CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Office of the City Auditor

Report to the City Council
City of San José

TECHNOLOGY DEPLOYMENTS: ADDITIONAL RESOURCES NEEDED TO SHORTEN DEPLOYMENT TIMELINES

Report 16-04
March 2016

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Office of the City Auditor
Sharon W. Erickson, City Auditor

March 10, 2016

Honorable Mayor and Members
Of the City Council
200 East Santa Clara Street
San José, CA 95113

Technology Deployments: Additional Resources Needed to Shorten Deployment Timelines

The City of San José uses a multitude of computer systems to track, monitor, and deliver services to its residents. Like many entities, San José finds itself deploying new technology on what feels like a continuous basis. The purpose of this audit was to review the timeliness of the City's technology deployment process.

Finding 1: Continuous Technology Replacement Cycles Require a Defined Replacement Program and an On-Going Funding and Staffing Strategy. The City is currently replacing several mission critical systems. Some of these systems were in danger of losing support or were legacy systems that do not meet user needs. Previous studies identified the risks associated with not addressing the City's technology infrastructure backlog, but funding constraints have hampered the City's ability to address that backlog. Clearly defining a technology replacement program would allow policymakers to understand what systems are (or will shortly be) in need of an upgrade or need to be replaced, given risk.

A technology replacement program must be funded to be effective. Despite being in the center of Silicon Valley, the City's funding for its IT department is lower than other California jurisdictions. Other jurisdictions not only spend more money, but are taking a proactive and strategic funding approach based on technology replacement lifecycles to meet their future technology needs and vision.

In our opinion the City should establish a continuous replacement program for the City's key technology systems. An annual base level of funding required to continuously replace existing technology systems should also be identified and prioritized for budget consideration. Finally, given the City's limited resources, the Chief Information Officer (CIO) should determine which enterprise technology projects in the replacement program should be prioritized based on risk. In addition, a cross-departmental committee should be established to achieve economies of scale for other cross-departmental technology projects.

Finding 2: The City Lacks Dedicated Staffing and Project Management to Ensure Timeliness and Success of Technology Implementations. Procurement and deployment of major technology systems is a long and complicated process. Many departments and staff are involved, and the major technology deployments we reviewed for this audit have taken as long as five years from the initial planning to implementation. Reasons for this ranged from changes in the initial direction of the project, to the need to meet and confer with labor unions. What these projects had in common was that they did not have project managers assigned to them from the beginning of the process. In our opinion, having qualified project managers throughout a project is critical to the success and timeliness of a technology project.

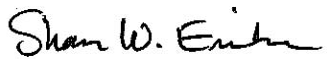
Further, the City has not been able to dedicate sufficient staffing to some of these major projects. Staffing shortages in IT and strategic support departments further exacerbate the problem. Finally, IT has responsibility to approve technology deployments but little staff to support them.

The City needs to ensure that sufficient resources are allocated from the project start. This includes IT staffing and qualified project managers who are dedicated and responsible for the entire project from planning to deployment. In our opinion, given the continuous need to replace technology systems, the City should hire qualified, permanent project management staff to develop in-house knowledge and maintain continuity. Further, the City should require outside project managers to transfer responsibility and lessons learnt during a project to internal City staff. In addition, the Administration should require written project plans and timelines, and project steering committees to be appropriately staffed, with authority to reallocate resources where needed. Finally, the Administration should review the overall strategic support staffing in the IT Department and ensure that its vacant positions are immediately filled. This may require salary enhancements.

Finding 3: Updated Procedures Would Facilitate Technology Procurement. The Purchasing Division in the Finance Department leads all technology solicitations. For more commonly needed items, Purchasing has Open Purchase Orders. However, most technology purchases (including PCs, mobile devices and laptops) currently require additional IT scrutiny. We found that there is confusion about what information IT requires for these purchases. The policy on technology purchases is outdated and could benefit from clarification. In our opinion, the Finance Department should ensure that all procurement forms are available centrally and provide training to relevant staff on technology procurement processes.

This report includes 9 recommendations to increase resources for and deployment of 21st century technology in the City of San José. We will present this report at the March 17, 2016 meeting of the Public Safety, Finance, and Strategic Support Committee. We would like to thank the Information Technology and Finance Departments for their time and insight during the audit process. The Administration has reviewed this report, and their response is shown on the yellow pages.

Respectfully submitted,



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Introduction

The mission of the City Auditor's Office is to independently assess and report on City operations and services. The audit function is an essential element of San José's public accountability and our audits provide the City Council, City management, and the general public with independent and objective information regarding the economy, efficiency, and effectiveness of City operations and services.

In accordance with the City Auditor's Fiscal Year (FY) 2015-16 Audit Work Plan, we have completed an audit of technology deployment. The purpose of our audit was to review the timeliness of the City's technology deployment process.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. We limited our work to those areas specified in the "Audit Objective, Scope, and Methodology" section of this report. The Office of the City Auditor thanks the management and staff from the Information Technology Department (IT), the Environmental Services Department (ESD), Human Resources Department (HR), Finance Department, the San José Police Department (SJPD), the Office of Employee Relations, the City Manager's Office, Department of Transportation (DOT), and the City Attorney's Office for their time, information, insight, and cooperation during the audit process.

Background

The mission of the Information Technology Department is to:

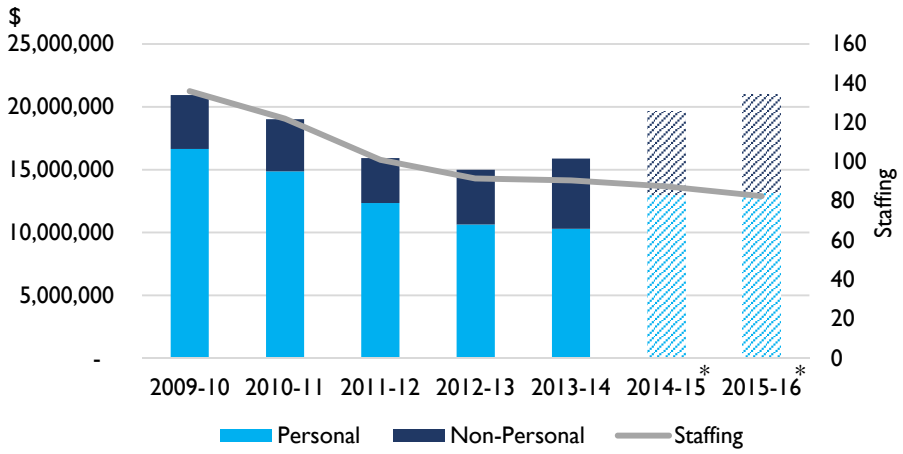
Enable the service delivery of our customers through the integration of city-wide technology resources.

In order to do this, the Department determines, develops, implements and supports technology solutions that maximize the delivery of enterprise City services. Its core services include the customer contact center, enterprise technology systems and solutions, and information technology infrastructure.

Organization and Structure

For 2015-16, IT's adopted budget is $21 million and is budgeted for 82.5 staff. IT Department staff maintain the City's technology infrastructure, and support most citywide technology functions. IT's staffing includes 59 technical positions including the Division Managers and the Supervising Applications Analysts.

Exhibit 1: IT Department Budget and Authorized Staffing (2009-10 to 2015-16)



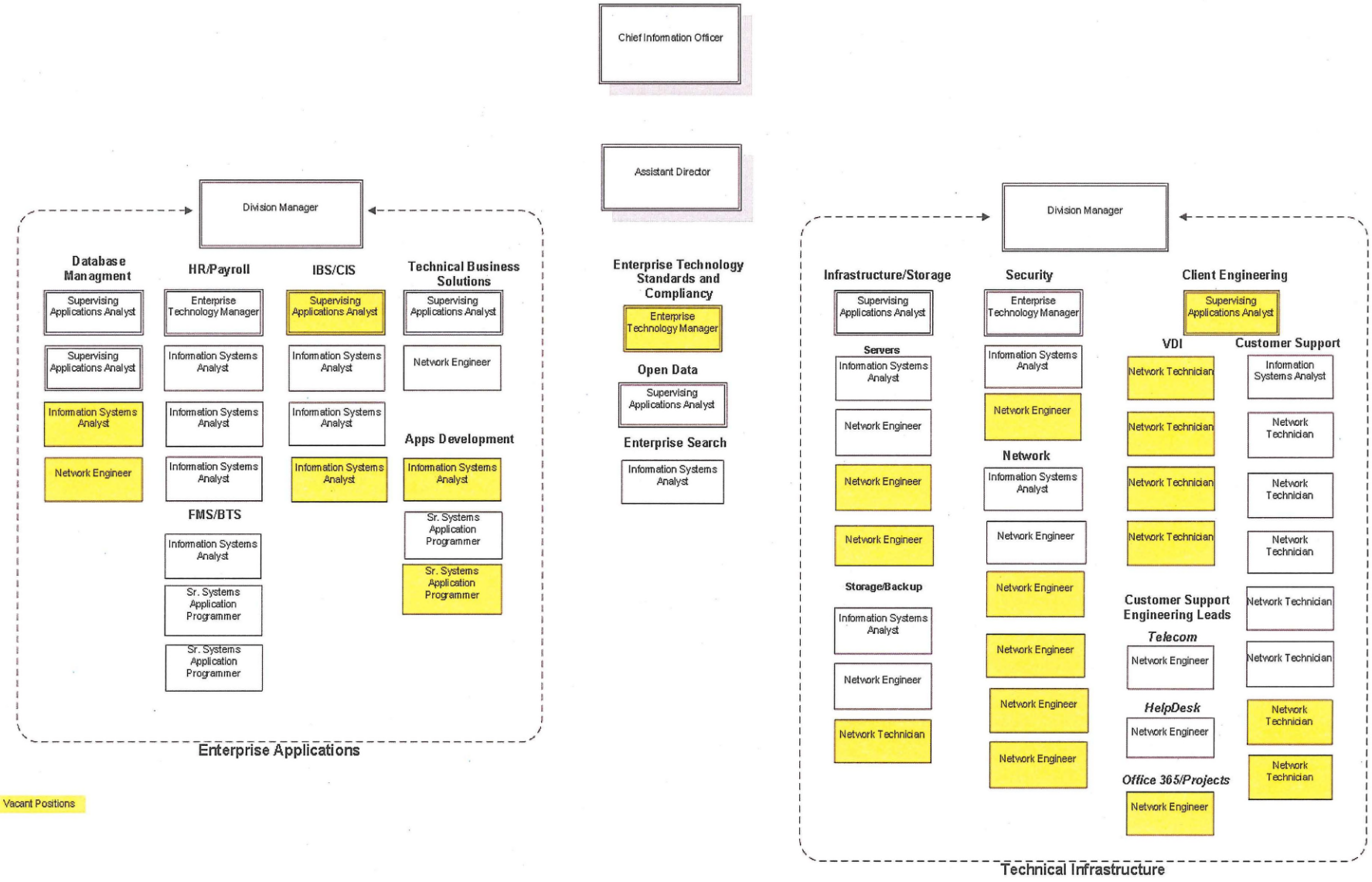
*Adopted Budget

Source: Auditor summary of IT Department budget and staffing

As of February 2016, IT had 23 vacant positions overall; almost 30 percent of its overall positions were vacant. IT is currently recruiting for 22 positions, including Supervising Applications Analysts and Network Engineers. Human Resources (HR) has been working with IT to address its high vacancy rates.

The organization chart for IT's technical staff is shown below.

Exhibit 2: Information Technology Organization Chart (technical positions)



Source: IT (As of February 2016)

Additional Citywide Technical Positions Provide IT Support

In addition to the technical positions in IT, many large departments also maintain technical staffing within their departments. These larger departments include Airport, Police, ESD, Public Works, Department of Transportation (DOT), Fire and Planning, Building and Code Enforcement (PBCE). There are around 60 such positions citywide.[1] Staff from these departments are directly accountable to their respective department directors.

Technology Deployment Process in San José

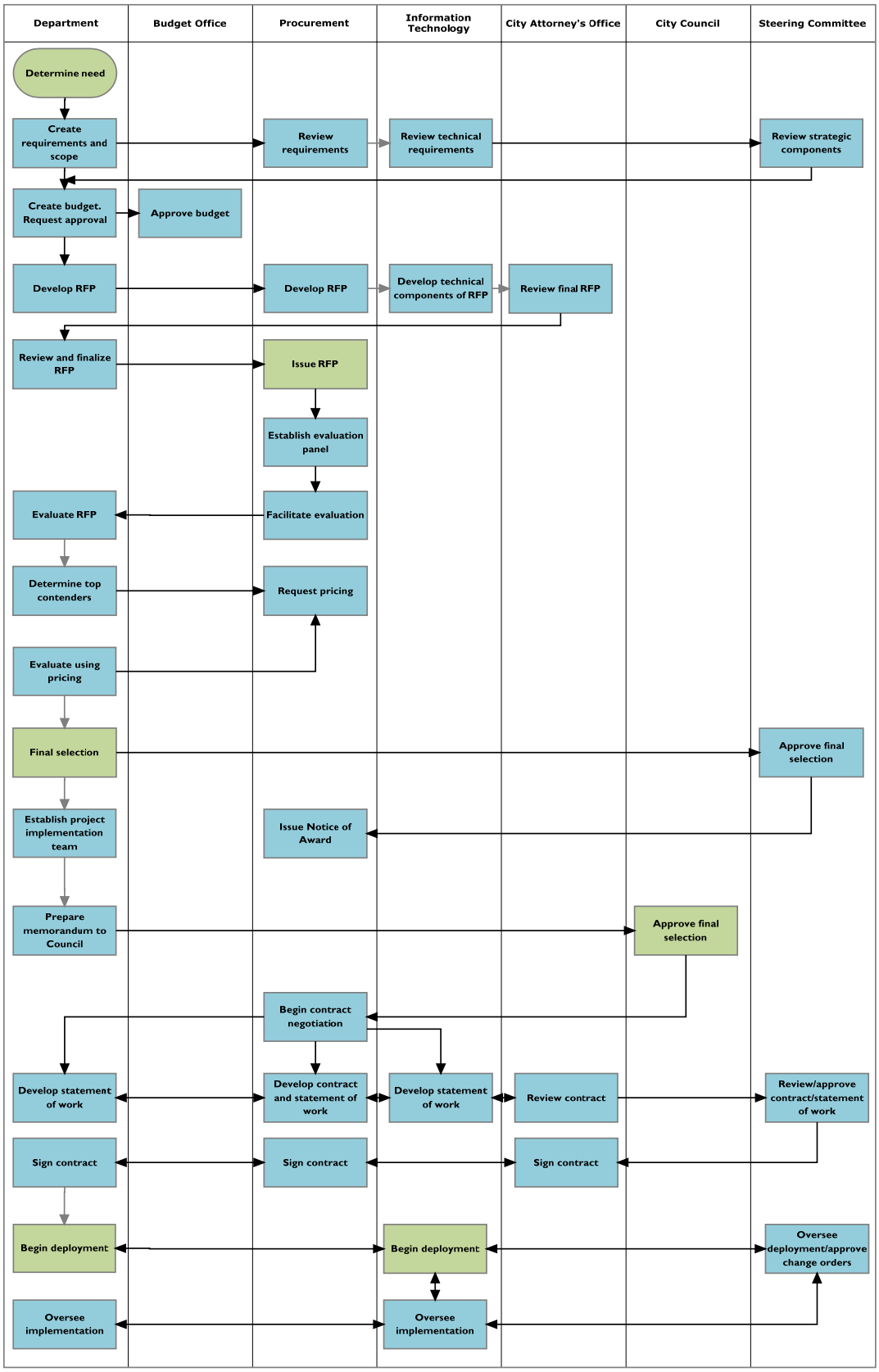
A technology deployment or technology project is a collaborative effort designed to create a unique product, service, or solution related to technology. Due to their technical complexity, interrelations with other City systems and technologies, and often multi-departmental nature, technology deployments take time. San José's technology deployment process has multiple phases. These include:

- Conception and planning: Departments determine the need for a solution and develop the technical and functional requirements for the solution based on business processes. Budget approval is required.
- Acquisition and selection: The project goes through a competitive procurement. Contract negotiation follows this process. The Finance Department's Purchasing Division leads both of these processes.
- Implementation: This phase includes a fit/gap analysis, data transfer (if needed), user testing, etc.
- Ongoing support: City staff maintain the system on an ongoing basis with some back-end support from the vendor.

Exhibit 3 details further the steps and key players in the City's technology deployment process.

[1] As of September 2015.

Exhibit 3: Technology Deployment in San José



City Policies/Requirements

The Municipal Code and various City policies govern certain aspects of the technology deployment process.

Section 4.12.120 of the San José Municipal Code designates the Finance Director as the procurement authority for: 1) Contracts for the purchases of supplies, materials and equipment; 2) Contracts for services; and 3) Contracts for information technology.

The Municipal Code requires a competitive process for the purchase of goods and services above $10,000. Specifically, Section 4.12.210 states

> *The procurement authority shall use the following methods of procurement under the circumstances described below:*
>
> *A. Purchases which are estimated not to exceed ten thousand dollars (as adjusted pursuant to Section 4.04.085) may be made without a competitive procurement method.*
>
> *B. Request for quotes process shall be used for purchases with an estimated value between ten thousand dollars (as adjusted pursuant to Section 4.04.085) and one hundred thousand dollars (as adjusted pursuant to Section 4.04.085).*[2]
>
> *C. Request for proposal process shall be used for purchases of services with an estimated value of more than one hundred thousand dollars (as adjusted pursuant to Section 4.04.085).*
>
> *D. Formal bidding process shall be used for purchases of supplies, materials and equipment with an estimated value of more than one hundred thousand dollars (as adjusted pursuant to Section 4.04.085), or for services when the director determines that it is in the best interest of the city to do so.*

Establishment of a Steering Committee

City Policy 5.1.9 provides guidance on technology purchases. Although City policy 5.1.9 (Procurement of Information Technology) requires the establishment of an Information Technology Planning Board (ITPB) for strategic planning, the City does not currently have an ITPB, as will be discussed in Finding 3. The City does make use of executive steering committees to oversee technology projects, especially if a project is complex, reaches across multiple departments, and/or affects an enterprise system. Executive steering committees are comprised of project stakeholders from both the functional and technical sides of a technology project, as well as at least one person in executive management. Multiple executive managers may be on the committee, as is the case with the Human Resources

[2] In 2010, the City Council approved Procurement Reforms that included the periodic automatic adjustments to contract authority limitations and related figures. Pursuant to section 4.04.085 of the Municipal Code, these adjustments may be made administratively every three years, and are tied to increases in the Consumer Price Index and rounded to the nearest $10,000. The figures were last adjusted to be effective July 1, 2013.

(HR)/Payroll/Budget System upgrade.[3] At a recent Council Study Session, the City Manager's Office discussed the role of an innovation cabinet in reviewing and approving upcoming technology projects.

Previous Studies Have Raised Concerns About the State of the City's Technology Program

The City has drafted numerous masterplans and conducted several studies on its technology program. These are summarized in Exhibit 4 below.

Exhibit 4: City Technology Program Masterplans and Studies

Document	Year	Author	Description
Computer Systems Masterplan	1994 (updated 1996)	City	Identified 42 different technology-related projects for the City to undertake, including setting hardware and software standards.
IT Masterplan	2000	City	Established a framework for how information resources (technology, data, applications, and people) should be acquired, deployed, and managed to enable the City to effectively carry out its mission.
City of San Jose: Integrate "Like" IT Functions	2001	Arthur Anderson	Studied San José's IT functions and created an IT enterprise integration strategy to consolidate "like" functions.
IT Master Plan (Draft)	2006	City	Drafted an Information Technology Master Plan for each City Service Area.
Business Process Modernization/ Infrastructure Roadmap	2009	City	Identified and prioritized business process initiatives essential to delivering services in an efficient, economical way.
City of San José Information Technology Optimization Study	2010	Management Partners	Assessed the current state of the City's IT program, presented recommendations to optimize citywide IT service delivery models, and recommended a governance and budget structure appropriate for the City's needs.

Source: Auditor summary of technology vision masterplans and reviews

[3] Establishing a steering committee is currently not a City requirement and is usually done when a project is cross-departmental.

These reports have raised concerns about the state of the City's IT governance, planning, and funding strategy, with many of the concerns directly related to the City's ability to conduct technology deployments.

The City's 2000 IT Masterplan stated that its IT weaknesses were:

- *Fragmented IT Investments - to date, investments in IT systems and projects have not been prioritized or optimized. Apart from having ITD try to prioritize annual IT-related budget requests, coordination has occurred on an ad hoc and informal basis.*
- *Lack of Formal IT Governance - IT governance promotes operational success by establishing a structure that guides the deployment of integrated, cost-effective, reliable, and secure technologies.*
- *Over Reliance on Contractors -The difficulty in recruiting IT support staff have resulted in having to hire expensive contractors to support key IT functions within the department.*
- *Informal IT Project Management and Accountabilities-The roles and responsibilities for management of major IT projects is not consistent.*
- *IT Recruitment and Retention - There is a critical shortage of IT professionals nationwide. Recruitment and retention of IT development and support staff is especially difficult for government organizations that can't compete with the private sector.[…]This has resulted in expensive and time-consuming recruitment efforts, high turnover, inadequate support for some existing systems, and use of expensive contractors for support.*

Many of the points raised in the 2000 Masterplan ring true today. The current upswing in employment in Silicon Valley is again impacting the City's ability to recruit and retain technology professionals. The totality of these concerns forms the current environment in which the City is trying to upgrade its technology through the numerous technology deployments described throughout the audit.

Budget Crises in the Mid-2000s Prevented the City From Investing in Major Enterprise Technologies

In the mid-2000s, the City of San José went through major budget crises. Hundreds of positions were eliminated, departmental budgets were cut, and major infrastructure upgrades were delayed. These financial crises also impacted the City's technology infrastructure. In 2003, the Mayor directed the City Manager "to freeze all technology expenditures, including individual personal computer purchases, unless they will have a beneficial impact on the General Fund."

Because of fiscal limitations, the City's ability to invest in major enterprise-wide technology projects, especially those that were tied to the General Fund, was limited during those years. As a result, upgrades and technology investment for many enterprise-wide systems were urgently needed because maintenance

support for the software ended, as was the case for the systems described in Finding 1 and 2.

Audit Objective, Scope, and Methodology

The objective of this audit was to review the management and timeliness of the City's technology deployment process and compare the City's practices to best practices.

We reviewed the current status and timeliness of the following technology deployments:

- HR/Payroll/Budget System: This includes the systems used for recruiting, benefits, absence management, time and labor, payroll, creating the operating and capital budgets, and tracking performance metrics.
- Customer Information System (CIS): The Customer Information System (CIS) is a software solution for utility billing. This is a web-based billing solution to replace the City's previous Integrated Billing System.
- Business Tax System (BTS): The Business Tax System (BTS) is a single tax billing and management application to manage about 85,000 business tax accounts and other taxes such as cardroom tax, marijuana tax, transient occupancy tax, etc.
- Office 365: This includes two major components, email migration and SharePoint, as well as Lync (Skype for business), which was a minor component. SharePoint is a Microsoft Office solution that allows users to create websites in which they can securely store, organize, share, and access information.
- Body Worn Cameras: This includes body worn cameras for the San José Police Department including peripherals/accessories, hosted video storage, video management software, configuration, implementation, and training.
- Integrated Permitting System: This is intended to be a commercial-off-the-shelf (COTS) Integrated Permitting System to replace or upgrade Development Services' existing permitting software. The solution is intended to be a web-based, turnkey permitting solution including professional services, data migration and training.

To meet our objectives we did the following:

- Interviewed staff and compiled timelines for the six projects listed above. We reviewed various City staff updates on these deployments. We also reviewed current and past requests for proposal, requests for bid and requests for information related to these deployments
- Reviewed City procurement policies, manuals and related Municipal Code sections
- Reviewed contracts for the deployment vendors and other consultants associated with the selected projects; reviewed FMS reports on expenditures for above projects; and reviewed a sample of invoices submitted by various consultants for compliance with the contracts
- Interviewed staff from Finance, IT, ESD, HR, and Police. We also interviewed steering committee members, and reviewed a sample of steering committee minutes
- Reviewed project manager updates; interviewed the HR/Payroll/Budget system project manager; and reviewed team project sites for several projects
- Reviewed the following best practices in technology deployment
  - California State Office of Systems Integration process
  - Washington State Office of the CIO
  - Audit of Best Practices for Information Systems Software Acquisition and Implementation (City of Portland)
  - DIA Information Technologies Project Life Cycle Process (City of Denver)
  - Government Accountability Office's Schedule Assessment Guide—Best Practices for project schedules
- Reviewed previous IT reports/studies
  - 2000 IT Masterplan,
  - City of San José Integrate "Like" IT Functions (2001),
  - 2006 IT Master Plan (Draft),
  - City of San José's: Business Process Modernization/Infrastructure Optimization Roadmap (2009),
  - City of San José IT Optimization Study by Management Partners (2010)
- Compared San José's IT expenditures and operating budgets to the following jurisdictions—cities of Palo Alto, San Diego, Long Beach, Santa Clara, San Mateo, Mountain View, Sunnyvale, Fremont, Oakland and City and County of San Francisco

Finding I Continuous Technology Replacement Cycles Require a Defined Replacement Program and an On-Going Funding and Staffing Strategy

Summary

The City is currently replacing several mission critical systems. Some of these systems were in danger of losing support or were legacy systems that do not meet user needs. Previous studies identified the risks associated with not addressing the City's technology infrastructure backlog, but funding constraints have hampered the City's ability to address that backlog. Clearly defining a technology replacement program would allow policymakers to understand what systems are (or will shortly be) in need of an upgrade or need to be replaced, given risk.

A technology replacement program must be funded to be effective. Despite being in the center of Silicon Valley, the City's funding for its IT department is lower than other California jurisdictions. Other jurisdictions not only spend more money, but are taking a proactive and strategic funding approach based on technology replacement lifecycles to meet their future technology needs and vision.

In our opinion the City should establish a continuous replacement program for the City's key technology systems. An annual base level of funding required to continuously replace existing technology systems should also be identified and prioritized for budget consideration. Finally, given the City's limited resources, the Chief Information Officer (CIO) should determine which enterprise technology projects in the replacement program should be prioritized based on risk. In addition, a cross-departmental committee should be established to achieve economies of scale for other cross-departmental technology projects.

Continuous Technology Replacement Requires Strategy and Planning

Technology is constantly changing. Lifecycles are short, and technology needs to be replaced or upgraded on a continuous basis, as the upgrade/replacement cycles for some of San José's systems depicted in Exhibit 5 demonstrate.

Exhibit 5: Lifecycles of Technology Systems

System/Technology	Last Upgrade/ Implementation	Next Upgrade/ Implementation	New System Contract Length
Budget System	2003[4]	Currently being upgraded	2021
ESD Billing System	2006	Currently being upgraded	2020
Business Tax System	2008	Currently being upgraded	2020
HR/Payroll System	2005	Currently being upgraded	2021
Disaster Recovery Infrastructure	Not started	Recommendation to upgrade within five years	N/A
Mobile Device Management Infrastructure	Not started	Recommendation to upgrade within five years	N/A
Financial Management System	2011	Recommendation to upgrade within five years[5]	N/A

Source: Auditor summary

We found that system upgrades are conducted at least every ten years, and in many of these cases, systems should have been upgraded earlier as they were nearing the end of their useful life or in danger of losing support. Moreover, because deployments can take as long as five years (discussed in Finding 2), strategic planning and funding for continuous upgrades is necessary. However, due to the fiscal limitations described in the Background, the City's ability to routinely invest in major enterprise technology projects has been limited. Not upgrading technology systems adds to the City's technology infrastructure backlog.

Mission Critical Technologies Are in the Process of Being Replaced

As the City recovered from budget crises, funding for technology projects began to be available. Many departments are now in the process of replacing old mission critical systems. In many instances, loss of maintenance support and poor user interface has increased the urgency. For example, the City's HR/Payroll system was transitioning to limited support as early as 2010, which was one of the impetuses for releasing an initial RFP to find a potential alternative. However, because of the fiscal crisis and lack of immediate funding to upgrade the system, the City continued to use it. The system is currently running with limited support. Similarly the old utility billing and business tax system was to lose support in July 2015, increasing the urgency to replace it.

In addition, the City is undergoing a competitive purchasing process to replace its old permitting system. This is a legacy system that was developed in-house that

[4] In 2003, the Capital Budget System (CABS), which produces the City's Capital Budget, was upgraded. The Operating Budget System (ABS), which produces the City's Operating Budget, was developed in-house in the 1980s and has gone through incremental upgrades since then.

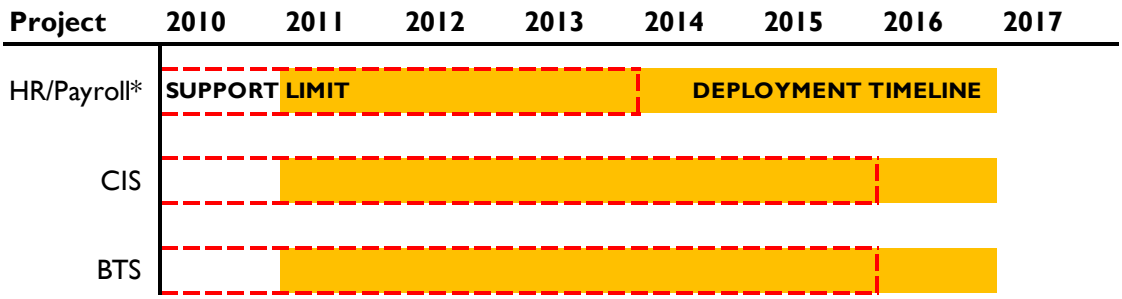
[5] The FMS upgrade has been delayed because of staffing limitations in IT. While FMS is currently supported, staff agrees that it is a legacy system that does not currently meet the needs of the organization.

lacks many essential functionalities such as some types of online permitting, submissions of plans online, etc., that users have come to expect.

Finally, much of the hardware that was replaced during the Office 365 upgrade was already at the end of its useful life. The software that most employees ran on was Office 2003. Desktop environments and operating systems across the City were not standardized. Bringing the organization up to the current environment, which would allow for the upgrade, added to the complexity of the implementation. In hindsight, smaller more frequent upgrades would have reduced the complexity of the implementation.

Exhibit 6 provides a snapshot of deployment timelines for selected systems compared to the expected loss of maintenance support for those systems. In each case, the end of projected deployment is past a system's loss of support.

Exhibit 6: Maintenance Support of Existing Systems Exceed Deployment Timelines[6]



*The HR/Payroll system continues to run with limited support from Oracle. Its revenue management component lost premier support in December 2010, and its portal solutions component lost extended support in March 2013.

Source: Auditor summary

Additional Technologies Need to be Replaced in the Near Future

In addition to the mission critical technologies currently being upgraded, IT's internal five-year forecast estimates that certain mission critical technologies will need replacement in the next five years. Some of these are described below:

- Disaster recovery infrastructure: Most of the disaster recovery plans for the City's key computer systems are over 15 years old. This project would allow the City to select a cloud provider for managing redundancy should there be a major disruption of government services.

[6] Deployment timelines cover the beginning of a project's planning to the end of system stabilization. "Beginning" refers to the issuance of a request for proposal/information or other documented initiation of a project, although discussions to replace or upgrade a system may have started long before.

- Mobile device management infrastructure: The mobile device management infrastructure provides secure and seamless access to internal City resources while mobile. The current system protects data on mobile devices, both at rest and in transit, providing the ability to "wipe" devices that may be lost or stolen.
- Financial Management System: The City's Financial Management System (FMS) is almost 30 years old and based on system architecture from the 1980s. Although upgraded numerous times, the system lacks functionality in many key areas including contract administration, procurement, budgeting, project cost accounting, etc.

While these projects have been identified as future expenses by IT, none of these are funded nor is there a plan to set aside funding for them.

Moreover, the replacement/renewal schedules for many of the major systems being currently upgraded or implemented will be on the horizon:

- The contract with the Business Tax System vendor lasts until 2020;
- The contract for Customer Information System also lasts until 2020;
- The hosting timeframe for the HR/Payroll/Budget system is 6 years; and
- The contract time-frame for the permitting system is expected to be for 7 years with an option to renew.[7]

Creating a replacement program to upgrade or implement new systems based on when their maintenance expires is crucial, as we found that, historically, the City has had to replace major information systems in less than ten years, and that a technology deployment from conception to conclusion can take as long as five years.

The City Faces Risks by Continuing to Use Outdated Systems

In the late 2000s, the City coordinated two initiatives to assess its information technology programs, provide recommendations based on those assessments, and identify priority technology initiatives the City should undertake. These were the 2009 *Business Process Modernization/Infrastructure Roadmap* ("Roadmap") undertaken by a Business Process Transformation/Infrastructure Optimization (BPT/IO) Action Team composed of City staff, and the 2010 Management Partners *City of San José Information Technology Optimization Study* ("Optimization Study"). Both of these reports warned of the risks the City faces by continuing to use

[7] The City Auditor's audit of IT general controls in 2010 (http://www.sanjoseca.gov/DocumentCenter/View/3168) recommended that given scarce funding, the Administration review the age of its critical computer applications and determine a replacement schedule and budget for the highest risk systems. This recommendation has still not been implemented.

outdated systems, especially those that have lost support or are in danger of losing support.

Management Partners' Optimization Study found that many of the City's systems were "quite old and are no longer meeting the needs of the organization," or were running on old computer operating systems. It cautions that

> *Old operating systems are often not supported or are poorly supported by their manufacturers. Organizations that cling to outdated systems too long often find themselves with major support problems as the few employees with those skills leave…Keeping business systems within a few years of the current state-of-the-art can be an important component in ensuring service reliability.*

In addition to support problems, the report notes that "there is a risk of deteriorating performance and increased maintenance costs as the technology approaches and exceeds its useful life."

The Roadmap's findings reinforce these warnings. Specifically, the study found that the old age of the City's systems resulted in "frequent component failure, emergency repairs and operational/security risks." It elaborated that

> *Systems older than 5 years frequently lack the functionality and flexibility to meet changing business requirements resulting in stagnant business process improvement initiatives, dozens and dozens of 'shadow systems,' wasted staff time, poor customer service and duplication of effort.*

The Action Team concluded that the "cost of not making critical business systems improvements will be far greater over time than the cost of the investments in modern business systems."

The enterprise-wide nature of some of the City's systems makes the risks detailed above a concern for the entire organization. For example, a failure of the Payroll system or Financial Management System could have devastating impacts across the City. It is imperative that the City adopt a replacement program for its mission critical or enterprise-wide technologies, as well as a funding strategy to execute that program (described below), to better address and mitigate these risks. Defining a technology replacement program would allow policymakers to understand what systems are in need of an upgrade or need to be replaced, given risk.

Funding Strategies Are Required to Meet the Long-Term Needs of Technology Replacement Lifecycles

Given the continuous need to upgrade or replace technology systems, best practices require jurisdictions to have a funding strategy to meet the needs of their technology replacement schedules.

For example, the City and County of San Francisco engages in long-term planning for the city's infrastructure and information technology needs. Managed by the City Administrator, the City has completed comprehensive assessments of the City's near- and long-term capital and technology needs through the creation of the Ten-Year Capital Plan and the Five-Year Information and Communications Technology Plan, each of which is issued biennially in odd calendar years, and in conjunction with the City's Five-Year Financial Plan.

In the State of Oregon, agencies are required to establish standard lifecycles for agency IT assets. Further, agencies are required to develop and submit a Lifecycle Replacement Plan for all assets included in the agency IT asset management program to the Department of Administrative Services CIO at the same time the agency submits its biennial agency request budget document.

In San José, however, the replacement practice has been different. Rather than a technology replacement program defining a long-term funding strategy to ensure technology across the City is kept up to date, the budget has instead defined what technology projects the City can take on at any given point. This is especially true for departments funded with General Fund monies.

As early as 2000, the City's IT Masterplan noted that

> *technologies continue to evolve rapidly... This requires some flexibility in budgeting and financing strategies. The City should seek to improve IT lifecycle cost estimates, IT project cost management and accountability, and coordinated IT investing.*

Despite this early-identified need, Management Partners' 2010 Optimization Study found that the City lacked "an appropriately funded replacement program for major IT infrastructure, equipment and systems."

The Business Process Transformation/Infrastructure Optimization (BPT/IO) Action Team's 2009 Roadmap further emphasized that

> *The City has not employed a sustainable funding strategy for enterprise business systems and infrastructure investment consistently for at least the past ten years. As a result, funding for major system improvements has been available mostly on a one-time or ad-hoc basis… A sustainable commitment for long term funding and support of IT investments is the single most critical issue that*

> *has to be addressed in order to succeed in the development and deployment of the Process Improvement Initiatives that the departments agreed are badly needed. Without a sustainable commitment; acquisition, configuration and operational support of the business systems needed to succeed in process improvement is impossible.*

Cheaper doesn't always work. The reality of the City's budget-constrained technology decisions is exemplified by the initial budget approval for the Office 365 deployment. The City made a strategic decision to purchase and deploy a web-based version of Office 365 for most of the City—an initial investment of $800,000. Only 400 employees were given the more robust desktop-based version. Ultimately it was determined that the rest of the City needed to be upgraded to the desktop version—leading to a second wave of upgrades at an additional cost of $350,000.

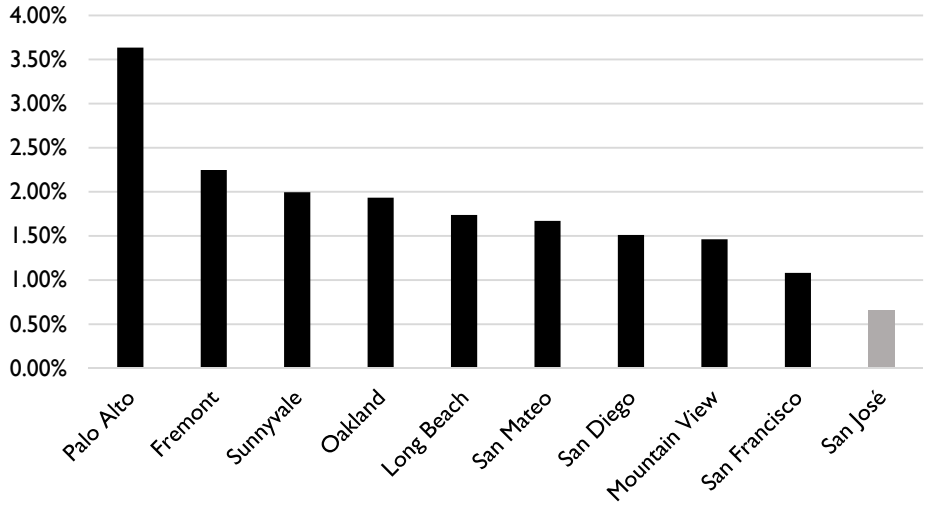
In order to ensure the long-term technology needs of the City are met, the City needs to develop a replacement program for its systems and IT infrastructure. This can only be done effectively when there is a long-term funding strategy to implement the program.

Other cities have technology funds/reserves to ensure this type of strategic process. In addition to the examples of the City and County of San Francisco and the State of Oregon cited above, Palo Alto has an Internal Service Fund for technology. This fund reflects costs associated with citywide information technology activities including maintenance and infrastructure replacements for all City departments, including the Utilities Department.

San José Invests Fewer Resources in IT Compared to Other Jurisdictions

Not only does San José lack a funding strategy to cover the continuous needs of technology replacement, it also invests less monetary and personnel resources in IT on the whole when compared with other jurisdictions. Exhibit 7 summarizes the spending of several California jurisdictions for their information technology departments.

Exhibit 7: San José's 2015-16 IT Department Budget as a Percentage of Overall City Budget Compared to Other California Jurisdictions



Source: Auditor review of comparative city budgets

We should note that the organization of IT functions varies across cities. For example, San José's IT department houses the Citywide call center, and is thus included in the San José budget depicted in the exhibit. In addition, San José, like many other cities, has a decentralized IT function with many technology staff spread across various major City departments.

Despite being at the center of the Silicon Valley, San José's funding and staffing (discussed in Finding 2) for its central IT function are among the lowest of the jurisdictions to which we sampled.

Citywide Technology Masterplan

Having a funded technology replacement program is only one aspect of an overall citywide technology masterplan. Best practices state that in addition to a replacement program, cities should develop their own masterplans to address more strategic questions such as: What are the City's organizational information technology priorities? What body determines these priorities? What is the relationship between IT and other departments in supporting the City's technology infrastructure and systems?

The City has had a long history of creating such masterplans, with the creation of the following:

- 1994: Computer Systems Masterplan (updated 1996)
- 2000: IT Masterplan
- 2006: IT Master Plan (Draft)

These masterplans included items such as the City's information technology management vision and principles, information technology governance, and strategic information technology initiatives. However, despite the City's efforts in creating such comprehensive plans, the Business Process Transformation/Infrastructure Optimization (BPT/IO) Action Team's Roadmap, as well as the Management Partners Optimization Study, found that a lack of funding to execute these visions rendered them ineffectual.

The lack of a funded strategic technology vision has had impacts on technology deployments in the City. The BPT/IO Action Team noted that "not funding the 2000 [master] plan has forced departments to seek separate funding and acquire business systems for their internal needs." Management Partners' Optimization Study reinforced this, saying, "funding for enterprise-wide projects has not been forthcoming, driving line departments to develop department versions of what should have been enterprise-level projects."

The Optimization Study cited GIS packages and systems used for internal collaboration, project management, and document sharing as examples of existing redundant systems within the City. Strategic planning could have prevented these redundant cross-departmental deployments, reduced the City's purchasing costs and ongoing operating costs for such redundancies, and taken advantage of economies of scale.

Further, having a strategic vision and a focus to execute that vision could guide decisions on upgrading or implementing new software based on a replacement program. For example, every other year the City and County of San Francisco's Committee on Information Technology (COIT) issues a five-year Information and Communication Technology Plan[8] to better align the city's resources with its technology goals and objectives.[9] Given the many systems the City currently has and its limited resources, the City will have to decide which systems are a priority to replace, or even which systems should be discontinued.

In 2010, Management Partners envisioned four beneficial outcomes that an updated, and funded, strategic vision could have for the City's information technology program:

- The establishment of an effective IT governance structure that recognizes IT support of any public service being a concern of the entire city enterprise with IT services contributing the largest benefit to the broadest base possible.

[8] http://ictplan.sfgov.org/assets/ict-plan-fy-2016-2020---coit.pdf

[9] COIT is composed of five permanent members (the Mayor, the President of the Board of Supervisors, the Controller, the City Administrator, and the Chief Information Officer), eight rotating positions reserved for department heads, and two members of the public. At the beginning of every budget cycle, COIT requests every department to submit all information and communication technology project proposals with an estimated cost of $100,000 or greater, which COIT then reviews to develop funding recommendations.

- The development of base leveling funding for key common business applications and the replacement of equipment.
- Future budgets and organizational structures are focused on delivering IT services that provide the most cost efficient and broad benefit possible.
- New IT investments are prioritized according to overarching city needs and service priorities while providing the highest cost and service benefit to the entire organization.

Recommendation #1: The Administration should establish a continuous replacement program for the City's key technology systems by:

a) Clearly defining a continuous replacement program that outlines the City's key technology systems, the end of these systems' support/useful life, the estimated cost for upgrade/replacement (if possible), etc. The program should give a clear picture of the risks the City faces by not upgrading these systems, and should be incorporated in the Status Report on Deferred Maintenance and Infrastructure Backlog;

b) Identifying and prioritizing for budget consideration an annual base level of funding required to continuously replace existing technology systems (in addition to the current process for identifying one-time funding for new technology projects); and

c) Given the City's limited resources, the CIO should determine which enterprise technology projects in the program should be prioritized based on risk, and establish a cross-departmental committee to advise on additional cross-departmental technology needs with a focus on the efficient deployment of resources to deliver the Citywide technology vision.

Finding 2 The City Lacks Dedicated Staffing and Project Management to Ensure Timeliness and Success of Technology Implementations

Summary

Procurement and deployment of major technology systems is a long and complicated process. Many departments and staff are involved, and the major technology deployments we reviewed for this audit have taken as long as five years from the initial planning to implementation. Reasons for this ranged from changes in the initial direction of the project, to the need to meet and confer with labor unions. What these projects had in common was that they did not have project managers assigned to them from the beginning of the process. In our opinion, having qualified project managers throughout a project is critical to the success and timeliness of a technology project. Further, the City has not been able to dedicate sufficient staffing to some of these major projects. Staffing shortages in IT and strategic support departments further exacerbate the problem. Finally, IT has responsibility to approve technology deployments but little staff to support them.

The City needs to ensure that sufficient resources are allocated from the project start. This includes IT staffing and qualified project managers who are dedicated and responsible for the entire project from planning to deployment. In our opinion, given the continuous need to replace technology systems, the City should hire qualified, permanent project management staff to develop in-house knowledge and maintain continuity. Further, the City should require outside project managers to transfer responsibility and lessons learnt during a project to internal City staff. In addition, the Administration should require written project plans and timelines, and project steering committees to be appropriately staffed, with authority to reallocate resources where needed. Finally, the Administration should review the overall strategic support staffing in the IT Department and ensure that its vacant positions are immediately filled. This may require salary enhancements.

Major Technology Deployments Have a Multi-Step and Inherently Lengthy Process

Best practices recommend a multi-step approach to technology deployments. According to the Portland audit of "*Best Practices for Information Systems Software Acquisition and Implementation,*" typically there are four distinct phases in the implementation of information systems. These are:

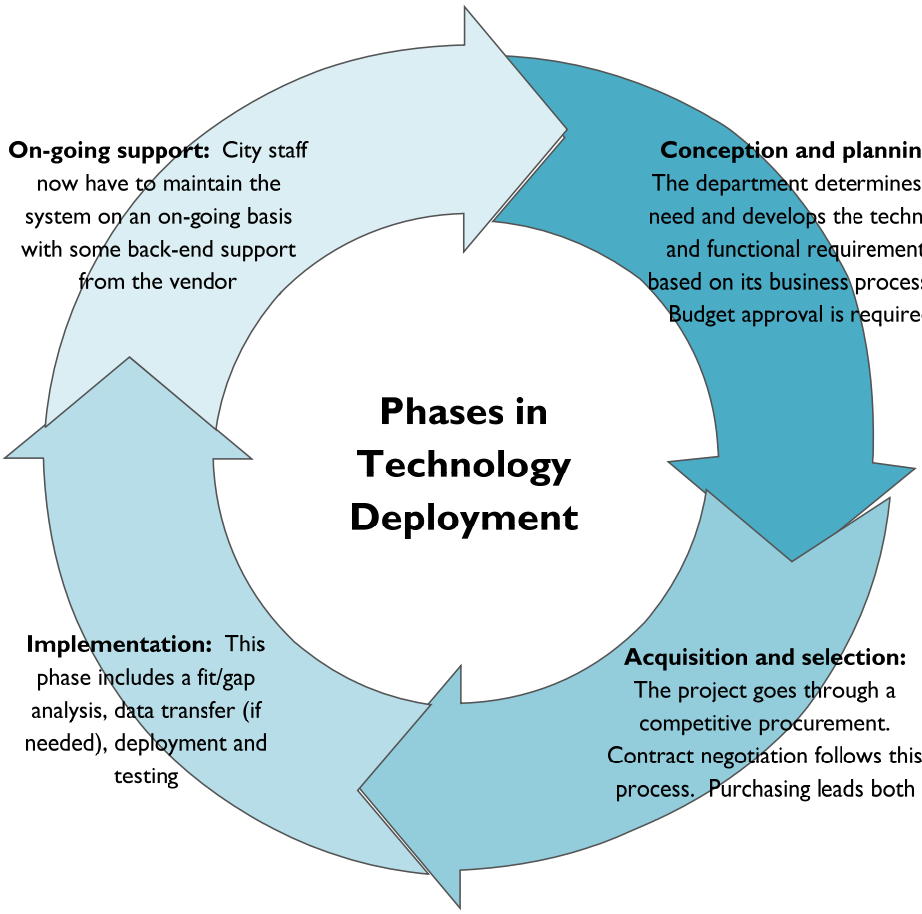
1. Project concept and solution definition
    i. Determine if you have a project
    ii. Try to keep projects small and modular
    iii. Describe the project in functional terms
    iv. Know your business processes
    v. Evaluate the project financially
    vi. Use project deliverables to define success
    vii. Involve users early and often
    viii. If you need outside help, get it
2. Selection and Acquisition
    i. Write a detailed and clear request for proposal
    ii. Make a team effort but speak with one voice
    iii. Select two or three top finalists and see working versions of their software
    iv. Negotiate a good contract
    v. Don't be afraid to stop and reevaluate if things are not going well
3. Design, building, testing and acceptance
    i. Have good systems in place for communicating, and monitoring deliverables and milestones
    ii. Create a process for managing scope change requests
    iii. Keep risks visible and managed
    iv. "Chunk it" and clearly define end points
    v. Insist on thorough system documentation
    vi. Test
    vii. Prepare a system implementation plan early
4. On-going maintenance and operation
    i. Plan for maintenance
    ii. Invest in training
    iii. Conduct a post-implementation review

San José's technology deployments also have four distinct phases. These are:

- Conception and planning (which includes budget approval)
- Acquisition and selection (which includes contract negotiation)
- Implementation, and
- On-going support

Exhibit 8 shows the four steps in San José's technology deployment.

Exhibit 8: Phases in San José's Continuous Technology Deployment



Source: Auditor summary of the City's technology deployment process

Many Departments Are Involved in Technology Deployments

Larger technology deployments[10] requires multi-department coordination throughout the technology deployment process. This coordination is shown in Exhibit 9 below.

[10] We have defined larger technology deployments to mean deployments over $1 million.

Exhibit 9: Multiple Departments Are Involved During Various Phases of a Large Technology Deployment

Phase	Department	IT	Procurement	City Attorney's Office	City Council*
Concept and Planning					
Identify operational need	X				
Budget					
Receive initial IT approval	X	X			
Receive Budget Office approval	X**				
Acquisition and Planning					
Develop specifications	X	X			
Receive specification approval	X	X			
Develop evaluation factors and weights	X				
Develop and issue solicitation	X		X	X	
Receive solicitation responses			X		
Questions or clarifications about the solicitations	X		X		
Facilitate evaluations			X		
Review technical responses	X				
Communicate the final technical evaluation	X		X		
Tabulate cost responses/scores			X		
Issue Notice of Intended Award			X		
Respond to protests			X		
Process Council Memo for award of contract	X		X		
Approve final selection and proceed to contract execution					X
Contract Negotiation					
Negotiate contract			X	X	
Implementation and Support					
Assure contractor provides service	X	X			

* Council approval is required for contracts for services over $270,000 and $1 million for goods.

** The San José City Council approves the annual budget, which includes funding for various technology projects/staffing.

Source: Auditor summary of City Policy 5.1.9 and staff interviews

In addition, the Office of Employee Relations (OER) may need to be involved if there is a staffing impact, or if there are labor contract or service delivery evaluation considerations. For example, OER was involved in negotiating with the Police Officers Association on a mutually agreeable policy for the upcoming body worn camera roll-out. Similarly OER contacted the affected bargaining units (MEF and CEO, and CAMP)[11] in September 2012 when the initial decision to contract out Recycle Plus was made. The City subsequently met several times with MEF, CEO, and CAMP, separately, to discuss the impacts of Recycle Plus

[11] MEF—Municipal Employees' Federation, CEO—Confidential Employees Organization, CAMP—City Association of Management Personnel.

changes, including any potential reductions in staff, alternatives to maintaining an in-house system, etc., at each stage of the process. Finally, the City Attorney's Office may review and approve the Request for Proposal (RFP) and the final contract to ensure that legal requirements are met.

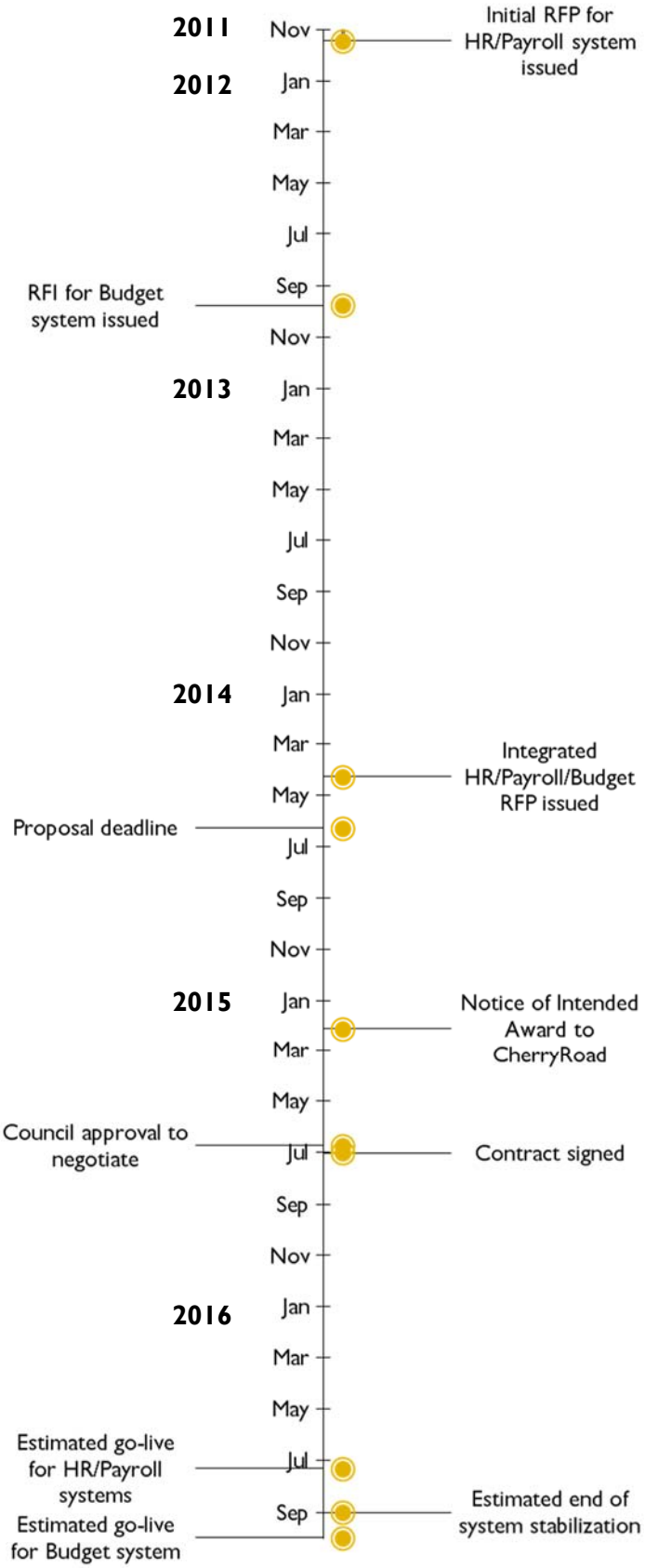
The Technology Deployments We Reviewed Took Long

We found that the City's planning and competitive process can take a long time. Each of the deployments we reviewed and described below have taken over two years to plan.

Projects Took Long for a Variety of Reasons

Each of the projects we reviewed underwent long planning and competitive processes, while the implementation process (including fit/gap analysis, data transfer, and user testing) has been on a relatively aggressive schedule. Each project had its own budget and staffing constraints. The bottlenecks for each of these projects are depicted below. We should note that these timelines do not capture the full length of a deployment, as discussions to upgrade the systems discussed below may have started long before the initial requests for proposal/bid/information were issued. Further, the timelines depicted only reflect decision points traceable through City records such as memoranda or RFPs/RFIs.

Exhibit 10: HR/Payroll/Budget System



The City initially released two separate requests—an RFP for the HR/Payroll system in November 2011 and a Request for Information (RFI) for the Budget System in September 2012.

From these requests, staff found that there were solutions in the market that could meet the needs of the City. However, at the time there was no funding to move forward with either of these projects.

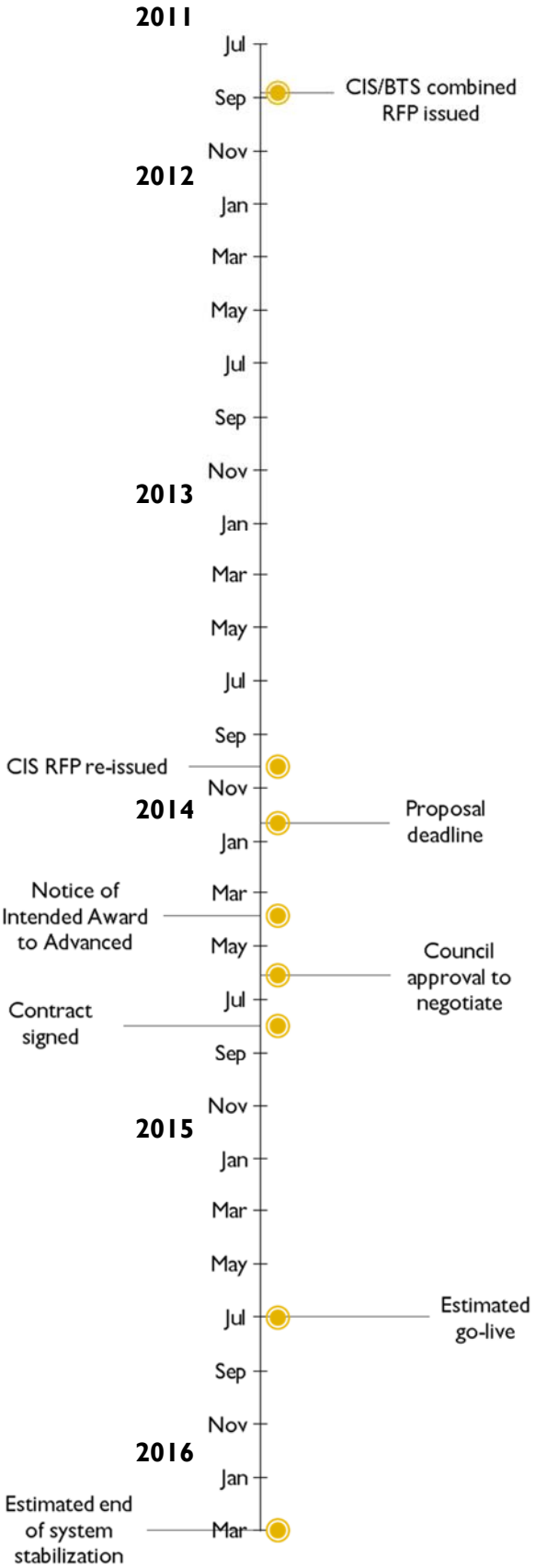
Internal discussions among stakeholders for both systems led to the decision to release a single RFP for an integrated HR/Payroll/Budget system in April 2014.

The contract was executed in June 2015 with CherryRoad selected as the vendor. In total, the initial planning phases and internal discussions account for half of the 5 year deployment timeline.

Competent project management and tight coordination with the Steering Committee have led to overall successes with the implementation thus far. There have been several customizations identified. The Steering Committee approves all customizations.

Additional City staff have been brought on to the project team to assist with these changes.

Exhibit 11: Customer Information System



The Customer Information System (CIS) is a software solution for utility billing. This is a web-based billing solution to replace the City's previous Integrated Billing System. Finance and ESD did a combined RFP for the BTS and CIS system.

Finance and ESD used an outside consultant do the RFP process for the combined CIS/BTS RFP.

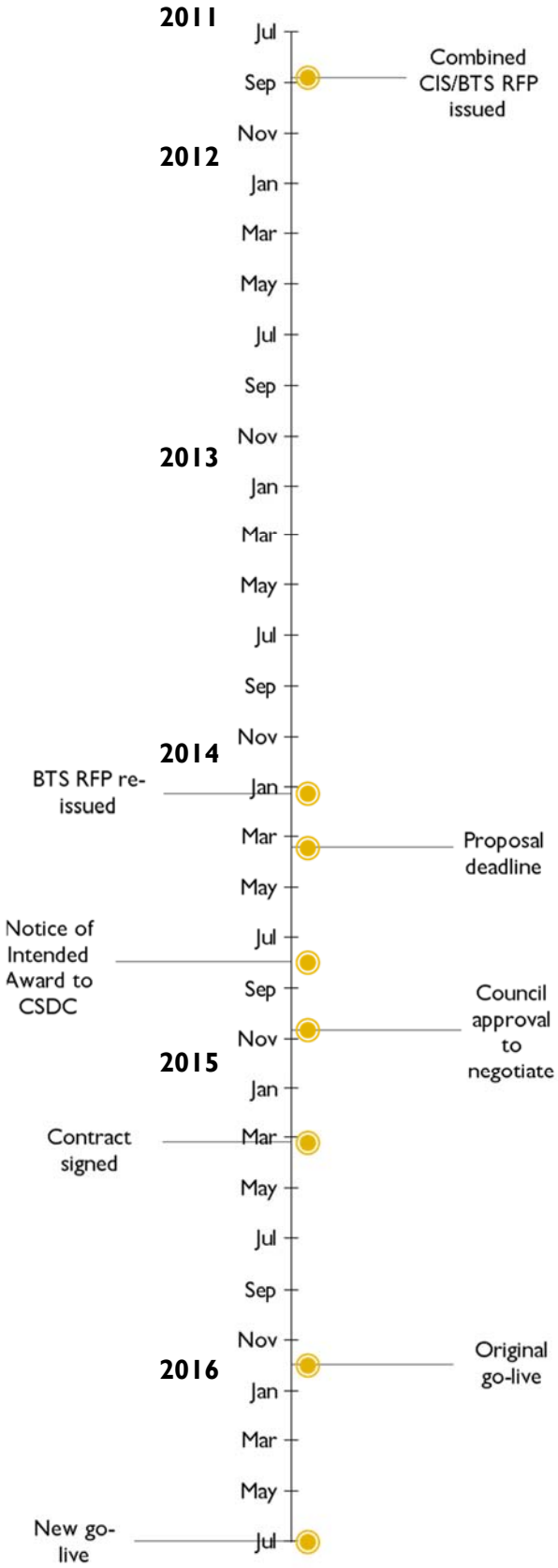
This RFP was released in September 2011 with responses expected in November 2011. However, after vendors had submitted responses and the City had gone through the evaluation process, the City decided to cancel and restart the process again.

This time, Finance Department's Purchasing Division took the lead. Purchasing began work on the second RFP and in December 2013 two RFPs were issued—one for CIS and the other a month later for BTS.

Vendor selection for CIS was completed in March 2014. The vendor selected for this implementation was Advanced Utility Systems.

The implementation for the CIS system has had some problems causing delays. There have been problems with the bill print function that has led customers to receive incorrect bills for incorrect amounts. The City is in the process of finalizing a list of final requirements before making final payments. Members of the Steering Committee and other stakeholders appear to be actively engaged with these problems.

Exhibit 12: Business Tax System



The Business Tax System (BTS) is a single tax billing and management application to manage about 85,000 business tax accounts and other taxes such as cardroom tax, marijuana tax, transient occupancy tax, etc. Finance and ESD did a combined RFP for the BTS and CIS system.

Finance and ESD used an outside consultant do the RFP process for the combined CIS/BTS RFP.

Due to dissatisfaction and concerns with the original RFP process, the City decided to re-do the solicitation, this time with the BTS system solicitation issued as its own RFP.

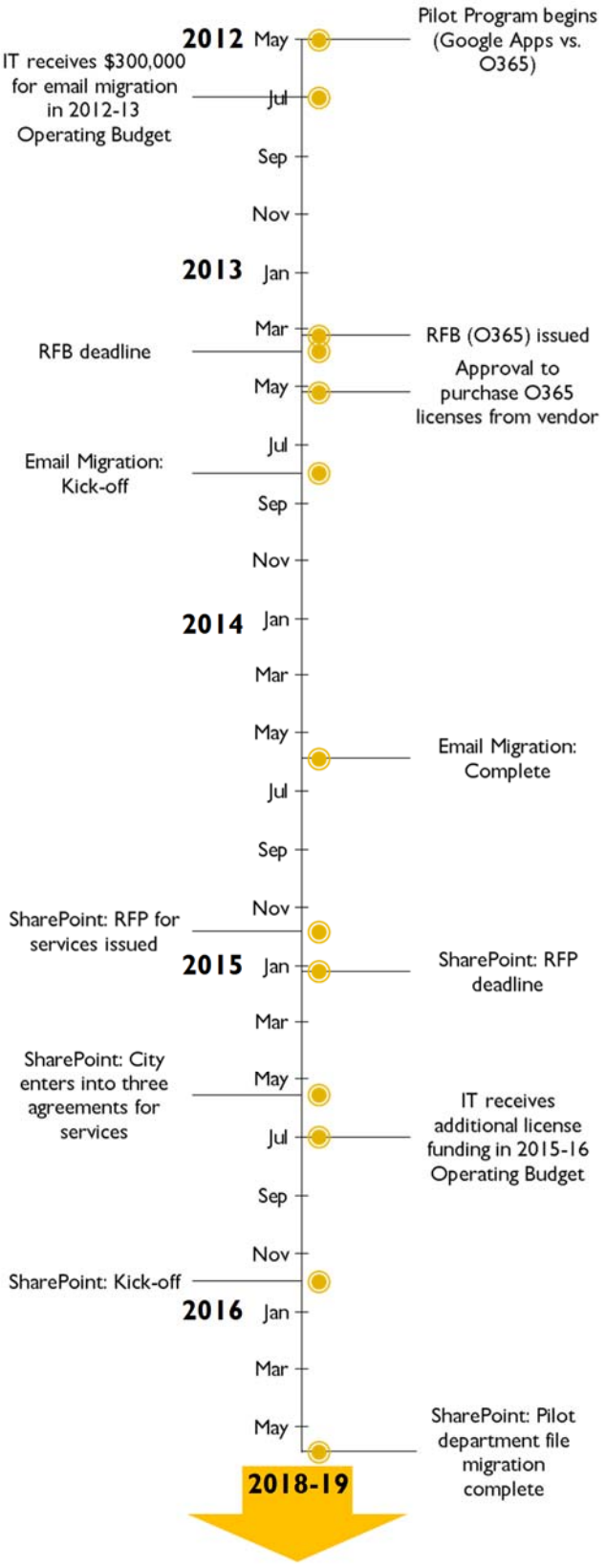
Finance and ESD chose an outside vendor to provide project management service for the implementation phase of the project.

Vendor selection was completed but contract negotiations took longer than expected due to disagreements on contract terms.

Finance has assigned three full-time staff to this project. The project sponsor is a Division Manager that is also responsible for managing regular department activities. No staff from IT is assigned full-time.

The data transfer from the old BTS system has taken longer than anticipated. The go-live date for the BTS system is now anticipated to be in July 2016.

Exhibit 13: Office 365 Email Migration and SharePoint Deployment



Although the City's email system was nearing the end of its useful life for some time, financial constraints prevented IT from upgrading or replacing it until the system began failing. In 2011-12, IT began to research alternatives, and in the 2012-13 Adopted Operating Budget, IT received funding to migrate the City's email to a new platform.

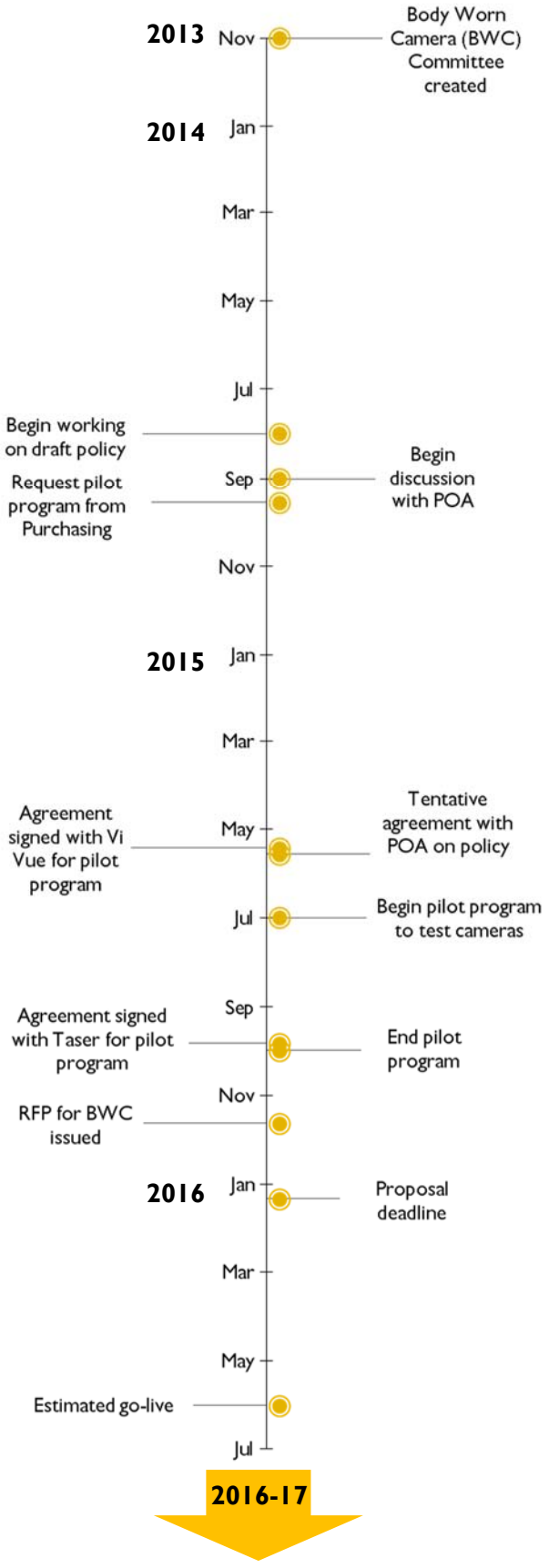
In May 2012, IT ran a pilot program between Google Apps and Office 365. After choosing Office 365, an RFB was released in March 2013, and IT received approval to purchase licenses from the selected vendor in May 2013.

The email migration component of the upgrade began in August 2013 and was completed in June 2014. The City was initially upgraded to a web-based email system for all employees, with only around 400 receiving the more robust desktop-based upgrade. IT received funding in the 2015-16 Adopted Operating Budget to upgrade all staff to the desktop version.

The SharePoint implementation began in December 2015 with several "pilot" departments (IT, City Manager's Office, and Airport), and file migration for these departments is expected to be complete in May 2016. The entire SharePoint implementation, however, is expected to take three years from the December 2015 kick-off.

Two IT staff manage both major components of the Office 365 deployment, one for the email migration and one for the SharePoint implementation, both of whom are also working to support the City's daily IT operations.

Exhibit 14: Body Worn Cameras



The City began the planning process in 2013 by forming a Body Worn Camera Committee in November 2013. Purchasing began reviewing specifications in March 2014.

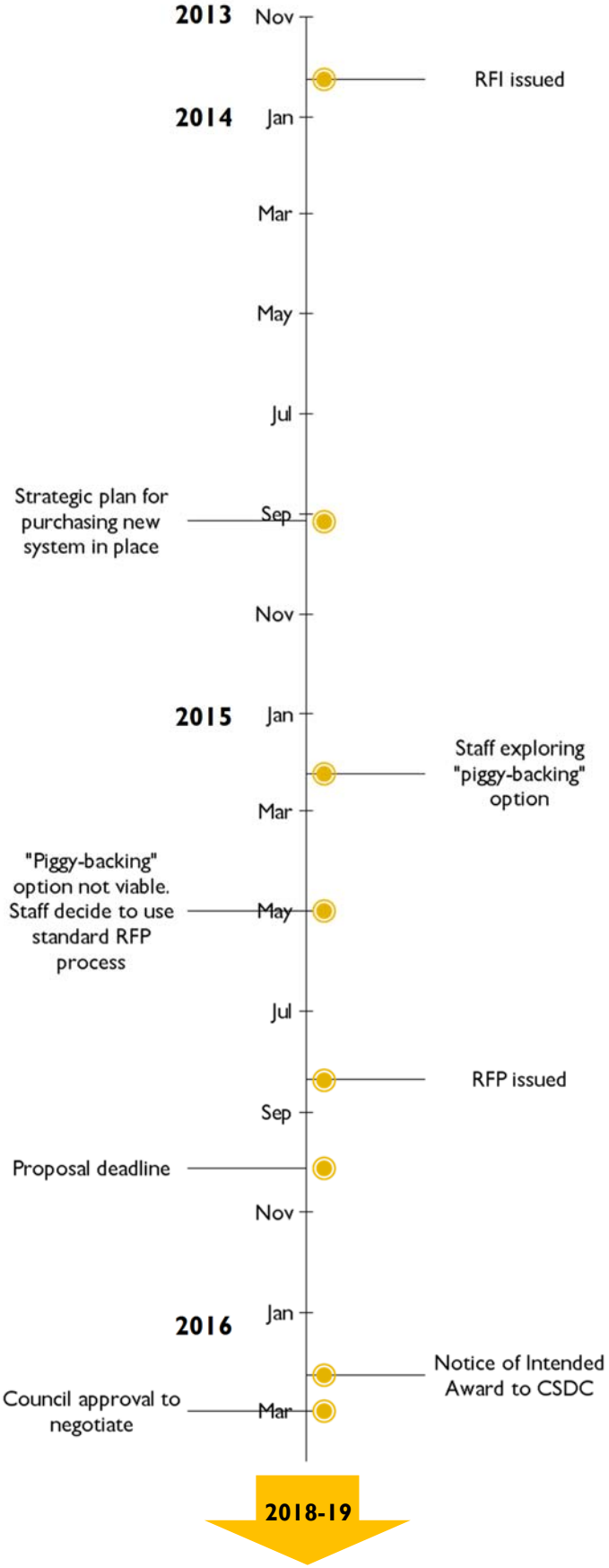
One year after beginning the planning process, the Police Department decided to do a pilot program for body worn cameras. In order to do a pilot program, the department had to get approval from Purchasing. Purchasing approved this request in September 2014, and began working on pilot agreements with two vendors.

The Police Department then requested that this pilot program be put on hold in order to negotiate the use of the cameras with the Police Officers Association (POA). These negotiations began in September 2014 and culminated with a policy agreement in May 2015.

The Department and Purchasing Division signed agreements with Taser Inc, and Vu Vie for a no-cost three month pilot program.

The City's Purchasing Division released an RFP in November 2015 with responses expected by January 2015. SJPD expects that cameras will be deployed in June 2016, with full implementation before the end of fiscal year 2016-17.

Exhibit 15: Integrated Permitting System



The Integrated Permitting System is intended to be a commercial-off-the-shelf (COTS) system that will be a web-based, turnkey permitting solution. The deployment will include professional services, data migration and training. This system will replace or upgrade Development Services' existing permitting software.

Planning for purchasing a new system began in 2013 with the release of a Request for Information (RFI) in December.

By early 2015, staff were exploring the option of utilizing an older agreement ("piggy-backing") to purchase a new system that would allow them to not go through an RFP process. In May 2015, staff found this option unviable and began preparing for the standard RFP process.

In August 2015, the RFP was released. The City issued a Notice of Intended Award to CSDC in February 2016, and Council approved to negotiate with CSDC in March 2016.

The total implementation is expected to take 28 months, with an estimated system go-live 9 months after project kick-off. Staff are working to issue an RFQ for an "advisor" who will help during the contract negotiation and system implementation.

Across projects, we identified issues in several areas—planning and oversight, project management, and staffing—contributing to long deployment times. These issues are detailed below.

A Project Steering Committee Is Important to Ensure Accountability

In general, for technology projects spanning multiple departments, the City establishes a Steering Committee. The Steering Committee is made up of executive level staff, generally department directors, whose role is to steer the project to a successful completion.

All the multi-departmental projects we reviewed (the HR/Payroll/Budget system, CIS and BTS) had active and appropriately staffed steering committees that met on a regular basis. Exhibit 16 below shows the staffing of the Steering Committees for the three projects.

Exhibit 16: Steering Committee and Project Sponsor Make-up

Project	Steering Committee Department Directors	Project Sponsor
HR/Payroll/Budget System	CIO,[12] Assistant Budget Director, Finance Director, HR Director	Senior Deputy City Manager/Budget Director
CIS	CIO, ESD Director, Finance Director	ESD Deputy Director
BTS	CIO, Finance Director	Finance Division Manager

Source: Auditor summary of steering committees

Each of the deployments has an outside consultant acting as project manager. The Project Manager provides a regular update to the Committee on the overall status of the costs, timelines and staffing issues. According to a Steering Committee member, the Steering Committee is ultimately responsible for the failure or the success of a project.

Ensuring that all players know their responsibilities, and know how to communicate with each other is also essential. An article in the Information Systems Journal advises that

> *a large number of IT projects go 'off the rails' (i.e., over budget and/or poor-quality deliverables) when key stakeholders are not clear about their role, responsibilities and authority.*

In our opinion, a Steering Committee is critical to the success of the project and it is especially important for complex technology deployments. Steering Committee actions can determine the success or failure of a project and having the right people involved is important. For example, the Project Manager for

[12] Chief Information Officer

the HR/Payroll/Budget system raised staffing concerns to that Steering Committee and the committee was able to quickly deploy additional City staff to ensure that the project was not delayed.

Finally, having the Steering Committee well engaged with the project manager is also important. This makes a project manager directly accountable to the Steering Committee. In the case of the projects we reviewed, the Steering Committee was involved with the selection process for the project manager for the HR/Payroll/Budget implementation, making the working relationship smoother. This was not the case with the CIS and BTS implementations. Staff pointed to this difference as being critical to the working relationships and ultimate success of the projects.

Recommendation #2: The Administration should ensure that Steering Committees for major technology deployments are appropriately staffed and notified of any deviations from the project concept plan and timeline, and are authorized to reallocate existing resources where needed.

The City Sets Timeliness Targets for Implementation But Not for Planning and Development

None of the projects we reviewed had any written plans on the anticipated time for the conception and planning, and acquisition and selection stages.

The planning stage is an important part of any technology deployment. The Portland best practices audit acknowledges that the more time that is spent in project concept and solution definition, the more successful the project implementation will be.

Each of the projects we reviewed appeared to have an extremely long planning process. So long that some of the systems they were replacing were in danger of losing support (See Exhibit 6 in Finding 1).

For example, the HR/Payroll system has been with very limited support since 2013. As a result of a long planning timeline (and to meet the start of a new budget cycle), the actual implementation schedule for the HR/Payroll/Budget system have had to be aggressive.

Further, two of the other systems implementations that we studied (CIS and BTS) were in danger of losing support in July 2015. Due to some unrelated legal issues with Municipal Water, the City extended support of the integrated billing system that was being replaced. This has made the implementation schedule for these two systems slightly less urgent.

Realistic Planning for a Long and Complex Process

As mentioned above, the City has a complex process for technology approvals and implementation touching many different departments. This needs to be built into the planning timeline. According to an audit conducted by City of Denver's Auditor

> *Dividing the span of [a] project into phases allows the project manager to set milestones and deliverables for each phase to ensure continual progress toward completion of the project.*

According to the Government Accountability Office's Schedule Assessment Guide—Best Practices for project schedules

> *The schedule should realistically reflect how long each activity will take. When the duration of each activity is determined, the same rationale, historical data, and assumptions used for cost estimating should be used. Durations should be reasonably short and meaningful and allow for discrete progress measurement. Schedules that contain planning and summary planning packages as activities will normally reflect longer durations until broken into work packages or specific activities.*

Project Concept Statements

We found that the State of California Office of Systems Integration (OSI) requires any major technology deployment to complete a *Project Concept Statement*. According to the OSI

> *The Project Concept Statement is the foundation for making the decision to initiate a project. It is a brief statement summarizing the purpose, approach, necessary resources, risks, and impacts of a proposed project/initiative.*

This checklist to be completed includes, among other elements, the business problem, goals of the project, the system concept, justification and benefits and resources needed.

The OSI further requires a Project Charter at the beginning of the planning stage of the project. The purpose of the charter is to describe expected outcomes and a high-level approach to the project. The charter is used to confirm expectations with the sponsor and stakeholders and to formally authorize the project. The charter lays out the expected timelines, resources needed, stakeholders and project impact. The City does a project charter during the actual implementation stage of the project.

The Washington State Office of the CIO requires a communications plan for technology deployments. According to the Washington State Office of the CIO, a communications plan is important for technology deployments:

> *The Communications Plan outlines the roles and responsibilities of project participants in the review, approval and dissemination of information about key project processes, events, documents and milestones.[…] [It]*
>
> - *Help[s] manage expectations regarding the project,*
> - *Ensure[s] methods used for communication will be most effective,*
> - *Assure[s] appropriate levels of communication with internal and external project stakeholders,*
> - *Provide[s] relevant, accurate, consistent information at all times and*
> - *Generate[s] and sustain[s] enthusiasm and support for the project.*

In our opinion communication should be continuous and strategic. Further, having such a written plan would provide and hold departments accountable for the timelines and resources required to successfully plan and implement the project.

Recommendation #3: The Administration should prepare written project concept and communications plans for each of its upcoming major technology deployments. This document should include: project purpose, approach, necessary resources, risks and impacts of the project, and estimated timelines for each stage of the project.

Best Practices Recommend Dedicated Project Management for Technology Deployments

The best practices we reviewed all emphasize the importance of dedicated and specialized project management for technology deployments. According to Portland's Best Practices for Information Systems Software Acquisition and Implementation

> *Project management is the linchpin of successful IS project. The project manager is responsible for the schedule, budget, functionality, risk management, and overall implementation of the project. Project managers must be proficient in understanding and communicating both the technology of the project and the business concerns of the organization. Project management is*

> *increasingly viewed as a professional discipline, and organizations and universities provide classes, workshops and training in project management.*

Further, according to the same best practices

> *Never undertake a major software implementation without experienced project management skills. Complex project management experience is critical. Experience in IT implementations is highly desirable. Insist on both.*

The 2010 Management Partners Optimization Study also emphasized IT project management. According to the report

> *Problems with IT projects are not always due to problems within the IT departments. Many organizations with troubled projects have large, highly professional and experienced IT departments. The preponderance of the problems comes from basic project management errors such as insufficient project staffing, poor business processes and procedures overlaid on the software, insufficient technical or functional skills by the project team, excessive reliance on vendors, and insufficient attention to change management, training, or quality assurance.*

The City Lacks Dedicated Project Management

We found that during the initial planning phase, the City does not designate a project manager to manage the planning aspects of the project. Instead a designated project sponsor is responsible for the project. This is generally a Senior Staff member (such as a Division Manager or a Deputy Director) from a primary stakeholder department. Staff that were involved with the projects were doing so along with other daily responsibilities. Project managers were only assigned during the actual implementation of the project. For example, the project managers for the HR/Payroll/Budget, CIS, BTS and Office 365 projects were assigned for the implementation phase after the planning phase had already concluded.

The HR/Payroll/Budget, CIS and BTS projects all have a project sponsor that reports to a Steering Committee, however this staff member is also responsible for their primary job duties – not project management. Further, the same staff members are involved in different ways for all three projects, thus stretching staff resources.

The City Has Relied Heavily on Outside Consultants for Project Management for Large Technology Deployments

Because of the City's staffing limitations (discussed later in this Finding), departments have been relying heavily on consultants to fulfill the project management role. Consultants are used to write technical specifications, manage projects and provide training.

While using consultants when there is a lack of internal knowledge is necessary, consultants are expensive. For example, in addition to the actual system cost, since 2012, the City will have spent an additional $1.5 million for consultants to provide project management services for the CIS, BTS, and HR/Payroll/Budget implementations. Furthermore, once the consultants leave, they take the knowledge of the implementation, project management experience and lessons learnt with them. Requiring the consultant to do a knowledge transfer as part of their contract responsibilities is important. Finally, the City needs to have a plan to train in-house staff to be responsible and accountable for the overall project and to ensure that there is a transfer of the project manager's knowledge and responsibilities when outside consultants are used.

Recommendation #4: For major technology projects, require appointment of a qualified (preferably certified) project manager dedicated to and responsible for the entire project (including planning and deployment), with clear authority, roles, and responsibilities, and accountable to the steering committee for project progress and challenges.

Recommendation #5: The Administration should build into its agreements with outside consultants a requirement to transfer responsibility/knowledge and lessons learnt during a project to internal City staff (or City Project Manager) once an implementation is complete.

Other Jurisdictions Have Specialized Project Managers

Other jurisdictions in contrast have a specialized project management classification. For example, the City and County of San Francisco lists job duties for an Information Technology Project Manager as:

> *preparing and monitoring the project budget, including occasionally obtaining funding and controlling project costs; project design and system architecture/infrastructure planning; developing and implementing strategic and change management planning; directing or managing the development of technical and*

> *functional requirements; selecting and negotiating with software vendors and/or integration partners; coordinating the work of a multi-disciplinary staff which may cross more than one department, technical, and functional areas; managing the performance of project staff, including contractors and City and County employees; developing training plans for project staff during development and for all users at implementation; managing eventual deployment of the new system; and may require working extensively with contractors, City and County departments and boards and commissions.*

Similarly, the City of Palo Alto lists a project manager's job duties as:

> *Originates schedules, prepares technical data, specifications, drawings, maps and other related drafting services, cost estimates, inspects quality and quantity of work; maintains accurate records of work and schedules and ensures compliance with specifications and/or regulatory requirements.*

The City of Palo Alto also has in-house IT staff that are specifically dedicated to managing technology projects. The responsibilities include providing customer-centric project management services to City departments for technology projects. Services include business analysis, consultation, project management, and project management training.

In our opinion, project management is a specialized skill and it would behoove the City to invest in developing this skill in-house in order to maintain continuity and knowledge gained from various technology implementations.

Recommendation #6: Given the continuous need to replace technology systems, the Administration should hire qualified, permanent project management staff and train department staff in project management skills to develop in-house knowledge.

Best Practices Emphasize the Importance of Adequate Project Staffing

According to Washington State Office of the CIO

> *It's important for a project to accomplish its objectives as efficiently as possible. This requires a project manager to skillfully allocate resources. Once a project's scope is defined, the management decisions relating to project resource assignments usually are the single most important factor in ensuring a project's ultimate successful outcome.*

Further

> *Large, complex projects require more staff planning discipline than small projects. Their scale creates the probability that staff estimation may be incorrect and this introduces risk that can only be mitigated through careful staff planning. A common tactic to combat this risk is to decompose the required staff into sub-teams or project sub-functions in order to isolate any potential planning miscalculation.*

Similarly, the State of California's Project Concept Statement includes designated staffing and resources required for a successful implementation.

The City Has Not Dedicated Sufficient Technical Staff to Several Major Deployments

We found that the City has not dedicated sufficient technology staff to major technology projects. For example, for the Office 365 implementation, only one staff member is assigned to lead each of the major phases (email migration and Lync, and SharePoint). IT staff absorbed the work of implementing Office 365 on top of their regular duties. The email migration lasted approximately one year, and the SharePoint implementation is expected to take a total of three years. This is one of the largest citywide implementations that IT has undertaken in the past decade, but overall staffing dedicated to this implementation is minimal.

Similarly, IT has no single dedicated staff member for the CIS, BTS, or HR/Payroll/Budget implementations. Staff work on these implementations on top of their other job duties managing the City's enterprise systems. IT staff manage their daily work groups, workload, and the project deployments.

Finally, regular department operations are affected by the transfer of key staff from their normal roles to work in project implementation teams. For the HR/Payroll/Budget system upgrade, key Payroll staff have needed to continue supporting normal Payroll functions on top of their duties as members of the project implementation team. Backfilled positions have been approved, but not all positions have been filled. Further, according to staff, training new people that enter these backfilled positions can take time. The Budget Office is utilizing retiree rehires to ensure that on-going operations are not impacted. These staff changes should be taken into consideration prior to implementation and not as a result of a reaction to problems in implementation.

IT Recruitment and Retention Problems

IT has a high vacancy rate among its technical staff. It has recently successfully hired an Assistant Director. However as of February 2016, 23 of 59 (excluding the CIO) technical positions in IT still remain vacant.

Our previously completed audit of *Employee Hiring: The City Should Streamline Hiring and Develop a Workforce Plan to Fill Vacancies* noted that many positions in IT are hard to fill. That audit found that as of March 2015, IT had 24 vacancies, and reported frequent problems hiring positions in its department because of competition with the surrounding private sector for the same jobs. We recommended that HR increase use of outside recruiters to work on positions that take significant resources to recruit and fill, and focus HR resources on the remaining more routine positions. Doing so would also alleviate IT staff who currently are involved in the screening of applicants, as well.

Difficulty with hiring IT positions is not new. The 2000 IT Masterplan highlighted recruitment and retention as a significant organizational weakness for the City of San José. According to the Masterplan

> *There is a critical shortage of IT professionals nationwide. Recruitment and retention of IT development and support staff is especially difficult for government organizations that can't compete with the private sector. This problem is especially pronounced in the Silicon Valley where the explosion of private sector technology companies has drained an already limited IT talent pool. The cost of living in the Silicon Valley has also made it difficult for the City to recruit IT professionals from out of the area. The shortage of talent hinders the City's ability to develop and adequately support its current and planned information systems.*

This remains true over fifteen years after the Masterplan was published, with Silicon Valley in the midst of another job boom.

IT reports that compensation for the hard-to-fill positions has been increased but still remains below surrounding jurisdictions. In our opinion, there is an urgent need to fully staff IT so it can not only support basic services, but also provide organization-wide expertise on new implementations and systems integration in a timely manner.

Recommendation #7: The Administration should ensure sufficient technical resources, allocate adequate technology staff from IT and individual departments, and include these resource commitments in project concept plans.

Staffing Limitations in Critical Support Departments

The City has cut hundreds of positions since 2007. This has also severely impacted the City's strategic support departments.[13] Specifically, IT has gone from having 157 budgeted positions in 2007-08 to 82.5 (including call center staff) in 2015-16. Further, IT currently has a vacancy rate of about 40 percent among its technical staff. Similarly, Finance is budgeted for six buyers in the Purchasing Division for 2015-16 but two of those positions remain vacant.

As mentioned previously, the Municipal Code gives the City's Purchasing Division the primary responsibility to procure technology. Purchasing staff is also responsible for contract negotiations after the competitive procurement concludes. The Division has limited staffing to support this function. We found that it has dedicated one staff person to technology procurements. As a result of this staffing limitation, procurement for the CIS and BTS systems was outsourced. Because of Steering Committee concerns about that procurement process, it was re-done by Purchasing.

Similarly, IT approval is required for major technology purchases. IT has to approve technical specifications prior to the RFP being finalized. Hiring and retention problems in IT exacerbate this problem. Generally, in IT this approval falls on the CIO (discussed below).

IT Staffing Is Not Conducive to Providing Support for Complex Deployments

IT's core service is to manage the City's data so that critical business processes remain operational; determine, develop, implement, and support technology solutions that maximize the delivery of enterprise City services; consolidate technology solutions and ensure optimal resource utilization and technology investment across the city-wide organization.

However, IT lacks middle-level management to help support this mission. This lack of staff means that the IT CIO is closely involved with writing and reviewing specifications for these deployments and is also part of all the steering committees.

Further, IT is not staffed for providing project management or technology support to complex technology deployments. As shown in the organization chart in Exhibit 2 in the background section of the report, even a fully staffed IT department would be primarily responsible for managing the day-to-day technology needs of the City, including managing servers, supporting enterprise

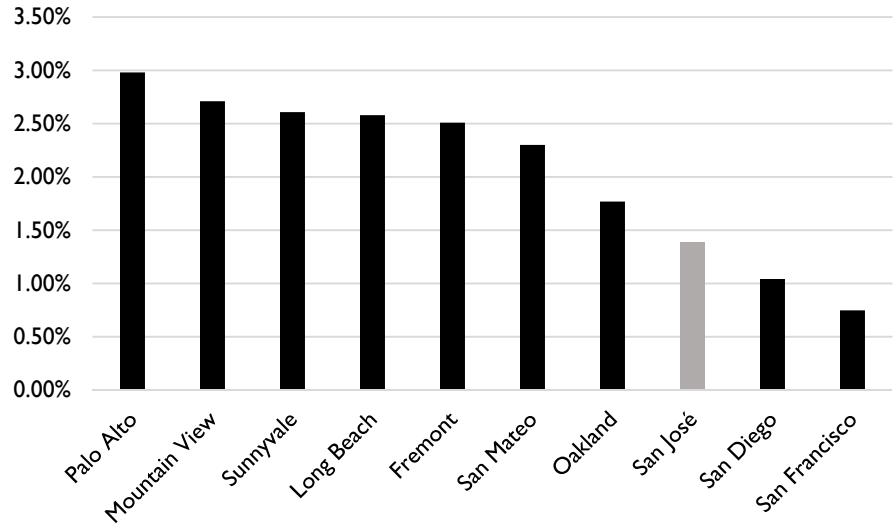
[13] Strategic support departments include Finance and IT.

systems such as FMS, and providing network support for email and phones.[14] As discussed above, this is in contrast to the City of Palo Alto where staff are specifically dedicated to assisting with providing expertise and project management for technology deployments.

San José's IT Department Staffing Is Among the Lowest in Compared Jurisdictions

Compared to many California jurisdictions and especially neighboring Bay Area jurisdictions, we found that San José has one of the lowest proportions of IT staff to other staff. Exhibit 17 below shows the staffing in IT departments compared to overall citywide staffing.

Exhibit 17: Staffing in San José's Central IT Department Compared to Overall Staffing as Compared to Other California Jurisdictions



Source: Auditor review of 2015-16 budgets for San José and listed cities

The organization of IT departments vary. For example, San José's IT department includes staff for the City's central call center. Further, because of San José's decentralized IT environment many large departments have a dedicated IT function housed in their department. For example, the Airport, ESD, SJPD, DOT, and SJFD all have IT staff. We found that there were around 60 technology positions in various departments Citywide. These positions are not included in the comparison. Other cities such as San Francisco also have IT

[14] While larger departments have their own IT staffing, they still have to use IT for central support. Major technology purchases require IT approval for the technical specifications. For mobile devices and laptop purchases, the departments need to get Director approval and submit this approval to IT. IT purchases the item. This policy went into effect during the budget deficit years when most purchases were frozen.

positions housed in various departments. Those are also not included in the comparison.

The 2010 Management Partners report recommended that

> *Since information technology is essentially a service provided to all city employees, staffing levels of the IT department should correspond with the overall staffing levels of the city. Industry standards encourage that IT staffing should represent between three and five percent of total city staff.*

Further, according to the same study

> *The goal of finding a perfect balance between centralized and de-centralized IT staff is more of an art than a science, and each agency is best suited to examine this question with the unique characteristics of its enterprise in mind. Nevertheless, the primary objective of every agency is to prevent an "us vs. them" mentality between centralized and decentralized IT. To prevent this tension, best practices among peer cities suggest implementing an integrated citywide technology strategy. While some IT functions must remain decentralized to provide service to departments most efficiently, the general trend among the peer cities is to centralize as many elements of IT management as possible. The central agency would have direct responsibility for all IT systems and personnel.*

Over time, IT staff citywide has become decentralized

> *Overall IT staffing that can be dedicated to major technology deployments is low. Over time, many large departments have hired their own IT staff. In fact, filled technical positions in other departments far outnumber filled technical positions in IT. Specifically, IT has 36 filled network coordinators (excluding 23 vacancies). Citywide various departments have 58 network coordinators including 10 in Library, 9 in ESD, and 8 in the Police Department. Staff in IT are primarily tasked with providing technology support to the organization. Large departments have significant technical staff that is answerable to the department, not the IT CIO. Technical staff is being hired in other departments without investing in hiring technical staff for IT.*

An article by the Information Systems Audit and Control Association says the following about IT management in the private sector

> *Over time, there have been many examples of non-IT business units making their own decisions on the allocation of human and financial resources for IT purposes. This decentralization has introduced new risks. One that has often materialized is the*

acquisition and development of incompatible IT architectures. The larger the organization, the higher the risk of long-term commitments to incompatible systems consuming valuable resources and ongoing maintenance… It is generally accepted that the decentralization of IT-related decision-making increased the potential risk that…[i]t will become increasingly difficult and expensive to adequately support or maintain the IT investment…

Recommendation #8: The Administration should review the overall strategic support staffing in the IT Department and ensure that its vacant positions are immediately filled. This may require salary enhancements.

Finding 3 Updated Procedures Would Facilitate Technology Procurement

Summary

The Purchasing Division in the Finance Department leads all technology solicitations. For more commonly needed items, Purchasing has Open Purchase Orders. However, most technology purchases (including PCs, mobile devices and laptops) currently require additional IT scrutiny. We found that there is confusion about what information IT requires for these purchases. The policy on technology purchases is outdated and could benefit from clarification. In our opinion, the Finance Department should ensure that all procurement forms are available centrally and provide training to relevant staff on technology procurement processes.

Technology Purchases in San José Require IT Review and Approval

City policy 5.1.9 (dated May 2008) outlines the internal process for procuring information technology software and equipment that cannot be purchased via a Citywide Open Purchase Order or through utilization of a City Procurement Card:

- For purchases above $10,000, a department has to develop specifications and solicit the procurement. IT has to review (and approve) those specifications.
- For purchases above $100,000, the policy requires that the Information Technology Policy Board approve all technology purchases.
- All purchases above $1 million require the department to develop a "source selection plan," which includes an outline of the scope of work, vendor outreach, staffing resources needed for the procurement, etc.

IT has provided further guidance on the technology approval process on its intranet website. Specifically, **all** PC and monitor requests must have department approval at the executive level or above, and IT Department approval, regardless of quantity or amount of purchase.

The only technology purchases that do **not** require IT department approval are:

- Peripherals that do not require installation and are purchased using an existing Citywide Purchase Order, up to $20,000
- All printers, scanners, projectors and/or fax machines purchased through an existing Citywide Purchase Order, up to $20,000[15]
- Maintenance renewals
- Common desktop software as listed on the Service Desk website, up to $20,000

Open Purchase Orders

For purchases that are routine and extend beyond one department, the Finance Department's Purchasing Division solicits proposals and maintains an Open Purchase Order with the winning proposer. For technology purchases, these vendors are listed on the City's intranet site. These include network switches, computer peripherals, software, desktops, servers, etc. For some purchases as long as the purchase is below $20,000 and the department director approves the purchase, the department can purchase directly from the vendor listed. A department has to provide this approval to IT prior to making the purchase.

Additional Oversight for Laptops and Mobile Devices

While the City has open purchase orders for the purchase of laptops and mobile devices, a Department Director (Chief), Assistant Director (Chief) or Deputy Director (Chief) has to ensure there is a valid business justification to warrant the purchase of laptops or tablets before approving the purchase.

The reason for the additional approval level is because laptops and tablets may pose additional security risks due to the greater potential of loss or theft, which may compromise potentially confidential data that resides in those devices. However, there appears to be confusion in departments regarding how much information IT requires as part of the approval. Furthermore, requiring department head approval may be adding time in large departments.

Technology Procurement Policies Should Be Updated

The City's technology procurement policy is outdated and should be updated. We found that many of the policy guidelines are no longer applicable to technology procurements. For example, the policy states that for technology procurements over $1 million, departments must complete a "source selection plan." However, this is not being practiced. According to Purchasing, in lieu of completing a source selection plan, departments and Purchasing have discussions

[15] The City is in the process of phasing out personal desktop printers, scanners and fax machines and the purchase of these items will only be approved by IT on an exception basis. Users are encouraged to utilize the City's multi-function devices for these requirements.

prior to beginning the solicitation. One of the aspects of the source selection plan is a determination of how the solicitation is going to be marketed. The City simply puts all its solicitations on "BidSync" which is an open solicitation website.[16]

Further, the policy states that all technology projects over $100,000 require approval from the Information Technology Planning Board (ITPB). The ITPB has been defunct for almost ten years. In general, for cross-departmental deployments the City has steering committees made up of executive management. However, this is not a policy requirement, and it is up to departments to determine where and when to use them, as well as the make-up of steering committees.

Finally, many of the policy guidelines on the City's IT intranet site discussed above are not reflected in the Citywide technology procurement policy 5.1.9. These changes and guidelines should be reflected in an updated policy to ensure that department staff have adequate guidance in a centralized location.

The Purchasing Manual Should Include Guidance on Technology Procurements

The RFP Manual on the Finance Department's website has not been updated since 2007. It also does not provide specific guidance on technology procurements even though there is a separate process required. The decentralization of many IT functions and staffing constraints in both IT and Purchasing requires that department staff figure out the technology procurement processes even though they may have limited experience in doing competitive procurements.

Staff attrition and vacancies add additional challenges. The inexperience can lengthen the timelines for technology deployments. Oftentimes writing a competitive solicitation requires staff to define current processes and technical specifications of current and future systems. According to the City's Purchasing Division, many of the longer discussions occur during the planning/acquisition phase because department staff are unable to provide clear technical specifications and functional requirements to be included in the solicitation. On the other hand, staff in departments are not provided training on how to write these requirements. This results in a drawn out back and forth between departments and Purchasing that could be avoided if staff were aware of and trained in the RFP process.

[16] BidSync Source is a comprehensive, cloud-based sourcing solution that allows organizations to electronically create, manage and award all standard solicitation types (such as RFPs, RFQs, RFIs, etc.). The solution automatically notifies suppliers of solicitation status, facilitates the receipt and electronic tabulation of responses, and permits an award to be made and suppliers notified.

Recommendation #9: IT and Finance should review and update policies on technology procurement (including the purchase of PCs and monitors), make all required forms available centrally in one location, and train relevant staff on technology procurement processes.

Conclusion

The City of San José uses a multitude of computer systems to track, monitor, and deliver services to its residents. Like many entities, San José finds itself deploying new technology on what feels like a continuous basis. We found that the City requires a defined technology replacement program and an on-going funding strategy. Furthermore, the City's resources are strained to adequately staff projects, and specialized project management is needed throughout a technology deployment to ensure timeliness and success of these implementations. Finally, IT and Finance should update and clarify technology procurement policies to facilitate these purchases.

RECOMMENDATIONS

Recommendation #1: The Administration should establish a continuous replacement program for the City's key technology systems by:

a) Clearly defining a continuous replacement program that outlines the City's key technology systems, the end of these systems' support/useful life, the estimated cost for upgrade/replacement (if possible), etc. The program should give a clear picture of the risks the City faces by not upgrading these systems, and should be incorporated in the Status Report on Deferred Maintenance and Infrastructure Backlog;

b) Identifying and prioritizing for budget consideration an annual base level of funding required to continuously replace existing technology systems (in addition to the current process for identifying one-time funding for new technology projects); and

c) Given the City's limited resources, the CIO should determine which enterprise technology projects in the program should be prioritized based on risk, and establish a cross-departmental committee to advise on additional cross-departmental technology needs with a focus on the efficient deployment of resources to deliver the Citywide technology vision.

Recommendation #2: The Administration should ensure that Steering Committees for major technology deployments are appropriately staffed and notified of any deviations from the project concept plan and timeline, and are authorized to reallocate existing resources where needed.

Recommendation #3: The Administration should prepare written project concept and communications plans for each of its upcoming major technology deployments. This document should include: project purpose, approach, necessary resources, risks and impacts of the project, and estimated timelines for each stage of the project.

Recommendation #4: For major technology projects, require appointment of a qualified (preferably certified) project manager dedicated to and responsible for the entire project (including planning and deployment), with clear authority, roles, and responsibilities, and accountable to the steering committee for project progress and challenges.

Recommendation #5: The Administration should build into its agreements with outside consultants a requirement to transfer responsibility/knowledge and lessons learnt during a project to internal City staff (or City Project Manager) once an implementation is complete.

Recommendation 6: Given the continuous need to replace technology systems, the Administration should hire qualified, permanent project management staff and train department staff in project management skills to develop in-house knowledge.

Recommendation #7: The Administration should ensure sufficient technical resources, allocate adequate technology staff from IT and individual departments, and include these resource commitments in project concept plans.

Recommendation #8: The Administration should review the overall strategic support staffing in the IT Department and ensure that its vacant positions are immediately filled. This may require salary enhancements.

Recommendation #9: IT and Finance should review and update policies on technology procurement (including the purchase of PCs and monitors), make all required forms available centrally in one location, and train relevant staff on technology procurement processes.

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Memorandum

TO: SHARON ERICKSON
CITY AUDITOR

FROM: Vijay Sammeta

SUBJECT: SEE BELOW

DATE: March 8, 2016

Approved [signature] Date 3-9-16

SUBJECT: RESPONSE TO THE AUDIT REPORT – TECHNOLOGY DEPLOYMENTS: ADDITIONAL RESOURCES NEEDED TO SHORTEN DEPLOYMENT TIMELINES

BACKGROUND

The Administration would like to thank the City Auditor's Office for their insight and recommendations in the Audit Report entitled, *Technology Deployments: Additional Resources Needed to Shorten Deployment Timelines*. After more than a decade of under investments in technology, functional and technical staffing reductions, and deferral of mandatory upgrades, there are numerous simultaneous deployments that affects the quality and timeliness of system implementations. The single greatest issue that plagues information technology investments and the items identified in this audit is a sustainable and ongoing funding source. The City would be better positioned for technology service delivery by enabling smaller, more frequent upgrades that better meet the needs of the organization and reduce the time and cost for implementations.

It is important to note that the findings and best practices referred to in this audit and those in the Administration's response apply to Citywide technology implementations, and not simply those of the IT Department (ITD). For this reason, a Technology Project Engagement Charter referred to in audit responses below will be formalized as an administrative policy. This Charter will combine audit recommendations and best practices, to serve as a framework for successful Citywide technology implementations.

Consistent with other priority-setting processes, the Council adopted a new framework for the Administration's response to Audit recommendations in May of 2015. As with other priority processes, the green, yellow and red light system is utilized to convey the Administration's operational readiness to undertake workload demands. Green administrative responses represent items that are either in existing work plans or are part of work already underway. Yellow administrative responses represent items that would take more than 40 hours including research and policy/ordinance development. Red administrative responses indicates that the item is not feasible. The Administration's response to each of the Audit's recommendations is presented below employing the green, yellow and red light system consistent with Council direction in May 2015.

RECOMMENDATIONS AND RESPONSE

Recommendation #1: The Administration should establish a continuous replacement program for the City's key technology systems by:

- ***a) Clearly defining a continuous replacement program that outlines the City's key technology systems, the end of these systems' support/useful life, the estimated cost for upgrade/replacement (if possible), etc. The program should give a clear picture of the risks the City faces by not upgrading these systems, and should be incorporated in the Status Report on Deferred Maintenance and Infrastructure Backlog;***
- ***b) Identifying and prioritizing for budget consideration an annual base level of funding required to continuously replace existing technology systems (in addition to the current process for identifying one-time funding for new technology projects); and***
- ***c) Given the City's limited resources, the CIO should determine which enterprise technology projects in the program should be prioritized based on risk, and establish a cross-departmental committee to advise on additional cross-departmental technology needs with a focus on the efficient deployment of resources to deliver the Citywide technology vision.***

Administration Response to Recommendation #1:

The Administration agrees with this recommendation. ITD will include a matrix of the City's key enterprise technology systems as outlined above as part of its semiannual report to the PSFSS Committee on IT Project Status and Investment Strategies. This matrix will also be incorporated into the annual Status Report on Deferred Maintenance and Infrastructure Backlog. However, a replacement program is directly dependent upon the allocation of funding for such projects. In addition, the Administration will evaluate the best method to develop a cross-departmental committee to focus on the delivery of a Citywide technology vision.

Green – The Administration will implement Recommendation 1a with the next Status Report of IT Projects for the PSFSS Committee in May, 2016 and the Deferred Maintenance and Infrastructure Backlog memo in 2017.

Yellow - To implement Recommendation 1b, the reallocation or addition of resources will be required. This will need to be evaluated by the Administration as part of the annual budget process in light of the City's budget outlook and other Citywide and departmental funding priorities.

Green - For Recommendation 1c, ITD will be including a replacement and risk matrix of major systems in its regular updates to PSFSS to be included for consideration in the budget process. Further, the Administration will evaluate the best method to develop a cross-departmental committee to focus on the delivery of a Citywide technology vision.

Recommendation #2: The Administration should ensure that Steering Committees for major technology deployments are appropriately staffed and notified of any deviations from the project concept plan and timeline, and are authorized to reallocate resources where needed.

Administration Response to Recommendation #2:

The Administration agrees with this recommendation. Utilization of a Steering Committee that is regularly updated on project status and implementation timelines, with authority to reallocate departmental resources, is part of the organization's practice on major enterprise system upgrades. This process will be formalized as a required part of the memo for Council approval of IT projects and included in the Technology Project Engagement Charter.

Green – As has been the recent practice, all future major technology projects will include Steering Committees.

Recommendation #3: The Administration should prepare written project concept and communications plans for each of its upcoming major technology deployments. This document should include: project purpose, approach, necessary resources, risks and impacts of the project, and estimated timelines for each stage of the project.

Administration Response to Recommendation #3:

The Administration agrees with this recommendation. A completed project concept and communications plan will be a required deliverable of the Project Manager (in Recommendation #4 below) in conjunction with City staff and selected solution provider. This recommendation will also be formalized as part of the Technology Project Engagement Charter.

Yellow – The Administration will draft a written project concept and communication plan template to be used for major technology deployments, within the next six to 12 months.

Recommendation #4: For major technology projects, require appointment of a qualified (preferably certified) project manager dedicated to and responsible for the entire project (including planning and deployment), with clear authority, roles, and responsibilities, and accountable to the steering committee for project progress and challenges.

Administration Response to Recommendation #4:

The Administration agrees with this recommendation and has used project managers on recent major technology projects. Appointment of a qualified project manager with clear roles and responsibilities, accountable to the steering committee will be required and formalized as part of the Technology Project Engagement Charter.

Green – All future major technology projects will include a project manager as part of the deployment strategy.

Recommendation #5: The Administration should build into its agreements with outside consultants a requirement to transfer responsibility/knowledge and lessons learnt during a project to internal City staff (or City Project Manager) once an implementation is complete.

Administration Response to Recommendation #5:

The Administration agrees with this recommendation. This requirement will be formalized as part of the Technology Project Engagement Charter, and the Administration will work with Finance and the City Attorney's Office to draft standard contract language that satisfies this recommendation.

Green – The Administration, ITD, Finance and the CAO will work to incorporate language into the standard consultant agreement template for future major technology projects.

Recommendation #6: Given the continuous need to replace technology systems, the Administration should hire qualified, permanent project management staff and train department staff in project management skills to develop in-house knowledge.

Administration Response to Recommendation #6:

The Administration agrees with this recommendation. Best practices dictate the need for qualified project management staff to ensure successful and timely IT implementations. This role is often absorbed by stakeholder departments, introducing potential risk to completion timelines, ongoing support and oversight of contractual requirements. However, position reallocations or additions will need to be evaluated by the Administration as part of the 2016-2017 budget process in light of the City's budget outlook and other Citywide and departmental funding priorities.

Yellow - To implement this recommendation, the reallocation or addition of resources will be required. This will need to be evaluated by the Administration as part of the annual budget process in light of the City's budget outlook and other Citywide and departmental funding priorities.

Recommendation #7: The Administration should ensure sufficient technical resources, allocate adequate technology staff from IT and individual departments, and include these resource commitments in project concept plans.

Administration Response to Recommendation #7:

The Administration agrees with this recommendation for major projects. This "best practice" will be formalized in the Technology Project Engagement Charter. However, it should be noted that if full funding is not available, the Administration may choose to delay other work and reallocate resources in favor of performing mandatory or critical technology implementations.

Green – Ensuring sufficient technical resources prior to approval of technology projects is dependent upon the allocation of funds. In the absence of adequate new resource allocations, the Administration may be required to employ different strategies such as deferring or reprioritizing existing workload or staff to ensure sufficient resources are available for technology deployments.

Recommendation #8: The Administration should review the overall strategic support staffing in the IT Department and ensure that its vacant positions are immediately filled. This may require salary enhancements.

Administration Response to Recommendation #8:

Filling IT positions is the top non-public safety Human Resources (HR) priority for the Administration. ITD has augmented its administrative staff with temporary embedded recruitment staff from the HR Department, with most vacancies already posted. IT and HR meet regularly to review recruitment status and discuss strategy for attracting and retaining qualified applicants. In addition, HR completed classification studies that resulted in compensation increases to 70% of the market average for public sector in certain job classes, and 100% of the market average of public sector in one class. A study of additional IT classifications is underway which will review potential changes similar to other positions that have historically been difficult to recruit in departments such as Airport and Environmental Services. ITD is also investing in training for current employees to help prepare them to support new technologies and take the next steps in career advancement with the City.

Overall, the Administration agrees with this recommendation but the City's proximity to numerous high tech firms as well as other municipalities with more robust compensation packages, places it at a competitive disadvantage in attracting highly skilled personnel for IT classifications. For these reasons, it is unlikely that the vacant positions will be "immediately filled."

Yellow – There is not a mechanism to "immediately fill" IT positions with qualified staff. The Administration is actively working with ITD and HR on a number of strategies to attract and retain highly qualified personnel. Some of these changes require complicated classification and compensation studies, as well as potential meet and confer issues. The Administration will continue to employ different strategies to attract and retain highly skilled IT resources.

Recommendation #9: IT and Finance should review and update policies on technology procurement (including the purchase of PCs and monitors), make all required forms available centrally in one location, and train relevant staff on technology procurement processes.

Administration Response to Recommendation #9:

The Administration agrees with this response. ITD has already begun updating the technology procurement guidelines and will work cooperatively with the Finance Department to ensure that all policies and related forms are centrally and easily located. Instructions will be provided to relevant staff for training purposes.

Green – This item is part of ITD's workplan and should be fully implemented within six months.

CONCLUSION

We would like to thank the City Auditor and her staff for highlighting the challenges and complexities of departmental and central IT system implementations. While the City has made substantial one-time investments in technology over the past two years, the Administration recognizes that regular ongoing investments are necessary to meet the growing needs of the organization and the community. Although the City's budgeting outlook has hampered those efforts, the Administration will continue to prioritize technology projects that are of risk of failure and/or improve organizational efficiency and effectiveness.

The Administration values the recommendations of this audit; they are an important part of continued efforts toward strengthening the City's technology infrastructure and maximizing the value of system implementations.

COORDINATION

This response was coordinated with the Finance and Human Resources Departments.

/s/
Vijay Sammeta
Chief Information Officer

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