APPROVED
AUDIT ADVISORY BOARD REGULAR MEETING
CITY OF FORT LAUDERDALE
CITY HALL 1st FLOOR COMMISSION CHAMBERS
TUESDAY, APRIL 23, 2013
5:00 PM

		Cumulative Attendance 1/1/13 – 12/31/13	
Board Member	**Attendance**	**Present**	**Absent**
Martin Kurtz, Chair	P	2	0
Bob Oelke, Vice Chair	P	2	0
Roger Ally	P	2	0
Jennifer Diehl	P	2	0
Richard Owen	A	1	1

Staff
Gina Rizzuti, Board Liaison
Douglas Wood, Director of Finance
Kirk Buffington, Deputy Director of Finance
Stanley Hawthorne, Assistant City Manager
Linda Logan-Short, Controller, Finance Department
John Herbst, City Auditor's Office
Marco Hausy, City Auditor's Office
Emilie Smith, Budget
Laura Garcia, Senior Accountant
Mike Maier, Chief Technology Officer
Kevin Keimel, Application Services Manager

Communication to the City Commission
None

Call to Order
Chair Kurtz called the meeting to order at 5:05 p.m.

- **Roll Call**

As of this date, April 23, 2013, there are 5 appointed members to the Committee, which means 3 would constitute a quorum. At this time, there is a quorum.

Review of January 31st, 2013 Meeting Minutes for Approval:

There was correction noted on page 6, paragraph line 24 & 25, the word audit should be replaced with budget.

> **Motion** made by Mr. Oelke, seconded by Mrs. Diehl to approve the minutes as corrected. In a voice vote, the motion passed unanimously.

5 – Year Plan: (See Attached Presentation)

Mr. Maier introduced himself to the Board. Mr. Maier explained to the Board that he was tasked by the City Manager to put together an IT 5-year strategic plan. This plan was presented to the Budget Advisory Board in June and then City Commission in November. City Commission gave their approval to proceed with the 5-year plan.

Mr. Maier highlighted the following areas:

- Department Strengths:
  - Dedicated and Innovative Staff
  - Modern GIS web-site

- Department Weaknesses:
  - No operating systems standards – Employees are using various versions of Microsoft
  - No Security Officer or Security Analyst
  - Outdated equipment
  - No PC replacement plan
  - Public Safety Radio Infrastructure is over 20-years old – replacement parts are only available on the black market and parts are drying up
  - Finance system has multiple interfaces that are all manual – requires "Humanoids" move data from one machine to another

- Challenges:
  - Upgrading the telephone system
  - Replacing the existing radio infrastructure that is over 20-years old
  - Upgrading Microsoft email system from 2003 to 2010
  - Implementing a PC replacement program

IT Study: Vulnerability Network

In June there was a RFP for a network vulnerability assessment. The vendor that was selected was Magellan Advisors. A final report was completed in November. The

details of the security assessment are confidential however; the information provided in the assessment justifies the decision to hire a Chief Security Officer along with a Security Analyst. Interviews for the Chief Security Officer were held about 3 weeks ago, final selection of the 3 remaining candidates will be held on May 10th. Mr. Maier is hoping for a June start date.

Discussion of Work Program and Risk Assessment

As discussed at a previous meeting, Mr. Herbst explained that he had completed a Risk Assessment and developed a Work Program but as the charter permits, the City Auditors Office is subject to requests of the Commission as it pertains to the work flow and overrules anything that he may put together and suggest to the Commission.

At the direction of the City Commission, his office is still working on the audit of the Resource Recovery Board and will continue to do so and the end of June. There is 100 million dollars on the table, the City of Fort Lauderdale's stake is somewhere between 16-20%. This is a worthwhile expenditure of his departments' time. Once the RRB audit is complete he will begin the review of the annual budget.

Mr. Oelke asked Mr. Herbst if he knew when the last time the employee insurance funds were audited. Mr. Herbst was not sure. Mr. Oelke further explained that he has heard rumors of claims being paid out that were not justified or for services that have not been performed. Mr. Herbst agreed an audit of the employee benefits might be something well worth looking into and that he probably would outsource that kind of audit to a firm with expertise in insurance and healthcare audits.

Mr. Oelke also inquired if there was a way for employees to file a complaint with regards to potential fraud. At this time, Mr. Herbst suggested that concerned Residents, Employees or Vendors can contact the Inspector General.

> **Motion** made by Mr. Oelke, seconded by Mrs. Diehl to make a recommendation to the City Manager to implement a whistleblower policy for Employees, Residents and Vendors and to also publicize the resources of the Inspector General. In a voice vote, the motion passed unanimously.

Discussion of Revenue Estimating Conference Committee (RECC)

Chair Kurtz explained to the Board that he has been participating in a new function of the budget process over the past six weeks or so called the Revenue Estimating Conference Committee. The RECC meets to review the assumptions underlying the revenue estimates that are going to be used in the budget process.

The RECC is made up of June Paige, Chair of the Budget Advisory Board, Norm Mason from the Budget Department and Pamela Winston from the Finance Department and Chairman Kurtz. Prior to the meetings taking place, the City hired a consultant, Burton and Associates to put together a Fiscal Capacity Study. Chair Kurtz was quite impressed with the study and felt it put credibility behind the assumptions that are being used. He is glad to have been a part of the RECC and hopes it will make the budget process stronger.

Other Business

Chair Kurtz suggested to the Board that there should be a standardized schedule of discussions for future meetings. His recommendations are as follows:

- October – Audit Plan & City Auditor Work Plan
- January – Status from Auditors & Prior Year Findings Update
- April – Discussion of Recommendations to the Budget Process
- July – Audit Findings and Corrective Actions Status Review
- Special Meeting March – Review the CAFR and Single Audit

At the January 10, 2012 Audit Advisory Board Meeting, the Board approved a motion to send a communication to the City Commission to ask for staggered two-year Board member terms: three members would be appointed one year and two members would be appointed the next year. Since the January meeting there had been no further action on the motion, recently the City Clerk's Office asked if the Board would still like to proceed with the staggered terms.

There was a **motion** by Mr. Oelke, seconded by Mr. Ally to proceed with the original request to stagger two-year Board member term: three members would be appointed one year and two members would be appointed the next year. In a voice vote, the motion passed unanimously.

Mr. Oelke announced that he would be leaving the Audit Advisory Board to serve on the Budget Advisory Board. The Board thanked him for his service as member of the AuAB and wished him luck.

Next Meeting Date scheduled for July 30, 2013

The meeting was adjourned at 6:54 pm.

[Minutes prepared by Gina Rizzuti, Board Liaison]

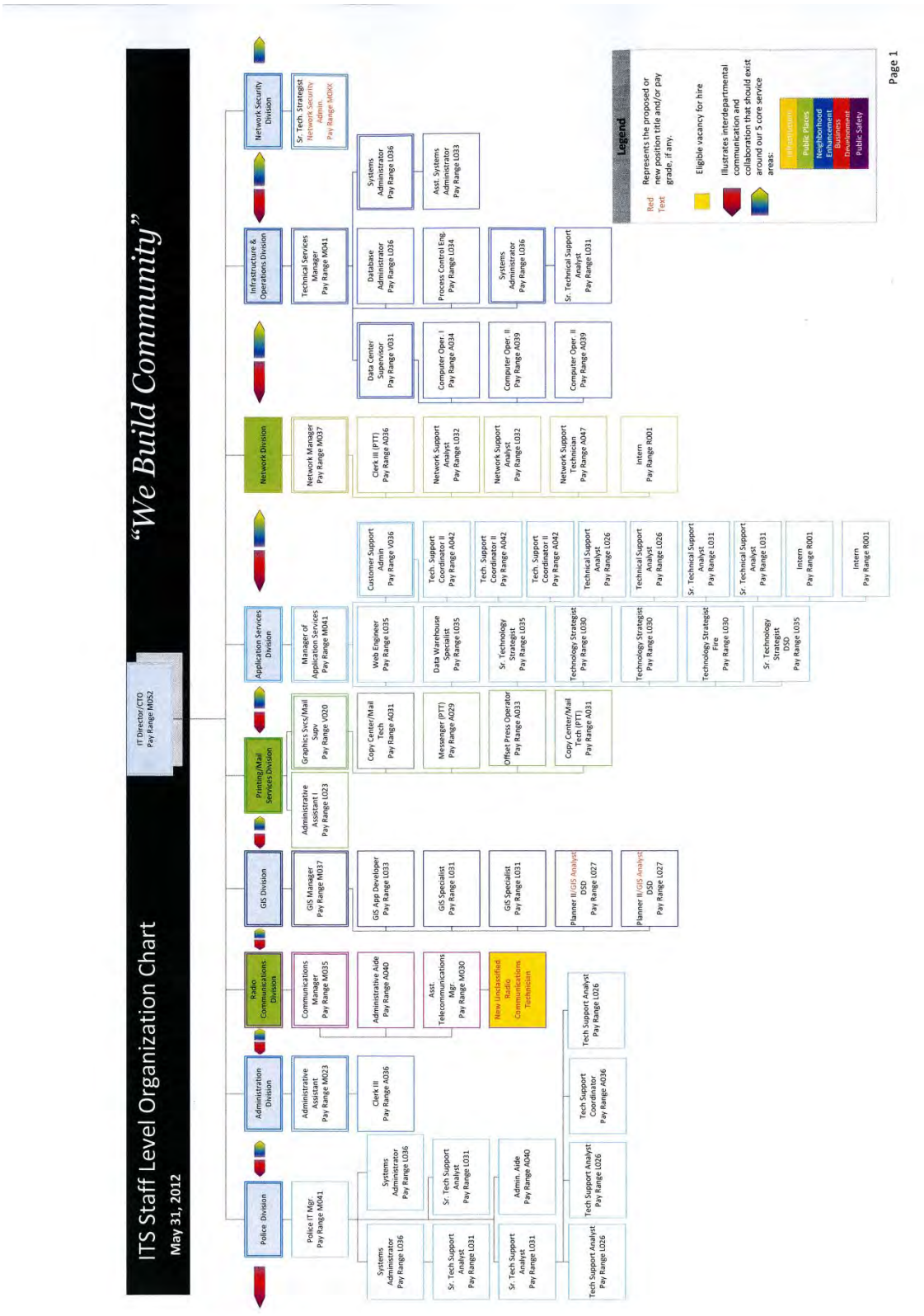
City of Fort Lauderdale

Information Technology Services Department

Five Year Strategic Plan 2012-2017

Prepared by Mike Maier, Chief Technology Officer

Contributing members; Andrew Parker, Craig Richards, Donna Perez, Ian Wint, Jay Stacy, Kevin Keimel, Mark Blanco, Rick Keiser, Troy Bailey



Our mission is to improve operational efficiencies and employee productivity through innovative solutions, emerging technologies, and quality IT services.

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Our mission is to improve operational efficiencies and employee productivity through innovative solutions, emerging technologies, and quality IT services.

1 Executive Summary

The biggest challenges facing the Information Technology Service Department over the next few years will be replacing the existing radio infrastructure and moving to P25, procuring a telephone system that is supported, upgrading the current non-supported Microsoft email system from Exchange 2003 to 2010 and expanding virtualization Citywide.

The City's Radio Communications Infrastructure is over 20 years old and is in critical need of replacement. The infrastructure is no longer supported by its manufacturer and system parts and components are lacking or unavailable should an outage or failure occur. City staff has relied heavily on after-market parts and components to keep the system operational over the last several years. The City has started its process of replacement of the communications infrastructure by commissioning an independent communications study in 2008/2009. Additionally, in 2011, the City invested $3.49 million to replace the most critical component, "Microwave Network". The requirement (mandate) of P25 is related to licensure of 700 MHz Frequencies. That requirement is essentially all 700 MHz Licensees must be in P25 Phase II compliance by 2017. As for the City and general strategy of this plan we are dealing with 800 MHz frequencies and thus have no mandate on deployment compliance. At this point we will need to convert all remaining analog channels to P25 Frequency Division Multiple Access (FDMA). The conversion of the infrastructure to P25 Time Division Multiple Access (TDMA) is driven by the need to interconnect with the County for roaming and to address system capacity issues. The estimated cost is approximately $11 million to migrate to P25. The Radio Division's strategic plan should be implemented with urgency as vital services provided by public safety departments are potentially threatened by the loss of the radio communication network and the inability to provide effective support services.

The primary internal telephone system is a legacy Nortel Time-division multiplexing (TDM) system that supports most of the City's critical telephone services such as 911 non-emergency communications, voicemail, departmental auto attendants, Public Works, Police Records and other call center systems. This TDM system provides telephone services in approximately 51 City buildings. The manufacturer of this system, Nortel Networks Inc., filed for bankruptcy and was acquired by Avaya in 2009. The system is more than 10 years old and is currently operating with critical components such as the main CPU boards, line cards, auto attendants, voicemail and call center servers that are no longer supported by the manufacturer. The aforementioned conditions create a very high risk of multi-day or indefinite outages of Public Safety and other heavily used telephone communications, a highly critical situation the City can no longer afford to ignore. Moreover, manufacturer patches to resolve known or unknown bugs are not available anymore for this outdated system, for example, the current system cannot adjust the time on phones and voicemail messages based on the new daylight savings schedule. By and large, sourcing replacement parts is becoming increasingly difficult as telephone technology evolves and moves in another direction, which has become very apparent during several outages. The cost of the migration is about $2 million and the project is being broken into phases.

Microsoft will officially end extended support for the City's email system (MS Exchange 2003) in April 2014. An alternative email system must be in place before that time as Microsoft will no longer provide bug and security patches or provide technical assistance. The Exchange 2003 system was released 9 years ago and was not designed for how email is used today. In particular, the system was not designed to handle the volume of emails sent and received, the size of emails (including the attachments), and the explosive use of iPhones, iPads, Android, and other smart-devices used by many City employees which continuously synchronize via the Internet to the email servers. Microsoft currently refuses to offer support regarding performance issues due to these reasons. Funding is necessary this coming fiscal year to purchase and begin implementation so that the entire Citywide system can be replaced before Microsoft discontinues all support in April 2014. The estimated cost of this project is $550,000.

We are analyzing computer usage patterns of employees to determine what level of computing power is required. Based on this analysis we will be able to segment out groups of users who we can move to a Virtual Desktop Infrastructure (VDI) where the desktop OS is actually running remotely on a server. Funds will be allocated this year to update 1/20th of the work force based on the analysis.

The Police Division has a core team of experienced, skilled, and motivated staff, however over the past several years the IT staff has decreased while at the same time there has been in an increase in the reliance of technology throughout the department. The number of technology projects in queue and under consideration is significant; as a result it will be a challenge to provide an acceptable level of service with the current level of staffing. However, it is expected that the consolidation of IT departments across the City will afford opportunities for more efficient use of staffing and technology resources. During these austere budgeting times the Police IT infrastructure and computing environment has been stretched past the normal expected life and thus several aspects are overdue for an investment. A third of the departmental servers are 6 years old or older, over a quarter of the department workstations are 7 years or older, and patrol laptops are all 5 years or older. In addition, there are data center infrastructure maintenance investments required to keep the core systems up and running to provide essential computing services to end users. Staff has developed a plan to responsibly address these issues with technology innovation and fiscally responsible purchases. Two of the key projects under consideration include the advanced authentication and the CAD and RMS upgrade projects. The State has mandated advanced authentication by September 2013 for user access to the Criminal Justice Information. This information is used today by officers and detectives on a daily basis in their duties. Several options are being investigated for the optimal solution for providing this authentication. There is also a planned upgrade to the Computer Aided Dispatch and Records Management System which were last upgraded 4 years ago. This will move the agency to the current version which will ensure maintenance fixes and support on the latest version and is required in order to take advantage of new features and capabilities such as Field Reporting.

Successful implementation of Geographic Information System (GIS) concepts and GIS software in large organizations involve several specialties. Even activities that may appear on the surface as simple mapping activities may require a combination of specialties in geodesy, cartography, spatial analysis, desktop software programming, web development, and database administration. Prior to recent

transfers from other departments, the City's GIS Division was a staff of three that served the entire City workforce in some capacity. All three engaged in all aspects of GIS, which did not allow much opportunity for them to hone their skills in any one area. For instance, the GIS Application Developer is highly involved in cartography, spatial analysis, report generation, and server maintenance. Reliance on a small GIS staff also proved challenging in working with City departments to better bridge activities in those departments. The more knowledge the GIS staff acquires as far as activities in individual departments, the more they can make recommendations on how GIS can improve work processes in those departments.

The problem of insufficient staffing has been exacerbated by a lack of funding for continuing education. As with other professionals working in a technology related field, to remain proficient in their field, GIS professionals require continual training in current and emerging technologies. Training must be administered in emerging technologies in the areas of geospatial tools, database management, and software development. The last conference or training course attended by a member of the GIS Division, other than its manager, took place at least six years ago. The industry has undergone tremendous changes since then. Funding allocation will be increased this year to allow the GIS staff to hone in on their skills. In addition, a GIS day in November will be planned for the City so businesses and residents can see the value that GIS brings to the table.

In recent years the lack of funding to update the Print Shop's current offset press to modern day digital equipment has resulted in the loss of in house full color work and degradation of the City's image in printed form. Currently, all three and four color print jobs are contracted out where purchasing/ leasing a press would be more efficient if the volume continues. The City's red & blue sun/sailboat logo is recognized internationally and should be kept to the highest standards. Centralized loss of control to meet critical mailing deadlines for City events, dated materials and the accurate formatting and required colors per the City Graphics & Standards Manual cannot be guaranteed by other establishments.

2 Introduction

The process began in 2012 with guidance from the City Manager's Office to create a Citywide Information Technology Services Strategic Plan. Technology in the past was divided among various departments creating silos of technology staff throughout the City of Fort Lauderdale. This plan would consider the economies of scale by consolidating technology from all departments and be the basis for connecting all departments within the City. Developing a sound strategy is a major effort. Establishing a dynamic strategy requires far more finesse than it did even a decade ago. It requires improving the management process, synthesized with a clear global Citywide vision of foreseeable directions and trends of information technology. This is a cyclic process that is reviewed at least annually and for Information Technology Services a living document undergoing continuous change. This plan is the overarching one that guides our Information Technology Services Department and project plans. It makes sense to develop long-term information technology strategy prior to any further investment in software or equipment. Our approach is to base the systems strategy on the future needs of the City. Out of this will come the optimal solution that will produce the results that can be implemented in the shortest period, with lowest total implementation costs while supporting the Cylinder of Excellence for Internal Support. The Plan also outlines specific performance metrics. Many of the measures reflect new and innovative approaches for technology. Collectively, these measures take a much broader view of the work of the Information Technology Department and the impact it has in fulfilling its mission. The Information Technology Department will track our performance against these metrics, and report monthly on how we are doing. This plan was prepared with significant involvement from staff after the consolidation of various departments. I also urge each employee to take this strategic plan to heart; let it guide each of us as we continue to work for our stakeholders.

Goals, Objectives, & Strategies

The strategic plan is a high level top-down planning process. At the highest level the plan is to set direction and establish the Information Technology Center purpose. The future is brought into focus with a vision; the mission articulates what we are presently and provides a unifying force for daily operation; goals are the general high-level descriptions of what we will do to fulfill our mission. Attached to each goal are objectives that need to be specific (one result), Measureable, Assignable, Realistic (doable), and Time-related, the entire process needs to be smart. The actions or tasks that will be completed to fulfill each objective must also follow the faster, smarter and cheaper format and are the lowest level of the plan with the most detail. The actions or strategies are associated with the corresponding objective, the objective with the goal, the goal with mission and the mission with the vision. The items on the template at the action level may also be referred to as the tactical plan. The

strategic plan states what we want to accomplish in the broad sense but the tactical version states how we will accomplish it in a step-by-step nature by execution of the strategic plan.

2.1 Department Vision

Our vision is to be leaders in creating a technology enabled community by using cost effective measures that fosters efficiency, safety, and transparency by which all residents, visitors, businesses, local government and employees can access relevant government information and value added services at anytime from anywhere.

2.2 Department Mission

Our mission is to improve operational efficiencies and employee productivity through innovative solutions, emerging technologies, and quality IT services.

2.3 Department Overview

Information Technology Services (ITS) provides leadership and technical direction to the various departments for The City of Fort Lauderdale. The ITS group is responsible for all system implementations, security, and the tactical and strategic planning for technology solutions and services to support the City functions and service delivery to the citizens. The current organization structure of ITS as illustrated in the organizational chart (inside cover) is designed to address the ongoing evolution of technology and its utilization in support of the business functions for the City of Fort Lauderdale. This evolution has seen a tremendous growth in department-specific leading practice solutions, requiring infrastructure investments in networks and web portals as well as in the number of processors and applications used to provide these solutions. These technology systems have become crucial components in the day-to-day operations of almost all areas of City services, to the point where it is no longer possible to provide some services without the availability of the underlying technology.

The ITS Department has embraced the practice of performance management by using ICMA measurements as a governance model. Outcomes define where the City is going, what will be accomplished, for whom and at what cost over the next several years. Several outcome statements have been defined and can be found in the division-specific for goals and strategic plans for the City of Fort Lauderdale. These outcome statements focus on the aspects of the organization that come into direct and continuous contact with the citizens. As primarily an internal service provider, the key to success for ITS is to partner with our stakeholders to understand, achieve, and if possible to enhance the desired outcomes.

Information Technology Services is organized into nine divisions:

Administration Division

The Administration Division gives focus and direction to staff within the department and other Divisions and helps plan an overall mission for the future. The Information Technology Service Administration Division supports Police, Radio, GIS, Printing & Mail, Application Services, Network, Infrastructure & Operations and the Network Security (new) Divisions. The Administration Division has been established with eight strategic goals. The mission and goals statements were developed with considerable input from Information Technology Service employees regarding the important issues facing the City.

Major goals:

1. Ease the access to information.
2. Closely integrate department visions with technology and plans.
3. Provide technology leadership to the Fort Lauderdale community.
4. Develop our employees and our core teams.
5. Provide a secure, reliable, and cost-effective infrastructure.
6. Ensure Citywide integration of information and compatibility of processes.
7. Establish an Organization Governance Task Force
8. Establish standards for software and hardware support.

TECHNOLOGY SERVICES PLANNING OBJECTIVES AND PROCESS

With the new ITS organization structure, this is the first year that ITS will have an opportunity to consolidate services from various departments, reduce costs and make strategic investments in information technology hardware and software. The ITS group is responsible for these investments and provides leadership, vision, and technology direction to all departments in the City of Fort Lauderdale. ITS is responsible for overall Enterprise Architecture, all system implementations, network and application security, preparation of an annual technology budget, management of capital spending and technology, ongoing support, disaster recovery, and the tactical and strategic planning for technology solutions and services to support the City of Fort Lauderdale functions and service delivery to out neighbors.

To accomplish this task, it was decided that all technology purchases initiated by departments in the City of Fort Lauderdale needed to be approved by the Chief Technology Officer. This included money spent from grants, City-sponsored inter-local services among judiciaries, all PCs, peripheral devices, servers, telephones, and all handheld technologies.

3 Applications Services

3.1 Mission

To provide technology support and solutions to enhance the City's overall service to neighbors and visitors.

3.2 Division Overview

The Application Services Division is primarily an internal support function within the City that provides 24x7x365 technology support to employees and neighbors for applications in use on desktops, across the enterprise and on the web. Specific Application Services functions include the following:

- Create Requests For Proposals (RFPs), evaluate, recommend, implement and provide integration and support of technology for departments so they can perform their operations and provide improved/efficient services to out neighbors.
- Provide direction and technical support for electronic records management.
- Planning, project management, process review for the implementation and support of enterprise computer applications as well as applications specific to certain departments and business functions.
- The Help Desk provides support for personal computers, mobile devices and applications as well as coordination of the purchase and replacement of over 1,000 personal computers.
- Maintenance, technical support and programming services for the Internet that provide automated services to citizens such as online payment of water bills, business taxes, parking tickets and registration fees for parks and recreation as well as Intranet applications for budget, grants, engineering, CIP, cash receipts and fleet.
- Reporting services to deliver complex reports from any of the various databases through ad-hoc requests or reports for users to run for themselves periodically.
- Support Fire operations and administration desktop and mobile applications including setup and configuration of the Emergency Operations Center when activated.

3.3 Division SWOT Analysis

	Helpful **to achieving the objective**	**Harmful** **to achieving the objective**
Internal origin **attributes of the organization**	**Strengths** • Dedicated staff • Innovation within constrained budget • Great customer service • Knowledge of applications, organization and function of departments • Fresh technology perspective from ITS Management	**Weaknesses** • Departmental silo approach to application selection • Microsoft operating system versions in use from 2000 - 2010 • No standardized hardware, software and architecture • Limited / specialized skill sets • Numerous interfaces between systems / manual intervention • Redundant data capture and storage • IT resources outside of the IT department • Disaster recovery / lack of redundancy • Asset management strategic plan • Communication with stakeholders and users' needs improvement

External origin attributes of the environment	Opportunities	Threats
	• Alignment with City Vision and Mission • Application of technology to increase workforce mobility • Enterprise approach to application selection • Standardized hardware, software and architecture • Sharing of technical skills • Shared data and databases • Virtualization of applications • City Administration commitment to technology • Maximize performance improvement efforts by aligning IT services with the business processes. • Employ dynamic web site content, social media and mobile applications to enhance community participation	• Mainframe computer that hosts the Financial and Budget applications, no redundancy and no mainframe technical expertise on staff • Budget constraints • Implementation of departmental systems without Central IT involvement • Diverse applications installed on PCs • Security vulnerabilities and increased cyber crime

3.4 Problem Statement

Problem 1: Departmental silo approach to application selection

We have numerous 'vertical' applications that support individual departments or business functions that have been acquired over time and do not interface with each other as effectively as they could. This has led to redundant capture and processing of data.

Problem 2: Limited / specialized skill sets

Employee training and skill sets have stagnated and become specialized to particular areas as a result of a training budget that has been cut to zero for the past four years.

Problem 3: Non-centralized IT functions

A non-centralized IT approach has inhibited communication between IT staff and hindered citywide adoption of technology and application of best practices across the organization.

Problem 4: Aging PC inventory

The City PC inventory had been managed via a PC replacement plan that was last fully budgeted in 2008. The budget for this plan was cut 80% over the past four years; thus we are currently supporting approximately 1000 PCs on less than a $40,000 annual budget. As a result, we have many personal computers that are being used beyond their expected useful life that has led to support of multiple operating systems including Windows 2000 and XP that are either no longer supported by the manufacturer or are scheduled for termination of support.

3.5 Problem Resolution Strategies

Resolution 1: Departmental silo approach to application selection

Many applications have not been upgraded to their respective most current release versions and we are looking at the alternatives offered by vendors to host these applications instead of continuing to host them in-house. We are weighing the cost of the upgrade and continued in-house hosting against the cost of paying for the application annually as a service. We are also investigating obtaining new software that can be more seamlessly integrated with existing or upgraded systems.

Resolution 2: Limited / specialized skill sets

A new online training system has been put in place to allow employees to expand their knowledge skills and the Information Technology Services department is in the process of consolidating outlying IT areas into a centralized department so that cross training and economies of scale can be utilized to improve service across the organization.

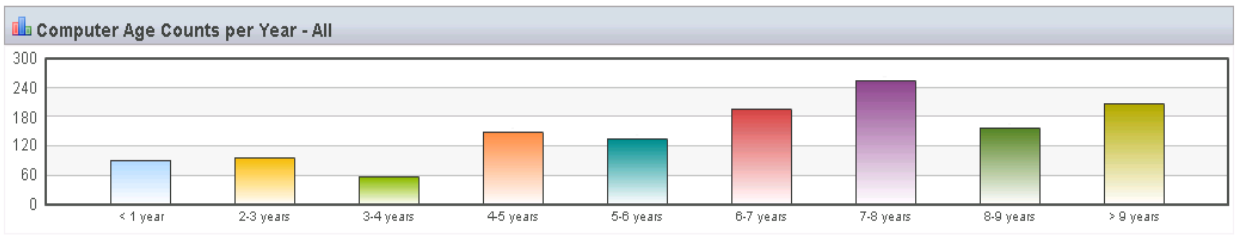
Resolution 3: Non-centralized IT functions

IT groups and functions that existed outside of the centralized IT department are being consolidated. Efforts are underway to evaluate and consolidate redundant servers and support functions such as help desk services. Meeting with individual business units to map out current processes and recommend

ways to utilize technology to eliminate unproductive activities are underway. An IT governance board will be established to gain consensus from departments on project funding and priorities.

Resolution 4: Aging PC inventory

We are analyzing computer usage patterns of employees to determine what level of computing power is required. Based on this analysis we will be able to segment out groups of users who we can move to a Virtual Desktop Infrastructure (VDI) where the desktop OS is actually running remotely on a server. We are investigating lease options as a lower cost alternative to purchase so that we may upgrade a larger base of machines in a shorter period of time as well as virtualization of applications as a way to consolidate the delivery of these services.



City Hall IT Services: Computer Age Counts per Year - All
Computer aging for per year (9 items)
Generated on May 22, 2012 @ 10:27 pm

Category	Count
< 1 year	92
2-3 years	96
3-4 years	57
4-5 years	148
5-6 years	135
6-7 years	195
7-8 years	254
8-9 years	158
> 9 years	207

3.6 Goal 1: Provide employees and neighbors with access to leading edge information technology that enhances communication and collaboration.

Objective 1.1: Enhance channels of communication and collaboration.

There is no opportunity for the public to communicate about technology in the City as part of the budget process. It is vital that those who use the technology and those that pay for it understand existing system's capabilities and potential uses of new technology. Periodic focus group meetings would allow City staff to communicate technology needs, plans and priorities with our neighbors and gather valuable feedback that will help manage expectations and gather support for technology related initiatives.

In an effort to increase participation and provide transparency, IT will hold focus group meetings open to the public to get feedback on how to utilize technology to conduct City business. The City web site in its current form does not allow departments to dynamically update their content. We plan to enhance the City web site to allow for more dynamic and timely content by departments by implementing a Content Management System (CMS). Another communication method is the local access TV channel, currently channel 78 on Comcast. The existing programming on this channel is a series of PowerPoint presentations that are rotated periodically between live and re-broadcast City meetings. A Content Management System for video would allow for a richer media content to be broadcast and managed on this media outlet.

Objective 1.2: Enhance mobile computing options and communication links.

Provide more ways for employees and neighbors to utilize applications on smart phones and devices to communicate and connect with the City. Upgrading or replacing existing back office software systems that utilize the web and smart phones as an entry point for gathering and providing data.

Objective 1.3: Upgrade the City web site to provide a more interactive environment.

Incorporate ways to collect information from the public via surveys, suggestion box or departmental feedback pages on the City web site. Expand the use of social media tools to communicate with neighbors. Employ new technology to enhance public interaction at City meetings and make meeting content more accessible.

Objective 1.4: Expand remote access options for employees.

Virtual desktop environments allow access to desktop computer resources from any computer or device such as a tablet or even a smart phone from anywhere. This allows employees to gain access to their programs and data from outside of their traditional office environment. This type of remote access can be especially useful to employees to remain connected even during emergency situations.

Solution Architecture

The web content management software requires a separate server from the web server so additional hardware is required for this functionality. Enhancing the City Commission meetings to integrate the agenda with the video will entail procuring new hardware for encoding the meetings and new software to prepare and index the agenda materials. A new media scheduling and management system will have to be purchased to replace the PL/PowerPoint solution currently in place.

5-Year Budget to Attain the Goal

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Web Content Management System (CMS)	Capital Cost	$50K				
	Maintenance Cost	$10K	$10K	$10K	$10K	$10K
	Total Cost	$60K	$10K	$10K	$10K	$10K
Web CMS Server	Capital Cost	$5K				
	Maintenance Cost	$1K	$1K	$1K	$1K	$1K
	Total Cost	$6K	$1K	$1K	$1K	$1K
Agenda and Meeting Management System	Capital Cost	$55K				
	Maintenance Cost		$27.5K	$27.5K	$27.5K	$27.5K
	Total Cost	$55K	$27.5K	$27.5K	$27.5K	$27.5K
Digital Video Content Management System	Capital Cost	$11K				
	Maintenance Cost		$1.5K	$1.5K	$1.5K	$1.5K
	Total Cost	$11K	$1.5K	$1.5K	$1.5K	$1.5K
	Annual Total	$132K	$40K	$40K	$40K	$40K
	5-Year Total	$292K				

Performance Measures to Evaluate the Goal

- Number of web site visits (percentage increase over past FY).
- Survey to determine if customer expectations are being met (Service Level measures met).
- Number of requests implemented from neighbor focus group meetings.
- Percentage of the existing web sites converted to Content Management System.

3.7 Goal 2: Provide technical and strategic leadership to City departments via IT consulting services in an effort to ensure technology is being utilized and leveraged to the maximum extent possible.

Objective 2.1: Improve IT best practices.

Information Technology has been brought in after-the-fact in many cases to assist departments with implementing technology that they had selected by themselves. To help departments align their technology with the overall IT strategic plan, IT will be involved in all phases of technology decisions starting with review of current business practices. Periodic meetings with departments will be conducted to identify ways to improve service delivery by assessing their use of existing technology and evaluating the use of new technologies. A periodic newsletter with IT related news, tips, best practices and policies will be distributed to users to help raise awareness and inform the user community of current events. Service level agreements will be developed with departments and/or application users to set realistic and attainable service and availability expectations.

Objective 2.2: Ensure future needs are met and new technologies leveraged where appropriate.

A New Technology group has been created in the Information Technology Services department that meets periodically to discuss emerging technologies and how they could be utilized within the City. The group has started out with the Information Technology department only, but will expand to include representation from every department in an effort to foster participation from all City operations. Establish resources for product and technology research such as a subscription to research group such as Forester, Infotech, Gartner, or Norex . (Low of $5,000 – high of $25,000).

5-Year Budget to Attain the Goal

The technology research subscription(s) chosen will determine the funding required.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Technology Research Subscription	Capital Cost	$0K				
	Maintenance Cost	$10K	$10K	$10K	$10K	$10K
	Total Cost	$10K	$10K	$10K	$10K	$10K
	Annual Total	$10K				
	5-Year Total	$50K				

Performance Measures to Evaluate the Goal

- Customer Satisfaction Survey – Quality of Service
- Total IT Operations & Maintenance as a percentage of total City Operating Expenses
- Number of newsletters sent out to employees

3.8 Goal 3: Provide training to City employees to increase their technical competence and productivity.

Objective 3.1: Increase technical proficiency and skills.

No ITS technology will be worthwhile and effective if people do not know how to properly use it. All employees need to know they are expected to be proficient with the systems provided to them. This needs to be promoted by directors, managers, supervisors and staff so that service delivery can be optimized by the investments made in technology.

Build a knowledge base of commonly requested information and make it available to all users to easily access online. The Help Desk system recently purchased has this tool built in and over time the knowledge base will expand and be more useful to users when they search for answers to their questions.

Ensure ITS staff receives regular training on systems in use throughout the City. With the rapid pace of change in technology and the frequent updating of system to new versions, it is imperative that ITS staff attend training on the upgrades to ensure proper troubleshooting and support. Support for some systems may require certifications and these should be obtained where appropriate. The reorganization and consolidation of ITS includes cross training to provide additional support for critical systems. The ITS training budget has been reduced to zero for the past four years making it difficult to attend training at user group meetings and conferences.

Objective 3.2: Target training where needed.

Utilize metrics and reports from the Help Desk to determine departmental training needs based on calls for help. Training plans can be put into place as needs are uncovered based on analysis of this data. Periodic meetings will be held with application users and departments to review current training levels and ensure adequate opportunities exist for them to meet their minimum requirements.

Provide comprehensive and flexible training programs to employees at several locations. Currently there are training facilities in City Hall, Public Works and the Police department. Online training classes can be scheduled at any of these facilities to make it convenient for employees to attend sessions. A subscription to an online library of training classes will provide access to a diverse base of software and hardware training opportunities

Solution Architecture

Online training classes will be provided by a subscription service and conducted in existing City training room facilities. The existing Help Desk system will be the source of data to help meet these objectives.

5-Year Budget to Attain the Goal

Subscription to online training service.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Online training *classes*	Capital Cost	$0K				
	Maintenance Cost	$5K	$5K	$5K	$5K	$5K
	Total Cost	$5K	$5K	$5K	$5K	$5K
	Annual Total	$5K	$5K	$5K	$5K	$5K
	5-Year Total	$25K				

Performance Measures to Evaluate the Goal

- Number of training classes held.
- Number of people attending training classes.

3.9 Goal 4: Provide employees and neighbors access to City-based systems and data for retrieval, analysis and reporting in support of increased transparency in government.

Objective 4.1: Make commonly requested data available to the public.

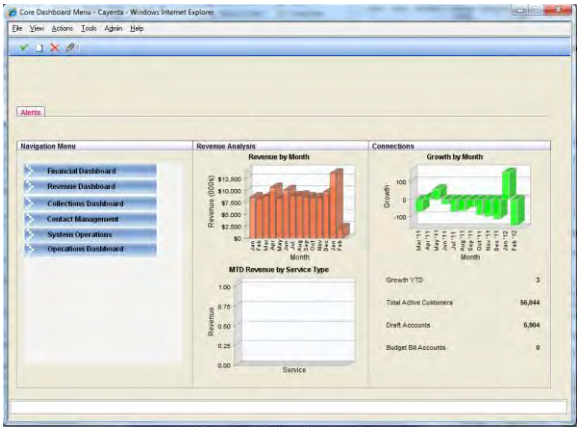
The public is demanding transparency in government, especially at the municipal level. Providing commonly requested data using standard electronic file formats gives neighbors the ability to acquire data and analyze it so they can provide the most informed feedback possible. Electronic delivery will also reduce paper and printer supply usage.

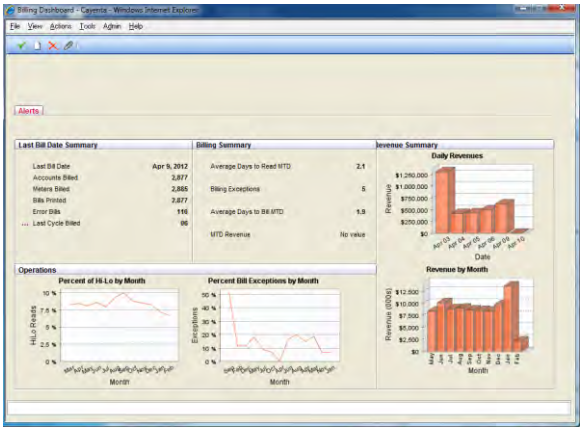
Objective 4.2: Enhance information exchange with other government institutions.

It is vital to be able to communicate with other municipalities, county, state and federal governments through information sharing for grants requests/reporting and legislative/regulatory compliance. The ability to extract data from systems and share it in the proper format is important so that the City may participate in grants, regional initiatives and comply with mandated reporting requirements. Utilizing business intelligence software facilitates data retrieval with dashboards and ad-hoc reporting capabilities that leverage stored data as a tool to help drive informed decisions.

Solution Architecture

The existing architecture can accommodate these objectives, yet we could benefit from additional training for the Data Warehouse Analyst position to expand knowledge and skills to include development and administration of the existing resources.





5-Year Budget to Attain the Goal

Specialized training for data warehouse tools need not be performed every year as the tools need not be updated that often; every other year training should be sufficient to meet these goals and objectives.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Data warehouse training	Capital Cost	$0K				
	Maintenance Cost	$6.5K	$0K	$6.5K	$0K	$6.5K
	Total Cost	$6.5K	$0K	$6.5K	$0K	$6.5K
	Annual Total	$6.5K				
	5-Year Total	$19.5K				

Performance Measures to Evaluate the Goal

- Number of ad-hoc reports created.
- Number of dashboards created.
- Number of web site documents downloaded.

3.10 Goal 5: Increase integration of software systems for more efficient business processes and effective service delivery.

Objective 5.1: Integrate core systems such as financial accounting, budgeting, purchasing, asset management, payroll, and timekeeping.

This is a major priority that has been a recurring theme in meetings with departments and City management. Not only will an integrated solution improve information sharing, it will promote more timely and accurate data analysis leading to better decision making. Determine the feasibility of implementing an Enterprise Resource Planning (ERP) system where applicable to replace stand-alone systems. Based on the determination, issue requests for proposals (RFPs) to ascertain financial costs.

Objective 5.2: Integrate other systems that provide essential functions for departments that serve neighbors such as permitting, planning, code enforcement, business tax, customer relationship management, work orders, fire inspections, alarm billing, special assessments and utility billing.

Replace the multiple Customer Relationship Management systems being used throughout the City to a single system that will avoid duplication of effort and provides a consistent, accurate and complete response to neighbor requests. We are currently evaluating the use of a Customer Relationship Management (CRM) system that can be utilized by all City departments.

Solution Architecture

Depending upon the software direction chosen as part of these goals and objectives, the architecture may be hosted on site or in the cloud. The budget will be determined after a direction is chosen.

3.11 Goal 6: Develop structured processes to prioritize and fund information technology initiatives.

Objective 6.1: Develop standard procedures for the review, prioritization and funding of IT projects.

Create an Organizational Governance board of senior City management that will meet regularly to review, prioritize and fund IT projects. Obtain support and a clear directive from Citywide management that IT is an organizational priority that should be used to enhance service delivery, processes and public participation.

Objective 6.2: Improve IT budgeting and purchasing processes.

Utilize IT Service Management (ITSM) methods to align IT services with business processes. Create partnerships with departments to review all IT purchases to ensure compatibility with existing hardware and software standards.

5-Year Budget to Attain the Goal

Budget costs and performance measures will be determined once a firm direction is established.

Performance Measures to Evaluate the Goal

- Customer Satisfaction Survey – Quality of IT Services, software provided and ability to work and communicate more efficiently.

3.12 Goal 7: Create a PC Replacement Plan to standardize software and hardware.

Objective 7.1: Replace computer workstations that have exceeded their end-of-life expectancy with systems configured to meet the needs of newer software applications requiring more processing power.

To replace computers that are beyond their life expectancy we are researching leasing options that will give us an opportunity to bring in more systems in a single refresh period. We are also researching other technologies to virtualize applications and desktops on existing hardware. This will give us an opportunity to centralize the support of the applications and desktop sessions for multiple users in our data center.

Objective 7.2: Standardize the computer operating system in use on all workstations.

90% of the computers currently supported are running Windows XP Professional and Microsoft support for Windows XP will be ending in April of 2014 eliminating security updates. We are evaluating a Microsoft Enterprise Agreement which will allow us to own upgrade licenses for every Windows XP computer.

Objective 7.3: Implement virtualized desktops (VDI) and applications in support areas that will most benefit from this technology.

Implement virtual desktops to decrease support of computer workstations at the desktop and move it to the server room. Purchase zero-client devices for running a virtualized desktop. These devices have no moving parts and will last many years beyond the life of a computer. This will also promote the Green Team initiatives at the City as the energy consumption is no more than 2 watts per hour while in use.

Objective 7.4: Purchase and support mobile tablets by using a Mobile Device Management (MDM) solution that will allow employees to have access to internal City resources.

There is a growing trend of tablets and smartphones being used for tasks that used to be performed on a personal computer. Integrating these types of devices into our computing infrastructure has some challenges that need to be met to ensure the continued safety and operations of our network and existing computers. Implementation of a MDM solution will allow employees use of mobile devices to access City resources while protecting our network from unauthorized access and enforcing security policies.

Objective 7.5: Standardize the version of business productivity software used for word processing, spreadsheets, messaging, and presentations.

Upgrade all older versions of Microsoft Office to Office 2010 by using an Enterprise Agreement. An Enterprise Agreement will give us upgrade rights all at once to have everyone on the same version. This

will allow feature and file type compatibility for document collaboration between internal employees, neighbors and other governmental institutions.

5-Year Budget to Attain the Goal

An evaluation of current computer usage is being conducted in order to determine feasibility and quantities of users that can benefit from the virtual desktop environment.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
PC Replacement Plan	Capital Cost	$275K	$250K	$250K	$250K	$250K
	Maintenance Cost	$0K	$0K	$0K	$0K	$0K
	Total Cost	$275K	$250K	$250K	$250K	$250K
Microsoft Enterprise Agreement	Capital Cost	$250K	$250K	$250K		
	Maintenance Cost	$0K	$0K	$0K	$75K	$75K
	Total Cost	$250K	$250K	$250K	$75K	$75K
	Annual Total	$525K	$500K	$500K	$325K	$325K
	5-Year Total	$2,175K				

Performance Measures to Evaluate the Goal

- Customer Satisfaction Survey – Quality of IT Services, software provided and ability to work and communicate more efficiently.
- Ratio of workstations (intelligent and dumb) to total # of City employees.

3.13 Goal 8: Relocation of the dispatch communications center to station 53.

Objective 8.1: Perform dispatch operations from a CAT 5 facility with City personnel.

Currently the communications center is located at the police department and the call takers and police dispatchers are staffed by Broward County Personnel. Not having the call takers and police dispatchers as City personnel there is little control over the methods utilized. In addition, the police department is not a CAT 5 building. In the event of a hurricane, the current personnel would have to be relocated to the County's Public Safety Building and we would have to revert to manual dispatch methods and have all of our systems backfilled when we returned to our building.

Fire would like to use the existing Fire Station 53 as the new permanent dispatch facility for police and fire. In order to facilitate this, the existing Fire Training Bureau would have to be relocated and the training section of station 53 would have to be built out to accommodate a communications center. There would also have to be a build out of the telecommunications room to accommodate the additional hardware required to move CAD. Additionally, personnel would have to be hired and trained to replace the existing Broward County personnel that staff the existing call center.

5-Year Budget to Attain the Goal

An evaluation of personnel requirements and building configuration changes at Fire Station 53 are currently being done by the Fire Department to determine the viability of this goal. Costs for the building and reconstruction of facilities are still being determined and will be submitted as CIP projects by the Fire Department.

3.14 Goal 9: Hardware/Data Center Upgrade for CAD.

Objective 9.1: Utilize more features for Fire personnel in the field via CAD interface.

We are currently running on an older version of CAD. The newer version allows for additional features that would enhance the overall experience for the end users. Additionally, new hardware is needed to facilitate the upgrade and additional features. Fire operations would like to be able to have access to tac surveys when downloading data on a specific address on the MDT. Fire would also like to evaluate the IPAD version of the latest CAD version.

Having access to the tac surveys on the MDT's would allow the operations personnel in the field to have up to date information on the building including a floor plan, standpipe locations, hazards, etc. The map is another enhancement that would be beneficial to field personnel. The upgraded CAD allows for integration with Google or Bing maps. This would allow different and real-time views for the field personnel. The latest version of CAD also includes an IPAD component which Fire would like to evaluate. If this feature proves to be beneficial, then Fire would like to deploy IPADS to the Chiefs in the field. The Chiefs are currently using the Panasonic Toughbooks to access IMobile. If IPADS were able to be deployed in place of the Toughbooks, there could be a substantial savings in hardware costs.

5-Year Budget to Attain the Goal

The CAD upgrade budget is located in the Police IT section.

3.15 Goal 10: Emergency Operations Center (EOC) software system.

Objective 10.1: Implement EOC system.

Currently during EOC activations, the city connects to the County's WebEOC hosted application. Due to connectivity restrictions and the fact that the host application is off site, the application runs slow. Additionally, the connectivity is dependent upon an internet connection. If during a severe weather incident the internet connectivity is severed, the connectivity to the application is lost.

Purchase our own WebEOC system so the application is hosted in our facilities and on our network. By utilizing the same software as the County, we can remain compliant with their operation and still track and coordinate incident responses from the EOC regardless of connectivity status with the County.

5-Year Budget to Attain the Goal

Hardware options, including a blade enclosure environment, are being evaluated and may impact the initial budget estimates given below.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
EOC Software	Capital Cost	$191K				
	Maintenance Cost	$0K	$28K	$28K	$28K	$28K
	Total Cost	$191K	$28K	$28K	$28K	$28K
	Annual Total	$191K	$28K	$28K	$28K	$28K
	5-Year Total	$303K				

4 Geographic Information System (GIS) Division

4.1 Mission

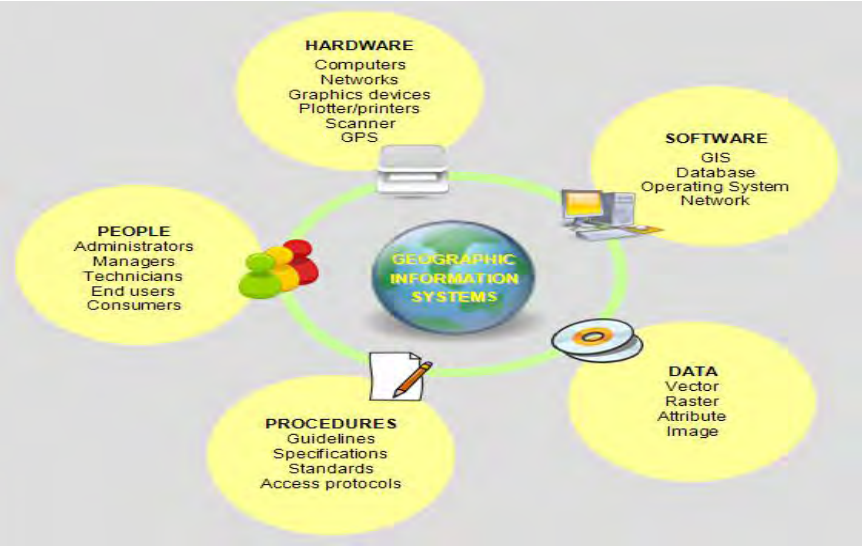
To be leaders in providing high quality geospatial services to our community by making complex issues simpler to understand, and by providing broad access to information.

4.2 Division Overview

In general terms, the GIS Division exists to provide support services to internal staff, make the job of internal staff easier by providing information in a more useable form, provide information otherwise not available, and to provide information to the City's neighbors and all other City stakeholders. It delivers services without much assistance from outside contractors. It can be said that the City's GIS Division helps to make the City government more efficient and more accessible. Specific GIS services include the following: setting the direction of GIS throughout the City; GIS dependent software implementation; the integration of GIS with other City systems; custom GIS application and software development; the development of web-based applications for distributing and sharing information; the management of GIS dependent hardware; data creation and data maintenance; support and maintenance of data for the City's Computer Aided Dispatch (CAD) system; the provision of GIS user technical support; geospatial analysis and reporting of results; and map production using geo-referenced data.

The City's Existing GIS Infrastructure

GIS is most often thought of as being a single software program. The truth is that a GIS is comprised of five major elements: 1) people, 2) software, 3) hardware, 4) data, and 5) procedures. A GIS must be strong in all five elements in order to be successful. Weakness in any one element will degrade the effectiveness of an enterprise GIS such as the City's.



People

Our mission is to improve operational efficiencies and employee productivity through innovative solutions, emerging technologies, and quality IT services.

Prior to April 2012, the GIS Division operated with a staff of three GIS professionals. Three more were added in that month by way of reassignment from different City departments. Of the three transfers, one was already employed in the City's Public Works Department as a GIS professional while the other two held Planner II positions. Below are the listings of positions along with a brief overview of their primary areas of responsibility:

- **1 GIS Manager**: Creates the vision and strategies for the division, manages the division's daily operations, serves as the division's primary database and SDE administrator, and engages in application development.
- **1 GIS Applications Developer**: Develops and customizes applications, conducts geospatial analyses, creates maps, produces reports, and carries out GIS-related tasks as needed.
- **1 GIS Specialist**: Data management, creates data automation tasks, conducts geospatial analyses, creates maps, produces reports, and carries out GIS-related tasks as needed.
- **1 GIS Specialist, transferred from Public Works**: Manages the utility geodatabase, conducts geospatial analyses, creates maps, produces reports, and carries out GIS-related tasks as needed. The person currently holding this position is being utilized by utilities to carry out non-GIS related work.
- **2 GIS Analysts, formerly Planner II, transferred from the Department of Sustainable Development**: Conduct geospatial analyses, create maps, produce reports, and carry out GIS-related tasks as needed. Both are currently being utilized by their former departments to carry out non-GIS related work.

Software

A suite of ESRI software products represent the foundation of the City's GIS software catalog. As the global leader in providing GIS software, ESRI sets the direction of the industry. The suite of ESRI software implemented by the GIS Division is augmented by software from other companies such as Microsoft. The following is a list of software and web services that represent a significant portion of the City's GIS infrastructure:

- **ESRI ArcGIS for Server Advance (ArcGIS for Server)**: Server side software for creating and managing map-based web services. ESRI makes available Application Programming Interfaces (API) for building web applications that interface with ArcGIS for Server's web services.
- **ESRI ArcIMS**: Server side software that precedes ArcGIS for Server. ESRI no longer supports ArcIMS, but the City still utilizes applications that were built using this technology.
- **ESRI ArcGIS for Server Basic (ArcSDE)**: Server side software for managing spatial (geographic) data in a relational database. Using ArcSDE, traditional database functions such as multi-user connections, multi-user edits, and security can be enabled on geographic data. ArcSDE also allows rules and relationships to be applied to geographic data and data stored in tabular form.
- **Microsoft SQL Server**: Server side Relational Database Management System (DBMS) on which ArcSDE operates. It is used to store geographic data, tabular data, manage user logins, manage data backup and recovery, and manage security.

- **ESRI ArcGIS Desktop**: Client side software for retrieving, viewing, querying, and editing data. ArcGIS Desktop is licensed to the City in two flavors; ArcGIS Desktop Advance and ArcGIS Desktop Basic. Both possess geoprocessing capabilities, analytical functions, and map making capabilities.
- **ESRI ArcView 3.2**: Legacy client side desktop software that was succeeded by ArcGIS Desktop Basic. ESRI no longer supports ArcView 3.2. It is incapable of reading data stored in ArcSDE's geodatabase. Similarly, it does not interface with any other current-day GIS technology. The City, however, still uses applications that were built as customized versions of ArcView 3.2.

  ArcGIS Online Personal: This is sometimes referred to as ArcGIS.com. ArcGIS Online Personal is a free cloud computing service that allows anyone to create and share simple web maps. ArcGIS Online Personal allows the GIS Division to quickly create simple interactive applications. Standalone applications that are passed through ArcGIS Online Personal and web maps created on ArcGIS Online Personal can be served out to GIS customers through a dynamic and visually engaging gallery. ArcGIS Online Personal serves as the warehouse for applications and web maps published on the City's GIS Applications Gallery located at http://gis.fortlauderdale.gov/AppGallery/. The same is true for PDF map documents that are made available through the City's PDF Map Gallery at http://gis.fortlauderdale.gov/PDFgallery/. In June, 2012, ESRI will release ArcGIS Online Subscription, a paid version of its free ArcGIS Online personal. It will offer greater collaboration capabilities and increased security for sensitive information.
- **Microsoft Visual Studio**: An Integrated Development Environment (IDE) used to create and customize software. It is also used for developing web applications.
- **Adobe Flash Builder**: An IDE used to create and modify flash based web GIS applications. The GIS Division has implemented several flash based applications using ESRI's Flex Viewer and ESRI's Adobe Flex API for ArcGIS for Server. Adobe Flash Builder may also be used to create multi-platform applications for mobile devices.
- **Adobe Photoshop**: Graphic creation and enhancement program used in designing software

Several customized web GIS applications and interactive web maps augment desktop GIS software used throughout the City to present information and solve problems. The present count of web GIS applications exceeds twenty. They have become an effective tool in expanding the reach of the City's GIS to interested local parties that have no access to the City's internal network. They also serve those who are interested in the City but live outside the area.

As alluded directly above, application development is a major undertaking of the GIS Division. Application development is the process of creating or customizing software to meet the needs of the division's customers. This could take the form of integrating with other systems as is the case with utility billing. The GIS Division has created software to establish bi-directional data transfer between the GIS SDE database and the Cayenta utility billing system. This integration with utility billing allows the ability to now provide consumption reports of an area in the City.

While water consumption information is contained in utility billing, the Cayenta system, like many other similar systems, does not allow for geographic-based searches. Where this becomes a limitation is when the City wishes to perform a consumption audit of an area, which is often the case when infrastructure improvements are proposed. By integrating customer locations with GIS, staff is able to generate consumption reports based on neighborhoods or a project specific geographic area.

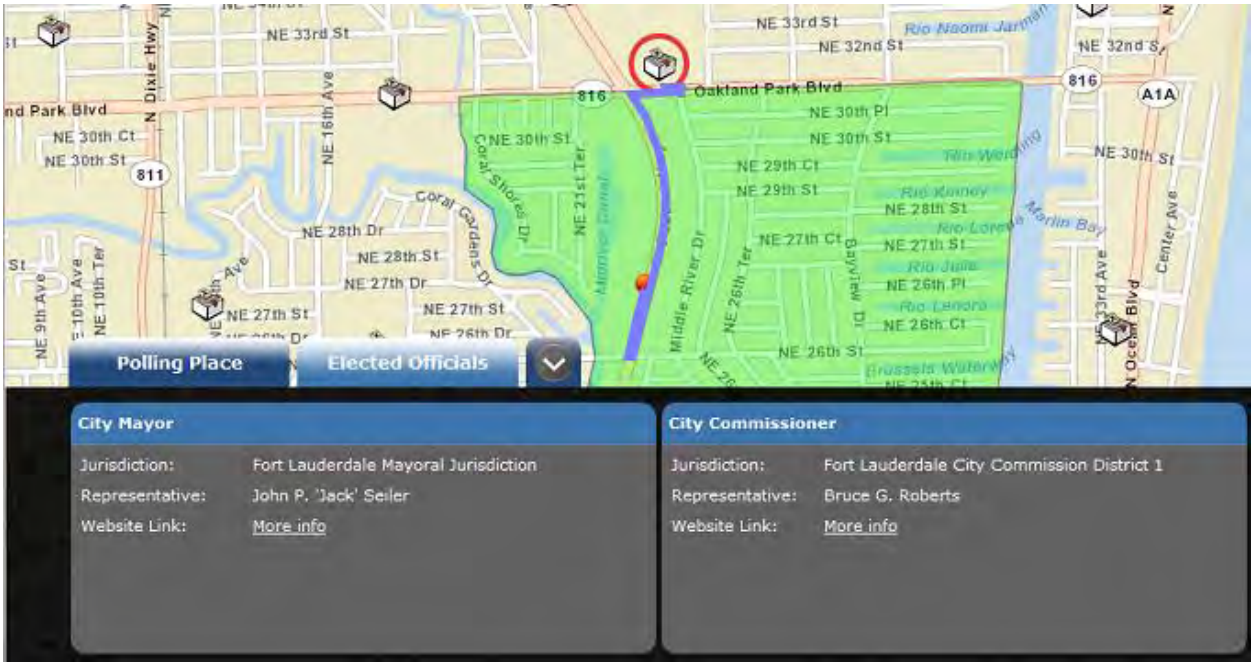
The creation of web applications and mobile friendly applications is another form of application development. This activity allows the GIS Division to support the City Administration's desire to improve government transparency, citizen access to information, and citizen engagement. The GIS Division's application development efforts also serve to furnish City staff with information otherwise not accessible, and in many cases, makes staff more efficient. Currently, the GIS Division supports over 2-dozen web applications and interactive web maps. In terms of subject areas, their varied uses are applied to the areas of Business Development, Ordinance Enforcement, Community Engagement, Community Outreach, Government Transparency, Infrastructure Operations, Permitting and Development, and Public Safety. The following are examples of web and mobile friendly applications already deployed by the GIS Division:

- **The City's GIS Website**: The GIS portion of the City's website is a gateway to all GIS services available to the public and to a fraction of services available to City staff. Its web address is http://gis.fortlauderdale.gov/
- **GIS Application Gallery**: This is another portal for the City's GIS applications that are accessible to the public and to staff connecting from outside the City's network. The GIS Application Gallery is located at the following web address; http://gis.fortlauderdale.gov/AppGallery/

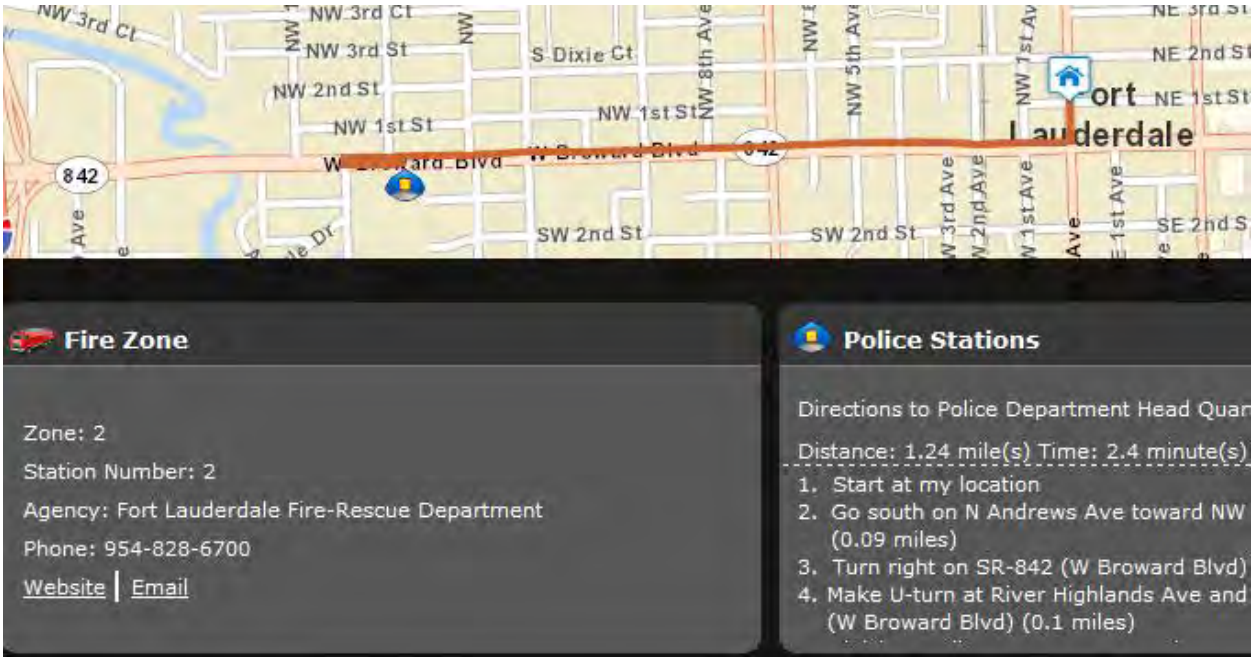
- **Enterprise Zone Business Address Lookup:** Businesses located in Broward County's Enterprise Zone are eligible for tax incentives. Fort Lauderdale's Department of Sustainable Development (DSD) was charged with managing the effort to establish the County-wide zone. The GIS Division deployed this lookup tool to assist DSD, other municipalities in Broward County, and businesses to determine whether a business is located in the Enterprise Zone. The application is accessible from the GIS Application Gallery at http://gis.fortlauderdale.gov/AppGallery/

- **Sex Offender Permissible Living Areas:** This application was deployed to alleviate some of the difficulties encountered in enforcing the City's ordinance governing where Sexual Offenders and Sexual Predators are permitted to reside. Prior to the deployment of this address lookup application, the Special Crimes Unit of the Police Department had a difficult time enforcing the ordinance. This application provides a simple to use interface that identifies whether an address is permitted. It is the backbone of the Police Department's initiative to enforce this ordinance. Other agencies have turned to this application as well. The list includes the Broward Sherriff's Office, the State's Department of Corrections, and the US Districts Courts. This application is also available at http://gis.fortlauderdale.gov/AppGallery/

- **Election Polling Places and Elected Officials**: South Florida caters to many who choose to reside here on a seasonal basis. It is not unusual for some to forget something as simple as the name of their elected official or where they should go to vote. Moreover, an elected official may change during the time a resident is away. The Election Polling Places and Elected Officials application helps to re-acclimate seasonal and permanent neighbors with their elected officials and their voting place. It is a mobile device compatible application that provides turn-by-turn driving directions to a neighbor's assigned election polling places. This application is available in the GIS Application Gallery at http://gis.fortlauderdale.gov/AppGallery/



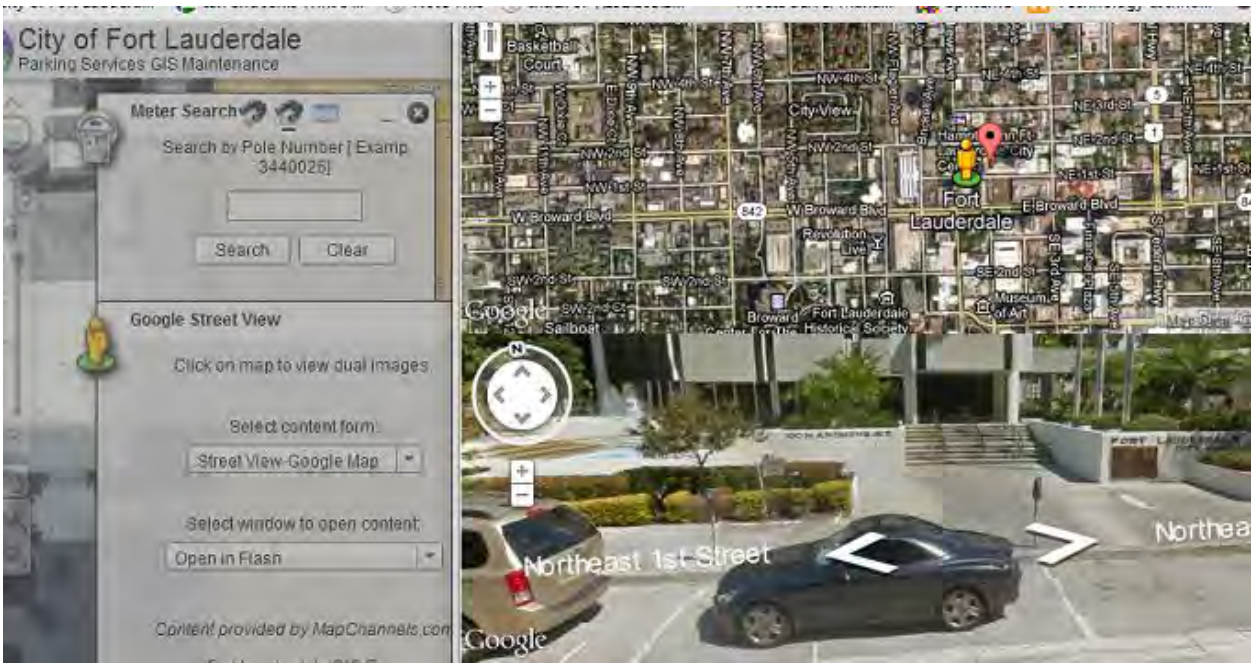
- **Property Information Reporter**: The City's most popular GIS application allows staff, neighbors, businesses and visitors to discover service information for an address. Information available for each address includes property ownership, sanitation curbside pickup service schedules, and zoning designations among many other items. This application is accessible through the GIS Application Gallery at http://gis.fortlauderdale.gov/AppGallery/. A replacement application, which will be dubbed **My Government Services**, is currently in development. My Government Services will build on its soon to be predecessor by providing turn-by-turn driving directions to facilities such as the City's fire stations, the City's police stations, emergency shelters, hospitals, and schools. A very early pre-release preview is available at http://gis.fortlauderdale.gov/MyGovernmentServices/.



- **FEMA Flood Insurance Lookup**: This application satisfies a requirement from the Community Rating Service (CRS) for the City to provide its neighbors with a means to determine their flood insurance requirements. The mere availability of this application helps to lower the City's CRS score, resulting in millions of dollars in accumulated savings for the City's neighbors. A simple address search will return whether flood insurance is required for an address. Additional information is also made available through the application. Like all the City's other public-facing GIS applications, it is accessible through the app gallery at http://gis.fortlauderdale.gov/AppGallery/

- **Park and Recreation Finder**: This application allows the City's neighbors and visitors to quickly find a park that offers recreational activities of interest to them. The user has a choice of searching by recreational activity, a park name, an address or by allowing the application to find their location by use of a geo-locate button. Additionally, the user is able to specify a search radius based on how far they are willing to walk or drive to engage in their activity of interest. Park and Recreation Finder provides turn-by-turn driving directions to locations with the reaction activities of interest to the user. The application supplements the City's efforts to promote its park system. It is accessible by searching the GIS Application Gallery at http://gis.fortlauderdale.gov/AppGallery/

- **Parking Meter Maintenance**: The Parking Meter Maintenance application is necessary to support meter mechanic maintenance work and the City's Parking Division Customer Service Representatives. The application allows the meter mechanics to track the City's meter inventory and their maintenance and repair history. It incorporates Google Street view to reduce site visits, thereby facilitating operational efficiency and saving money in fuel costs. This application is only available internally to appropriate staff.



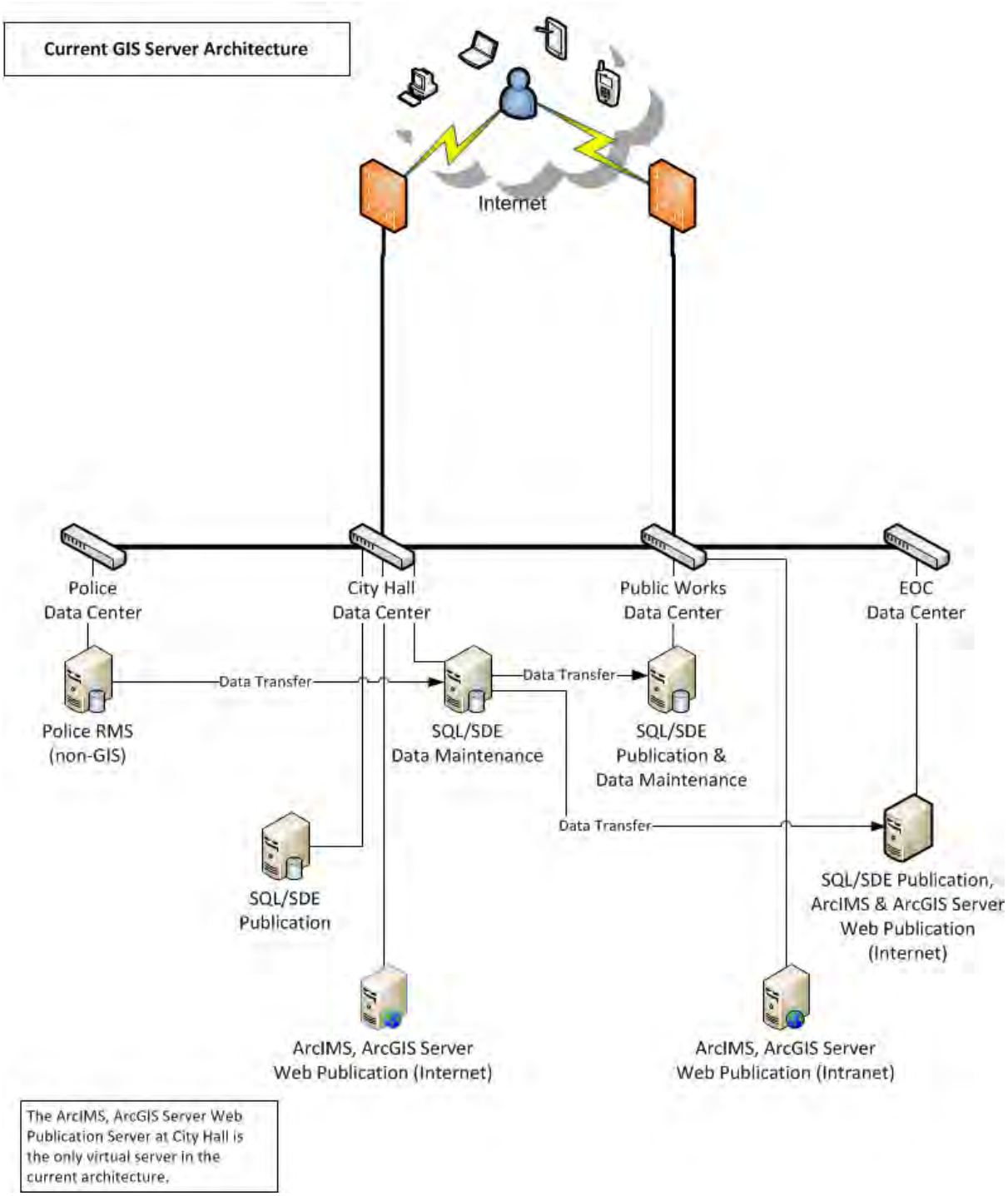
- **Utility Infrastructure Viewers**: A series of web applications allowing staff in Public Works to identify the location of the City's water, sewer and stormwater infrastructure. The viewers are relied upon to quickly locate valves and mains during a break of a water line. Other uses include determining conflicts with applications for digging, applications from other agencies for road work, applications for construction permits, and the creation of utility atlases. Due to security concerns, the viewers are only available to appropriate staff.

Hardware

- 2 physical data servers in the City Hall Data Center running ArcSDE and Microsoft SQL Server.
  - 1 is a publication server accessed by internal customers using desktop GIS software. It also feeds data to the publication web server.
  - 1 is used for data updates.
- 1 physical publication data server at the Public Works Data Center, running ArcSDE and Microsoft SQL Server.
- 1 physical publication data server at the Emergency Operations Center, running ArcSDE, Microsoft SQL Server, ArcGIS Server, and ArcIMS.
- 1 publication web server operating in a virtual environment at City Hall, running ArcGIS for Server, ArcIMS, and serving out the City's GIS website.
- 1 physical publication web server at Public Works' Data Center, running ArcGIS for Server and ArcIMS.
- 1 large format plotter at City Hall.
- 1 large format plotter at Public Works administration compound.
- 1 large format plotter at the Emergency Operation Center.

- 1 sub-meter Global Positioning System (GPS) apparatus at the Public Works administration compound.

The following figure illustrates the Citywide GIS hardware architecture:



Data

The GIS Division manages over 300 data layers, some of which are created and updated through field-work using Global Positioning Satellite (GPS) technology. The following is an abbreviated list of data that are managed or accessible by the GIS Division:

- Broward Enterprise Zone
- Building Permits
- Businesses
- Census Demographics
- Code Cases
- Hospitals
- FEMA Flood Zones
- Fire Incidents
- Fire Stations
- Future Land Use
- Hurricane Evacuation Zones
- Hurricane Evacuation Routes
- Parcels (properties and property ownership)
- Parks
- Parking Meters
- Sanitation Service Schedules
- Sewer Network (mains, service lines, fittings, manholes, pump stations, etc.)
- Sex Offender Permissible Living Areas
- Street Centerlines
- Stormwater Network (stormwater lines, manholes, pump stations)
- Utility Billing Account Locations
- Water Network (mains, fire hydrants, meters, plants, wells, etc.)
- Zoning

Processes

Processes refer to the structured way in which the GIS Division gathers information, adheres to the City's business practices, adopts GIS and IT industry best practices, and executes deliverables. For the purposes of efficiency and personnel cross-training within the division, structured processes are documented by the GIS Division.

4.3 Division SWOT Analysis

	Helpful **to achieving goals**	**Harmful** **to achieving goals**
Internal origin **attributes of the organization**	**Strengths** • A resourceful team. • The team's ability to adapt to and successfully leverage new and emerging technologies. • A modern GIS website that effectively serves as a portal for distributing maps and apps. • Confidence of the internal customer base in the GIS Division.	**Weaknesses** • Inadequate staffing to meet the increasing needs and the broad spectrum of customers. • Hardware environment not conducive to achieving high availability for web apps. • Aging hardware with no replacement plan. • Reliance on old technology for widely used applications. • Limited access to GIS services from the City's Emergency Operations Center (EOC).

External origin
attributes of the environment

Opportunities	Threats
• The City administration's commitment to use technology in improving efficiencies, transparency, and delivering services. • The transfer of 3 GIS-centric staff to the GIS Division. • Merger of the 3 IT groups should foster greater collaboration to explore areas where GIS can provide added value benefits. • ESRI's Local Government Information Model and application starter templates reduce the time and resources needed to build apps. • ESRI's ArcGIS Online makes it easier to create and publish interactive maps and apps. • ESRI's Portal for ArcGIS offers solutions for publishing sensitive maps, apps, and data with greater security. • The Implementation of OneSolution software may help to replace 2 legacy apps. • Access to countywide data helps to extend the reach of the GIS Division. • ExaGrid backup system provides faster recovery of files.	• The City's state of austerity makes it difficult to acquire resources. • The absence of a budget for continuing education. • The reliance on old technology for widely used apps. • Heavy reliance on ESRI's cloud hosted ArcGIS Online as a portal for serving maps and apps while having no on-premise alternative of equal capabilities. • The pending expiration of the City's tape backup solution combined with the cost of moving to ExaGrid backups. • The transfers into the GIS Division have significant non-GIS responsibilities in their former departments. • Insufficient attention given to the GIS activities in the Public Works department. • The absence of a budget for upgrading essential non-GIS software. • The proposed Content Management System for the City's website could present challenges in developing apps.

4.4 Problem Statement

Problem 1: Insufficient Staffing Resource

Successful implementation of GIS concepts and GIS software in large organizations involve several specialties. Even activities that may appear on the surface as simple mapping activities may require a combination of specialties in geodesy, cartography, spatial analysis, desktop software programming, web development, and database administration. Prior to the recent transfers from other departments, the City's GIS Division was a staff of three that served the entire City workforce in some capacity. All three engaged in all aspects of GIS, which did not allow much opportunity for them to hone their skills in any one area. For instance, the GIS Application Developer is highly involved in cartography, spatial analysis, report generation, and server maintenance. Reliance on a small GIS staff also proved challenging in working with City departments to better bridge activities in those departments. The more knowledge the GIS staff acquires as far as activities in individual departments, the more they can make recommendations on how GIS can improve work processes in those departments.

The problem of insufficient staffing has been exacerbated by a lack of funding for continuing education. As with other professionals working in a technology related field, to remain proficient in their field, GIS professionals require continual training in current and emerging technologies. Training must be administered in emerging technologies in the areas of geospatial tools, database management, and software development. The last conference or training course attended by a member of the GIS Division, other than its manager, took place at least six years ago. The industry has undergone tremendous changes since then.

Austerity policies implemented in the last five or so years have not only resulted in the elimination of continuing education funding for the GIS Division, it has resulted in the elimination of continuing education funding for other departments as well. Even in cases where an Enterprise Fund division such as Utilities has funding for continuing education, requests for training are sometimes subjected to a bureaucratic approval process. The result is an environment in which new users of ArcGIS Desktop receive no formal training for proficient use of the software. This has been the case with the Crime Analysts in the Police Department and Engineers in Public Works. Ultimately, productivity suffers, user confidence in the software is diminished, and the number of technical support calls to the GIS Division increases.

In the year 2000, the City embarked on a $2.3-million project to inventory and field verify the City's water, wastewater and stormwater utility networks. Project deliveries included a sophisticated rule-based geodatabase representing the City's three utility networks. Understanding the structure and rules of the geodatabase can be an arduous task. Understanding how the geodatabase applies to the business operations of the Public Work department can also be a difficult undertaking. The overall learning process for understanding the intricacies of the geodatabase and its application to the City's operations is, at a minimum, a six-month effort requiring full-time dedication. Yet the GIS Specialist who was formerly housed in Public Works is the only individual with the knowledge and skills required to

proficiently leverage the utility geodatabase. Should this person leave the City, Public Works would be set back years as the City scrambles to find a solution.

Problem 2a: Inadequate Hardware Architecture for High Availability of Web Applications

High availability refers to the ability of a system to continue operating with as minimal downtime as possible when one or more components fail. Customers using a system with one-hundred percent availability endure no downtime even when a component malfunctions. While it might not be practical to expect perfect availability for the City's GIS applications, a lot of improvements can be made to improve their availability. Although the City's hardware environment includes a publication data server and a failover data server, no servers exist for staging a major software upgrade. This need was evident as recently as 2010, when the GIS Division upgraded its suite of ESRI software from ArcGIS 9.3 to ArcGIS 10. Several public-facing web GIS applications were inoperable for over a week as the GIS Division struggled with resolving issues encountered during the migration. A set of staging servers consisting of a web server and a data server would have helped in uncovering the issues before migrating software on the City's publication servers.

Problem 2b: Aging Hardware

A good proportion of the equipment used by the GIS Division is antiquated. The GIS Specialist assigned to Public Works maintains the City's $2.3-million GIS inventory of utility assets with the aid of a GPS apparatus that is sixteen years old. Today's equivalent devices allow for more efficient capture of data.

Access to reliable printing devices is critical to the success of a GIS operation. Last minute plot requests by clients dashing off to a meeting are not uncommon. Most of the printing is done using large format plotters. A typical large format plotter is expected to function for about 8 years, after which time the frequency and severity of service calls increase. Plotter repairs often require the equipment to be taken offsite, resulting in downtimes that last days. The large format plotters being used by the GIS Division are either past their expected end of life or are approaching their end of life. On several occasions the GIS Division resorted to trucking the plotter housed 10-miles away at the EOC to City Hall whilethe City Hall plotter was taken away to be serviced.

Presently, the City does not have a server replacement plan. If a server malfunctions to the point of no repair, the City will either need to find emergency funding or the service provided by the server will cease to exist. In general, aging equipment contributes to the availability problem.

Problem 3: Reliance on Legacy GIS Software Technology

The GIS Division still relies on old technology in some areas. Several are no longer supported by the vendor. ESRI's ArcIMS is an example of technology that no longer has vendor support. The City's three most widely used web GIS applications, Building Permit Tracker, Code Case Tracker and Property Information Reporter, are all built on ArcIMS technology.

Even more troublesome is the fact that software incapable of running on the latest Windows operating system are still in use. ArcView 3.2, a desktop GIS software, serves as an example. The City's Community Inspections Division relies on a custom version of this software to produce reports on code

cases for City Commissioners and neighborhood associations. ESRI ceased support of ArcView 3.2 a few years ago. Moreover, the program does not install on Windows 7, Microsoft's most current version of the Windows operating system for desktops and laptops. The City's heavy reliance on old GIS technology is attributable to a combination of a shift in the technological landscape, insufficient staffing, and the limited access to formal training.

Every new ESRI release of its suite of ArcGIS software creates a greater gap between compatibility between legacy software and the new software. Challenges emerge during the software revision upgrade process as the GIS Division tries to interface old software with new. Again the 2010 upgrade attempt from ArcGIS 9.3 to ArcGIS 10 serve as another "lessons learned." During the upgrade, the applications that were built using ArcIMS were inoperable for over a week as the GIS Division attempted to resolve issues associated with interfacing old technology with the new technology. Then there is the grim reality that some of these older technology do not work when users are issued new computers running the latest operating systems. The GIS Division's heavy reliance on unsupported technology software technology puts it in a precarious position.

Problem 4: Limited Access to GIS Services from the EOC

The City's EOC becomes the City's command center when responding to emergencies such as major tropical storms and hurricanes. Fire Station 53/88, where the EOC is located, represents the only category five rated City building with a data center. Computer equipment located here stands the best chance of surviving a major storm. Meanwhile, GIS servers housed in the City Hall Data Center serve as the engine for GIS services offered throughout the City.

Historically, Information Technology Services procedures call for all servers in the City Hall Data Center to be powered down prior to the arrival of a major storm. This procedure was put in place as a measure of protection for the servers against possible failure of the data center's cooling system during a major storm. With the City Hall servers powered down, GIS services at the City's EOC are severely limited. The thought of the City Hall servers being damaged in a hurricane is even more frightening in that the vast majority of GIS services would vanish. It only makes sense that the EOC is equipped to provide the level of GIS services that closely resembles what is made available from City Hall.

Problem 5: Lack of Funding for Upgrading Vital Non-GIS Software

Vital non-GIS software for the GIS Division is defined as non-GIS software that is necessary in order to provide the products and services required of the GIS Division. Microsoft SQL Server and Microsoft Visual Studio are examples of non-GIS software that are critical to the operations of the GIS Division. The City's GIS data are managed by ESRI's ArcSDE software, which in turn is dependent on the presence of SQL Server to function. An upgrade of ArcSDE may require an upgrade of SQL Server, which may then require an upgrade of Visual Studio. Visual Studio, another vital non-GIS software, is used to build the web based and desktop applications in use throughout the City. It has co-dependency with some modules of SQL Server. Since there is an interdependence of this software with others in use, they must remain compatible with software on which they depend and with software that are dependent on them.

No funding program exists to ensure critical non-GIS software remain compatible with other interdependent non-GIS software and with GIS software.

4.5 Problem Resolution Strategies

Resolution 1: Insufficient Staffing Resource

The reassignment of three GIS-centric staff to the GIS Division was an attempt by the City administration to provide assistance. It was believed that these staff members would help the GIS Division better serve the growing needs for GIS services. A need to have one coordinated Citywide GIS direction was another impetus for the reassignments. One of the transfers was a GIS Specialist who previously reported to the Public Works Department. The other two held Planner II positions in the Department of Sustainability Development.

Although the transfer of additional staff to the GIS Division was a step in the right direction, the three new staff members have significant non-GIS responsibilities in their former departments. The two employees that held Planner II positions are asked to carry out duties such as sit at the zoning desk, create Microsoft Power Pointe presentations, create poster boards for meetings, and monitor the beach for repairs. Even the transfer that holds the title of GIS Specialist spends a great proportion of his time engaged in non-GIS work. His former supervisor explained that GIS might comprise only about ten percent of the work in which he engages. Although this might not be an entirely accurate number, it does hold some value in that it indicates the degree of non-GIS activities in which that individual engages. One example given was that the GIS Specialist is the only employee working in Utilities that is certified to create and approve Movement of Traffic (MOT) plans. MOT plans are created to reroute traffic when utility related work that would disrupt the flow of traffic is being performed. Influential leaders in the former departments of all three cautioned that their respective transfers must continue to perform non-GIS work.

A need exists to develop the technical capabilities of the new transfers and the original members of the GIS Division. In the case of the new transfers, GIS analysis and mapping have been their primary GIS roles. The opportunity for them to support an enterprise GIS infrastructure was not present in their former departments. Their involvement in non-GIS activities further hindered their ability to advance their IT and GIS skills. As with the original members of the GIS Division, who have not attended formal training in years, the transfers are in need of training in several areas.

Staff in the GIS Division have dealt with the lack of training by scouring the Internet for free material, borrowing training manuals from colleagues external to the City, and paying their own costs for local conferences and seminars. While some of these solutions would still take place in an environment where funding for continuing education was available, the expectation that staff would continue to pay their way to training events is an unreasonable one.

The transfer of staff to the GIS Division offers an opportunity for staff in the division to have more focused roles. It also offers an opportunity for cross-training in the various roles. The roles will cover technical areas of responsibility as well as subject matter responsibility. For instance, application

development, which is a technical role, will still be led by the GIS Application Developer with some cross-training of one newcomer to provide some redundancy. Another example is in the area of database and ArcSDE administration. The plan is for one newcomer to be cross-trained to act as a backup in this area. The concept is also applicable to subject areas in that individual GIS staff will be assigned to providing services to one or more departments with another cross-trained to serve as backup for those departments. A training plan is currently being developed to train one of the newcomers on the intricacies of the utility data and operations in Public Works.

Resolution 2a: Inadequate Hardware Architecture for High Availability of Web Applications

High availability is of paramount importance as the City's GIS applications and services become more mission critical. Actions taken toward achieving high availability includes establishing a data creation and update server that is separate from the publication data server. At the same time, several issues exists that hinder high availability:

- The publication data server and the update data server, which also acts as the failover data server, are both stored in the vulnerable City Hall data center.
- Should the publication web server fail, no failover web server exists for powering the City's GIS website and web applications when the publication server fails.
- The reliance on old web application development technology makes it difficult to establish a failover web server that uses current-day operating system.
- No staging environment exists for upgrading software on servers. The GIS Division has resorted to seeking out retired servers to serve in this capacity. This doesn't work in most cases since the architecture and capabilities of retired servers are often vastly different from those used in the production environment.

Resolution 2b: Aging Hardware

IT industry best practices require specific hardware be evaluated for replacement every five years. The cycle at which other types of equipment are replaced would be determined by factors such as the expected lifespan of that type of equipment, the life of manufacturer warranty versus the cost of after-factory service requests, and tolerance for service interruptions. Large format plotters generally have a life expectancy of seven to eight years, so eight years should be a good cycle for replacing plotters. History has shown that ten years should be the limit as far as how long GPS equipment can be relied upon.

The GIS Division, in working towards establishing a hardware replacement program, has done an assessment of all its hardware with the goal of finding opportunities for consolidation. The idea was to assess the need for all the servers at the City's data centers and look for opportunities for all sites to share servers. Server consolidation eliminates the need for all the City's data centers to purchase servers. Cost savings resulting from consolidation can then be put towards purchasing new replacement servers as the existing ones reach their end of life.

Server virtualization is potentially another solution that may help mitigate the issue of aging hardware. Assuming the City commits to investing in virtual server environments, the cost of adding individual servers should decrease as the virtual environments benefit from an economy of scale as new servers are added. ITS' Infrastructure Division has converted the GIS Division's web server from an eight year old physical server to a virtual one. Research indicates that creating a failover equivalent would cost less than $3,000, maybe even as little as $1,100. In comparison, a new physical failover equivalent could cost upwards of $6,000.

Resolution 3: Reliance on Legacy GIS Software Technology

The GIS Division must replace web applications built using ArcIMS technology and desktop applications built by customizing ArcView 3.2. A move to replace applications built on these technologies with applications built using ArcGIS for Server is the solution. A significant part of the problem is the time required to rebuild the applications to operate within the framework of the new ArcGIS for Server environment. It has already been mentioned that insufficient resources is a weakness of the GIS Division. Thankfully, ESRI starter templates help in making this migration easier in the face of the limited application development resources available. ESRI's recent trend of releasing application starter templates, along with the availability of ArcGIS Online, reduces the amount of time and effort needed to build and deploy applications.

Many ESRI application starter templates require their data to be stored in ESRI's Local Government Information Model. This is a database schema being adopted by ESRI's customers for ease in data sharing. It also serves the purpose of allowing ESRI to develop application templates using a common data schema shared by many, which in turn makes it easier to develop and deploy the applications. The GIS Division has already started migrating some of its data into the model to make use of application starter templates. The new Park and Recreation Finder application originated as an ESRI starter template that uses the Local Government Information Model. The GIS Division enhanced this template to serve the needs of the City. This new application, which can be accessible at http://gis.fortlauderdale.gov/ParkAndRecFinder/, now replaces the ArcIMS based Park Locator application.

As already discussed, the consolidation of staff from other departments presents an opportunity for cross-training. This might alleviate some of the pressures of application development and support by training one of the newcomers. The success of cross-training in application development and support will be highly dependent on the ability for at least one to grasp the concepts of software programming.

Resolution 4: Limited Access to GIS Services from the EOC

An ideal Citywide GIS architecture would enable City authorities to have access to all GIS services even when the City Hall Data Center becomes inoperable. Because the City uses ArcGIS Online Personal to build and publish applications, high availability necessitates access to an ArcGIS Online-like service at the EOC. ESRI has a new product that emulates ArcGIS Online except that it is installed on and operates from the organization's internal network. It is currently being called Portal for ArcGIS. The local installation of Portal for ArcGIS is significant in that it would eliminate the dependency on an Internet

connection so that many of the web maps and applications remain operational even when the Internet connection is severed. It offers other benefits over ArcGIS Online Personal in the way of added security of the City's sensitive data.

Server consolidation is an approach being employed to help make the EOC self-sufficient in the context of access to GIS services. The EOC has recently purchased a new grant-funded server for GIS use. Although this server will be housed at the EOC, it will fulfill the role of replacing one of the two data servers currently being housed in the City Hall Data Center. Software installed on the server it replaces will be installed on the new EOC server. All this is contingent on the robustness of the network connection between City Hall and the EOC.

Resolution 5: Lack of Funding for Upgrading Vital Non-GIS Software

A need exists for the GIS Division to establish a budget for upgrading vital non-GIS software. The solution could be as simple as creating a budget when new releases of critical non-GIS software are expected. Today the GIS Division addresses this issue by purchasing software upgrades on their Purchasing Card (P-Card) as emergency purchases. This is a problem in that the GIS Division's annual P-Card budget is a mere $1,051 and is intended for unbudgeted emergencies. Such a miniscule budget won't even make a dent in the cost of purchasing a single SQL Server license.

4.6 Goal 1: Enhance the Capabilities of the GIS Staff and the City's Desktop GIS Users

Of all the five elements that comprise a GIS, the people element is arguably the most essential to its effectiveness. A GIS needs the right staff to create plans, and the staff must be equipped with the skills necessary to execute the plan. Everything else is secondary. Although the GIS Division's staff has historically been a small one, it has been resourceful. A significant amount of work still awaits the GIS Division, requiring an elevation in the capabilities of its staff. An effort to elevate the technical capabilities of internal GIS desktop software users would also go a long way in increasing the effectiveness of the City's GIS.

Objective 1.1: Evaluate the City's Staffing Needs and Make Recommendations on Staffing Requirements to Meet the City's Needs

With the new additions to the GIS Division, a need exists to see how well their skills fit with the goals and needs of the City. The GIS Division will look for ways to cross-train in subject areas as well as technical areas. At the end of fiscal year 1, the GIS Division will recommend a staffing strategy for achieving the City's, the departments, and the division's goals and objectives.

Objective 1.2: Obtain an Annual Budget for Continuing Education

The GIS Division must stay abreast of the rapidly changing technology landscape. Members of the GIS Division already take the initiative to seek out free training resources. This, however, is insufficient. The need for greater exposure to professional instruction on emerging technology is still a real one. So is the need to interface with colleagues in the field. Consider that the GIS Division's new transfers all have non-GIS duties that hinder their GIS development. Moreover, the original members of the division have

not received training in over five years, all while technology continues to evolve. An annual continuing education budget must be established for the GIS Division.

Objective 1.3: Cross-Train GIS Staff in Technical and Departmental Subject Matter Areas

Cross-training is essential in maintaining overall GIS high availability when a member of the GIS Division leaves. Previous sections of this document touched on the need for cross-training in technical areas such as application development and database development. Cross-training should also take place in departmental subject matter areas such as Planning, Police, and Public Works, just to list a few. The GIS staff maintaining the Computer Aided Dispatch system (CAD) must have a capable backup that can fill in whenever needed. Same with the GIS staff that services Public Works. An annual continuing education budget would help with continued cross-training.

Objective 1.4: Establish a Budget for Training Desktop GIS Users

A few positions in the City require use of ArcGIS Desktop Basic in order to carry out their job functions. The list includes Crime Analysts, Engineers, Engineering Technicians, and Planners. The GIS Division should continue to encourage City staff's use of ArcGIS Desktop Basic whenever appropriate. However, a training budget would assist in increasing user proficiency. In turn, this would increase the productivity of City staff needing access to ArcGIS Desktop.

Objective 1.5: Participate in ESRI Beta Programs

Exposure to emerging technology in beta form offers benefits to the City. It helps the development of staff in the GIS Division because they gain experience with software ahead of release. It also allows the GIS Division to provide feedback prior to the software becoming final. Some feedback may be along the lines of ensuring the software will be compatible with City processes and requirements. Furthermore, beta programs present an opportunity to evaluate software for their appropriateness for the City prior to purchasing the software.

Objective 1.6: Invest in Emerging Technology

The concept of investing in emerging technology includes an investment in emerging ESRI technology as well as non-ESRI technology. This objective is in place to insure follow through with beta programs. It is not enough to participate in beta programs if the participation isn't followed through with the implementation of technology that will benefit the City.

Objective 1.7: Establish a Community Outreach Program

The GIS Division must establish a community outreach program in order to fulfill its mission, which is "to be leaders in providing high quality geospatial services to our community by making complex issues simpler to understand, and by providing broad access to information." The community comprises the City's neighbors, businesses, City staff, area local governments, and GIS professionals external to the City. An outreach program would serve a purpose that is twofold: First, it would serve as a mechanism for soliciting input from the community as far as learning what services they deem important. Second, it would be used to educate the community on the products and services made available by the GIS Division. It may include the dissemination of written material highlighting specific services,

presentations at local neighborhood associations, presentations at local conferences, and even presentations at conferences outside South Florida.

5-Year Budget to Attain the Goal

The five-year budget to attain this goal only accounts for items that are known today. Items such as the cost of future technology are unknown. The same is true if it is later determined that the GIS Division needs additional dedicated resources in terms of staffing. As a result, the budget presented here is limited to a training budget for each of the six-member GIS Division to attend continuing education events every year. These may include conferences, seminars, technical training sessions, and user groups.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
GIS Staff Continuing Education	Capital Cost	$10K	$15K	$15K	$15K	$15K
	Maintenance Cost					
	Total Cost	$10K	$15K	$15K	$15K	$15K
GIS Desktop User Training	Capital Cost	$22.5K	$22.5K	$22.5K	$22.5K	$22.5K
	Maintenance Cost					
	Total Cost	$22.5K	$22.5K	$22.5K	$22.5K	$22.5K
	Annual Total	$32.5K	$37.5K	$37.5K	$37.5K	$37.5K
	5-Year Total	$182.5K				

GIS Desktop User Training budget was established after the GIS Division submitted its requests for the fiscal year 2013 budget. This leaves doubt as to how GIS Desktop User Training will be funded for Year 1.

Performance Measures to Evaluate the Goal

The educational and staffing components of this goal will be evaluated using the following measures:

- The percentage of map products and reports from analysis that are delivered on time.
- The percentage of calls for assistance using GIS software that are resolved within four (4) hours. Not only would this demonstrate the level of responsiveness of the GIS staff, it would also gauge their technical ability to resolve issues in a timely manner.

The outreach component will be evaluated using the following measures:

- The total number of annual visits to the City's GIS website and web applications.
- The total number of unique annual visitors to the City's GIS website and web applications.
- The average number of weekday visitors to the City's GIS website and web applications.
- The average number of unique weekday visitors to the City's GIS website and web applications.

4.7 Goal 2: High Availability of GIS Services

The GIS Division has deployed applications whose customers demand little to no downtime. One such example is the Property Information Reporter application, which is used extensively throughout the City. The Department of Sustainable Development depends on this application to complete permitting approval, and to field customer inquiries. Similarly, City customers rely on non-application GIS services in order to conduct business. For instance, staff in the Treasury Division need access to property ownership information in the GIS Division's geodatabase for billing purposes. Customer Service Representatives in Parking Services require uninterrupted access to the Parking Service Customer Service application. Many more examples of GIS applications and services requiring high availability exist throughout the City. A mission to achieve this goal necessitates server consolidation, server redundancy, server segregation, a server replacement program, and a staging environment for software upgrades. Peripheral equipment such as large format plotters and GPS apparatus also contribute to high availability when providing GIS services.

Objective 2.1: Consolidate GIS Servers Housed in the City's Data Centers

City Hall, the EOC, and the Public Works Administration building are the sites at which GIS servers are implemented. If the three sites are able to share servers, the City would realize significant cost savings in the areas of server replacement, maintenance, and software licensing. The long term approach is to virtualize the City's GIS servers

Objective 2.2: Establish Server Load Balancing and Failover

ESRI's best practices for implementing its ArcGIS for Server software call for load balancing and failover. A two-core site architecture such as the City's where Internet traffic is distributed between the City Hall Data Center and the Public Works Data Center offers opportunities for load balancing web applications. A web server running the GIS Division's web site and its applications would run at each of the two core sites. A load balancing appliance would then be implemented to establish load balancing and failover for web GIS services.

Failover would be possible with the City's GIS data servers by use of a two node SQL Server Active/Passive cluster. Users would actively interact with one server while the other server stands by in a passive mode. If the active server fails, the passive server acts as the primary data server for user interaction. The two data servers would reside in different Data Centers.

Objective 2.3: Segregate Publication and Failover Servers

South Florida's vulnerability to major storms and hurricanes creates an emphasis on the need to geographically segregate load balancing and failover servers. Assuming all servers are virtualized as desired, and assuming the EOC has redundant fiber connections, moving one set of servers to the category five rated EOC represents a layer of protection from natural disasters.

Objective 2.4: Create a Staging Environment for System Upgrades

ESRI's best practices warrant a staging environment that is separate from the publication and the failover environments. Such a system architecture provides another layer of support for high availability. It ensures that service goes un-interrupted during software upgrades and testing. A move to virtual servers should make it easier to establish staging environments for web servers and data servers. Virtual server technology makes it possible to produce staging copies of publication servers by cloning the publication servers.

Objective 2.5: Establish an Eight-Year Recurring Plotter Replacement Program

Large format plotters generally have a longer life-span than servers. They have a life expectancy of about eight years. For that reason an eight-year replacement plan is recommended. The large format plotters currently under the purview of the GIS Division are all close to the eight-year old mark.

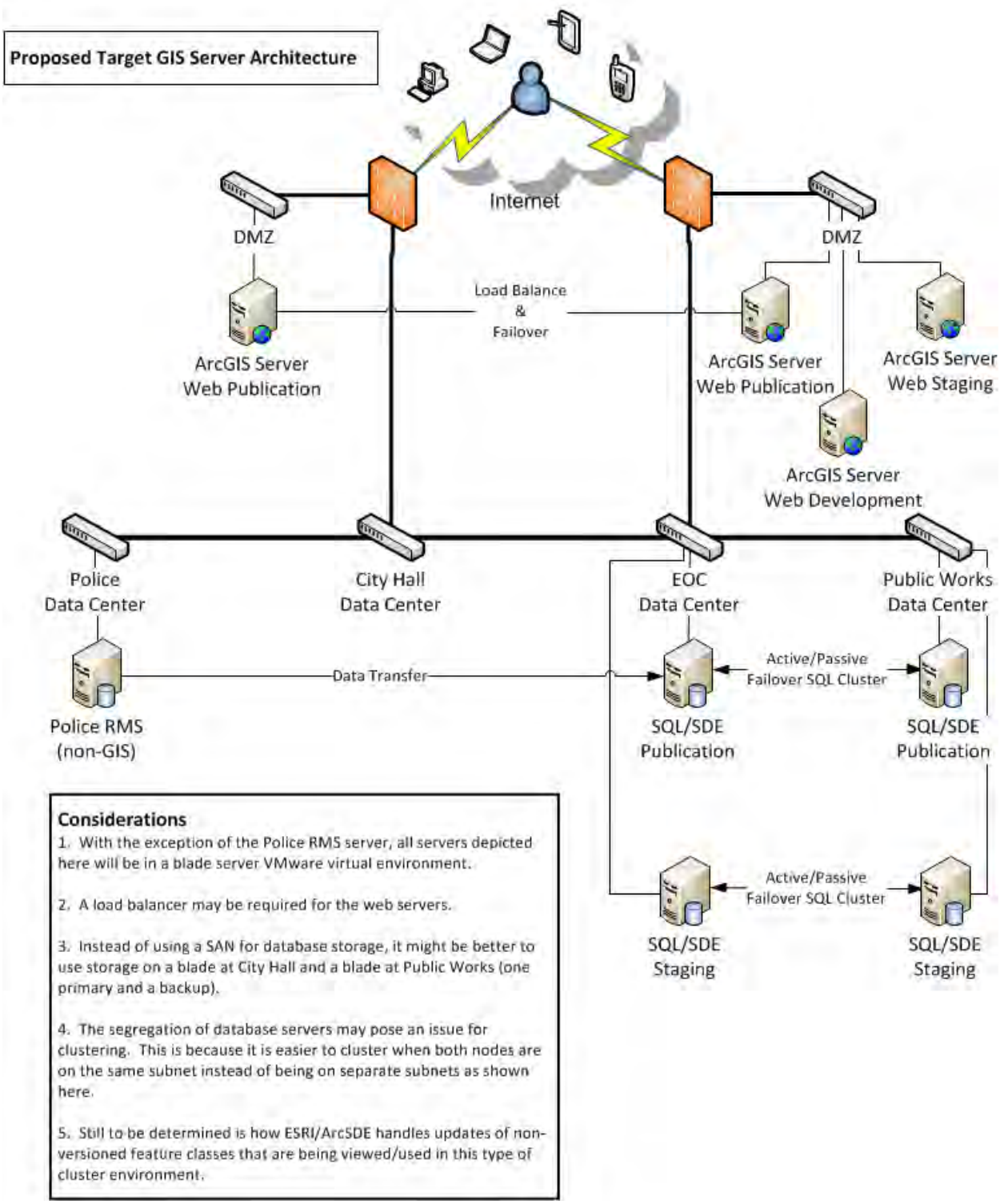
Objective 2.6: Develop a Ten-Year Recurring GPS Equipment Replacement Program

A ten-year replacement cycle is recommended for GPS equipment. Public Works relies on sub-meter GPS equipment to maintain its $2.3-million GIS representation of the City's utility infrastructure. They are in the process of replacing their sixteen-year old GPS equipment. Assuming the current purchase is finalized; no replacement is being recommended for the next five-years unless the new device is faulty or is damaged beyond repair.

Another GPS device is in use for Park and Recreation activities and Beach CRA activities. The Parks and Recreation Department purchased this device in 2009 using grant funds. This purchase timeframe doesn't warrant a replacement either.

Solution Architecture

The diagram that follows serves as an illustration of the proposed solution architecture:



The solution architecture for high availability follows ESRI's best practices and IT industry best practices. It was devised under the following assumptions:

- All ArcIMS applications are eliminated, thereby allowing the GIS Division to only support web GIS applications built using ArcGIS for Server.
- The EOC has redundant fiber optic connections to the other Data Centers.
- The EOC replaces Public Works as the second core site for Internet traffic.
- A blade enclosure exists at the EOC.
- All servers are in a HP Blade enclosure.

The following is a walkthrough of the solution from top to bottom, left to right:

1. A Data Management Zone (DMZ), also referred to as a demilitarized zone, is created at the City Hall Data Center and an ArcGIS for Server Web Publication virtual machine placed in this zone. This machine would host web services that are intended for internal consumption only as well as those intended for public-facing web GIS applications.

2. In section 6.10 of this document, the Network and Telephone Communications Services Division identified an objective to transfer the Internet access line from Public Works to the EOC. This would make the EOC the City's second primary Internet access site.

3. A DMZ would be established in the second primary Internet Data Center.

4. An ArcGIS Server Web Publication server that is a clone of the one at City Hall would be placed in the DMZ at the second Internet Data Center.

5. The ArcGIS Web Publication servers in both Internet Data Centers would carry out load balancing and failure by way of a load balancing appliance installed in both Internet Data Centers.

6. An ArcGIS Web Staging sever would be created from a clone of an ArcGIS Web Publication server. A benefit of the virtual servers allows for this server to always be configured exactly as its publication counterparts. This benefit would be realized whenever GIS software and operating system patches and upgrades are applied. If for some reason the upgrade or patch creates an issue, the virtual server could be wiped clean and be replaced with a new clone. Once the issues with the upgrades or patches are resolved, the staging server could be cloned to create replacement publication servers. The City already has sufficient ArcGIS for Server licenses to create a staging server without incurring additional software licenses.

7. An ArcGIS Web Development Server would reside in the DMZ of the second Internet Data Center. It would be used as the server for building web applications and for making modifications to the City's GIS website. Again, ESRI licensing would be of no extra cost to the City.

8. A publication data server at the EOC running SQL Server and ArcSDE.

9. A second publication data server at Public Works running SQL Server and ArcSDE. Although this architecture calls for this machine to be housed at Public Works, it could operate from the City Hall Data Center.

10. A staging SQL Server/ArcSDE data server at the EOC. This virtual server would be created from a clone of the EOC data server.

11. A staging SQL Server/ArcSDE data server at Public Works. This virtual server would also be created by cloning one of the publication data servers. The City currently owns sufficient ArcSDE licenses to accommodate for two staging servers running ArcSDE. Two of the City's ArcSDE licenses would be converted to staging licenses for a fifty percent of their full annual cost. Microsoft, on the other hand, permits unlimited number of staging SQL Server Licenses on a single server with a $1,200 annual subscription of their Microsoft Developer Network (MSDN).

Five-Year Budget to Attain the Goal

The five-year budget to attain this goal is broken down in the table that follows.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Upgrade the Operating System on City Hall Web Server (virtual server)	Capital Cost	$0.5K				
	Maintenance Cost					
	Total Cost	$0.5K				
Establish GIS Virtual Servers and Load Balancing Appliances for Data Center 1 (City Hall/EOC), Annual SQL Server Software Assurance, and annual MSDN.	Capital Cost		$44.2K			
	Maintenance Cost			$21.8K	$21.8K	$21.8K
	Total Cost		$44.2K	$21.8K	$21.8K	$21.8K
Establish GIS Virtual Servers and load balancing appliances for Data Center 2 (Public Works/EOC), Annual SQL Server Software Assurance and annual MSDN.	Capital Cost	$51.32K				
	Maintenance Cost		$21.8K	$21.8K	$21.8K	$21.8K
	Total Cost	$51.32K	$21.8K	$21.8K	$21.8K	$21.8K
Plotter Replacement (City Hall in Year 2 and Public Works in Year 4)	Capital Cost		$7.5K		$7.5K	
	Maintenance Cost					
	Total Cost		$7.5K		$7.5K	
GPS Replacement used for Parks and Recreation, and Beach CRA	Capital Cost					
	Maintenance Cost					
	Total Cost					
	Annual Total	$51.8K	$73.5K	$43.6K	$51.1K	$43.6K
	5-Year Total	$263.6K				

Performance Measures to Evaluate the Goal

Availability is generally expressed as a percentage of uptime in a given year. The following table identifies the availability targets for various GIS services:

Service	Availability % Target	Maximum Downtime per Year
Desktop access to ArcSDE geodatabases	99.9%	8.76 hours
Access to web GIS applications	99%	4 days

The performance measures for peripheral equipment are as follows:

- The number of days in the year a plotter has been rendered inoperable.
- The number of days in the year the GPS equipment has been rendered inoperable.

4.8 Goal 3: Make GIS Activities at the EOC Self-Sufficient

The City's EOC becomes the City's operational center when the City is in a state of emergency. GIS services are sometimes requested during these times. Currently, the types of services that can be delivered from the EOC are limited due to restrictions on hardware, software licensing, and the network connection between City Hall and the EOC. Attainment of this goal would make all GIS services available from the EOC even when data connection between City Hall and the EOC is severed. This goal is aligned with the City's Public Safety Goal 2: "Be a City well-prepared for and responsive to all hazards."

Objective 3.1: Implement GIS Hardware and Software at the EOC

This objective piggybacks the previous goal of establishing High Availability of the GIS website and its applications. The previous solution architecture shows GIS web servers and data servers at the EOC in a virtual enclosure. This objective is dependent on the City's success in making the EOC a primary Internet Data Center as well as being able to locate a virtual enclosure at the EOC.

Objective 3.2: Implement GIS Portal for ArcGIS at the EOC

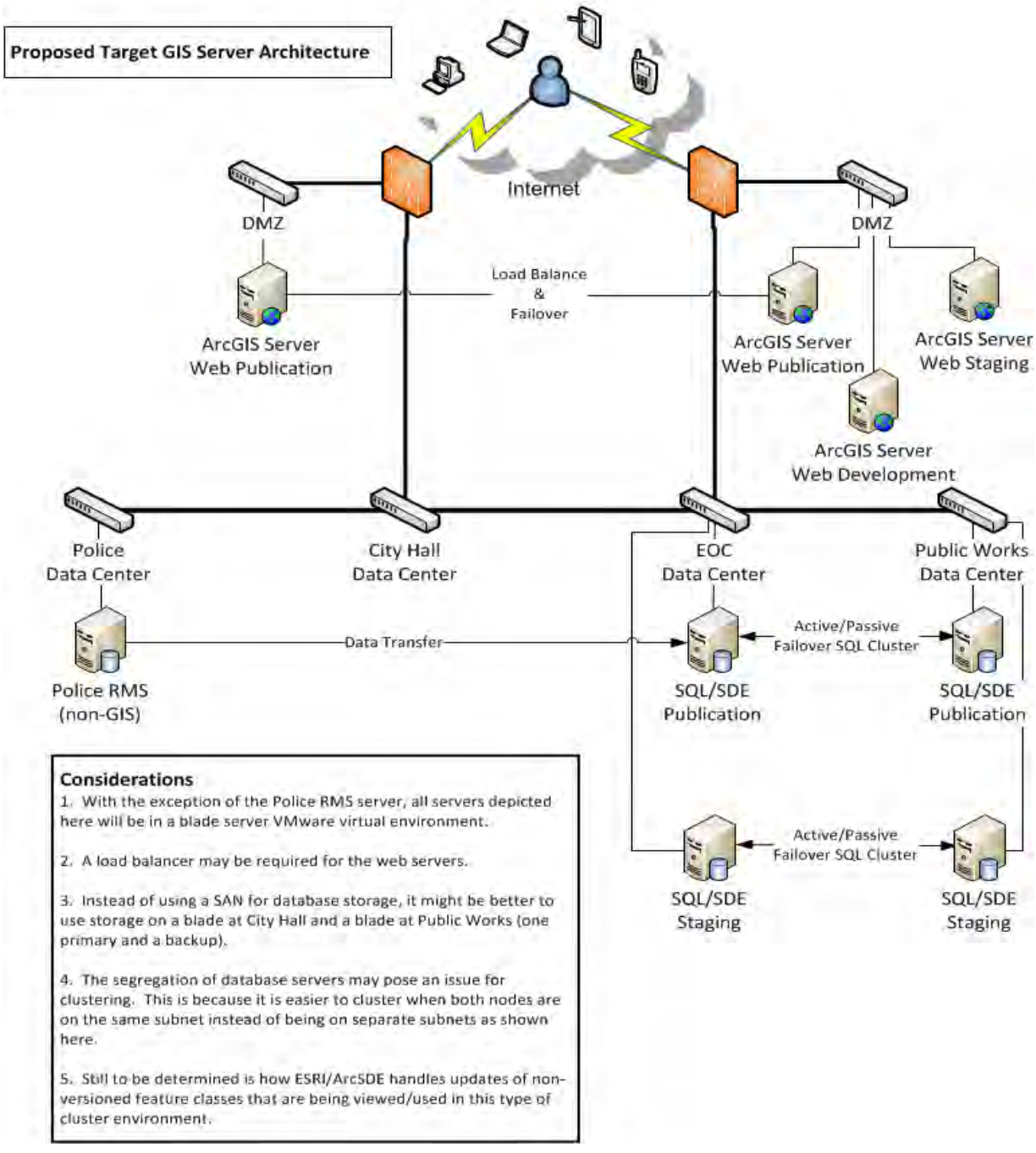
The GIS Division's GIS Application Gallery and PDF Map Gallery both rely on Internet availability in order to communicate with ArcGIS Online Personal. This is a vulnerability in the City's GIS infrastructure. Fortunately, it can be mitigated by investing in ESRI's Portal for ArcGIS, which would allow the GIS Division to create an internal portal for serving out its applications, web maps, and PDF maps. Portal for ArcGIS is the label given to the locally installed version of the beta service called ArcGIS Online Subscription.

If the GIS Division relocates its publication servers to the EOC, adding Portal for ArcGIS would give it near perfect redundancy. City staff would continue to have access to GIS applications and data as long as the EOC is still standing and has electricity. An added benefit of Portal for ArcGIS would be that staff from anywhere in the City could also use it to create maps themselves, even in times of non-EOC activation.

Furthermore, this product would serve as a portal for the internal distribution of applications containing sensitive information.

Solution Architecture

This goal shares the same solution architecture as that of Goal 2: High Availability of GIS Applications. It is presented again in the diagram that follows:



Five-Year Budget to Attain the Goal

The server consolidation effort previously described makes it possible to achieve this goal without additional hardware costs. Assuming the objectives supporting goal 2 are in place, the cost of purchasing Portal for ArcGIS would be the only cost associated with this goal. This cost is included in the five-year budget for achieving this goal. Currently, Portal for ArcGIS is a $35,000 purchasing cost with a $30,000 service cost for installation. ESRI has indicated that they will release a downloadable installation package sometime in the future. This would relieve the City of the $30,000 installation cost. It might be prudent to wait until the installation package is available in order to reduce the implementation cost. It is reasonable to expect that an installation package will be available by year two.

As far as annual maintenance costs for Portal for ArcGIS, none has been discussed to date. That is not to say maintenance costs are completely off the table. This goal is presented under the assumption that there will be no maintenance costs. Still, ESRI promises to maintain the product by indicating that they will make changes to the Portal for ArcGIS product as it does with its other products.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Implement Portal for ArcGIS	Capital Cost	$0K	$35K	$0K	$0K	$0K
	Maintenance Cost	$0K	$0K	$0K	$0K	$0K
	Total Cost	$0K	$35K	$0K	$0K	$0K
	Annual Total	$0K	$35K	$0K	$0K	$0K

Performance Measures to Evaluate the Goal

The performance measures for this goal are as follows:

- The percentage of the City's GIS applications that are functional from the EOC regardless of whether the EOC retains connections to external sites or the Internet.

The percentage of the City's production GIS datasets that are functional from the EOC regardless of whether the EOC retains connections to external sites or the Internet.

4.9 Goal 4: Replace Applications Built on Legacy Technology and Continue to Deliver Services by Adding New Applications

Applications built using ESRI's ArcIMS and ArcView 3.2 are proving to be more difficult to support with each passing year. Meanwhile, the services they provide are tremendously important to City staff, the City's neighbors, the City's businesses, and the City's visitors. These applications must be replaced with applications built using current-day technology. Web applications built using ArcGIS for Server will replace most of the legacy applications. New ArcGIS for Server applications will be built with regard for

mobile device compatibility. This may support the City's Internal Support Objective 1.4: "Provide a reliable and progressive technology infrastructure." This particular City objective lists as one of its performance measures, the number of smart phone applications for City services.

Objective 4.1: Migrate Relevant Data to ESRI's Local Government Information Model

Due to its purpose of being a shared data schema, the ESRI Local Government Information Model makes it easier for ESRI to create application templates. In turn, its customers who have implemented the Local Government Information Model can easily adopt these templates. The GIS Division has embraced this concept by starting to migrate some of its data into this data schema. A commitment to transferring additional relevant data to this schema will be a tremendous help to the City in deploying additional applications.

Objective 4.2: Rebuild the Park Locator Application using ESRI's ArcGIS Server Technology

ESRI has released a Park and Recreation Finder template that was built using their ArcGIS Server JavaScript Application Programming Interface (API). It was also built on ESRI's Local Government Information Model. This ArcGIS Server Javascript API template is similar in functionality to the City's ArcIMS-based Park Locator application. The GIS Division will use this template as a starting point for creating a replacement to its ArcIMS-based Park Locator application.

Objective 4.3: Rebuild the Property Information Reporter Application using ESRI's ArcGIS Server Technology

This would not only replace a widely used ArcIMS application, it would also allow the GIS Division to serve out countywide property related information. The GIS Division already receives countywide data from the Broward County Property Appraiser's office. A bigger, better, more beautiful Property Information Reporter would do wonders for the profile of the City's GIS. It would simultaneously solve a second problem in that it would also be able to replace the heavily relied upon Property Zoning application that was built on legacy ArcView 3.2 technology.

Objective 4.4: Rebuild the Parking Customer Service Application using ESRI's ArcGIS Server Technology

The ArcIMS based Parking Services GIS application is integral to the daily operations of the City's Parking Services Division. Customer Service Representatives depend on this application to resolve ticketing disputes, provide information on parking rates, provide information on parking availability, and provide information on enforcement hours. The GIS Division plans to replace this application by using ESRI's Flex Viewer template to build a new application.

Objective 4.5: Rebuild the Building Permit Tracker Application

Among the ArcIMS based applications with a public audience, Building Permit Tracker is one of the three most heavily used. The City's commitment to implement the property modules of the OneSolution product may present an opportunity for replacing this application. It might be possible to replace the ArcIMS version of Building Permit Tracker by incorporating its functions into the OneSolution

integration. If it turns out this level of integration is not possible, an ArcGIS Server based replacement will be necessary.

Objective 4.6: Rebuild the Code Case Tracker Applications

Two Code Case Tracker applications are currently in use at the City. One is an ArcIMS based application that is part of the triumvirate of the most heavily used web GIS applications. The other is an ArcView based application that provides more detailed information to City staff. It is the only tool available for producing often requested City Commission reports pertaining to code cases within City Commission Districts and neighborhoods. Similar to the plan for replacing Building Permit Tracker, the City's plans for implementing OneSolution may help the GIS Division in replacing this application.

Objective 4.7: Rebuild the Fire Incident Tracker Application

Fire Incident Tracker is yet another ArcIMS based application in use at the City. This application allows staff in the Fire-Rescue department to produce reports on fire incidents and detect patterns. This is another application that may benefit from the implementation of One Solution.

Objective 4.8: Introduce Additional ArcGIS Server Applications

ArcGIS Server applications allow the GIS Division to grant access to GIS data without the need for additional user licenses. Perhaps more importantly, it extends the reach of the City's GIS to those outside the City's internal network by way of the Internet. The GIS Division must continue to introduce new ArcGIS Server web applications. Attempts must be made to make them function well on mobile devices.

Objective 4.9: Continue to Implement ArcGIS Online Web Maps

The GIS Division uses the free ArcGIS Online Personal service at ArcGIS.com to create interactive web maps and package them as web GIS applications. The process of implementing ArcGIS Online web maps significantly reduces the time and effort required to develop a similar web GIS application. An application that would take dozens of hours to develop can be produced through ArcGIS Online in one-tenth of the time. The service allows the GIS Division to produce more in less time. Unfortunately, however, ArcGIS Online will not be suitable for all the City's applications needs. First, the service is only capable of supporting simple point and click functions or simple address search functions. Second, the service is a hosted one that is entirely dependent on Internet availability. Third, the free version of ArcGIS Online, referred to as ArcGIS Online Personal, is limited in its level of security for web maps and map services. A hosted paid version, which is being called ArcGIS Online Subscription, will soon be available at a cost of $37,000 per year. A locally installed version called Portal for ArcGIS will also be available at a one-time cost of $35,000, plus additional costs for optional basemaps.

Five-Year Budget to Attain the Goal

- The execution of the objectives to attain this goal can all be free of cost so long as the following conditions are in place:
- The GIS Division is adequately staffed to meet the growing demands for GIS services,
- the GIS Division is granted funding for continuing education so that it remains proficient with software development technology,
- the GIS Division maintains its funding for ESRI software licenses,
- and the GIS Division acquires funding to stay current on essential non-GIS software.

Consideration should also be given that some needs that arise in the future may be beyond the capabilities of in-house staff. A customer may request work requiring special expertise or extensive labor. These cases may require a competitive process to solicit contractors to conduct the work.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Migrate Relevant Data to Local Government Data Model	Capital Cost	$0K	$0K	$0K	$0K	$0K
	Maintenance Cost	$0K	$0K	$0K	$0K	$0K
	Total Cost	$0K	$0K	$0K	$0K	$0K
Application Rebuilds	Capital Cost	$0K	$0K	$0K	$0K	$0K
	Maintenance Cost	$0K	$0K	$0K	$0K	$0K
	Total Cost	$0K	$0K	$0K	$0K	$0K
Introduce New ArcGIS for Server Applications	Capital Cost	$0K	$0K	$0K	$0K	$0K
	Maintenance Cost	$0K	$0K	$0K	$0K	$0K
	Total Cost	$0K	$0K	$0K	$0K	$0K
Implement Additional ArcGIS Online Web Maps	Capital Cost	$0K	$0K	$0K	$0K	$0K
	Maintenance Cost	$0K	$0K	$0K	$0K	$0K
	Total Cost	$0K	$0K	$0K	$0K	$0K
	Annual Total	$0K	$0K	$0K	$0K	$0K
	5-Year Total	$0K				

Performance Measures to Evaluate the Goal

Performance measure number one for this goal will be a report detailing the applications and interactive web maps that were introduced, rebuilt, or enhanced. The second will rely on Google Analytics statistics to identify usage of the City's GIS website and web applications. The following constitutes the statistics:

- The total number of annual visits to the City's GIS website and web applications.
- The total number of unique annual visitors to the City's GIS website and web applications.
- The average number of weekday visitors to the City's GIS website and web applications.
- The average number of unique weekday visitors to the City's GIS website and web applications.

4.10 Goal 5: Consistent Upgrades of Vital non-GIS Software

Attainment of this goal would result in essential non-GIS software undergoing regular upgrades. At a minimum, upgrades should take place when significant software revisions are released. This goal is essentially the creation of an annual budget for purchasing the upgrades.

Objective 5.1: Create an Annual Budget for New non-GIS Software Upgrades.

Currently, no budget exists to upgrade essential non-GIS software being used by the GIS Division. This list of software includes Microsoft SQL Server, Microsoft Visual Studio, Adobe Photoshop, and Adobe Flash Builder. New revisions for the software on the list are generally released every two to four years.

Five-Year Budget to Attain the Goal

Because the needs would be determined by the revision cycle of the specific software developers, it is difficult to project the five-year cost with great certainty. Nevertheless, the budget presented here assumes that software falling in this category is generally upgraded every two to four years. Most software listed have a purchase or upgrade price of around $800. The exception is the new licensing structure for SQL Server, which is priced per hardware processor core. SHI.com offered the most competitive pricing at the time of this writing at a price of $9,058.46 per 2 cores. Microsoft requires a minimum of two 2-core sets to be purchased (4 cores) at a SHI price of $ 18,116.92. Assuming all GIS data servers are housed in a blade virtual server enclosure managed by the Infrastructure Division, today's cost of SQL Server upgrades would be $18,116.92.

The following is a list of software currently in use today that is being considered for regular upgrades:

- Microsoft SQL Server
- Microsoft Visual Studio.
- Adobe Photoshop (in dire need of new licenses).
- Adobe Flash Builder.

The following table identifies the five-year cost for upgrading software using today's prices.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Microsoft SQL Server Upgrade (2 servers located in 2 Data Centers, 1 active the other passive).	Capital Cost					$36.23K
	Maintenance Cost					
	Total Cost					$36.23K
4 Copies of Microsoft Visual Studio Professional	Capital Cost			$2K		
	Maintenance Cost					
	Total Cost			$2K		
4 Copies of Adobe Photoshop.	Capital Cost	$2.8K				
	Maintenance Cost					
	Total Cost	$2.8K				
2 Copies of Adobe Flashbuilder	Capital Cost	$1.4K	$1.4K			
	Maintenance Cost					
	Total Cost	$1.4K	$1.4K			
Other Non-GIS Software Purchases and Upgrades	Capital Cost			2K		
	Maintenance Cost					
	Total Cost			2K		
	Annual Total	$4.2K	$1.4K	$4K	$0K	$36.23K
	5-Year Total	$45.83K				

Performance Measures to Evaluate the Goal

The performance measure for this goal is the number of days from the time ESRI certifies a software to be compatible with its software, to the time it takes to fully implement the software. The target is sixty days.

5 Infrastructure and Operations Division

5.1 Mission

To provide a robust server and database infrastructure capable of running the City's software applications in secure, fault-tolerant data centers using industry best practices in both technology and procedures. To remain current with all available technologies and be able to recommend and implement these technologies to achieve overall City goals.

5.2 Division Overview

The Infrastructure & Operations Division is responsible for implementing and supporting all aspects of the City's (non-Police) computer servers, databases, email, spam filtering, network disk drives, user accounts, and access privileges. Currently this consists of approximately 160 physical and virtual servers, 55 databases, and 2200 email accounts (this division is responsible for all external email and spam filtering which includes the Police accounts). It is also responsible for data backups and recovery, and data center management regarding cooling, backup power sources, and physical security. Other duties include public records requests for email and data, hurricane preparation, and associated disaster recovery tasks.

For the Public Works Department this division is also responsible for all PC/laptop support (approximately 150 machines) and certain aspects of the building security systems, surveillance camera systems, telephone PBX and handsets, and the data network. Many of these items will be transferred to other divisions in the coming months. This division is also responsible for supporting the work order application (Hansen), the backflow monitoring software Tokay, and the time keeping application Kronos.

The Operations Section of this division also performs numerous duties throughout the day and evening required by applications such as Payroll, Finance (FAMIS), Budget (BPREP), Building and Permitting (Community Plus), and Utility Billing (Cayenta) to name just a few.

5.3 Division SWOT Analysis

	Helpful **to achieving the objective**	**Harmful** **to achieving the objective**
Internal origin **attributes of the organization**	**Strengths** • Established Virtual Server Environment. All major components are in place (enclosure, VMware, backup software, etc.). • Highly technical staff capable of implementing most technologies in-house which often avoids contractor assistance for installs and implementation. • Sufficient space in data center to add new systems, offer up as a co-location site to another City, or to consolidate disparate IT centers around the City.	**Weaknesses** • Policies outdated (most from 2003). Some refer to technologies no longer used and some are missing new technologies now in place. • No backup personnel for the Database Administrator • Insufficient backup storage to perform off-site disked-based backups and replication. • No conference/training budget. Weakens our exposure to new technologies that could improve neighbor services and/or lower costs. • No official remote access methodology for employee personal devices (computers, iPads, etc.). • Too many manual processes required to support existing applications. • Reliance on older tape devices for backups of many of the systems. • Shared storage systems insufficient to meet the higher data storage demands of City Employees

External origin
attributes of the environment

Opportunities

- IT resources in external departments are not cross-trained with their counterparts at City Hall. Consolidation and cross-training would create a more capable and redundant work force for new and existing systems.
- There is in-house talent (across multiple divisions/departments) capable of creating advanced mobile applications.
- Possibility of a partnership with Florida Lambda Rail which would dramatically improve the internet services to our users. Google (searches, YouTube, etc.) is a partner and Google traffic would not count against our service. Right now most users are blocked from streaming media sites.
- Standardization of hardware and software for virtualization across all Data Centers would allow better fail-over and disaster recovery capabilities for the City as a whole.

Threats

- Finance and Budget applications (FAMIS/BPREP) running on proprietary IBM VSE operating system. Hardware choices are limited to IBM mainframes and the operating system appears to only have one company within the state capable of supporting it.
- Microsoft to drop support on Exchange 2003 in 2014. City must migrate to another email platform before then.
- Datacenter air conditioners do not restart automatically after power failure/flickers. Room quickly overheats unless someone is onsite to restart them. Equipment will either shutdown or become permanently damaged.
- MICR check printers in IT and Finance are no longer supported.
- Backups of the servers and databases located in the Public Works Data Center are not sufficient.
- City Hall Data Center surrounded by glass and not rated for Cat-5 Hurricane. A breach on that floor (or higher) could potentially cause excessive equipment damage.
- UPS in City Hall Data Center no longer supported by vendor. 3rd party support is still available but could end abruptly.

5.4 Problem Statement

Problem 1: Email System Must Be Replaced

Microsoft will officially end extended support for the City's email system (MS Exchange 2003) in April 2014. An alternative email system must be in place before that time as Microsoft will no longer provide bug and security patches and will not provide technical assistance. The Exchange 2003 system was released 9 years ago and was not designed for how email is used today. In particular, the system was not designed to handle the volume of emails sent and received, the size of emails (including the attachments), and the explosive use of iPhones, iPads, Android, and other smart-devices used by many City employees which continuously synchronize via the Internet to the email servers. Microsoft currently refuses to offer support regarding performance issues due to these reasons.

Problem 2: Excessive Manual Processes

The numerous applications used by the City are not tightly integrated and therefore manual procedures are necessary to perform various daily functions. Currently this requires three full-time personnel staggered across a 19 hour work day.

Problem 3: Insufficient Backup Procedures in Public Works Data Center

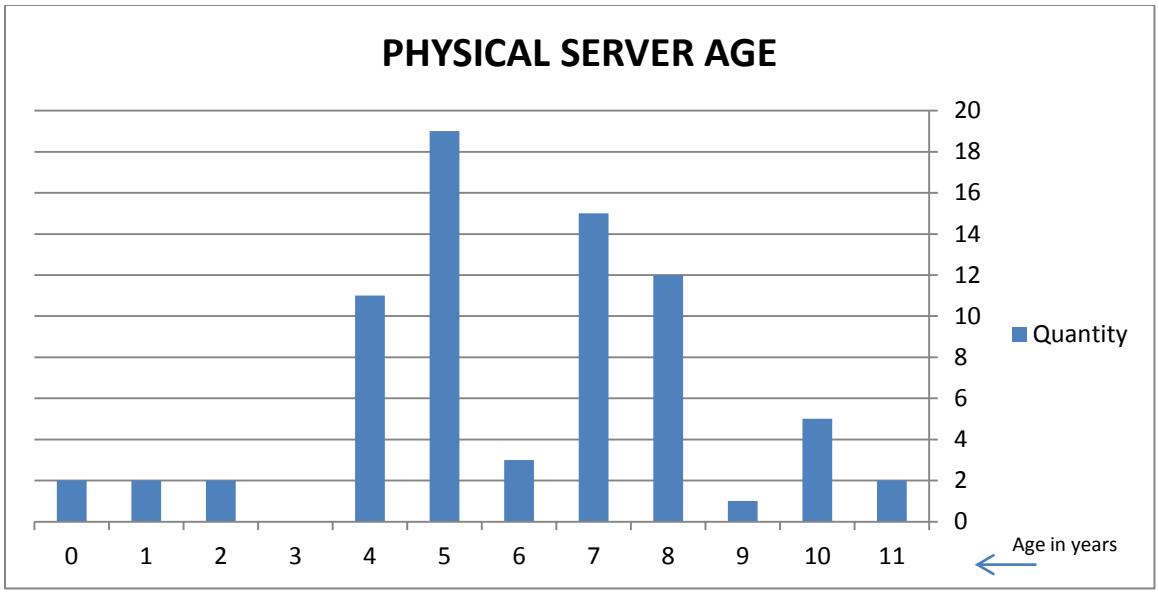
Servers located in the Public Works Data Center are not following best practices for data backup. The email system and several databases are being backed up manually to local disk. The backups are not performed on a rigid schedule and there is only one day of data retention. All previous backups are overwritten and none of the backups are taken offsite for disaster recovery purposes.

Problem 4: Networked and Local Storage Insufficient to Meet Demand

The current networked storage drives are insufficient to meet user needs. Many users now require large files as part of their daily work. These files range from graphics intensive presentations to engineering plans. Currently these users have been forced to install external USB drives onto their PC's. These drives are prone to failure, and there are no standards for how these drives are backed up.

Problem 5: Physical Servers/Systems No Longer Supported by the Manufacturer

There is no server replacement lifecycle established. At least 50 systems within the data centers at City Hall and Public Works are 5 years old or more (see table on the next page). Some critical components are 11 years old (e.g. the domain controller at Public Works). Replacement parts are no longer available from the manufacturer to repair these systems which would result in extensive downtime to find alternative sources.



Problem 6: A Comprehensive Security Analysis Has Not Been Performed In Four Years

Server systems are vulnerable to attack and there isn't any proactive threat management solution to identify and mitigate the threat resulting in increased damage and possible spread of attacks to other systems and potentially resulting in citywide outages of infrastructure system resources.

Problem 7: Dependence on Older Tape Devices for Backup

The 10 year old tape devices used to backup many of the City's critical systems will not be supported by the vendor after November 2013. It is essential that the City migrate to a supported backup product before that time. The ability to reliably backup and restore the City's data is a core responsibility of the ITS Department and unsupported backup hardware poses a serious threat to meeting that objective.

5.5 Problem Resolution Strategies

Resolution 1: Email System Must Be Replaced

As a government organization the City must adhere to certain restrictions regarding email retention, public records requests, and security (especially for Police). Because of these restrictions the standard email services offered by cloud companies such as Google are not sufficient and require additional add-on services to be purchased. The State of Florida recently performed a comprehensive study and subsequently issued an RFP for a new email system. A *private* cloud solution was selected utilizing Microsoft Exchange and Enterprise Vault. As this type of system meets all of our requirements, is significantly less expensive than the available cloud solutions (see below), and internal staff has the necessary skills to design, implement, and maintain such a system, this is the solution being recommended for the City.

A replacement email system could take up to a year to fully implement and migrate all accounts. It is necessary to obtain funding for this replacement in the upcoming budget year in order to complete the entire process before the April 2014 deadline. See Goal 1 for details of the proposed solution.

5 YEAR EMAIL PRODUCT COMPARISON					
SOLUTION	**PRODUCT**	**USERS**	**MB**	**TOTAL COST**	*
OFFICE 365	Office 365 with Live Office 3YR	2500	25GB	$4,492,500	
EXCHANGE ONLINE	Exchange Online with LiveOffice3YR	2500	25GB	$1,500,000	
GOOGLE	Google 3Yr with archive 1 yr	2500	25GB	$1,412,500	
	Google 3Yr with archive 10 yr	2500	25GB	$1,662,500	
ACS (Florida State)	ACS MB Adv Auth, arch, sycn 500MB	2500	500MB	$1,155,148	
	ACS MB Adv Auth, arch, sycn 2GB	2500	2GB	$1,375,648	
Exchange On Premise	Exchange 2010 5GB Mailbox	2500	5GB	$812,173	*
Recommended	Exchange 2010 25GB Mailbox	2500	25GB	$910,593	*

* These costs include internal costs for comparison purposes. The actual budget request is much smaller. See below.

Resolution 2: Excessive Manual Processes

All manual processes will be evaluated to determine whether:

- The job could be automated using scripts or a vendor customization
- The job could be performed by the users themselves (e.g. running a daily report)
- The application could be replaced with another system that either has better integration with existing systems or eliminates the need altogether for such processes. See the Application Services Division Strategic Plan for more info on this.

As the manual processes are eliminated, the operations personnel will be given in-house training and redeployed to other areas of the organization.

Resolution 3: Insufficient Backup Procedures in Public Works Data Center

Purchase and implement an off-site disk-based backup device (Exagrid) and necessary software licenses to incorporate these backups into the City Hall Symantec NetBackup system. This will allow a rigid backup schedule to be maintained as the jobs are run without operator intervention. It will also accomplish the goal of off-site backups, and will allow better fault monitoring. Email and file archiving must also be implemented as the systems have grown too large for nightly backups to complete.

Resolution 4: Networked and Local Storage Insufficient to Meet Demand

The division is reviewing new technology that will identify and automatically tier storage based on rule sets that will allow moving older non-critical documents to cheaper storage or offline tape. In addition, implementation of virtual storage will be tested. This will allow for the consolidation of storage resources within the data centers. However, this still is not expected to resolve the issue for users with a need for large files as these files would not be archived by software that looks for older and unused files. In these cases a 3rd tier solution is being researched. The primary difference of the various tiers of

storage is the ability to backup, restore, and version the files. Tier 1 storage will be recoverable almost immediately via online snapshots, and versions can be restored going back several months. Tier 2 storage provides disk redundancy but does not support the online snapshots. Tier 3 storage would simply be a mirror copy of what the users keep local on their PC. Only the latest version would be recoverable from backup storage. In many cases this is sufficient to meet user needs and provides a significant cost savings over Tier 1 storage and backup.

Resolution 5: Physical Server/Systems No Longer Supported by the Manufacturer

The division has migrated over 70 servers to our private cloud (virtual server) environment. This transition has removed the hardware constraint of physical server system failure and allows for transfer of applications to other virtual resources within hours. Continuation of this process for the remaining servers will significantly reduce the hardware replacement costs and expensive 3rd party support required. Additionally, the division will be able to implement virtual disaster recovery options by replication of critical systems to other virtual private cloud locations transparently to end-users. See Goal 3 for details on proposed solution.

Resolution 6: A Comprehensive Security Analysis Has Not Been Performed In Four Years

The City has not done a comprehensive system security audit in many years. Recently an RFP was issued for this service and we are in the process of evaluating the responses. Once the vendor is awarded and the analysis is complete, a strategic roadmap can be developed to address any vulnerabilities that are discovered. It is expected that the vendor will, at a minimum, recommend intrusion detection and threat assessment systems to provide real time alerting to minimize impact of any breach or attempted breach of security.

Resolution 7: Dependence on Older Tape Devices for Backup

Several years ago the City began moving away from tape devices to off-site disk-based backup devices. The disk-based devices offer a number of benefits, including faster backup and restore times, and native ability to locate the device offsite creating offsite data backups without the need to physically relocate the tapes every morning. These factors are especially beneficial for completing the necessary backups during the Hurricane Watch phase after the City has closed for business. Having an operator stay onsite to complete the tape backups and then relocate the tapes offsite during the beginning of a storm can be hazardous.

Due to budget cuts a complete migration to disk-based backup was postponed. But, with the announcement from the manufacturer that support will end in 2013 for the tape devices, we are proposing that the City complete the migration to disk-based backup devices and remove the dependency on tape units altogether (for backup purposes that is, there still may be a use for tapes as an archiving medium). See Goal 2 for details of the proposed solution.

5.6 Goal 1: Implement Microsoft Exchange (Email) And Enterprise Vault

As stated in Problem 1, the City must replace its email system by 2014. To meet that deadline funding is necessary this coming fiscal year to purchase the necessary hardware and software and begin migrating the existing email accounts. For public records requests and email archiving the software product Enterprise Vault is an industry standard, has been in use by the City for several years, and is our product of choice moving forward. The City has in-house expertise capable of designing, implementing, and maintaining this complete solution. Therefore no contract professional services are necessary throughout the entire process.

Objective 1.1:

Design and purchase the necessary components to implement the new email system.

Objective 1.2:

Migrate all email accounts to the new system. This is mostly a manual process and will take many months to perform.

Solution Architecture

As opposed to the three distinct email systems (City Hall, Public Works, Police) in use today, the new design will take advantage of consolidation. It has already been decided that the Public Works domain will be consolidated with the City Hall domain. All email accounts for Public Works and City Hall will therefore reside on the same hardware saving capital costs and duplicate ongoing internal support costs. It is still undecided at this time whether the Police domain can be consolidated with the City Hall domain and still be compliant with state regulations. Therefore the costs on the chart (next page) include the hardware necessary for a separate email system for the Police department.

5-Year Budget to Attain the Goal

The email system requires a large initial capital purchase to obtain the hardware and software. It cannot be broken out across multiple years unless the City decides to enter into a three year Enterprise Agreement with Microsoft and/or lease the hardware. Until the direction is set on these two factors, we will be requesting the full amount in year one to implement the system in order to begin migrating all accounts before the April 2014 deadline.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Hardware	Capital Cost	$360				
	Maintenance Cost	$0K	$7K	$7K	$63K	$63K
	Total Hardware	$360	$7K	$7K	$63K	$63K
Software	Capital Cost	$188K				
	Maintenance Cost	$0K	$2K	$2K	$2K	$2K
	Total Software	$188K	$2K	$2K	$2K	$2K
Total Cost	Total Capital Cost	$548K				
	Total Maintenance Cost		$9K	$9K	$65K	$65K

Performance Measures to Evaluate the Goal

- Percentage of Email Uptime. Target: 99.9%
- Cost ($) per Email Inbox. Target: To Remain Competitive with Cloud Services
- Number of Email Inboxes Migrated to New System by April 2014. Target: 100%

5.7 Goal 2: Implement Offsite Disk-Based Backup Devices for All Systems

To address the issue of vendor support ending in 2013 for the tape backup devices (see Problem 7 above), we are recommending a complete migration to the offsite disk-based devices. Currently only 50% of the City's systems are backed up offsite to the disk-based system. A complete migration to disk-

based backup has several benefits including faster backup and restore, native offsite backup each night, during hurricane watch procedures and offers the ability to replicate the data to another location outside the county area.

Objective 2.1:

Purchase and implement sufficient disk-based backup storage to backup all systems located in the City Hall and Public Works data centers.

Objective 2.2:

Enter into a partnership with another city or other acceptable co-location site to replicate the most recent backup image. In most situations the backup devices store up to a year's worth of backup data in case this information is needed for analysis or to recover from an unusual situation (e.g. an undetected virus). Since the replication site is only needed for disaster recovery, a full replication would be expensive and largely unnecessary. Bandwidth available to the remote site could also pose a limit on the amount of data that could be replicated. If Objective 2.1 is achieved, the new devices would become the primary backup medium while the older units would be relocated to the remote site. If the City could become an associate with the Lambda Rail System (we are continuing to explore this possibility), we would have expanded options for this remote site by partnering with other associates.

Solution Architecture

The product currently used for disk-based backup is the Exagrid product. These products have proved very reliable, easy to use and offer exceptional data compression and data deduplication ratios. However, if other vendors products are available at the time of purchase and are capable of the same price/performance they will be considered. The pricing below reflects a complete Exagrid solution.

5-Year Budget to Attain the Goal

The migration to disk-based backup and the ability to replicate to another location can be spread out across multiple years if necessary. The costs below reflect an initial $75K purchase in Year 2 to address the upcoming need (Problem 7). An additional $85K would complete the conversion and give enough capacity to replicate to a remote location.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Exagrid Devices	Capital Cost	$0K	$65K	$65K		
	Maintenance Cost	$0K	$10K	$20K	$20K	$20K
	Total Cost	$0K	$75K	$85K	$20K	$20K

Performance Measures to Evaluate the Goal

- Percentage of Data Backed up to Disk-Based Devices: Target 100%
- Percentage of Data Replicated to Remote Location: Target 100% (one day retention only)

5.8 Goal 3: Virtualize as Many Servers as Possible

Server virtualization has proven to be a cost effective solution for approximately 50% of the City's servers. As this technology has matured, it is now our goal to virtualize as many as possible. In some cases software vendors do not support virtualization, so a 100% goal is not feasible. At this time we believe over 80% of our servers could be virtualized, including most of our database servers.

Objective 3.1: Virtualize Servers Instead of Replacing Hardware

Instead of replacing server hardware as they age, each server will be analyzed to determine if virtualization is possible. If the application vendor supports virtualization, the appropriate hardware will be purchased for the virtual server environment. Depending on the application, this could require any or all of the following: memory, processor, disk storage, and/or additional enclosure.

Objective 3.2: Virtualize Database Servers

Microsoft has changed their database licensing strategy to a per processor-core model instead of a per processor model. As most server processors now come standard with multiple cores, this can double or quadruple the cost of Microsoft database licenses for certain applications (web apps for instance). It is much more cost effective to consolidate as many databases as possible onto a single server with a single Microsoft SQL Server license. It is not absolutely necessary to utilize virtualization to take advantage of this cost savings, but the additional benefits of virtualization (e.g. able to bring the database server up almost immediately on a remote enclosure) appears to provide the best of both situations.

Solution Architecture

The City selected the HP Blade System several years ago as its virtual environment primarily because of the ability to run our existing HP-Unix applications such as Payroll, Utility Billing, and Community Plus. The system has proven to be robust, well supported by the manufacturer, and capable of efficiently running the VMware software. This system will continue to be our recommended approach for all virtual server implementations to maintain consistency and further enhance fail-over capabilities.

5-Year Budget to Attain the Goal

The Public Works Data Center has an urgent need to replace a significant portion of their servers. We believe it is in the City's best interest to migrate those servers immediately to a new HP Blade Enclosure. Once the enclosure and peripherals are purchased, it becomes rather inexpensive to virtualize all the remaining servers. Therefore, we are recommending that Public Works virtualize their entire set of servers this year. This enclosure could then serve as a disaster recovery location running the City's Payroll and Utility Billing systems in an emergency situation. Similarly, the enclosure at City Hall could serve the same function for applications located at Public Works, such as the work order system (Hansen) and the time keeping system (Kronos). The virtualization of the City Hall servers could be postponed until the following fiscal year. Virtualization is expected to save over $100,000 compared to the traditional method of replacing the servers with stand-alone systems.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
New Public Works Enclosure and associated components	Capital Cost	$130K				
	Maintenance Cost	$0K	$20K	$20K	$20K	$20K
	PW Cost	$130K	$20K	$20K	$20K	$20K
Additional Components for existing City Hall Enclosure	Capital Cost	$0K	$50K			
	Maintenance Cost	$0K	$0K	$10K	$10K	$10K
	CH Cost	$0K	$50K	$10K	$10K	$10K
Virtualize All Public Works Databases	Capital Cost	$0K	$39K			
	Maintenance Cost	$0K	$0K	$5K	$5K	$5K
Total Cost	PW and CH Total Cost	$130K	$109K	$35K	$35K	$35K

Performance Measures to Evaluate the Goal

- Percentage of Servers Virtualized (ICMA Performance Measure). Target: 80%

5.9 Goal 4: Consolidate hardware and software spread across the City's Data Centers.

The Data Centers at City Hall, Public Works, and Police have operated independently for many years. Because of this there is some duplication of services and in many cases a divergence in software, hardware, and methodologies. Now that all Data Centers are under the responsibility of the IT Director, we will look for opportunities to streamline services and implement cost saving strategies.

Objective 4.1:

Examine the age, function, and capacity of all servers located in the City Hall and Public Works Data Centers and look for opportunities to combine or eliminate hardware. The planned server and database virtualization efforts will contribute largely to this consolidation effort.

Objective 4.2:

Examine all system software (email, spam filtering, anti-virus, user account maintenance, file archiving, databases, etc.) and look for duplication of services.

Performance Measures to Evaluate the Goal

- Dollars ($) Saved by Consolidation and/or Virtualization

5.10 Goal 5: Implement Security Best Practices across all Data Centers

Objective 5.1:

Isolate SCADA system from City's primary data network.

Objective 5.2:

Update and implement security policies.

Objective 5.3:

Follow recommendations after security analysis is performed (see Resolution 6)

Solution Architecture

To Be Determined.

Performance Measures to Evaluate the Goal

- Percentage of Existing Policies Updated. Target: 20% each year.
  Note: If the Department creates and hires a fulltime Security Analyst this target can become more aggressive.
- Number of New Policies Created Resulting from the Security Analysis
- Number of Vulnerabilities Patched/Closed

5.11 Goal 6: Improve Disaster Recovery Capabilities

With the continued migration of the City's servers to the HP Blade Enclosure and VMware virtual server technology, we are getting closer to being able to run all essential applications on a single offsite enclosure. The EOC is currently the targeted location for this enclosure.

Objective 6.1: Purchase Off-Site Enclosure as Part of New Server Upgrades

The three data centers at City Hall, Public Works, and Police Headquarters all have redundant systems for fault tolerance. If these fault-tolerant servers were moved offsite, then the added benefit of disaster recovery could be achieved. Plans are currently in progress to upgrade the aging servers at the Public Works Data Center with an enclosure/VMware solution. If this is successful, the enclosure can serve the dual purpose of replacing aging server hardware for Public Works and serve as a disaster recovery site for City Hall. City Hall could then also serve as a disaster recovery site for Public Works.

Objective 6.2: Replicate City Data to another City to the North

We are currently seeking partners in another City to co-locate our data backups. We have space in the City Hall data center to host another city's backups and are looking for another City interested in offering space to us.

Solution Architecture

To Be Determined

Performance Measures to Evaluate the Goal

- Percentage of Essential Systems That Can Be Run At Remote Location

5.12 Goal 7: Replace UPS in City Hall Data Center

The UPS in the City Hall Data Center is no longer supported by the manufacturer and batteries are out of warranty. The UPS is currently being supported by a 3rd party. We do not see an immediate need to take action but a replacement UPS must be included in the Divisions 5 year plan.

Objective 7.1: Continue Maintenance with 3rd Party and Replace Batteries as Needed

Objective 7.2: Replace UPS in Year 3

Solution Architecture

A complete UPS replacement is suggested. The current UPS is running at nearly 80% capacity, but it is expected that server virtualization/consolidation would reduce this load and therefore the new unit can be sized similarly to the current unit.

5-Year Budget to Attain the Goal

The below projections are estimates for a new UPS plus installation/maintenance.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
City Hall UPS Replacement	Capital Cost	$0K		$200K		
	Maintenance Cost	$0K	$0K	$20K	$20K	$20K
	Total Cost	$0K	$0K	$200K	$20K	$20K

Performance Measures to Evaluate the Goal

- Percentage of Servers Running on Manufacturer Supported UPS

5.13 Goal 8: Cross Train City Hall Technical Support Staff with Public Works Staff

Currently the City has technical staff specializing in systems located at either the City Hall or Public Works Data Centers. The City would benefit from having similar positions cross-train to provide backup support personnel when needed and to potentially eliminate contractor support in certain areas.

Objective 8.1: Cross Train Process Control Engineer as Database Administrator Backup

Objective 8.2: Cross Train Desktop Support Personnel

5-Year Budget to Attain the Goal

It is expected that this cross-training would save money on contractor services and therefore (after year one) a decrease in budget requirements is projected.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Train Process Control Engineer as Backup DBA	Training Costs	$10K				
	Reduction in Contractor Costs	$0K	(-$15K)	(-$30K)	(-$45K)	(-$60K)
	Total Cost	$10K	(-$15K)	(-$30K)	(-$45K)	(-$60K)

Performance Measures to Evaluate the Goal

- Percentage of Databases With Backup Support: Target 100%
- Percentage of Databases Fully Supported In-House: Target 100%

5.14 Goal 9: Continue to Provide Existing and New City Services via Smart Phone Technology (i.e. iPhone and Android devices)

Mobile technology is a new and exciting concept for most of the City's neighbors and visitors. It not only enables the City to provide existing online services to smart phone users, it opens the door to new services. These devices have built-in GPS receivers, cameras, QR code scanners, and, of course, web browsers. As this is a relatively new area for application developers, there is typically a large upfront cost for custom applications targeted to these devices. Simple applications typically cost $10,000 to develop while more feature rich "apps" can cost up to $40,000.

The City of Fort Lauderdale has the necessary talent in-house to develop these apps. We were one of the first cities to develop a citizen reporting app. and to develop a lobbyist/elected official meeting app (EthicsTrac) that records meetings between lobbyists and elected officials on the spot and uploads this information to a publicly viewable database.

The ITS Department is planning to continue in this pursuit to provide mobile enabled services and will be meeting with the public through focus groups and other methods to determine needs and wants pertaining to this technology (and technology in general).

Objective 9.1: Meet with the Citizens and Visitors via Focus Groups

From these focus group meetings the City will determine a priority for the types of services that it can provide to mobile users.

Objective 9.2: Add Features to the existing LauderServ App

The City's LauderServ app will be the portal for the public to access all City services via smart phones. Currently this app has only a single function (citizen reporting) but will be expanded as determined in Objective 9.1. See Prototype Screen Shots Below.

Concept Design of the *New* LauderServ for iPhone and Android

Solution Architecture

Currently the City only has the LauderServ app for Android devices. This app was developed using the open source Java language. To develop for the iPhone, developers generally use Apple's proprietary Xcode development environment programming in the language Objective C. These two languages generally have no cross-over and each application must be developed from scratch. There is however emerging technologies that allow developers to utilize much of their code across the two platforms. These products are not freeware and an annual license fee is required to use and publish apps. Given the cost savings associated with the ability to develop apps in-house across the two prevalent platforms, the cost of these development tools is easily justified.

5-Year Budget to Attain the Goal

The most complete cross-platform application development environment for creating native iPhone and Android phones today is Appcelerator. To develop and publish apps using this application the City must pay an annual software license. To improve the efficiency of the in-house development team, books and other code libraries may need to be purchased to stay current with fast changing smart phone operating systems.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Annual License Fee for Appcelerator	Est. Cost for Books and Code Libraries	$1,000	$1,000	$1,000	$1,000	$1,000
	License Cost	$500	$500	$500	$500	$500
	Total Cost	$1,500	$1,500	$1,500	$1,500	$1,500

Performance Measures to Evaluate the Goal

- Number of New Services Available to Smart Phone Users. Target: 3/year

5.15 Goal 10: Replace MICR Check Printer in Finance and City Hall Data Center

The printers used to print the City's various checks (e.g. paychecks, pension checks, longevity checks, accounts payable bi-weekly checks, termination checks, drop checks, fire share checks, and pension refund checks) are no longer supported by the manufacturer nor are they supported by any 3rd party. The printers are functional at this time but replacements should be factored into the 5 year plan.

Objective 10.1: Purchase One New Printer for the City Hall Data Center

Objective 10.2: Purchase Two Additional Printers used within the Finance Department

5-Year Budget to Attain the Goal

Three replacement printers spread out over the next 5 years.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
City Hall Printer	Capital Cost	$3K				
	Maintenance Cost					
	Total Cost	$3K				
Finance Printer	Capital Cost	$0K	$3K	$3K		
	Maintenance Cost					
	Total Cost	$0K	$3K	$3K		
Total Cost	Capital Cost	$3K	$3K	$3K		
	Maintenance Cost	$0K	$0K	$3K	$0K	$0K

Performance Measures to Evaluate the Goal

- Number of MICR Printers Installed: Target: 3.

6 Network & Telephone Communications Services

6.1 Mission

Our mission is to provide a unified, secure, robust and scalable voice, video, data and Internet network, including wired and wireless services to meet the evolving demands of the City.

6.2 Division Overview

The Network Communications Division is responsible for the planning, design, implementation, maintenance and 24x7x365 monitoring and support of the City's evolving wired and wireless computer and telephone networks spanning over eighty buildings. In addition the team also manages the City's Internet communications and related network, telephone and security systems such as voicemail, call center, firewall, remote access, second factor authentication, and web filtering. Administrative duties include related budgeting, billing and contract management tasks.

Our team operates as part of the City's Emergency Support Function (ESF #2 Communications) to provide emergency telecommunication services for City departments involved in response and recovery operations, and; to restore and maintain communications services needed for emergency response and recovery operations by the City.

Our team works closely with the architecture group, engineering group and individual departments to coordinate the requirements for the implementation of computer and telephone communications services with regard to all new and remodeled City buildings. These services include integration with access control, video security, fire alarm, elevator, fire suppression and HVAC systems. The team also works closely with individual departments on special projects such as, but not limited to, connecting the City's fuel pumps to the network, non-emergency communications to the 911 Center and remote wireless network access for the Fire and Building Inspectors.

As the City grows and implements new services to meet the dynamic needs of our neighbors, the network will require on-going changes to meet the demands. Our small yet highly skilled and efficient team will continue to support these changes as well as streamline access to and support of the computer and telephone networks and related systems to maintain a high level of customer service.

6.3 Division SWOT Analysis

	Helpful **to achieving the objective**	**Harmful** **to achieving the objective**
Internal origin attributes of the organization	**Strengths** • Highly skilled and motivated team. • Extensive experience in managing a Cisco data and VoIP network. • A Citywide network consisting mostly of a fiber optics lines.	**Weaknesses** • Insufficient staff to cope with current demand and future developments. • Lack of training and continuing education for several years. • Inadequate network and Internet lines to the EOC to support a Citywide disaster recovery and business continuity plan.
External origin attributes of the environment	**Opportunities** • Opportunity to better align ITS staff to meet the demands of the City. • Opportunity to optimize the core network design to provide the required capacity, redundancy and resiliency between the data centers. • Opportunity to reduce operating expenses by moving to a unified wired and wireless IP network. • Opportunity to leverage the existing VoIP systems to provide advance communication services. • Ability to implement a comprehensive security framework. • Opportunity to provide more effective cross training and knowledge transfer between ITS staff.	**Threats** • Unsupported 10 years old legacy telephone system. • Insufficient funding for the replacement of the City's unsupported telephone system. • The financial sustainability of the City's institutional network (I-Net). • Absence of comprehensive security framework. • Insufficient funding for security, mobile communications or business continuity projects.

6.4 Problem Statement

Problem 1: Telephone System Replacement

Cities today depend on telephone communications to conduct a wide variety of operational functions and service provision to residents, visitors, businesses and other government agencies. The City's ITS department currently supports two internal telephone systems utilized by staff at various City locations. In addition, AT&T also provides telephone services to other locations where the internal telephone systems are unable to provide services due to insufficient network capacity or cabling.

The primary internal telephone system is a legacy Nortel Time-division multiplexing (TDM) system that supports most of the City's critical telephone services such as 911 non-emergency communications, voicemail, departmental auto attendants, Public Works, Police Records and other call center systems. This TDM system provides telephone services in approximately 51 City buildings. The manufacture of this system, Nortel Networks Inc., filed for bankruptcy and was acquired by Avaya in 2009. The system is more than 10 years old and is currently operating with critical components such as the main CPU boards, line cards, auto attendants, voicemail and call center servers that are no longer supported by the manufacturer. Several systems are also running operating systems that are no longer supported by Microsoft. Repairs are becoming increasingly difficult and are done on a "best effort" basis. There is no warranty on repairs or replacement of critical components.

The aforementioned conditions create a very high risk of multi-day or indefinite outages of Public Safety and other heavily used telephone communications, a highly critical situation the City can no longer afford to ignore. Moreover, manufacturer patches to resolve known or unknown bugs are not available anymore for this outdated system, for example, the current system cannot adjust the time on phones and voicemail messages based on the new daylight saving schedule. By and large, sourcing replacement parts is becoming increasingly difficult as telephone technology evolves and moves into another direction, which has become very apparent during several outages caused by lightning strikes at the Police Department in recent years. This system also stifles growth and the implementation of new applications or innovative solutions such as unified communications and virtualization technologies that can improve staff productivity and be more cost-effective for the City.

The secondary internal system is a Cisco Voice over Internet Protocol (VoIP) system that utilizes the data network to support inbound and outbound calls for the Emergency Operations Center (EOC) and several other locations such as fire stations, the Police Mobile Command Unit. This Cisco system provides telephone services in approximately 26 City buildings. This system has been in place for over six years and is fully supported by the manufacturer, however, users of this system are still dependent on the primary Nortel system for voicemail and other call routing functions.

The AT&T telephone service is an external service much like a home telephone service. This system provides telephone services in approximately 16 City buildings and approximately 200 Public Works' pump and lift stations. This service is totally independent of the City's two internal telephone systems and does not provide any integration or utilization of internal services such as 4-digit dialing, voicemail, auto attendant, call center functions or use of the City's 828 telephone prefix.

Failure to act and proceed with the current disparate telephone situation poses a major risk and could present the City with an extensive unbudgeted cost in the event of the failure of critical components of the Nortel system. Possible affected departments and services include the following:

- Approximate Citywide daily call statistics
  - 6,279 inbound calls to the City staff
  - 3,089 outbound calls from City staff
  - 1,551 internal calls between City staff
- Approximate customer service daily call statistics.
  - 293 calls to the Utility Billing contact center
  - 128 calls to the Parking Services contact center
  - 204 calls to the Police Records contact center
  - 50 calls to the IT HelpDesk contact center
- Approximate daily revenue collections via the telephone.
  - Utility Billing – approximately $16K daily
  - Parking Services – approximately $1K daily

Problem 2: Citywide Security Framework

Being part of the connected world entails many benefits as well as challenges. The extent to which the City can assure the security of its assets, information and services, directly affects its ability to ensure continued operations and delivery of services that contribute to the health, safety and economic well-being of its neighbors. U.S. Government agencies have been facing an increase in the number of Cyber-attacks in recent years and the City's network and systems also face an increased risk of an exploit from potential internal or external devices. An exploit from either source could render the City's critical networks and systems inoperable temporarily or permanently. Any device connected to the City's network has a potential risk for a specialized targeted attack or an indirect attack from viruses, worms, trojan horses, spyware, adware, zero-day attacks, denial of service and identity theft. In addition to protecting typical PCs and servers, protecting systems that handle and transport credit card transactions, Police investigations and evidence information, Public Works water plant supervisory control and data acquisition (SCADA) communications, as well as access control and video security information requires a higher level of security protection from external and internal threats. Traditional security measures, such as firewalls, no longer effectively protect the City's networks, systems, information and electronic services. The City's current security solution is based on several independent security components associated with different systems. This approach is ineffective and poses an increased challenge to successfully detect threats or protect the City's network from potential risks.

Problem 3: Mobile Data Communications Networks

Mobile computing is changing the landscape of how we do business and how we communicate and collaborate with each other. Today, mission critical applications are no longer accessed only from within

the City's network. WiFi and cellular data networks have become an integral part of the computer and telephone networks the City relies on. Advancement in the functionality of smartphones and tablets along with the cost effective high speed connections offered by wireless telecommunications vendors, now provide a mobile communications platform that can be leveraged to improve the efficiency and productivity of the City's mobile workforce.

Currently, several departments utilize the Verizon 3G wireless network as their preferred mobile carrier. Those departments include Transportation and Mobility, Public Works, Police, Fire, and Sustainable Development. The equipment and mobile communications networks used by staff are outdated and constrains rather than enhances operational efficiency or staff productivity.

Currently, to provide the mobile communications network capacity and security required by the mobile workforce of the departments, independent primary and secondary lines are implemented to provide communications to City devices on the Verizon network. These lines were installed managed and paid for by individual departments to meet their specific needs. This resulted in the City paying for over five different lines to accommodate communications with City devices connected to the Verizon network. This approach not only duplicated lines and the associated recurring cost to the City, it also duplicated the backend systems used to integrate and secure these points of access with the City's network. The City currently pays for five lines dedicated to communications with the carrier. In addition the City pays for annual maintenance and support for the systems and network devices used to support these five lines. There is a current need to upgrade the capacity on all five lines to accommodate the additional capacity needed for 4G devices. This approach will increase the City's recurring cost for several communication lines and is not the most effective solution. It also will not provide adequate redundancy and will not appropriately allow for the dynamic increase in capacity to meet bursts in communications capacity from 4G devices.

In addition to backend network issues, all the above mentioned City departments and most other surrounding government agencies also utilize the Verizon cellular network. Because of their dependence on only one carrier, this presents a very high risk of a communication failure for emergency responders, other City staff and external agencies that have to converge on a location in response to a City or cross jurisdictional emergency or crisis. At large, City events such as the Air and Sea show, most of our neighbors and City staff including police officers have experienced an unusual level of interruption to their wireless services. Because of this fact, it is believed that Verizon will not be able to provide sufficient capacity to support the number of City staff and external agencies using their cellular network from a central location.

Problem 4: Municipal Wireless (WiFi) Network

Providing residents, businesses and visitors with wireless broadband access is a great value-added community service that is now offered by a growing number of cities around the country. These networks are used to provide important information about neighborhood, government and community services. In conjunction, cities use these broadband networks to enhance or directly replace other paid communications services used by City offices and mobile staff including Police Officers, Fire Fighters,

Building Inspectors as well as Code and Parking Enforcement staff. Currently, The City does not have a municipal WiFi network in place.

Problem 5: Disaster Recovery and Business Continuity

Disaster recovery and business continuity refers to an organization's ability to recover from a disaster and/or unexpected event and resume operations. The planning, implementation and testing of these measures should be given special attention by all businesses or government agencies. The City's information technology disaster recovery and business continuity plan is due for an update. Currently, The City's EOC is used as the central location for emergency operations. However, this facility is minimally equipped with the network connections and systems required to sustain substantial City operations should the systems located in the main data centers become unavailable. The network and Internet components of the City's information technology disaster recovery and business continuity plan requires an upgrade in order to provide the communication foundation necessary for the survivability of key systems.

6.5 Problem Resolution Strategies

Resolution 1: Telephone System Replacement

Traditionally, voice and data communications required separate networks because the transport methods were significantly different. Telephone networks originally required legacy circuit-switched transport methods and ran across legacy public switched telephone networks (PSTN) as well as the private branch exchange (PBX) equipment. Today's data networks standards are based on the TCP/IP (IP) transport. This transport method was originally designed and implemented to support data traffic using packet switched technology. However, deployed in conjunction with a quality of service (QoS) control protocol, data networks based on the IP transport are now capable of supporting enterprise grade voice (VoIP), video and data communications. VoIP is now a widely accepted principle and the future direction of all telephone system manufacturers and carriers.

Due to the above described changes in technology standards, initial steps have already been taken to mitigate the risks associated with the current Nortel telephone system. A Cisco next-generation VoIP telephone system deployed at the EOC approximately six years ago has been expanded on a case by case basis with a proven cost savings model to support other City locations.

The strategic plan of the ITS department is to replace the City's aging and unsupported Nortel telephone system by expanding the next-generation and supported Cisco VoIP telephone system to support all City locations. This expansion will include the conversion of all wired and wireless networks into one unified IP network utilizing the QoS control protocol. The completed expansion will provide the City with one scalable, resilient, cost effective network that will support enterprise quality voice, video and data communications.

In the long run, the division's operating expenses will be reduced by maintaining and supporting a single network for voice, video and data communications. The VoIP system will provide faster service delivery to departments, reduce telephone troubleshooting time due to the unified cabling and equipment

components, and will in turn improve customer service levels. Moreover, the VoIP capabilities will increase operational efficiencies, improve employee collaboration and productivity, and it will create a converged telephone and computer network that will provide easy access to relevant government value added services at anytime from anywhere on any Internet enabled computing device.

Resolution 2: Citywide Security Framework

At a Citywide level, information security threats, risks and incidents must be proactively managed to help protect the City's electronic assets, information and services. The management of information security is most effective when it is based on a layered but unified defense-in-depth threat management security framework. The idea behind defense-in-depth is to utilize multiple layers of defenses to protect against the wide variety of attacks and threats, so that if one layer of defense turns out to be inadequate, another layer of defense will hopefully detect and prevent a full breach. The integration of all these defenses results in a far more effective security framework than any single defense system or un-integrated systems.

The ITS Department's Strategic Plan is to design a layered but integrated defense-in-depth threat management security framework to protect against threats and reduce existing vulnerabilities. This framework will include the implementation of new systems as well as the integration of existing systems used by several ITS Divisions. The implementation of new systems includes a network access control (NAC) system, intrusion prevention system (IPS) and a security incident and event manager (SIEM). The integration of existing solutions includes antivirus, email spam filtering, firewalls, web filtering and second factor authentication systems as well as changes to our network topology to become compliant with regulatory bodies such as the payment card industry (PCI) Security Standards Council.

Resolution 3: Mobile Data Communications Networks

Today's mobile communications platforms are generally great at what they were originally intended to do, such as make telephone calls, send text messages and provide limited Internet communications services. With an overwhelming demand for more mobile services, most if not all wireless communications carriers are migrating to a fourth-generation (4G) wireless network. The two outstanding benefits of these new wireless networks are the extensive (in some cases 10 times faster) bandwidth capacity increase and the integration of voice and data communications on a single network using VoIP technology.

To accommodate the expansion of and migration towards 4G devices the City needs a more cost effective, scalable and secure backend mobile communications network. The recommended path is to centralize the backend networks and systems that provide integration with the Verizon and City's networks. This can be accomplished by utilizing the City's existing Internet access lines to support all communications with 3G and 4G end points. This method is already used by the Transportation and Mobility department as well as City staff with VPN access to the network. This move would also require increasing the security functions and bandwidth capacity of the exiting Internet lines to meet the needs of each department. This will be a more cost effective solution instead of the variety of independent networks and systems currently in place. Additional cost savings will be achieved by leveraging the

existing network devices and security systems already used to support the two main Internet lines. The mobile communications platform will also inherit the redundancy, load balancing and scalability functions of the existing Internet network. To ensure the security requirements of each department are met, the consulting services of the soon to be selected network vulnerability assessment vendor will be used to provide a proposed network design and associated security policy. These security functions will also be incorporated it in the Citywide security framework outlined in the Network Divisions resolution 2 section of this strategic plan. In addition to the network and security layers, an application layer will be implemented to provide enhanced mobile device management with integrated communications and collaborations functionality. This project will be undertaken by the Application Services Division as outline in their section of this strategic plan. The Citywide security framework along with the mobile device management solution will increase the productivity of the City's mobile workforce by allowing them to securely utilize any available wireless network to gain access to City resources during the performance of their daily City duties. These networks include 3G, 4G, Hotspot WiFi and the upcoming Municipal WiFi networks.

To reduce (not eliminate) the risk associated with the dependence on one wireless carrier, the plan is to partner with another of the top three carriers to design and implement a second 4G mobile communications platform to provide diversification at the carrier level. However, because of the lack of mobile communications capacity, reliability and coverage of the other carriers, previous attempts to implement this plan have failed. Today, the departments remain open to the diversification strategy of utilizing another carrier and plans are on the way to test the above mentioned functions of the other carriers once again.

Investing in the advancement of the City's mobile communications network will provide several benefits. The City's mobile workforce will be able to leverage this universal platform to improve the operational efficiently and productivity of their functions. Mobile workers such as building inspectors will be able to share photos and videos real-time with subject matter experts located at City offices to improve their daily service call cycle. Mobile workers will also be able to use one device and one application for real-time collaboration including integrated voice, video and application sharing.

Resolution 4: Municipal WiFi Network

The plan is to develop an RFP to solicit a vendor for the initial deployment and on-going support of a regional municipal WiFi network in three areas. The initial areas will include the Sistrunk business corridor, the downtown area and the City's beach front. To ensure the sustainability of this network, the City will leverage CRA programs, public safety grants and an extensive partnership with the business community. The intent of the network will be to offer free WiFi services to our neighbors, secured WiFi services for the City's mobile workforce and public safety wireless services for police officers. This WiFi network will provide many productivity enhancements for the City's mobile workforce. Investing in a municipal WiFi network will benefit the City and community in the following ways.

- Fosters economic development by attracting customers to local business districts
- Attract new businesses by allowing them to collaborate over the wireless network

- Encourage the use of public parks and facilities
- Enable more citizens to access City services online
- Augment or replace paid communications services to other City locations and staff

Resolution 5: Disaster Recovery and Business Continuity

A good disaster recovery and business continuity plan will keep the City's critical systems and services up and running through interruptions, including: power failures, IT system crashes, natural disasters, supply chain problems and more.

The plan is to utilize the current EOC as the City's disaster recovery and business continuity location. Utilizing the EOC in this manner means hosting the primary (active) or secondary (standby) components of critical systems at the EOC. In either case to make the EOC a viable disaster recovery and business continuity location, network and Internet lines with the appropriate capacity and connectivity are required. The implementation of the required network and Internet lines will provide a sustainable network to support the daily access to primary systems or the synchronization of data to secondary systems.

6.6 Goal 1: Replace the 10 years old unsupported decentralized legacy telephone system.

Objective 1.1: Upgrade the power systems for the EOC and all three data centers (where required)

This objective includes the purchase and installation of several appropriately sized UPS, the installation of electrical outlets and the integration of a generator for backup power.

This upgrade will provide a short-term and long-term power source for the core VoIP telephone components. The implementation of backup power source for the core VoIP components is vital to providing the five nines (99.999%) of uptime for a telephone system and to mitigate the risk of equipment damages associated with FP&L power outages or power spikes.

Objective 1.2: Upgrade the Ethernet cabling at all Data Centers and City locations that does not conform to the City's unified structured cabling standards.

Data centers and remote locations not conforming to the City's unified structured cabling standards will be upgraded to support voice, video and data communications.

A unified structured cabling architecture will reduce troubleshooting time for telephone related issues, simplify the moves, adds, changes, and deletes process for telephone requests. Reduce the on-going cabling installation and maintenance cost.

Objective 1.3: Migrate the core and distribution layers of the City's network to a unified, high capacity, scalable, redundant and resilient IP network.

The appropriate equipment will be purchase and installed to migrate the network topology to a core, distribution, access model outlined in the solutions architecture section below.

The completion of this objective will create a unified, high capacity, scalable, redundant, and resilient core IP network.

Objective 1.4: Upgrade the VoIP data center components to the capacity required to provide VoIP services Citywide.

The appropriate VoIP servers, gateways and components will be purchased and installed to support the aggregate telephone calls and services such as voicemail, auto attendants, call centers and local and long distance PSTN access for the entire City.

The completion of this objective will provide the following benefits:

- Move the core telephone services such as voicemail, auto attendants, call center and local and long distance PSTN lines located at all three data centers to a manufacturer supported platform.
- Increase energy efficiency in each data center by reducing the telephone equipment footprint by over 70 percent. This is accomplished by the integration of voice and data hardware as well as utilizing VMware technology to virtualize the call processing, voicemail, & call center systems onto one appliance. The reduction in equipment will reduce the power and AC consumption in the data centers.
- Reduce staff training requirements, improve support response times, and reduce the maintenance cost. By utilizes homogeneous hardware and software operating systems across switches, routers and voice gateways, this solution provides greater integration between the voice and data networking equipment. This integrations will allow staff to be trained on both voice and data equipment more efficiently and allow them to provide faster support response times. This integration also allows for interchangeable hardware and software configuration standards between voice and data hardware, hence, requiring less variety and quantity of replacement hardware.
- Provide the City's call centers with innovative communications features such as automatic customer information lookup in external databases and the integration of additional contact channels. These contact channels include the addition of web chat, email and text messaging features, along with the required archiving function into the same agent software. These features can be used to reduce problem resolution times and increase the number of issues handled by each center. With a multi-channel service center, you'll ensure your customers can reach you in the method of their choice.
- More efficiently utilize centralized resources such as voicemail, call center systems, local and long distance PSTN lines, as well as centralize the management for these systems.
- Provide automatic load balancing and failover for inbound and outbound call routing, voicemail and call center services between call centers.
- Reduce the number of local voice PRI lines from 15 to 12. A cost savings of approximately $24K annually.

- Remove reliance on a 3rd party integrator for support of the telephone system.
- Allow staff to easily create a virtualized VoIP lab environment to replicate the production environment. This lab environment will be a huge asset in the testing of complex designs and advance unified communications and collaboration solutions prior to the implementation in the production environment.

Objective 1.5: Migrate each City locations to the VoIP solution in a phased approach over a three year period.

This objective includes the on-going migration of the telephone components deployed at each City location to the VoIP platform. Each location will go through a cabling and power assessment, followed by the purchase and installation of the required VoIP cabling, equipment and components.

The completion of this objective will provide the following benefits:

- Reduce the City's annual cabling installation and maintenance cost by unifying the voice and data networks.
- Remove the recurring cost for locations using the AT&T telephone system.
- Provide the same telephone, voicemail, and call center services to all City locations. Users moving from one City location to the other will not have to learn a new telephone system and features.
- Reduce telephone troubleshooting and problem resolution times by simplifying the moves, adds, changes, and deletes process.

Objective 1.6: Implement advanced VoIP communications and collaborations tools.

This objective includes the implementation of advanced tools that will allow staff to communicate and collaborate more effectively and efficiently.

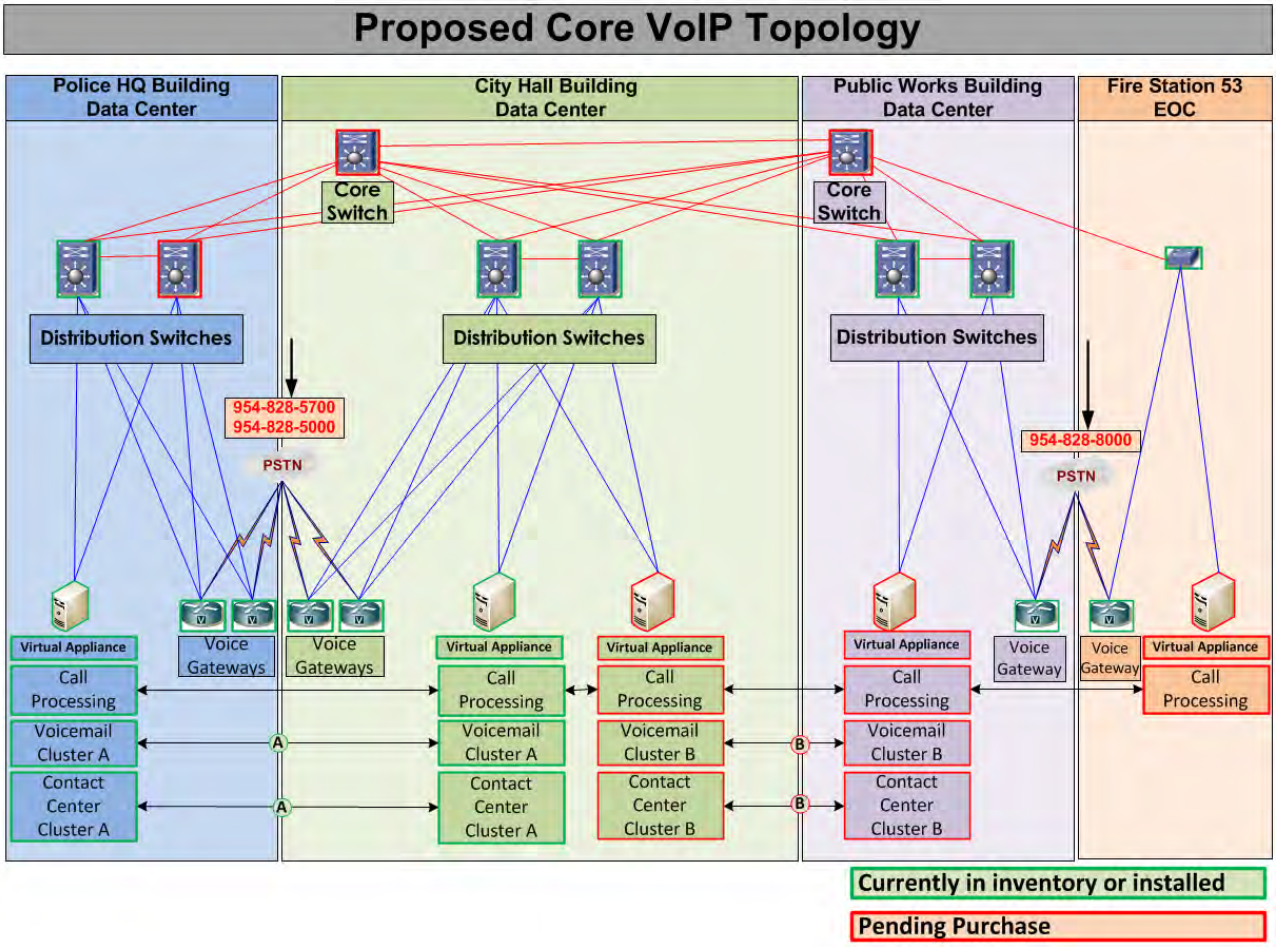
The completion of this objective will provide the following benefits:

- Provide a single communications and collaboration application for all computing devices.
- Reduce staff commuting cost by providing a real-time voice, video and application collaboration solution that would simulate an in-person experience for various staff meetings.
- Increase staff operational efficiencies and productivity by providing a platform for staff to carry out the following functions:
  - Staff will be able to initiate application and document collaboration sessions with multiple internal or external users from their desktop computers, laptops and mobile devices.
  - Staff and mobile workers will be able to determine the availability other staff members in real time based on their outlook calendar and telephone usage.
  - Mobile workers will be able to seamlessly communicate with staff and subject matter expert at City offices using a VoIP application on their smartphones, tablets and laptops. This feature will reduce staff cell phone usage and cost.

Solution Architecture

The integration of the voice and data networks will include a core, distribution and access network design in the diagram below.

- Core Layer: this layer is considered the backbone of the network and provides a unified, high capacity, scalable, redundant and resilient IP network between the different data centers.
- Distribution Layer: this layer provides redundant connectivity to the access layer devices and servers, and it ensures that information is properly routed between locally attached devices and remote devices.
- Access Layer: end-stations and servers connect to the enterprise at the access layer



5-Year Budget to Attain the Goal

The telephone system replacement project will be funded over a three year period. The first year (phase 1) will be funded from the FY2012/2013 operating budgets of the Public Works and ITS departments in the amount of $551,850K. The second and third years will be funded from a 2013 CIP request in the amounts of $927,849K and $890,555K respectively. The maintenance cost for years four and five will be funded by the ITS departments operating budget.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
VoIP Components and Parts	Capital Cost	$513,375	$876,267	$845,389		
	Maintenance Cost	$38,475	$51,582	$45,166	$135,223	$135,223
	Total Cost	$551,850	$927,849	$890,555	$135,223	$135,223
	Annual Total	$551,850	$927,849	$890,555	$135,223	$135,223
	5-Year Total	$551,850	$1,479,699	$2,370,254	2,505,477	2,640,700

Performance Measures to Evaluate the Goal

- Telephone - Percentage of repair calls resolved within 24 hours (ICMA)
- Network – Percentage of repair calls resolved within 24 hours (ICMA)
- Internet – Percentage of repair calls resolved within 24 hours
- Percentage of network device moves, additions or changes completed when scheduled (ICMA)
- Percentage of telephone uptime
- Percentage of network uptime
- Percentage of Internet uptime
- Overall internal customer satisfaction with telephone services (ICMA)

6.7 Goal 2: Implement a Citywide Security Framework

Objective 2.1 – Vulnerability assessment of the City's networks and systems.

To accomplish this objective, the services of an external security firm will be utilized to perform a vulnerability assessment of the City's networks and systems. The procurement of these services is currently in progress.

Objective 2.2 – Update and create where necessary all security policies relevant to the City's information technology environment.

To accomplish this objective, the services of an external security firm will be utilized to create and document a set of security policies that will govern the use of all technology resources within the City.

Objective 2.3 – Upgrade the City's network security topology.

To accomplish this objective, City staff will modify the network to meet network topology best practices and compliance policy outlined by the security firm in objective 2.2.

Objective 2.4 – Purchase and implement additional security systems.

To accomplish this objective additional security systems will be purchased and implemented to achieve compliance with the security framework policies outlined by the security firm in objective 2.2.

Objective 2.5 – Upgrade and modify existing security systems

To accomplish this objective, existing security systems will be modified to achieve compliance with the security framework policies outlined by the security firm in objective 2.2.

Objective 2.6 – Monitor security systems, logs and surveillance devices according to the City's security policy.

To accomplish this objective, on-going monitoring and auditing should be implemented as a part of the ITS standard operating procedures. This procedure includes a proactive strategy that audits the network and systems to identify vulnerabilities using a centralized surveillance monitoring solution.

5-Year Budget to Attain the Goal

The initial funding for this project will be requested as an above base request in the year following the 2012 Citywide network vulnerability assessment.

Performance Measures to Evaluate the Goal

- Outcome Measure: Number of Security Violations Detected
- Efficiency measure 1: Percentage of device and system vulnerabilities detected
- Efficiency measure 2: Percentage of information security incidents detected

6.8 Goal 3: Upgrade the Mobile Communications Infrastructure

Objective 3.1 – Continued testing of other carrier's 4G networks for future possible diversification at the carrier level.

Objective 3.2 – Redesign and upgrade the capacity of the existing Verizon communication networks to support the bandwidth and security requirements of 4G end points.

Objective 3.3 – Integrate the mobile communications networks into the City's security framework.

Objective 3.3 – Create a voice, video and collaboration platform for mobile communications devices.

5-Year Budget to Attain the Goal

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Recurring cost for the upgraded Internet lines ***Pending internal agreement on final design***	Capital Cost					
	Maintenance Cost					
	Total Cost					
Internet QOS management appliance	Capital Cost	$50,000				
	Maintenance Cost	$5,000	$5,000	$5,000	$5,000	$5,000
	Total Cost	$55,000	$5,000	$5,000	$5,000	$5,000
Network routing and switching equipment ***Pending internal agreement on final design***	Capital Cost					
	Maintenance Cost					
	Total Cost					
	Annual Total					
	5-Year Total					

Performance Measures to Evaluate the Goal

- Mobile network - Percentage of repair calls resolved within 24 hours
- Percentage of mobile network uptime
- Overall internal customer satisfaction with mobile network services

6.9 Goal 4: Implement a Municipal WiFi Network

Objective 4.1 Create a wireless City plan

This plan will identify and clearly define the City's long-term objectives and sustainability plan for the wireless initiative.

Objective 4.2 Develop a business model

This model will include not only the government itself, but also private businesses who can contribute to the overall sustainability of the business model.

Objective 4.3 Develop and issue a RFP

The purpose of this RFP will be to select a vendor for the implementation of the City's Municipal WiFi network in accordance to the policy objectives defined in the City's wireless vision. This RFP will include on-going support and maintenance of the City's Municipal WiFi network by the selected vendor.

Objective 4.4 Build a wireless technology infrastructure

This infrastructure will be the launch of the City's Municipal WiFi Network that supports the policy objectives defined in the City's wireless plan.

5-Year Budget to Attain the Goal

The line items below are budgetary costs.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Sistrunk Business Area	Capital Cost	65,140				
	Maintenance Cost	8,932	8,932	8,932	8,932	8,932
	Total Cost	74,072	8,932	8,932	8,932	8,932
Downtown Business Area	Capital Cost	181,474				
	Maintenance Cost	28,248	28,248	28,248	28,248	28,248
	Total Cost	209,722	28,248	28,248	28,248	28,248
Beach Business Area	Capital Cost	223,973				
	Maintenance Cost	37,060	37,060	37,060	37,060	37,060
	Total Cost	261,033	37,060	37,060	37,060	37,060
	Annual Total	544,827	74,240	74,240	74,240	74,240
	5-Year Total	544,827	619,067	693,307	767,547	841,787

Performance Measures to Evaluate the Goal

- Percentage of public places with WiFi accessibility
- Municipal WiFi network - Percentage of repair calls resolved within 24 hours
- Percentage of Municipal WiFi network uptime
- Overall internal customer satisfaction with Municipal WiFi network services

6.10 Goal 5: Upgrade the EOC Network and Internet Lines

Objective 5.1: Upgrade the network equipment at the EOC to support elevating the EOC to a data center network level.

Objective 5.2: Upgrade the network connectivity at the EOC to support elevating the EOC to a data center network level.

Objective 5.3: Migrate the Internet line from the Public Work data center to the EOC.

5-Year Budget to Attain the Goal

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Network equipment upgrade	Capital Cost	$ 60,000				
	Maintenance Cost	$ 3,000	$ 3,000	$ 3,000	$ 3,000	$ 3,000
	Total Cost	**$ 63,000**	**$ 3,000**	**$ 3,000**	**$ 3,000**	**$ 3,000**
Network connectivity upgrade *** Pending quote from Comcast***	Capital Cost					
	Maintenance Cost					
	Total Cost					
Internet line migration from Public Works to the EOC	Capital Cost	$ 10,000				
	Maintenance Cost					
	Total Cost	**$ 10,000**				
	Annual Total	**$ 73,000**	**$ 3,000**	**$ 3,000**	**$ 3,000**	**$ 3,000**
	5-Year Total	**$ 73,000**	**$ 76,000**	**$ 79,000**	**$ 82,000**	**$ 85,000**

Performance Measures to Evaluate the Goal

- EOC Telephone - Percentage of repair calls resolved within 24 hours (ICMA)
- EOC Network – Percentage of repair calls resolved within 24 hours (ICMA)
- Percentage of EOC telephone uptime
- Percentage of EOC network uptime
- Overall internal customer satisfaction with EOC telephone and network services

7 Radio Communications Services

7.1 Mission

The mission of the Radio Communications Services Division is to provide and ensure reliable and interoperable communications that will facilitate City departments and public safety first responders to reach target capabilities through cost-effective measures and proficient technical support service.

7.2 Division Overview

The Radio Communications Services Division "Communications Shop" is currently staffed with three (3) full-time employees (FTE) that consist of a Communications Manager, Assistant Communications Manager and an Administrative Aide. In addition, the division out-sources labor services under two (2) contracts. One contract provides a communications technician for 24 hours per week (3 days for 8 hours each day) for 52 weeks. The second communications technician is on an as needed basis. The cost for out-sourcing labor will be provided later in this Strategic Plan.

This division provides mission-critical communications, technical support services and operational support during emergency operations and City special events. The division staff is available to respond to emergency situations 24 hours a day, 365 days a year. Additionally, the division is classified as ESF-2 Communications for emergency communications deployment for Southeast Regional Domestic Security Task Force (SERDSTF 7). As members of the SERDSTF 7, the staff is responsible for the Mobile Emergency Radio System (MERS). The MERS is a regional asset that provides transportable 800 MHz Radio Communications that can be deployed throughout the State of Florida at the request of the Office of the Department of Emergency Management (ODEM), or Federal Emergency Management Agency (FEMA). Additionally, staffs are members of the Department of Homeland Security -Urban Area Security Initiative (UASI) Communications Committee and Florida State Emergency Response Team (SERT). The staff members are certified All-Hazardous ICS Communications Unit Leaders (COML) and have successfully completed numerous specialized technical communications and FEMA training, i.e., ICS100, 200, 300, 400, 700, 800, 801,Emergency Deployable Interoperable Communications (EDIC), Emergency Deployable Wide Area Remote Data Systems (EDWARDS), Mutual Aid Radio Communications (MARC).

The Radio Communications Services Division is responsible for, but not limited to technical support service and installation of the following communications networks and equipment:

- UHF Fire Alerting Network.
- 11 Fire Stations Alerting System (Encoders, Decoders, Lights, Audio Speakers).
- 22 Fixed Control Stations throughout City buildings.
- 3600 Subscriber Radios (mobiles, portables, control stations) (800 MHz, UHF & VHF)
- 26 Channel, 4 site 800 MHz Communications Network (Trunked Radio System).
- 1 channel, 3 site 800 MHz Conventional Backup System.
- Regional Mobile Emergency Radio System, a (6) Channel Analog 800 MHz System and a (6) Channel P-25 800 MHz Trunked System).

- Dispatch Consoles (9-1-1 Center & Utilities Administration).
- CERT UHF System.
- Public Announcement System located on the Beach.
- Highway Advisory Radio Service (HARS)
- Opticom (Preemption) System - (vehicle unit and intersections).
- Weatherbug & Weathernet System & Cameras.
- Emergency Operation Center Communications Equipment (consolettes, fixed and portable satellite phones, AV-AUDIO system).
- 43 Fire Apparatus i.e., Engines, Aerial, Rescues, Command & Hazmat vehicles with communications equipment.
- 182 Mobile radios in vehicles and heavy industrial equipment.
- 43 Mobile Data Docking Stations.
- 43 Sigtronic System with 172 headsets in Fire apparatus
- 50 Pin-Point Modems.
- Battery Chargers & Anaylzers (110 - Multi-unit Chargers, 2000- single unit chargers)
- Ancillary equipment (batteries, speaker microphones, surveillance equipment, , etc.)
- Manage and maintain City FCC Licenses of various Radio Frequency (RF) equipment (800 MHz, UHF, VHF).

Radio Communications System Usage:

The City of Fort Lauderdale, with the City of Pompano Beach, owns a Motorola 800 MHz (26) channel, (3) sites Transmit and Receive and (1) Site Receives Only Simulcast Trunked Radio System. There are over 3600 subscriber radios (portables, mobiles, control stations, and dispatch consoles) that operate on the radio system.

The City's 800 MHz Trunked Radio Communications System is a multi-jurisdictional network that provides mission critical two-way communications. The radio system is an integral tool and first line of defense to facilitate preparedness, response, and recovery from a major disaster, domestic terror attack and other emergencies. Further, the network enables interoperability and collaboration between public safety agencies and other disciplines in the region; especially regional partners of Miami-Fort Lauderdale's Urban Area Security Initiative (UASI) group and Southeast Regional Domestic Security Task Force Region 7 (SERDSTF) participants. In addition, the system is utilized by the cities of Pompano Beach, Oakland Park, Wilton Manors and various Federal agencies. The operational cost of the 800 MHz Trunked Radio System is the responsibility of the owners – Fort Lauderdale 65%, Pompano Beach 35%. Each agency is responsible for their respective infrastructure and subscriber radios. The Cities of Oakland Park and Wilton Manors costs are based on the number of subscriber radios active on the radio system.

Radio Communications System History:

After exploring the feasibility of implementing two separate and independent radio communications networks, the City of Fort Lauderdale and City of Pompano Beach entered into a joint venture agreement in 1992, to implement a combined Motorola 800 MHz twenty-three (23) channel Simulcast Trunked Radio System with three (3) full Transmit and Receive sites, and one (1) Receive only site. The Receive only site was initially to be a full transmit and receive site, but budget constraints forced a compromise of the system design. The system was implemented utilizing the Associated Public Safety Officials (APCO) Project 16 Standards. The system covered seventy-two (72) square miles that includes the Cities of Fort Lauderdale, Wilton Manors, Oakland Park, Pompano Beach and Lauderdale-By-The-Sea.

In 1997, the City of Fort Lauderdale – Pompano Beach Trunked Radio System was upgraded to twenty-six (26) channels to accommodate the City of Oakland Park Police Department, Fire Department and local government agencies.

In 2005, the City integrated its SmartNet communications network with Broward County's SmartNet network to create a cohesive SmartZone network. The integration addressed some of the deficiencies faced by the Fort Lauderdale-Pompano Beach Trunked Radio System; diminishing coverage due to growth of high-rise construction and lack of coverage along the City's east and southeast corridor. The integration provided additional benefits such as seamless "roaming" onto Broward County's system thus providing enhanced coverage throughout the county. Dispatchers gained the ability to directly patch countywide mutual aid talk-groups with the City's talk-groups for interoperability and collaboration among first responders.

In 2008, the City commissioned a Communications Study which was performed by an independent consultant. The consultant, Tusa Consulting Services, of New Orleans, La., delivered its findings in two reports; *Conceptual Solution Report* and *Existing Facilities Report*. The reports identified areas of deficiencies of the City's radio communications infrastructure. Several of the deficiencies will be listed in **Section 7.3 SWOT Analysis** of this Strategic Plan.

In 2011, the City began the replacement of the "Microwave System" a critical component of the radio communications network. At the time of this Strategic Plan, the project was underway with beneficial use of the new microwave system. Further information, regarding the Microwave System will be highlighted later in **Section 7.6.2.**

7.3 Division SWOT Analysis

	Helpful **to achieving the objective**	**Harmful** **to achieving the objective**
Internal origin **attributes of the organization**	**Strengths** • Staff knowledge & experience in communications industry field • 100% interoperability county-wide • Collaboration with regional partners • Communications infrastructure evaluation • Progress in upgrading communications infrastructure • Web-based Service Ticket & Database Application • Migration allows continued beneficial use of subscribers and new microwave network	**Weaknesses** • Lack of staffing • Costly out-sourcing of labor • Excessive downtime of equipment • Extended turnaround time on service ticket completion • Lower performance level • Staff working 50-60 hours weekly to maintain service level • Lack of training • Antiquated radio communications infrastructure • Lack of manufacturer support • Lack of parts & components • Cannibalizing system to maintain operations • Loss of system capacity due to component failure • System coverage diminishing

External origin
attributes of the environment

Opportunities

- Discontinue use of costly out-sourced labor
- Add two (2) communications technicians to department staff immediately– cost neutral and/or cost saving to City.
- Re-coup internal labor cost by providing services to other municipalities
- Proactive management
- Preventive maintenance program
- Improve department service performance
- Reduce internal cost to customers
- Increase training opportunities
- Communication infrastructure upgrade immediately
- Migration methodology approach
- Lessen impact to any particular capital budget year (fiscally prudent)
- Enable City to continue with beneficial use of $3.55 million dollars of subscriber radios
- Enable City to continue with beneficial use $3.49 million investment of Microwave network in 2011
- Significant cost saving from acquisition of equipment and maintenance
- Minimize impact to current operational system users
- Maintain current and future interoperability for public safety responders
- Collaboration with customers

Threats

- Not achieving performance measurement
- Burn-out of current staff
- Potential productivity loss due to equipment being out of service
- Increasing costs for out-sourcing labor
- Continued loss of system capacity
- Potential inability to restore communications system after failure
- Continue with band-aid approach for addressing communications infrastructure deficiencies
- Potential costly repairs
- Inability for Emergency First Responders to prepare, respond and recovery from a disaster or other emergencies
- Inability to protect life and property of neighbors
- Endanger life of Emergency First Responders
- Loss of interoperability
- Loss of dispatch consoles
- Potential loss of communications services to partners i.e., Pompano Beach, Oakland Park & Wilton Manors
- Loss of $94 thousand in potential revenue annually from system users

7.4 Problem Statement

Problem 1: Costly Out-Sourcing of Labor

Problem 2: Inadequate Staffing of Radio Communications Services Division.

Problem 3: City-wide compartmentalization of Communications Services.

Problem 4: Communications Infrastructure in Critical Need of Replacement.

7.5 Problem Resolution Strategies

Resolution 1: Elimination of Costly Out-Sourcing of Labor

Over the years, the City has relied on costly contractual labor instead of increasing personnel headcount on City payroll. The City should discontinue the use of costly contractual labor when internal labor cost is cost neutral and/or provides a cost savings. The department eliminated a technician in its Service Agreement in FY 2009, to enable the City to put a technician on City payroll and allow for cost savings of $14,000 annually. Unfortunately, the technician position still has not been filled at the time of this Strategic Plan. Discontinued use of costly out-sourcing of labor would enable the facilitation of Resolution2, and Resolution 3. Out-sourcing cost is illustrated in the Comparison Table of Out-Source Labor Cost and Out-Sourcing verses Internal Labor Cost Tables at the end of this section.

Resolution 2: Adding three (3) Communications Technicians to Radio Communications Services Division

As mentioned in the division overview section, the division is currently staffed with three (3) FTEs, two (2) management and (1) one clerical position. The division averages over seven hundred requests for service through its web-based service ticket application annually. The service request statistics don't include large or small scale projects that require a considerable amount of project management and technical expertise. Requests for Service are not being fulfilled in a timely manner and support for special events is severely lacking as staffing resources are not available internally. Three (3) FTE Communications Technicians should be immediately added to the division in order to sustain and improve technical support services to current customers*. The cost and comparison is illustrated in tables at the end of this section. This resolution is the foundation of, and has a direct correlation to, achieving several goals and objectives in this Strategic Plan.

*The added technicians will be able to support and maintain the installation and trouble-shooting of the Police Department mobile data computers docking stations, wiring, pin-point modems, in-car cameras and battery charges.

Resolution 3: Centralization of Technical Support Communications Services

The City has become very compartmentalized over the past several years. Collaboration among departments essentially has become non-existence creating duplication of services which has increased the use of costly out-sourcing of labor and increased the City's budget. To eliminate duplication of

services; the City must move in the direction of centralizing and/or consolidation of its technical support services as well as better collaboration with departments. Centralizing and/or consolidation of services will provide cost savings by eliminating multiple out-sourcing contracts and reduce the cost all City's departments as services would be consolidated and no one particular department would be responsible for the individual contract cost. Centralization and/or Consolidation will further improve effective, efficiency and proficiency as staffing would be available 40 hours per week for services. In addition, savings could be redirected to capitol and other operational cost. Cost and Comparison is illustrated in Section 7.6 1.1. and 7.6.

Resolution 4: Radio Communications Infrastructure in Need of Critical Replacement

The City's Radio Communications Infrastructure is over 20 years old and is in critical need of replacement. The infrastructure is no longer supported by its manufacturer and parts and components are lacking or not available to repair the infrastructure if an outage or failure occurs. City staff has relied heavily on after- market parts and components to keep the system operational over the last several years. The City has started its process of replacement of the communications infrastructure by commissioning an independent communications study in 2008/2009. Additionally, in 2011, the City invested $3.49 million to replace the most critical component, "Microwave Network". The "Microwave Network" replacement is a step forward but it is a band aid approach to addressing the City's overall mission-critical communications network which will be explained further in Section 7.11.

7.6 Goal 1: Eliminate costly out-sourcing of labor.

Objective 1.1: Elimination of contracts for labor services.

Over the years the City has elected to out-source labor instead of staffing the City Radio Communications Services Division with the proper staffing to sustain current technical services and meet rising needs throughout City departments. The City currently has several active labor service contracts with several vendors. The division also had a contract for technician services, in a Service Agreement providing for Subscriber and Infrastructure support that was discontinued in 2009, with plans to hire a communications technician internally. At the time of this Strategic Plan, the technician position has not been filled. Additionally, none of the contracts stated in this strategic plan provides for a 40 hour work week. The table below will provide empirical data that will show the out-sourcing labor cost for the past four years and this cycle will continue if the Goals and Objectives are not implemented thus causing the City to lose funds and department performance measures to not be reached.

Out-Sourcing Labor Cost Only (Actuals for 10/1/2011-04/01/2012)					
Department	**Vendors**	**FY 2008-2009 Actual**	**FY 2009-2010 Actual**	**FY 2010-2011 Actual**	**FY2011-2012 Paid YTD**
ITS-Radio	Motorola	$76,000	$76,000	$0	$0
	Control USA	$83,378	$87,225	$91,070	$46,480
	Tech Tonix Pro Inc.	$16,442	$9,800	$17,593	$8,887
FTL Police	Motorola	$106,699	$106,699	$106,699	$53,349
Per Fiscal Year		$282,519	$279,724	$215,362	$108,716

***Fiscal Year 2011-2012, contracts with Control Communications USA, Motorola Inc., and Tech Toni Pro Inc. are currently on track with the previous year. Contract with Tech Tronix Pro Inc., is fixed at $25,000. *Figures for this table were collected from Service Agreement contracts and verified through the City's Financial System "FAMIS".**

Comparison Table of Out-Sourcing verses Internal (Staff) Labor Cost							
FY 2008-2009		**FY 2009-2010**		**FY 2010-2011**		**FY2011-2012 Budget**	
Actual Out-Source labor cost	Projected (3) Staff cost @ $63K per staff	Actual Out-Source labor cost	Projected (3) Staff cost @ $63K per staff	Actual Out-Source labor cost	Projected (3) Staff cost @ $63K per staff X3% increase	Out-Source labor cost	Projected (3) Staff cost @ $63K per staff X3% increase
$ 282,519	$189,000	$ 279,724	$ 189,000	$ 215,362	$ 194,670	$ 222,769	$ 194,670
$93,519		$90,724		$20,692		Projected saving $28,099	

***Fiscal Year 2010-2012, had a significant decrease due in part to the City discontinued out-sourcing labor from Motorola Solutions Inc., for a technician. (As previously mentioned, at the time this plan was being developed the technician position for the out-sourcing labor cost from the ITS-Radio budget had not be filled.)**

Based on the comparison table, the City could have potentially saved, over three (3) fiscal years, a total of $204,935**.** For FY 2011-2012, the figure was not calculated in the potential savings amount due to out-sourced labor is budgeted and the timing of the Strategic Plan. But, the budgetary cost of out-sourcing labor for FY 2011-2012 is expected to meet the previous year.

5-Year Budget to Attain the Goal

There is no impact to budget in attaining Goal 1.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Not Applicable	Capital Cost	N/A	N/A	N/A	N/A	N/A
	Maintenance Cost					
	Total Cost	N/A	N/A	N/A	N/A	N

Performance Measures to Evaluate the Goal

There is no performance measurement for Goal 1.

7.7 Goal 2: Increase Staffing of Radio Communications Services

Objective 2.1: Hire three (3) Communications Technicians

The City should hire three(3)FTE Communications Technicians to support and service current communications technologies and all city departments. This will allow continued serviceability, improve performance measures and eliminate staff from working 50-60 hours a week. reduce the need for out-sourcing and reduce department overhead for that type of service. Further benefits of internal staffing will increase customer satisfaction and prevent the department from turning customers away and having to reschedule services. This will prevent additional cost for fuel or employee productivity loss. As you will see, other Goals and Objectives are reliant on Objective 1.1 being achieved immediately.

The Radio Communications Services Division currently handles a large quantity of service requests annually. Technology that the City has implemented requires continuous support and is not a one-time installation or support. Utilized by public safety departments and local governments, the technology is being used 365 days a year and must be maintained to ensure reliability. The following are the number of service ticket recorded in the past several years:

Year	Service Tickets Handled
2009	382
2010	670
2011	847
2012 as of March	337

*Service Tickets figures were collected from the Radio Shop Service Ticket Web base Program, and don't include the Police Department fleet.

The Service Ticket Application was implemented in mid July 2009 and the number reflects service requests from that point. Also, the 2012 statistic is based on the period January 1, 2012 – April 13, 2012. Based on the numbers from 2012, the service requests are on track to exceed the previous year.

The Radio Communications Services Division's current performance measurements are not being met on the basic services for subscriber radios repair or service tickets completion within twenty-four (24)

hours. This will be addressed in a later objective. The division is tremendously lacking in staffing and inundated not only with two (2) federally mandated projects, but there are critical communications infrastructure issues and on-going technical support service requests. The federal mandated projects have stringent deadlines that must be adhered to. Failure can and will result in the City being penalized financially and/or suspension or loss of FCC Licenses.

7.8 Goal 3: Generate income

Objective 3.1: Generating Income by Providing Services to Other Municipalities.

As the country recovers from the recession, many municipalities have faced severe budgetary cuts in order to maintain basic general services. After the City hires the necessary staff to efficiently operate its Radio Communications Services Division, it can easily take advantage of its asset, trained staff. The City can begin generating monies to offset personnel costs by providing services to other municipalities. This can be easily achieved with current, but not limited to, Inter-Local Agreement (ILA) partners i.e., City of Oakland Park, Wilton Manors and Pompano Beach. In addition, technical services can be extended out to other agencies. This service could provide a cost savings to those agencies as well.

The following are examples of some basic services that can be easily rendered to and are necessities of municipalities:

- Radio Template Creation
- Programming Code-plug
- Programming of Subscriber Radios
- Subscriber Radios (mobile) installation
- Opticom (Preemption System) installation (This level of service is only provided by two vendors, and only one is located in the southern region of Florida. The City's current staff is trained and experienced in the installation and troubleshooting of this device.)

Municipalities that don't have communications personnel on staff, such as current system users, out-source the aforementioned services to vendors whose rates vary, but standard quoted prices are:

- Radio Template Creation/Programming Code-plug cost = $800.00 per code-plug.
- Programming of Subscriber Radios = $150.00 per hour.

Programming Code-Plug per department varies depending on the different model radios, firmware and number of templates. The average small department has fourteen (14) programming code-plugs. This equates to a cost of $11,200 to outsource their programming code-plugs.

Another example is subscriber (mobile) radios installation. The Fair Market Rate for mobile installation varies depending on customization but a basic installation averages 2.5 labor hours at a rate of $125.00 per hour totaling $312.50. The projected hourly rate for a City technician is $29.80 per hour totaling $74.50 per installation. The City can provide installation services at a cost savings to the other municipalities or charge the Fair Market Rate. At the Fair Market Rate, the City could make $238.00 per

installation. A technician cost to the City for an eight (8) hour workday is $238.40. One installation performed for another municipality would result in a cost savings of the eight (8) work hours for a City employee. Achievement of this objective would greatly benefit the City and offset personnel cost.

7.9 Goal 4: Implementation of Proactive Management and Quality Assurance Program.

Objective 4.1: Implement Proactive Maintenance

With the achievement of Goal 2 (increased staffing), staff will be able to implement a Preventive Maintenance Program which will maximize equipment performance, reduce potentially costly repairs and extend the life-cycle of equipment to avoid premature replacement. In addition, the program will prevent excessive downtime of equipment which has the potential of impacting productivity as departments rely on equipment for their daily performance and employee accountability. Implementing a Preventive Maintenance program will initially increase the workload (staff estimates processing ten (10) radios per week) thus increasing the number of annual service requests. Staff will concentrate on Public Safety and Public Works equipment based on the harsh environment they're utilized in. It also should be noted that subscriber radios are not the only equipment that will be part of the preventive maintenance program.

Objective 4.2: Improved Department Proficiency and Performance Measures

As mentioned earlier in this plan, the department is not meeting basic ICMA Performance Measurements.

Fiscal Year	Service Tickets	Completed within 24 hours	Percentage
FY 2009-10	521	173	33.21%
FY 2010-11	387	97	25.06%
FY 2011-12 as of April 2012	546	162	29.67%

With the achievement of additional staff, the department will be able to address the number of service tickets and achieve a much higher completion percentage. A list of performance measures tied to this objective is provided at the end of this section.

5-Year Budget to Attain the Goal

Redirection of out-sourcing labor and minimal increase to budget would attain the goal. This Goal can only be attained if staffing is adequate and trained.

Also see Out-Source verses Internal Labor Comparison table in Goal 1.

Cost Items	Cost Type	Year 1 2012-2013	Year 2 2013-2014	Year 3 2014-2015	Year 4 2015-2016	Year 5 2016-2017
Personnel Cost 3 Comm. Tech @ $63K per annually per tech.	Salary	$189,000	N/A	N/A	N/A	N/A
	Maintenance Cost	N/A				
	Total Cost	$189,000				
Vehicle	Capital Cost	$18,000	N/A	N/A	N/A	N/A
	Maintenance Cost	$2200				
Per Fiscal Year	Total Cost	$	N/A	N/A	N/A	N/A
5 Year Total		$209.200				

- Fiscal Years 2, 3, 4, 5 would not be a capital cost in the Strategic Plan, these years would be a part of the department budget that is charged to the customers.

Performance Measures to Evaluate the Goal

- Performance Measure 1 - Workload / Outputs
- Number of Radios Active on System
- Percentage of Service Request completed annually
- Number of Preventive Maintenance Performed on Radio annually
- Performance Measure 2 – Efficiency (Turnaround Time for Repair)
- Percentage of Service Request completed within 24 hours(ICMA)
- Percentage of Radio Repair completed within 24 hours (ICMA)
- Number of Communications Infrastructure repairs within 1 hour
- Performance Measure 3 - Effectiveness
- Radio Returned Due to Improper Repair
- Radio Communications Infrastructure Up-Time
- Overall Customer Satisfaction with Radio Comm. Support Services

7.10 Goal 5: Provide and Ensure Radio Communications Services Staff is Afforded Quality Training Through Educational Programs, Manufacturer Training, Workshops, Conferences, and Operational Exercises.

Objective 5.1: Quality Training

To remain proficient and maintain operational readiness status in the public safety communications field; continual training and certifications are required for specialty operations. It's imperative that staff is afforded training, educational programs, operational exercises to maintain certification, operational readiness, and manufacturer training to support technology and remain well versed in emerging technologies. All staff members will be cross-trained to ensure and strengthen the division's ability to provide cost effective and efficient technical service and customer satisfaction. Further, a trained staff will reduce the reliance upon costly vendor and contractual services, which would prevent taxing the City's budget. Staff has been very successful in seeking alternative funding sources such as grants from SERDSTF and UASI for training and will continue in that manner but believe it's imperative for the City to earmark funds for this objective.

5-Year Budget to Attain the Goal

As mentioned, a trained staff has tremendous benefits, reduces costly vendor or contractual services, ensures operational readiness and high-level of proficiency and effectiveness.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Manufacturer Training	School Cost	$4,500	$4,500	$3,000	$1,000	$1,000
Workshops, Educational Program & Conferences	School/Conferences Cost	$4,500	$4,500	$4,500	$4,500	$4,500
Operational Exercises	Training	$500	$500	$500.00	$500.00	$500.00
Per Fiscal Year		$9,500	$9,500	$8,000	$6,000	$6,000
5Yr Total	$39,000					

Performance Measures to Evaluate the Goal

- Require completion of training and certification.
- RF Site Safety Awareness
- National Incident Management System (NIMS)
- FEMA- IS 100, IS-700
- DHS-OEC – All Hazards Communication Technician (COM-T)
- Communications Technician General Skill set.

7.11 Goal 6: Radio Communications Infrastructure Upgrade

Objective 6.1: Evaluation and Need Assessment of City's Communications Infrastructure.

As previously mentioned the City's communication infrastructure is over 20 years old and is no longer supported by the manufacturer. Parts are lacking or not available for several operational components of the system. City staff have been soliciting parts through networking at conferences and securing equipment on the black market over the last several years to maintain system operations. The City has taken steps to address the antiquated communications infrastructure in the past years, but unfortunately due to the negative financial climate those steps (investments), have fallen short of addressing the need. In 2008, the City invested in an independent communications study to evaluate the City's communications infrastructure and need assessment. The evaluation and need assessment was delivered in two separate reports "Conceptual Solutions Report" and "Existing Facilities Report". The following are several deficiencies highlighted in the reports:

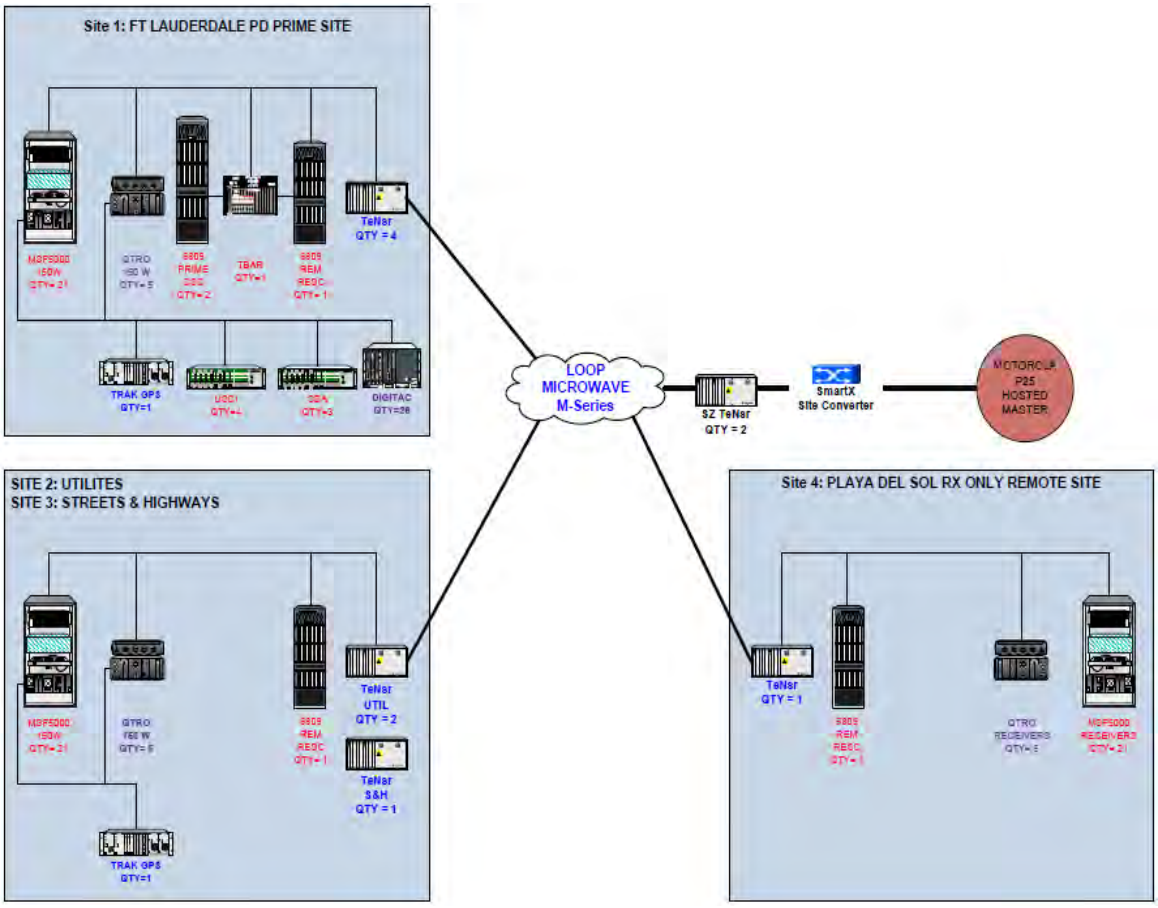
- The City's requirements in terms of radio coverage reliability are not being fulfilled. Continued growth in terms of residential and commercial construction will only exacerbate coverage deficiencies.
- The current system is nearly 20 years old and is technically obsolete. Due to the obsolescence, it can no longer keep up with the City's continual escalating communications requirement.
- Many system components are no longer supported by Motorola, the system manufacturer; in some cases even replacement subassemblies and individual component parts no longer available.
- City staff has resorted to cannibalizing existing equipment to keep the system operational.
- Significant failures of critical system components, such as from a single lightning strike, and the lack of components and parts to effect timely restoral presents a significant liability in terms of the City's ability to support its first responders and to protect the lives and property of its neighbors.
- The existing radio system infrastructure (repeater stations, antenna sites, etc.) is operating at peak performance given its current configuration and age. Any perceived system performance issues will require costly and intrusive corrective measures.
- Replacement of the existing 800 MHz Trunked Radio System should be elevated to an immediate capital expense priority. Given the age of the system, and its reliance on proprietary components that are no longer available, it is only a matter of time before a catastrophic failure occurs. The City would face a significant and potentially permanent reduction in communications capability. At the extreme, such a failure could result in a totally unusable and unrecoverable radio communication system.

Objective 6.2: Addressing Critical System Component "Microwave Network".

Objective 4.1 was achieved with the delivery of the "Conceptual Solutions Report" and "Existing Facilities Report". To achieve this objective, the City invested $3.49 million dollars for the replacement of the "Microwave Network" in 2011. The "Microwave Network" Project replaced the obsolete Siemens Channel Banks, Efratom Site Frequency Standards, Prime Optimization Node and Microwave radios at all sites. In this objective, which is Phase II of the Communication Network Upgrade, the Microwave Loop is expanded to include the Motorola Hosted Master Site (HMS). The HMS will be discussed later in Objective6.3.

The "Microwave Network" Project is underway at the time of this Strategic Plan. Additionally, Objectives 4.1 and 4.2 are part of a phase migration approach which will be illustrated later in the communications network topology, migration strategy and goal time-line table.

Phase II – Microwave Upgrade (Completed 4Q2012)



Objective 6.3: Motorola's Hosted Master Site (HMS) connectivity.

The City's Communications Network is integrated into Broward County's Communications Network through Motorola's technology called, "SmartZone". Broward County owns and maintains a Motorola 800 MHz (10 sites, 28 channels) Simulcast SmartZone Trunked radio system with approximately 30,000

subscribers (portables and mobiles) utilizing the radio communications network. Broward County provides and financially supports fourteen (14) Gold Elite Dispatch Consoles for the City of Fort Lauderdale.

In 2009/2010, the County informed all subsystem owners that the SmartZone network's Zone Controller was no longer supported. The availability of repair parts and components was lacking or non existant. Without the availability of parts, components and manufacturer support, any failure can result in no communications services and the inability to restore the system to beneficial use. For agencies that rely on the system for their mission-critical communications, it can become a catastrophic situation gravely impacting their operations. For Fort Lauderdale, the loss of connectivity to the SmartZone network will cause the loss of Dispatch consoles, the infrastructure and subscriber management system, wide-area talk-groups with their "seamless roaming", and digital talkgroups for encrypted communications utilized by the Police Department Special Investigation Division. Further, the loss of dispatch consoles will hinder the Public Services and 911 dispatch centers' ability to dispatch calls for services.

In order to address the critical situation with the Zone Controller, Broward County Board of Commissioners authorized their staff to enter into a "sole-source" purchase with Motorola Solutions Inc. In December 2011, Broward County entered into an agreement with Motorola Solutions, to provide services of a Master Controller. The Master Controller will replace the County's unsupported Zone Controller. The Master Controller will be housed at Motorola's facility in Plantation, FL. The facility is called a "Hosted Master Site" (HMS). The use of the Motorola HMS relieves Broward County and the City of Fort Lauderdale of an estimated cost of $2.5-$3 million dollars for the acquisition of a Master Controller independently and a recurring maintenance cost of an estimated $400,000 annually. There are additional savings the City will benefit from as Broward County will pay for the Smart-X interface box, peripherals and initial upgrades to the dispatch consoles and for additional software upgrades needed for the consoles and Smart-X Site Converter for a term of five (5) years. Broward County is aggressively moving forward with connectivity to the HMS. They are tentatively scheduled for the cutover in November 2012.

In order to maintain its level of current communications services, the City will need to forge forward with the Motorola HMS. The City's cost for this service is $150,000 annually for a port fee and a one-time connectivity fee of $25,000. This cost has been included in the Radio Communications Services Division FY2012-2013 General Budget and not included in the Strategic Plan. At the time of the Strategic Plan, staff was in the process of finalizing its Hosted Master Site Agreement with Motorola Solutions Inc.

In the City's Microwave Network replacement project, staff took into consideration the situation with the Zone Controller and Motorola HMS. The network will be configured to utilize the Motorola HMS as the Master Controller in order to maintain interoperability and current level of services from the Zone Controller. Two (2) TeNsr Channel Banks and the Smart-X Site Converter are installed to support the system in the analog format.

If the City opts not to connect to Motorola's HMS, the City system will be forced into "Site-Trunking". The City will lose all dispatch console capabilities, wide-area talk-groups and system management functions.

The HMS doesn't preclude the City's ability to seek competitive bids through an RFP process. The HMS is a service that is being provided by Motorola Solutions Inc., which enables the County, City and subsystems to remove a critical deficiency presented by the inability to support or service the SmarZone's Zone Controller.

Objective 6.4: Phase Migration Approach verses Request for Proposal (RFP)

In order to achieve the infrastructure upgrade, a full understanding of the advantages and disadvantages of both methods i.e., Phase Migration Approach and RFP was considered; analyzing technical challenges and mitigation factors such as interoperability, cost, and operational impact. After considerable internal collaboration amongst technical staff and evaluations of factors; staff has elected to utilize a "Phased Migration" approach methodology. This methodology exceeds any benefit provided by a RFP, especially if another vendor is selected other than the current vendor.

City staff has a tremendous amount of expertise and experience in the field of two-way communications technologies which has allowed them to face and overcome numerous amounts of technological and managerial challenges through creative thinking, initiative, adaptability and proactive management in dealing with the City's legacy communications system. Successful achievement of this goal will ensure a reliable, long-term viable communications system that meets current industry radio system standards and current interoperability.

A "Phased Migration" approach would provide the following benefits and advantages:

- Enable the City to move forward immediately with project.
- Lessen impact to any particular budget year (fiscally prudent).
- Allow for a smooth technological transition.
- No impact if City has shortfall of revenue, the migration can be delayed at any particular budget year without negatively impacting users and overall goals and objectives.
- Prevent the loss of beneficial use of all microwave network equipment implemented in 2011.
- Protect City $3.55 million dollar investment of subscriber radios.
- Significant cost saving from acquisition of equipment (Master Site Controller $2.5 - $ 3 million)
- Recurring maintenance cost for a Master Site Controller ($400,000).
- Leverage cost savings for equipment Broward County has assumed cost i.e., Smart-X, peripherals, and 5 years of software upgrade.
- Maintain Dispatch Consoles.

- Minimize impact to current operational system and users.
- Allow department to gradually phase out old technology.
- Maintain current level of interoperability with other local and federal public safety agencies.

The disadvantage of a "Phased Migration" approach would be as follows:

- No Competitive Bidding – potential cost saving.

A Request for Proposal (RFP) process is a competitive bid process. This process enables the City to seek competitive pricing from vendors, which has the potential to provide monetary cost savings to the City. Unfortunately, for this particular project a RFP can result in the City doing a complete system "Forklift". The term "Forklift" for this plan means the complete changing-out/replacement of equipment with another vendor.

Staff has determined that the only advantage of a RFP in this application would be as follows:

1. Potential cost savings from Competitive Bidding Process.

Staff has highlighted the disadvantage of a RFP or "Forklift":

1. Upfront capital outlay cost for system.
2. Additional cost for infrastructure Dispatch Consoles ($1.8 million).
3. Additional cost for RF infrastructure Master Site Controller ($2- $3 million)
4. Infrastructure and subscriber radios would have to be replaced simultaneously.
5. Tremendous impact to users – two radios have to be carried during transition.
6. Public Safety interoperability would greatly be impacted with Broward County agencies.
7. Loss of seamless roaming capabilities for wide-area talk groups
8. Loss of secure communications during the transition for Special Investigation Division, which would impact Narcotics Operations
9. Significant impact to the 9-1-1 Dispatch consolidation with County.
10. Impact ILA's municipality investment in subscriber radios, as compatibility is lost until all system or subscribers radios are P-25 Compliance.
11. Potential loss of investment of $1.9 million in microwave network, particularly TenSr Channel Banks that was implemented in 2011.

12. Communications Site has limited space and cannot accommodate two parallel systems.

13. Reduction of system capacity during transition, which can take over 1 year.

14. Potential for losing Pompano Beach Street & Hwy Site if moved off the system prematurely.

15. Developing specification for a RFP require approximately 6-8 months.

16. Potential of Broward County Radio System would no longer be capable of acting as a Back-up system for Fort Lauderdale if different vendor.

Staff has reviewed several RFPs in the State of Florida, including its own "sole-source purchase" in 2008 with Motorola Inc., for an 800 MHz P-25 (6) channels, and (6) channel, Analog system for the Mobile Emergency Radio System (MERS), that was acquired using Urban Area Security Initiative (UASI) funds. Staff feels very confident that enclosed budgetary numbers are well within competitive pricing range and negotiation can be handled internally or with assistance from an independent consultant to derive competitive price. Further, staff believes that negotiations could begin immediately with appropriate City approval and funding. With the number of competitive bids and negotiated contracts throughout the State of Florida; staff feels confident that the disadvantage cited for not doing a RFP is moot as the City can get the best pricing through negotiation.

Another major reason for the migration strategy is due in part to the level of interoperability we currently have within Broward County and the need to maintain such level to ensure collaboration, real-time dissemination of critical information, safety of first responders and the facilitation of target capabilities of first responders i.e., preparedness, response, and recovery from terror attack, disaster or other emergencies. Lessons learned because of "lack of interoperability", was the Oklahoma City Bombing, 9-11 Attack and Hurricane Katrina.

The migration methodology as pointed out throughout this Strategic Plan will provide the City a cost savings on major infrastructure equipment acquisition, potential trade-in on old infrastructure equipment and recurring annual maintenance cost. During the migration path, the City would continue to lease master controller services at $150,000 per year from Motorola's HMS. As mentioned in previous sections, a Master Site Controller costs approximately $2.5 - $3 million dollars and maintenance cost is estimated annually at $400,000.

Staff has looked at implementing a City owned Master Site Controller but doesn't feel it's cost effective when the City can lease the services at $150,000 annually. Based on the estimated cost of a Master Site Controller at $2.5 - $3 million dollars, verses a 10 year lease at $150,000 annually, the City would be saving $1 – $1.5 million dollars on infrastructure equipment and additional savings on the maintenance of infrastructure. Cost savings are provided in Section 9.10 Migration Cost Saving Table. In addition, the City will save on software and firmware upgrade for a period of five (5) years which the County is assuming the cost as previously mentioned.

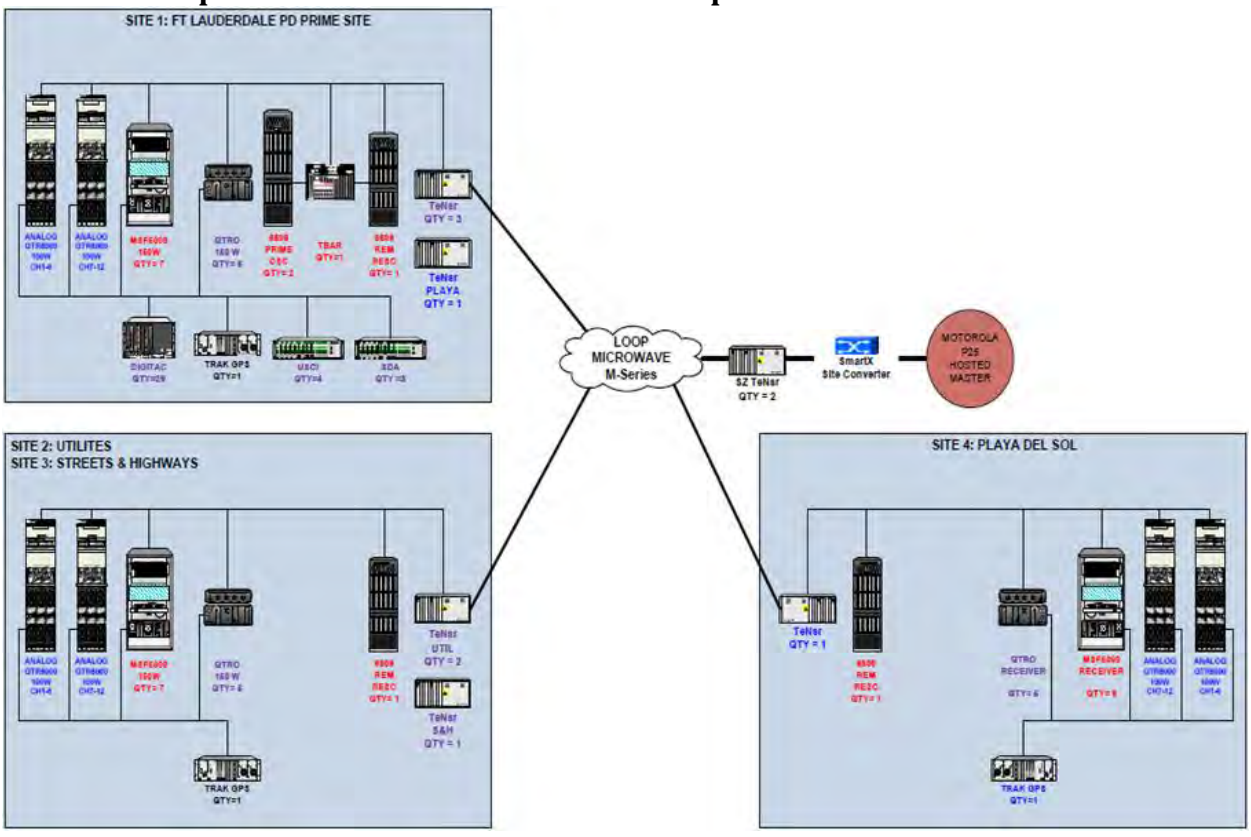
If the City elects to utilize a "RFP" verses "Sole-Source" to its current vendor; a selection of a vendor other than its current vendor, Motorola Solutions will result in the purchase of a Master Controller and associated peripherals, subscriber radios and dispatch consoles as part of the initial capital out-lay. In addition, a vendor other than Motorola Solutions will greatly impact the City's ILA partner's budget and operations.

The achievement of the overall Goals and Objectives is reliant on a migration approach.

Objective 6.5: Replacement of Obsolete MSF5000 Repeaters

Replacement of the obsolete MSF5000 stations begins in this Phase III of the Migration Strategy. Two (2) "Six-Pack" racks and a pre-configured package of six (6) repeater channels contained in a single rack assembly are installed at each of four (4) sites. This installation of twelve (12) channels at each site will remove twelve (12) obsolete MSF5000 repeaters at each site for a projected maintenance contract reduction of $54,000.00. A TeNsr Channel Bank will be installed at Playa and PD to support the additional transmit functionality of the six-packs at this site. A TRAK GPS and four (4) transmit antennas will also be installed at Playa. The new Six-Packs and ancillary equipment are estimated at $2,630,000. Users from Oakland Park, Wilton Manors and Pompano Beach will not need to replace their subscriber radios at this point. They do need to be informed as to the overall timing of the project to allow them to obtain appropriate funding for the eventual conversion to the P25 trunking protocol. Begin the acquisition of P25 TDMA subscribers with an estimated expenditure level of $500,000 per year.

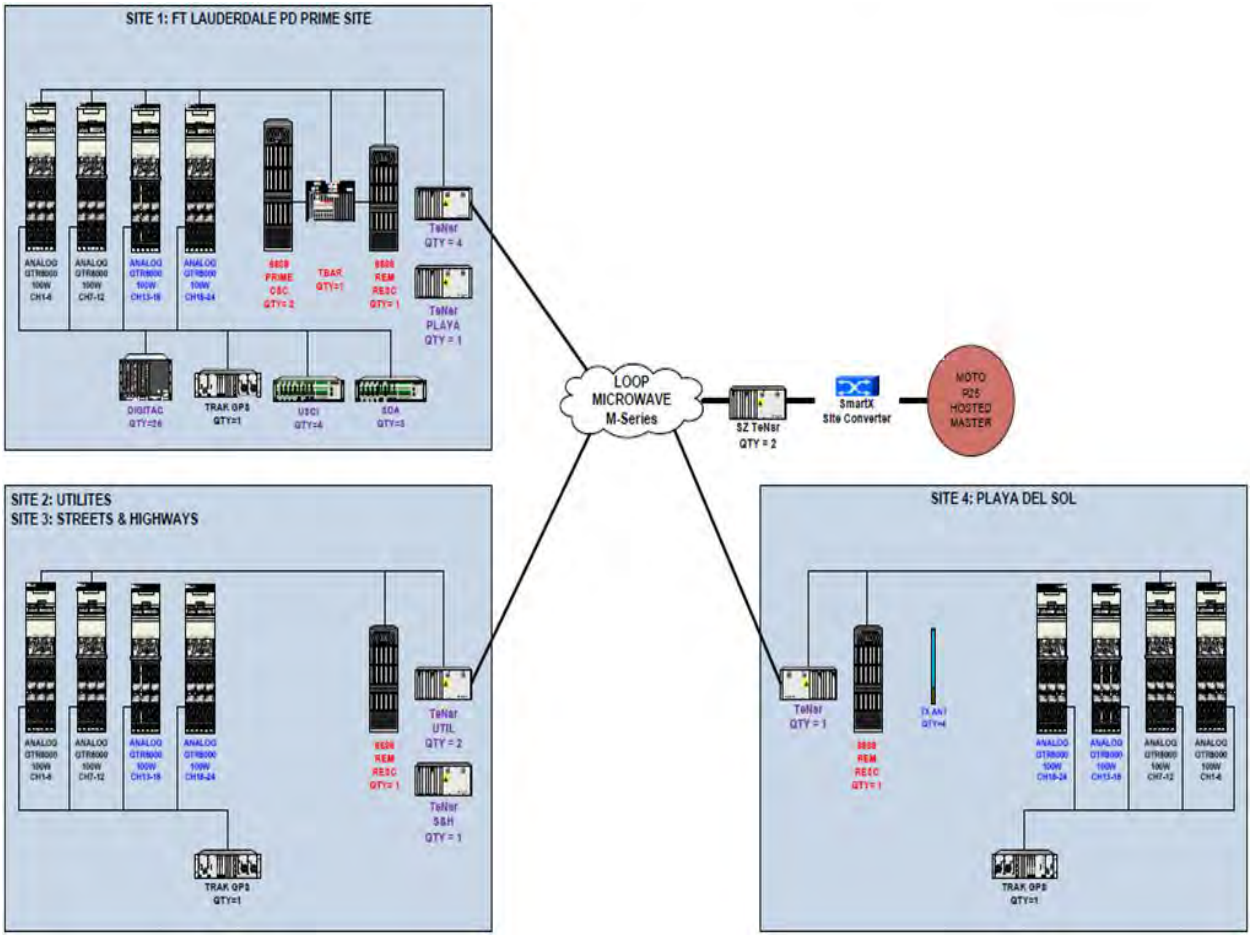
Phase III – Replacement of obsolete MSF5000 Repeaters



Objective 6.6: Replacement of remaining obsolete MSF5000 Repeaters

This objective is to implement Phase IV by adding two (2) more Six-Packs at each site removing another twelve (12) obsolete MSF5000 repeaters from the system. Projected savings are $54,000.00 per year in maintenance costs. At this point, we will have twenty-four (24) channels operating from four sites with full transmit and receive capabilities from all four sites. The projected cost of Phase IV is $2,240,000. Phase 4 could easily be combined with Phase III to accelerate the project. There is an anticipated savings in implementation costs if the two phases are combined. If accelerated, the anticipated completion would be 2Q2014. If held for a budget year, anticipated completion would be 1Q2015. Continue the acquisition of P25 TDMA subscribers with an estimated expenditure level of $500,000 per year.

Phase IV – Replacement of remaining Obsolete MSF5000 Repeaters

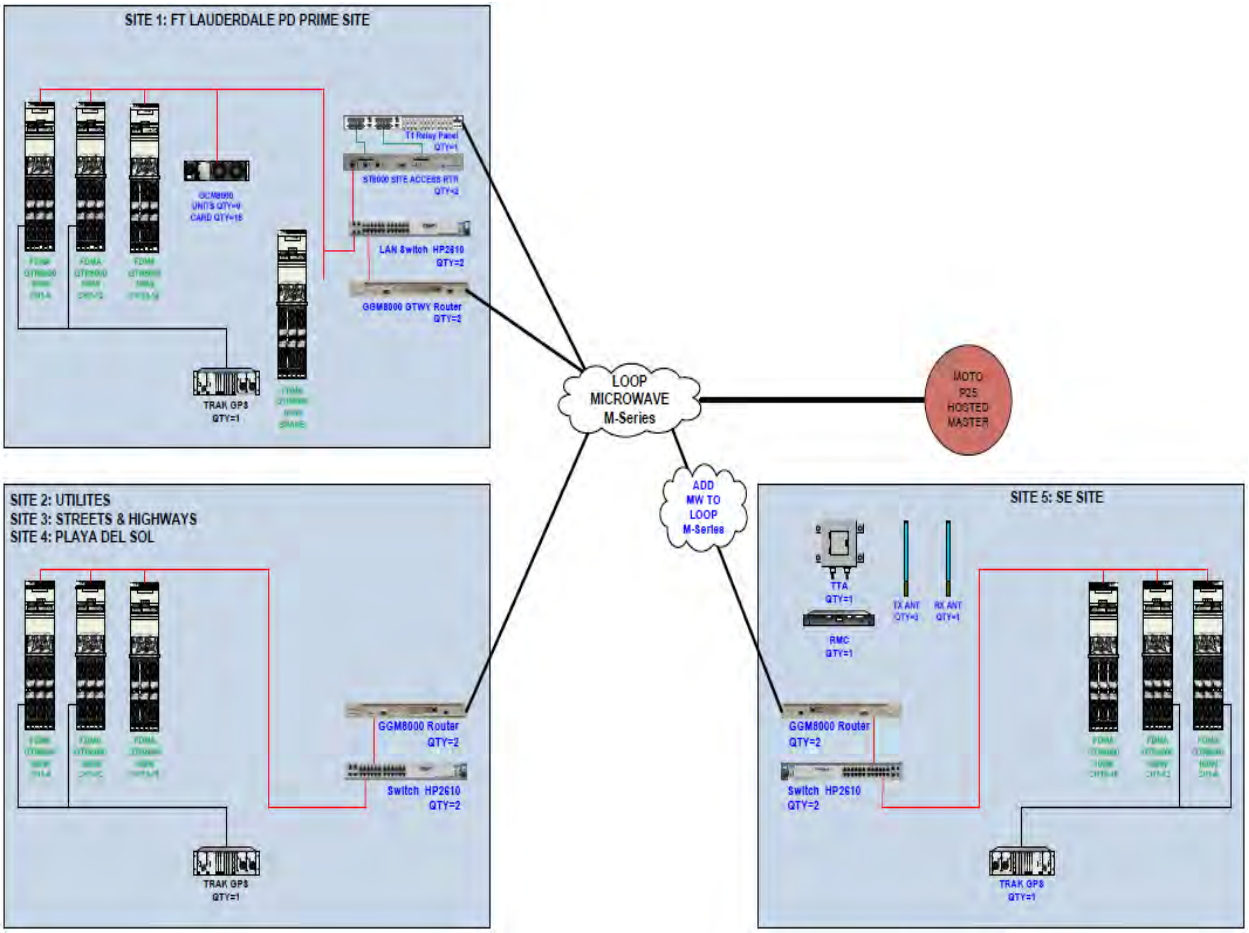


Objective 6.7: Site Acquisition and P-25 Configuration

The fifth site that is needed in the south-east section of the City to support the P25 configuration will need to be identified and developed as expediently as possible. Site identification and negotiations with the site owners can commence immediately. One (1) Six-Pack from three of the existing sites will be moved to this new location. A microwave path will need to be established back to the Police

Department building at an anticipated cost of $280,000. There will be other technical details with regard to microwave path viability, AC power, climate control and site security to be resolved. During this phase of the project, the appropriate routers and switches will be installed at all of the sites to facilitate a smooth migration to the P25 environment. Initially, one of the Six-Packs at each site will be reconfigured into the P25 FDMA network. This will give five (5) voice paths of P25 and eleven (11) voice paths of analog. No analog will be present at the fifth site due to obsolesce and unavailability of the required controllers, the expense of configuring analog capabilities and the short term usefulness of that service. As subscriber units are replaced more users will migrate to P25 and additional channels will be converted from analog to P25. The anticipated cost of this phase is $2,790,000. There may be some additional costs for civil engineering work to develop the site and make it suitable for the equipment for at this time a final site has not been identified. Once the final site has been identified and the lease signed, this phase can be completed within nine months. At this point, all of the analog only subscribers should be retired with all subscriber units ready to use the P25 FDMA system.

Phase V – Site Acquisition and P-25 Configuration



Objective 6.8: Subscriber Radio Conversion and Replacement (P25 TDMA)

Phase VI – Subscriber radios P25 conversion and replacement

Phase VI will entail the replacement of all remaining subscribers not capable of operating on a P25 TDMA network. There are several different operational mode radios currently on the City's radio communications network. Below is a chart that identifies the estimated number of radios that will require firmware upgrade or replacement. This phase has no sense of urgency until 2017 unless we have a controller failure. There are other factors will drive the final phase out of analog service: the end of support on the DigiTAC Comparators, Simulcast Distribution Amplifiers (SDA), Universal Simulcast Channel Interfaces (USCI) and TeNsr Channel Banks, and more importantly, any failure of the 6809 controllers that cannot be repaired using existing spares. Two of the factors previously mentioned i.e., T-Bar Switch and 6809 Controllers are considered critical for the operations of the radio system. Staff has considered the likelihood of its failure and a method to mitigate such. The T-Bar Switch is primarily a mechanical device consisting of relays. The T-Bar Switch is used to transfer the station control lines from the primary Controller to the secondary Controller. It consists of multiple relays that are commanded to switch states based upon command data from the Controllers. The primary vulnerability is in the automatic switching control circuitry. If the automatic capability fails, the ability of manually switching control is available. If there is a failure of a relay or multiple relays, the T-Bar Switch can be manually by-passed by removing the connections to the T-Bar and routing them directly to the appropriate Controller. This process may require a few hours to accomplish, but the system would be able to be restored to a functional state. After restoring the system to a functional state, staff with maintenance provider could then start the process of identifying, repairing, or replacement acquisition of T-Bar Switch. Staff feels the likelihood of a failure is relatively small and since the installation of the T-Bar Switch, even during severe lightning events, there has not been any failure of the device. In addition, the T-Bar Switch is the property of Broward County and we could make the case that they are responsible for cost of repair and replacement.

The 6809 Controllers are the brains of the radio system. The radio system is designed with a redundant 6809 Controller for backup purposes. As mentioned, the T-Bar Switch allows for automatic and manual switching of the 6809 Controllers. Failure of one (1) Controller doesn't cause a failure of the radio system. During any outage of a Controller, troubleshooting and evaluation would immediately commence to prevent any full system outage. Unfortunately, the City has a limited number of spare boards in house and has relied on grey market components for the last five (5) years. This creates complications as firmware versions and variations of boards vintage make integration into the Controller complex.

To ensure restoration of services and mitigation of the absence of the 6809 Controller; staff has engaged the system manufacturer, Motorola Inc., to commit to making the MTC 3600 Series Controllers should the need arise. While the City would face costs for the use of MTC 3600 Series Controller, it would be available. Due to the anticipated cost and the short expected beneficial usage, Staff didn't recommend their purchase in this plan until the City would definitively knows what directions it wanted to go i.e., P-25 Phase I or P-25 Phase II.

Before we can move forward with this Objective, a layman must get an understanding of P25, and a common misconception needs to be cleared up about P25. First, P25 is the acronym for Association Public Safety Communications Official Project 25 or APCO P25. APCO P25 or P25 is an industry standard, not a requirement as many laymen commonly assume. The requirement (mandate) of P25 is related to licensure of 700 MHz Frequencies. That requirement is essentially all 700 MHz Licensees must be in P25 Phase II compliance by 2017. As for the City and general strategy of this plan, we are dealing with 800 MHz frequencies, thus we have no mandate on deployment compliance. There are two (2) known phases of P25, P25 Phase I (Frequency Division Multiple Access (FDMA) and P25 Phase II Time Division Multiple Access (TDMA). P25 Phase I (FDMA) is the division of the frequency band allocated for wireless communications in 30 channels, each of which can carry a voice conversation or, with digital service, carry digital data. P25 Phase II (TDMA) is a technology used in digital wireless communications that divides each into time slots in order to increase the amount of data that can be carried. TDMA is technology in digital.

The initial implementation of P25 is known as P25 Phase I or P25 Frequency Division Multiple Access (FDMA). This is one 12.5 KHz voice path per Radio Frequency channel. You can have up to 30 discrete channels in a P25 FDMA system, one control channel and 29 FDMA voice path channels to meet the design requirements.

P25 Phase II Time Division Multiple Access (TDMA) has two voice paths per 12.5 KHz channel. You can have up to 16 discrete channels in a P25 TDMA system. There are two voice paths on each of 15 channels and one control channel giving a total of 30 voice paths and one control channel path. In a TDMA system, you have fewer RF channels to support while maintaining the same voice path capacity. Once the decision to go with the TDMA format is made, mixing TDMA and FDMA within the same system can have a serious impact on system capacity and potential channel busy blocking.

P25 TDMA subscriber radios are a very recent development and only became available in August of 2011 when the TIA published the standard for TDMA. The City is very heavily invested in radios that were purchased in March of 2009 and were received as part of the Sprint/Nextel Rebanding effort. These radios can be upgraded to P25 FDMA but they are not capable of an upgrade to P25 TDMA. Our system ILA partners have a similar situation.

Understanding P25 standards and the subscriber radios capabilities and quantities will now allow for an easier understanding and ability to facilitate the achievement of this phase and objective. The estimated budgetary figure for this phase is $2,500,000.

At this point, we will need to convert all remaining analog channels to P25 FDMA. The conversion of the infrastructure to P25 TDMA is driven by the need to interconnect with the County for roaming and to address system capacity issues.

While the County is planning to implement a 700 MHz P25 TDMA network for their public safety users, those plans have not been solidified with firm dates and funding commitments. They too have an extensive base of subscriber radios that are not capable of operating on a TDMA P25 network that

would need replacement in order for them to proceed. Preliminary discussions with the County have indicated that they are not planning to go P25 TDMA until sometime after 2017.

The strategy of staying analog for as long as we can will maximize the lifecycle for our subscriber base. The chart below shows the number of radios in service that are capable of operating in each of the different modes.

TYPE	FLPD	FLFD	FLLG	OPLG	PBLG	WMPD	WMLG
Analog Only Radios – Cannot Be Upgraded	48	37	91	36	120	13	0
P25 FDMA Capable – Requires FW Upgrade	90	205	759	92	183	37	26
P25 FDMA Ready	674	166	0	0	0	22	0
P25 TDMA Capable – Requires FW Upgrade	0	0	0	0	0	0	0
P25 TDMA Ready	0	0	0	0	0	0	0

Acronyms

FLPD- Fort Lauderdale Police Department

FLFD-Fort Lauderdale Fire Rescue Department

FLLG-Fort Lauderdale Local Government

OPLG-Oakland Park Local Government

PBLG-Pompano Beach Local Government

WMPD-Wilton Manor Police Department

WMLG-Wilton Manor Local Government

Objective 6.9: Subscriber Radio Conversion and Replacement (P25 TDMA)

Phase VII – Subscriber radios P25 conversion and replacement

Phase VII will continue the conversion and replacement of remaining subscriber radios. The Phase budgetary cost is estimated at $1,000,000.

5-Year Budget to Attain the Goal

The overall attainment of this goal and its objectives is to provide the City with a vital long-term communications network utilizing current industry standards and to ensure current interoperability with

Cost Items	Cost Type	2012	2013	2014	2015	2016
Infrastructure & Subscriber equipment replacement Phase III, IV,V,&VI	Capital Cost	$2,300,000	$2,130,000	$2,620,000	$2,400,000	$1,000,0000
	Maintenance Cost	$0	$0	$0	$0	$0
	Project Management Cost	$330,000	$110,000	$170,000	$100,000	$0
	Total Cost	$2,630,000	$2,240,000	$2,790,000	$2,500,000	$1,000,0000
Site Acquisition (Lease) Phase V	Capital Cost Lease	$0	$0	$30,000	$0	$0
	Civil Work Cost	$0	$0	$175,000	$0	$0
	Total Cost	$0	$0	$205,000	$0	$0
Per Fiscal Year		$2,630,000	$2,240,000	$2,995,000	$2,500,000	$1,000,0000
5Yr Total	$11,365,000					

Public Safety agencies in the region. Below is a budgetary outlay to attain the Goal.

The above cost per fiscal year arebudgetary numbers based from competitive and negotiated contracts throughout the State of Florida i.e., City of Tallahassee, City of Jacksonville, Orange County, Marion County, Lake County and Broward County. In addition, the City of Fort Lauderdale's negotiated contract in 2007.

Performance Measures to Evaluate the Goal

	YEAR 1 2012-2013	YEAR 2 2013-2014	YEAR 3 2014-2015	YEAR 4 2015-2016	YEAR 5 2016-2017
PHASE III – REPLACEMENT OF MSF5000	1 -30 DAYS FUNDING APPROVAL 10/2012 2- 30 DAYS CONTRACT NEGOTIATION 11/2012 2- 30 DAYS FINALIZATION OF AGREEMENT 12/2012 3- 30 DAYS CC APPROVAL				

	01/2013 4- 30 DAYS DDR & FALL BACK PLANS 02/2012 5-60 DAYS EQUIPMENT OF ORDER 03/2013-04/2013 5-30 DAYS STAGING & ATP 05/2013 6 60 DAYS INSTALLATION, TESTING, OPERATIONAL, ATP 06/2013 -07/2013 7 OPERATIONAL 08/2013				
PHASE IV – REPLACEMENT OF REMAINING MSF 5000		1 -30 DAYS FUNDING APPROVAL 10/2013 2- 60 DAYS EQUIPMENT OF ORDER & SHIPPED 11/2013-01/2014 5-30 DAYS STAGING & ATP 02/2014 6- 60 DAYS INSTALLATION, TESTING, OPERATIONAL, ATP 03/2014 - 05/2014 7 OPERATIONAL 06/2014			
PHASE V – SITE ACQUISTION & P25 PHASE I CONFIGURATION RELOCATION EQUIPMENT			1 -30 DAYS FUNDING APPROVAL 10/2014 2- 90 DAYS SITE ACQUISTION 12/2014 3- 60 DAYS AGREEMENT FINALIZED & CC APPROVAL	1 -30 DAYS FUNDING APPROVAL 10/2015 2- 60 DAYS EQUIPMENT ORDER & SHIPPED 12/2015 3- 8 MONTHS P25 CONVERSION	

			4-60 DAYS EQUIPMENT ORDER 01/2015-03/2015 5-30 DAYS STAGING ATP 04/2015 6- 60 DAYS CIVIL PERMITTING & CIVIL WORK 06/2015 7- 30 DAYS EQUIPMENT SHIPPING 07/2015 8- 60 DAYS INSTALLATION, TESTING, OPERATIONAL 09/2015	& SUBSCRIBER UPGRADES 8/2016	
PHASE VI P25 PHASE II CONVERSION & SUBSCRIBERS					1-CONVERSION TO P25 PHASE II FULLY DIGITIAL IF FUNDING

Migration Cost Saving Table Opting to utilize the migration methodology approach and HMS as previously mentioned in Section 4.4, will allow the City to have a tremendous cost savings over 10 years. The table below will highlight the savings over a 5 year period. The table reflects the estimated cost of a Master Site Controller and maintenance, with additional cost savings on the replacement of MSF5000 Repeaters in FY 2012 -2014. The cost savings of this migration methodology can then be applied to attaining other goals and objectives.

Cost Saving	**2012**	**2013**	**2014**	**2015**	**2016**
Master Site Equipment	$2,500,000 - $3,000,000	$0	$0	$0	$0

Maintenance Recurring	$400,000	$400,000	$400,000	$400,000	$400,000
Maintenance saving of removal of 48 MSF 5000 Repeaters once the 2 (6) pack is installed at 4 sites.	$54,000	$108,000	$108,000	$35,000	$25,000
Total Fiscal Saving	$2,950,000 - $3,454,000	$512,000	$512,000	435,000	$425,000

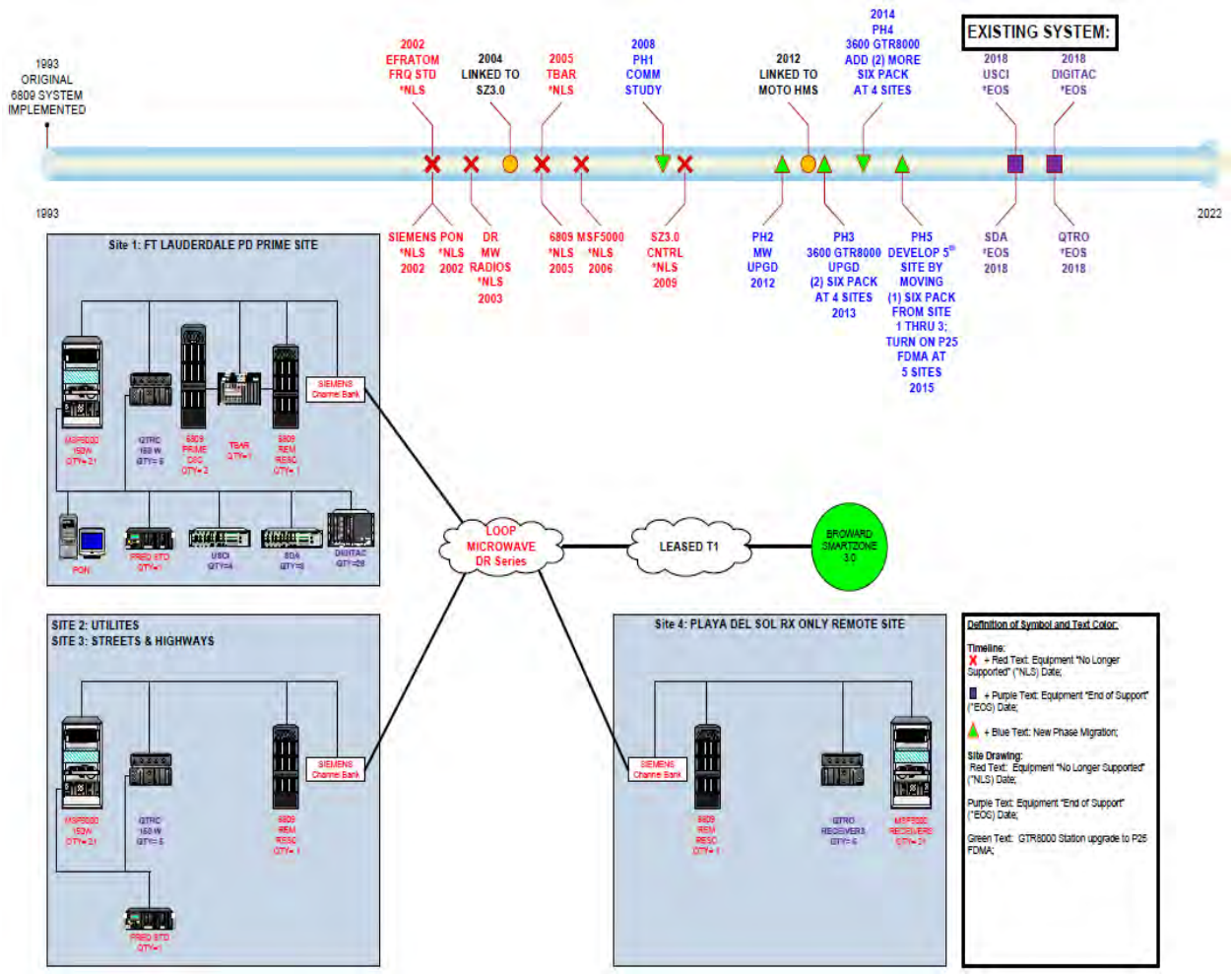
STRAGETIC PLAN OVERALL STATUS

GOALS	PROJECTED DELIVERABLE	DURATION	STATUS
Phase I of Strategic Plan (Communications Study)	December 2008/January 2009	6 months	**Completed**
Phase II of Strategic Plan (Communications Infrastructure – Microwave Network Replacement)	OCTOBER 2011	12 months	**In-progress** 90% Completed – Pending Hosted Master Site Hop & Management System
Hosted Master Site Agreement (HMS) – Operability & Interoperability	NOVEMBER 2012	8 months	**In Progress**
Obtain approval for hiring two (2) communications technicians	1-Development of position specification (PD-13) approval 10/2011 2-Hiring of 2 technicians 10/2012	1-6 months 2-2 months	**Approval & In-progress** for 1 technician, 2-Pending Approval

Discontinue costly out-sourcing of labor	October 2012	1 month	**Pending**
Provide specific training for technicians	October 2012 for handling PD technical services, MDC, AVL, Modems, Docking stations, etc.	1 month	**Pending approval and hiring of personnel**
Re-alignment-Centralization of Services	Handling of PD technical services, MDC, AVL, Modem, Docking Stations, Cameras 2012	1 month	**Pending proper staffing**
Consultant to Review Communications Migration Plans and Recommendations	Consultant Report 7/2012	3 months	**In Progress**
Obtain Funding for Communications Infrastructure	Funding Approval 10/2012	1 month	**Pending**
GOALS	**PROJECTED DELIVERABLE**	**DURATION**	**STATUS**
Obtain Funding for Communications Infrastructure	Funding Approval 10/2012	1 month	**Pending**
Implementation of Communications Infrastructure Migration Path – Replacement of MSF 5000 Phase III	START OCTOBER 2012 COMPLETION AUGUST 2013	11 months	**Pending**
Implement Preventive Maintenance Plan	12/2012	3 months	**Pending proper staffing**
NIMS Training	Start November 2012	1 month	**Pending**
IS 100, IS 700	January 2013	1 month	**Pending**

Implementation of Communications Infrastructure Migration Path – Replacement of remaining MSF5000 Phase IV	Start October 2013 Completion June 2014	9 months	**Pending**
COM-T Training	April 2013	1 month	**Pending**
RF Awareness	May 2013	1 month	**Pending**
General Comm. Tech Skill Set Training	Annually	Annually	**Pending**
Implementation of Communications Infrastructure Migration Path – Phase V Site Acquisition and P25 Configuration	Start October 2014 Completion September 2015	12 months	**Pending Approval**
Continue P25 Configuration & Subscribers radios	Start October 2015 Completion August 2016	10 months	**Pending Approval**
P25 II Configuration & Subscribers radios (2016-2017)	Start October 2016 Completion March 2017	6 months	**Pending Approval**

TOPOLOGY SUMMARY OF RADIO COMMUNICATIONS NETWORK STRATEGY



Timeline of Significant Events for the Trunked Radio System and current network topology.

1993 – Fort Lauderdale/Pompano Beach Trunked Radio System is born.

1997 – Additional channels added to support Oakland Park Police, Fire and Public Works.

2002 – Siemens Channel banks, PON, Efratom no longer supported.

2003 – DR Series of Microwave radios no longer supported.

2004 – Linked system to Countywide SmartZone Network.

2005 – T-Bar controller Main Standby switch and 6809 Central Controllers are no longer supported.

2006 – MSF5000 stations no longer supported.

2008 – Phase I of Plan; Communications Study by Tusa Consulting.

2009 – SmartZone 3.0 Zone Controller no longer supported.

2012 – Phase II of Plan; Replace channel banks, PON and Microwave backbone system. Connect to Hosted Master Site to continue interoperability and wide area roaming with the County.

2013 – Install two 6-pack repeater packages at each of four sites. Begin acquisition of P25 TDMA subscribers.

2014 – Install two 6-pack repeater packages at each of four sites. Install transmit antennas at Playa Site. Continue acquisition of P25 TDMA subscribers.

2015 – Develop 5th site in the southeast corner of the City. Continue acquisition of P25 TDMA subscribers.

2016-2017 – Simulcast Distribution Amplifiers (SDA), Universal Simulcast Channel Interfaces (USCI), Quantar repeaters and Digitac voting comparators will no longer be supported. Analog system support will no longer be available. All subscriber radios must minimally be at the P25 FDMA level and preferably at the P25 TDMA level.

8 Police Information Technology Services

8.1 Mission

The mission of the Police Information Technology Division is to provide technology leadership and strategic direction in technology in a collaborative manner, while responsibly managing the Fort Lauderdale Police Department's technology infrastructure and applications, and providing the highest level of reliable service.

8.2 Division Overview

This division uses technology resources to support the mission of the City of Fort Lauderdale Police Department. These resources are provided to a very diverse group of end users, including Officers on patrol, Command staff, Detectives in house and in the field, Crime Analysts, Dispatchers, Records staff, Booking officers, and Support staff throughout the department. In addition, the environment in which these resources are provided is very dynamic, priorities and technical approaches may change quickly according to activities and current level and type of crime in the City. The Police ITS division is composed of several key groups with various responsibilities as described below.

The **Communications/Records Management Group** is responsible for operating the Intergraph Computer Aided Dispatch (CAD) for the Police and Fire-Rescue departments, and the Police Records Management Systems (RMS). This group is responsible for performing application and database maintenance and monitoring, corrective actions, bug fixes and new functionality. They also update reference information within the systems including user and device accounts and attributes, hazard information, patrol and fire units, code tables and map updates. They perform event analysis and provide standard and custom RMS and CAD reports, including state-federal mandated Uniform Crime Reports.

The **IT Help Desk Group** is responsible for providing technical support services to Police staff. This includes PC, laptop, scanner and printer support within the station and offsite locations, auxiliary devices such as Taser downloads, covert surveillance device downloads and media access, software application support, and access to Law Enforcement web sites and databases through the Florida Department of Law Enforcement (FDLE) Criminal Justice Network (CJNet).

Database Administration is performed by a consultant who maintains the CAD, RMS and other databases in the Police Department.

The **Network and Systems Administration Group** is responsible for the network and server infrastructure supporting the Police department software applications and systems. This includes ensuring system availability, backup and restore, system configuration and tuning for performance and reliability, design and review of architecture for new and updated systems. This also includes maintaining file permissions and user accounts.

The **Mobile Data Team** is responsible for providing technical support services for Patrol vehicle computing technology including laptops, secure remote connectivity, laptop applications, in-car video, automatic vehicle location technology, mobile fingerprint readers and other technology associated with patrol vehicles.

The **New Projects Group** is responsible for identifying and recommending solutions to information systems needs within the department and carrying out the solutions through implementation. This will include conducting cost/benefit analysis, development of RFP's, evaluation and award of bids, and project management of new systems implementation. This group also coordinates with outside vendors as well as other City staff to ensure successful project implementation. Troubleshooting of computer systems to determine the cause of problems encountered during system implementation and on-going operation is also performed.

8.3 Division SWOT Analysis

	Helpful to achieving the objective	**Harmful** to achieving the objective
Internal origin attributes of the organization	**Strengths** • Experienced, skilled and motivated staff • Highly efficient with limited resources • Availability of project funding through trust funds and grants • 7 x 24 support including remote access • Critical systems operate with 99% uptime • Accredited Agency through Commission for Florida Law Enforcement Accreditation	**Weaknesses** • Staff reductions even with increase in scope of technology and reliance on technology • Lack of continuing technical education • Many computer systems have reached or exceeded end of life • Older Computer Aided Dispatch and Records Management System and no Field Reporting • Lack of full funding for technology replacement plan • Lack of clarity for project prioritization • Lack of standardization of current Office productivity software and Operating systems.

External origin attributes of the environment	Opportunities	Threats
	• Abundant force multiplier technologies for Law Enforcement: Field reporting, mobile ID systems, License plate readers, remote access to Law Enforcement systems etc. • Availability of grants and trust funds • Integration with City Hall ITS to leverage processes, knowledge, and resources • Ability to operate as pilot test site for technology • Data center consolidation • Availability of Category 5 hurricane rated EOC building as Business continuity site and to host the 911 call center.	• State mandated security requirements for continued access to vital Law Enforcement data • Building is not Cat 5 rated • Business Continuity site has not been established and set up • 911 system may be moved to BSO • System wide service interruptions due to failure of old servers • Increased staff and maintenance costs to support older systems • Inability to obtain vendor support on some older systems • Data Center UPS and air conditioning are insufficient for current load • Service interruption for employees within the building due to inadequate or failing computers • Patrol officers may not have access to necessary IT services due to inadequate or failing patrol laptops • Cannot take full advantage of new technology solutions due to existing constraints imposed by old systems • Effectiveness of IT staff diminished with changes in priorities • Lack of staff technical training • Decrease in staffing levels accompanied by increased level of technology

8.4 Problem Statement

Problem 1: State Mandated Security Requirements

The State has increased the security requirements associated with computer systems accessing Criminal Justice Information (CJI) through the Florida Department of Law Enforcement's (FLDE) CJNet (Criminal Justice Network) to require advanced authentication. This will affect every officer using the Mobile Data Terminal (MDT) software or accessing CJNet in patrol vehicles, as well as officers accessing CJI through workstations or laptops through the Virtual Private Network (VPN). Officers access CJI through the use of the MDT software to perform queries to the Florida Crime Information Center for license plates, vehicle registrations, suspects, guns, and other articles. Officers also access other databases through CJNET such as DHSMV for Driver License photos for ID, county warrant searches, name and property searches etc.

An additional consideration in meeting the security requirements is that there are a number of patrol vehicles that do not have equipment that provides sufficient bandwidth required to complete the two factor authentication process through the VPN.

Problem 2: Back Office and Data Center Upgrades

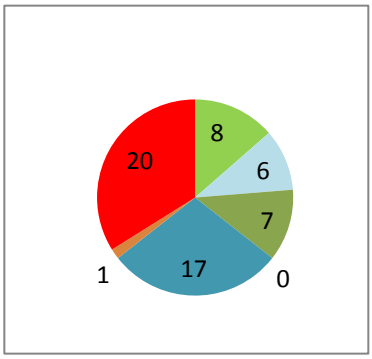
Currently there are several shortcomings that need to be addressed with respect to the back office data center infrastructure at the Police department. Aging back office system hardware has reached or exceeded end of life and needs to be replaced or upgraded. In some cases, vendors are no longer supporting the systems still in use. This leaves the department at risk of having long term interruption of some IT services. In addition, existing back office applications do not always make most efficient use of computing resources on individual servers resulting in unused capacity and overused capacity.

Another shortcoming of the existing data centers is related to the power and cooling. The uninterruptible power supply (UPS) in one data center is near end of life and the UPS in the other data center is no longer supported by the vendor, and both are at or above capacity loading. The electrical, generators, and UPS's were also not designed with any degree of redundancy, resulting in potential loss of service at any single point of failure. In addition, the air conditioning systems in both data centers are insufficient for current data center needs.

There is no offsite business continuity site equipped and ready for use. Previous discussions of moving the 911 call center to the Broward Sheriff's Office location have resulted in all county 911 upgrades at the Fort Lauderdale call center being put on hold, including the VIPER 911 phone upgrade and digital recorder upgrade.

OPERATING SYSTEM	
RED HAT Linux	1
VMWare 5.1 Enterprise Plus	2
Windows NT 4.0	2
Windows XP Pro	2
Windows 7 Pro	2
Windows 2000 Server	4
Windows 2000 Advanced Server	1
Windows 2003 Standard Server	11
Windows 2003 Enterprise Server	3
Windows 2003 R2 Standard	3
Windows 2003 R2 Enterprise Server	14
Windows 2008 Standard Server	9
Windows 2008 Enterprise	1
Windows 2008 R2 Standard Server	1
Windows 2008 R2 Enterprise Server	4
Checkpoint	4
RNC Motorola	1
TOTAL	65

Hardware age	
Less than 1 Year	8
1 to 2 Years	6
2 to 3 Years	7
3 to 4 Years	0
4 to 5 Years	17
5 to 6 Years	1
6 and above	20
Total	59



Total Physical servers	59
Total Virtual Servers	6

Problem 3: Patrol Laptop Replacements

Laptops used by Patrol officers in their patrol vehicle equipped with a wireless cellular device have access to a multiplicity of functions and data sources.

The MDT application provides officers access to the following:

- Dispatch Incident information
- Call history
- Location and status of open events and other Patrol units
- A City geo-coded map
- Car-to-car and car-to-dispatch messaging
- Vehicle, tag, suspect, and gun queries to the Florida Crime Information Center

The officers also have access through a web browser to Law Enforcement related web sites and databases through the Florida Criminal Justice Network such as:

- Driver License information including pictures from Department of Highway Safety and Motor Vehicles
- Name search in the Broward Sheriff's Office Records System
- Pawned property search in the Broward Sheriff's Office Records System
- County Arrest information including suspect pictures
- County warrants search
- Florida Department of Corrections Inmate Search
- Data from many other Criminal Justice Agencies

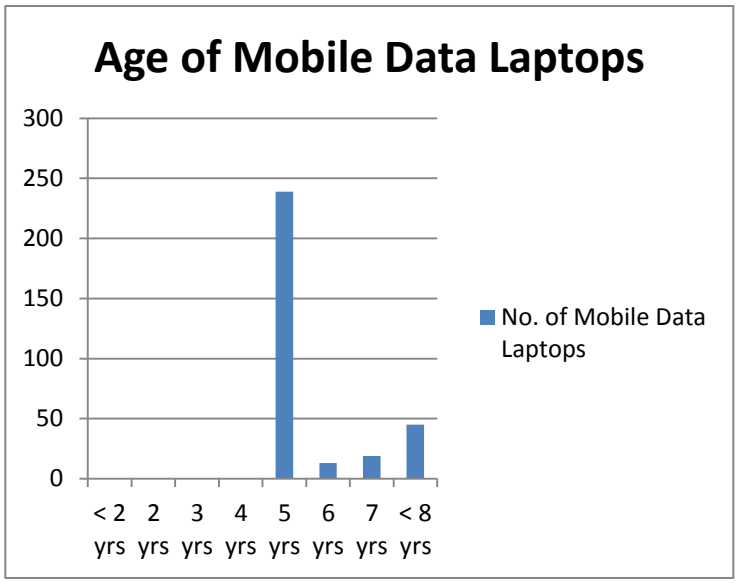
Officers also have access to the Fort Lauderdale Police Intranet to access:

- Current departmental policies and procedures
- BOLO (Be On the Look Out) notices
- Departmental Rosters and Contacts
- Agency Information Bulletins
- Other departmental information posted on the Intranet

In addition, there are several new technologies that have been deployed to a limited number of Patrol officers such as Finger print readers that can be used for identification against state and federal fingerprint databases, and License plate readers which can scan thousands of plates per hour and identify vehicles that have been stolen or are otherwise of interest.

The laptops used by Patrol officers are all 5 years old or older, are out of warranty and have reached or exceeded their expected life span. Due to the age of the laptops, they require higher levels of maintenance and are starting to fail in a manner that cannot be repaired in-house. In addition, newer Law Enforcement oriented technologies and State mandated authentication require additional capabilities that these laptops cannot accommodate. Peripherals for new projects require additional interfaces that 5 year old laptops were not designed for. The peripherals would facilitate the use of digital cameras, Driver License mag stripe readers, portable citation printers etc. In addition, the standard police Crown Victoria vehicles are no longer being manufactured and thus new mounts and port replicators will be required for every new marked Patrol and Public Service Aide (PSA) vehicle.

Age of Mobile Data Laptops	Number of laptops
< 2 yrs	0
2 yrs	0
3 yrs	0
4 yrs	0
5 yrs	239
6 yrs	13
7 yrs	19
< 8 yrs	45
Total Laptops in Patrol vehicles	**316**



Problem 4: CAD and RMS upgrade and Field Reporting

The Computer Aided Dispatch (CAD) system is a mission critical, highly specialized application that facilitates coordinated communication, assignment and tracking of Police and Fire Department resources in response to calls-for-service. The Records Management System (RMS) is also an important system which improves efficiency and effectiveness within the Police department by centralizing storage and access to records for people, property, places, and related information including Police reports into a single database. In addition, the RMS also provides the means for meeting statutory reporting requirements such as Uniform Crime Reports.

Today, officers write Police reports on hard copy or type into a MS Word template to print, and then provide to Records staff for manual entry. As a result of this inefficiency, incorrect or incomplete data is entered and data related to law enforcement activity is not available in a timely manner concerning crimes occurring in the City. Field reporting will address these inefficient processes and result in improved and timelier data collection. Field reporting is integrated closely with the Computer Aided Dispatch (CAD) and Records Management System (RMS), as it uses dispatch and query response information from CAD to initially populate a report, and once the report is submitted it goes into the RMS.

The CAD and RMS applications were last upgraded in 2008/2009 and components of the hardware are nearing or have reached end of life. Future maintenance and support, as well as the ability to move forward with new product features and projects such as Field Reporting, depend on these systems being upgraded to the current version.

Patrol vehicles are outfitted with laptops and wireless cellular devices which provide secure encrypted access to the Police department's network and computing systems. These laptops are all over 5 years

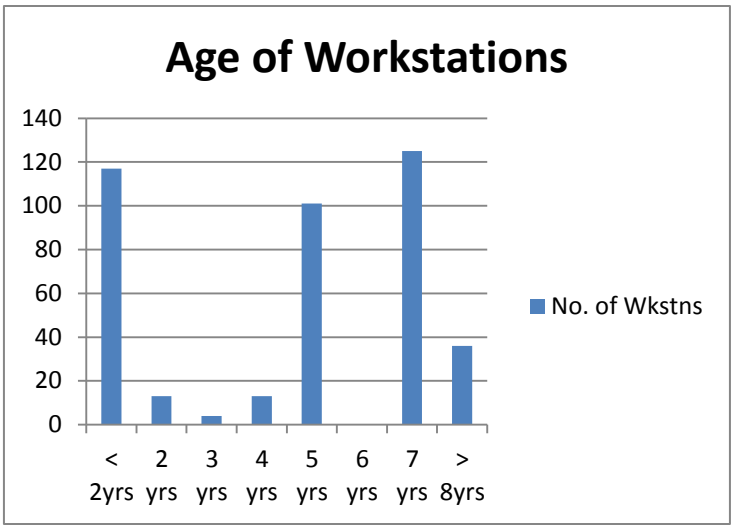
old and limited in capabilities and ability to continue to function. These aging laptops will need to be replaced not only to be able to continue to operate as a valuable tool to Patrol officers and to provide valuable and timely law enforcement information, but also for field reporting to be a success. Reference "Problem 3 Patrol Laptop Replacements" for additional details regarding the need for replacement laptops.

An additional consideration is that if the 911 Call center moves to the Broward Sheriff's Office then the implementation of Field Reporting will be affected due to a different CAD system, changes in network architecture and how user authentication is performed.

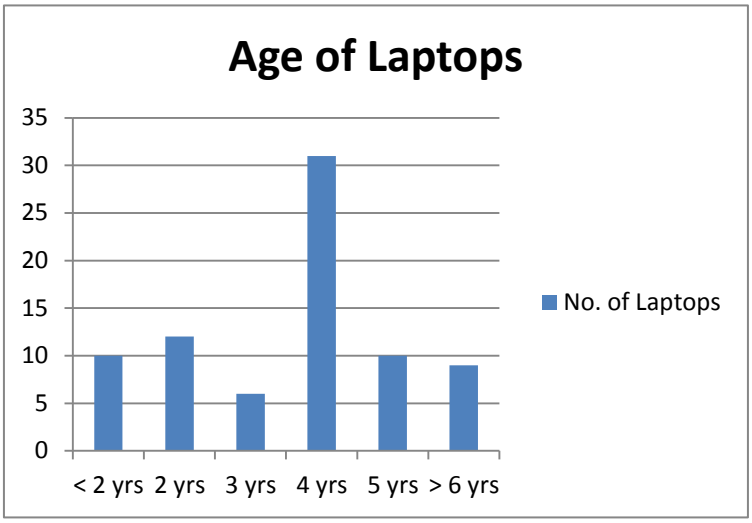
Problem 5: Desktop and Laptop Replacements

At this time, over a quarter of departmental workstations and office laptops are 6 years old or older. In addition, the workstations running Windows XP operating system will no longer be supported by Microsoft in less than 2 years. Over two thirds of the Police department's computers are still running Windows XP. Given the long lead time in approval, purchase, and deployment of new computers and the fact that the City may wish to spread purchases over more than 1 budget cycle, it makes sense to put a plan in place to address this now. Going forward, there will be applications that will no longer be supported on unsupported operating systems and the use of Windows 7 (or Windows 8) will be required. Also, computers running unsupported operating systems are vulnerable to security risks. These vulnerabilities may result in noncompliance with security standards required for data access by certifying bodies such as Florida Department of Law Enforcement or the FBI. In addition, there are at least two versions of Microsoft Office on the different generations of computers, resulting in added support overhead.

Workstn Age	Number of workstns
< 2yrs	117
2 yrs	13
3 yrs	4
4 yrs	13
5 yrs	101
6 yrs	0
7 yrs	125
> 8yrs	36
Total workstations	**409**



Laptop Age	Number of Laptops
< 2 yrs	10
2 yrs	12
3 yrs	6
4 yrs	31
5 yrs	10
> 6 yrs	9
Total Laptops	**78**



Problem 6: Staffing

Today a resourceful and efficient staff are fulfilling the department's IT mission. However, during the last few years, the reliance on technology and the use of technology has become even more pervasive, while at the same time the staff size in the department has been decreased. As a result the staffing resources available for support and maintenance as well as for new projects have been reduced. In addition, technical training which could help partially offset staff reductions has been reduced as well. There are also some systems that have been developed in-house or are no longer supported by the vendor and are supported by a single in-house expert. As a result, it will be a challenge to maintain acceptable service levels for existing systems and deploy new projects in a timely manner.

Problem 7: The 911 Center may move to Broward Sheriff's Office

Today, 911 call taking and dispatching is performed out of the Ft Lauderdale Police building using Intergraph's CAD system. This system has several servers and numerous interfaces and is tightly integrated with other systems provided by Intergraph including the Records Management System (ILEADS) and the Police MDT application on the officer laptops (I/Mobile). CAD is also integrated with the Fire-Rescue data systems. There have been discussions of moving the Fort Lauderdale 911 operations to the Broward Sheriff's Office (BSO) and using their CAD system which is from a different vendor. This will have a major impact on other IT projects at Fort Lauderdale. The Data Center upgrades are affected by use or non use of CAD workstations, servers and interfaces that support the 911 activities. The Field Reporting is tightly integrated with the CAD, if the vendor is changed and CAD is located at BSO then the field reporting project will be affected. The implementation of State Mandated Security Requirements will be affected depending on whether the patrol laptops access criminal justice data through Fort Lauderdale networks or BSO networks. A change to the patrol laptop networking to access the BSO system will also affect the security requirements project. At this time, the Police IT division is working under the assumption that the CAD 911 system will continue to be managed by the City and that the call center will be relocated to the EOC.

8.5 Problem Resolution Strategies

Resolution 1: State Mandated Security Requirements

Vendor discussions have been initiated to devise a solution that can be integrated with our existing infrastructure, the plan is to use existing employee assigned door cards as the "token" with the use of fingerprints as an alternative biometric. This means there will not the added expense of a FOB or other "token" to be purchased by the City and kept track of by the employee.

Additional wireless cellular devices are planned for purchase with grant funds to complete outfitting the patrol fleet with high bandwidth wireless cellular so all laptops will have sufficient wireless bandwidth to support two factor authentication.

Additional analysis will be performed to identify the optimal product(s) that will meet the security requirements in the most cost efficient manner. Existing infrastructure will be utilized as much as possible, however it is expected that the solution will entail adding at least an authentication server and card readers for the laptops. Once the product has been identified and the architecture defined, the project will continue to move through the project lifecycle through deployment.

Resolution 2: Back Office and Data Center Upgrades

As a standard strategy that will continue, old servers are repurposed when any new project results in a new server purchase, in order to maximize use of server resources. In addition, a pilot virtualization project has been successfully deployed using a VMWare system on an existing storage area network. At present six servers are running in the virtualized environment, including five productions servers and one development server.

Moving forward, a multi-pronged approach is proposed to address the data center challenges. Use of virtualization is at the center of the effort to address these challenges, and therefore expansion of the virtual environment is required. Virtualization allows for more efficient use of computing resources by allowing each system to be tailored to only use what is required and to quickly increase resources available as needed. Virtualization also allows us to schedule hardware migrations around other projects by allowing for interim migration of older servers into a virtual environment as a stop-gap measure prior to entirely replacing a server with a new (potentially virtualized) system. As various options such as data center consolidation are evaluated, virtualization continues to be at the center of the approach. A comprehensive evaluation will be performed of all of the department's servers to identify key attributes required for a virtualization and the data center consolidation effort. Each server's required rack space, power requirements, and cost to replace the server if it is close to end of life will be documented. Each server will also be evaluated as to whether it is possible to be virtualized. A foundation virtualization system will be put into place which will handle the known virtualization candidate servers, and is also architected to allow expansion as new projects are implementation or additional existing servers are identified for virtualization.

In addition to virtualization, the use of blade servers will be used to reduce power consumption, air conditioning requirements, and rack space needs. Blade servers are designed to operate in a specialized enclosure with efficient and shared components, resulting in smaller footprint and less need for power and cooling. Blade servers will need to be an integral part of the annual server replacement plan budget as well as being considered for new projects.

In parallel with the virtualization efforts, the department will be working closely with other City IT staff to identify servers that may be consolidated, relocated, or decommissioned. This includes projects such as the Exchange email system upgrade as well as the significant initiative under discussion to relocate the 911 dispatch system to the cat 5 rated EOC location. This initiative will also consider implementing some degree of back office computing redundancy and business continuity capability at the EOC.

Once the expected achievable outcome of the virtualization and consolidation effort has been defined to some level of detail, the required environmental needs will be known and can be evaluated against the current power, UPS, and air conditioning system to identify required upgrades to support the upgraded data center(s). These upgrades can be categorized in terms of what is needed immediately and what would be considered longer term required upgrades.

Resolution 3: Patrol Laptop Replacements

In order to keep laptops functioning that are out of warranty and experiencing component failures, IT staff has cannibalized existing laptops already out of commission for parts. There has also been a limited amount of funding allocated to perform out of warranty repairs. A small number of new laptops are planned for purchase with grant funds from recently approved grant applications submitted some time ago, which will alleviate but by no means fully address the current laptop situation. Vehicle mounts and replicators are also reused when possible and relocated from retired vehicles to new vehicles as vehicles are replaced.

Going forward, alternative solutions such as rugged or semi rugged laptops, or tablet form factors will be evaluated for a cost effective solution that meets the need for the patrol officers and can stand up to the environmental conditions. Panasonic Toughbook rugged laptops have been used exclusively in patrol vehicles and have proven to be well suited to the environment; however there are other alternatives that should be evaluated to determine whether there is a more cost effective solution that still meets the need. The evaluation will also consider suitability for new technologies and projects such as the State mandated security requirements. A leasing approach will also be investigated. In addition vehicle mount options will need to be reviewed and the most cost effective solution that meets the need identified. Testing of various options may be required prior to identifying the optimal solution. As part of a long term solution a regular funding mechanism such as including patrol laptops and mount in the cost of the vehicle as part of vehicle technology should be considered.

Resolution 4: CAD and RMS upgrade including Field Reporting

The vendor for the CAD and RMS has an integrated Field Reporting solution. This solution requires and upgrade of CAD and RMS to the current version of the product. Quotes have been obtained from the vendor and internal discussions have been held regarding funding sources. Additionally, 3rd party electronic citation applications are being investigated.

Additional discussions must be held to confirm funding, timing, scope, and dependencies of the upgrade. Once the project has been funded, staffing identified and approved to move forward it will continue through the project lifecycle. Prior to agency-wide deployment, the aging patrol laptops must be replaced to ensure officers have functional laptops on which to use the field reporting application. The possibility of relocating the CAD center to Broward Sheriff's Office would also have a major effect on this project.

Resolution 5: Desktop and Laptop Replacements

IT staff continues to use creative ways to provide sufficient computing resources to users by extending the life of existing computers. Additional memory is added to computers originally purchased with minimum RAM, hard drives and other components which fail are replaced, and computers displaying performance issues are re-imaged with a clean department standard image of Windows. In addition, as new computers become available computers are reallocated according to the computing requirements of the particular user. Users with more demanding applications will receive the newer computers and the older computers will roll down to users with less substantial computing needs.

Computer replacement has been identified as a funded item in next year's Police budget. This will address the computers most in need of replacement. As new computers are purchased they will include Microsoft Office 2010 as the standard to bring all computers up to the same level of Office productivity applications. Each succeeding year, there will need to be regular funding as part of an annual replacement plan. In addition, other approaches will be investigated including leasing or the use of virtual desktops (smart terminals) for a more cost effective solution to providing computing power to users.

Resolution 6: Staffing

A recent positive development with respect to staffing issues is the recent decision to integrate all City IT departments under a unified management structure. This is expected to provide more efficient use of staff resources as well as to provide opportunities for leveraging technical expertise and business domain knowledge across the City. There also may be economies of scale for purchasing of technology and training.

A single unified help desk application is in process of implementation which is expected to facilitate pooling of resources, more efficient handling of help desk calls, and a means of sharing common technology solutions.

Additionally, the City has a task force reviewing how timekeeping and payroll is handled which will bring more attention the possibility of replacing the custom in-house developed Police Overtime Informix system currently supported by a single in-house expert.

Resolution 7: Decision on 911 relocation

Several major IT projects have a major impact in terms of direction, project activities, and funding depending on whether the 911 center stays or relocates to the county. Rather than place all the affected initiatives on hold, the Police IT division is working under the assumption that the CAD 911 system will continue to be managed by the City and that the call center will be relocated to the EOC. The goals associated with this problem resolution are encompassed by the goals of the other major initiatives affected by the 911 center relocation decision.

8.6 Goal 1: Implement State Mandated Security Requirements

Deployment of appropriate solution to meet the State mandated security requirements for two factor authentication.

Objective 1.1: Confirm Scope of advanced authentication requirements

Work with FDLE to ensure that the requirements are unambiguous and the scope of what is required is fully understood and to ensure the proposed solution is appropriate. FDLE staff should agree that the approach will meet the mandate.

Objective 1.2: Analysis of vendor solutions

Available solutions will be analyzed for suitability to meet the FDLE requirements which are also cost effective and will work within the departments existing infrastructure.

Objective 1.3: Purchase solution

The purchasing process will be conducted to acquire the product.

Objective 1.4: Deploy solution for non-patrol laptops

The solution will be piloted initially for the detectives, which is a far smaller group than patrol officers. Once it has been deployed to a limited number of users and issues worked out in a manageable situation, it will be ready for further deployment.

Objective 1.5: Deploy solution for all Patrol Officers

Deploy the two factor solution to all patrol officers using laptops in vehicles.

Solution Architecture

An authentication server will be integrated into the Police network and existing Virtual Private Network (VPN) solution. Each laptop will require a card reader (either integrated or an external reader), as well as the installation of an authentication client. These components will all work together to perform two factor authentications using the employee's door access card for the 2nd authentication factor.

Five Year Budget to Attain the Goal

During year 1 the Two factor authentication product will be purchased and installed. Subsequent years should require only maintenance.

Maintenance for the VPN is not shown as it is an existing budgeted maintenance item, however with the VPN upgrade and drop of support for the Motorola RF network, the maintenance will drop from approximately $31K to $16.5 resulting in $14.5K maintenance savings.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Two factor authentication product	Capital Cost	$80K				
	Maintenance Cost	$6.6K	$6.6K	$6.6K	$6.6K	$6.6K
	Total Cost	$86.6K	$6.6K	$6.6K	$6.6K	$6.6K
VPN Upgrade	Capital Cost	$41.6K				
	Maintenance Cost					
	Total Cost	$41.6K				
	Annual Total	$128K	$6.6k	$6.6	$6.6	$6.6
	5 year total					

Performance Measures to Evaluate the Goal

- Internal audit of compliance with FDLE CJIS advanced authentication requirement
- Solution deployed to 30 detectives in 3 months
- Solution deployed to all Patrol officers in 6 months

8.7 Goal 2: Perform Back Office and Data Center Upgrades

Expand the existing virtualization environment to support virtualization of a significant number of servers. The number of physical servers should be reduced by virtualization and other approaches. This should allow for reduction in space, power, UPS capacity, and air conditioning needs.

Objective 2.1: Expand Virtualization Environment

Acquire and implement a virtualization environment with additional capacity including a SAN, hardware to operate as host servers, and required virtualization components.

Objective 2.2: Increase the use of virtualization

Increase the number of servers that are virtualized, which will reduce the number of physical servers and thus the requirements for power, UPS capacity, rack space, and air conditioning.

Objective 2.3: Perform analysis of data center consolidation

Generate a report that identifies key attributes of each server including requirements for power, rack space, cost to replace and expected normal date to replace, whether the server can be virtualized and if not then what are the reasons. This will allow for development of a plan to move forward with reduction in total number of physical servers through means other than by virtualization.

Objective 2.4: Reduce physical servers through non-virtual means

Reduce number of servers through relocation, consolidation, or attrition. This will reduce the requirements for power, UPS capacity, rack space, and air conditioning.

Objective 2.5: Address environmental shortcomings in existing data center environment

Perform upgrades to power, UPS capacity, and air conditioning as required to support the streamlined data center. This will ensure that the data centers are capable of supporting the department's onsite computing infrastructure with a minimum risk of service failure due to environmental factors.

Five Year Budget to Attain the Goal

Notes:

- All costs are estimated prior to having conducted the analysis required to develop firm numbers.
- The CAD and Records upgrade project is not included in these costs and will affect the scope and cost of this goal.
- Existing VMWare system licenses and maintenance are not included in costs below.
- The required air conditioning, UPS, and electrical work cannot be estimated without better understanding of the virtualization project, CAD and Records upgrade, and further discussion of acceptable scope.

In year 1, the hardware and software to expand the virtualization environment will need to be purchased. The required power, UPS, and air conditioning upgrades to support the streamlined environment should also be purchased. Year 2 additional capability will be added to the Storage Area Network to support virtualization of additional servers.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Blade environment for Virtualization (Enclosure and blade servers)	Capital Cost	$38K				
	Maintenance Cost					
	Total Cost	$38K				
Storage Virtualization (Storage Area Network)	Capital Cost	$50K	$35K			
	Maintenance Cost					
	Total Cost	$50K	$35K			
VMWare Licenses, Services, Training and OS	Capital Cost	$19.3K				
	Maintenance Cost	$3.7K	$3.7K	$3.7K	$3.7K	$3.7K
	Total Cost	$23K	$3.7K	$3.7K	$3.7K	$3.7K
UPS and Electrical work	Capital Cost	$TBD				
	Maintenance Cost	$TBDK	$TBDK	$TBDK	$TBDK	$TBDK
	Total Cost	$TBDK	$TBDK	$TBDK	$TBDK	$TBDK
Air Conditioning Work	Capital Cost	$TBD				
	Maintenance Cost	$TBDK	$TBDK	$TBDK	$TBDK	$TBDK
	Total Cost	$TBDK	$TBDK	$TBDK	$TBDK	$TBDK
	Annual Total	$111K	$38.7K	$3.7K	$3.7K	$3.7K
	5 year total					

Performance Measures to Evaluate the Goal

- Number of servers virtualized
- Number of physical servers eliminated due to virtualization
- Number of physical servers eliminated due to other approaches

8.8 Goal 3: Replacement of Patrol Laptops

Replacement of existing laptops in Patrol vehicles with a computer that meets existing and future planned needs.

Objective 3.1: Evaluate alternative solutions and identify pros and cons

Define requirements and evaluate a number of brand and model laptops for suitability against the requirements.

Objective 3.3: Purchase laptops

The laptops will be purchased.

Objective 3.4: Deploy laptops

Deploy the laptops.

5-Year Budget to Attain the Goal

Notes:

- This cost is based on a semi-rugged laptop which is a step down in durability and cost from the Panasonic Toughbooks currently deployed. This assumes a 4 year replacement lifecycle. If a longer duration replacement cycle is planned, such as the current 5 – 7 year replacement plan, then the fully ruggedized laptop is recommended instead.
- Each set of mount and port replicator estimated at $1000.
- Does not include laptops for pool vehicles.

During year 1, half the laptops should be acquired along with sufficient mounts for annual vehicle replacements. During year 2, the other half of laptops should be acquired and continue acquiring mounts as vehicles are replaced. A three year warranty is included on the mounts and port replicators. Replacement of entire fleet begins anew in year 5.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Laptops and port replicators	Capital Cost	$680K	$680K			$680K
	Maintenance Cost					
	Total Cost	$680K	$680K			$680K
Mounts and Port replicator	Capital Cost	$100K	$100K	$100K	$20K	$100K
	Maintenance Cost					
	Total Cost	$100K	$100K	$100K	$20K	$100K
	Annual Total	$780K	$780K	$100K	$20K	$780K
	5-Year Total					

Performance Measures to Evaluate the Goal

- Deployment of 160 laptops in 6 months of year 1

8.9 Goal 4: Deployment of Field Reporting

Deploy a field reporting solution for patrol officers to use on their laptops.

Objective 4.1: Upgrade CAD and Records

The current CAD and Records systems are required by the vendor to be at the latest version before field reporting can be implemented.

Objective 4.2: Complete a field reporting pilot

The field reporting solution can be deployed to a limited set of users to identify operational and technical issues. These issues can then be addressed prior to full scale deployment.

Objective 4.3: Full deployment

Deploy the field reporting solution to the full set of users.

5-Year Budget to Attain the Goal

Notes:

- Cost is estimated based on previous quotes that have expired.
- Maintenance cost includes current maintenance cost for Police and Fire CAD and RMS with the addition of $30K to add Field Reporting module.
- Year 1 the CAD and Records upgrade should be performed.
- Year 2 the Field Reporting should be implemented.

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
CAD and Records Upgrade including Field Reporting	Capital Cost	$854K				
	Maintenance Cost	$0K	$250K	$250K	$250K	$250K
	Total Cost	$884K	$250K	$250K	$250K	$250K
	Annual Total	$884K	$250K	$250K	$250K	$250K
	5-Year Total					

Performance Measures to Evaluate the Goal

- RMS upgrade complete
- CAD upgrade complete
- Number of laptops on which field reporting is deployed
- Number of reports generated electronically

8.10 Goal 5: Replacement of Desktop and Laptops

Replacement of the desktops and laptops.

Objective 5.1: Purchase desktops and laptops

The computers will be purchased.

Objective 5.2: Deploy desktops and laptops

The desktops and laptops will be configured according to a department standard then rolled out to users according to a defined plan.

5-Year Budget to Attain the Goal

Notes:

- Year 1 purchase desktops (161) to replace those that are 6 years and older.
- Year 1 purchase laptops 43 to replace those that are 5 years and older
- Year 2 purchase desktops (118) to replace all that have reached 6 years old as well as the small quantity that have reached 4 and 5 years old and are still running Windows XP.
- Year 2 purchase balance of laptops to replace those that are 5 years and older.
- Subsequent years replace on average 4 year lifecycle

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Desktops	Capital Cost	$105K	$74K	$2.6K	$8.5K	$76K
	Maintenance Cost					
	Total Cost	$105K	$74K	$2.6K	$8.5K	$76K
Laptops	Capital Cost	$68K	$20.5K	$19K	$16K	$80K
	Maintenance Cost					
	Total Cost	$68K	$20.5K	$19K	$16K	$80K
	Annual Total	$173K	$94.5K	$21.6K	$24.5K	$156K
	5-Year Total					

Performance Measures to Evaluate the Goal

- Number of desktops deployed
- Number of laptops deployed

8.11 Goal 6: More efficient use of Staffing

Make more efficient use of existing staff in order to maintain or improve upon existing service levels.

Objective 6.1: Implement self-service help desk portal for Police users

Use of a self-service portal will allow uses to submit and track their support requests, thus freeing up IT staff for more productive activities.

5-Year Budget to Attain the Goal

The unified help desk application, including the self-service portal, has already been acquired and thus will not incur additional unbudgeted costs.

Performance Measures to Evaluate the Goal

- Number of help desk calls submitted through self-service portal
- Number of help desk calls resolved within 8 hours

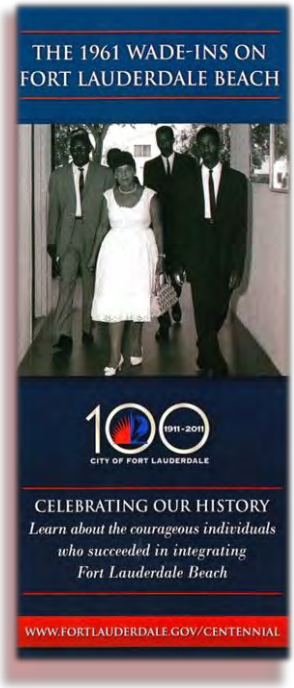
9 Print Center

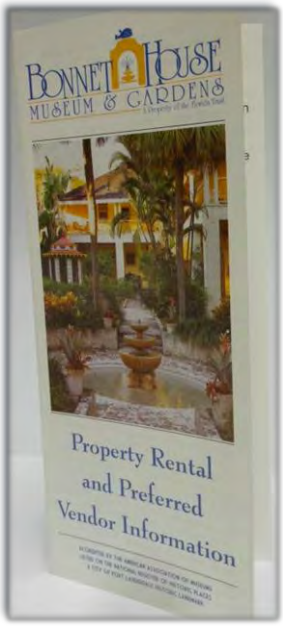
9.1 Mission

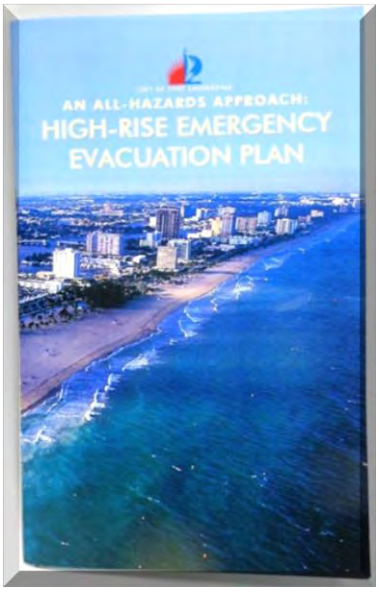
To timely provide quality print and copy products at competitive pricing in a responsive customer service oriented atmosphere.

9.2 Division Overview:

The City of Fort Lauderdale's in plant Print Shop/Copy Center/Mailroom operates an internal publishing and print media distribution network. We provide forms, brochures, stationery, informational mail materials, newsletters, sensitive documents and graphic design. We handle all interoffice communications, US mail, FEDEX and UPS packages. Water bills, fire inspection fees, police alarm notices and Business Tax renewal letters and licenses etc. are printed, folded, stuffed and mailed daily. We sustain the Cylinders of Excellence by supporting City departments with their mission objectives. With minimal staff, critical deadlines are met through prioritization by dedicated personnel. We also provide printing services to local municipalities, non-profits, neighborhood homeowners and civic associations.







Our mission is to improve operational efficiencies and employee productivity through innovative solutions, emerging technologies, and quality IT services.

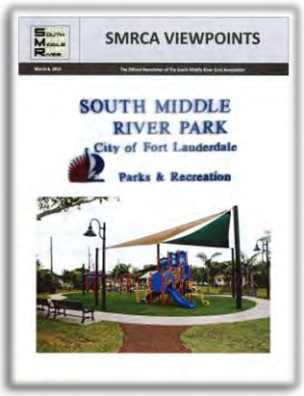
9.3 Division SWOT Analysis

	Helpful to achieving the objective	**Harmful** to achieving the objective
Internal origin attributes of the organization	**Strengths** • 80 years of combined publishing knowledge • Critical deadline fulfillment with minimal staffing • Exceptional quality control • Complete print project management • Support the cylinders of excellence • Loyal/dedicated staff • Institutional control • Cost reduction efforts • Security & confidentiality • Green Initiatives • Emergency Readiness	**Weaknesses** • Lack of CIP funding • Minimal staffing • Internal control software • Lack of prepress training • Recent loss of experienced personnel • Limited funds for advertising • Diminished Citywide demand for printed materials due to budget cuts • Printed content limitation rules • Non digital equipment results in outsourcing of full color work and overdependence on local vendors
External origin attributes of the environment	**Opportunities** • Provide printing to a variety of outside organizations • Incorporate new technologies to reduce internal costs & increase production • Use of online technology for material & services procurement • Update to digital equipment • Utilize industry affiliations to expand technical advancement	**Threats** • Electronic format replacing print media • Local competition with advanced technology • Lure of low price/quality multi job run print vendors results in increased postage costs, loss of Green initiatives, ADA requirement controls, City Graphics & Standards Manual requirements and quality control • Rising cost of materials

9.4 Problem Statement

Problem 1: Lack of CIP funding

In recent years the lack of funding to update the current offset press to modern day digital equipment has resulted in the loss of in house full color work and degradation of the City's image in printed form. The City's red & blue sun/sailboat logo is recognized internationally and should be kept to the highest standards. Centralized loss of control to meet critical mailing deadlines for City events, dated materials and the accurate formatting and required colors per the City Graphics & Standards Manual cannot be guaranteed by other establishments.



Problem 2: Insufficient advertising

Electronic format print replacement has decreased the requests for printed materials by established customers, internally and externally. Lack of advertising to potential new customers due to funding reduction reduces overall revenue generation.

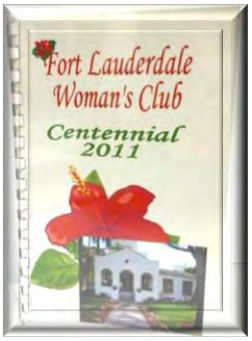
9.5 Problem Resolution Strategies

Resolution 1: Outsource full color work

In order to control costs of printed materials for City departments, large scale full color work has been managed utilizing the services of outside vendors. Centralized ordering through the City Print Shop ensures all time sensitive printed materials are finished on schedule and adhere to established standards. Securing funds for digital equipment will sustain internal control and maintain the City's external image. Employee education reinforces the City Policy and Standards Manual 9.7.1 and published Graphics Standard Manual guidelines. Informational meetings with City personnel are on-going and are intended to increase awareness of the inadvertent consequences of using external vendors.

Resolution 2: Advertise

Advertising funding, although reduced in recent years, has included annual mailing of various sample materials to surrounding cities and non-profit organizations to increase awareness of our services.

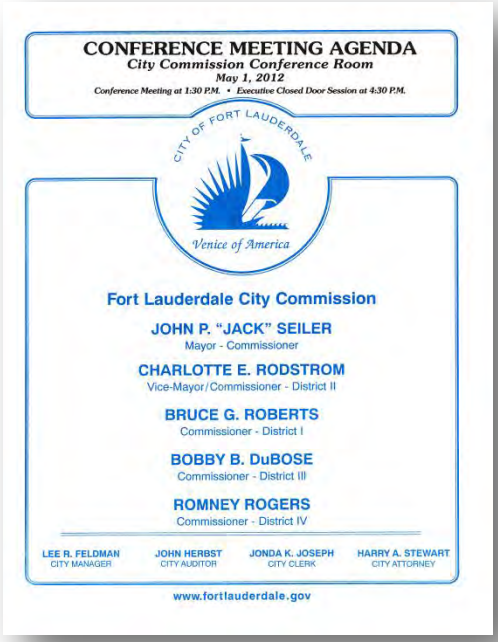


9.6 Goal 1: Increase productivity

A modern digital full color press which would allow us to keep printed requests in house, reduce overall City printing costs while maintaining our current staffing level and maintain the City's recognized image. Increased productivity through the use of a high speed digital press would generate additional revenue by offering print services to our neighbors at a competitive or reduced rate.

Objective 1.1:

Request funds for and obtain a high speed full color digital press next fiscal year. The digital press will allow faster job completion and turn around resulting in our ability to handle an increased work load at the current staffing levels We will bring the full color work in house and continue to provide on time quality service to the departments at a cost equal to or lower than other vendors. We will continue to track the four color savings on a monthly basis and provide a cost analysis.



Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Digital press	Capital Cost	$55K				
	Maintenance Cost	$8K	$8K	$8K	$8K	$8K
	Total Cost	$63K	$8K	$8K	$8K	$8K

Performance Measures to Evaluate the Goal

- Count rush emergency jobs with on time completion
- Customer satisfaction survey
- Impression counts for cost per impression analysis

Our mission is to improve operational efficiencies and employee productivity through innovative solutions, emerging technologies, and quality IT services.

9.7 Goal 2: Advertising

Objective 2.1:

Advertising of the print shop/copy center services, through print and electronic media, will inform potential customers of our services. Increasing next fiscal year's budget request will escalate external advertising through direct mail programs to surrounding cities, non-profit organizations and organized neighborhood groups. Working with City departments allows us to be self-supporting and the increased revenue generated from working with our neighbors will benefit the Central Services fund.

5-Year Budget to Attain the Goal

Year 1

Cost Items	Cost Type	Year 1	Year 2	Year 3	Year 4	Year 5
Advertising	Advertising/Operating	$2K	$2K	$2K	$2K	$2K
	Total Cost	$2K	$2K	$2K	$2K	$2K
Cost Items	**Cost Type**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**

Performance Measures to Evaluate the Goal

- Number of organization meetings attended

9.8 Goal 3: Department presentations

Communicate to departments/divisions the services offered by the Print Center/Mailroom/Copy Center. Demonstrate the requirements of the Graphics and Standards Manual through presentation materials and enforce the Policy and Standards Manual 9.7.1 requirements

Performance Measures to Evaluate the Goal

- Number of department presentations