Performance Audit

Department of Innovation and Performance

Report by the
Office of City Controller

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AUDITEE RESPONSE

CITY OF PITTSBURGH
OFFICE OF THE CITY CONTROLLER
Controller Michael E. Lamb

October 25, 2020

To the Honorables: Mayor William Peduto and
Members of Pittsburgh City Council:

The Office of the City Controller is pleased to present this performance audit of **The Department of Innovation and Performance** conducted pursuant to the Controller's powers under Section 404(b) of the Pittsburgh Home Rule Charter.

This audit addresses the daily operations of the department, the impacts of a 2017 department-wide reorganization, the status of recommendations of an IT assessment conducted by Deloitte in 2016, the City's long-term IT planning strategy, and the City's network infrastructure and cybersecurity.

EXECUTIVE SUMMARY

The Department of Innovation and Performance (I&P) is responsible for providing and maintaining the IT services used by city government. In some cases, I&P also develops custom applications, software, and dashboards for departments. The City Cable Channel and 311 response center, which are housed under I&P, serve city residents as well. This audit is a comprehensive examination of the department's daily operations and its long-term IT planning.

In 2016, the City asked Deloitte to conduct an IT assessment and report recommendations for improvements. That report was broken down into six areas and contained 27 opportunities for improvements. At the time of this audit, 9 were found to be complete and 13 in progress. The remaining 5 were found to be in progress but as continuous objectives.

As part of Deloitte's recommendation to improve communication with city departments, I&P hired three business relationship managers that serve as intermediaries between departments, I&P, and vendors providing IT services. After surveying department administrators, the auditors found a high level of approval for their performance and respondents noted improvements in their ability to communicate problems.

Deloitte also reported low morale and frustration with the department administration's lack of communication among employees. Auditors' communications with various employees found that many of the workplace issues mentioned by Deloitte are still present and could be improved by implementing management best practices that encourage feedback and collaboration.

Despite this, employee turnover rates are roughly in line with industry averages, salaries are competitive with the private sector, and the department has made a substantial investment in training and professional development for employees. I&P would also benefit from a talent pipeline by formalizing agreements with local universities to attract local IT talent and make up for the in-house developers lost by the City over time.

Since 2018, the City's internal print shop has been staffed by a single employee, increasing the length of time needed to complete a request and creating a backlog of work. In 2019, the office was also moved to a smaller space. Given these constraints, the print shop is in urgent need of a capital improvement plan prioritized by the city administration that includes a full staff and digital tracking of completed jobs. The auditors also recommended that the print shop, Help Desk, 311 response center, City Cable Channel, and digital communications be moved to the Mayor's Office under a centralized Office of Communications so I&P can focus solely on providing IT services to city employees.

Long-term IT management has become a major focus for I&P. As part of Deloitte's first recommendation, the City created the Technology Leadership Council as a citywide IT governance structure for departments to coordinate IT needs and vote on major proposed projects. In 2018, OMB centralized the procurement of all IT hardware purchased by the City within I&P. This allowed the department to implement a proactive asset refresh schedule, as recommended by Deloitte and a past performance audit by the Controller's Office. This practice replaces computers and devices, ideally, every four years through a leasing agreement with Dell Computers.

The asset refresh schedule is a good practice that has allowed the City to begin migrating to Windows 10 this year. However, the auditors found that software and application procurement remain under each department's direction and recommended that these programs be centralized within I&P as well.

B-Three Solutions Inc. is the primary IT consultant for custom application development, largely for the Police Bureau. Investigations by a former Police Chief and PublicSource found that at least three applications were left incomplete following a whistleblower's report. As a result of those concerns, City Council replaced the City's open-ended cooperative purchasing agreement with B-Three with a closed contract. The auditors found that the contract has been effective in containing costs associated with B-Three services, but three applications for the Police Bureau still remain unfinished. The auditors recommended that I&P work with B-Three to prioritize the completion of those applications, and the department's responses confirmed an intention to phase out B-Three applications entirely. The Bureau's reliance on B-Three to create and maintain those applications also highlights the need for a talent pipeline within I&P that attracts more in-house developers.

Our findings and recommendations are discussed in detail beginning on page five. Our procedures were conducted in accordance with applicable government auditing standards and are limited to our Objectives noted in the Scope and Methodology sections of this report. We believe our recommendations will provide more efficient operations.

We would like to thank the I&P staff for their cooperation and assistance during our audit.

Sincerely,

Michael E. Lamb
City Controller

INTRODUCTION

This performance audit of the City of Pittsburgh's Department of Innovation and Performance was conducted pursuant to Section 404(c) of the City's Home Rule Charter. This audit will address the daily operations of the department, the impacts of a 2017 department-wide reorganization, the status of recommendations of an IT assessment conducted by Deloitte in 2016, the City's long-term IT planning strategy, and the City's network infrastructure and cybersecurity.

Two prior performance audits were completed in 2011 and 2014 when the department was known as Computer Information Systems (CIS). The 2011 audit examined the effectiveness of the CIS Help Desk, CIS contract usage and the City's network security. The 2014 audit focused on CIS's computer hardware purchasing practices and the use of consultants for IT functions. The department's name was changed in January 2014 from City Information Systems to its current name, the Department of Innovation and Performance (I&P).

OVERVIEW

The offices of the Department of Innovation & Performance are located on the 6th floor of the City-County Building behind secured, locked doors. All guests are required to sign in and wear a visitor's badge when entering the department. Sensitive areas, including the data center, are securely locked with keycard access and restricted to qualified personnel.

The Department of Innovation & Performance has experienced a number of changes and directions in leadership since 2014. The first director of I&P left in December 2016; her tenure focused on updating external products and services. The second director started in December 2016 and left in August 2018. His main focus was on internal processes, operations and support of the city's various departments to improve the delivery of services to city residents. In 2018, sustainability initiatives, a key focus under the first director, was moved out of I&P to the Department of City Planning. In addition, business relationship managers (BRMs) were created and assigned to work with city departments to help identify their business and technology needs. The city's Chief Financial Officer, who heads the Office of Management and Budget (OMB), temporarily became the acting director in August 2018 until resigning from the position in September 2018. I&P's assistant director of operations then became the acting director until a new replacement was found in January 2019 when the latest director took over.

As outlined in the 2018 I&P budget, "The mission of the department of I&P is to deliver strategic technology services and support to all City departments, foster technology innovation in City government and the broader community, and facilitate efficient and effective City services by supporting data-driven decision making and continuous process improvement."

In 2019 I&P's mission changed and reads as follows: "The mission of the Department of Innovation & Performance (I&P) is to elevate the work of City government. I&P has four priority focus areas to accomplish this mission:

1. Refresh and Enhance the City's Technology Infrastructure: I&P's goal is to provide stable, resilient, and secure IT infrastructure in all city facilities that supports an increasingly mobile workforce and our vision for pervasive digital services.
2. Transform the Delivery of City Services: I&P's goal is to support all City departments in delivering world-class services to businesses, residents, and visitors by introducing technology innovations and user-focused tools paired with an organization-wide continuous improvement program.
3. Improve Public Engagement: I&P's goal is to partner with departments to deliver clear, consistent communications about city services to residents, businesses, and visitors across multiple communication channels, including web, social media, print, and cable.
4. Invest in Human Capital: I&P's goal is to prepare our staff to develop and support the next generation of technology infrastructure for the City of Pittsburgh while at the same time preparing the broader City workforce to thrive in an increasingly digital workplace."

OBJECTIVES

1. Assess the daily operations of the department.
2. Assess the 2017 reorganization of staff, duties and processes.
3. Evaluate management changes and its effects on employee morale in 2017, 2018, and 2019.
4. Determine the status of recommendations from a 2016 IT assessment conducted by Deloitte.
5. Assess the relationship with other City departments.
6. Assess the City's long-term IT needs and the department's efforts to meet them.
7. Assess the City's network and cyber security policies.
8. Make recommendations for improvement.

SCOPE

The scope of this performance audit is the years 2017, 2018, and 2019. April 2020 is used to determine the most recent status of recommendations for improvement provided by the 2016 IT assessment conducted by Deloitte. For payments provided by the City to B-Three Solutions, 2012-2019 is used. For technical training budget and spending, a 5-year scope from 2016-2020 is used to analyze the increase or decrease of investment over time.

METHODOLOGY

The auditors met with the assistant director of operations and the new 2019 Director of I&P to discuss the department overview and future goals. The assistant director of performance and improvement and the assistant director of services were also interviewed. A tour of the inventory room was given by the assistant director of operations.

The auditors reviewed: City budgets for 2017, 2018, and 2019; information from the I&P website; the City's Roadmap for Inclusive Innovation; the department's policies and procedures manual, the Open Data Handbook, and the three-year Strategic Plan.

The auditors reviewed the findings and recommendations of a 2016 IT assessment conducted by Deloitte and requested materials to analyze progress on the report's recommendations for improvements.

The auditors reviewed the workflow, practices, and work completed by: the Business Relationship Manager group, Civic Innovation Group, Help Desk, 311 Response Center, Digital Services Team, and IT Project Management Office. Statistics about request tickets were analyzed for 311 and the Help Desk. The auditors also requested and reviewed: monthly page views for the city website, monthly visitors for Burgh's Eye View (the City's open data visualization tool), the City's waste prevention policy, and I&P's e-waste and recycling practices. The City's digital services for the public were examined for compliance with disabilities and accessibility legislation.

The auditors conducted a salary analysis comparing budgeted salaries for I&P employees to private sector averages using Payscale.com and Glassdoor.com, employment data websites. Information on current employee status, job descriptions, and employee turnover was provided by the Department of Human Resources & Civil Service. Fiscal Focus Pittsburgh, a public data visualization website operated by the City Controller's Office, was used to determine length of employment for I&P employees.

A department relations survey was sent to each department director and assistant director (except I&P and the Controller's Office) to assess satisfaction with the City's IT services and request feedback for improvements. The auditors asked that the department submit one response delegated to an employee in the department best positioned to answer questions about daily interactions with I&P. Responses were received anonymously and confidentially using Google Forms.

The print shop coordinator was interviewed, and the auditors toured the print shop on the fifth floor of the City-County Building, as well as the fourth floor after it was relocated. The print shop's workflow and practices were reviewed, and the auditors were given an explanation of each piece of equipment.

The auditors reviewed the City's contract with B-Three Solutions, a custom software developer. They contacted departments listed in the agreement to review the functionality and

effectiveness of those applications, as well as the completion of the terms of the contract. All survey results were gathered and evaluated to determine the status of those applications.

To analyze the status of I&P's long-term IT management practices, the auditors reviewed: the City's hardware and software inventories; the practices of the citywide Technology Leadership Council and its votes on proposed IT projects; the status of the City's migration to Windows 10; and I&P's network and cyber security policies. For security reasons, all information regarding network and cyber security policies will be redacted except in copies of this audit provided to I&P, the Mayor's Office, as well as the copy held by the Controller's Office.

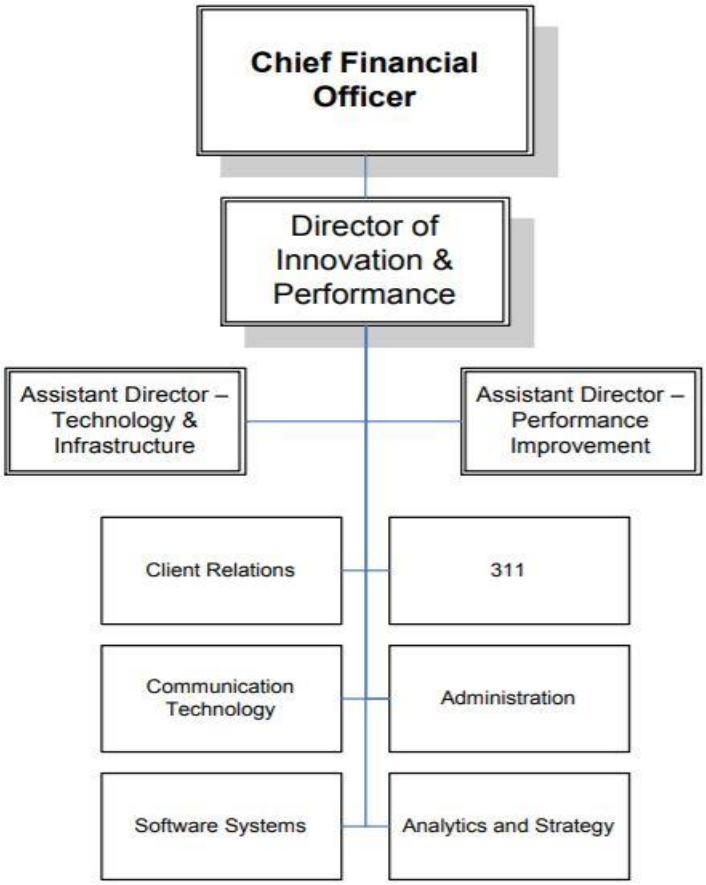
FINDINGS AND RECOMMENDATIONS

Department Overview

Organization Charts

The Department of Innovation and Performance functions were reorganized in 2017 to better align positions with their work functions. In 2017, I&P had 63 budgeted positions with a salary total of $3,564,033. According to the 2017 organization chart, a chief financial officer oversaw the director of I&P along with an assistant director of technology and infrastructure and an assistant director of performance improvement. It should be noted that the salary of the chief financial officer was paid out of OMB's budget. The rest of the department consisted of 6 areas of service: 1) Client relations 2) Communication technology 3) Software systems 4) the 311 response center 5) Administration and 6) Analytics and strategy.

FIGURE 1
2017 I&P Organizational Chart

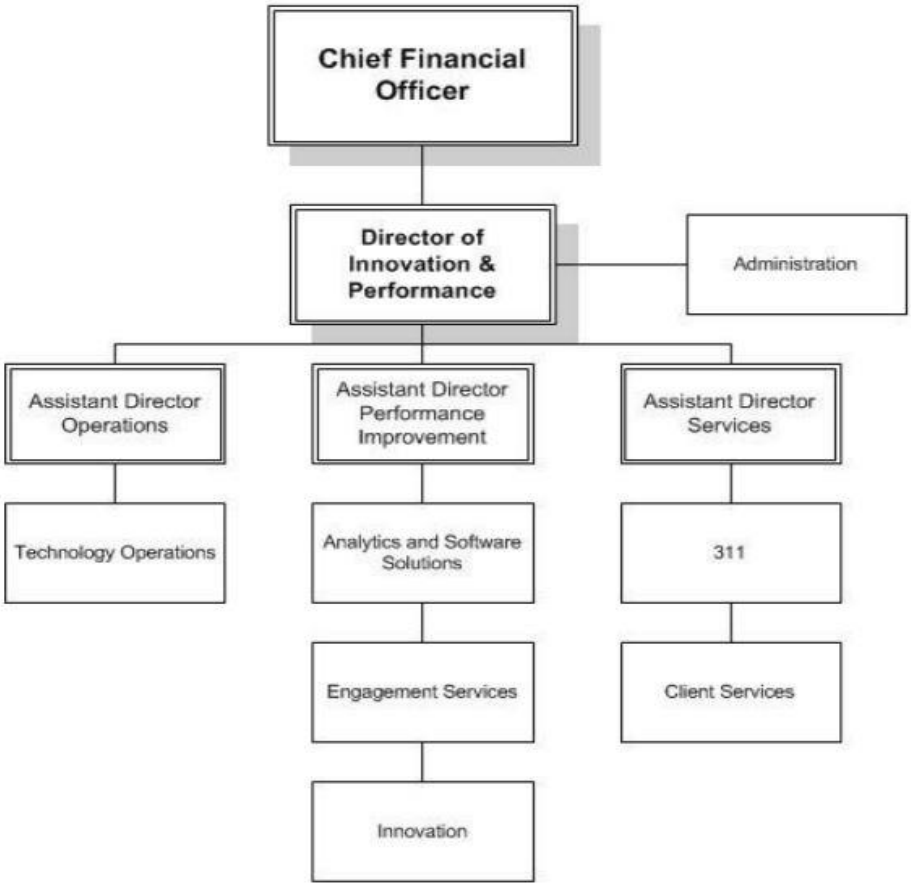


Source: City of Pittsburgh's 2017 Approved Budget

In 2018, I&P had 66 budgeted position totaling $3,887,703. While the names of the service areas were similar compared to 2017, there were slight differences in functions. For example, "client relations" referred to the Help Desk and Tier I computer support in 2017, but referred to the Help Desk, business relationship managers, project management office, and performance improvement teams in 2018. In addition, procurement of all city IT equipment became centralized under I&P in 2018.

The assistant director of operations manages Technology Operations. The assistant director of performance improvement manages Analytics and Software Solutions, Engagement Services and Innovation. The assistant director of services manages the 311 Response Center and Client Services. Figure 2 presents the 2018 organizational chart.

FIGURE 2
2018 I&P Organizational Chart

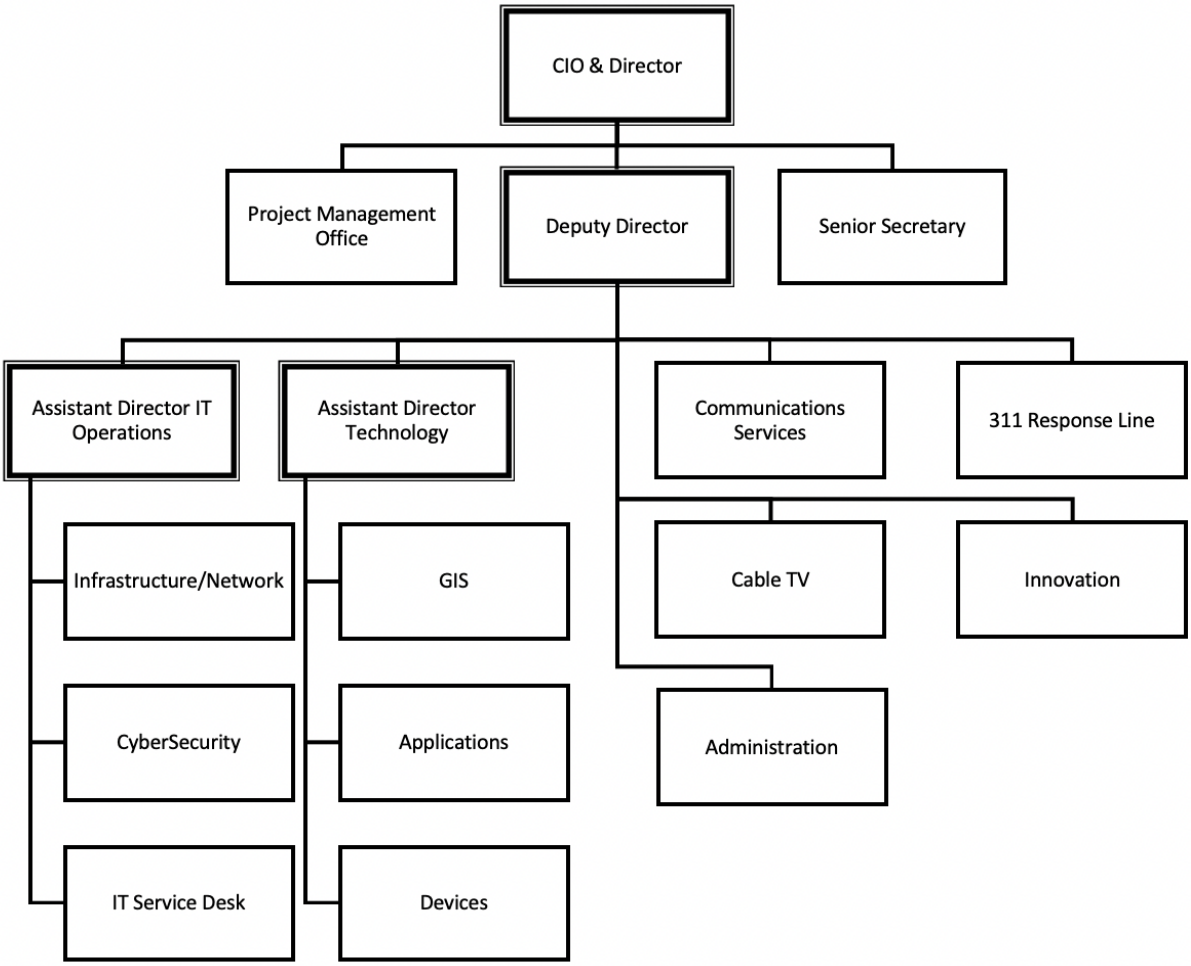


Source: City of Pittsburgh's 2018 Approved Budget

In 2018, the CFO position was permanently vacated. Beginning in 2019, the new I&P director began reporting directly to the Mayor as both the director and Chief Information Officer (CIO). Additionally, the assistant director services was promoted to deputy director, leaving only two assistant directors.

The following represents I&P's reorganization in 2019, which occurred after an earlier organization chart was submitted for the budget in 2018.

FIGURE 3
2019 I&P Organizational Chart



Source: I&P

In 2018, there were four main service areas categorized as Administration, Operations, Performance Improvement, and Services. In 2019, two assistant directors managed three service areas each, while both assistant directors and five other service areas reported directly to the

deputy director. Those service areas are further broken down into teams. Teams originated from separating or combining other service areas. The number of employees in each team for 2017, 2018, and 2019 are as follows:

TABLE 1

I&P Employee Totals by Team			
TEAM	**2017**	**2018**	**2019**
311 Response Center	7	7	8
Administration	6	6	6
Analytics & Strategy	6	-	-
Software Systems	6	-	-
Analytics & Software Solutions	-	4	4
Client Relations	-	13	14
Client Services	-	13	14
Communication Tech	11	-	-
Engagement Services	-	12	12

Source: I&P

Deloitte IT Assessment

In 2016, the Office of Management and Budget contracted with Deloitte to perform an IT assessment of the Department of Innovation & Performance to measure its capabilities and future technological needs. OMB reported that $200,000 was spent for the Deloitte assessment in 2016. The objectives of the assessment were as follows:

- Understand the City's IT organizational and functional Strengths, Weaknesses, Opportunities, and Threats to meet the City's current and future business needs
- Define improvement opportunities in the current IT model and changes needed to achieve the desired model
- Identify overall opportunities regarding IT services and an implementation roadmap with immediate, near-term, and long-term priorities/initiatives
- Provide realistic recommendations to achieve efficiencies, given the City's participation in Act 47 and overall financial condition

The Deloitte assessment contained findings in six areas and are as follows:

FIGURE 4
Deloitte IT Assessment Findings

IT Governance
• The City does not have a formalized way of making IT decisions. Thus, priorities are pursued locally, not strategically • The City does not have an IT Strategic Plan against which projects can be pursued and progress tracked • While recent I&P initiatives have started outreach to, and proactive communication with customers, I&P still needs to make gains to combat historical perceptions and build trusting relationships with other departments • There is a lack of formal frameworks to manage risks across the City's IT portfolio, especially for non-I&P applications • The City has limited capability or discipline around portfolio and project management, leading to an ad hoc approach, although I&P recently held a boot camp to address the capability gap around project management
IT Finance
• The City's IT Operating Budget as a percentage of total operating expenditure (2.9%) is slightly lower than the benchmark of 3.6% • Departments do not have an overarching IT strategy to drive budgeting – most use prior year spend for IT budgets • There is no defined or documented formula for IT allocation between I&P and other departments • IT spend is spread across 150 vendors, but the majority of spend is highly concentrated (top 10% vendors account for 80% of spend) • There are limited tools and defined processes to properly track and monitor IT spend, particularly across departments
IT Talent
• Based on the functional and skills analysis, I&P lacks adequate staff in key areas such as Application Architecture, Service Management, and Network, and existing staff lack necessary training in these key areas • Staff feel that they have been underappreciated by leadership and morale across the department has recently been low • Lack of clear career paths, under-resourced teams, and frequent assignment of tasks outside of job and role descriptions have caused confusion among staff • Inadequate spending on IT training, coupled with the lack of defined requirements for positions, have prevented staff from advancing their skillsets

FIGURE 4
Deloitte IT Assessment Findings (Continued)

IT Infrastructure
[Redacted]
Applications
• Application governance is not well defined across departments, especially around I&P ownership and maintenance • There are a number of key application capability gaps, and limited documentation for key enterprise applications • There is redundancy in City applications, especially among departments with more custom applications • There is a lack of a well-defined City-wide strategy, and limited formalized processes and frameworks to enable consistent sourcing and deployment of applications • Ownership of technical support for applications not owned by I&P is unclear, and I&P struggles to deliver technical service to users of these applications
IT Service Management
• Lack of definition of the IT services provided by I&P hinders efforts to define and meet target metrics and manage expectations • There is an overall lack of maturity in a majority of the IT service management capability areas • Lack of process documentation and standardization across different services (e.g., incident management, access management) has resulted in inconsistent service delivery and knowledge management • Although overall IT help desk customer satisfaction lags only slightly (4.4) behind the benchmark (4.7), customers have voiced concerns around issue resolution and resolution time

Source: Deloitte IT Assessment

Deloitte provided a number of recommendations as to how I&P and the City could improve IT management. The status of those recommendations as of April 2020 are shown below, as reported by I&P. Note that certain recommendations are continuous objectives. Deloitte's findings will serve as the basis for portions of this audit.

FIGURE 5
Deloitte IT Assessment Recommendations

OPPORTUNITY	STATUS
1. IT GOVERNANCE	
1.1 IT Governance Structure	Completed
1.2 Governance Processes & Tools	In Progress
1.3 Redefine Security & Risk Management Approach	Completed
1.4 Coordinated IT budget	Completed
1.5 Formal relationships with external stakeholders	In Progress - *Continuous*
2. IT Finance	
2.1 Enhance IT Asset Management	In Progress
2.2 Implement value-based strategic procurement	In Progress
2.3 IT Vendor Management	In Progress
2.4 Improve financial management, monitoring and reporting	In Progress
3. IT Talent	
3.1 Reorient I&P Structure	Completed
3.2 Formalize Staff Development	Completed - *Continuous*
3.3 Define Performance Evaluation	In Progress
3.4 Shape desired IT Culture	In Progress - *Continuous*
4. Applications	
4.1 Rationalize redundant applications	Completed - *Continuous*
4.2 Criteria for Application Ownership	Completed
4.3 Application Sourcing Strategy	Completed
4.4 Application Innovation Strategy	In Progress
5. IT Infrastructure	
5.1 Network Enhancements	In Progress
5.2 Infrastructure Strategy	In Progress
5.3 Re-evaluate Virtualization	In Progress
6. IT Service Management	
6.1 Establish BRM group	Completed
6.2 Establish PMO group	Completed
6.3 Develop IT Service Catalog & SLAs	In Progress
6.4 Implement Key ITSM Processes	In Progress
6.5 Execute Service Desk Model	Completed
6.6 Standardize IT Architecture	In Progress
6.7 Drive Performance Improvement	In Progress - *Continuous*

Source: I&P

Administration and Management

Annual Budgets

During the scope of the audit, salary wages and benefits increased by 17.7%, professional services increased by 21.4%, other services increased by 19.9%, and supplies decreased by 20.8%. Property and property services were also shown for the first time. The addition of property is due to the adoption of the city-wide policy for I&P to take over the central purchasing of all IT equipment including: computers, printers, copiers, cell phones, and tablets. This centralization of hardware purchasing accounts for the $1,794,295 increase in machinery and equipment in 2018.

I&P's total budget for 2017 was $10,381,964 of which 45.2% was for salaries, wages and benefits, 38.7% for contracted professional and technical services, and 15.2% for other services, which include telephone services and internal printing and binding. The remaining amount was for supplies. I&P finished 2017 $1,507,995 (14.5%) under budget with the majority of the savings from $1,089,044 in professional services. Unspent funds are taken into consideration when the next year's budget is proposed.

I&P's total budget for 2018 was $13,511,778 of which 38.2% was for salaries, wages and benefits, 35.4% for contracted professional and technical services, 12.5% for other services, and 13.2% for property. The remaining amount was for property services and supplies. In 2018, I&P finished $4,058,755 under budget with the majority of savings coming from professional services of $2,520,045 or 18.6% total. Of that amount, $1,996,745 were encumbered monies to contracts, resolutions, and 2018 invoices not yet paid.

I&P's total budget for 2019 was $15,094,788 of which 37.4% was for salaries, wages and benefits, 33.9% for contracted professional and technical services, 13.0% for other services, and 15.0% for property. The remaining amount was for property services and supplies.

Relationship with City Departments

Business Relationship Managers

Beginning in 2017 as part of the department-wide reorganization, I&P created the Client Services Team, one component of which were the business relationship managers. The role of the BRMs is to serve as liaisons between I&P and other departments to streamline needs and to better implement IT solutions. The principles and procedures the managers operate on are defined by the Information Technology Infrastructure Library best practices as well as the BRM Institute.

When working with a department to implement a project, goals are clearly defined prior to the project's start date and success is assessed by metrics developed by the department executive sponsors and other stakeholders. The following are examples of projects that BRMs have helped to implement for departments with their respective metrics for success:

TABLE 2

Business Relationship Manager Projects 2017-2018			
Project	**Department**	**Dates**	**Metrics**
Morningside Crossings Senior Center	Citiparks	April 2018 – December 2018	Budget and timeline
Timekeeping Process Assessment	I&P, HR, Police, Fire, EMS, DPW	February 2018 – May 2018	Current state process map
Human Capital Management Request For Proposal (RFP)	HR	July 2018 – December 2018	Successful award of a vendor
Fire Station Alerting RFP	Fire, Public Safety, I&P	February 2017 – December 2017	Contract and legislation signed
Timekeeping and Scheduling RFP	EMS, Public Safety	May 2018 – October 2018	Contract and legislation signed
Credit Card Processing and Procedures	DPW	July 2018 – November 2018	Ability to receive payments via credit cards

Source: I&P

BRM Department Assignments (As of Fall 2019) are shown in Figure 7 (note that OEMHS is the Office of Emergency Management and Homeland Security):

FIGURE 6

Business Relationship Manager Department Assignments as of Fall 2019

BRM 1	BRM 2	BRM 3

• Public Safety Administration
  • Special Events
  • Community Affairs
  • Park Rangers
• Bureau of Fire and OEMHS
• Bureau of Police
• Bureau of EMS
• Bureau of Animal Care & Control
	• City Planning
	• Office of Community Affairs
	• Mayor's Office
	• Equal Opportunity Review Commission
	• Parks Department
	• Finance Department
	• City Clerk's Office
	• City Council
	• Office of Management and Budget
	• Permits, Licensing, and Inspections
	• Controller's Office
		• Law Department
		• Department of Mobility and Infrastructure
		• HR and Civil Service Commission
		• Office of Municipal Investigations
		• Ethics Hearing Board
		• Municipal Pension Fund
		• Innovation & Performance
		• Pittsburgh Partnership
		• Human Relations Commission

Source: I&P

Department Liaisons

Within each department, there is at least one designated employee who serves as the contact person to I&P. This employee is determined by each department's management, and the role is informal in nature. In other words, most of their full-time work is not related to IT, and it is not a requirement that they have an IT background. I&P works to accommodate each of their contacts based on their varying levels of technology experience, but ultimately all major upgrades and administrative approvals must remain within I&P for security containment.

Department Relations Survey

The auditors developed a department relations survey to assess how well I&P was meeting departments' IT needs and to make recommendations for improvements. The full survey questions can be found in the Appendix Exhibit A. Free text responses have been redacted to protect respondent privacy.

The department relations survey was sent to the following city departments: Office of Management and Budget (OMB); City Planning; City Controller's Office; Department of Mobility and Infrastructure (DOMI); Emergency Medical Services (EMS); Department of Finance; Bureau of Fire; Department of Law; Citiparks; Department of Human Resources and Civil Service Commission (HRCSC); Department of Permits, Licenses, and Inspections; Bureau of Police; Public Safety, and Department of Public Works.

This survey contained the following 10 questions:

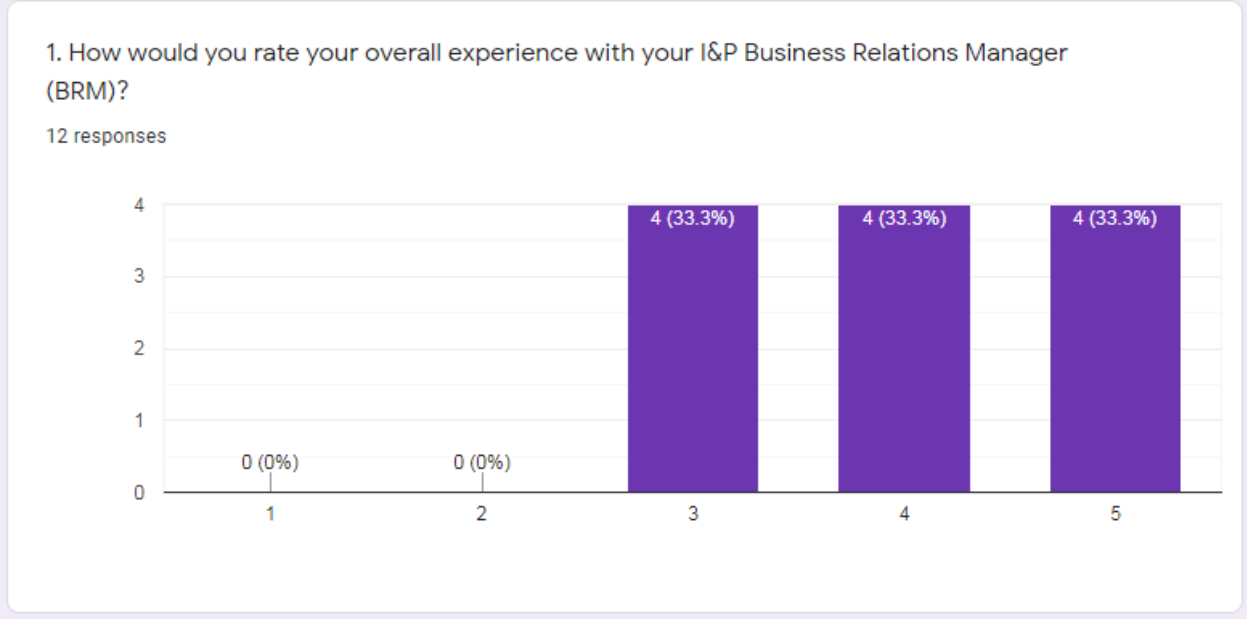
1. How would you rate your overall experience with your I&P Business Relations Manager?
2. In what ways has your Business Relations Manager improved IT-related services for your department?
3. How would you rate your overall experience with the City's internal Print Shop?
4. Does your department ever use outside vendors for printing? If so, for what purposes and which vendors?
5. Does your department's designated liaison to I&P have daily responsibility that are at least 50% IT-based?
6. How would you rate the I&P Help Desk's overall response time to your department's IT problems?
7. Does your department use custom-designed computer software or applications? If so, please specify which ones and for what purpose?
8. How would you rate your overall satisfaction with the IT services that I&P provides?
9. Are there any IT services that you would like to see the City adopt?
10. What comments, questions, or concerns do you have to improve I&P's performance? Is there anything I&P does well that should be recognized?

The department relations survey was sent to each department's director and assistant director using Google Forms. The auditors asked that the department submit one response delegated to an employee in the department best positioned to answer questions about daily interactions with I&P. All answers were anonymous and confidential. Of the fourteen departments and offices the survey was sent to, twelve responses were received, for a response rate of 85.7%.

The departments were asked about their experience with their business relationship manager based on a 5-point rating scale with 1 being the worst rating and 5 being the best.

CHART 1

Citywide Department
I&P Relations Survey (Question 1)



When the department respondent was asked how their BRM had improved IT-related services, answers were mostly all positive.

Finding: Departments did not report any negative responses about their experiences with their business relationship managers.

I&P employees also noted that the introduction of the BRMs improved relations with other departments. This was because BRMs allowed quicker responses to tickets and requests, clearer and effective communication and helped the department prioritize their IT needs.

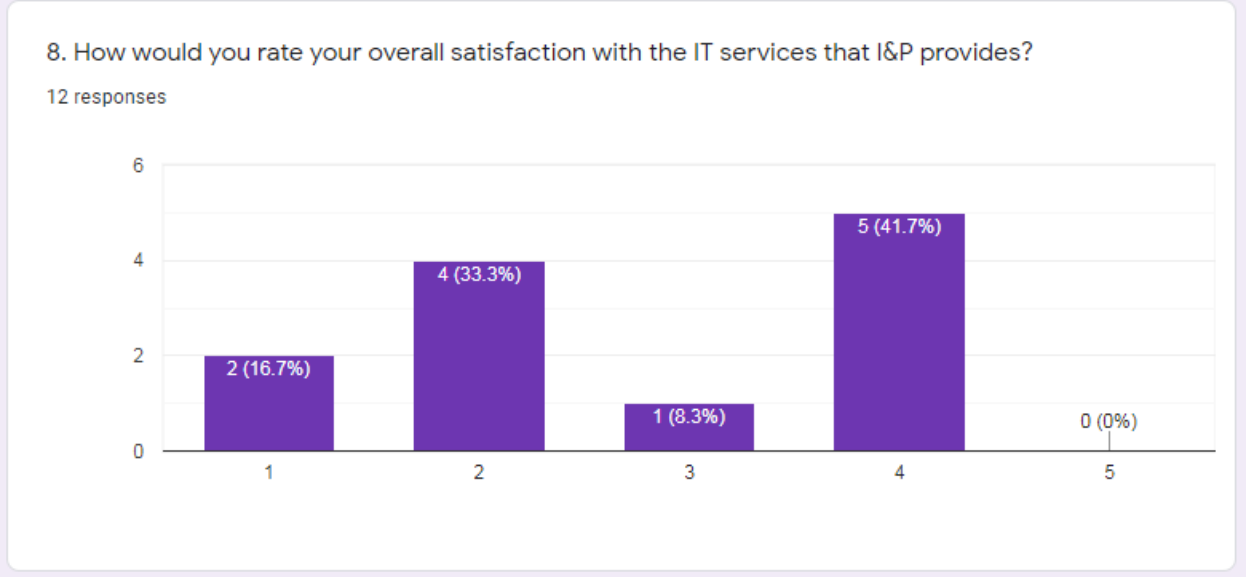
One drawback mentioned by employees was that the BRMs had limited ability to directly resolve IT services. This is because BRMs cannot solve technical issues. These issues must instead be delegated to technical staff. However, those responses praised the BRMs' ability to escalate those issues and maintain consistent contact through its resolution.

Finding: Department survey responses have indicated that the business relationship managers have improved I&P's efficiency and delivery of services both internally and externally.

In the department relations survey departments were asked about their overall experience with I&P:

CHART 2

Citywide Department
I&P Relations Survey (Question 8)



Finding: Departments' satisfaction with the IT services that I&P provides was mixed.

Examples of comments in the department relations survey's free text responses included:

- Noted recent improvements in the delivery of services and response times.
- Approval of department reorganization.
- Desire for "more user-friendly lingo for non-technical people."
- "Support department self-sufficiency by enabling vetted/trained end-users/power users in departments outside of I&P."
- Support staff through hiring and training and "adjust salaries to attract high quality candidates."
- "Create redundancy and cross training among staff so that more than one network expert can be relied on."
- Renewed focus on basic IT infrastructure.

When asked about IT services departments would like to see the City adopt, the following suggestions were offered in the department relations survey:

- Improved storage services or education on how to better utilize storage.
- Reliable Wi-Fi service throughout the City-County Building.
- Outsourcing network servers.
- 24/7 technical support staff.
- New computers.
- Collaboration with Human Resources to collect City property (e.g., cellphone, laptop) upon employee termination, and suspending employee access on leave of absence.

RECOMMENDATION 1:

The City Administration should work to ensure that each department has at least one employee with a specialization in IT services to be the designated contact person to I&P.

IT Talent Acquisition and Retention

In 2017, I&P had 63 full-time permanent positions, 1 part-time position, and 1 paid intern. At the end of 2017, additional positions had been added through the year to bring the position total to 68, of which 62 were filled. The additional positions were added in accordance to the needs outlined by the department's 2017 reorganization.

In 2018, I&P had 65 permanent full-time positions, 1 part-time position, and 1 paid intern. At the end of 2018, budgeted positions had increased by 5 full-time employees to 70 total; of which, 63 were filled.

In 2019, I&P had 72 permanent full-time positions, 3 part-time positions, and 1 paid intern.

As previously stated, in 2016, OMB contracted with Deloitte to perform an IT assessment of I&P. The purpose of the assessment was to measure the capabilities and future technological needs of the department.

Deloitte's assessment with employees showed considerable problems with organizational culture within I&P, including "low morale", organizational silos (a lack of collaboration across the department), and staff performing functions outside of the duties defined by their job descriptions. Specifically, the report states:

- Some staff find the organization's satisfaction with the status quo to be frustrating.
- A lack of trust in leadership has created a top-down culture.
- Staff are caught off-guard by changes and are upset by leadership's inability to take a proactive approach to communication.
- Silos have inhibited I&P from establishing a single cultural identity. The lack of collaboration creates duplication of efforts.

I&P administration reported to the auditors that in 2018, the I&P director worked with Gartner, Inc. to conduct an anonymous and confidential employee satisfaction survey. The auditors were told that the director was the only person to have seen the results, and I&P does not have any copies of the report. The cost of this report is unknown.

Finding: A confidential employee satisfaction survey was conducted in 2018 by I&P and the results were not shared.

Some challenges stated by the Deloitte report and communications with various employees include:

- Siloing of responsibilities; not enough cross-section training so multiple employees can complete a given task.
- Siphoning of under-40 staff to the private sector has led to a major skills gap.
- Praise for autonomy but desire for more guidance and performance reviews
- Too much red tape for basic needs (e.g., submitting tickets for basic office supplies).
- Unclear or inconsistent processes.
- No central inventory of software; departments will select software without I&P input, causing duplicative spending and poor vendor choices.
- Lack of clearly defined responsibilities post-reorganization.
- Erratic prioritization of needs from the Mayor's Office.

Positive qualities reported about the department include:

- Proactive approach to maintenance.
- Keeps an open mind toward innovation.
- Help Desk has improved service performance and delivery.
- Shared spaces and meeting rooms have been good for collaboration.
- BRMs have improved I&P's relationship with departments.
- Clear communication during stressful situations.

Possible improvements stemming from the Deloitte report and various communications from employees include:

- Recruiting talent from local colleges and universities, especially those with passion for public service.
- Consistent accountability for poor performance; setting greater expectations for and requiring results from employees.
- More opportunities for advancement and professional development
- Desire for more recognition and appreciation for their contributions to the department
- Channeling communication for the print shop through OTRS (a ticket-based digital service management system).
- An active directory system for I&P and all city departments.
- Consolidate processes, reduce red tape and administration for simple tasks.
- More department-wide transparency regarding what teams are working on and what the goals are.
- Shared documentation for best practices, updates, etc.

These comments on staff relations and organizational culture will be expounded upon later in the audit.

Finding: The City does not have a live staff directory for internal users organized by department. While the "People" function in Office 365's Outlook application allows users to search by name, it does not constitute a staff directory in its current form. Employee's position titles are not updated regularly in Office Outlook.

RECOMMENDATION 2:

I&P administration should work with HR to create a live staff directory for city employees. A live staff directory would improve citywide efficiency in communication. I&P administration should investigate whether the "People" function in Outlook can organized by department, and show each user's corresponding job title, email address, and work phone number to help create such a directory.

Retention and Turnover Analysis

Based on information provided by the city's Human Resources department, Table 3 shows I&P employee totals, terminations, and turnover rates in 2017 and 2018 (note: temporary employees are not included). Termination can include an employee who has quit, retired, or has been fired. HR does not release the reasoning for any terminations to preserve employee privacy.

TABLE 3

I&P Employee Turnover 2017-2019			
I&P Employees – 2017	**Total**	**Terminations**	**Turnover Rate**
Full-Time	58	4	6.9%
Part-Time	4	4	100%
Total Department	**62**	**8**	**12.9%**

I&P Employees – 2018	**Total**	**Terminations**	**Turnover Rate**
Full-Time	60	6	10.0%
Part-Time	4	2	50.0%
Total Department	**64**	**8**	**12.5%**

I&P Employees – 2019	**Total**	**Terminations**	**Turnover Rate**
Full-Time	69	10	6.9%
Part-Time	6	0	0.0%
Total Department	**75**	**10**	**7.5%**

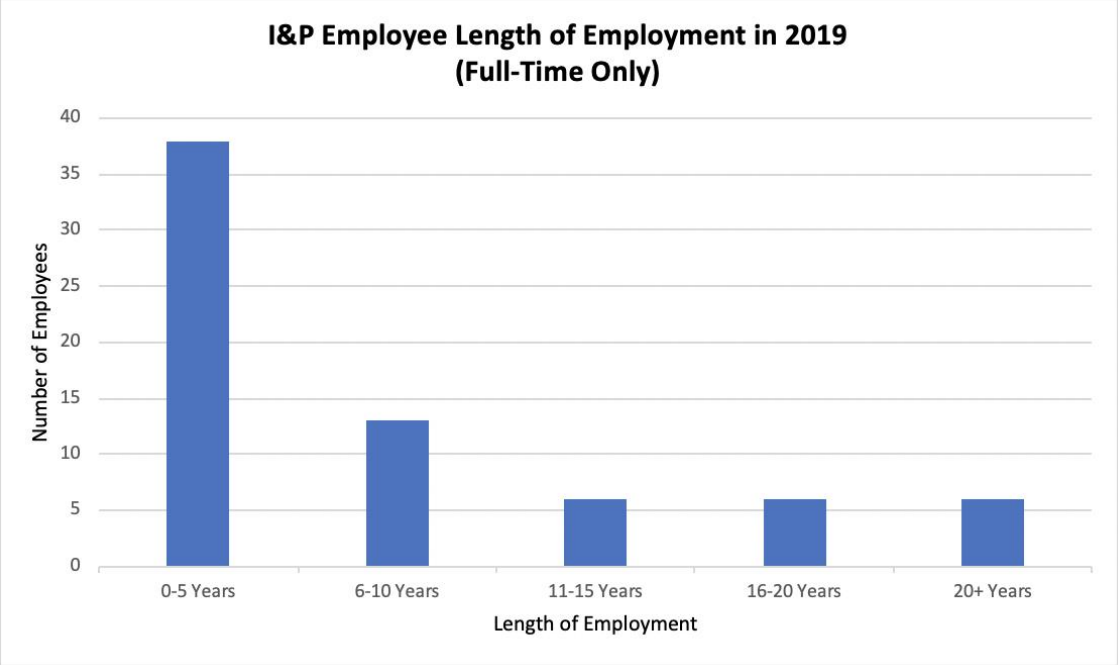
An analysis of sector turnover from LinkedIn lists tech as having the highest turnover rate of any field examined at 13.2%, and government/education/nonprofit in fifth at 11.2%. Compared to these numbers, I&P averaged roughly in the middle of these rates during 2017 and

2018 and lower in 2019, though its full-time employee retention rate beat the averages. However, it should be noted that turnover is a limited metric that does not measure whether terminated employees are high or low performing.

Finding: I&P had a total department employee turnover rate of 12.9% in 2017, 12.5% in 2018, and 7.5% in 2019.

Using Fiscal Focus Pittsburgh (an open data portal for employee statistics), the auditors determined the length of employment with the City for full-time employees:

CHART 3



Source: Fiscal Focus Pittsburgh

Finding: Of the 69 full-time employees in 2019, 55% have been employed with the City for less than five years.

Salary Analysis

Government IT is a field sometimes at a disadvantage due to private sector competition known to offer high salaries and flexible working arrangements. Given that Pittsburgh has become home to a growing number of private sector, tech-based companies in the past decade, it's worth analyzing the extent of the City's advantage or disadvantage when it comes to offering compensation competitive enough to prevent a "brain drain" to those private competitors.

Listed below is a sample of select I&P positions along with average wages paid per job title for 2017, 2018, and 2019. Because actual individual salaries vary based on a number of

factors including length of employment, the auditors calculated pay for each job title based on budgeted amounts found in the operating budget for each year. To do so, the total lump sum budgeted for a position was divided by the number of employees budgeted for that position.

Base salary averages for national and Pittsburgh area job titles were retrieved using Payscale.com and Glassdoor.com, respectively, both of which are employment data websites. Sample sizes on both sites tend to be high, and their reliability is generally well regarded. Those numbers were adjusted for inflation using the Bureau of Labor Statistics' CPI Inflation Calculator in order to compare them to I&P average salaries in each given year. When an I&P job title did not align with private sector equivalents, a comparable job title was used, as noted with footnotes.

Finally, a comparison was made between the average salary of the private sector to the average salary of the I&P employee. The overpay or underpay percentage was calculated. Table 4 shows the average I&P salaries compared to national average salaries with the percentage of over and under payments. Table 5 compares the average I&P salary to the average salary in the Pittsburgh area.

TABLE 4

I&P Salaries Compared to National Salary Averages			
I&P Job Title	**I&P Average Pay ($)**	**National Average Pay ($)**	**I&P to Private Sector**
Business Analyst[1]			
2018	55,967	66,125	-15.4%
2019	57,086	67,150	-15.0%
Business Relationship Manager			
2018	68,564	81,953	-16.3%
2019	69,935	83,225	-16.0%
Computer Support Analyst[2]			
2017	47,592	44,291	+7.5%
2018	48,544	45,208	+7.4%
2019	49,515	45,909	+7.9%
Data Base Administrator			
2017	76,315	69,438	+9.9%
2018	77,841	70,876	+9.8%
2019	79,398	71,975	+10.3%

[1] Used IT Business Analyst
[2] Used Computer Support Technician

TABLE 4 (continued)

I&P Salaries Compared to National Salary Averages			
I&P Job Title	**I&P Average Pay ($)**	**National Average Pay ($)**	**I&P to Private Sector**
Digital Services Analyst[3]			
2017	54,870	56,885	-5.5%
2018	55,967	58,063	-3.7%
2019	57,086	58,964	-3.2%
Editor/Videographer[4]			
2017	41,247	45,285	-8.9%
2018	42,072	46,223	-7.6%
2019	42,914	46,940	-8.6%
Help Desk Representative			
2017	41,247	37,992	+8.6%
2018	42,072	38,778	+8.5%
2019	42,914	39,380	+9.0%
Info Technology Analyst 2[5]			
2018	55,991	75,610	-25.9%
2019	57,111	76,783	-25.6%
IT Security Engineer[6]			
2017	76,315	67,569	+12.9%
2018	77,841	68,968	+12.9%
2019	79,398	70,037	+13.4%
IT Support Manager[7]			
2017	76,315	82,696	-7.7%
2018	77,841	84,408	-7.8%
2019	82,549	85,718	-3.7%
Lead Systems Administrator[8]			
2018	63,263	81,764	-22.6%
2019	69,935	83,032	-15.8%

[3] Used Digital Strategist
[4] Used Video Editor
[5] Used IT Consultant
[6] Used IT Security Analyst
[7] Used IT Manager
[8] Used Senior Systems Administrator

TABLE 4 (continued)

I&P Salaries Compared to National Salary Averages			
I&P Job Title	**I&P Average Pay ($)**	**National Average Pay ($)**	**I&P to Private Sector**
Mayor's 311 Response Line Representative[9]			
2017	32,141	36,947	-13.0%
2018	32,784	37,712	-13.1%
2019	33,440	38,297	-12.7%
Network Engineer			
2017	67,220	69,281	-3.0%
2018	68,564	70,715	-3.0%
2019	69,935	71,812	-2.6%
Network Technician			
2019	45,969	45,909	+0.1%
Project Manager[10]			
2018	63,263	84,685	-25.3%
2019	64,528	85,999	-25.0%
Systems Administrator			
2018	63,263	59,694	+6.0%
2019	64,528	60,620	+6.5%
Telecommunications Analyst			
2017	52,597	59,088	-11.0%
2018	53,649	60,311	-11.0%
2019	54,722	61,247	-10.7%
Web Developer			
2017[11]	64,655	55,901	+15.7%
2018	65,948	57,089	+15.5%
2019	67,267	57,974	+16.0%
Total Averages:	**59,395**	**61,881**	**-4.0%**

[9] Used 911 Dispatcher
[10] Used IT Project Manager
[11] Formerly called "Web Master" in 2017

In the following table, Table 5, the I&P salaries are compared to Pittsburgh area salary averages.

TABLE 5

I&P Salaries Compared to Pittsburgh Area Salary Averages			
I&P Job Title	**I&P Average Pay ($)**	**Pittsburgh Area Average Pay ($)**	**I&P to Private Sector %**
Business Analyst[12]			
2018	55,967	58,889	-5.0%
2019	57,086	59,803	-4.5%
Business Relationship Manager			
2018	68,564	77,130	-11.1%
2019	69,935	78,326	-10.7%
Computer Support Analyst[13]			
2017	47,592	41,126	+15.7%
2018	48,544	41,978	+15.6%
2019	49,515	42,629	+16.2%
Data Base Administrator			
2017	76,315	66,276	+15.1%
2018	77,841	67,648	+15.1%
2019	79,398	68,698	+15.6%
Digital Services Analyst[14]			
2017	54,870	53,837	+1.9%
2018	55,967	54,952	+1.8%
2019	57,086	55,804	+2.3%
Editor/Videographer[15]			
2017	41,247	39,324	+4.9%
2018	42,072	40,138	+4.8%
2019	42,914	40,760	+5.3%
Help Desk Representative			
2017	41,247	35,915	+14.8%
2018	42,072	36,659	+14.8%
2019	42,914	37,227	+15.3%

[12] Used IT Business Analyst
[13] Used Computer Support Technician
[14] Used Digital Strategist
[15] Used Video Editor

TABLE 5 (continued)

I&P Salaries Compared to Pittsburgh Area Salary Averages			
I&P Job Title	**I&P Average Pay ($)**	**Pittsburgh Area Average Pay ($)**	**I&P to Private Sector %**
Info Technology Analyst 2[16]			
2018	55,991	58,884	-4.9%
2019	57,111	59,797	-4.5%
IT Security Engineer[17]			
2017	76,315	62,729	+21.7%
2018	77,841	64,028	+21.6%
2019	79,398	65,021	+22.1%
IT Support Manager[18]			
2017	76,315	76,405	-0.1%
2018	77,841	77,987	-0.2%
2019	82,549	79,197	+4.2%
Lead Systems Administrator[19]			
2018	63,263	71,447	-11.5%
2019	69,935	72,555	-3.6%
Mayor's 311 Response Line Representative[20]			
2017	32,141	29,967	+7.3%
2018	32,784	30,588	+7.2%
2019	33,440	31,062	+7.7%
Network Engineer			
2017	67,220	60,930	+10.3%
2018	68,564	62,192	+10.2%
2019	69,935	63,157	+10.7%
Network Technician			
2019	45,969	45,616	+0.8%

[16] Used IT Consultant
[17] Used IT Security Analyst
[18] Used IT Manager
[19] Used Senior Systems Administrator
[20] Used 911 Dispatcher

TABLE 5 (continued)

I&P Salaries Compared to Pittsburgh Area Salary Averages			
I&P Job Title	**I&P Average Pay ($)**	**Pittsburgh Area Average Pay ($)**	**I&P to Private Sector %**
Project Manager[21]			
2018	63,263	78,000	-18.9%
2019	64,528	79,210	-18.5%
Systems Administrator			
2018	63,263	57,439	+10.1%
2019	64,528	58,330	+10.6%
Telecommunications Analyst[22]			
2017	52,597	61,147	-14.0%
2018	53,649	62,413	-14.0%
2019	54,722	63,381	-13.7%
Web Developer			
2017[23]	64,655	57,600	+12.2%
2018	65,948	58,792	+12.2%
2019	67,267	59,704	+12.7%
Total Averages:	**59,395**	**57,493**	**+3.0%**

In both Table 4 and 5, the salaries were totaled for all three years and then an overall average was calculated. The overall total percent for the over or under payment was calculated using the average salary for the calculation.

Finding: I&P employees receive base salaries 4.0% less than national averages in the private sector, and 3.0% higher than Pittsburgh area averages in the private sector when compared to equivalent or similar positions.

It should also be noted that the City offers many benefits that are comparable if not advantageous to many private sector tech jobs, including a defined-benefit pension, paid vacations, comprehensive health care, and tuition reimbursement programs. I&P holds that talent retention has not been perceived as a problem and that because of the City's fixed scheduling, a work-life balance is a major advantage over local tech companies.

[21] Used IT Project Manager
[22] Used Telecommunications Engineer
[23] Formerly called "Web Master" in 2017

Attracting and Retaining IT Talent

In addition to those benefits, I&P allocates funding for ongoing education in order to keep its employees up to date with technical changes in their fields. These funds are used for training resources and conferences. In 2018, a Professional Development Plan (PDP) template was made available for employees to document career goals and plan development strategies with their supervisor, which can be found in Appendix Exhibit B. A completed PDP was made mandatory for those requesting training or attendance at a conference to ensure alignment with job responsibilities and department strategy.

RECOMMENDATION 3:

Encouraging the use of a Professional Development Plan is a good practice and I&P administration should continue its use.

For the past five years, the amount budgeted and spent on tech training for I&P staff was as follows:

TABLE 6

I&P Technical Training Budget and Spending 2016-2020					
	2016	**2017**	**2018**	**2019**	**2020**
Amount Budgeted	$22,250	$100,000	$90,000	$71,400	$75,000
Amount Spent	$25,053	$82,981	$95,459	$68,226	$6,400 as of March 2020

Source: I&P

Finding: I&P has made a substantial investment in training and professional development for its employees.

RECOMMENDATION 4:

I&P administration should continue ongoing education and training programs. This is a vital resource for keeping IT staff up to date with a continuously changing field.

The department administration told auditors that "I&P staff are encouraged to identify opportunities for innovation using technology, particularly where processes have been optimized and can then be automated, or when a need is identified that cannot be solved with the skills and tools [they] currently have within the department".

However, auditors' communications with employees indicated that more progress needs to be made to improve morale and engagement. By adopting the following recommendations, I&P administration can work to break down some of the biggest barriers weighing on employee morale.

RECOMMENDATION 5:

I&P administration should break down organizational silos by building a shared culture through department-wide and team meetings, shared documentation, and other opportunity areas. I&P leadership could hold quarterly department-wide meetings where they share long-term visions, teams share what they're working on and opportunities for cross-team collaboration, department-wide goals are set, and employees feel welcome to share honest feedback. This could also be accompanied by regular meetings within each department section to focus on the finer details of how each team is working toward those goals.

Both Deloitte's report and auditors' communications with employees show a continuing challenge with organizational silos. For example, tasks can often only be completed by one person, teams feel disconnected with the department's overall vision, and employees feel like the skills they have are not utilized to their full potential. The auditors also agree with Deloitte's suggestions for more shared documentation to reinforce that collaboration with best practices, workflows, and status updates. By offering transparency in leadership decision-making, two-way feedback, and shared accountability, employees are given a buy-in for the entire department's success.

RECOMMENDATION 6:

I&P administration should identify opportunities for cross-training and increase the number of employees able to complete multiple tasks throughout the department.

Cross-training employees would address a number of issues simultaneously. It would be yet another layer of shared culture as described in Recommendation 5, because employees would have a greater awareness of how other teams contribute to the department. It would boost motivation and help employees feel their skills are being fully utilized. It would make the entire department more efficient and agile since fewer tasks would be left uncompleted when one employee is absent or needs assistance when work piles up.

Based on human resources best practices, participation in any established cross-training program should be voluntary and primarily employee-driven. In the long-term, it could produce a leaner, more productive department as redundant positions are phased out.

RECOMMENDATION 7:

I&P administration should adopt one-on-one performance reviews that give employees guidance and an opportunity to provide suggestions for department improvement. Quarterly performance reviews, an industry best practice, are an opportunity to deliver on this.

I&P employees indicated that they value the autonomy of their work but would like to see it balanced with guidance and recognition for their contributions. Above all else, any performance reviews should be non-hierarchical; rather than fearing them, employees should feel comfortable sharing feedback and suggestions to their supervisors, as well as their contributions to the department. In return, supervisors have an opportunity to learn what motivates individual employees, acknowledge those contributions, and maintain a productive relationship. When an employee is failing to meet goals or deadlines, it's an opportunity to learn how supervisors can help remedy the situation. And when positions open up, those meetings can be the basis for an employee to advocate their own merits.

RECOMMENDATION 8:

I&P administration should establish clear career lattices and transparency in department advancement.

Establishing career lattices as recommended by Deloitte's report would provide clarity as to how employees can advance or transition to other positions. As opposed to career ladders, lattices recognize the non-hierarchal structures of many nontraditional organization structures and show the horizontal or diagonal paths for moving to other positions in addition to vertical pathways. Working with HR to ensure this is an option for employees introduces a degree of flexibility that potential hires might value in private sector firms. Those lattices should make explicit the skills and experience required for an employee to apply for the position. Careeronestop.org, an initiative from the US Department of Labor, provides resources and examples to help organizations in various industries, including IT, establish their own lattices.

Finding: Deloitte's recommendation to establish career lattices has yet to be implemented by I&P.

In their interactions with the auditors, employees mentioned red tape and over-administration as a hindrance on their performance. While multiple layers of approval for certain critical processes are necessary to prevent error, those for low-risk and routine tasks can be relaxed to improve flexibility, productivity, and morale. For example, requests for office supplies requires an IT ticket and can take up to two days to receive. This is cumbersome and inefficient.

RECOMMENDATION 9:

I&P leadership should identify areas where policies and procedures can be simplified and consolidated to reduce "red tape" in administration.

Under the current administration, there has been a renewed prioritization of funding the City's IT systems after years of underinvestment and budget constraints under Act 47 state oversight. One component of this has been moving away from the short-term, reactive "break-fix" model and toward a proactive strategy of anticipating future challenges and keeping I&P ahead of potential problems. The citywide Technology Leadership Council described later in this audit is an example of how this long-term focus has been implemented.

Attracting Local IT Talent

The department would benefit from creating an IT Planning Team that applies this proactive approach internally, whose focus is solely on long-term IT management. When it comes to the topic of employee acquisition and retention, this team could play an instrumental role in addressing a concern among employees that the department is losing ground on its under-40 staff.

Since 2015, I&P has seen a number of initiatives that leverage its relationship with local talent. It worked with Allegheny County and the University of Pittsburgh using a grant from the Heinz Endowments to help create the Western Pennsylvania Regional Data Center (WPRDC). There is an existing memorandum of understanding between the City and Carnegie Mellon University for the Metro21 Initiative to coordinate research and educational projects. And in 2017 and 2018, I&P had an agreement with Code for America to maintain Beacon, its procurement software suite.

The IT Planning Team could consolidate, manage, and expand these relationships with formal agreements with CMU and Pitt to hire student interns as full-time employees upon graduation, or have employees regularly provide support for research projects. The same could be done with Code for America or annual hackathons (a collaborative computer programming event) to improve city IT systems.

Pittsburgh has one of the highest per-capita college student populations in the US, but retaining them post-graduation has been an ongoing challenge. An IT talent pipeline is one way the City can work to combat that.

RECOMMENDATION 10:

I&P administration should establish an IT planning team that would be responsible for managing a long-term Talent Pipeline through formal agreements with local universities, as well as other long-term IT needs for the City recommended by the Deloitte assessment.

Additional needs recommended by Deloitte include working with the Technology Leadership Council to align department goals, IT enterprise architecture management, working with OMB to track and standardize IT spending across departments, and IT vendor management.

City of Philadelphia Innovation Model

Philadelphia's I&P equivalent, the Office of Innovation and Technology (OIT), has undergone a radical transformation during the current mayor's tenure, providing a model of open, innovative employee culture that Pittsburgh could replicate. In addition to revamping its internal IT systems and embracing open data, the OIT has created an internal subgroup called the Office of Innovation Management (OIM) that has implemented a number of programs aimed at crowdsourcing innovation through a partnership with all stakeholders – including department employees, local students, and city residents. Among these programs, they list the following:

- *Innovation Academy* – Training employees in creative problem solving
- *Innovation Lab* – Managing a space for employees to work together
- *Innovation Fund* – Providing funds for employees to test new ideas
- *Innovation Consulting* – Facilitating workshops that help City departments approach problems differently
- *Digital Literacy Alliance* – Working to improve digital skills in our communities
- *STEM Mentoring* – Teaching students about careers in government and technology
- *SmartCityPHL* – Using advanced technology to improve resident services

The Civic Innovation Group within I&P serves a similar purpose by partnering with community stakeholders and private businesses to improve the delivery of city services. The following lists projects undertaken by the Group, partnering departments, and the results of those projects:

TABLE 7

Civic Innovation Group Projects 2017-2018			
Department	**Date of Project**	**Description**	**Metrics/Results**
Urban Redevelopment Authority (URA)/I&P	Jan-Dec 2017	Inclusive Innovation Meetup events highlighted underrepresented local organizations and businesses	81 events drawing over 600 attendees produced by 140 partners over the course of the year
I&P/DPW	Jan- July 2017	PGH Lab company Kaarta created 3-D maps of real-world assets	Two 3D maps of City properties were provided to DPW to allow facility cleanup and organization
I&P/DPW, Office of Recycling	Jan- July 2017	PGH Lab company CleanRobotics piloted Trashbot to sort waste from recycling	Testing at the City-County Building for one week, the company was able to collect user feedback via surveys

TABLE 7 (continued)

Civic Innovation Group Projects 2017-2018			
Department	**Date of Project**	**Description**	**Metrics/Results**
URA and I&P	Jan-July 2017	PGH Lab company Cognowear tested Smart Garment, a wearable sensing tech that measures and maintains body temperature in cold offices.	12 URA employees tested prototypes and provided feedback on comfort and pricing
PWSA and I&P	Jan-July 2017	PGH Lab company MellonHead Labs produced FlaminGO, an advanced sensor used to measure water quality	The company was able to gain and report data to PWSA regarding the water quality of one of its plants
DPW and I&P	Jan-July 2017	PGH Lab company FlyWheel helped DPW understand how their teams do work to increase efficiency	Produced analysis of URA workflows created with input from employees. Resulted in a contract with the URA
URA and I&P	Jan-Dec 2018	Inclusive Innovation Meetup events highlighted underrepresented local organizations and businesses	76 events drawing over 500 attendees produced by 187 partners over the course of the year
HACP and I&P	Oct- Dec 2018	PGH Lab company Meta Mesh worked to provide free, or reduced cost Wi-Fi to areas of critical need.	Company worked in 3 Housing Authority buildings to provide Wi-Fi, and also installed a pilot project on the Greenfield Rec Center.
DPW and I&P	Oct- Dec 2018	PGH Lab company Cropolis connected local growers and sellers through an e-commerce software	Engaged with 3 city farmers markets to test e-commerce software for the summer farmers markets season
DPW and I&P	Oct- Dec 2018	PGH Lab company Netbeez monitored network performance to identify problems before they occur	8 sensors were deployed around the City-County Building to monitor network performance. Pilot resulted in a contract with I&P

TABLE 7 (continued)

Civic Innovation Group Projects 2017-2018			
Department	**Date of Project**	**Description**	**Metrics/Results**
HACP and I&P	Oct- Dec 2018	PGH Lab company Global Wordsmith provided low cost language translation services	Trainings were issued to employees in the HACP's Occupancy Dept. and now has a contract with the City of Pittsburgh
DPW, Forestry Division and I&P	Oct- Dec 2018	PGH Lab company Steel City Soils creates compost from food and yard waste	Converted City wood chips and public food waste into two tons of compost
Parking Authority and I&P	Oct- Dec 2018	PGH Lab company Zensors uses artificial intelligence via a camera software system to make data-driven pricing decisions	Installed 13 camera sensors to gather data on a busy commercial street and generated reports for owners on the number of passersby
URA and I&P	Oct-Dec 2018	PGH Lab company Qlicket provides an office communication decision to gather feedback on workplace issues	URA employees were asked daily questions with resulting in a 73% response rate and after the pilot period, a kiosk was developed that encouraged greater employee participation

Source: I&P

Operations and Policies

Client Services Division

As part of the department reorganization in 2017, the Client Services Division was created with the intention of focusing on internal and external IT project management. During the audit scope, the Client Services Division was comprised of five different teams: the Performance Improvement Team, Business Relationship Managers, Project Management Office, and Help Desk.

The Performance Improvement Team offers coaching, training, and support for staff in departments interested in improving their work processes. The department identifies potential opportunities and the performance improvement team utilizes best practices found in their Lean and Six Sigma trainings to help realize those goals. The team's assistance is voluntary and only provided if requested by a department. Department heads also set their own benchmarks for improvements.

The business relationship managers act as liaisons between departments and I&P to develop technical strategies, communicate effectively, and help identify technical needs of departments to better serve their customers. The BRMs also work with departments to determine if there are IT solutions needed for their assigned departments' service strategies. They research what applications already owned by the City can be leveraged to fulfill those needs or, when appropriate, what is available on the market to help departments make a business case for purchasing new IT solutions. Each department has a designated BRM who helps mediate communication between both parties and resolve issues with vendor services.

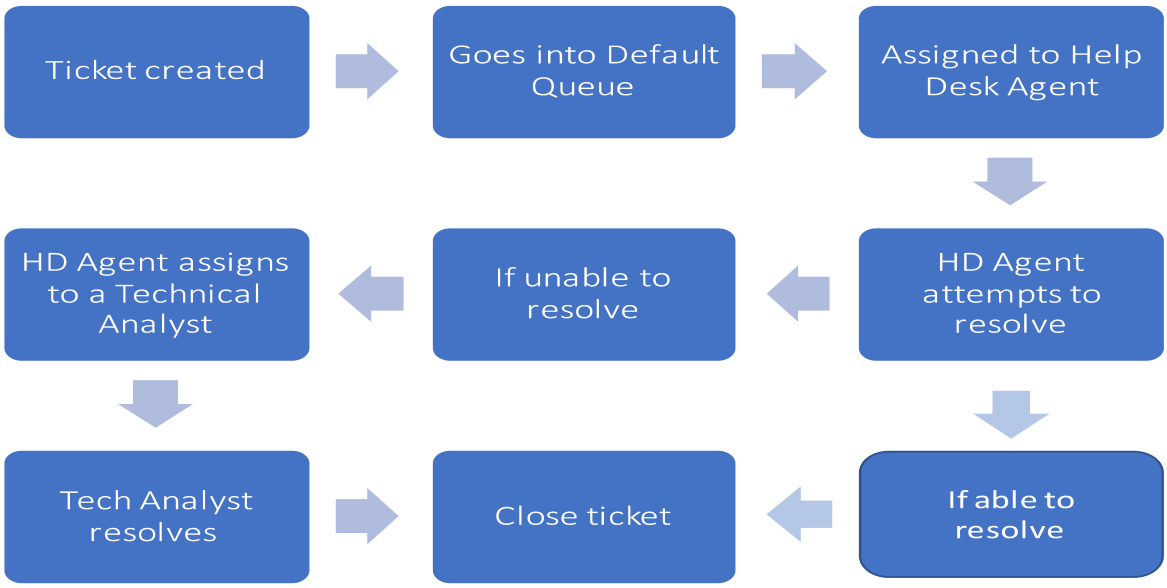
The Project Management Office consists of IT qualified employees who manage major IT projects and are responsible for I&P's project portfolio management as well as project management training for staff. Examples of major IT projects include the implementation of Computronix and the citywide migration to Windows 10. The team was created in the fourth quarter of 2017 and hired a second project manager in June of 2018.

To efficiently manage and track progress on project completion, standard templates were implemented. In the Appendix, Exhibit items C, D, E, and F show sample templates for project charters, weekly status reports, RAID (Risks, Action Items, Issues, Decision) logs, and project schedules, respectively.

Help Desk

The Help Desk is the primary source of assistance with issues and requests from the city's end users. The Help Desk operates on an open-source ticket request system (OTRS). Shown below is the flowchart of how tickets are processed from start to close. If a request cannot be successfully resolved by the Help Desk, the ticket is assigned to a specialist within one of 19 other queues.

FIGURE 7
Help Desk Ticket Processing Flowchart



Source: I&P

The OTRS system assigns a ticket to an I&P employee based on ticket type. The following lists the 20 possible ticket assignments:

1. DevPS
2. DBAdmin
3. Tier 1
4. Tier 2
5. Tier 3
6. Network
7. DevWeb
8. Equipment
9. DataTeleCom
10. OTRS
11. PrintShop
12. MobileCom
13. InfoSec
14. DevFin
15. City Channel
16. DevAnalytics
17. DevIntranet
18. Email
19. UserMod
20. Help Desk

VIP Tickets

There is also a VIP ticket list that includes council members and the heads of each department. Those tickets are escalated to the front of the queue. Tickets can be manually escalated, for example, if there is a systemic user issue. I&P has implemented a process that flags when tickets have been sent to the wrong queue so Help Desk employees can learn in real time and improve future accuracy. These changes are aligned with Deloitte's recommendations for an Enhanced Service Desk Model. I&P leadership also meets with the Help Desk team several times per week to discuss issues, and conducts a meeting at least twice annually to reorient staff with new technologies and developments. Shown below is data on the number of tickets received by the Help Desk during the scope period and the average length to close them.

Finding: I&P has implemented improvements to the Help Desk using Deloitte's recommendations.

TABLE 8

2017 - I&P Help Desk Ticket Statistics			
Month & Year	Average Days to Close a Ticket Each Month	Total Number of Tickets Open per Month	Total Number of Tickets Closed per Month
January 2017	6.63	1393	1310
February 2017	7.19	1344	1310
March 2017	11.38	1516	1481
April 2017	7.44	1306	1197
May 2017	9.54	1397	1498
June 2017	10.67	1414	1354
July 2017	11.04	1251	1291
August 2017	14.9	1390	1389
September 2017	12.61	1163	1248
October 2017	7.4	1253	1270
November 2017	12.93	1168	1114
December 2017	10.5	1103	1079
2017 Averages	**10.19**	**1308**	**1295**

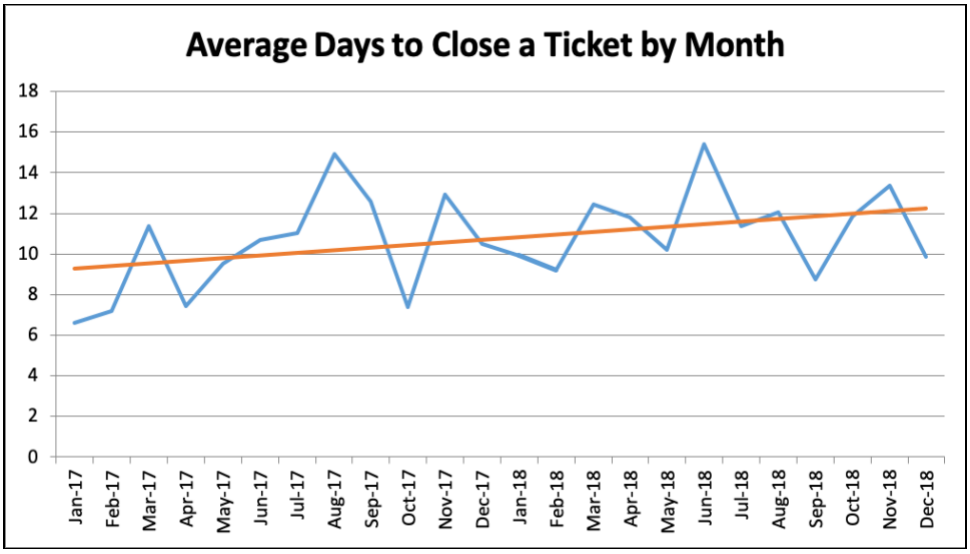
Source: I&P

TABLE 9

2018 - I&P Help Desk Ticket Statistics			
Month & Year	Average Days to Close a Ticket Each Month	Total Number of Tickets Open per Month	Total Number of Tickets Closed per Month
January 2018	9.93	1345	1301
February 2018	9.21	1220	1090
March 2018	12.42	1408	1279
April 2018	11.81	1313	1282
May 2018	10.2	1249	1257
June 2018	15.39	1215	1198
July 2018	11.37	1150	1183
August 2018	12.07	1083	1129
September 2018	8.73	1113	1077
October 2018	11.84	1793	1818
November 2018	13.36	1078	1053
December 2018	9.88	1004	989
2018 Averages	**11.35**	**1248**	**1221**

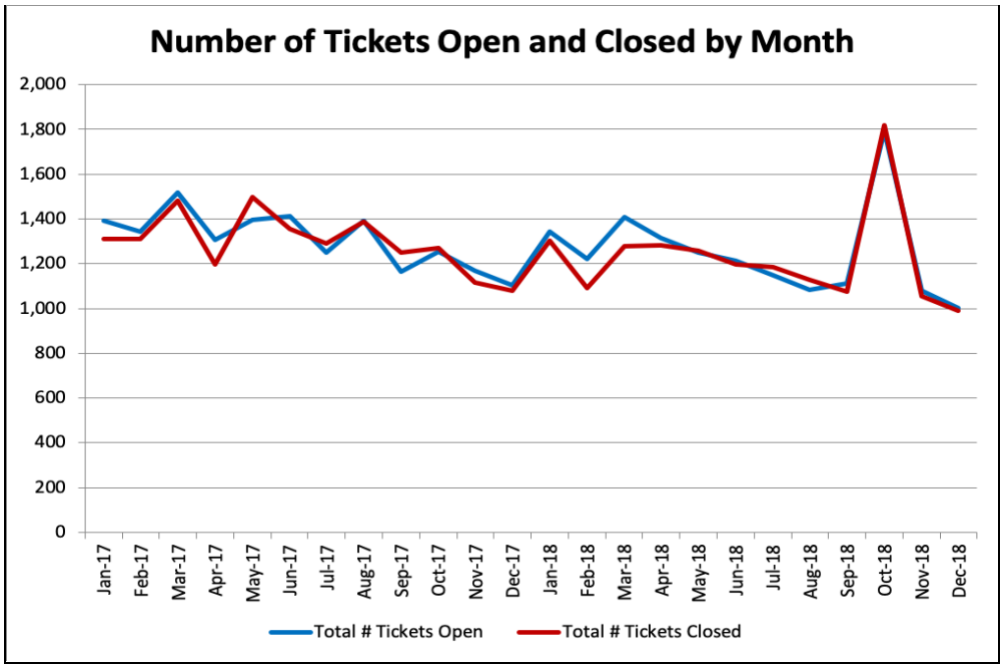
Source: I&P

FIGURE 8



Source: I&P

FIGURE 9



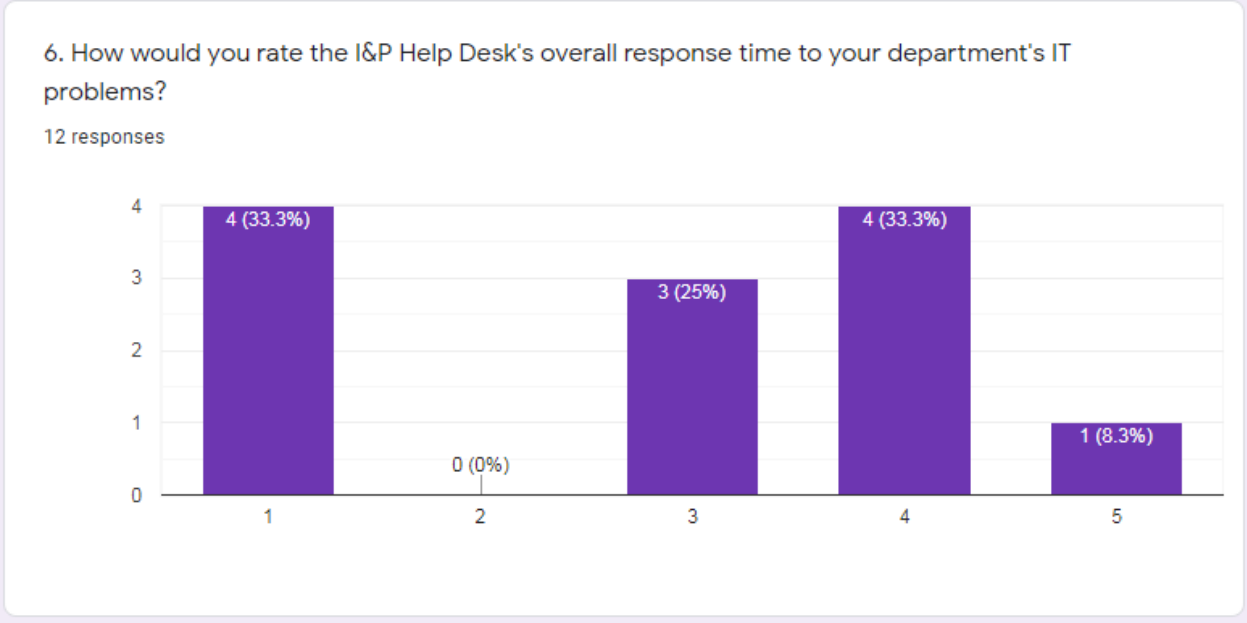
Source: I&P

Finding: As Figures 9 & 10 show, in 2018, the average time to close a ticket each month was 11.35 days. This is an increase from 2017 average days to close a ticket of 10.19.

In the survey sent to city departments, respondents were asked to rate the Help Desk's overall response time. Their ratings are as follows:

CHART 4

Citywide Department I&P Relations Survey (Question 6)



The above chart shows that respondents varied in rating I&P's Help Desk. Free text responses also showed mixed feedback to Help Desk services. One answer noted a recent improvement in response time, which may reflect I&P's ongoing implementation of the Enhanced Service Desk Model recommended by Deloitte.

RECOMMENDATION 11:

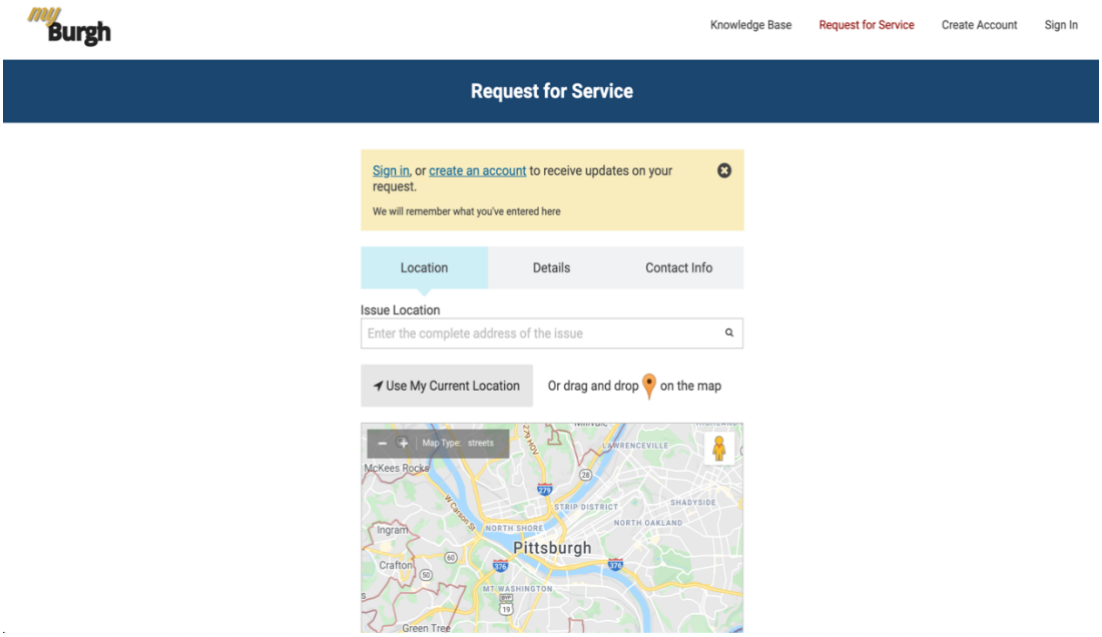
I&P administration should continue to fully implement the Enhanced Service Desk Model to lower the average response time to close a ticket.

311 Response Center Team

The 311 Response Center handles non-emergency questions and concerns from city residents. They are responsible for taking the requests for City services and routing them to the appropriate department for resolution. Citizens can either contact 311 by phone (staffed Monday – Friday, 8pm to 6pm), by online form, Twitter post, or by the MyBurgh app or website.

Screenshots of the MyBurgh app and website are shown in Figures 10 and 11. Most reporting methods give options for the reporter to remain anonymous. Examples of typical requests include potholes that need to be filled, missed trash pick-ups, and fallen trees.

FIGURE 10

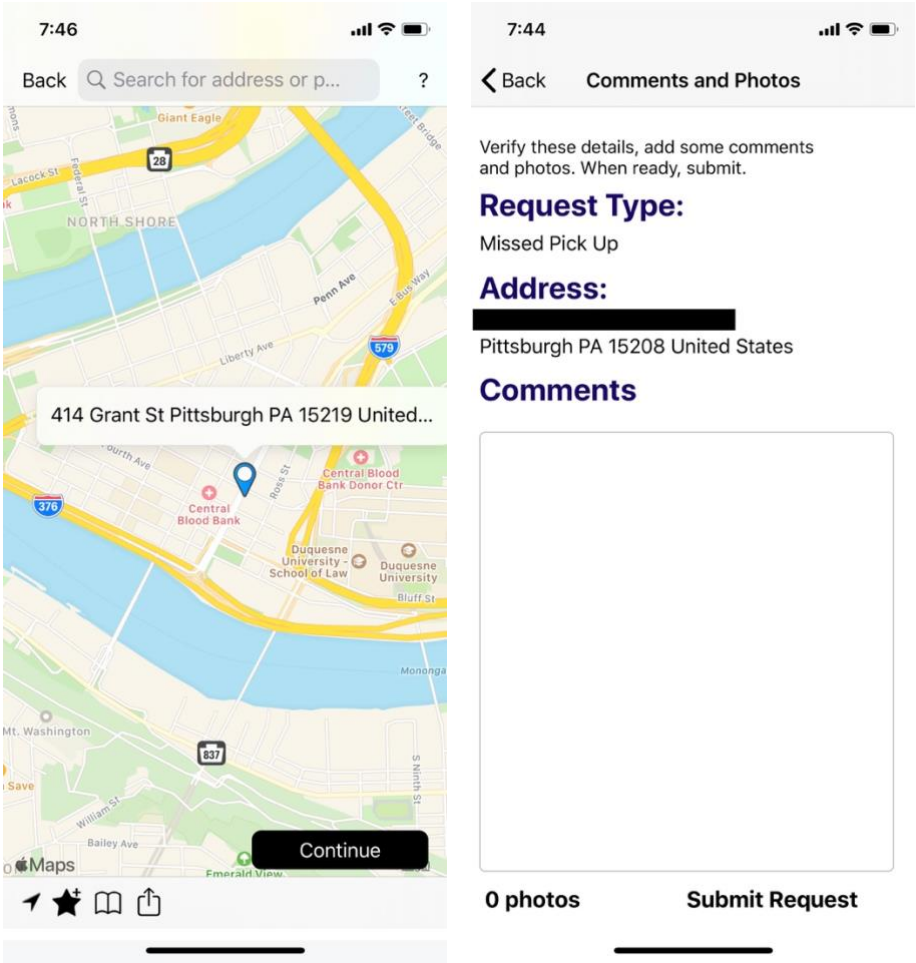


MyBurgh Website Screenshot

Source: MyBurgh website

FIGURE 11

MyBurgh Mobile App Screenshot



Source: MyBurgh mobile app

The Response Center may directly fulfill some requests, such as enrolling residents in the Snow Angels or City Cuts programs, but its primary function is to serve as a source for intake and referral to the appropriate department. Responsibility for responding and completing those requests lie with the request's referred department, though the Center will provide updates on requests if asked. The ticket is closed when the referred department reports the request's completion.

Response time is tracked through a ticketing system called QAlert from QScend Technologies, Inc. For 2017 and 2018, the 311 Response Center received 78,412 requests on QAlert at an average of 300 per working day. 68,311 (87.12%) have been completed and 10,101 (12.88%) were left incomplete. The following shows the percentage of requests by department:

TABLE 10

2017-2018 I&P 311 Ticket Breakdown by Department	
Department	**Percentage (%)**
DPW	32.52
PLI	24.25
DOMI	13.14
Police	9.60
PWSA	4.83
311	4.63
Animal Care & Control	3.17
Allegheny City Electric	1.86
City Source Associates, Inc.	1.80
Parking Authority	0.70
Fire Bureau	0.55
Mayor's Office	0.16
ACHD	0.13
Finance	0.09
Port Authority Transit	0.09
Parks & Rec	0.08
School Guards	0.08
OMI	0.07
City Planning	0.06
Innovation & Performance	0.05
Lamar Advertising	0.04
PCSC	0.02
EMS	0.02
City Clerk's Office	0.01

Source: I&P

In the Innovation Roadmap, the Mayor's quality of life improvement plan published in 2015, one of the stated goals was to make all 311 statistics public.

Finding: Statistics about the number and type of calls and completion data from 311 have not been made available to the public as of 2020.

RECOMMENDATION 12:

I&P and 311 administrators should make 311 statistics available to the public. This should include a breakdown of requests per department, request type, and requests completed or incomplete. This would provide transparency and accountability to the public.

Currently I&P provides services to both an internal audience (city employees) and an external audience (city residents). Part of Deloitte's recommendations for reorganization involved moving the public engagement portions of the department to the Mayor's Office under a centralized Office of Communications. In addition to making I&P a leaner organization, it would allow the department to maximize the reach of its resources on its primary mission, which is the IT needs of the City. Because the Mayor's Office has an established role and mandate to serve external constituents, that office is better equipped to manage communications functions, allowing I&P to refocus on its core IT needs.

RECOMMENDATION 13:

I&P should work with OMB and the Mayor's Office to move the 311 Response Center, Cable Channel, print shop, and digital communications (city website and social media) to an Office of Communications in the Mayor's Office. I&P would continue to deliver technical support for those services as they do for all other internal users.

Digital Services

The digital services division focuses on the digital content produced by the City. It includes the city website, cable channel, internal print shop, and digital services team, which primarily focuses on data engineering, data analytics, and open data.

City Website

The current version of the City website, pittsburghpa.gov, was launched in 2017 as part of a redesign. Its goal was to be more intuitive for users and to be search oriented so users can find what they are looking for more quickly.

TABLE 11

Pittsburghpa.gov Monthly Page Views 2017-2018

Month	Pageviews	
August 2017 (half month)	171,354	New City Website Launch
September 2017	190,995	
October 2017	194,946	
November 2017	204,288	
December 2017	209,797	
January 2018	304,293	
February 2018	250,305	
March 2018	262,977	
April 2018	293,397	
May 2018	310,122	
June 2018	372,266	
July 2018	311,849	
August 2018	295,608	
September 2018	250,597	
October 2018	314,779	
November 2018	247,945	
December 2018	232,660	
January 2019	338,350	
February 2019	315,582	
March 2019 (1 - 22)	315,582	

Source: I&P

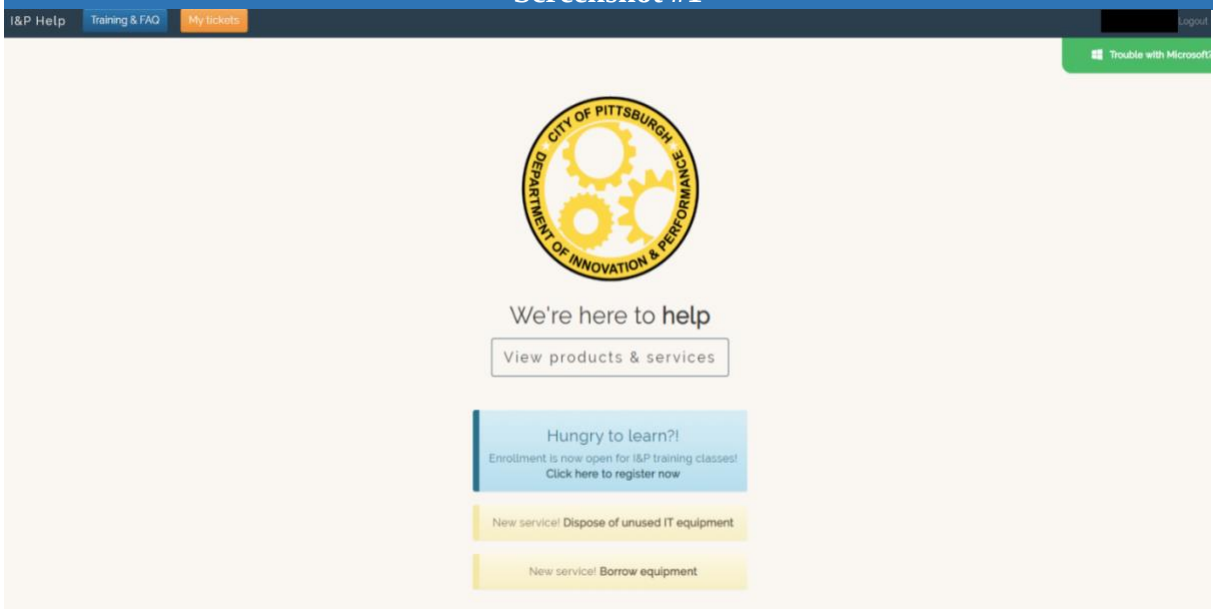
Deloitte's report noted confusion with city employees about what IT services are offered and available from I&P, as well as frustration with the informal procedures and lack of documentation in obtaining them. The report recommended a central IT service catalog in a self-service portal.

Finding: I&P created a self-service tool under the employee portal in 2019 in response to Deloitte's recommendation.

Screenshots of the self-service portal are shown in Figures 12 and 13:

FIGURE 12

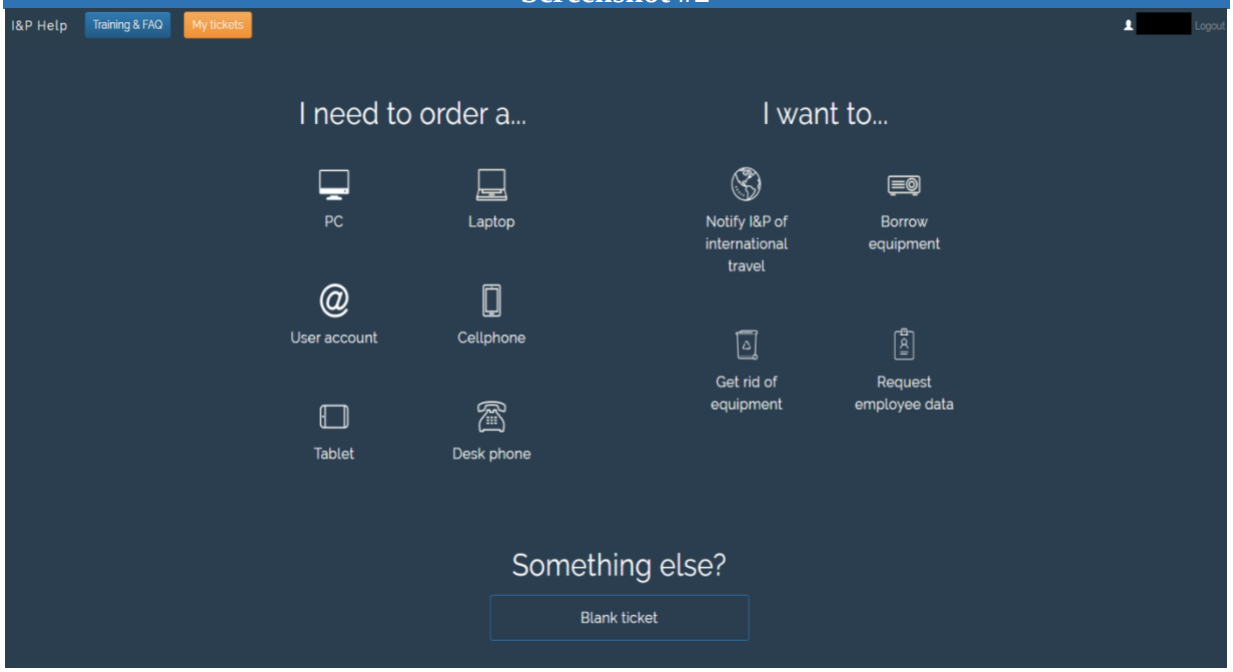
Employee Self-Service Portal
Screenshot #1



Source: City employee intranet portal

FIGURE 13

Employee Self-Service
Screenshot #2



Source: City employee intranet portal

Print Shop

The print shop is the City's office for internal document printing, copying, and binding services. It is located on the fourth floor of the City-County Building. Examples of products delivered by the shop include: business cards, official letterhead, postcards, envelopes, mailings, budget reports, labels, audit reports, first responder paperwork, and timesheets for the aquatics division. It is left to each department's discretion as to whether a job can be produced within the department or sent to the print shop, but generally, large volume projects and jobs requiring specialized stock are prioritized for print shop handling. In general, requests from the Mayor's Office and City Council are prioritized.

Finding: The auditors requested data regarding materials produced by the print shop. According to I&P, this information has not been tracked or recorded.

RECOMMENDATION 14:

I&P administration should implement a system of tracking and analyzing all print jobs produced by the shop to better inform its management and optimize its operations. The print shop could use the digital intake system, OTRS, used by the Help Desk to accomplish this.

To support these functions, the print shop has a complete inventory of full-service equipment and machinery. This includes: one black-and-white copier/booklet maker, two color copier/booklet makers, a cutter, one large and one small lamination machine, a saddle-stitch machine, four binding machines, a three-hole punch machine, a paddy wagon station, a tablet maker, and a folding machine. Overall, the inventory is sufficient to support the shop's needs, though some equipment, such as the folding machine, is inoperable due to old age and should be replaced.

A job order form must be completed to process a print request along with supplying the appropriate paper stock and binding materials. This contains costs within the print shop.

Finding: The print shop requires that departments supply their own paper and any other products needed for their print requests.

In mid-2014, the print shop was moved from under the Department of Finance to under I&P. In 2018, the Graphic and Print Technician position was reduced to a part-time position and vacated, and the print shop has since been staffed by a single employee, the Graphic and Print Supervisor (renamed Print Shop Coordinator in 2019). Based on conversations with this employee, limited personnel has produced a backlog of work that has increased the length of time it takes to complete a job submitted by the departments. Because of this time constraint, the employee is unable to attend regular meetings held with I&P staff to discuss the challenges and potential improvements to the shop.

Without full support staff or a legacy plan for the current employee to transfer the skills and knowledge needed to adequately operate the print shop, the City runs the risk of losing print shop capabilities entirely should that position suddenly be vacated. I&P management identified the need for additional staff and equipment upgrades during the 2018 budget cycle. Equipment upgrades, modern print shop software, and other investments were made after this funding was allocated. However, no requests for additional staff were submitted to City Council for funding, which I&P attributes to an inability to retain staff in the print shop.

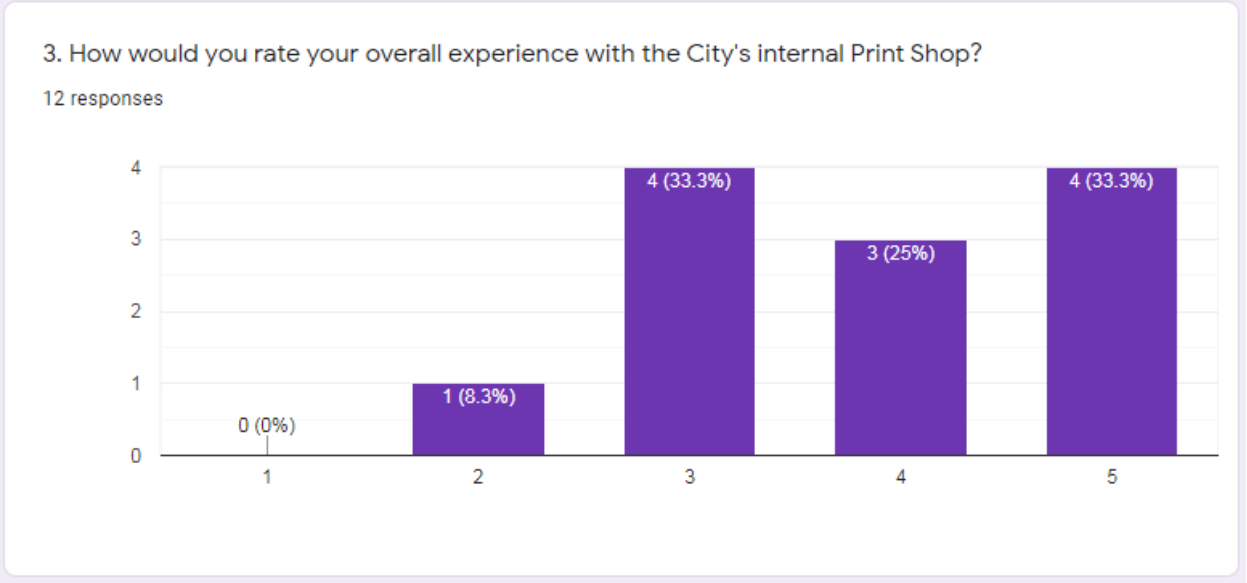
RECOMMENDATION 15:

I&P administration should meet with the current print shop employee to discuss the full range of challenges and possible improvements that could be made to the shop. I&P administration should request to OMB that the hiring of additional full-time staff members in the print shop be made a priority.

In the department relations survey, the auditors asked respondents to rate their overall experience with the print shop. Results are as follows:

CHART 5

Citywide Department Relations Survey (Question 3)



When asked if the department ever uses outside vendors for printing, six out of ten respondents confirmed that they have used outside print sources. Some respondents said they used outside vendors infrequently and some said they used them regularly. For some, these involved specialized printing services the city print shop could not support. Those that use an

external vendor frequently do so for large-volume, constituent-facing services such as billing notices, tax bills, and direct mailing.

Finding: There is no official policy directing City staff to use the in-house print shop, nor is there a policy preventing them from using outside printing vendors.

It should be noted that the print shop moved from the fifth floor of the City County Building to the fourth floor in 2019. The auditors physically inspected this space and found it to be smaller than the previous space. In addition, some printing equipment is located in the basement.

RECOMMENDATION 16:

To contain costs, I&P administration should draft an official policy outlining when it is appropriate to use outside vendors as opposed to the internal print shop. I&P's administration should explore whether any external print jobs such as tax bills or direct mailings could be supported by the print shop. This should happen after the print shop is fully staffed.

RECOMMENDATION 17:

I&P administration should draft and prioritize a complete capital improvement plan for the print shop to fully meet the City's internal printing needs including adequate space. In addition to a full staff, it should include electronic intake of requests and templates for various types of documents that can be approved digitally, ability to produce large format printing, and a budgeted stock of its own printing materials for specialized requests.

Digital Services Team

During the audit scope, the digital services team worked on and/or completed the following projects:

Metrics-focused dashboards and reports:

- OTRS ticketing system for the Help Desk (I&P)
- FuelMaster (Fleet Services)
- SendGrid (I&P emails sent through the City's website)
- Active Directory expiration (I&P staff network accounts)
- Commercial Building Inspections (Fire Bureau)
- Public Safety Master Map (Public Safety)
- PC Ordering Process (I&P)
- Potholes Dashboard (Department of Public Works)
- Energy Benchmarking (Sustainability in Department of City Planning)
- Traffic Dashboard (Department of Mobility & Infrastructure)
- Trash Cans Dashboard (Department of Public Works)
- Traffic Obstructions (Department of Mobility & Infrastructure)

Artificial Intelligence projects:

- Police Hotspot program
- Fire Inspection Predictive Analytics program

Open data sets added to or enhanced in Western PA Regional Data Center and/or Burgh's Eye View:

- City Owned Properties
- Crosswalks
- Crashes
- Stop Signs
- Schools
- Grocery Stores
- Steps & Steps Fixed
- Tree Keeper

Software systems:

- VET and Cartegraph
- Station Alerting
- Accela and Computronix (OneStopPGH)

Custom mini-applications:

- Animal Control mobile app
- PGH supply portal (DPW and Fire)
- Maintenance requests for DPW facilities
- I&P Gold Belt Workshop registration
- Confiscated guns tracker (Police)
- Ethics training registration (Ethics Hearing Board)
- I&P Help Portal

The Digital Service division also develops, collects, and monitors applications that allow city employees and citizens to access important data. Many of these applications were developed in partnerships with foundations, local businesses, and universities. Examples include:

- Burgh's Eye View application datasets for both the public and departmental use.
- The Western Pennsylvania Regional Data Center (WPRDC), an open data portal that allows the public to access a variety of datasets, including public safety, health, and demographic information.

Burgh's Eye View (https://pittsburghpa.shinyapps.io/BurghsEyeView) is an open data tool that allows users to view a variety of (statistics collected by the City, such as 311 requests, building permits, code violations, public safety incidents, city assets, and public records on every parcel in the city. Data is mapped with real time updates.

TABLE 12

Burgh's Eye View Monthly Visitors
October 2016-March 2019

Year	Month	Total Unique Users	Total Sessions
2016	Oct	1,498	1,666
	Nov	7,563	9,688
	Dec	1,106	1,533
2017	Jan	1,185	1,628
	Feb	1,004	1,340
	Mar	1,556	2,087
	Apr	892	1,217
	May	1,439	1,817
	Jun	1,104	1,470
	Jul	4,999	6,255
	Aug	2,763	3,778
	Sep	1,780	2,366
	Oct	1,837	2,556
	Nov	1,198	1,705
	Dec	998	1,336
2018	Jan	1,243	1,673
	Feb	1,259	1,594
	Mar	1,471	2,019
	Apr	5,737	7,203
	May	2,272	3,082
	Jun	1,559	2,313
	Jul	1,288	1,892
	Aug	1,342	1,895
	Sep	1,268	1,873
	Oct	1,527	2,133
	Nov	1,226	1,693
	Dec	879	1,294
2019	Jan	1,307	1,808
	Feb	1,257	1,738
	Mar (Mid Month)	980	1,437

Source: I&P

Recycling and E-waste

As technology improves, the City has to deal with the full life-cycle of IT equipment and hardware purchased. This includes proper disposal of broken or obsolete IT equipment and hardware commonly known as e-waste. E-waste is defined as "waste consisting of discarded electronic products (such as computers, televisions, and cell phones)" by *Merriam-Webster Dictionary.* Types of e-waste include: TVs, computer monitors, printers, scanners, keyboards, mice, cables, circuit boards, calculators, phones, digital/video cameras, radios, VCRs, DVD players, tablets, and other electronic devices.

Enacted in 2014, the citywide operating policy below outlines specific measures regarding waste and recycling. The policy also outlines specific procedures for I&P. The measures are as follows:

Waste Prevention

As part of its overall integrated approach to waste management, it is the policy of I&P to implement cost-effective waste prevention practices in all of its in-house and external operations. Specifically, except where prohibited by State law, regulations, or preexisting contracts, I&P should:

1. Discourage the purchase of items that cannot be recycled on the premises such as Styrofoam and plastics 6 and 7
2. Purchase or contract photocopiers with a duplex function designed for heavy loads
3. Purchase computer printers that have double-sided printing capability
4. Maintain all copiers and printers so that all functions are in full working order
5. Double-side all documents and communications except where necessary in the case of master documents or where equipment is unable to perform this function reliably
6. Encourage use of paper used on one side in fax machines and for scratch paper and pads, except where specifically prohibited by equipment warranties
7. Assure that electronic systems, including individual and network software, are always set up to allow for default double-sided printing and copying
8. Require that all proposed changes in procedures, formatting, the computer network, any software, and documents be reviewed for their impact on waste generation and that adjustments be made to the proposed changes if necessary to minimize any waste generation
9. Encourage internal documents to be submitted with electronic correction or minor legible handwritten corrections
10. Practice waste prevention in all procurement decisions
11. Operate in a facility that maximizes waste prevention in its custodial, maintenance, and landscaping practices
12. Maintain and require that staff use a centralized mailing system
13. Purchase only useful promotional items which further waste reduction
14. Purchase items containing the highest concentration of recycled material within reason of cost and product usefulness

15. Actively pursue reducing the size and number of all documents and I&P informational publications through streamlining and format revisions
16. Implement other waste prevention practices as deemed appropriate

In addition, the City-wide policy identifies and outlines the recycling of "boutique items" including: writing utensils, batteries, cell phone batteries, compact fluorescent light (CFL) bulbs, and ink and toner cartridges.

In practice, the Administration Team oversees adherence of I&P's internal e-waste policy by evaluating equipment when it is returned, determining what is reusable, and sending the rest to CyberCrunch, the contracted vendor for recycling. Furniture and other equipment returned to I&P are given to OMB to sell on GovDeals.com, a surplus website for auctioned government property. The responsibility of recycling batteries, CRT and CFL light bulbs was transferred to the Department of City Planning in 2016 when Sustainability was moved out of I&P.

Amcom is the contracted vendor for all ink and toner recycling. To collect used toner cartridges from departments, specially marked blue recycling bins are placed in the City-County Building, the Ross Street Civic building, and Police Headquarters, and emptied for recycling by Amcom professionals every other week.

Finding: I&P is only responsible for recycling and sustainability efforts related to IT devices. All other recycling responsibilities remain with the Department of City Planning's sustainability team.

Accessibility Compliance

Municipalities are subject to various accessibility laws that aim to ensure people with disabilities have equal access to government services and communications. The two most relevant pieces of federal legislation are the Americans with Disabilities Act (ADA) and the Rehabilitation Act of 1973. According to the National Institute of Health, up to one in five Americans have a disability of some kind.

Due to the growing prevalence of the Internet as a source of information for constituents, the Rehabilitation Act was updated in 1998, went into effect on March 21, 2017, and mandated compliance by January 18, 2018. Section 508 applies to any local public entity accepting federal funding, which includes Pittsburgh. Pennsylvania has its own website accessibility standards for state agencies, boards, councils, and commissions, which are outlined in ITP-ACC001 Accessibility Policy and ITP-SFT002 Commonwealth of PA Website Standards.

Among other changes, the most recent updates to Section 508 made the previous recommended Web Content Accessibility Guidelines (WCAG) 2.0 a mandate. WCAG 2.0 contains three levels of conformance:

- Level A – the most basic web accessibility features
- Level AA – deals with the biggest and most common barriers for disabled users
- Level AAA – the highest (and most complex) level of web accessibility

And those standards must satisfy four areas:

- Perceivable – User must be able to perceive all information presented
- Operable – User interfaces cannot require interaction that users cannot perform
- Understandable – Website operations cannot be beyond a user's understanding
- Robust - As technologies change, content should remain accessible

Failing to satisfy any one of these criteria means that all users with disabilities are not able to use the City's website services. Examples of assistive technology that would improve compliance include closed captioning, screen readers, optical character recognition (OCR) software, magnification software, and voice recognition tools. Section508.gov provides guidance for accessibility program management, procurement, tools and training, and policy compliance.

Finding: While the City website does post its Accessibility Policy as required under the ADA, it is not compliant with the most recent updates to accessibility law, including Section 508.

Since Section 508's updated regulations became effective, states have seen an increase in lawsuits against localities. Entities can be fined up to $75,000 for an initial ADA violation and $150,000 for subsequent violations on top of associated legal fees.

RECOMMENDATION 18:

I&P administration should adopt tools and procedures necessary for all City websites to become compliant with accessibility requirements under the ADA and Rehabilitation Act, with Level AAA conformance as the goal.

Citywide IT Planning

Hardware and Software Inventory

Beginning in 2018, OMB centralized the procurement of all IT hardware purchased by the City within I&P. Prior to this, each department was free to request their own hardware on demand. This was a scattered and highly inefficient system that left the City without a central inventory of IT equipment, and past audits have uncovered unused or unopened equipment like computer monitors within the various departments' possession (see City Controller's Office 2018 performance audit of Public Safety Bureau of Administration Fire Supply Warehouse).

In the last performance audit of the department released in 2014, a recommendation was made for I&P to adopt the Information Technology Investment Management (ITIM) Framework for Assessing and Improving Process Maturity, a best practice for capital purchases recommended by the Government Accountability Office. This refers to a proactive strategy of replacing hardware by compiling and continuously updating inventory and scoring the maturity of an IT product to determine whether it should be fixed or replaced when a problem arises. The end goal is seamless transition into new technology that keeps the City's IT hardware functional, efficient, and able to accommodate advances in software functionality. Another recommendation

was the centralization of department requests within I&P. This recommendation is also part of Deloitte's IT assessment.

Both of these recommendations have been made possible with OMB's movement of hardware centralization under I&P. Since 2014, the department has worked to establish what it calls a Proactive Asset Refresh Schedule under the ITIM framework to begin compiling a previously nonexistent inventory of all IT hardware. This began with surveying each department to get an estimate of what hardware was in their possession. Estimates were made more accurate by sending designated I&P employees with assistance from members of Public Allies (a nonprofit division of AmeriCorps) to each department and physically recording observed equipment. PCs were rated using an internal scoring system of 0 to 8 based on processor type, memory, age, and other relevant factors. After falling below a certain threshold, equipment can then be automatically refurbished, recycled, or discarded depending on its score.

Finding: I&P has implemented past audit recommendations from the City Controller's Office and Deloitte to centralize hardware procurement and begin compiling a citywide, ITIM based inventory.

The current threshold is whether a device can be updated to Windows 10 by the end of 2019. If it cannot, it must be replaced before then. Beginning in 2020, the refresh schedule is planned to replace 25% of all computing devices every year to ensure the entire city computing fleet is fully functional with modern IT and software standards. The goal is to ensure that all devices are replaced at minimum every four years.

Finding: I&P's goal is to implement best practice standards to replace IT hardware at minimum every four years.

Concurrently, all newly purchased equipment was labeled with bar codes to track what goes in and what leaves a department. This equipment is securely held in a physical storage space accessible only with authorized employee IDs. Around twenty PCs are held in this space's "stores", which refers to I&P's system of tracking inventory flow. When that supply falls below a certain level, more are ordered. In the staging store, approximately five PCs are held to be prepared for deployment to a department at any given time by installing the appropriate security software and any other software needed for that department.

The current inventory is considered a "live" document given that it is constantly being updated as new hardware is purchased, transferred, and discarded. The electronic inventory is part of I&P's enterprise agreement with Microsoft and is held on an in-house database using a SQL server. In addition, a full inventory of devices and equipment is expected to be performed annually.

According to I&P management, as of fall 2019, the inventory is estimated to be approximately 80% accurate, and has logged 16,445 total devices (defined as any piece of IT hardware or peripheral, including: desktops, laptops, tablets, cell phones, headsets, keyboards, monitors, speakers, projectors, etc.) and 15,463 considered "in use". The inventory is anticipated to be completed by the end of 2020, with all Windows 7 devices replaced by the end of March

2020. According to I&P management, full deployment has been delayed to the end of 2020 due to contract negotiations with Dell Computers.

Currently all hardware is purchased outright through individual contracts with IT vendors. I&P is in the process of transitioning to leased agreements, which would have the department return devices at the expiration of the lifecycle. Prior to a device's return, data held on it is erased using the Department of Homeland Security's secure 7-pass erase standard.

At the time of this audit, no such equivalent system exists for software purchased and installed throughout city departments. Software is virtually in the same position that hardware was prior to the 2014 performance audit, with departments free to request their installation on demand. These programs' maintenance, including regularly installing the appropriate software updates, relies on their administrators being proactive.

A recurring problem that past performance audits have uncovered involve software that is obsolete, poorly functioning, underused, and/or plagued with user issues. Often this is due to a failure to conduct software updates provided by the vendor, which exacerbates issues over time, results in lower user engagement, and costs departments in lost productivity. Deloitte's assessment found that nearly 200 applications were active across the City, placing Pittsburgh in the 75th percentile compared to other cities. As of fall 2019, that number stands at 180.

Finding: Software is not centralized or directly maintained for updates by I&P.

RECOMMENDATION 19:

As I&P administration completes the hardware inventory, it should begin working with OMB to initiate the same type of centralization of all software and applications used by city departments.

Just as department administrators would not be expected to repair the PCs their department uses, they should not be expected to handle the regular maintenance of the software they use. As the City moves toward long-term technology management, software should be moved under I&P's management to make maintenance more efficient. Using the ITIM framework, an inventory of all software used by every department should be compiled, and I&P's BRMs should work with vendors to install the latest updates and ensure programs are working at their full functionality. By centralizing software procurement within I&P, the department could verify the software's compatibility and reliability, ensure that there is no duplication of functionality with existing software used by the City, and issue licenses for installation once approved.

RECOMMENDATION 20:

I&P administration should create a Software Management Team to manage all software programs used by the City.

With a live inventory in place, a proactive asset refresh schedule for software would anticipate when updates become available and install them immediately, eliminating a recurring problem in which programs malfunction as they fall behind on updates. It would also enable I&P to identify areas where functionality is duplicated between software and where multiple software applications could be eliminated in favor of one, saving the City money on unnecessary contracts . Common problem areas across departments would become noticeable and allow I&P to search for possible solutions, aligning the entire City's needs in a collaborative manner.

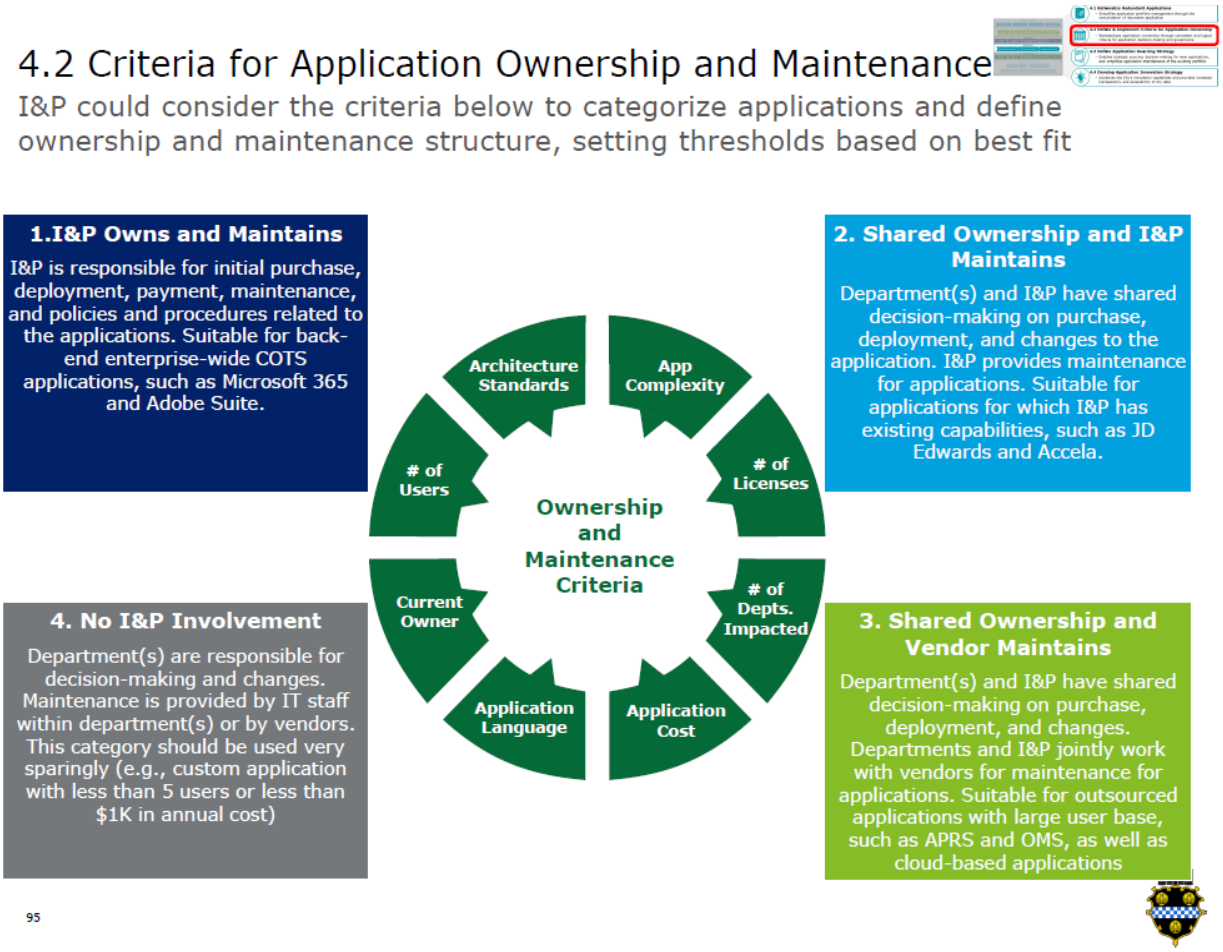
I&P's involvement in the current software procurement process is limited to providing boilerplate language regarding IT and cybersecurity standards to the Law Department as part of contract negotiations. By managing the actual procurement process, I&P could directly work with departments after issuing an RFP to choose the appropriate vendor based on both the department's needs and the best tech qualifications. The new Software Administration Team should directly train employees on a program's full functionality to ensure complete user adoption and to maximize its usefulness to the department. Under this model, BRMs would also be in a better position to mediate issues regarding software functionality given I&P's greater familiarity with software under its purview.

Similarly, the City should eliminate redundancy across IT applications across the City. During the scope, there were 180 applications active across all departments. Deloitte's report noted that redundancy is particularly common in the Police Bureau, where 65% of applications are custom-designed, primarily by B-Three Solutions. Deloitte recommended a long-term strategy for I&P to take ownership of applications, consolidate based on function, and decommission redundant and cost-ineffective applications as part of a citywide portfolio. Approximately 20% of applications are cloud-based, and 5% were designed in-house by I&P employees.

Deloitte's report offers several suggestions on how a flexible, "shared ownership" model would work, as shown in figures 14 and 15.

FIGURE 14

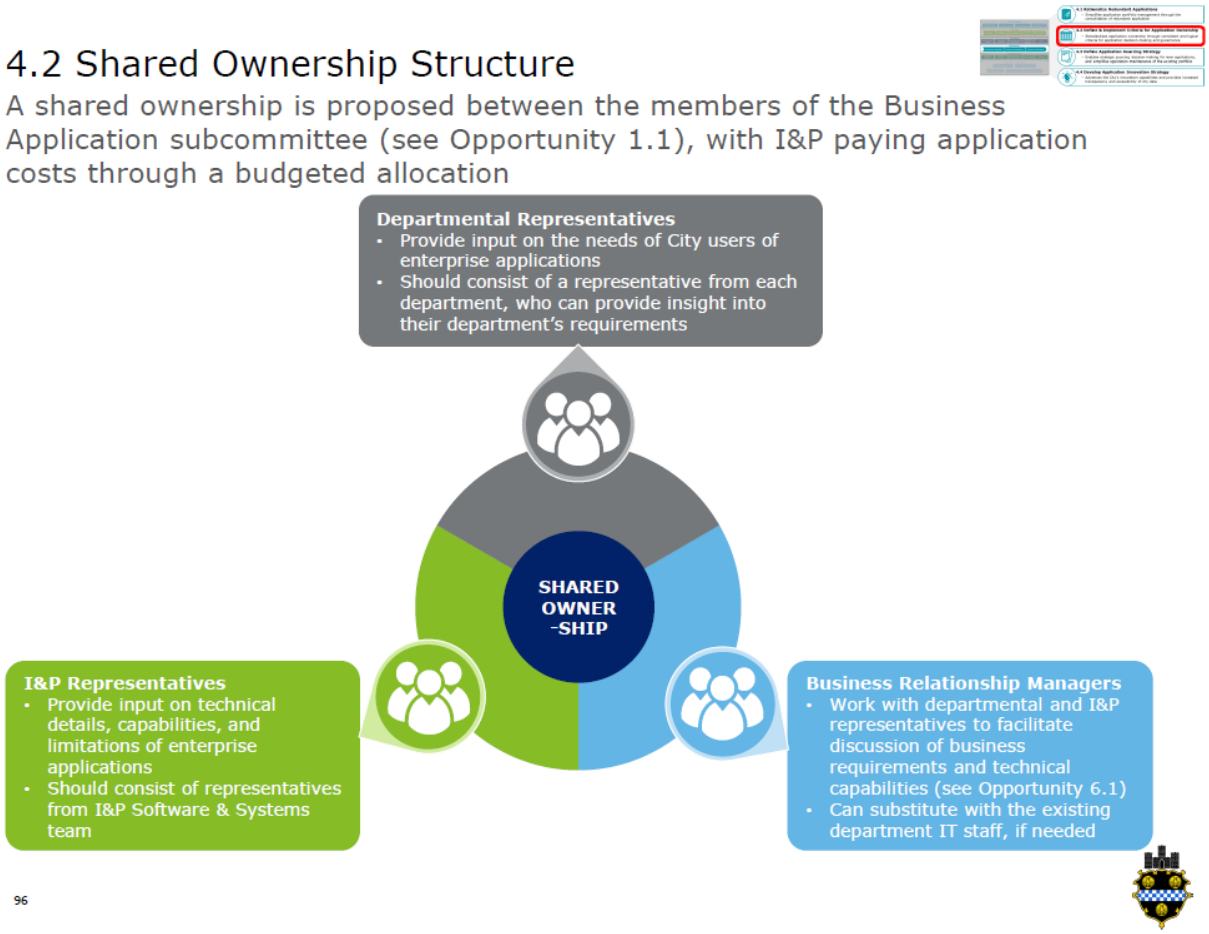
Deloitte IT Assessment Application Shared Ownership Recommendation #1



Source: Deloitte IT Assessment

FIGURE 15

Deloitte IT Assessment Application Shared Ownership Recommendation #2



Source: Deloitte IT Assessment

One of Deloitte's recommendations was that I&P directly contract with the City's top 15 IT vendors. At the time of this audit, those vendors are:

- Allegheny County
- AMCOM
- B-Three Solutions
- Cartegraph
- CDW Government
- CDW Solutions
- Ceridian
- Computronix
- Dell Computers
- DLT Solutions
- ERSI
- John Weinstein (County Treasurer)
- Staples Technology
- Verizon
- Wireless providers (AT&T, Sprint)

Finding: Two new positions within I&P were budgeted at the end of 2019 focused on creating a vendor management program as per Deloitte's recommendation.

RECOMMENDATION 21:

I&P administration should prioritize directly contracting with the City's top IT vendors.

RECOMMENDATION 22:

I&P administration should centralize the City's IT applications, build a citywide application portfolio, and eliminate redundant applications. The department should utilize in-house staff for application development whenever possible.

IT Project Management Office

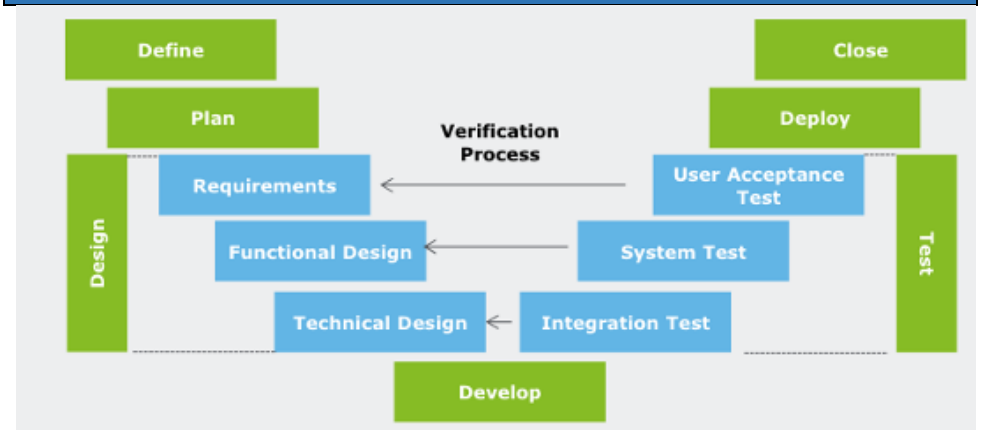
A new IT Project Management Office (PMO) was established in late 2017 focused on developing and implementing best practices for IT project management throughout city government. The office consists of two employees whose responsibilities include:

- Standardizing project management tools
- Standardizing templates and procedures to be used in I&P
- Acting as project managers for key enterprise-wide IT projects
- Supporting IT governance efforts, i.e. the Technology Leadership Council
- Project portfolio management for I&P
- Program evaluation
- Providing training and support for other staff to consistently utilize and apply best practices the PMO establishes.

Staff in this office differ from the Business Relationship Managers, whose primary responsibilities are focused on communications and coordination of project implementation in their assigned client departments. The IT Project Management Office follows a best practices workflow shown in Figure 16.

FIGURE 16

IT Project Management Office Workflow



Source: I&P

Technology Leadership Council

As part of Deloitte's first recommendation, a Technology Leadership Council was established in 2018 as a citywide IT governance structure. The purpose of this council is to provide a forum for city departments to coordinate IT needs and collaborate holistically on the City's long-term IT needs rather than inter-department competition for resources.

Finding: I&P administration has established a citywide technology governance structure as recommended by Deloitte.

The various city department directors represented at the Leadership Council are determined by the I&P director. In 2019, its membership was changed to include all directors and bureau chiefs. IT budgeting remains within each department in conjunction with OMB. Any IT-based contract costing $300,000 or more must be approved by the Technology Leadership Council. Deliberations are based on department presentations of the proposal and voted on accordingly. This process does not override or alter the standard contract approval process, which must still go through City Council.

Table 13 shows the IT projects voted on by the Technology Leadership Council in 2018. No formal votes took place in 2019, but the Council was presented with and agreed on an I&P performance improvement plan as well as a timeline for the network wiring upgrade.

TABLE 13

2018 Technology Leadership Council Vote Results	
IT Project	**Vote Result**
Timekeeping and Attendance Scheduling, Payroll Processing System and Storage Area Network (SAN) Upgrades	Approved
ArcUrban, DOMI Transportation Planning Dataset Access, DOMI Software Licenses	Referred to Operating Budget
Legislative Management System	Not Recommended
DPW Warehouse Management Software Solution and Webform System	Deferred for Additional Investigation

RECOMMENDATION 23:

I&P administration should work with the Technology Leadership Council to make project proposals and vote results public on the I&P website.

Long-Term IT Management

B-Three Solutions Inc.

B-Three Solutions Inc. is an independent contractor based in Plum, PA that has a professional services relationship with the City of Pittsburgh spanning over ten years, developing applications. As of the last audit of I&P's predecessor, City Information Systems, which covered the period of 2012-2013, B-Three was the department's primary IT consultant and remains so at the time of this audit. Because of the extensive costs found in that audit, it was recommended that the department shift more IT functions internally.

The status of work completed by B-Three has been a source of controversy. This has particularly been the case for applications in the Police Bureau, as investigated by PublicSource, a nonprofit investigative news outlet covering the Pittsburgh area. In March 2018, the Police Chief confirmed to City Council that at least three applications – Evidence Tracking, Case Management, and Daily Activity Sheet – were never implemented despite having paid $335,000 to B-Three for those three systems.

The vast majority of B-Three's work was performed through open-ended, pre-approved contracts on COSTARS, the state government's cooperative procurement program. In March of 2018, City Council responded to oversight concerns by approving an encumbered contract with B-Three, which sets a cap on the amount of funds available to spend. The contract runs from April 1, 2018 to March 31, 2020 with $572,640 in reserve funding.

Using JD Edwards, the City's financial accounting software, the auditors found that the City has paid $4,007,238.63 to B-Three between 1/30/2012 and 12/31/19.

TABLE 14

City Payments to B-Three Solutions by Year, 2012-2019	
Year	**Total Payments**
2012	888,244.30
2013	634,233.99
2014	389,016.50
2015	545,313.75
2016	412,979.91
2017	402,325.26
2018	403,376.79
2019	331,748.13
Total Payments:	**4,007,238.63**

Source: JD Edwards

All payments in 2019 were made under the closed contract passed by City Council.

Finding: The total paid to B-Three in 2019 was the lowest on record. The closed contract appears to have been effective in controlling costs associated with B-Three services.

The contract designates B-Three as having three service roles: support activities, business analysis, and training. The City remains the sole owner of any software created by B-Three as part of the contract. In the first year, the City pays $27,000 per month for two full-time developers, totaling $324,000. Database management services, if required, are billed at a rate of $90.25 per hour. In the second year, the City pays a flat monthly rate of $13,500 per month for one full-time developer, totaling $162,000. A time and materials component for additional maintenance services is available at $90.25 per hour not to exceed $43,320.

Figure 17 lists the applications that are included as part of the support contract.

FIGURE 17

City Application Support from B-Three Contract 2018-2020

List of Systems to be Included in Support Contract

The following systems will be included in application support but needs may arise for B-Three to work on software outside these systems, **see also Exhibit A2**, attached. These needs will be evaluated on a case by case basis.

1. Automated Police Reporting System (APRS)
2. APRS Lite
3. Crimes
4. Warrants and Complaints
5. Property Room
6. Modus Operandi (MO)
7. Real Estate
8. PayCops
9. UCR
10. PARS
11. Crime Blotter
12. Graffiti
13. Panhandling
14. PAWN
15. Secondary Employment
16. Warrant List
17. Transfers and Promotions
18. Pension
19. Disruptive Properties
20. Violation Enforcement Table (VET)
21. APRS Queues
22. Auto Scanning
23. VRB
24. SmartCard Database
25. Finance SharePoint Site
26. Police SharePoint Site
27. I&P Knowledge Base
28. HotSheet
29. IMS
30. OMS
31. Auto-Arrest
32. Evidence Listing
33. ISAT
34. OMI
35. Auto Rotation
36. Web Citations
37. Community Safety Web-Site
38. Police Payroll Reporting System
39. Fire Web Citations
40. PASCDU File Generator (Personnel & Finance)
41. Real Estate Public Property
42. LAP Mobile App Connector
43. County 911 Integration App
44. Open Data datasets
45. PLI QScend Connector
46. Cartegraph/VET/QScend Connector

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3

Source: B-Three Contract

Deloitte's assessment states, "B-Three is the predominant developer of custom applications [with] redundant functions". The report found that redundancy was especially common within Police, where 65% of applications were custom designed.

These recurring problems highlight a major problem with the City's current system of allowing individual departments to purchase and manage their own software and applications. Centralizing this process within the department that has the most IT expertise would equip the City to more efficiently procure, consolidate, and manage its digital infrastructure, as suggested in Recommendation 19.

Furthermore, language in the City Council resolution approving the 2018 contract illustrates the extent of the City's reliance on B-Three: "the Department of Innovation & Performance does not have the software development staff who can perform all required software maintenance services required; and… B-Three Solutions Inc. has developed or supported many of the critical business systems used by City departments".

The auditors contacted each department that the B-Three contract designated application design and/or support to. This included Animal Control; the Bureau of Fire; Department of Finance; Department of Innovation & Performance; Department of Permits, Licenses, and Inspections; and Office of Municipal Investigations (OMI). The auditors received responses from each department. All delivered satisfactory reviews of the work completed by B-Three. The applications listed were reported as fully operable, functional, and fulfilling their intended purposes, and the terms of the contract relevant to their department were reported as having been completed in their entirety.

The Bureau of Police stated that three applications from the previous contract were halted by the former Police Chief in 2015 due to allegations of B-Three misconduct and remain unfinished. The Bureau stated that they are not aware of any negative outcomes for audits or investigations into those misconduct allegations. The following lists those unfinished projects, remaining tasks, and the estimated cost to reach completion:

1. <u>Evidence Tracking</u>

   Remaining Tasks:
   1. Complete the design and development of the system integrations into the "Property Room" and County Crime Lab systems
   2. Migrate the Evidence Tracking feature into the latest version of APRS
   3. Fully QA Test all functionality, including the potential integrations with the "Property Room" and County Crime Lab systems
   4. Allow for the PBP to complete the full process of acceptance testing on the application
   5. Complete the final user guide to supplement existing APRS documentation for the new feature
   6. Deploy the feature into production

   Estimated development effort: **80 hours / $8,000**

2. <u>Confidential Reports</u>

   Remaining Tasks:
   1. Migrate the code into the latest version of APRS
   2. Re-perform a complete round of QA testing
   3. Update the APRS documentation for the new feature
   4. PBP complete acceptance testing
   5. Deploy the feature into production

   Estimated development effort: **80 hours / $8,000**

3. <u>Case Management</u>

   Remaining Tasks:
   1. PBP project team completes the design of the unified Case Management Form
   2. B-Three completes the development of the unified Case Management Form
   3. Migrate the code into the latest version of APRS
   4. Re-perform a complete round of QA testing
   5. Update the APRS documentation for the new feature
   6. PBP complete acceptance testing
   7. Deploy the feature into production

   Estimated development effort: **120 hours / $12,000**

<u>RECOMMENDATION 24:</u>

I&P administration should make working with B-Three a priority to complete the three unfinished applications for the Bureau of Police.

Finding: Three applications from the previous COSTARS contract that was replaced in 2018 remain uncompleted as of spring 2020.

Finding: The Bureau of Police also confirmed that the retirement of experienced IT personnel within I&P over the years whose skills were not replaced has left them reliant on B-Three for continued maintenance of their applications.

Section 18(c) of the contract that ended in April 2020 included an "Exclusive Remedies" provision:

> Complete refund by B3 of the amount of all funds paid by CITY and received by B3 in respect of the Software. I&P maintains that all work from B-Three has been completed under the contract and the City has not had to request a refund for any unfinished work.

RECOMMENDATION 25:

City Council should continue to include this provision in all contracts for IT related services as a safeguard against unfinished work.

RECOMMENDATION 26:

I&P should place a high priority on the in-housing of software and application development staff, and especially for the items listed in its support contract with B-Three. Those efforts should run in coordination with the development of a Talent Pipeline.

Windows 10 Migration

The majority of city computers run on the Microsoft Windows 7 operating system. This system was released in 2009 and Microsoft ended support for this system on January 14, 2020. To prepare for the transition, the City negotiated and finalized a contract on June 15, 2018 with RGH Enterprises, Inc. and Staples to replace any computer hardware and peripherals that are not compatible with the most recent Microsoft operating system, Windows 10. The RGH and Staples contract allocated $1.8 million from the I&P operating budget over a three year period and ended April 1, 2020.

A new Master Lease Agreement with Dell Computers was signed after the completion of that previous contract in April 2020. The contract runs for a period of seven years and is not to exceed $3,358,711.23. Historically the City has purchased its own IT hardware outright. The new contract with Dell Computers replaces that with a leasing system that will continually update hardware according to the asset refresh schedule. This also reduces ownership costs for the City.

Finding: The City now leases its IT hardware from Dell Computers.

The following items are available to the City under the contract with lease pricing per-unit as listed:

TABLE 15

Item Lease Prices Under City Contract with Microsoft		
Item	**Part Number**	**Price**
Laptop	2STO9UT	$723.80
Slate Style	1PH92UT	$1,208.61
Basic Desktop	1FY43UT	$665.73
Power Desktop	1FY73UT	$1090.42
Monitor (Low End)	V5G70AA	$93.13
Monitor (High End)	J3G07A8	$427.31
Zero Client	2EZ54AT	$253.09
Zero Client (Integrated Display)	J2N80AT	$408.70
Thin Client	W5Y93UT	$366.67

Source: OpenBook Pittsburgh

Peripherals (keyboards, mice, docking stations, and carrying stations) are also available under the contract for retail price plus a five percent supplier margin. Peripherals are not leased.

Between summer 2018 and summer 2019, about 500 of the City's computing devices were replaced as part of the Windows 10 upgrade. In mid-2019, this project was ended and replaced with the more proactive Asset Refresh program. I&P estimates that full deployment of Windows 10 will be completed by the end of 2020 under the new program. Beyond 2020, the routine refresh schedule will replace around a quarter of the City's hardware fleet each year. As employees migrate to Windows 10, I&P has made online training videos available on the employee portal. The videos are created and supplied by Evolve365, a Planet Technologies company.

Network and Security

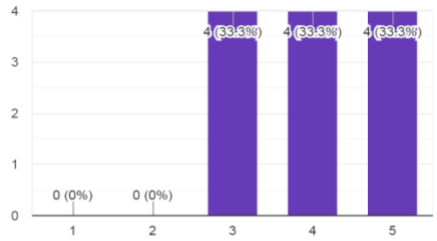
[Redacted]

APPENDIX

EXHIBIT A

1. How would you rate your overall experience with your I&P Business Relations Manager (BRM)?

12 responses



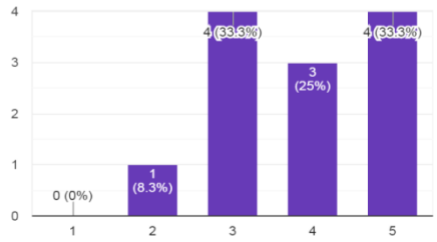
2. In what ways has your Business Relations Manager improved IT-related services for your department?

[redacted]

[redacted]

3. How would you rate your overall experience with the City's internal Print Shop?

12 responses



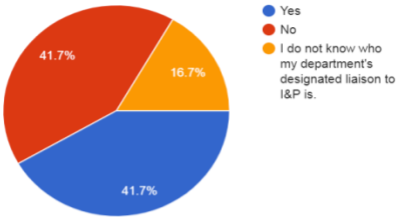
4. Does your department ever use outside vendors for printing? If so, for what purposes and which vendors?

[redacted]

[redacted]

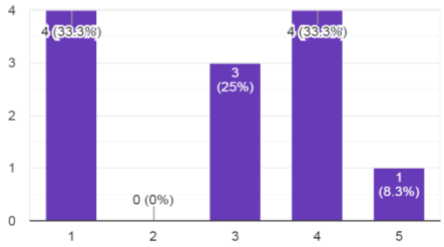
5. Does your department's designated liaison to I&P have daily responsibilities that are at least 50% IT-based?

12 responses



6. How would you rate the I&P Help Desk's overall response time to your department's IT problems?

12 responses



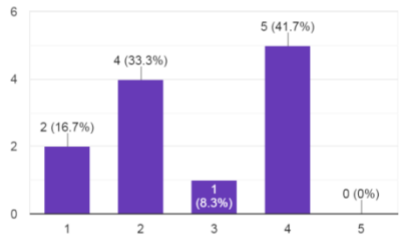
7. Does your department use custom-designed computer software or applications? If so, please specify which ones and for what purpose.

[redacted]

[redacted]

8. How would you rate your overall satisfaction with the IT services that I&P provides?

12 responses



9. Are there any IT services you would like to see the City adopt?

[redacted]

[redacted]

10. What comments, questions, or concerns do you have to improve I&P's performance? Is there anything I&P does well that should be recognized?

[redacted]

[redacted]

EXHIBIT B

	Your Professional Development Plan				
What are your professional growth objectives? Or, how can you contribute to your team's growth?	How does this objective for growth align with I&P's Strategic Plan?	What key skills do you need to work on related to this growth objective? Or, what will make you better at your job?	How will you develop or obtain these skills/tools/knowledge?	When do you plan to develop or obtain these skills/tools/knowledge?	What can your manager and/or the department do to support you?

Source: I&P

EXHIBIT C

Project Management Office: Project Charter Template

Project Charter

Problem Statement	Roles & Responsibilities
Business Objectives	
Project Scope	Milestones

Deliverable	Start Date	Due Date

Project Charter

Problem Statement	Roles & Responsibilities
Business Objectives	
Project Scope	Milestones

Deliverable	Start Date	Due Date

Source: I&P

EXHIBIT D

Project Management Office: Weekly Status Report

Weekly Status Report **2/20/2018**

Major Accomplishments Since the Last Status Report:

Next Steps

Overall Status: GREEN

	Current Status	Last Status	Trend
Schedule			
Scope			
Budget			

Risks (R)/ Issues (I):

- **Issues:**
- **Risks:**

1

Weekly Status Report **2/20/2018**

Major Accomplishments Since the Last Status Report:

Next Steps

Overall Status: GREEN

	Current Status	Last Status	Trend
Schedule			
Scope			
Budget			

Risks (R)/ Issues (I):

- **Issues:**
- **Risks:**

1

Source: I&P

EXHIBIT E

Project Management Office: RAID Log Template

Project Name:

Risks

Last Reviewed: {date}

Events that will have a negative impact on your project if they occur. Risk refers to the combined likelihood the event will occur and the impact on the project if it does occur. If the likelihood of the event happening and impact to the project are both high, you identify the event as a serious risk. The log includes a description of each risk, analysis and a plan to manage it.

ID	Date Raised	Risk Description	Likelihood	Impact	Severity	Mitigation Plan	Owner	Status	Comments	Date Closed
Example	*10/31/2016*	*May need to extend Accella contract if unable to deploy new Permits and Licensing System before June 30, 2017*	5	3	15	*OMB should begin reviewing contact with legal to determine if a 6 month extension is possible* *Contract Decision must be made by April 15, 2017*	*Lloyd Hedlum*	*In Process*		
1					0					
2					0					
3					0					
4					0					

Project Name:

Risks

Last Reviewed: {date}

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1					0					
2					0					
3					0					
4					0					

Source: I&P

EXHIBIT F

Project Management Office: Sample Project Schedule

Work Stream	Tasks	Start	End	Owner	Status

Work Stream	Tasks	Start	End	Owner	Status

Source: I&P

EXHIBIT G

[Redacted]

EXHIBIT H

[Redacted]

EXHIBIT I

[Redacted]

WILLIAM PEDUTO
MAYOR

SANTIAGO GARCES
DIRECTOR

CITY OF PITTSBURGH
DEPARTMENT OF INNOVATION & PERFORMANCE
CITY-COUNTY BUILDING

10/15/2020

City Controller Michael E. Lamb

City of Pittsburgh, PA

Mr. Lamb,

Pursuant to Section 404(c) of the City's Home Rule Charter and the Performance Audit of the Department of Innovation & Performance carried out by your staff starting in January of 2019, I, Santiago Garces – Director of the Department, am providing a formal response to the Audit.

The Department of Innovation & Performance has been undergoing a major transformation in the past several years. Aligned with recommendations from the Deloitte report from 2016, the changes in the Department have been focused on bringing best practices both to the management, and technology employed in the Department to support all City departments and residents with Information Technology, Innovation, Performance, 311, and Communication services. Between 2017 to 2018, the original scope of the audit, the Department focused on building the foundations of service management by establishing a Business Relationship Management group, and by bringing systematic use of a ticketing system that plays a key role to document any work performed by the Department and to track key metrics regarding time to fulfill requests and number of open request. Since 2019, the Department increased its emphasis on service management including training and certifying 100% of its staff in ITIL (Service Management best practices) and reorganizing the department around functional areas. Under my leadership, the Department has systematically evaluated, planned, and started enhancing every aspect of the technology operation of the City: network, infrastructure, cybersecurity, end-point devices, software, and data. The City has been adopting best practices from the National Institute of Standards and Technology (NIST) as well as other national and international standards. These efforts have been improving the reliability of the department and easing the compatibility of systems. **The rapid rate of change of continuous improvement of the Department presented a challenge for the audit and extended the scope of the audit period**.

Technology changes rapidly, and so do the ways in which our employees and residents use it to interact with their City government. Also, there is a continuously growing number of threats to local governments from cyber

criminals. In 2019, the Multi-State Information Sharing and Analysis Center that supports Local and State government with cybersecurity services observed a 153% increase in attacks to local government[1]. Internally the Department will continue to address gaps identified by the audit and other assessments, these gaps will have to be prioritized against organizational objectives. We also realize that with limited resources, the goal of the department is reaching the appropriate level of technological maturity – balancing fiscal and organizational constraints. **Accordingly, we expect that the goal line will keep moving – and we must keep managing the length of the gap between our current state and our desired state.**

Below we provide a response to the audit findings.

Recommendation 1:

The Department coordinates with liaisons in all Departments; however, since City Departments vary largely in size and IT needs not every Department has liaisons that are dedicated to IT specific functions for most of their work. Departments with specialized staff include: Public Safety, Police Bureau, Emergency Medical Services, Fire Bureau, PLI, Planning, DOMI (position open), and Controller's Office. I&P is working on providing consistent training, security controls, and access.

Recommendation 2:

Information regarding the titles and departments are managed in the Human Capital Management System (Ceridian) by Human Resources. An integration between Office 365 and Ceridian in order to receive the most updated information from HR has been planned for 2021.

Recommendation 3:

The Department will continue to use Professional Development Plans and allocate available resources for training to further this progress. The Department is finalizing a skills and competencies matrix that presents a development lattice per operational unit that complements the professional development plan.

Recommendation 4:

The Department will continue to invest in our team's skills and competencies. Following the new functional organizational structure enables the training to be more focused to build competency along a professional plan. Employees that want to move into other teams also have the opportunity of seeing what skills, competencies, and certifications are required in the other teams.

Recommendation 5:

The Department leadership has been working on eliminating silos between teams by fostering communication and collaboration. The staff and leadership of the Department embraced the 7 ITIL values as core tenets of the Department including "collaborate and promote visibility."

The Department started using a shared SharePoint site for the entire Department since 2019, enabling staff to access relevant documentation and information. Department wide quarterly meetings have been held since 2017, and since March of 2020 the Department holds 30 min daily stand-up meetings via Microsoft teams.

Recommendation 6:

The Department has been working on developing redundant capacity for critical tasks in all teams. By establishing specialized teams during the 2019 reorganization, the staff has been able to get "deeper" expertise in specific areas. IT is a highly technical field where different functions require specialized skills to support

[1] (Center for Internet Security, 2020)

specific systems. For instance, with the establishment of the Data Services team with the right tools and skills will reduce the cost of integrations (system to system communication) between 16 and 8 times the current cost.

Recommendation 7:

We accept the recommendation; the Department will work on implementing at least annual performance reviews in the future.

Recommendation 8:

The Department has established a first draft of Skills and Competencies matrices for each team that establish technical and professional lattices for career advancement within or across teams.

Recommendation 9:

We accept the recommendation; the Department embraces a culture of continuous improvement utilizing Lean as a methodology to identify non-value added steps in processes and eliminating practices that are not supported by regulatory requirements or value. I&P employees share those skills with other Departments, to date this *Gold Belt* program has saved over $200,000 in efficiencies.

Recommendation 10:

The City is a pioneer in its relationship with CMU and Pitt to further innovation in the public sector including several projects with Pitt's MBA Six Sigma process improvement class. The City has a formal MOU with both Universities. This MOU became the template that has been used nationally and internationally as the standard for City-University Partnerships. In 2015 the City of Pittsburgh and CMU became co-founders of the MetroLab Network which was launched at the White House by the Obama Administration. However, we believe that based on the Civil Service and labor union regulations – the administration cannot guarantee employment outside of the existing hiring procedures.

Recommendation 11:

The City has adopted ITIL (IT Service Management best practices) as a service management framework. In 2019 it provided training and certified 100% of the staff in the ITIL Foundations Certificate inviting liaisons from other Departments including Police and Fire Bureaus. Using the systematic approach to service management and continuous improvement we expect the performance and satisfaction of the IT services to continue to improve.

Recommendation 12:

The Department has been developing an external facing portal to share 311 data by Department, by type, by neighborhood, etc. A prototype was completed during the fall of 2019; however, the COVID-19 pandemic delayed the development efforts. The current release date is projected to be at the end of 2020 or first quarter of 2021.

Recommendation 13:

The organizational structure of the City follows the Mayor's strategy and vision. The Department of Innovation & Performance seeks to achieve a holistic approach to improve the quality of municipal services by leveraging technology, data analytics, digital services, communication services, and innovation services. Our Department has leveraged the proximity of these services to achieve strategic objectives. For instance, at the beginning of the COVID -19 pandemic our team was able to come together to implement a Voice over IP solution for 311 in record time. The close collaboration of the Applications team, Cable Chanel, and Innovation team enabled remote Council meetings as well as other public meetings.

Recommendation 14:

Since the fall of 2019, the new Assistant Manager of Communications that oversees the Graphic Design and Printshop, established that all requests for the Print Shop be managed in OTRS. This procedure has been

communicated to all customers of the printshop. I&P uses these data to track the performance and prioritize jobs across Departments.

Recommendation 15:

The Department leadership consults with all Managers during the establishment of the budgetary requests, and these requests are prioritized based on need. With limited resources, the City evaluates those competing requests. The Assistant Manager of Communications has started working on cross-training other members of the team on the operation of the Print Shop.

Recommendation 16:

The Department accepts this recommendation; the Department will work on establishing policies and procedures regarding the use of the Print Shop, once the long term impact of the COVID-19 pandemic becomes clear.

Recommendation 17:

Currently, the main printing equipment in the Print Shop enjoys upgrades performed in 2018, especially upgraded software that enables electronic intake of requests and templates that can be approved. The Department will work with the Print Shop staff to more fully utilize these capabilities. Some other equipment might not be replaced as the tools and future printing demand is evaluated.

Recommendation 18:

The City released a Request for Proposals (RFP) in September of 2020 to migrate the Content Management System that powers the City website to a commercially available system that leverages best practice functionality. Accessibility and ADA compliance is one of the key functionalities in the RFP, as well as one of the projects main objectives. The new CMS would be launched in the second part of 2021.

Recommendation 19:

The Department established an Applications team during the 2019 reorganization and hired a Senior Manager of Applications to lead the development and execution of Application standards, guidelines, and policies City wide. During the Technology Leadership Council (TLC) of Q4 2019 the first draft of Application guidelines were shared with the leadership of all Departments. In the summer of 2020, the Department finalized an initial version of an Application Inventory that is maintained by the Application team. The Department has been working since March of 2019 on a Software Roadmap that maximizes the value and optimizes the cost of software investments for the City, following best practices in Application procurement and development in the public sector. The first full iteration of the Roadmap will be presented to the TLC during the Q4 2020 meeting.

Recommendation 20:

The Department created a Software Applications team responsible for the programmatic management of all the software and applications used in the City. This team now includes the GIS team as well as Application Managers. Since 2018, the Department has been developing guidelines for the management of software systems across all Departments. In December of 2019, the Director of I&P shared the first draft of guidelines that include roles and responsibilities between Departments and I&P for the management and administration of software.

Recommendation 21:

The Department uses a continuous improvement approach to procurement including incorporating elements of supply risk management. Several IT vendors including Microsoft, Hyland, Google, and VMWare operate through resellers exclusively for State and Local customers.

Recommendation 22:

The Applications Roadmap which I&P has been developing since 2019 includes functional mapping to determine redundancies and to establish an enterprise architecture. The City administration has been rationalizing and prioritizing software investments since 2018 with the establishment of the Technology Leadership Council. The Department has been optimizing the application portfolio since 2019, the Applications Roadmap will document this strategy and establish a mechanism to communicate with the public, Council, and City Departments. The Applications Roadmap will need to be continuously updated as Department needs change and new technology becomes available.

Recommendation 23:

Since the Q2/Q3 Technology Leadership Council (the COVID Pandemic forced the Department to consolidate both meetings), the Department started using digital tools that enable capturing the projects and the prioritization available. Currently these are being shared internally. The Department will evaluate the risks associated with sharing the proposals and the votes. Currently, the TLC proceedings are presented as recommendations to the Mayor and OMB during the budget process.

Recommendation 24:

I&P will continue to work supporting all City Departments including the Bureau of Police. The contracts for these applications were developed between the Bureau and B-Three, without involvement from Innovation & Performance so we cannot comment on the status of those projects. Currently, the Department of Innovation & Performance and the Department of Public Safety and the Bureau of Police are focused on replacing the B-Three applications with commercial-off-the-shelf (COTS) applications. COTS are supported by dedicated research and development teams that receive funding from a multitude of customers, whereas custom applications whether developed with dedicated I&P staff or third parties requires the City to provide all funding for the development and maintenance of these systems. The current B-Three solutions will be replaced with the implementation of the records management system provided through the County. The Bureau of Police is scheduled to have replaced all B-Three applications by 2023.

Recommendation 25:

The Department will continue to work with the City Council and the Department of Law to ensure that the City is protected from risks.

Recommendation 26:

In 2018 the City contracted with DeltaWrx to provide an analysis of technology and applications in the Department of Public Safety. The findings shared with the Departments of Innovation and Performance, and Public Safety recommended replacing B-Three applications with COTS (commercial off the shelf) applications that leverage the resources of multiple customers and that can dedicate larger teams of software engineers to develop and maintain these applications. This strategy aligns with the applications standards presented to the TLC during the Q4 of 2019. The Department continues to invest in the new Applications team to provide sufficient staffing and training to manage 37 applications identified in the Application Inventory.

We will continue to work to improve the quality and reliability of the City's technology, innovation, and performance services to better serve the public. Thank you for giving us an opportunity to review our progress as well as the areas that require further attention.

Santiago Garces

Director of Innovation & Performance - CIO