief 1 said that the jurisdiction initially reported only travel time, but the chief has pushed to change that because the mission of the department is to improve emergency response, and a call-to-dispatch time is part of that measure. The department used the fractile measure for the same reasons as aforementioned departments: the measure is less influenced by outliers and provides a more accurate representation. Fire Chief 2 said that the department reports full response time in large part because of a responsibility it has to its citizens. Though the department does not control the 911-center — the Police Department does — the department has an obligation to provide the best, most complete services information it can to its citizens.

The chief also said that the full measure enables the department identify problems and address them. If the department only reported dispatch to arrival, and there was a problem with the call processing time, the chief would never know. The chief also said that the department uses the average response time measure because it is easier for residents to understand than the fractile measure.

**REPORTING A RESPONSE TIME MEASURE THAT IS UNSPECIFIED: 18 percent of jurisdictions**

Chiefs of departments that reported a measure that did not provide a full description of the response time measurement — for example, a department that used “response time” to represent “dispatch-to-arrival time” — had varied reasons for not being more explicit in their public reporting. One said that the wording was what had been used traditionally, and the response time measure was utilized mostly internally. A second fire chief said that the intricacies of response time reporting is confusing to the public, and to clarify what the term meant, the fire department was currently revamping its Standard of Cover document to make response time reflect the entire response time measure.

**CONCLUSIONS & RECOMMENDATIONS**

The results of this Capstone study suggest that response times are often less readily available to the public than might be imagined, and the manner by which departments report response time varies widely. Less than 8 percent — 8 of the 99 jurisdictions studied — publicly reported the full time response time
measure on its web site or in its budget. About a third reported nothing and the remaining jurisdictions reported a time that was only part of the total emergency response.

Although the majority of the jurisdictions studied do not publicly report the full 911-call-to-arrival time, this Capstone argues that they should because of the importance of government transparency, the predominant public perception of response times, the public’s desire for comprehensive response time measures, and the benefit that comprehensive measures provide public managers in assessing the adequacy of emergency response.

Citizens interested in public safety services want to know the full fire department response time rather than just one or two segments and often believe that the phrase “response time” represents the time between 911-call and the first fire truck’s arrival. In a citizen-initiated performance measures project completed in 2001, citizens in Burlington, Iowa, said they would prefer the city to implement Fire Department performance measures that illustrated total response time – 911 call to arrival on scene.\(^6\) The chiefs of departments that reported the total response time interviewed for this project agreed. They said that even though neither department controlled the dispatch operation, citizens deserved to know the full time for a service their taxes support. One of the chiefs put it this way: “Do you think the public gives a crap who controls the dispatch?”

The assumption that citizens anticipate that “response time” refers to total response time was tested by this researcher. In mid-January 2011, about 75 local government practitioners in a session on performance measurement in the School of Government’s “Municipal and County Administration Course” were asked to match “fire department response time” to the correct definition from a list consisting of six options, including “Dispatch-to-Arrival” and “911-call-to-Arrival.” Three times as many respondents believed that response time meant the “911-call-to-arrival” measure. The results underscore the common assumption of citizens and also show that even individuals working in government do not realize the tendency of many fire departments to deviate from the assumed response time measure.

When examined through the lens of government management, a full response time measure is essential for developing and maintaining a comprehensive and cohesive system of emergency response. One chief said that an incomplete measure can inadvertently camouflage a problem area. The fire department may not control call processing and dispatch, but they still affect the total response, he said. Public managers, who may use response time statistics as a basis for budgetary decisions, cannot make the most effective decisions if they base their decisions on incomplete measures. At least two fire chiefs contacted for this study said they were in the process of revamping their measures to reflect the total response time. Although two departments cannot be considered a trend, it is a promising start, and many would benefit if other departments followed their lead.

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3. The research only covered 99 total jurisdictions, and the jurisdictions were located in the same geographic area — the Southeastern United States — so the study cannot be generalized across the country.
4. In the initial Web site search of response times, it is possible that some information was provided and easily accessible, but missed during the Web site searches.
5. It is possible that non-respondents never received the follow-up emails regarding the lack of a publicly reported response time or an unspecified time measure.
## APPENDIX A

### NORTH CAROLINA

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APPENDIX B

The Many Faces of What Is Called “Response Time”

1.) Simply “Response Time” unspecified: When a department reports a number and calls it simply “response time,” it might mean the total time from emergency call until arrival of emergency personnel on the scene or it might mean any of several other things, each a smaller increment of the total response.

2.) Dispatch-to-Arrival: The measure clearly specifies that the time begins when the emergency call is dispatched and ends when the first fire truck arrives.

3.) Travel time: The measure clearly states that the time measure refers to only travel time.

4.) Full measure: The measure clearly states that the parameters of measure begin with the 911-call and end with the arrival of the first fire truck.
APPENDIX C

NFPA Cascade of Events Chart

*If alarms are received directly at the fire department communication center and not transferred from a PSAP, alarm transfer time is zero.

FIGURE A.3.3.53.6 Cascade of Events Chart.