



IT Advisory Committee Report

Assessment and Recommendations

March 2012





Contents

Introduction	4
Executive Summary	6
Discovery	10
City IT Department	10
Public Schools' IT Department	13
Police Department Information Technology	15
Fire Department Technology	16
Library IT	17
Subgroups	18
Comparison to Other Communities	19
Recommendations	21
Appendix A – Chief Information Officer (CIO) Job Description	25
Appendix B – Distribution of Departmental Software Platforms	28
Appendix C – Distribution of Computer-Related Procurement	29
Appendix D – Site List, City Buildings Requiring Network Access	30
Appendix E – Comparisons to Other Communities	32
Appendix F - Rationale for City Fiber CIP	33
Appendix G – Map of Buildings and Anticipated Bandwidth Requirements	35
Appendix H – Newton Public Schools' Building Statistics	36



Introduction

In early 2011, Mayor Setti Warren sought out interested and professionally involved citizens to team with selected staff and Board of Aldermen to form an IT Advisory Committee. The charge of the Committee was to review, over the course of nine months, the current City IT responsibilities, services and processes, and in collaboration with City management, provide recommendations to shape a vision by which technology staff can conduct needed functions more efficiently and effectively, and expend resources wisely and in a timely manner. While it has been well documented that greater investments in IT needed to be made, given the high competition for capital funds and the constantly changing nature of technology, it was imperative that experts be assembled who have a working knowledge of the state of the business and have an interest in the effective expenditure of taxpayer dollars.

Selection of Committee members was accomplished by the Executive Department after advertising for citizen volunteers and conducting interviews of these candidates by City staff. Since the breadth of expertise was wide, several candidates were not selected to actively participate in the committee but offered to be available should specific advice be sought. The Committee first met in April 2011, and has met every two weeks through February, 2012.



IT Advisory Committee Members

Name	Position	Organization
Bob Rooney	Chief Operating Officer	City Executive Office
Michael Cipriano*	Technology Consultant	TPP Global Services
Tom Rezendes	IT Director	Boston College
Susan Albright	IT Director & Alderman	Tufts University
Howard Johnson	IT Consultant	Metadata Labs
Joseph Mulvey	Interim IT Director	City IT Department
Bob Rainville	Manager of IT	School Department
Steven Smith	Director, Support Services	Police Department
David Miller	Software Engineer	Google Inc.
Kevin Mitchell	Marketing Director	Acme Packet
David Greenberg	IT Procurement	Coghlin Network Services
Robert Whitten	Disaster Recovery	MFS Management Svcs
Alan Mandl	Assistant City Solicitor	Law Department
Julie Ross	Assistant City Solicitor	Law Department

* Chair of Advisory Committee



Executive Summary

Beginning in April 2011, the IT Advisory Committee met bi-weekly for ten months. Managers providing core services in the City were called to join the meetings as appropriate, to present their views to the Committee as to the effectiveness of their daily work and the areas that are not operating as well as could be. Without exception, the Committee agreed that the current City IT staffs were actively engaged with their local constituents. Each department team was focused on the areas they represented. The committee members were impressed with the dedication and resourcefulness of the current city IT staff, who provide a broad range of services within a limited budget that has seen little growth in recent years despite tremendous increase in technology needs. As a result, the physical network has aged and applications are reliant on outdated and increasingly less reliable technology. As currently organized, there are not adequate cross-departmental support services to properly leverage resources and optimize efficiencies. No one individual or group is tasked with managing the City's enterprise network, or is responsible for securing volume purchase of technology equipment to lower unit costs. Operational standards are therefore absent, as is the presence of a strategic technology vision and plan. This report highlights the key issues discovered and suggests recommendations to remediate gaps or inefficiencies. It is the opinion of the committee members that the absence of a single leadership voice articulating the value of investments in technology contributed to consistently underfunded budget for information technology in the city.

As a result of these insights, early in the course of this study, two recommendations were made to the Administration for early-action based on urgency and pivotal nature of the issues:

- Recruit and hire the City's first Chief Information Officer (CIO) so that leadership and coordination on key initiative development would be in concert with shaping the strategic vision for technology utilization in Newton.
- Identify funding for the development of a City-wide fiber network to compete with the multitude of other City capital needs to unlock the possibilities of much of the recommendations contained in this study which are deemed crucial to the success of information technology as used by residents, businesses, education, and administrative functions of local government. (See Appendix F)

As of this writing, both of these early recommendations have been acted on by the Administration-- the CIO search is in process of selection and the Fiber Network Installation Plan has been documented in the City's FY13-17 Capital Improvement Plan.



The Committee also made the following recommendations which are discussed in greater detail in subsequent sections of the report.

The City IT management must:

- Produce a 5 year Technology Plan to serve as a roadmap for investments in and modernization of technology.
- Establish a review and approval process for citywide technology purchases to capture cost savings where possible.
- Consolidate cross-department software and hardware purchasing to standardize where possible to increase efficiencies.
- Establish regular IT leadership meetings and governance structure to coordinate city-wide technology strategy, work prioritization and communication among departments.
- Create application standards and technical framework for making application investment decisions.
- Establish a replacement plan for obsolete and end of life technology-based equipment to assure business continuity.
- Undertake an analysis of possible cloud-based (outsourced) solutions to reduce the city's technology footprint .
- Undertake an analysis of the city's data centers for consolidation to achieve operational efficiencies and cost savings.
- Create disaster recovery plan for critical IT services and systems.



Importance of Technology

Increasingly, information technology (IT) provides the underpinnings for all city operations. Not only **has it become required** for the conduct of basic administrative functions, but these functions which were once relegated only to computers, have now bridged into hybrid technologies, merging communication compatibility into cellular phones, copiers, fax machines, telephones, and smart boards. This technology merger has demanded a re-examination of the organizational and operational support structure to include hardware, software, staffing and finances.

Today, informational technology has eclipsed traditional methods for the delivery of education, building operations, municipal services, and public safety planning and response. No one can imagine working without technology, with computers at the heart of the current revolution. The City website provides immediate access to information for staff and citizens alike. Administrators rely on financial software to both track and forecast City expenditures and balances. While the use of IT has expanded steadily over the past fifteen years, there are areas where technology can further enhance Newton's operations.

The Citizen's Advisory Group (CAG) final report (2009) recognized the gap in IT within the City and listed it as one of its "game changers" for Newton. In the section "Re-engineering municipal operations" the committee wrote: "one of the few pathways to major change in the economics of municipal government operations are productivity increases stemming from re-engineering the current organization through, for example, outsourcing, consolidations, regionalization, automation, and technology innovation."

Additionally, the CAG recommended the implementation of operating efficiencies by investing now to achieve future savings. Specifically, the recommendation was to increase funding for communication and information technologies to facilitate more efficient marshaling of resources on a daily basis.

Technology can impact every area of city government from public safety and emergency management to health and human service provision and evaluation. It can impact our responsiveness to economic development, effect citizen engagement, offer transparency by providing data and information, and result in efficiency of operations for all levels and branches of government.

There are numerous examples of how our city has effectively implemented technology. The management of financial operations, providing access to the Assessor's database through the City's website, bill payments on-line, library on-line services, public safety communications, and wireless water meter readings, are only a few examples. However, we have only scratched the surface of possibilities. The 2011 report "Best Practice Guide for Local Government" was prepared by a consortium of the E-Republic, Inc. local government program, Digital Communities, and the Center for Digital Government and Government Technology, document



how technology is used effectively to enhance the business of city government from law enforcement to energy management.

With proper selection and investment, technology can be used to manage the workflow of documents between the branches of government in order to pass ordinances and budgets, while making information easily available to citizens. To avoid duplication of effort, the potential for error, and costlier processes, departments can strive to capture data only once using master data management in order to share existing data. In this configuration, updating data in one location results in that data being shared with all departments having need for that information. The establishment and use of common data and databases will ensure efficiency in managing data within and across departments.

Recognition that technology plays an increasingly important role in city/town government can be seen in the January 24, 2012 announcement by the U.S. Conference of Mayors which created a new task force on Information Technology on a national level. Part of the mission of the task force will be to "show how technology can foster innovation and transparency in local government. The committee will define mayoral priorities and will advise Congress and the Barack Obama administration."

Finally, it must be mentioned that for technology innovation to occur - the technology highway, the wires and hardware that cause information to flow from point a to point b, needs to be in place and it needs to be robust. The last design of Newton's network infrastructure to support IT functions occurred in 1998. Since then every city department uses technology in its work and every teacher and child uses technology in school.

Everyone expects to turn on the computer and have instant results similar to the television. You turn it on, the picture is there instantaneously as is every other channel as you click the channel changer. The city's aging Fiber network is not capable of meeting the service levels of a modern network (VoIP, cloud computing, live video streaming, etc.), thus demanding a review of the ramifications of not keeping pace with the changing technology and providing the capability to take advantage of these technologies as they evolve. Certainly, it was the multitude of options and choices for using technology for efficient and effective city operations as well as for education that precipitated the creation of the IT Advisory Committee. As we implement technology we must revitalize our information highway, our network, so that we have the bandwidth to satisfy the needs of municipal staff, school children, teachers and citizens as they constantly use technology in their lives in Newton.



Discovery

The Committee conducted individual discovery sessions with five departments who have staff dedicated to IT:

1. City IT Department – Joe Mulvey, Interim IT Director
2. School Department – Bob Rainville, IT Manager
3. Police Department – Steven Smith, Director of Support Services Bureau
4. Fire Department – Jeff Knight, Chief of Fire Communications Division
5. Newton Free Library – Ryan Hanson, Assistant Library Director

It should be noted that there are several departments located at City Hall who rely heavily on IT support, but do not have dedicated IT staff called out in the budget and were not interviewed individually: Assessing Department, Treasury Department, Human Resources Department, and Public Works Department. Virtually every department relies on IT to some degree; however, coverage of their individual needs is covered by the City IT Department.

City IT Department

The centralized City Hall IT team is comprised of 7 full-time employees, supporting 350 PC's and 35 file servers located in the on-site Data Center. The team manages the City's financial and administration applications:

- Geographic Information System (e.g. Mapping Schools bus routes, water mains, etc.)
- Finance Plus for accounting (e.g. issues 25,000 vendor checks per year)
- Community Plus for Permitting, Inspections and Code Enforcement
- Election Reporting, custom automation to speed election-day results
- Full time equivalent employees = 7.4 FTE
- FY12 Budget = \$1.1M (salary \$566k, GIS \$123k, expenses \$325k)
- Pegasus email, 650 mailboxes
- Citizen Self Service on-line
- Reverse 911 where pre-recorded emergency notifications are sent City-wide
- Freedom of Information Act support
- Shared Calendar/Scheduling (Brown Bear)
- Tracking of contract applications on-line
- Continues to help departments recognize efficiencies through technology
- Managing the City website since 1997, soon to be turned over to department-maintained pages
- Purchase, setup, maintain all PCs and servers
- Support and train on most software
- Support and maintain Internet access, firewalls and routers



The City Hall IT team is responsible for local infrastructure areas such as Internet (15 MB), servers, storage, network connectivity, wireless, and desktop/laptop PC's. An inventory of software platforms currently in use by City departments are listed in Appendix B.

Findings:

1. An early recommendation of the Advisory Committee was to recruit a Chief Information Officer (CIO). Research showed that the cities of Boston, Cambridge, Brookline, Medford, Andover and others had made this decision and were benefiting from having a senior, 'focal-point' IT leader, with interest across the City and authority to support that breadth.
2. The City's fiber backbone is inadequate to meet current requirements. Not all city buildings are connected to City-owned fiber in a network, and others that are, are below suggested operating capacity. As a result, the city's voice and data network are severely limited. The potential for a video network to enable educational opportunities is not an option at this time. This is a major IT weakness that impacts current performance and limits IT advancement, most notably, educational initiatives on the south side of the city (See Appendix F: Rationale for City Fiber).
3. IT and the City management need a Technology Plan that provides a vision which connects technology initiatives to municipal requirements at least 5 years into the future. Examples that need a plan for implementation and prioritization include a new network backbone, Voice-over-IP telephony, common email, and continuing transition to cloud-based solutions.
4. IT coverage to all City departments requires identification and staffing by the new CIO. Each department should have access to an IT analyst, and in turn, equal consideration for approval of IT initiatives.
5. Investments in securing the stability of the Data Center must be evaluated against outsourced 'cloud' options or consolidation with another city-funded Data Center. Disaster Recovery is also a risk factor to be considered.
6. Better consolidation of cross-department software and hardware solutions should be examined to find new cost savings that also benefit the sharing of data.
7. Internet access backup is a weak link with a very small DSL connection. A better solution for disaster recovery or ISP redundancy should be addressed.



The Network Sub-Committee concluded that the lack of continuity in the City fiber network has serious implications for a shortage of bandwidth capacity to support the explosion in wireless devices being connected to the City network. In turn, the overall reliability of the system is in jeopardy. The sub-committee built an inventory of the City's network capacity requirements and authored a 'design specification' for distribution to locate an expert network design specialist (Appendix D).



Public Schools' IT Department

Newton Public Schools' IT team is focused on supporting the thousands of student, teacher and administrative computers used in the 22 school buildings and delivering the unique applications and services necessary to run the K-12 school district business. Demographic data about the 22 school buildings is documented in Appendix G and an organization chart of the Schools' IT team is provided in Appendix H. The IT Advisory Committee did not review all of these initiatives in detail, but concluded that the appropriate management team and planning process is in place to support this important work. Selective notes from the Schools' site report (see appendix):

- Ed Center main admin. building + 21 schools, 11,800 students
- 5,000+ computers (80% Mac/20% PC's) in 700 instructional classrooms
- IT full-time equivalent employees = 15 FTE
- Centralized Management Tools (Casper Suite for Mac's, Dell's KBOX for PC's)
- All IT devices are tracked in Asset Management Data Base
- Browser-based ticketing system to resolve computer problems and repairs
- All 22 school buildings have full wireless coverage but further expansion is needed as more mobile devices enter the schools (e.g. students bring their home computers)
- Significant network bottlenecks exist (e.g. the 4 Middle Schools building connections)
- Chancery SMS Student Information System is the core application for the district acting as an ERP system.
- First Class is the District's Email and collaboration system (different from City's Pegasus Email System)
- District has about 150 cell phones total, about half are smart phones requiring IT support for accessing FirstClass mailbox and calendar.
- Redundant, Internet service with 3 ISPs is in place but educational bandwidth demands are growing exponentially, especially after introducing Google Docs to all 6000+ secondary school students.

Findings:

- I. The School's IT team is well positioned to address the technology needs of Newton's Schools. There are several key technology-based initiatives (e.g. implementing a Learning Management System, deploying a Parent Portal) that will keep this team engaged over the next two fiscal years.
- II. Newton School's IT would benefit from collaborating with the City's IT teams around the new CIO. Major city-wide IT infrastructure services such as: network, telephony, technology acquisition and support, need to be addressed centrally. The CIO would



coordinate these efforts and address service gaps that impact the School technology-based initiatives.

- III. Network bandwidth requirements to the 21 schools will grow dramatically as BYOD (Bring Your Own Device) is formally introduced at the 4 middle schools later this year. It is critical that the Schools' Technology Department work collaboratively with the CIO to insure that the necessary high-speed fiber network infrastructure is in place to meet the district's educational and technology goals.
- IV. Opportunities to partner exist between the Schools and City to provide disaster recovery support for key applications or services for both parties.



Police Department Information Technology

The Police IT functions with two full-time equivalent employees, one also acting as the Director of the Support Services Division. Dozens of automated tools have been introduced to solve the daily challenges of public safety record keeping. Many of the applications are home-grown and self-supported. Some examples of the Police IT's portfolio include:

- Website: "*Newtonpolice.com*"
- 150 computers, 5-6 virtual servers.
- QED Public Safety System
- Computerized Inventory Management application
- Records management
- Fleet Management
- Radio Communications
- Access Control – Doors
- LAN Equipment - Cisco

Findings:

- I. Home-grown applications usually meet targeted functionality and when thoroughly documented. The down-side is exposed when the author is not available and the application needs support or enhancement.
- II. PC & laptops replenishment is not budgeted to adhere to a systematic schedule. As a result, funding does not always support the timing of replacement to the degree needed, thus pushing devices beyond a typical end-of-life cycle (i.e. mobile wireless laptops in police cruisers).
- III. The processing of information during emergency (weather) events which typically involves several departments is cumbersome due to the use of different databases by each department. The result can be a delay in accurate information and not consolidated for true picture of event impact.



Fire Department Technology

In addition to local IT support issues specific to the Fire Department's facilities, the Fire Department Fire & Wire team is responsible for the installation and maintenance of the city's fiber backbone and telephony systems. The team oversees:

- Radio systems for Fire
- Medical Alarms
- Fire Alarms
- Outside plant fiber
- Telephone Systems (including 5000 school phones & intercoms)
- Code Enforcement
- PBX with 45 nodes

Findings:

- I. Certain core IT services are commingled with other technologies impacting City-wide delivery of information. For example, copier machines now scan to the server and can interface with the email system. Cellular phones are connected to the email system and scheduling calendars. The scope of this interface highlights the need for compatible systems to be addressed and coordinated by the CIO. The most critical fundamental IT services requiring review are:
 - a. Fiber backbone – no longer used only for public safety communications, it is fundamental to all users and the support for all IT capabilities.
 - b. Telephony – The City's aging PBX will need replacing within the next 3 years, likely by a modern Voice-over-IP, cost-reducing solution.
- II. Installation of city owned fiber with internally assigned personnel, competes poorly with other needs in communications and alarm systems resulting in delays of fiber implementation.
- III. Existing documentation and labeling of City-owned installed fiber is sporadic and critical to efficient future repair and testing.



Library IT

The Newton Library network is part of the Minuteman network of 40 libraries. The staff knowledgeable on IT matters includes the Assistant Director, one Technician, and a part-time technician. Additionally, one full-time web administrator maintains the Library's web-site content. The Minuteman network is problematic, with an average of six outages per year.

Findings:

- I. The use of the Minuteman network should be examined. What layered services do they provide and at what value?
- II. The Library IT team relies heavily on cable modems to establish network connections. A plan should be developed in concert with the network backbone project to displace these individual modems and adopt the Cisco-based standard used at other high-volume city facilities.
- III. The City IT team is the primary support team for all structural configurations at the library.



Subgroups

During the early stages of the Committee's work, it was determined that certain key priority areas required deeper review and focus. Committee members joined one of three sub-Committees to reflect a match-up of member's expertise and explore in detail one of these three critical areas: City-wide network infrastructure, software applications or procurement processes. These subcommittees met independently from the Advisory Committee to define the current status of these technology areas within the City and develop recommendations for improvement where possible.

City-wide Network Infrastructure: To begin the review, analysis and go-forward plan to address the city's fiber backbone development.

Software Applications: To examine the city's business and operational applications.

IT Procurement Processes: To review the city's technology purchasing policies and procedures.



Comparison to Other Communities

The Committee made a specific effort to leverage the work of other comparable Massachusetts communities in Information Technology and to incorporate their experience as Newton moves forward. Based on identifying a group of relevant communities, the Committee used several simple methods to develop rudimentary benchmark comparisons:

- Review of strategic analyses and reports
- Telephone interviews with elected officials and professional staff
- Review of budgets, operating plans, and job descriptions
- Review of capital investment plans
- Site visits

Among the communities the Committee evaluated were the following:

- City of Cambridge
- City of Melrose
- Town of Andover
- Town of Brookline
- Town of North Andover
- City of Somerville
- City of Boston

As might be expected, the motivation, methods, and results for these communities were similar in many ways and clearly offered valuable insights for Newton. Common threads included the following list of goals and objectives:

- Reduce operating costs, increase efficiency and enhance overall effectiveness of IT
- Current fiscal constraints dictate 'doing more with less'
- Optimize investments in technology and simplify organization and management of IT
- Leverage new and emerging technologies to deliver new services, foster innovation in municipal government
- Recognize and respond to increasing interdependence, rate of change, in key areas

Key technologies:

- Converged networks – data, voice, video
- Unified computing, SaaS, Cloud



-
- Mobile/personal devices
 - Wireless
 - Virtualization
 - Information security/privacy

Strategies for success:

- Consolidated IT management and organizational structure – CIO in charge
- Integrated IT infrastructure with network as the bedrock
- Unified standards, policies for key areas including procurement, security, applications
- Consolidated budgets and capital investment plans

Results:

These communities reported significant progress in implementing major changes in IT, resulting in specific, measurable positive impacts over time periods of two to five years. If anything, Newton could be seen as considerably 'behind the curve' by comparison. In several cases, major cost savings were realized, and then re-invested in IT initiatives judged to be of strategic importance.

Some of the documents and other materials that the Committee found most useful are included in Appendix E.



Recommendations

The Committee's recommendations were developed based on IT best practices and fall into five broad areas that are defined as follows:

- **Governance and Leadership:** the need for cohesive IT direction that organizes the City's IT efforts towards a common mission.
- **Strategic Vision:** the requirement that the City have an agreed upon Technology Plan that identifies opportunities and required improvements.
- **Investment Optimization:** the process of insuring that limited city IT funds are budgeted and spent appropriately.
- **Innovation and Leveraging of Technology:** the requirement to explore new technologies in response to City priorities.
- **Business Critical and Business Continuity Conditions:** an examination of critical IT systems and services and how to insure the proper level of performance.

Organizational Attribute: IT Leadership

Independent IT teams lacking city-wide coordination.

Key Findings	Key Recommendations
<ul style="list-style-type: none"> • Five IT teams of various size; City Hall, Schools, Police, Fire, and Library • Lack of formal communication between IT teams • IT product decisions and expenditures are being redundantly decided by each team. 	<ol style="list-style-type: none"> 1. Recruit and hire an established IT leader into the role of Chief Information Officer 2. An early deliverable for the new CIO will be to hold regular IT sessions with all IT leaders together 3. The CIO should evaluate all city-wide technology plans and involve an IT Executive Committee to determine priorities

Organizational Attribute: Infrastructure – Network backbone

The City's fiber network, which is used to carry data traffic between buildings, is under performing and nearing the end of useful life.

Key Findings	Key Recommendations
<ul style="list-style-type: none"> • Schools are unable to meet collaboration goals. • Network outages are at a higher risk on the current fiber. • Internet and wireless growth will not be satisfied on the current infrastructure. • New VoIP telephony system requires a new backbone. 	<ol style="list-style-type: none"> 1. Treat as a priority project. Begin by securing a design specialist to 'size' the appropriate solution for the City. 2. Forecast of spend: \$1M-\$1.5M over 3 years



Organizational Attribute: Applications - Business Systems

Large inventory of applications, with some redundancy. Three email systems with integration challenges. Little automated workflow. Support of current application portfolio is a risk, as many applications are home-grown and customized.

Key Findings	Key Recommendations
<ul style="list-style-type: none"> • Application priorities are not set across city needs, individual departments decide on solutions working with independent IT staffs • Lack of applications standards have resulted in a broad range of technologies in use. • Some applications are underutilized, for example; document imaging and document management 	<ol style="list-style-type: none"> 1. Increase efficiency in accomplishing departmental tasks 2. Develop a framework for making decisions on applications. 3. Eliminate redundancies in data entry 4. Foster communication, collaboration and data sharing across departments
<ul style="list-style-type: none"> • Enhance the efficiency of communication between the executive and legislative branches of Newton government 	<ol style="list-style-type: none"> 1. Examine the use of work flow and agenda management software.
<ul style="list-style-type: none"> • Not employing best practices in choosing Applications. 	<ol style="list-style-type: none"> 1. Web based applications versus client installations 2. Cloud based , Software as a Service solutions 3. Mobile device accessibility
	<ol style="list-style-type: none"> 1. Open Source
	<ol style="list-style-type: none"> 4.

Organizational Attribute: Strategic Sourcing – IT Procurement

Technology funding is budgeted by department. No one is overseeing the department's expenditures to insure they comply with technical standards or are valid against more pressing needs.

Key Findings	Key Recommendations
<ul style="list-style-type: none"> • Larger quantity purchases of 30-50 PCs can be bid with a benefit of volume savings • IT should review all technology purchases to insure validity and compatibility • IT Standards – to reduce overall support costs it is best to standardize on vendor. 	<ol style="list-style-type: none"> 1. Move independent technology funds to a fund managed by the CIO 2. The CIO should establish a technology replenishment plan 3. Establish a baseline for major technology purchases (PC's, servers, etc.).



Organizational Attribute: Strategic Long range IT planning

The CIO needs to develop a strategic plan that lays out a technology vision that supports the mission of the City.

Key Findings	Key Recommendations
<ul style="list-style-type: none"> • City leaders do not have a roadmap of upcoming IT expenditures. • The ability to prioritize technology investments is difficult • New, cost-effective trends in IT are not being considered (i.e. Cloud Computing) 	<ol style="list-style-type: none"> 1. The CIO, early in his/her tenure, should research and develop a 3-year Technology Plan for Newton 2. This plan should be reviewed and prioritized quarterly and be a driver for all major IT initiatives 3. The plan should identify opportunities for technology modernization

Organizational Attribute: Infrastructure – City Hall Data Center

The current IT Data Center occupies premium City Hall floor space and is at risk due to heat and power.

Key Findings	Key Recommendations
<ul style="list-style-type: none"> • Major investments are being considered; generator & UPS (batteries) 	<ol style="list-style-type: none"> 1. An analysis of outsourcing or consolidation options should be a priority of the new CIO

Organizational Attribute: Infrastructure – Disaster Recovery

Critical business systems running on servers within the City Hall Data Center are not satisfactorily protected against failure.

Key Findings	Key Recommendations
<ul style="list-style-type: none"> • FinancePlus and other key systems could be unavailable due to a major disruption 	<ol style="list-style-type: none"> 1. The new CIO should conduct a needs review and consider a fail-over to a 3rd party facility

Organizational Attribute: Infrastructure - Telephony

Several end-of-life phone systems are in operation across the city

Key Findings	Key Recommendations
<ul style="list-style-type: none"> • After the network backbone is enhanced, the city can explore a single, modern telephony solution that delivers some public safety features 	<ol style="list-style-type: none"> 1. The city should explore cost-effective voice-over-IP solutions that operate on the city data network



Organizational Attribute: Applications – email

Disparate email systems (Pegasus & First Class) cause minor interoperability issues such as address book sharing, receipt notifications, etc.

Key Findings	Key Recommendations
<ul style="list-style-type: none"> Cost has prohibited City IT from investing in a generally accepted email package 	<ol style="list-style-type: none"> Could the City use First Class alongside the Schools?

Organizational Attribute: Applications - transparency

City scheduling and communication of activities that impact its citizens is non-standard based on individual departments creativity

Key Findings	Key Recommendations
<ul style="list-style-type: none"> A collaborative toolset is not in use for city staff or elected officials 	<ol style="list-style-type: none"> As part of the Applications Roadmap, the CIO should conduct a review of collaboration requirements and potential solutions.

Organizational Attribute: Governance

The hiring of a Chief Information Officer is the first such position in Newton.

Key Findings	Key Recommendations
<ul style="list-style-type: none"> The Advisory Committee has the advantage of bringing together subject matter experts without direct managerial authority. 	<ol style="list-style-type: none"> Institute a modified IT Advisory Committee to assist and guide the CIO on developing operational protocols and strategic vision.

IT projects throughout the City move forward based on users articulation of need and are not prioritized compared to other IT projects benefitting the City.

Key Findings	Key Recommendations
<ul style="list-style-type: none"> Spending on IT initiatives is not consistent and cohesive based on a cross-departmental plan. 	<ol style="list-style-type: none"> Create an Executive Steering Committee comprised of senior City staff to prioritize IT initiatives and spending across all departments.



Appendix A – Chief Information Officer (CIO) Job Description

Position Title: Chief Information Officer
Technology

Department: Information

Reports To: Mayor

Date: August 2011

GENERAL SUMMARY:

Under the general supervision of the Mayor, the CIO is responsible for oversight of the city's Information Technology infrastructure. The CIO is accountable for the strategic direction and ongoing support of the city's application systems and telecommunications infrastructure for all voice, video, and data needs of the City. The CIO provides direct advice and counsel to the Mayor on matters related to information technology.

The position plays a leadership role in the planning, development, implementation, and maintenance of the City information systems, with collaboration and advisement on the School Department information systems. Specifically, the CIO would be responsible for development and maintenance of IT infrastructure (network) plan between all municipal buildings and departments; researching and recommending new and emerging technologies; development of City operating and capital improvement budgets; supervision of assigned staff; and duties necessary to ensure the general oversight of development and mutually supporting relationships with those departments operating external applications (e.g. school department, public safety, and library).

ESSENTIAL JOB FUNCTIONS:

The chief information officer (CIO) is accountable for leading the technology support functions of the city, and establishing a strategic direction for the future use of emerging technologies. This includes network operations (voice and data), City Hall Help Desk, Data Centers, GIS, applications program development, desktop support, and information security. The CIO is responsible for fostering cross-departmental collaboration and promoting multilateral communication relating to IT issues among departments, and reviewing all proposed IT capital projects thereby ensuring that an enterprise-wide approach to technology is undertaken, duplication of services and/or systems is eliminated, and the purchase of incompatible systems is avoided.



- ◆ Provides strategic and tactical planning, development, evaluation, and coordination of the administrative applications that automate and support City business processes. Oversees the operation of computer applications and associated databases. Maintains multiple and redundant backup services in support of the application infrastructure.
- ◆ Provides leadership over the City's IT infrastructure through fostering innovation, prioritizing IT initiatives, and coordinating the evaluation, deployment, and management of current and future IT technologies across the city. The CIO communicates this vision by developing and updating a 3-year Technology Plan for the City.
- ◆ Provides leadership and training in the management of the City's IT Services function which includes Helpdesk and desktop support. Establishes Helpdesk performance reporting standard and analyzes data on support trends. Maintains partnerships with strategic vendors and repair firms, and seeks outsourcing opportunities when appropriate.
- ◆ Sets policy and provides direct approval for City departments of IT procurement and purchases impacting the strategic development of network systems and infrastructure to include capital investment and operational budgets. In addition, oversees the procurement and maintenance in City departments of hardware and software related to computers, wired and wireless telephones, copiers, smart boards, projectors, and electronic monitoring systems.
- ◆ Oversees the city's technology buying standards, setting PC/Mac configuration guidelines and approving final procurement. Develop, track, and control the information technology annual operating and capital budgets.
- ◆ Facilitates cooperation of IT activities of non-aligned IT teams that support Newton's schools, police, fire, and library. Meets regularly with the IT team leads of these groups looking for synergies and process opportunities.

OTHER DUTIES AND RESPONSIBILITIES:

- ◆ Performs special projects and related responsibilities as initiated and requested.
- ◆ Participates in City government IT forums and organizations in order to keep abreast of emerging technologies.
- ◆ Integrates the city's goals to match the IT Technology plan.
- ◆ Develop and plans IT activities which allows the city's departments to best serve its citizens.
- ◆ Will be instrumental in defining further the CIO's role as a new position in the City.



SKILLS/EXPERIENCE/TRAINING REQUIRED:

- ◆ Bachelor's Degree in Computer Science required or related technical training equivalent and 7 years' experience in management of information technology teams. MBA or MS and 10 years related experience with some public sector experience preferred.
- ◆ Experience managing Information Technology organizations that utilize voice and data networking is preferred.
- ◆ Strong project management and budget formulation skills required.
- ◆ Excellent verbal and written communication skills required.



Appendix B – Distribution of Departmental Software Platforms

	Accounting	Assessing	CityClerk/BOA	Cultural Affairs	DpW	Election	Executive	Fire	Health	Human Resources	I.T.	ISD	Law	Library	Museum	Park & Rec	Police	Planning	Public Buildings	Purchasing	Senior Center	Treasury	Veterans
CAD					x																		
Calcium Calendar		x	x		x			x	x	x	x	x	x		x	x		x		x	x		
CAMA		x																					
Code Red							x																
Commplus (parking)																						x	
CommunityPlus								x				x						x					
Crime view																	x						
Fleet					x																		
FMLA										x													
Fund Raising														x	x								
Gasboy					x																		
GO	x																						
Hansen					x																		
Indesign														x	x								
LEEPS																	x						
MAVEN									x														
Need software for:			x					x	x											x			x
Publisher																		x					
QED								x									x						
Quickbooks														x	x							x	x
Risk Master										x													
SchoolDude				x	x			x	x					x	x	x	x		x		x		
ServTracker																					x		
SNAP									x														
Sportsman																x							
SPSS		x	x																				
Survey Monkey			x	x							x				x	x	x	x				x	x
Term Tracker			x				x																
Treeworks																x							
VRIS						x																	
WebEOC																	x						
WebQA					x											x							



Appendix C – Distribution of Computer-Related Procurement

Calendar Year 2011 Computer Hardware / Software Purchases

Retrofit Co.	Citywide	\$ 103,634.22
	City Hall IT	\$ 57,675.53

CDW	Citywide	\$ 6,382.83
	City Hall IT	\$ 2,660.39

Microcenter	Citywide	\$ 12,645.96
	City Hall IT	\$ 3,166.96

Dell/ASAP	Citywide	\$ 91,279.18
	City Hall IT	\$ 10,938.77

Citywide expenses include all departments



Appendix D – Site List, City Buildings Requiring Network Access

#	Resp.	Site Name	Site Loc	Svc	Curr. Devices	Curr Band-Width	Expect Band-Width 5 years	Expect Devices 5 yrs	Prio
1	Mun	Building Department	52 Elliot Street	RCN	15	100mb	1gb	17	1
2	Mun	Carr	233 Nevada Street	RCN	12	100mb	1gb	13	5
3	Mun	City Hall - HUB	1000 Commonwealth Ave.	Both	350	1gb	10gb	385	1
4	Mun	Comm. Tower - Herrick Rd N. Centre	Herrick Rd	-					
5	Mun	Comm. Tower - Manet Rd		City Fiber	4	Unknown	Unknown	4	1
6	Mun	Comm. Tower - Ober Road	Water Tower Ober Rd	-					
7	Mun	Comm. Tower - Prospect Hill - Waban	Prospect Hill	-					
8	Mun	Comm. Tower - W. Newton Tnpke Ext	Water Tower W. Newton Tnpk Ext	-					
9	Mun	Comm. Tower in Newton-Well Hosp.	inside NWH Beacon & Wash.	-					
10	Mun	Crafts Street Garage	110 Crafts Street	RCN	30	1gb	1gb	33	1
11	Mun	Elliot Street Garage	74 Elliot Street	RCN	30	1gb	1gb	33	1
12	Mun	Fire Headquarters	1164 Centre Street	Both	20	100mb	10gb	22	1
13	Mun	Fire Station # 1	241 Church Street	RCN	10	100mb	1gb	11	1
14	Mun	Fire Station # 2	1750 Commonwealth Ave.	Both	10	100mb	1gb	11	1
15	Mun	Fire Station # 3	31 Willow Street	RCN	10	100mb	1gb	11	1
16	Mun	Fire Station # 4	195 Crafts Street	RCN	10	100mb	1gb	11	1
17	Mun	Fire Station # 7	144 Elliot Street	RCN	10	100mb	1gb	11	1
18	Mun	Fire Station # 10	755 Dedham Street	RCN	10	100mb	1gb	11	1
19	Mun	Health Department	1294 Centre Street	RCN	20	100mb	1gb	22	1
20	Mun	Housing Rehab Fund	492 Waltham Street	RCN	0	100mb	1gb	0	5
21	Mun	Jackson Homestead	527 Washington Street	RCN	20	1gb	1gb	22	5
22	Mun	Library - Auburndale	375 Auburn Street	RCN	0	100mb	1gb	0	5
23	Mun	Library - Main	330 Homer Street	RCN	10	100mb	1gb	11	2
24	Mun	Library - Newton Corner	126 Vernon Street	RCN	30	100mb	1gb	33	5
25	Mun	Library - Nonantum	144 Bridge Street	RCN	0	100mb	1gb	0	5
26	Mun	Library - Waban	1608 Beacon Street	RCN	0	100mb	1gb	0	5
27	Mun	Police Annex	25 Chestnut Street	City Fiber	60	100mb	1gb	66	1
28	Mun	Police Garage	1321 Washington St (Rear)	City Fiber	10	100mb	2gb	10	1
29	Mun	Police Headquarters	1321 Washington Street	Both	258	1gb	10gb	284	1
30	Mun	Recreation Headquarters	70 Crescent Street	RCN	30	100mb	1gb	33	1
31	Mun	Senior Center	345 Walnut Street	RCN	20	100mb	1gb	22	2



#	Resp.	Site Name	Site Loc	Svc	Curr. Devices	Curr Band-Width	Expect Band-Width 5 years	Expect Devices 5 yrs	Prio
32	Non	Boston College	Campion Hall	-	0	0	?	?	5
33	Non	Brigham House	Lincoln St (Highlands)	-	0	0	?	?	5
34	Non	Hamilton	Grove Street (Aub.)	-	0	0	?	?	5
35	Non	Newton Wellesley Hospital	2014 Washington Street	-	2	0	?	?	5
36	Non	NewTV Cable Access	Needham St.	RCN	2	0	?	?	5
37	Ed	Angier School	1697 Beacon Street	RCN	244	1Gb	5Gb		3
38	Ed	Bigelow Middle School	42 Vernon Street	RCN	388	1Gb	10Gb		2
39	Ed	Bowen School	280 Cypress Street	RCN	196	1Gb	5Gb		3
40	Ed	Brown Middle School	125 Meadowbrook	RCN	396	1Gb	10Gb		2
41	Ed	Burr School	171 Pine Street	RCN	161	1Gb	5Gb		3
42	Ed	Cabot School	229 Cabot Street	RCN	250	1Gb	5Gb		3
43	Ed	Countryside School	191 Dedham Street	RCN	184	1Gb	5Gb		3
44	Ed	Day Middle School	21 Minot Place	City Fiber	401	1Gb	10Gb		2
45	Ed	Education Center	100 Walnut Street	Both	403	2Gb & 10Gb	40Gb		1
46	Ed	Franklin School	125 Derby Street	RCN	189	1Gb	5Gb		3
47	Ed	Horace Mann School	687 Watertown Street	City Fiber	176	1Gb	5Gb		3
48	Ed	Lincoln Eliot School	191 Pearl Street	RCN	175	1Gb	5Gb		3
49	Ed	Mason Rice School	149 Pleasant Street	RCN	214	1Gb	5Gb		3
50	Ed	Memorial Spaulding School	250 Brookline Street	RCN	204	1Gb	5Gb		3
51	Ed	Newton North High School	457 Walnut Street	City Fiber	1218	10Gb	40Gb		1
52	Ed	Newton South High School	140 Brandeis Road	Both	1013	10Gb	40Gb		1
53	Ed	Oak Hill Middle School	130 Wheeler Road	RCN	367	1Gb	10Gb		2
54	Ed	Pierce School	170 Temple Street	RCN	203	1Gb	5Gb		3
55	Ed	Underwood School	101 Vernon Street	RCN	142	1Gb	5Gb		3
56	Ed	Ward School	10 Dolphin Road	RCN	153	1Gb	5Gb		3
57	Ed	Williams School	141 Grove Street	RCN	190	1Gb	5Gb		3
58	Ed	Zervas School	30 Beethoven Avenue	RCN	192	1Gb	5Gb		3



Appendix E – Comparisons to Other Communities

References to Resources Provided by Other Communities

These documents are in the possession of the IT Advisory Committee file bank and are available for review by interested parties. Due to the volume of information, we have not included content of these documents in this report.

1. **Andover Strategic IT**, Town of Andover; Strategic Information Technology Plan Findings and Recommendations, Version 3.0, March 2010
2. **Town of Brookline, MA Town Charter**; ARTICLE 3.11B: INFORMATION TECHNOLOGY DEPARTMENT
3. **Special Assignment on Municipal Information Technology Services for the Regionalization Advisory Commission**, Linda Dunlavy, Executive Director, Franklin Regional Council of Governments
4. **IT Consolidation; Information Technology Consolidation Task Force**, Town of North Andover
5. **The IT Industry: Hub of the Massachusetts Technology Economy**, University of Massachusetts Donahue Institute on Economic & Public Policy Research
6. **Regionalized IT Services in Massachusetts**; City of Melrose Information Technology Department, 2011
7. **Melrose Public Schools 3 Year Technology Plan**; Melrose Public School system, Town of Melrose, MA, 2007
8. **City of Somerville, MA**, personal communications with the CIO, Karthik Viswanathan



Appendix F - Rationale for City Fiber CIP

The majority of Newton's buildings currently have a pair of fibers provided free as part of the 1997 cable franchise licensing agreement between the City and RCN. In most buildings, these fibers have been assigned for two distinct purposes: one fiber is usually dedicated for data network traffic and the other fiber to PBX-based phone technology. Having used both RCN fibers, there is no fiber redundancy or backup alternative available should a fiber break or other failure occur. Also, since these fiber pairs are not generating revenue for RCN, these fibers would likely be the last outage repaired by RCN in the event of a widespread catastrophe (i.e. after all cash-paying customers are restored).

Newton's continued dependence on these RCN fiber pairs has now become a major, limiting impediment in upgrading our network connection speeds across all the City buildings to deliver acceptable computer performance and response time to both our City employees as well as the Newton community at large. We have maxed out the RCN fiber alternative so it's important that that we develop a strategy that addresses these bottlenecks and shortcomings for the future.

The School Department is heavily impacted by these RCN fiber limitations. The table in Appendix A documents the number of computers in each school building as well as the number of Wireless Access Points (See Appendix G, # of APs column) servicing the mobile laptops used by teachers as of April 2011. Schools present a unique challenge because of the number of computers in each building (e.g. Elementaries:121-203, Middle: 283-344, High: 839-906) which generally exceeds the computer density of a comparably-sized office building environment. Other demanding network services used by staff and students in these schools include heavy use of the internet, video file retrieval, cloud services (i.e. external applications on the web) such as Google Docs and video file transfers to NewTV.

Given these demanding requirements, the School Department has been focused on increasing the network connection speed to each of the six secondary school buildings. A plan to allow middle school students to bring their own home computers to school in September, 2012 will add a tremendous network burden at these four schools (see *Students* count at each school in Appendix G). The higher 10GB speed needed by these schools generally requires two fiber strands but we only have one RCN data strand available (the other is phones). The lack of spare RCN fibers for this second strand plus the lack of fiber redundancy to quickly recover from a fiber break is an escalating concern to the schools as well as to the entire City.

A city-owned, city-wide high speed network is all about opportunity. The opportunity to realize cost savings by implementing VoIP (Voice over IP phone technology) will require a fiber network built with redundancy, supportability, and a level of Quality of Service that is not available with our current systems.



The opportunity to enable distance learning on a separate pair of fibers dedicated to a video distribution system to share teaching resources between buildings will continue to be a dream rather than a reality until connectivity is no longer an issue.

Opportunities for Public Safety include more video camera and surveillance monitoring to supplying fast, reliable data and training to Police Officers and Firemen on the front lines. Investments in infrastructure will contribute to the safety of our employees, students and constituents.

New solutions beget new opportunities to create new efficiencies and better answers to problems. The distribution and availability of applications and resources ranging from email to real-time data access to high-speed Internet will continue to lag while higher bandwidth solutions await dedicated fiber.

New money-saving tools such as cloud-based storage and application hosting require a solid, reliable, high speed core network. To be successful, the cloud requires a reliable, high capacity infrastructure that amply meets the demanding workload of a thousand concurrent users across the City's 50 locations continually accessing data from our data centers both within and outside of the city. Enabling cloud services can significantly save the City money when allocating resources for public, educational and private endeavors.

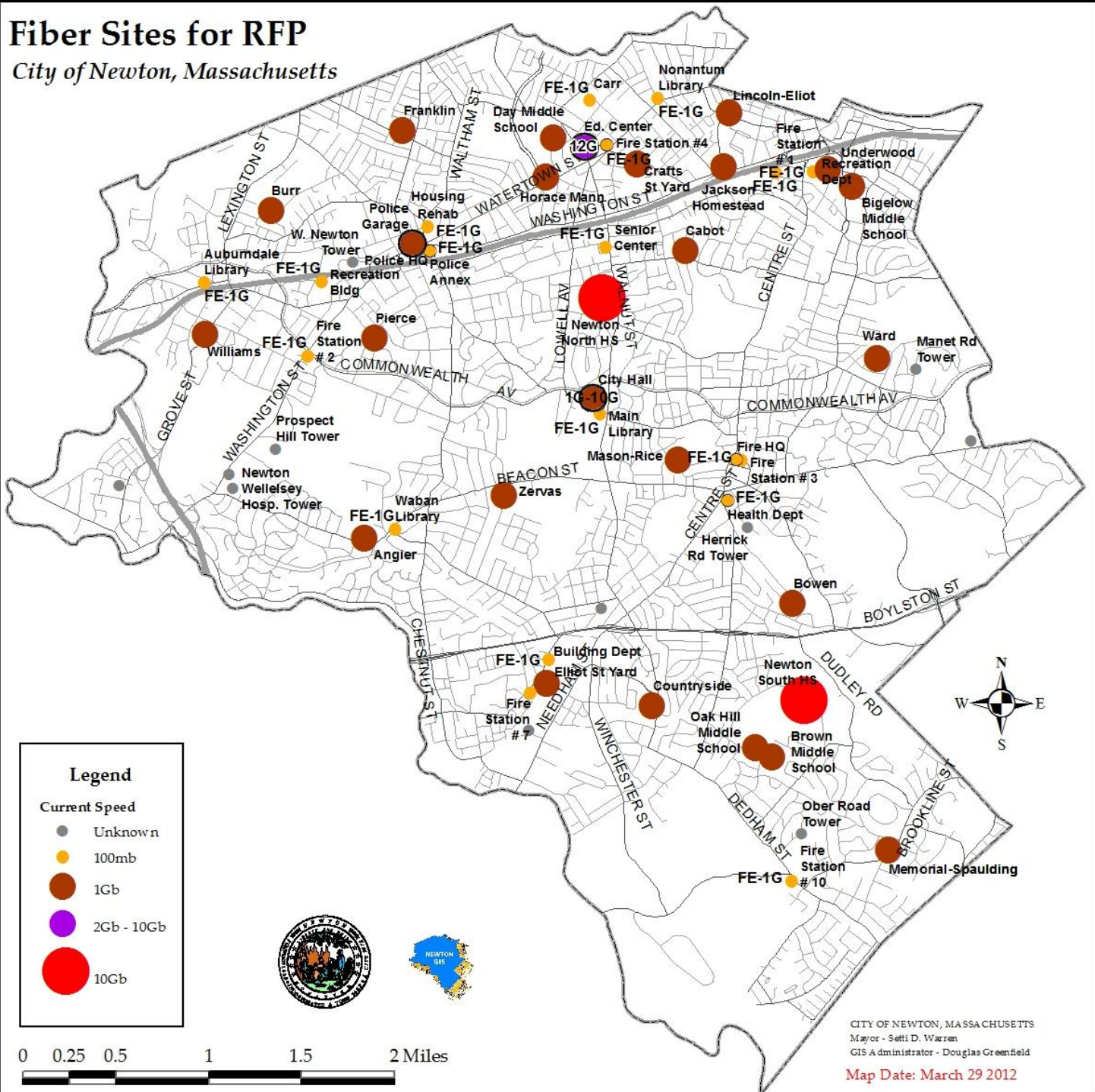
We welcome the Executive Office's technological foresight to include the City-wide fiber project as part of the CIP plan for at least the next three years. This acknowledgement of a forward thinking plan demonstrates that the City truly intends to remain a world class community.



Appendix G – Map of Buildings and Anticipated Bandwidth Requirements

Fiber Sites for RFP

City of Newton, Massachusetts



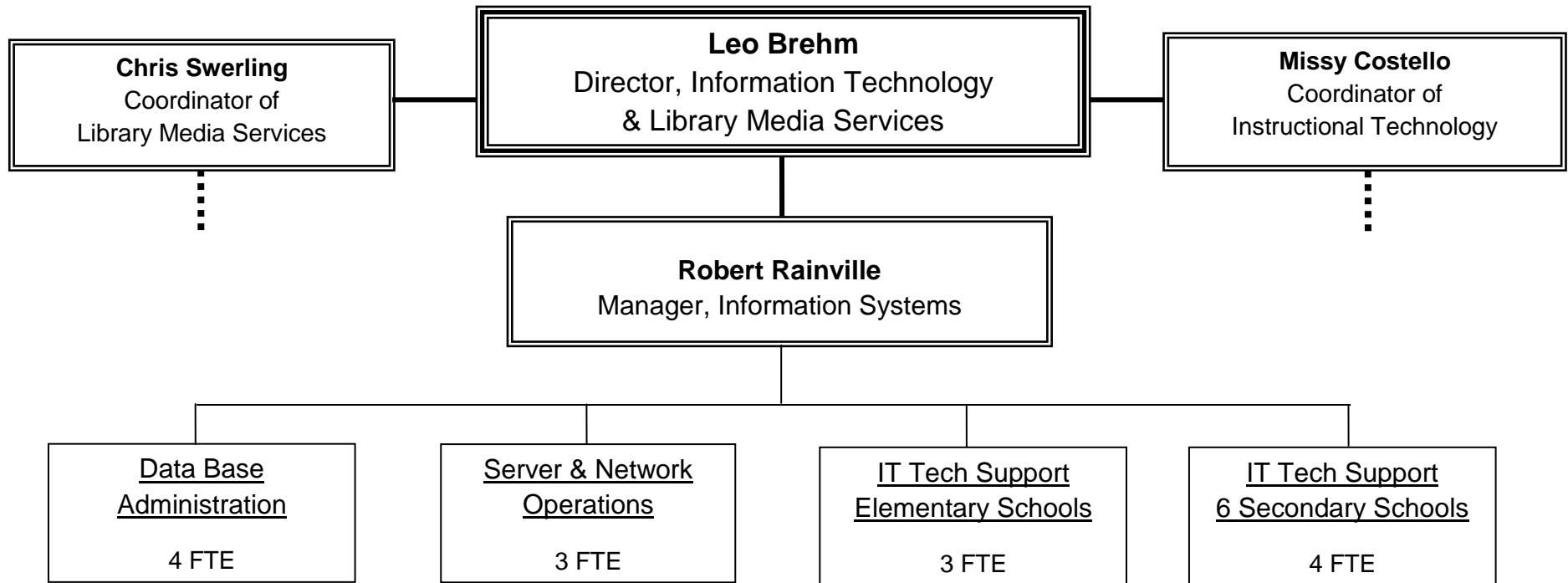


Appendix H – Newton Public Schools’ Building Statistics

<u>Building</u>	<u>Students</u>	<u>Classrooms</u>	<u>Computers</u>	<u># Macs</u>	<u># PCs</u>	<u># Laptops</u>	<u># Closets</u>	<u># APs</u>	<u>Band</u>
Newton North High	1893	147	906	687	219	356	10	132	b/g/n
Newton South High	1717	130	839	707	132	386	11	102	b/g/n
Bigelow Middle	523	32	324	190	134	195	1	29	a/b/g
Brown Middle	670	47	325	214	111	151	2	31	a/b/g
Day Middle	758	65	344	150	194	152	1	31	a/b/g
Oak Hill Middle	603	33	283	91	192	137	1	19	a/b/g
Angier Elementary	375	17	203	194	9	143	1	10	a/b/g
Bowen	449	20	171	161	10	118	2	16	a/b/g
Burr	391	17	138	129	9	95	2	14	a/b/g
Cabot	452	20	225	216	9	165	2	14	a/b/g
Countryside	500	11	156	146	10	96	3	15	a/b/g
Franklin	398	18	159	149	10	106	1	15	a/b/g
Horace Mann	371	17	153	139	14	95	1	11	a/b/g
Lincoln-Eliot	293	14	149	139	10	97	2	14	a/b/g
Mason-Rice	442	19	187	178	9	145	2	13	a/b/g
Memorial-Spaulding	464	21	160	149	11	93	2	17	a/b/g
Peirce	318	15	179	172	7	136	2	11	a/b/g
Underwood	282	12	121	112	9	79	1	16	a/b/g
Ward	270	13	128	117	11	93	1	12	a/b/g
Williams	298	13	161	152	9	118	2	12	a/b/g
Zervas	349	16	162	154	8	103	2	15	a/b/g
Totals:	11,816	697	5,473	4,346	1,127	3,059	52	549	<u>June 2011</u>



Appendix I – Newton Public Schools’ Technology Department Org Chart



Roles / Functional Areas

- | | | | |
|--|---|--|---|
| <ul style="list-style-type: none"> • SMS Student Information System • eFinancePLUS support for district • SQL Server & FileMaker database • Federal and State DOE Reports • ParentCONNECT Parent Portal | <ul style="list-style-type: none"> • Wide-area network of 22 buildings • Virtual server infrastructure of 120+ • Network design & administration • District-wide Cisco wireless network • Multiple ISPs of 180Mb, web filtered | <ul style="list-style-type: none"> • IT Tech Support for 15 elementaries • Configure all new PC & Macs • KBOX central mgmt system for PCs • Casper central mgmt. suite for Macs • Email & Active Directory accounts | <ul style="list-style-type: none"> • Cross-functional tech support • Specialized labs (TV, CAD, etc.) • High-speed network requirements • Oversee Secondary School laptop carts, computer labs & IT projects. |
|--|---|--|---|