

**Performance Audit:  
E911 Communications Center**

**April 2013**

**City Auditor's Office  
City of Atlanta**

File #12.01





## CITY OF ATLANTA

City Auditor's Office  
Leslie Ward, City Auditor  
404.330.6452

April 2013

### ***Why We Did This Audit***

We undertook this audit because our 2011 audit of Fire Department response times found that high E911 call transfer times contributed to the fire department's inability to meet response time standards. The fire department fell short of meeting the national standard of processing 90% of calls within 60 seconds.

E911 staff also expressed concern that the center did not have enough staff to handle its workload. The center spent \$1 million in overtime during fiscal year 2012.

### ***What We Recommended***

The Chief of Police should direct the E911 Communications Center to:

- Purchase scheduling software that will allow the center to develop shift schedules that optimize staff resources.
- Develop and implement shift schedules for communications staff that align staff with call workload. The center director should create staggered breaks.
- Require communications staff to properly record their status in the Positron system, eliminating any uncoded time.
- Continue to reinforce the existing call dispatching procedures and monitor dispatch times to ensure that call takers continue to transfer information to dispatchers as quickly as possible. Examine individual staff performance times and use the results to target training.

For more information regarding this report, please contact Stephanie Jackson at 404.330.6678 or [sjackson@atlantaga.gov](mailto:sjackson@atlantaga.gov)

## ***Performance Audit:***

### **Atlanta E911 Communications Center**

#### ***What We Found***

Shifting staff from the morning to the afternoon/early evening hours could improve performance throughout the day and reduce overtime. During fiscal year 2012 the center met its goal of answering at least 90% of emergency calls within 10 seconds. Although the center has not reached its goal of processing 90% of fire calls within 60 seconds, the center has improved its call processing time by implementing process changes.

The center met its answer goal for fiscal year 2012, but performance was uneven throughout the day. The center fell short of its goal 7 hours each day. The number of 911 calls was highest during the hour of 3:00 pm.

The center has more staff than needed during early morning hours to meet its answer time goal. Time spent on calls was twice as high during afternoon and evening hours compared to early morning. Call takers spent close to 50% of their time on emergency calls in the late afternoon and early evening and spent about 25% of their time on emergency calls during the early morning hours.

We calculated the number of call takers needed on duty by hour of day to handle existing workload while equalizing time waiting to take the next call at 33% of call takers' time. Our model added staff between noon and 9:00 pm and reduced staff between 11:00 pm and 8:00 am, while reducing total hours worked per week by about 305 hours. The reduction of hours by optimizing scheduling as well as some reduction of workload as a result of the implementation of the city's 311 call center should reduce the center's overtime usage.

While the center dispatched less than two percent of priority 1 emergency calls within 60 seconds in fiscal year 2012, process changes initiated by the Atlanta Police Department have begun to improve dispatch times, without the need for additional staff. Although fire dispatch times improved, the center was still far from reaching the NFPA standard of dispatching 90% of fire calls within 60 seconds. Industry literature suggests that the 60 second benchmark may not be reasonable.

## Management Responses to Audit Recommendations

Summary of Management Responses		
<b>Recommendation #1:</b>	The Chief of Police should direct the E911 Communications Center to purchase scheduling software that will allow the center to develop shift schedules that optimize staff resources.	
<b>Response &amp; Proposed Action:</b>	The department will conduct an assessment of scheduling software options and select and implement the appropriate solution.	<b>Agree</b>
<b>Timeframe:</b>	The estimated time frame for implementation is 6 months to 1 year.	
<b>Recommendation #2:</b>	The Chief of Police should direct the E911 Communications Center to develop and implement shift schedules for communications staff that align staff with call workload. The center director should create staggered breaks.	
<b>Response &amp; Proposed Action:</b>	The E911 Center will develop a plan to develop and implement a new shift schedule to improve the overall alignment with workload. In addition to the scheduling software referenced in Recommendation 1 above, this plan will include consideration of the current cross training program and other elements that are necessary to effectively support a more flexible schedule.	<b>Agree</b>
<b>Timeframe:</b>	The estimated time frame for implementation is 6 months to 1 year.	
<b>Recommendation #3:</b>	The Chief of Police should direct the E911 Communications Center to require communications staff to properly record their status in the Positron system, eliminating any un-coded time.	
<b>Response &amp; Proposed Action:</b>	The E911 Center will immediately introduce appropriate coding and procedure updates to ensure full accounting of time.	<b>Agree</b>
<b>Timeframe:</b>	Within 6 months.	
<b>Recommendation #4:</b>	The Chief of Police should direct the E911 Communications Center to continue to reinforce the existing call dispatching procedures and monitor dispatch times to ensure that call takers continue to transfer information to dispatchers as quickly as possible. Examine individual staff performance times and use the results to target training.	
<b>Response &amp; Proposed Action:</b>	The Chief of Police will direct the E911 Center to maintain the current improvement plan which focuses on the following: <ul style="list-style-type: none"> <li>• Continuous improvement and streamlining of processes to speed up service to citizens</li> <li>• Strong emphasis on raising the level of individual performance through training, building capacity and performance management</li> </ul> <p>This program will continue to monitor and analyze performance data to ensure the department is driving towards the national best practice.</p>	<b>Agree</b>
<b>Timeframe:</b>	This initiative is underway and will continue to be a key focus for the department.	



# CITY OF ATLANTA

**LESLIE WARD**  
City Auditor  
*lward1@atlantaga.gov*

**AMANDA NOBLE**  
Deputy City Auditor  
*anoble@atlantaga.gov*

**CITY AUDITOR'S OFFICE**  
68 MITCHELL STREET SW, SUITE 12100  
ATLANTA, GEORGIA 30303-0312  
(404) 330-6452  
FAX: (404) 658-6077

**AUDIT COMMITTEE**  
Fred Williams, CPA, Chair  
Donald T. Penovi, CPA, Vice Chair  
Marion Cameron, CPA  
C.O. Hollis, Jr., CPA, CIA  
**Ex-Officio:** Mayor Kasim Reed

April 30, 2013

Honorable Mayor and Members of the City Council:

We undertook this audit of the Atlanta E911 Communications Center because our 2011 audit of Fire Department response times found that high E911 call transfer times contributed to the fire department's inability to meet emergency response time goals adopted by the National Fire Protection Association (NFPA). Call processing time, defined as time elapsed from receipt of a call to dispatch of a fire apparatus, fell far short of meeting the national standard of processing 90% of calls within 60 seconds.

In this audit, we analyzed E911 call processing time and its components during fiscal year 2012. We found that while the center's processing time improved, it continued to exceed the NFPA benchmark. Since we completed our analysis, the center has continued to make process changes aimed at speeding call processing; we have analyzed fiscal year 2013 data and include it in Appendix C of this report.

We also found that the E911 center exceeded its goal of answering 90% of incoming emergency calls within 10 seconds. Call takers answered 91% of incoming calls in 10 seconds or less during 2012. Performance was uneven, however, throughout the day; call answer time was more than 10 seconds during 7 of 24 hours. Staffing did not increase enough during periods of higher workload, while staffing remained higher than necessary when workload was at its lowest.

Because E911 staffing did not match variation in call volume, our recommendations focus on shifting staff schedules to match workload while continuing the current processes that have improved overall processing time. In addition to improving performance during the busiest periods, we estimate that better scheduling would reduce total work hours by 305 hours per week. Because the center routinely relies on overtime to meet scheduled staffing, adopting our recommendations should reduce overtime and therefore narrow the gap between expenditures and dedicated E911 fee revenue now covered by the city's general fund.

The Atlanta Police Department agrees with all recommendations and commits to implementing them within 6 months to a year. The response and additional comments are

included in Appendices A and B respectively. The Audit Committee has reviewed this report and is releasing it in accordance with Article 2, Chapter 6 of the City Charter. We appreciate the courtesy and cooperation of city staff throughout the audit. The team for this project was Christopher Armstead, Rhonda Sadler, Sterling Thomas, and Stephanie Jackson.



Leslie Ward  
City Auditor



Fred Williams  
Audit Committee Chair

---

# E911 Communications Center

---

## Table of Contents

Introduction .....	1
Background .....	1
Staffing and Training .....	3
Equipment .....	6
Performance Standards.....	8
Funding.....	9
Audit Objectives .....	9
Scope and Methodology.....	9
Findings and Analysis .....	11
Overall Staffing Level Is Sufficient; Center Should Better Align Shift Strength with Workload .....	11
E911 Center Answered 91% of Emergency Calls Within 10 seconds during Fiscal Year 2012.....	12
Attempt to Adhere to ISO Staffing Criterion Resulted in Overstaffing During Low Call Volume Periods.....	14
Shifting Staff Could Improve Performance and Reduce Overtime .....	21
Implementation of the 311 Call Center Will Likely Reduce 911 Calls.....	27
Process Changes Are Speeding Dispatch to Emergency Calls .....	28
Time to Dispatch Emergency Calls Improved During Fiscal Year 2012.....	28
System Limitations Prevented the Center from Measuring Time to Transfer Emergency Calls to Other Agencies .....	32
Recommendations.....	33
Appendices .....	35
Appendix A Management Comments and Response to Audit Recommendations .....	37
Appendix B Atlanta Police Department’s Comments .....	39
Appendix C Updated Performance Data .....	41

---

## List of Exhibits

Exhibit 1	Count of Police and Fire Incidents by Priority .....	2
Exhibit 2	Training for E911 Center Communications Officers.....	4
Exhibit 3	Number of Communications Officers by Training Level .....	5
Exhibit 4	Call Notification Screen .....	6
Exhibit 5	Flow of 911 Calls through Positron and CAD .....	7
Exhibit 6	Percent of Emergency Calls Answered within 10 Seconds by Month in Fiscal Year 2012 .....	12
Exhibit 7	Percent of Emergency Calls Answered within 10 Seconds by Day of Week in Fiscal Year 2012 .....	13
Exhibit 8	Percent of Emergency Calls Answered within 10 Seconds by Hour of Day in Fiscal Year 2012 .....	13
Exhibit 9	Number of Days Hour Was Busiest in Fiscal Year 2012 .....	14
Exhibit 10	Call Takers on Duty by Hour of Day Compared to Workload .....	15
Exhibit 11	Overall Distribution of Call Taker Time in Fiscal Year 2012 .....	16
Exhibit 12	Distribution of Call Taker Time by Hour of Day .....	17
Exhibit 13	Median Call Taker Talk Time by Hour of Day Compared to Percentage of Time Spent On Call .....	18
Exhibit 14	ISO Call Volume Matrix Table for PSAPs that Perform Call Taking and Dispatching.....	19
Exhibit 15	Excerpt from ISO Presurvey Information Request for Communication/Dispatch Centers .....	20
Exhibit 16	Increasing Percentage of Ready Time and the Corresponding Median Performance by Hour of Day .....	22
Exhibit 17	Comparison of Actual Staffing to Model.....	23
Exhibit 18	Total Overtime and Compensatory Hours Worked by Week in Fiscal Year 2012 .....	24
Exhibit 19	Scheduled and Unscheduled Leave Time Granted by Week in Fiscal Year 2012 .....	25
Exhibit 20	Comparison of Weekly Overtime and Compensatory Time Worked to Workload in Fiscal Year 2012.....	26
Exhibit 21	Median Time to Dispatch High Priority Fire Calls by Month in Fiscal Year 2012 .....	30
Exhibit 22	Percentage of Fire Priority 1 Calls Processed within 60 Seconds by Month in Fiscal Year 2012 .....	31
Exhibit 23	Percentage of Fire Priority 1 Calls Processed within 90 Seconds by Month in Fiscal Year 2012 .....	32



Exhibit 24	Percentage of Calls Answered within 10 Seconds by Hour of Day .....	41
Exhibit 25	Time to Dispatch High Priority Fire Calls by Month .....	42
Exhibit 26	Percentage of Fire Priority 1 Calls Dispatched within 60 Seconds by Month....	42
Exhibit 27	Percentage of Fire Priority 1 Calls Dispatched within 90 Seconds by Month....	43



---

# Introduction

---

We conducted this performance audit of the E911 Communications Center pursuant to Chapter 6 of the Atlanta City Charter, which establishes the City of Atlanta Audit Committee and the City Auditor's Office and outlines their primary duties. The Audit Committee reviewed our audit scope in October 2012.

A performance audit is an objective analysis of sufficient, appropriate evidence to assess the performance of an organization, program, activity, or function. Performance audits provide assurance or conclusions to help management and those charged with governance improve program performance and operations, reduce costs, facilitate decision-making and contribute to public accountability. Performance audits encompass a wide variety of objectives, including those related to assessing program effectiveness and results; economy and efficiency; internal controls; compliance with legal or other requirements; and objectives related to providing prospective analyses, guidance, or summary information.<sup>1</sup>

We undertook this audit because our October 2011 performance audit of the Atlanta Fire Rescue Department identified long call processing times as a significant factor in the department's response times to emergency medical and fire incidents. In 2010, the median time for the E911 Communications Center to process an emergency call for a fire response was 3 minutes and 20 seconds, compared to the NFPA (National Fire Protection Association) benchmark of 60 seconds for 90% of calls. We concluded that auditing E911 to assess why call transfer times were high could help speed emergency responses.

---

## Background

The Atlanta Police Department operates the PSAP (public safety answering point) that serves the city of Atlanta. Calls to 911 from an Atlanta address or a cell phone tower located in Atlanta are routed to the department's E911 communications center. The E911 center is part of the police department's Support Services Division.

---

<sup>1</sup>Comptroller General of the United States, *Government Auditing Standards*, Washington, DC: U.S. Government Accountability Office, 2011, p.17-18.

The E911 center operates 24 hours per day, 7 days per week. Its duties include:

- answering emergency and non-emergency calls for service
- receiving, classifying, and prioritizing calls from citizens
- dispatching police and fire units to incidents that require a response
- transferring and/or directing calls that do not require a police or fire response to the proper agency
- checking on wanted/missing persons and reported stolen items
- completing Georgia Crime Information Center/National Crime Information Center forms on missing persons and stolen autos

In fiscal year 2012, the center answered over one million 911 calls and dispatched public safety personnel to 223,080 police incidents and 49,721 fire incidents (see Exhibit 1).

**Exhibit 1 Count of Police and Fire Incidents by Priority**

Priority	Count	Percent	Response
<b>Fire</b>			
1	46,880	94.3%	"All Units" Emergency Response
2	13	0.0%	"First Unit" Emergency Response
3	2,796	5.6%	Non-emergency
Undefined	32	0.1%	
<b>Total</b>	<b>49,721</b>	<b>100%</b>	
<b>Police</b>			
0	209	0.1%	Immediate
2	38,748	17.4%	Expedited
3	126,421	56.7%	Routine
4	57,450	25.8%	Non-emergency
5	81	0.0%	Teleserve Calls
6	19	0.0%	Court/Referral
Undefined	152	0.1%	
<b>Total</b>	<b>223,080</b>	<b>100%</b>	

**Source:** Atlanta Police Department's Computer-Aided Dispatch Data for fiscal year 2012

The majority of police responses were routine (56.7%) or non-emergency (25.8%); 17.5% required an immediate or expedited response. About 94% of fire incidents were priority 1, indicating a threat to life or property that required an immediate response.

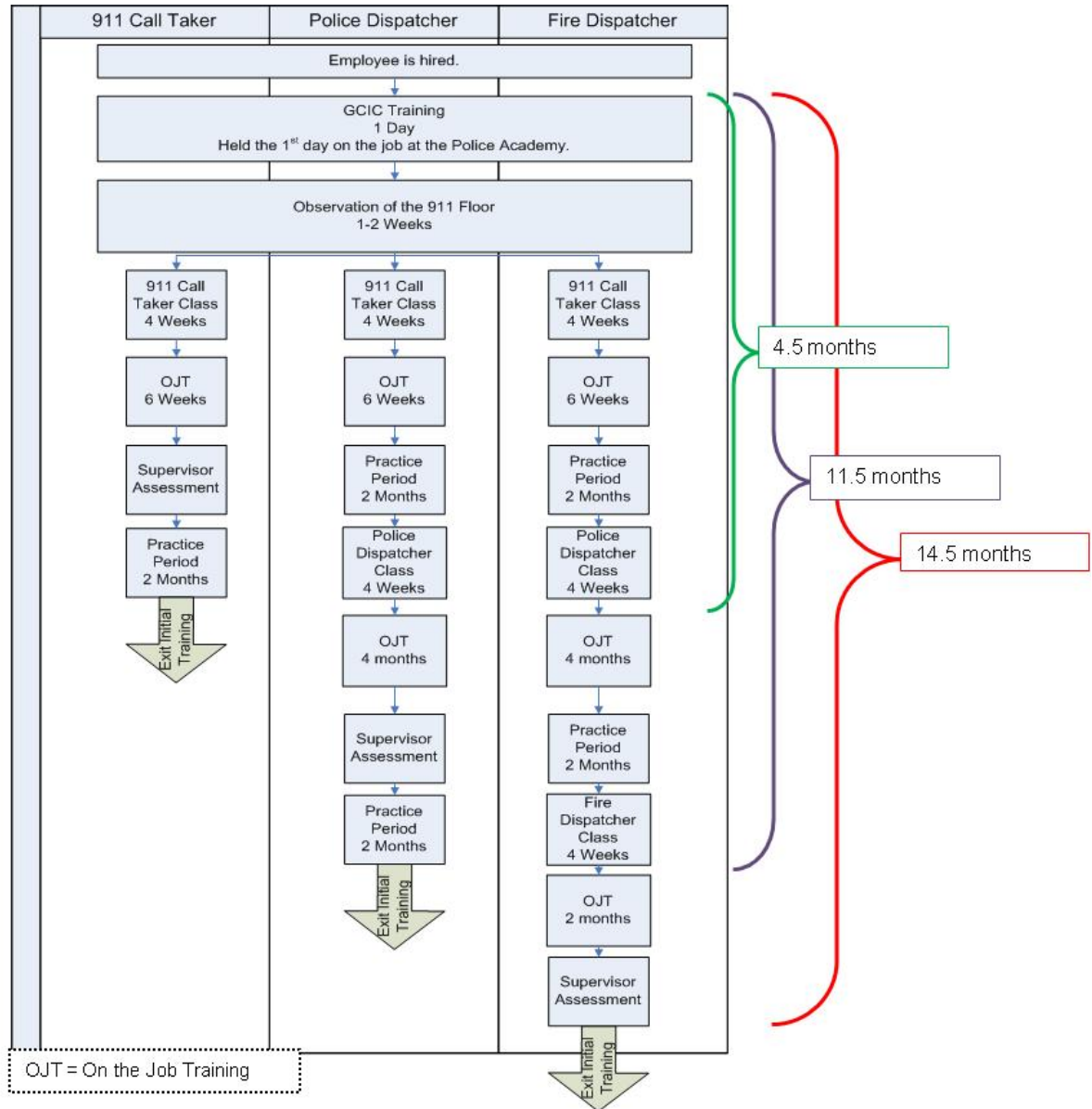
About 0.1% of police and fire calls are coded with a priority that is not defined by the department. The center's current systems do not track the number of calls transferred to other agencies such as Grady Emergency Medical Services, or other public safety answering points, such as centers operated by Fulton and DeKalb counties.

### **Staffing and Training**

The center was authorized 166 positions in the fiscal year 2013 budget and had 151 positions filled as of October 2012. Most of the positions are communications officers, including 911 call takers, dispatchers, supervisors, and the 911 communications manager and 911 communications director. State law defines communications officers as persons employed by a local government agency to receive, process, or transmit public safety information and dispatch law enforcement officers, firefighters, medical personnel, or emergency management personnel. E911 center support staff includes four training coordinators, one IT/telecommunications analyst, four IT/telecommunications managers, three quality services specialists, and two administrative positions.

All communications officers are trained as call takers. Call takers answer emergency calls, gather and record information from the caller to confirm the location and determine the nature of the emergency and type of response needed, and direct the information to a dispatcher through the CAD (computer-aided dispatch) system. Call takers receive four weeks of classroom training and at least six weeks of on-the-job training (see Exhibit 2). All communications officers receive 40 hours of P.O.S.T. (Peace Officer Standards and Training) basic communications training to become state-certified, and are trained to use the GCIC (Georgia Crime Information Center) system that maintains state criminal history records.

## Exhibit 2 Training for E911 Center Communications Officers



Source: E911 Training Coordinator

Call takers can be further trained to work as police or fire dispatchers. Dispatchers are responsible for dispatching emergency units as appropriate, monitoring the status of units in the field to ensure safety, taking and relaying messages, and coordinating support services and communication with other agencies. Dispatcher training includes four weeks of classroom training for each position and at a minimum, an additional sixteen weeks on-the-job training for police dispatchers and at least another eight weeks of on-the-job training for fire dispatchers. Full cross training

as a call taker, police, and fire dispatcher requires over a year to complete (See Exhibit 2).

About 14% of the communications officers (excluding the director and manager) were cross-trained to fill all call taker and dispatcher positions as of October 2012 (see Exhibit 3). About one-third of the staff was only trained to take calls or was a call taker trainee.

**Exhibit 3 Number of Communications Officers by Training Level**

<b>Training Level</b>	<b>Employee Count</b>	<b>Percent</b>
911 Call Taker Trainee	8	5.7%
911 Call Taker	38	27.0%
911 Call Taker/Fire Dispatcher	8	5.7%
911 Call Taker/ Police Dispatcher	53	37.6%
911 Call Taker/Fire Dispatcher/Police Dispatcher	20	14.2%
Supervisor/Supervisor Sr	14	9.9%
<b>Total</b>	<b>141</b>	<b>100%</b>

**Source:** Training records provided by the E911 Training Coordinator

The E911 Communications Center operates three 8-hour shifts per day:

- Day (7:00 am - 3:00 pm)
- Evening (3:00 pm - 11:00 pm)
- Morning (11:00 pm - 7:00 am)

About 40 staff members are assigned to each shift, with fewer on duty because of regular days off, vacations, sick days, and other absences. The E911 communications center director and a shift manager told us that the center tries to schedule a minimum of 11 call takers on duty to meet the ISO (Insurance Standard Office) rating criteria, and at least 13 call takers on duty during busy times. Typically the center schedules 14 dispatchers to be on duty, including one dispatcher to cover each of the department's six patrol zones, a police dispatcher for special units, three fire dispatchers, two relief dispatchers to cover for staff breaks, and two dispatchers for the GCIC desk. The shift supervisor can also take calls or fill-in for dispatchers, if needed.

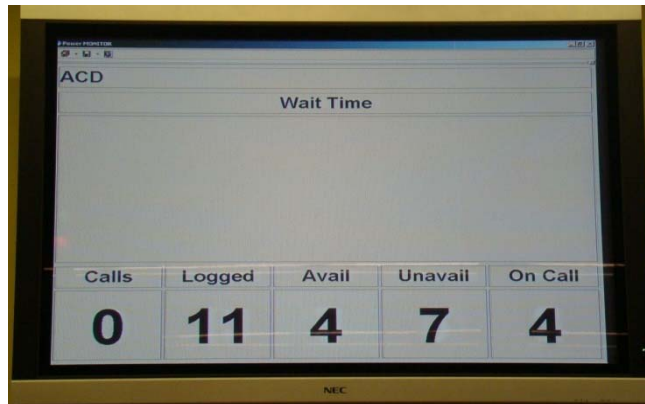
The E911 communications center manager told us that the center is short-staffed and employees are required to sign up for an additional half shift before or after a regular shift two days each week. Employees receive overtime or compensatory time at time-

and-a-half for the additional time worked. The center spent \$1.1 million on overtime in fiscal year 2012, approximately 8% of its overall budget.

### Equipment

The center has 30 trunks for incoming 911 calls and 18 administrative trunks. A trunk is a direct line between two telephony devices. The center is equipped with 18 call taker stations, 11 dispatcher stations, 3 GCIC stations, and 2 stations at the police information desk, which handles alarms and direct calls from police officers and incoming calls received on 333 and 666 lines. Screens in the call taker area display the calls in queue and wait time, the number of operators logged on to Positron (the call handling system), the number of operators available, the number of operators unavailable, and the number of operators on a call (see Exhibit 4).

#### Exhibit 4 Call Notification Screen



**Source:** Photograph taken by audit staff April 17, 2012.

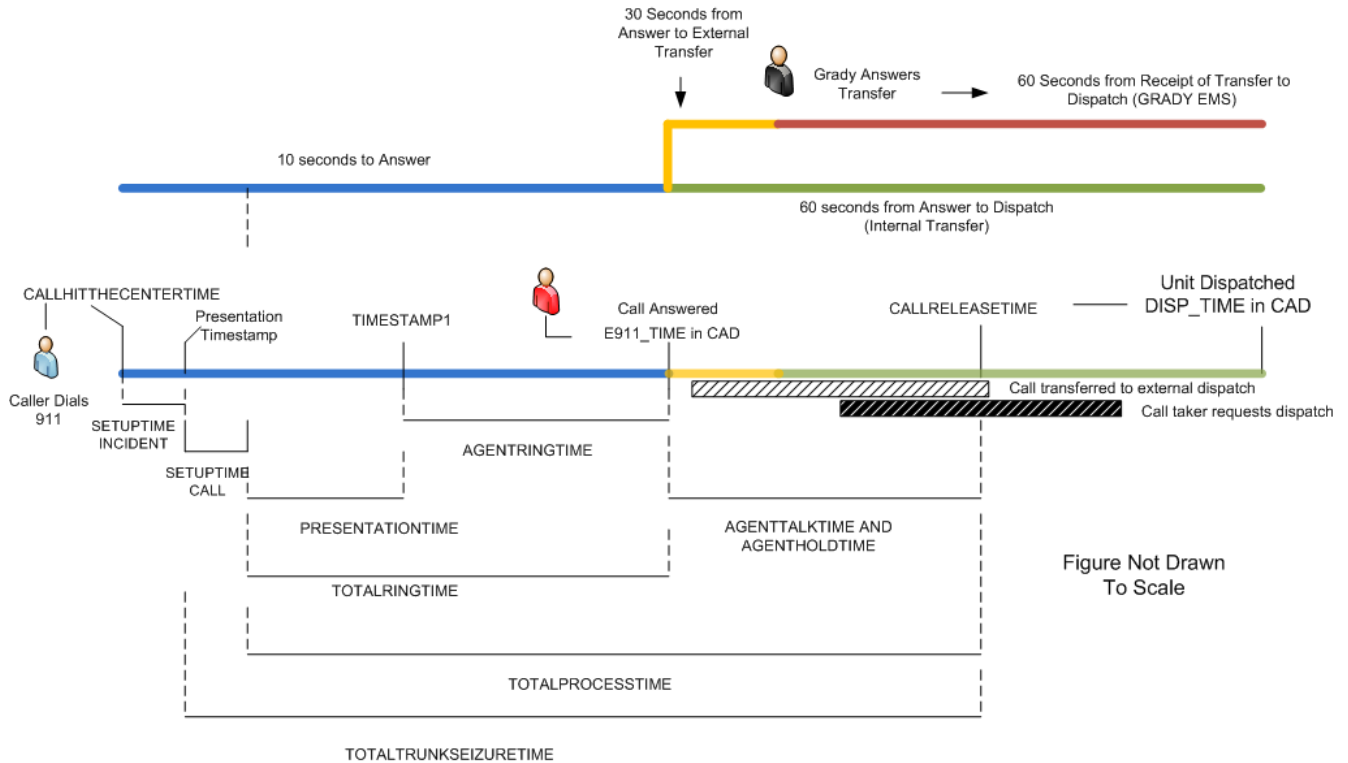
911 calls are automatically transferred from the AT&T telephony device to Positron, which captures the time the call was received, the phone number of the caller, and uses ANI/ALI technology to record the name and location associated with the telephone number. ANI/ALI stands for automatic number identification and automatic location identification and is part of the enhanced 911 system.

If the 911 call requires an emergency response, the call taker creates a record in the CAD system. Information from Positron populates the initial fields in CAD. The schematic below shows how an emergency call flows through the two systems, the events that



are recorded, and the performance standards that apply (see Exhibit 5).

### Exhibit 5 Flow of 911 Calls through Positron and CAD



**Source:** Prepared by audit staff based on review of Positron and CAD data fields and discussion with staff from Northrop Grumman, and Intrado.

Starting at the top left, when a caller dials 911 and the call comes into the center, Positron creates a record of the call as shown:

- During the SETUPTIME INCIDENT time, Positron gathers ALL information.
- Presentation Timestamp records when the call presents itself to the queue.
- At PRESENTATIONTIME, the call has entered a queue for a call taker to answer.
- From the end of SETUPTIME CALL to the call answer time is the TOTALRINGTIME, which represents the ring time that a caller hears from his or her point of view.
- At TIMESTAMP1, Positron assigns the call to a call taker.
- A combination of TIMESTAMP1 and AGENTRINGTIME equals the moment a call taker answers a call. The time the call is

answered populates the E911\_TIME fields in CAD and marks the beginning of response time calculations.

- The call ends at CALLRELEASETIME. The call taker can request dispatch for fire or police response units either during the call or afterwards, shown by the hatched black and white bars. The call taker can transfer information to the dispatcher while the caller is still on the line. The dispatch request time is a timestamp recorded in the CAD system. The time at which the dispatcher notifies the responding unit is captured as the DISP\_TIME in the CAD system.

The center contains a training facility that mimics the actual call center floorplan. The training desks can be brought live to add capacity to handle a large volume of calls. The desks in the training room can also accommodate other jurisdictions as a backup facility.

### Performance Standards

The center's goal of answering 90% of 911 calls within 10 seconds is similar to the NENA (National Emergency Number Association) benchmark of answering 90% of E911 calls within 10 seconds at the busiest time of day. The center also has a goal to process 90% of fire calls within 60 seconds, which is consistent with NFPA (National Fire Protection Association) Standard 1710. The 60-second processing time begins when the call taker answers the call and ends when the unit is dispatched.<sup>2</sup> The NFPA standard sets benchmarks of call takers processing 95% of calls within 30 seconds when transferring the call to a secondary public safety answering point. NFPA Standard 1221 recommends answering 95% of emergency calls within 15 seconds and 99% of emergency calls within 40 seconds.

The center has no specific performance goals for dispatching police to emergencies. The police department's response time goals are to respond immediately to priority 0 calls and to provide an expedited response to priority 2 calls. Priorities 3 through 6 are used to indicate routine, non-emergency and teleserve calls (to take reports that do not require a police officer at the scene), and referrals. The department measures response time from the time the call is received (shown as "E911\_TIME IN CAD" in Exhibit 5).

---

<sup>2</sup> In our 2011 audit, *Atlanta Fire Rescue Staffing*, we evaluated call taking using the 30 second standard and dispatching using the 60 second standard, for a total of 90 seconds to process a call. The Atlanta Police Department has since clarified that the 60-second benchmark should apply, rather than the 90-second benchmark.

## Funding

The E911 center is partially funded by telephone service provider user fees. State law provides for a fee of up to \$1.50 per month to be charged to subscribers of telephone service providers, including landline, wireless, and VOIP, that are within the center's service area. In fiscal year 2012, the E911 center received \$9.2 million in payments from service providers. The center also received a \$4.6 million transfer from the general fund.

The city received a grant from Bloomberg Philanthropies to develop a 311 system to serve as a central source of information for city services and help divert non-emergency calls from 911. Implementation is under way with plans to go live in October 2013.

The city also started a Smart911 initiative in December 2011, which extends the ANI/ALI technology. Users can voluntarily provide information to be recorded in a database so that 911 operators have information on the caller when the call is received. The purpose is to provide public safety responders with as much information as possible especially in the case where the caller may not be able to communicate clearly or effectively with the operator.

---

## Audit Objectives

This report addresses the following objectives:

- How long does E911 take to answer and dispatch emergency calls?
- Does E911 have enough staff to cover current call workload?
- How is the implementation of the 311 system likely to impact E911 workload?

---

## Scope and Methodology

We conducted this audit in accordance with generally accepted government auditing standards. We analyzed budget, staffing, and call processing data from fiscal year 2012.

Our audit methods included:

- Identifying the number and types of calls to the center on emergency trunk lines
- Analyzing call processing time by month, day of the week, shift, and hour of day
- Analyzing center staffing and workload
- Reviewing absences, overtime, training, and other factors that influence staffing

Generally accepted government auditing standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

---

## Findings and Analysis

---

### Overall Staffing Level Is Sufficient; Center Should Better Align Shift Strength with Workload

The E911 Communications Center met its goal of answering at least 90% of emergency calls within 10 seconds during fiscal year 2012 and met the more stringent NENA benchmark of answering 90% of calls within 10 seconds during the busiest hour of each day, 50% of the time. The center, therefore, needs no additional staff to meet existing workload. Performance was uneven throughout the day, however. Shifting staff from morning to afternoon/early evening hours—when call volume is highest—could improve performance throughout the day and reduce overtime.

The practice of scheduling a minimum of 11 call takers per shift results in much higher staff than needed in the early morning hours. Overall, call takers spent 39% of their time on calls, 39% of their time ready for the next call, and 22% of their time on breaks or wrapping up a prior call. Between 50% and 60% of call takers' time from 2:00 am to 7:00 am was spent waiting to take the next call, compared with about 30% of call takers' time between noon and 9:00 pm.

We calculated the number of call takers needed on duty by hour of day to handle existing workload while equalizing time waiting to take the next call at 33% of call takers' time. Our model added staff between noon and 9:00 pm and reduced staff between 11:00 pm and 8:00 am, while reducing the overall hours per week by about 305 hours. The center averaged about 760 hours of overtime and compensatory time per week in fiscal year 2012. A reduction in E911 center workload from the implementation of a 311 system could also help reduce overtime.

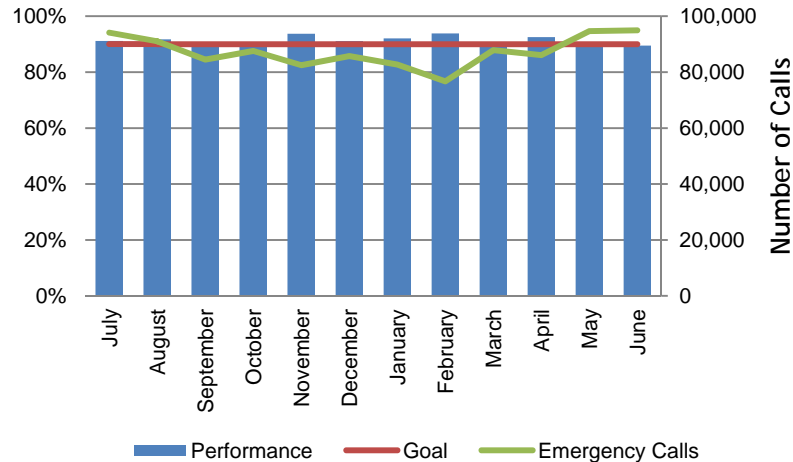
Developing a shift schedule to better align staffing with workload will likely require more than three shifts to stagger when employees come on and off duty. We recommend the Chief of Police purchase scheduling software and consider alternative scheduling.

## E911 Center Answered 91% of Emergency Calls Within 10 seconds during Fiscal Year 2012

The E911 Communications Center met its goal of answering at least 90% of emergency calls within 10 seconds during fiscal year 2012. Overall, the center answered 91% of emergency calls within 10 seconds. Answer time performance was steady by month and by day of week, falling slightly short of the goal during the busiest periods. While the center met the more stringent NENA benchmark of answering 90% of calls within 10 seconds during the busiest hour of the day about half of the time, performance was uneven throughout the day.

Answer time performance varied little by month. The center met its answer time goal each month except for May and June 2012 when call takers answered 89.2% and 89.5% of emergency calls within 10 seconds, respectively (see Exhibit 6). The number of emergency calls received in these months—shown by the green line in Exhibit 6—was higher in May and June than in the previous ten months.

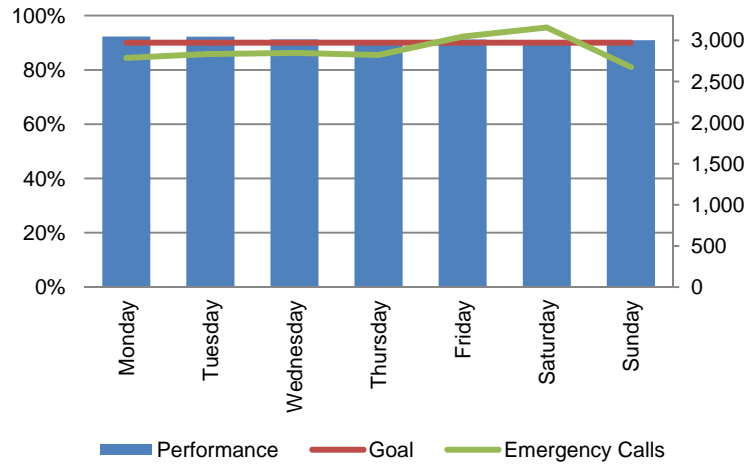
**Exhibit 6 Percent of Emergency Calls Answered within 10 Seconds by Month in Fiscal Year 2012**



**Source:** Positron records July 1, 2011, through June 30, 2012.

Answer time performance varied little by day of week. The center met its goal of answering at least 90% of emergency calls within 10 seconds each day of the week except for Saturday, when call takers answered 89.5% of emergency calls within 10 seconds (see Exhibit 7). The number of emergency calls was highest on Saturdays, with a median of 3,160 calls per day compared with a median of 2,666 emergency calls on Sundays, when workload was lowest.

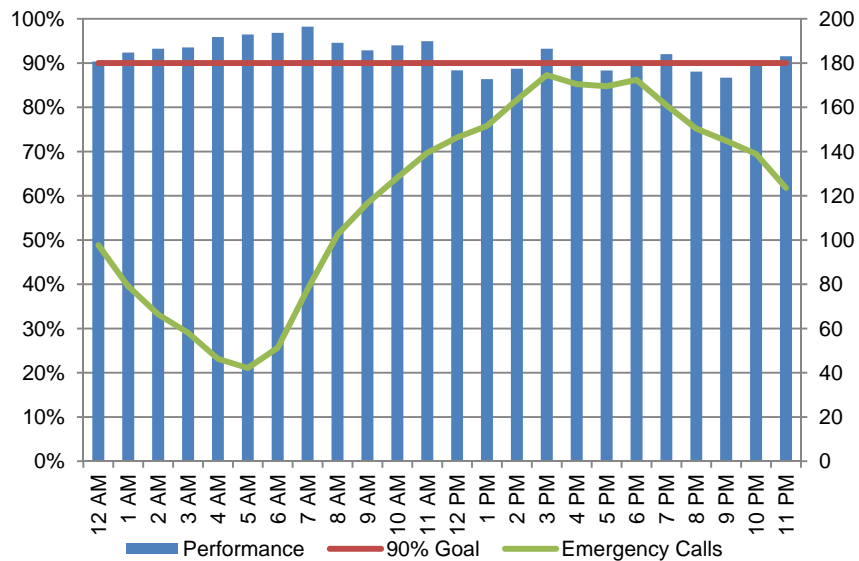
**Exhibit 7 Percent of Emergency Calls Answered within 10 Seconds by Day of Week in Fiscal Year 2012**



**Source:** Positron records July 1, 2011, through June 30, 2012.

Answer time performance was inconsistent across hours of the day. The center fell short of its goal of answering 90% of emergency calls within 10 seconds during 7 hours of the day—from noon until 3:00 pm, from 5:00 pm to 7:00 pm, and from 8:00 pm to 10:00 pm (see Exhibit 8). The number of 911 calls was highest during the hour of 3:00 pm when call takers answered a median of 175 calls per hour compared with a median of 42 calls per hour at 5:00 am.

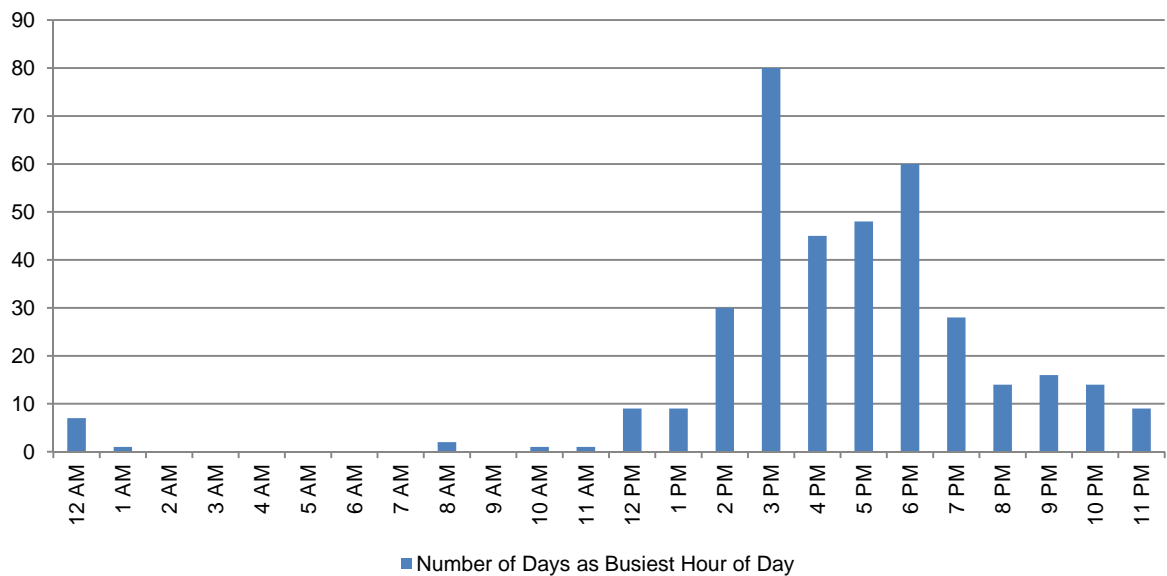
**Exhibit 8 Percent of Emergency Calls Answered within 10 Seconds by Hour of Day in Fiscal Year 2012**



**Source:** Positron records July 1, 2011, through June 30, 2012.

Overall, the center answered 86% of emergency calls received during the busiest hour of each day within 10 seconds, and achieved the NENA benchmark of answering 90% of E911 calls within 10 seconds at the busiest hour of each day, about half the time. The NENA benchmark is more stringent than the department's goal because quicker answer times during periods of low call volume are not averaged with busier times when it is more difficult to meet the goal. The hour between 3:00 pm and 4:00 pm was the busiest hour of the day during 80 days in fiscal year 2012 (see Exhibit 9). The three hours between 4:00 pm and 7:00 pm were busiest for another 153 days.

**Exhibit 9 Number of Days Hour Was Busiest in Fiscal Year 2012**



**Source:** Positron records July 1, 2011, through June 30, 2012.

Overall staffing level was sufficient in fiscal year 2012. Because the center was able to meet its overall call answer goal we conclude that the overall staffing level was adequate in fiscal year 2012, recognizing that the center supplemented staffing with overtime.

**Attempt to Adhere to ISO Staffing Criterion Resulted in Overstaffing During Low Call Volume Periods**

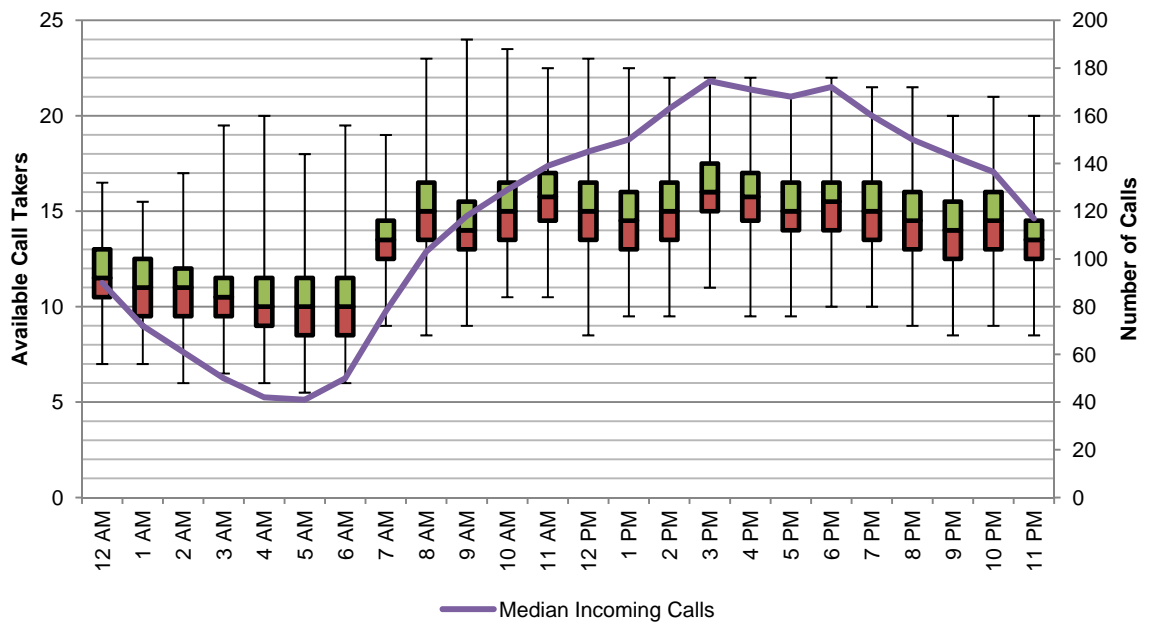
The center has more staff than needed during early morning hours to meet its answer time goal. The number of emergency calls to 911 was lowest between midnight and 7 am. The center typically had 10-11 call takers on duty during these hours, apparently due to a misinterpretation of ISO rating criteria, and answered 94% of



emergency calls within 10 seconds. Most call taker time during these hours was spent waiting for a call and the median time call takers spent on a call was longer than during busier times of day.

Staffing levels didn't match workload throughout the day. The E911 center had medians of 10 to 12 call takers logged in between midnight and 7:00 am. Exhibit 10 below shows the distribution of call takers logged into Positron by hour of day in fiscal year 2012. The line in the center of each box represents the median, the bottom of the red box represents the 25<sup>th</sup> percentile, the top of the green box represents the 75<sup>th</sup> percentile, and the tails at the opposite ends of the boxes show the minimum and maximum. The line overlaying the box and whisker plot shows the median number of emergency calls per day.

**Exhibit 10 Call Takers on Duty by Hour of Day Compared to Workload**



**Source:** Positron records July 1, 2011, through June 30, 2012.

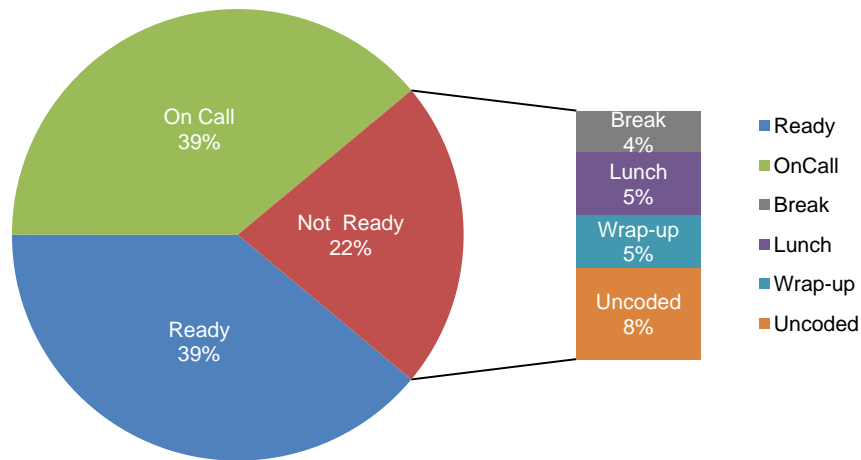
Exhibit 10 shows, for example, that at the hour between 5:00 am and 6:00 am, when workload was lowest, the center had at least 9 call takers logged in to Positron on 75% of the days, had at least 10 call takers logged in on 50% of the days, and had at least 12 call takers logged in on 25% of the days in fiscal year 2012. The center never had fewer than five call takers on duty. The maximum number of call takers logged in at the 5:00 am hour reached 18. At 3:00 pm, when workload was highest, the center had at least 15 call takers logged in to Positron on 75% of the days, had at least 16 call

takers logged in on 50% of the days, and had more than 17 call takers logged in on 25% of the days. The maximum number of call takers on duty at the 3:00 pm hour reached 22.

While the distribution of call takers on duty tracked call volume to some extent, dropping between midnight and 4:00 am and increasing at day shift, call volume shows a steeper drop and steeper climb during the day than staffing. Consequently, call takers were much busier during the afternoon and evening.

**Positron tracks call takers' activities.** Overall, call takers spent 39% of their time on calls, 39% of their time ready for the next call (recorded as a status of idle in Positron), and 22% of their time unavailable, or not ready to take a call, in fiscal year 2012 (see Exhibit 11).

**Exhibit 11 Overall Distribution of Call Taker Time in Fiscal Year 2012**



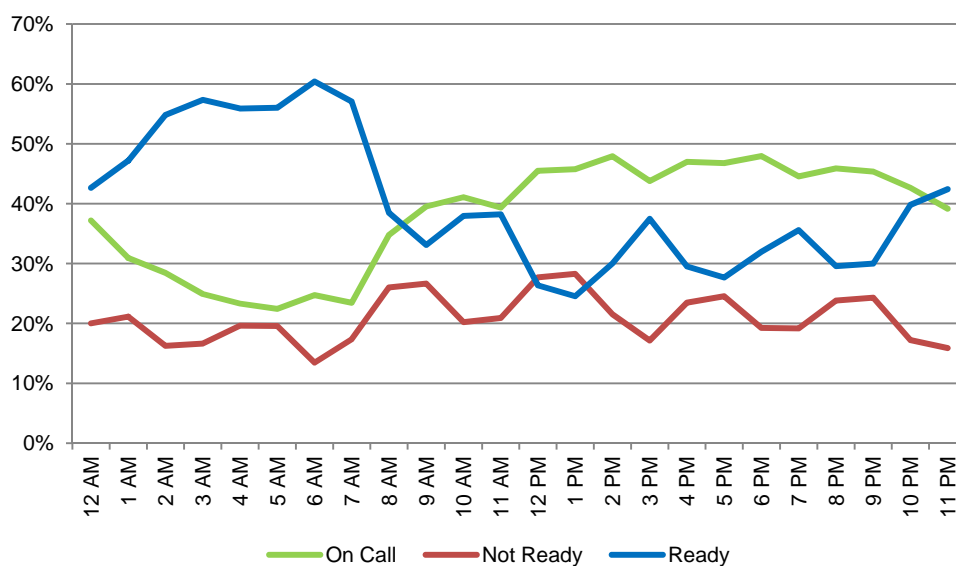
**Source:** Positron records July 1, 2011, through June 30, 2012.

Positron tracks the status of call takers logged into the system. Call takers can put themselves in a status of “not ready” if they are on a meal or other break, or if they are wrapping up a call after the caller is no longer on the line, by recording information into CAD, for example. Positron does not route calls to call takers with an unavailable status. If no call takers are logged in with an available status, the call shows up in queue. Eight percent of total time, accounting for 37% of “not ready” time, had no sub-code in the system. All emergency operations will have significant idle time in

order to maintain stability. Meeting higher service standards requires more idle time.

Time spent on calls was twice as high during afternoon and evening hours compared to early morning. Call takers spent close to 50% of their time on emergency calls in the late afternoon and early evening and spent about 25% of their time on emergency calls during the early morning hours. Conversely, between 50% and 60% of call takers' time from 2:00 am to 7:00 am was spent waiting to take the next call, compared with about 30% of call takers' time between noon and 9:00 pm (see Exhibit 12). The median percent of time that call takers were logged in with an unavailable status varied between a low of 13% and high of 28%, and was lower at shift changes and higher during break times.

**Exhibit 12 Distribution of Call Taker Time by Hour of Day**

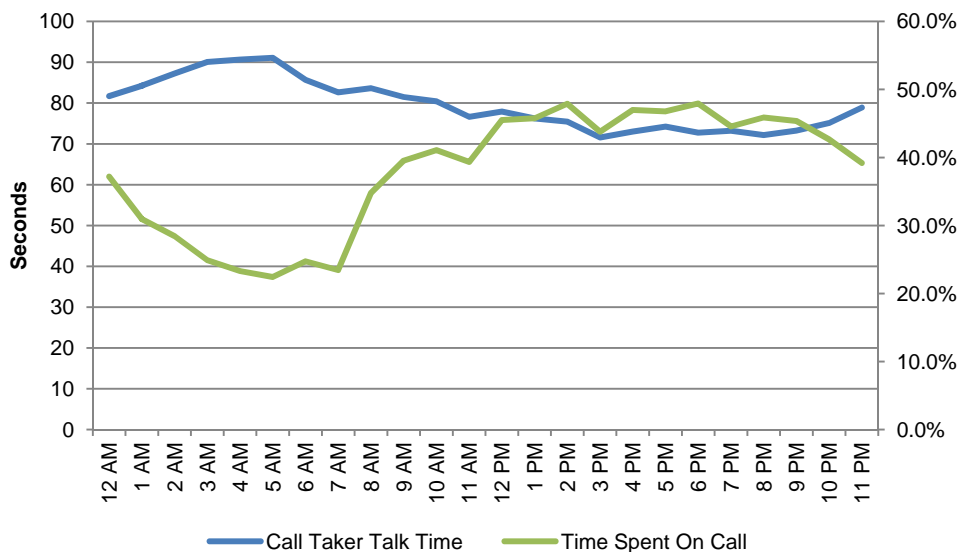


**Source:** Positron records July 1, 2011, through June 30, 2012.

We were unable to find a benchmark for how many hours per shift call takers should be available or unavailable to handle calls at emergency communications centers. Each employee at the center is granted two thirty minute paid breaks per shift. Employees are also allowed to take restroom breaks as needed. Based on these breaks, about 1.25 hours or 15% of a shift is a reasonable amount of time for call takers to be unavailable to take calls. Most employees are compensated for 8.25 hours each shift.

The median time call takers spent on each call was longer during periods of low call volume than during busier periods. Exhibit 13 shows the median time a call taker spent on each call by hour of day—the blue line—compared to the percentage of time call takers spent on call by hour of day. While call takers spent less than 30% of their time on emergency calls in the early morning hours, they spent longer on each individual call. The difference could result from fewer duplicate calls or pocket dials that are more quickly resolved, but could also reflect less urgency to complete a call when the center is not busy.

**Exhibit 13 Median Call Taker Talk Time by Hour of Day Compared to Percentage of Time Spent On Call**



**Source:** Positron records July 1, 2011, through June 30, 2012.

Overstaffing during the morning shift resulted from an apparent misinterpretation of ISO rating criteria. We conclude that the E911 center is overstaffed on the morning shift relative to workload. The director told us that the center tries to schedule a minimum of 11 call takers on duty at all times to meet the ISO rating criteria. The attempt appears to be based on a misinterpretation of the ISO criteria.

The ISO provides maximum credit for operators on duty to PSAPs that meet NFPA call answering and dispatch time performance measurement standards. If data are not available, credit is computed based on the number of telecommunicators on duty and call volume (see Exhibit 14). Centers that receive over 300,000 calls per year require 11 telecommunicators, and every additional 87,600

calls per year greater than 300,000 adds an additional telecommunicator on duty to receive maximum credit. Based on call volume, ISO's 2009 report would require Atlanta's E911 center to have 18 telecommunicators on duty at all times to receive maximum credit.

ISO's 2009 report for Atlanta calculated a score of 1.2 out of 3 as a credit for operators stating, "For maximum credit, there should be 18 operators on duty at all times. There are an average of 7.25 operators on duty at the communication center."<sup>3</sup> After the report was issued, managers decided to schedule at least 11 call takers on each shift because they determined that scheduling a minimum of 18 call takers per shift was not feasible.

**Exhibit 14 ISO Call Volume Matrix Table for PSAPs that Perform Call Taking and Dispatching**

Alarms per Year	Number of Needed Telecommunicators <sup>4</sup>
Less than 731	1
731 to 10,000	2
10,001 to 25,000	4
25,001 to 50,000	5
50,001 to 100,000	6
100,001 to 150,000	7
150,001 to 200,000	8
200,001 to 250,000	9
250,001 to 300,000	10
Over 300,000	11

**Source:** Public Protection Summary Report Atlanta, Georgia, prepared by Insurance Services Office, Inc., May 2009, p. 12

ISO's pre-survey information request asks agencies how many telecommunicators are on duty per shift and shift arrangements (See Exhibit 15). The form does not define the term "telecommunicator," but based on the context of the form, it is intended to include persons on duty working as call takers, dispatchers, and supervisors. The survey covers communications and dispatch but does not distinguish between call takers and dispatchers. Question 22 asks whether other personnel "are trained as telecommunicators so they can assist if needed as call takers or

<sup>3</sup> Public Protection Summary Report Atlanta, Georgia, prepared by Insurance Services Office, Inc., May 2009, p. 13.

<sup>4</sup> Communications centers that provide emergency medical dispatch require at least two operators on duty at all times. Supervisors are included when the required number is four or more.

dispatchers.” We talked to a service representative at ISO who agreed that dispatchers would be included in the count of available telecommunicators if they were trained as call takers and noted that ISO does not verify all self-reported information provided by agencies.

**Exhibit 15 Excerpt from ISO Presurvey Information Request for Communication/Dispatch Centers**

**Telecommunicators**

*At this point in the questionnaire we are ready to find out information about the telecommunications staff. The information provided will help us assess the number of telecommunicators you have relative to the number you need.*

17. Indicate the number of police, EMS, fire, and other emergency calls received during the past year or 12-month period by the communication/dispatch center:  
 Emergency calls: \_\_\_\_\_ Year or dates of the 12-month period: \_\_\_\_\_  
 Provide an exhibit to document this information (Exhibit 9B – 20 – Number of Calls)

18. Indicate the number of telecommunicators on duty per shift and the shift arrangements:  
 Number of telecommunicators: \_\_\_\_\_ Shift: \_\_\_\_\_  
 Number of telecommunicators: \_\_\_\_\_ Shift: \_\_\_\_\_  
 Number of telecommunicators: \_\_\_\_\_ Shift: \_\_\_\_\_  
 Number of telecommunicators: \_\_\_\_\_ Shift: \_\_\_\_\_  
 Provide an exhibit to document this information (Exhibit 9B – 21 – Shift Roster)

---

19. Do telecommunicators provide EMD protocols? Yes:  No:

20. Are telecommunicators allowed to sleep while on duty? Yes:  No:   
 If yes, please identify the periods when they are allowed to sleep and how many telecommunicators are allowed to sleep:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

21. Is a supervisor always on duty with the telecommunicators? Yes:  No:   
 If yes, where is the supervisor located? \_\_\_\_\_  
 If no, please indicate the days of the week and times when there is no supervisor on duty:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

22. Are any other personnel (director, administrative staff, etc.) available in the communication/dispatch center and trained as telecommunicators so they can assist if needed as call takers or dispatchers?  
 Yes:  No:   
 If yes, please indicate the following for each person:  
 a. Position title: \_\_\_\_\_  
 b. Normal location in the communication/dispatch center: \_\_\_\_\_  
 c. Hours per week they are normally available: \_\_\_\_\_  
 Note: For additional personnel, please provide the above information on an attached page (see Appendix A).

**Source:** ISO Presurvey Information Request for Communication/Dispatch Centers, p. 3-4, copyright ISO Properties, Inc., 2005.

ISO is an independent company that collects and evaluates information to assign a “Public Protection Classification” number to a community’s fire suppression system based on the alarm and communication system, fire department, and water supply. Some insurance companies use the classifications to establish insurance rates. The call center staffing criterion accounts for 3% of the total possible score.

### **Shifting Staff Could Improve Performance and Reduce Overtime**

Shifting some staff from early morning to the afternoon hours when call volume is higher should help the center meet the answer time goal more consistently and could also reduce overtime. Research attributes poor morale and high turnover among 911 call takers and dispatchers to excessive overtime.

To maintain a goal for the percentage of time call takers spend waiting for a call each hour, the center will have to shift staff. We calculated the number of call takers needed on duty by hour of day to handle existing workload while equalizing time waiting to take the next call at 33% of call takers’ time. We determined this value by combining the staff’s ability to answer calls within 10 seconds with the median percentage of time where call takers are waiting to take the next call. In Exhibit 16, “Ready Time” refers to the percentage of time where call takers are available to take the next call. Exhibit 16 shows performance and ready time percentages in order of increasing ready time percentages. The pink highlighted rows indicate hours where the center did not meet its performance goal. When the time waiting for the next call is less than 33% of a call takers’ time, the center missed its performance goal for all but two hours.

**Exhibit 16 Increasing Percentage of Ready Time and the Corresponding Median Performance by Hour of Day**

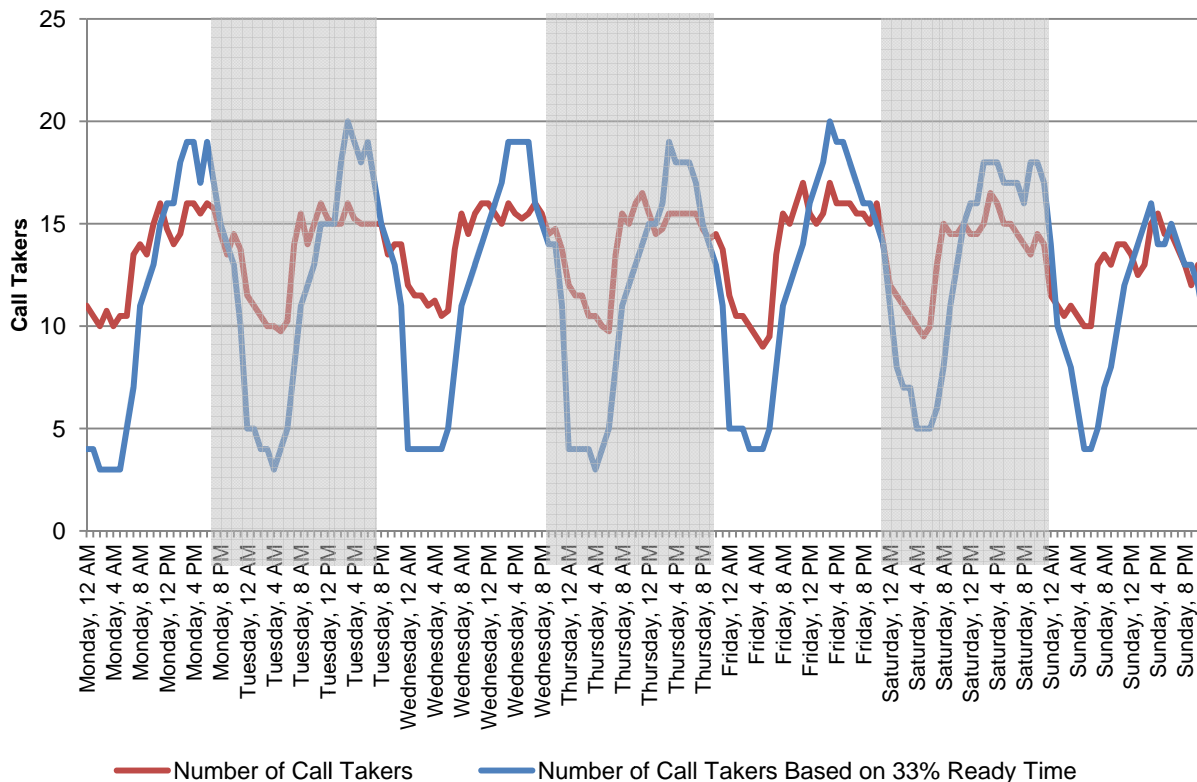
Hour	Performance	Ready Time
1 PM	86.4%	24.5%
12 PM	88.4%	26.4%
5 PM	88.3%	27.7%
4 PM	90.5%	29.5%
8 PM	88.1%	29.6%
9 PM	86.7%	30.0%
2 PM	88.7%	30.0%
6 PM	90.0%	32.0%
9 AM	92.9%	33.1%
7 PM	92.0%	35.6%
3 PM	93.2%	37.5%
10 AM	94.0%	38.0%
11 AM	94.9%	38.2%
8 AM	94.6%	38.5%
10 PM	90.6%	39.8%
11 PM	91.6%	42.4%
12 AM	90.3%	42.6%
1 AM	92.4%	47.2%
2 AM	93.2%	54.8%
4 AM	95.9%	55.9%
5 AM	96.5%	56.0%
7 AM	98.3%	57.1%
3 AM	93.5%	57.3%
6 AM	96.8%	60.4%

**Source:** Positron Data from July 1, 2011, to June 30, 2012

Exhibit 17 compares the results of our model with the number of call takers logged into the Positron system who are either on a call or unavailable to take calls. Our model adds staff between noon and 9:00 pm and reduces staff between 11:00 pm and 8:00 am, while reducing the overall hours per week by about 305 hours. The model suggests that the center overstaffs the morning shift and would improve its afternoon performance by realigning resources.



**Exhibit 17 Comparison of Actual Staffing to Model**



**Source:** Positron data and auditor's analysis

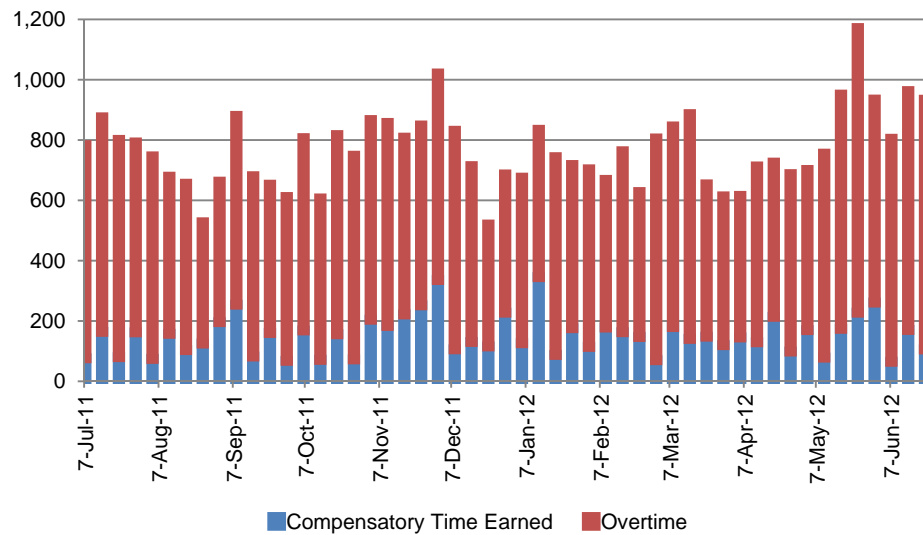
The E911 center uses no formula or software to determine the number of staff needed or to schedule staff among shifts. According to a 2005 Association of Public Safety Communications Officials report, 81% of large communications centers used staffing formulas, with 15% using an Erlang model. This type of model was developed from queuing theory. It calculates the number of call takers needed to handle a given volume of calls, given the average time to process each call and the desired performance. The Erlang-C model is often used by commercial call centers, but researchers have noted that the complexity of the formula may intimidate individuals who lack a mathematical background. Individual calls, for example, are assumed to arrive randomly in a *Poisson* distribution, while in reality calls often spike in response to an event, such as a traffic accident on the Interstate; the occurrence of the event is random but the groups of calls are not. The spikes in calls can create backlogs that affect performance.

We used an online calculator to compute the number of call takers needed by hour of day based on the Erlang formula. The results projected much lower staffing levels than the center employed in

fiscal year 2012. While we are not suggesting that the center reduce its staff to the levels calculated under the Erlang model, the results suggest that the center can meet its performance goals with fewer call takers on duty.

**Scheduling practices increased overtime in fiscal year 2012.** For every 8-hour regular shift, call takers and dispatchers worked an average of an hour and 25 minutes of overtime or compensatory time in fiscal year 2012, about 40% higher than a cap recommended by the Nuclear Regulatory Commission for employees at nuclear power plants. Excessive overtime can lead to fatigue, increased risk of mistakes, and increased absences. The center regularly schedules employees extra hours before and after shifts to fulfill assumed staffing requirements. The center’s employees worked about 760 hours of overtime and compensatory time per week in fiscal year 2012 (see Exhibit 18).

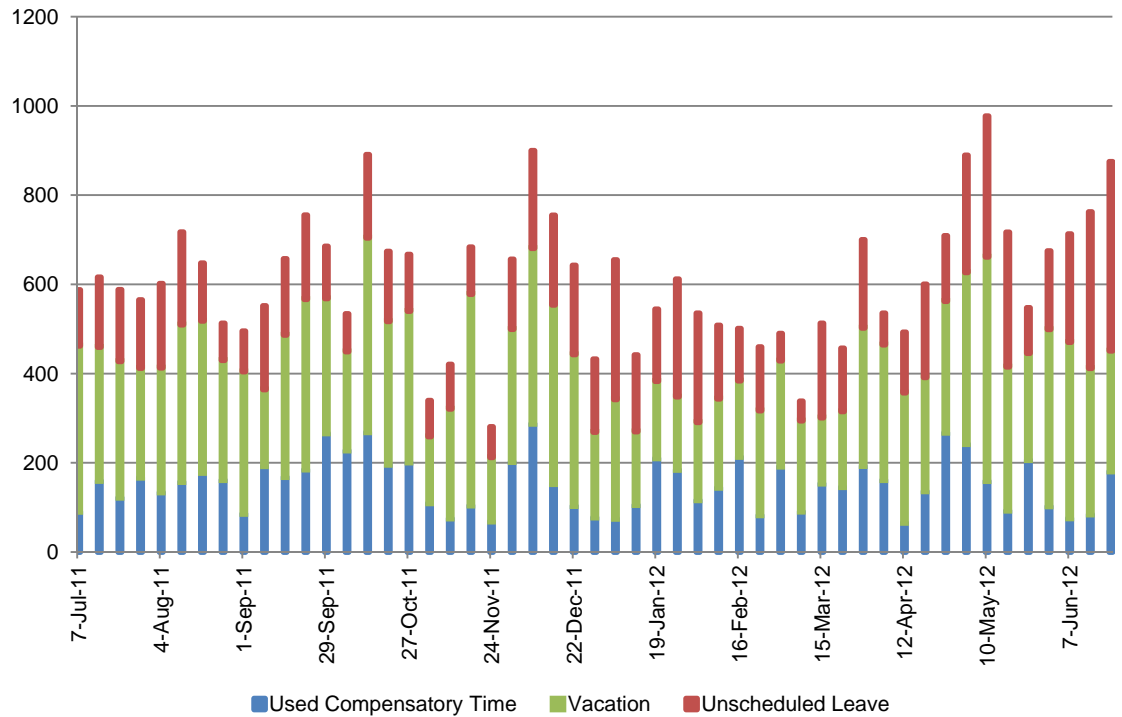
**Exhibit 18 Total Overtime and Compensatory Hours Worked by Week in Fiscal Year 2012**



**Source:** Kronos Data from July 1, 2011, to June 30, 2012.

City employees earn compensatory time off in lieu of overtime pay at the rate of 1.5 hours for each hour worked beyond their regularly scheduled work period. The combined use of overtime and compensatory time has a cyclical effect. The absences that occur from employees’ use of compensatory time require the center to use additional compensatory time and overtime to cover absences. Average weekly leave time was 610 hours, with about 25% due to employees taking earned compensatory time off (see Exhibit 19).

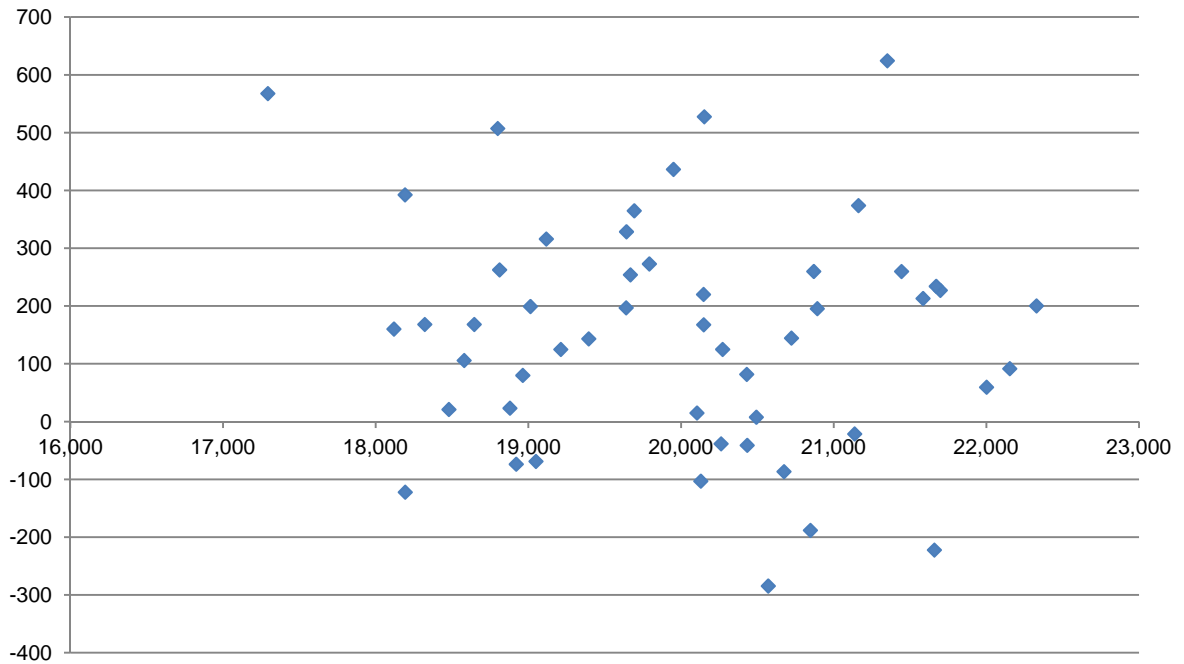
**Exhibit 19 Scheduled and Unscheduled Leave Time Granted by Week in Fiscal Year 2012**



**Source:** Kronos data from July 1, 2011, to June 30, 2012.

Overtime worked was uncorrelated with workload. The use of overtime in fiscal year 2012 did not appear to be targeted. We found no correlation between the amount of overtime and compensatory time worked and workload. Exhibit 20 shows a scatterplot with the number of calls received at the center per week on the horizontal axis and the number of overtime and compensatory time worked beyond the number of leave hours taken per week on the vertical axis.

**Exhibit 20 Comparison of Weekly Overtime and Compensatory Time Worked to Workload in Fiscal Year 2012**



**Source:** Kronos Data and Positron records from July 1, 2011, to June 30, 2012.

Overtime contributes to staffing and retention issues in the communications industry. A study conducted by the Association of Public Safety Communications Officials found that the demands of being a communications employee are less likely to contribute to burnout than excessive overtime. According to the study, as overtime hours increased, retention rates and employee satisfaction decreased, and that was especially true when overtime was required or mandatory. The city’s integrity line received a complaint about the center during the review period. In the complaint the caller reported that employees at the center did not have a choice about working overtime hours. The center director stated that employees were previously required to work overtime in order to meet staffing needs, but the center stopped requiring overtime in fiscal year 2013.

Staffing level is sufficient to meet workload. We estimate that the E911 center needs 131 call takers, dispatchers, and supervisors to cover existing workload, training and leave, which was about how many positions the center had filled as of October 2012, excluding trainees. Better aligning staffing with workload could both improve performance during busy hours and reduce overtime.

Developing a shift schedule to better align staffing with workload will likely require more than three shifts to stagger when employees come on and off duty. We recommend the Chief of Police consider alternative scheduling. The Chief of Police should create staggered breaks and monitor how center employees use their time.

### **Implementation of the 311 Call Center Will Likely Reduce 911 Calls**

Although most E911 calls are not emergencies, it is unclear how much E911 call volume will be reduced by implementation of a 311 call center to consolidate non-emergency call handling for all city services. In fiscal year 2012, 43% of 911 calls resulted in dispatching a police or fire unit or were transferred to another public safety agency. The remaining 57% of calls consisted of non-emergency requests for information or referral for city services, duplicate emergency calls, and pocket dial or misdial calls. In its research and planning for the 311 center, the Mayor's Innovation Delivery Team also estimated that over 50% of E911 calls currently received are non-emergency calls. The team observed call-taking operations for one 12-hour day and recorded the number of non-emergency calls. Based on this assessment, the team concluded that the largest percentage of non-emergency calls were pocket dials and misdials, with a smaller number of calls attributed to non-emergency calls such as requests for city services, non-emergency police calls, and duplicate emergency calls. A 311 system would not affect the volume of pocket dials and misdials.

Other large cities have reported reductions of 15% to 42% of 911 calls following implementation of a 311 system:<sup>5</sup>

- Baltimore, MD - 42% reduction of the calls to 911
- Chicago, IL - 15% reduction of the calls to 911
- Austin, TX - average 33% reduction of calls to 911
- Houston, TX - average 35% reduction of calls to 911

Based on the experience of other cities and the Innovation Delivery Team's observations, it seems likely that a 311 system will reduce the E911 center call volume, but it is not clear how big a reduction to expect.

---

<sup>5</sup> City of Atlanta 311 Call Center Evaluation Final Report, p. 41

---

## Process Changes Are Speeding Dispatch to Emergency Calls

While the E911 Communications Center dispatched less than two percent of priority 1 emergency calls within 60 seconds in fiscal year 2012, process changes initiated by the Atlanta Police Department have begun to improve dispatch times, without the need for additional staff. Call takers began sending information to the dispatcher while still gathering information from the caller so that parts of the call taking process were conducted simultaneously with dispatch rather than sequentially. Although fire dispatch times improved, the center was still far from reaching the NFPA standard of dispatching 90% of fire calls within 60 seconds. Industry literature suggests that the benchmark may not be reasonable - the processing time for fire dispatch is closer to 92 seconds for communications centers.

The center was unable to measure whether it met its goal of transferring 90% of emergency medical calls to Grady Hospital within 90 seconds; however, staff told us that a scheduled upgrade to Positron should allow this capability.

We recommend the Chief of Police continue to reinforce the simultaneous call dispatching process and monitor dispatch times to ensure that call takers are dispatching calls as soon as possible. The center should analyze individual call taker performance and use the results to target training efforts.

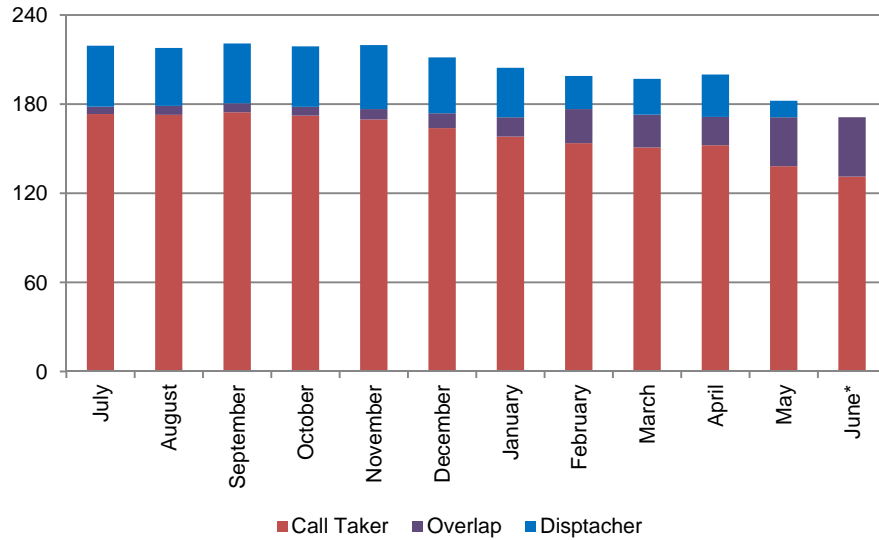
### Time to Dispatch Emergency Calls Improved During Fiscal Year 2012

Although the center's dispatch time was far below the NFPA standard for dispatching 90% of calls within 60 seconds, the dispatch time improved during the period we reviewed. The center shortened the amount of time to dispatch priority 1 emergency calls by training call takers to use a "send and update" approach so that dispatchers are notified sooner. Priority 1 incidents consist of primarily emergency medical calls, but can also include fire, special operations, and service calls. The NFPA standard may not be a realistic goal for the center to achieve. Despite the improvement in dispatch time, the percentage of priority 1 fire calls the center dispatched within 90 seconds only reached 15% during fiscal year 2012. Industry literature suggests that the processing time for fire dispatch is closer to 92 seconds for large communications centers.

The center has reduced the time for dispatching high priority fire calls by implementing simultaneous call processing. The center implemented a new "fire four" process for answering fire calls in May 2012. The process directs call takers to obtain the most pertinent information on a call, transfer the call to a dispatcher, and then continue to update the dispatcher with supplementary details regarding the incident while units are en-route to the scene. The process instructs the call taker to ask: 1) What is the location? 2) What is on fire? 3) Is anyone trapped or hurt? Finally, the call taker verifies the caller's name and telephone number. Call processing includes the time from when the call is answered to the time that the fire station is notified of the call.

Exhibit 21 illustrates that the center has improved dispatch times since implementing the new process in May 2012. The columns represent the time of the total process from when a priority 1 fire emergency call comes in until a response unit receives notification. The red and purple areas in the exhibit represent the total time a call taker is on a call. This time remained relatively constant from July 2011 to June 2012. The blue and purple areas represent the amount of time it takes for a dispatcher to notify a response unit after receiving a request. The purple area represents the overlap between call taking and dispatching - beginning at the point at which the call taker transfers information to the dispatcher and ending when the call taker releases the call. The growth of the purple area indicates that call takers are sending emergency requests to dispatchers earlier in the call. The median overlap between call taking and dispatch increased from 5 seconds in July 2011 to 40 seconds in June 2012. This overlap shortened the overall dispatch time, even though the total time the call taker spent on the call decreased little.

**Exhibit 21 Median Time to Dispatch High Priority Fire Calls by Month in Fiscal Year 2012**



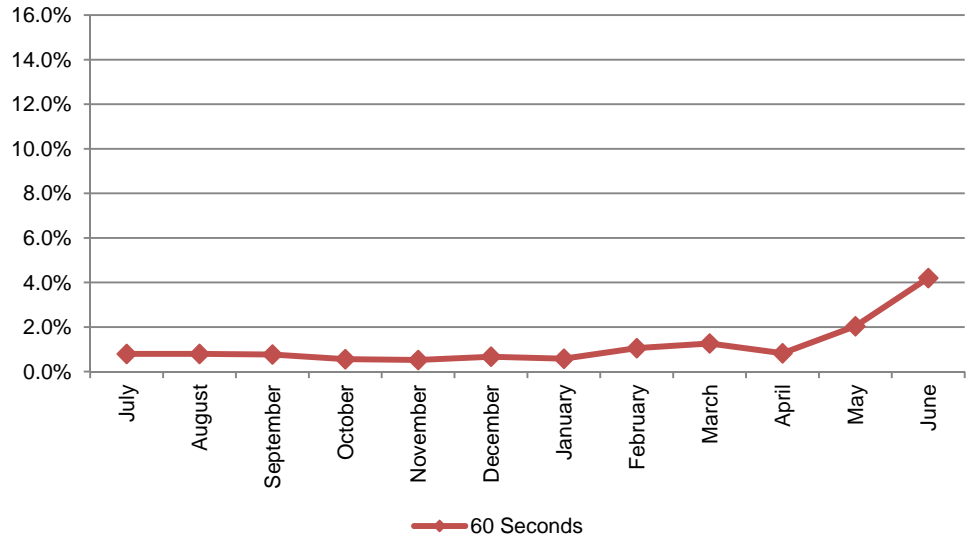
**Source:** Positron and CAD records July 1, 2011, through June 30, 2012.

The center put the process change in place after noting during an internal processing time analysis that “23 out of 41 operators are at least 50% slower than the fastest.” The report, prepared by the Atlanta Police Department in March 2012, noted that large variations in employee performance at the center suggest that significant improvements in processing times could be achieved through employee training and performance management.

The center processed 1.2% of fire priority 1 calls within 60 seconds during fiscal year 2012. The center did not meet the NFPA standard of dispatching 90% of fire calls within 60 seconds. However, the percentage of calls the center processed within 60 seconds began to improve toward the end of fiscal year 2012, as shown in Exhibit 22. Priority 1 incidents consist of primarily emergency medical calls, but can also include fire, special operations, and service calls.



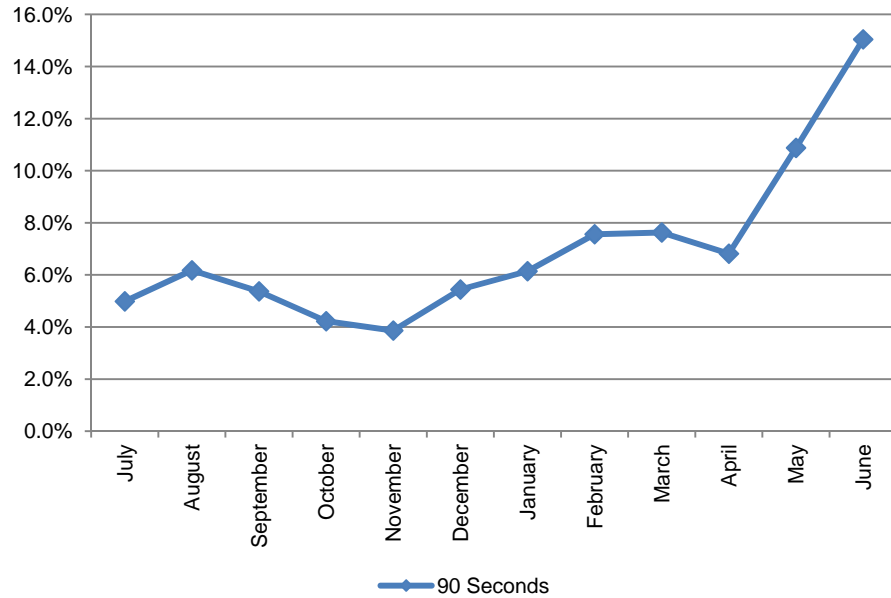
**Exhibit 22 Percentage of Fire Priority 1 Calls Processed within 60 Seconds by Month in Fiscal Year 2012**



**Source:** Positron and CAD records July 1, 2011, through June 30, 2012.

Sixty seconds may be an unrealistic goal for the center to achieve. Although fire dispatch times are improving, as shown in Exhibit 21, the percentage of priority 1 fire calls the center dispatched within 90 seconds only reached 15% during fiscal year 2012, shown in Exhibit 23. A report published by the NFPA in May 2010 suggests that most communication centers are not able to meet the 60 second standard for dispatching 90% of fire calls. The report surveyed large fire departments and found that the time required for handling 90% of fire calls was 92 seconds, slightly over one and one-half times the standard.

**Exhibit 23 Percentage of Fire Priority 1 Calls Processed within 90 Seconds by Month in Fiscal Year 2012**



**Source:** Positron and CAD records July 1, 2011, through June 30, 2012.

**System Limitations Prevented the Center from Measuring Time to Transfer Emergency Calls to Other Agencies**

Some calls to 911 require transfers to secondary answering points or communication centers. At the time of our audit, the center was unable to measure its transfer time performance because the Positron system did not record transfer time data.

NFPA requires primary communication centers to transfer at least 95 percent of calls to secondary answering points within 30 seconds. The center transfers calls to other 911 centers, police and fire departments in neighboring counties, as well as to hospitals. The majority (58.6%) of the calls that the center transfers are to Grady Hospital.

E911 center staff told us that although the center was unable to obtain transfer time data for fiscal year 2012, the vendor recently released a system update to include a time stamp for call transfer time. This will enable the center to track its performance.

---

## Recommendations

---

In order to more consistently reach its performance goals while optimizing existing staff resources and reducing overtime costs, the Chief of Police should direct the E911 communications center to:

1. Purchase scheduling software that will allow the center to develop shift schedules that optimize staff resources.
2. Develop and implement shift schedules for communications staff that align staff with the call workload. The center director should create staggered breaks.
3. Require communications staff to properly record their status in the Positron system, eliminating any un-coded time.
4. Continue to reinforce the existing call dispatching procedures and monitor dispatch times to ensure that call takers continue to transfer information to dispatchers as quickly as possible. Examine individual staff performance times and use the results to target training.



---

## Appendices

---



Appendix A Management Comments and Response to Audit Recommendations

<b>Report # 12.01</b>	<b>Report Title: E911 Communications Center</b>	<b>Date: 03/27/13</b>
<b>Recommendation Responses</b>		
<b>Rec. #1</b>	The Chief of Police should direct the E911 Communications Center to purchase scheduling software that will allow the center to develop shift schedules that optimize staff resources.	<b>Agree</b>
<b><u>Proposed Action:</u></b>		The department will conduct an assessment of scheduling software options and select and implement the appropriate solution.
<b><u>Implementation Timeframe:</u></b>		The estimated time frame for implementation is 6 months to 1 year.
<b><u>Responsible Person:</u></b>		Deputy Chief Shields
<b>Rec. #2</b>	The Chief of Police should direct the E911 Communications Center to develop and implement shift schedules for communications staff that align staff with call workload. The center director should create staggered breaks.	<b>Agree</b>
<b><u>Proposed Action:</u></b>		The E911 Center will develop a plan to develop and implement a new shift schedule to improve the overall alignment with workload. In addition to the scheduling software referenced in Recommendation 1 above, this plan will include consideration of the current cross training program and other elements that are necessary to effectively support a more flexible schedule.
<b><u>Implementation Timeframe:</u></b>		The estimated time frame for implementation is 6 months to 1 year.
<b><u>Responsible Person:</u></b>		Deputy Chief Shields
<b>Rec. #3</b>	The Chief of Police should direct the E911 Communications Center to require communications staff to properly record their status in the Positron system, eliminating any un-coded time.	<b>Agree</b>
<b><u>Proposed Action:</u></b>		The E911 Center will immediately introduce appropriate coding and procedure updates to ensure full accounting of time.
<b><u>Implementation Timeframe:</u></b>		Within 6 months.
<b><u>Responsible Person:</u></b>		Deputy Chief Shields
<b>Rec. #4</b>	The Chief of Police should direct the E911 Communications Center to continue to reinforce the existing call dispatching procedures and monitor dispatch times to ensure that call takers continue to transfer information to dispatchers as quickly as possible. Examine individual staff performance times and use the results to target training.	<b>Agree</b>

<p><b><u>Proposed Action:</u></b></p>	<p>The Chief of Police will direct the E911 Center to maintain the current improvement plan which focuses on the following:</p> <ul style="list-style-type: none"><li>• Continuous improvement and streamlining of processes to speed up service to citizens</li><li>• Strong emphasis on raising the level of individual performance through training, building capacity and performance management</li></ul> <p>This program will continue to monitor and analyze performance data to ensure the department is driving towards the national best practice.</p>
<p><b><u>Implementation Timeframe:</u></b></p>	<p>This initiative is underway and will continue to be a key focus for the department.</p>
<p><b><u>Responsible Person:</u></b></p>	<p>Deputy Chief Shields</p>



Appendix B Atlanta Police Department's Comments



CITY OF ATLANTA

Kasim Reed  
Mayor

226 Peachtree Street, SW  
Atlanta, Georgia 30303  
(404) 546-6900

Atlanta Police Department  
George N. Turner  
Chief of Police

MEMORANDUM

TO: Leslie Ward  
City Auditor

FROM: George N. Turner *GNT/CS*  
Chief of Police

DATE: March 27, 2013

SUBJECT: Response to Performance Audit: E911 Communications Center  
Report #12.01

I would like to express my sincere gratitude to the City of Atlanta Auditor's Office for the professionally administered audit of the E911 Communications Center. The Atlanta Police Department concurs with the findings and recommendations of the audit.

The Atlanta Police Department is proud to operate the City of Atlanta E911 Communications Center, typically processing well over 1.1 million Police, Fire and EMS calls per year. The department is continually striving to provide the best possible service through improvement programs; utilizing the guidance of industry bodies such as NENA, NFPA and CALEA. With that philosophy and approach the department welcomes the rigor and scrutiny provided by the City Audit team.

The two main conclusions of the audit: Improved staff scheduling and continued focus on fire call processing - align with our own management analysis and assessment. Improved data availability and analysis is providing us with unprecedented insight into the operations of the E911 Center. This in turn is allowing us to make smarter decisions that serve to improve overall efficiency and effectiveness. Successful implementation of the audit recommendations will require that we continue with our current focus on cross training to increase the overall capability of the E911 Center staff.

Following the COA Audit into Fire operations in September 2011, the department underwent a thorough examination of its Fire and EMS call processing performance. Subsequently, through changes made to processes, and the individual effort of the call takers and dispatchers in the

Response to Performance Audit #12.01  
March 27, 2013  
Page 2 of 2

Center, we have made significant measurable improvements. On average, Fire calls are now processed over a minute faster than they were 12 months ago. Our team will continue to relentlessly drive this performance improvement so as to provide our citizens with the highest level of emergency service.

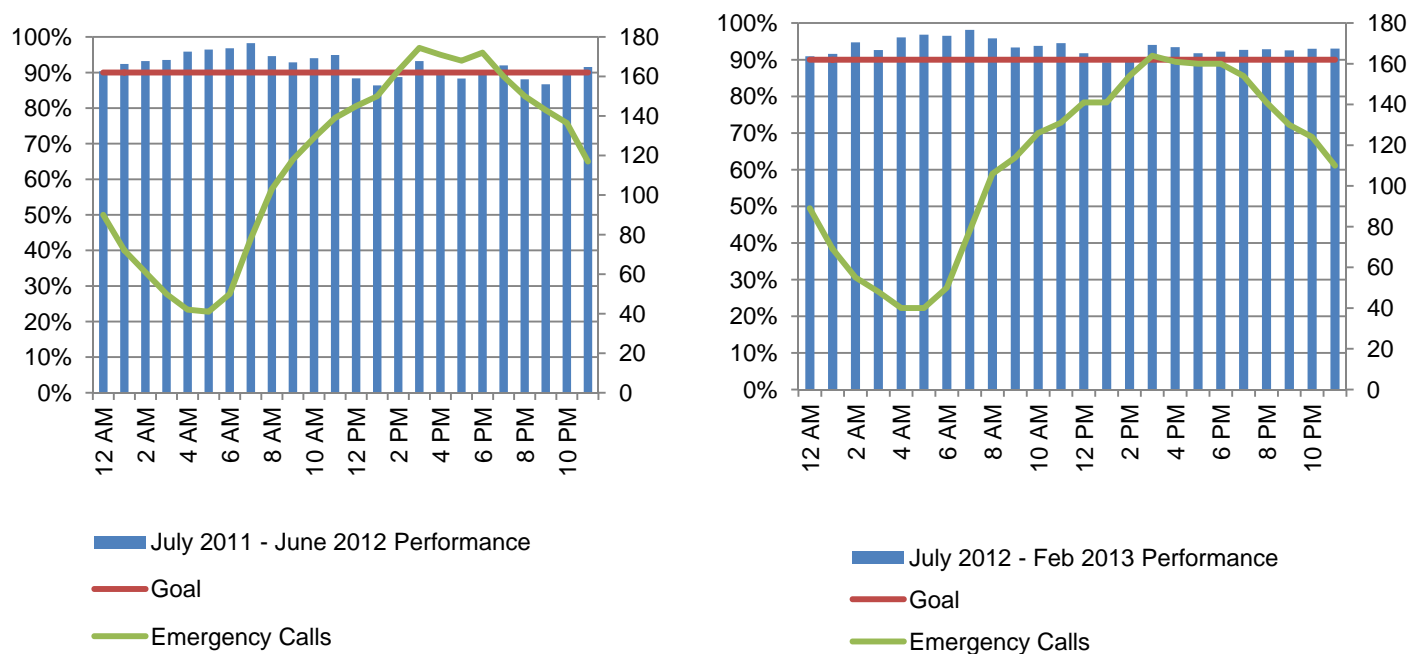
cc: Deputy Chief E. Shields  
Lieutenant D. Schierbaum

## Appendix C Updated Performance Data

As a supplement to the audit, we extended our analysis of the E911 Communications Center’s workload and performance data to include the time period from July 1, 2012, to February 28, 2013. We found that during this time period, the center improved call answer performance and continued to improve the time to dispatch high priority fire calls, shown in Exhibits 24 through 27 that follow. The center’s staffing levels, as well as the amount of time call takers spend both waiting for calls and actually on calls remained consistent with our previous analysis.

The E911 communications center has continued to exceed its goal of answering at least 90% of calls within 10 seconds. Overall, the center answered 93% of emergency calls within 10 seconds from July 2012 to February 2013, which is an improvement from 91% during the 2012 fiscal year (see Exhibit 8 on page 13). The center missed its target of answering 90% of call within 10 seconds for only one hour of the day at 1:00 pm. In fiscal year 2012, the center missed its goal during 6 hours of the day. Exhibit 24 indicates that the improvement occurred during the evening hours.

**Exhibit 24 Percentage of Calls Answered within 10 Seconds by Hour of Day**

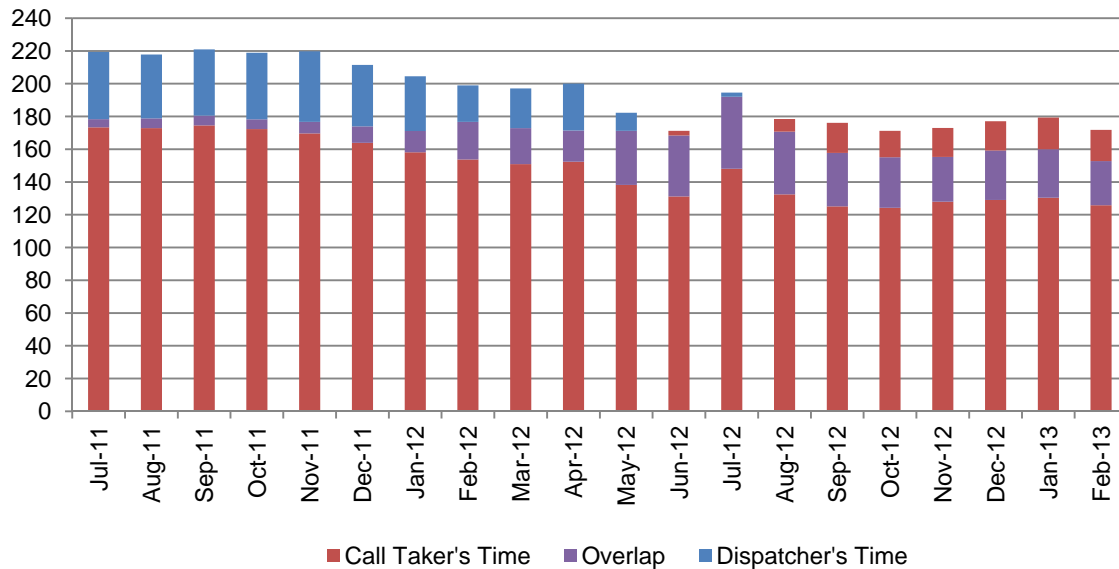


**Source:** Positron records from July 1, 2011, to February 28, 2013

The calling patterns and staffing levels remain consistent. The distribution of the busiest hour of day remained relatively similar to the pattern shown in Exhibit 9 on page 14. Also, the staffing levels from July through February remain similar to those shown in Exhibit 10 on page 15, which shows the distribution of call takers logged into Positron by hour of day. Further, the amount of time call takers spent on calls or waiting for incoming calls is similar to the call taker time distribution shown in Exhibits 11-13 on pages 16 - 18. Call takers spend longer on calls during the early morning hours than they do for calls during the busier hours of the day.

The E911 communications center continues to make improvements in dispatching high priority fire calls. The center has decreased the dispatch time for high priority fire emergency calls by more than one minute. In Exhibit 25 below, the red portion of the columns represents the time a call taker spends on the phone with a caller for an emergency call. The blue portion represents the time it takes a dispatcher to notify responding units after a call taker has initiated a request for dispatch. The overlap of these two processes is the purple portion of the column. From August 2012 through February 2013, the call center has been able to complete the entire dispatch process while a call taker is still on the phone. Data for the earlier period is also shown in Exhibit 21 on page 30.

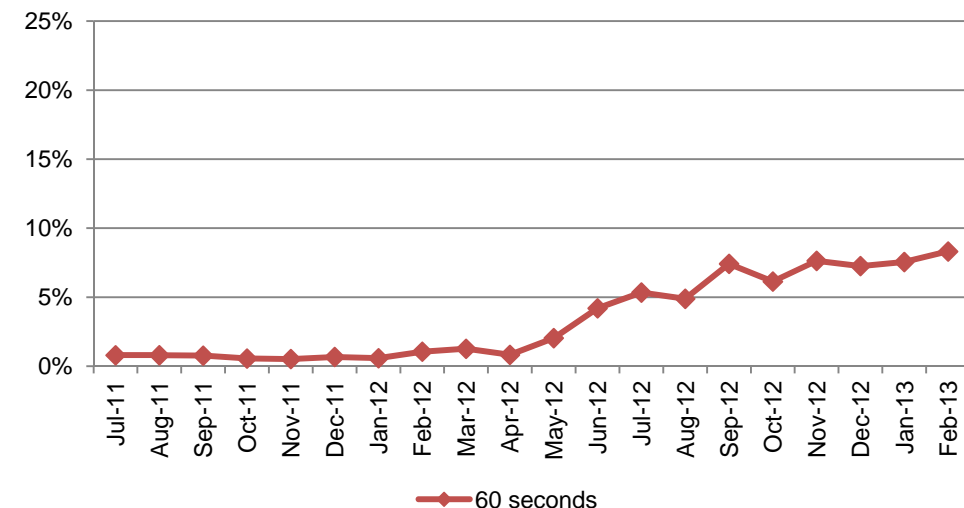
**Exhibit 25 Time to Dispatch High Priority Fire Calls by Month**



**Source:** Computer-Aided Dispatch and Positron records from July 1, 2011, to February 28, 2013

Although the NFPA goal of dispatching 90% of fire calls within 60 seconds remains unrealistic, the center dispatches more calls within 60 seconds. Exhibit 26 shows that the percentage of calls dispatched within 60 seconds has continued to increase since June 2012.

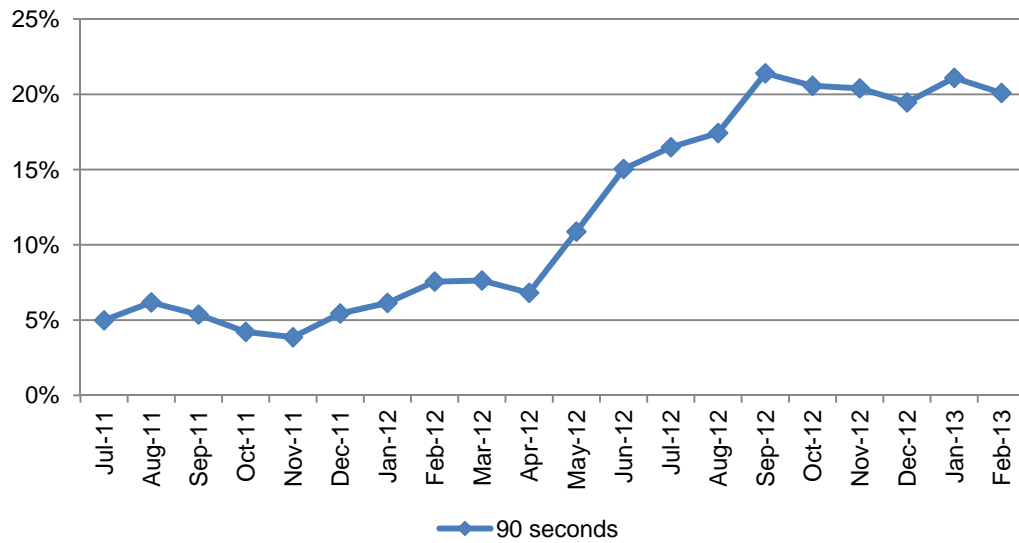
**Exhibit 26 Percentage of Fire Priority 1 Calls Dispatched within 60 Seconds by Month**



**Source:** Computer-Aided Dispatch records from July 1, 2011, to February 28, 2013

The center dispatches more calls within 90 seconds. Exhibit 27 below shows that the percentage of calls dispatched within 90 seconds has continued to increase from June 2012. The center dispatches one in five fire priority 1 calls within 90 seconds. The center's fire dispatch performance in fiscal year 2012 is also shown in Exhibits 22 and 23 on pages 31 and 32 of the audit.

**Exhibit 27 Percentage of Fire Priority 1 Calls Dispatched within 90 Seconds by Month**



**Source:** Computer-Aided Dispatch records from July 1, 2011, to February 28, 2013